Article

The Even–Odd Nature of Audit Committees and Corporate Earnings Quality

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Abstract

We apply voting theory to the context of audit committees and examine how the even–odd nature of audit committees is related to earnings quality. We hypothesize that an audit committee with an odd number of directors can improve the committee's voting efficiency by better aggregating directors' information and thus enhance the quality of committee decisions, as compared with an audit committee with an even number of directors. Supporting this implication, we find that an odd audit committee is associated with lower likelihood of financial restatements than an even audit committee, and that this relation is stronger when the committee members have more heterogeneous opinions, hold less equity ownership, are in a smaller audit committee, and face a more entrenched management.

Keywords

voting efficiency, audit committee, financial restatement, earnings quality, even, odd

Introduction

Understanding the relation between the characteristics of audit committees and the corporate earnings quality is an important issue that has attracted considerable research interests. Extant finance and accounting literature has put under scrutiny the effects of key characteristics of audit committees, including the size, the independence, the existence of financial expertise, and the meeting frequency, on corporate earnings quality.[1] This article extends the existing literature by examining the link between the voting efficiency in the audit committee and quality of earnings, where the voting efficiency refers to the extent to which voting outcomes aggregate committee members' information. As major decisions in the audit committee are generally preceded by a voting process, voting efficiency can be of critical importance to the quality of committee decisions.

The committee characteristic we focus on relates to the even–odd nature of members in the audit committee. This focus is motivated in part by anecdotal evidence, suggesting that the even–odd characteristic of audit committees may influence the committee's voting

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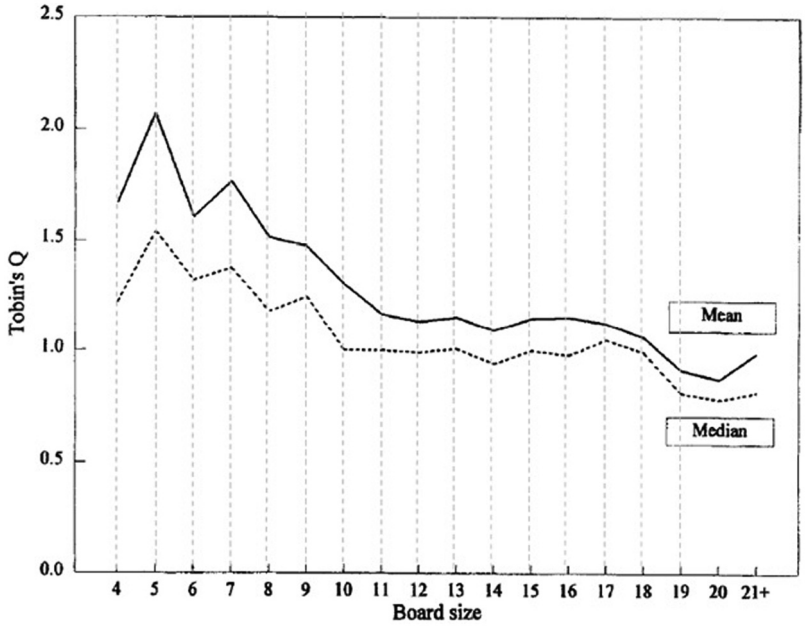

Figure 1. Board size and Tobin's *Q*.
Note. This graph is extracted from Figure 1 of Yermack (1996) and illustrates sample means and medians of Tobin's *Q* for different sizes of boards of directors. Yermack's sample consists of 3,438 annual observations from 452 firms between 1984 and 1991.

process significantly. For example, the American Institute of Certified Public Accountants (CPAs) recommends that audit committees be composed of an odd number of members to better handle the matters requiring a vote.[2] Deloitte also makes a similar recommendation in its Audit Committee Brief of 2012.[3]

Our focus on the even–odd characteristic of audit committees is also motivated by Yermack's (1996) classical study on corporate board. While Yermack (1996) focuses on the effects of board size on firm valuation, his findings also reveal a possible relation between the even–odd characteristic of boards and firm values. In particular, Figure 1, reproduced from Yermack (1996), shows that odd boards tend to be associated with a higher Tobin's *Q* relative to even boards, especially among small boards.[4]

The intuition for an odd number of voters being associated with better efficiency is as follows. Two factors come into play in deciding the direction of a vote: a *performance preference* and a *conformity preference*. The performance preference motivates the director to vote independently based on her own judgment and available information. The conformity preference, on the other hand, induces the director to vote for the decision favored by a majority of other directors.[5] In an odd audit committee, each director faces an even number of other directors. As, on average, opposing votes among an even number of directors tend to balance out one another, the conformity preference becomes moot, and the performance preference causes each director to vote based on her own information. In contrast, in an even audit committee, each director faces an odd number of other directors, among whom opposing votes generally do not balance out one another. Consequently, a strong conformity preference can cause a director to vote in accordance with the anticipated net vote by

other directors, even if her own information suggests otherwise. For example, for a director in a four-member audit committee, there are three other votes in addition to her own. Those three votes cannot be split evenly, so any individual member in the audit committee is likely to vote based on the way she thinks the majority of those three members will vote to be on the ''winning'' side.

Our study employs the firm's financial restatements as the measure of the decision quality of the audit committee. Based on a large sample of firms over the period from 1998 to 2010, we find that the audit committees with an odd number of directors (as compared with the ones with an even number of directors) are associated with 1.5 percentage points lower likelihood of financial restatements, relative to the unconditional likelihood of 10 percentage points. This relation is both economically and statistically significant after controlling for various firm, audit committee, and board characteristics.

To further examine whether improved voting efficiency by mitigating the directors' conformity preference is the source of these benefits, we conduct interaction analysis. First, directors' conformity preference is less likely to reduce voting efficiency when directors have homogeneous opinions. For this reason, the extent of information aggregation in decisions should be more important when directors are likely to have different opinions. We use R&D expenditure and stock return volatility to proxy for the uncertainty of the firm's operation, and thus the degree to which directors may have different views. We expect that the difference in earnings quality between audit committees with even and odd directors is particularly pronounced among firms with high R&D expenditures and high stock volatility. Second, directors with high ownership tend to have stronger performance preference, and thus are less affected by the conformity preference. Therefore, the positive association between odd audit committees and corporate earnings quality should be especially evident in firms with low ownership by audit committee members. Third, it is possible that the conformity preference weakens as there are more votes on each side, and we expect the even–odd effects to diminish as the size of the audit committee increases (as documented by Yermack, 1996, for boards). Finally, considering that directors have greater incentives to conform when facing entrenched management, we expect the even–odd effects to be more pronounced when the firm is controlled by entrenched management. Our interactive analyses based on R&D expenditure, stock volatility, director ownership, committee size, and chief executive officer (CEO) tenure confirm the above predictions and provide further evidence that improved voting efficiency associated with an odd audit committee is the source for the better earnings quality.

Endogeneity problems are less of a concern for our study as compared with other papers on audit committees. For example, while the size of the audit committee may well be related to economic factors that affect the accuracy of the firm's financial reports, the choice of an odd or even number of directors is less likely to have such a relationship. The corporate structure that determines the even–odd nature of the audit committee could be set up at the time of the initial public offering (IPO) and unrelated to the current economic structure of the firm. The various interactive analyses discussed above, in effect, could be viewed as evidence of a causal relationship (Rajan & Zingales, 1998) under the assumption that the even–odd structure of the audit committee is not systematically related to these economic factors.

Finally, we use four alternative measures of earnings quality: discretionary accruals (Dechow, Sloan, & Sweeney, 1995; Jones, 1991; Kothari, Leone, & Wasley, 2005), cash flow predictability (Barth, Cram, & Nelson, 2001; Dechow, Kothari, & Watts, 1998), earnings informativeness (Fan & Wong, 2002; Francis, Schipper, & Vincent, 2005; Warfield,

Wild, & Wild, 1995), and timely loss recognition (Ball, Kothari, & Robin, 2000; Ball, Robin, & Wu, 2003; Basu, 1997), and we still find that an odd audit committee is associated with better earnings quality than an even one.

A seemingly alternative explanation to our results is that an odd audit committee can enhance voting efficiency by better avoiding tie voting than an even one, and this has little to do with directors' conformity preference. First, it is unclear whether the fact that a ''difficult'' decision is resolved one way or the other necessarily predicts that the decision itself is of higher quality. Second, most companies have tie–break procedures, perhaps involving the entire board, so it is not evident that the possibility of tied votes leads to less efficient decisions.

If our findings suggest genuine benefits of odd audit committees, it might appear that firms should invariably opt for odd audit committees. Yet, many firms in our sample have an even number of directors in their audit committees. There could be at least two reasons for a firm to stay with an even audit committee. First, the structure of the board may be determined by the need for particular types of expertise rather than considerations of whether it is odd or even. The efficient management of the company may determine the committee structure, and the quality of financial reports may not be as important as other factors. For example, if the company is overall profitable, a small increase in restatements risk would be worthwhile. Second, as pointed out by Adams, Hermalin, and Weisbach (2010) and Coles, Daniel, and Naveen (2014), each firm operates within the confines of its exogenously given environment. If changing the environment is costly or takes time, a firm may optimally adopt an even audit committee as the best solution to the constrained optimization problem relating to the design of the committee. For instance, a firm wishing to switch from an even audit committee to an odd one may be constrained from doing so when the supply of competent directors is limited, and thus staying with an even audit committee may be the firm's solution to the constrained optimization problem.

This article makes two important contributions to the literature. First, while there is voluminous literature on group voting in economics and political science, the finance and accounting literature on board voting remains small and mostly theoretical in nature (e.g., Baranchuck & Dybvig, 2009; Chemmanur & Fedaseyeu, 2012; Gillette, Noe, & Rebello, 2003; Harris & Raviv, 2008; Malenko, 2014; Raheja, 2005; Warther, 1998). Lack of sufficiently detailed data on the process and outcome of board voting renders challenging direct tests. Perhaps for this reason, empirical analysis on board voting remains scarce. Our study, on the contrary, focuses on an easily measurable committee characteristic: the even–odd nature of the number of directors. Our findings help establish an empirical link between board characteristics and board voting efficiency in the audit committee.

Second, we complement the existing literature on audit committees by identifying the even–odd characteristic of committees as a measure of the committees' voting efficiency in improving corporate earnings quality. Our analysis suggests that this new measure represents an economically significant yet underexplored aspect of audit committees that is distinct from those captured by the conventional measures.

A Simple Model of Audit Committee Voting

The usual work of audit committees includes ensuring the soundness and quality of internal control practices, reviewing the corporation's financial statements, selection of external auditors, and so on. Suppose the audit committee is considering one of two actions: sticking to the existing internal control practice (*status quo*), denoted as $a = 0$, or adopting a new

internal control practice, denoted as $a = 1$. The firm's improvement in earnings quality $v(\theta, a)$ depends on the suitability of the new internal control practice θ to the firm, which can be either high $\theta = \theta_h$ or low $\theta = \theta_l$, and the action undertaken:

$$v(\theta, a = 0) = 0, \tag{1}$$

$$v(\theta_h, a = 1) = 1,\ v(\theta_l, a = 1) = -1. \tag{2}$$

From Equation 1, if the existing internal control practice is maintained, the improvement in earnings quality is invariably 0. However, from Equation 2, adopting the new internal control practice enhances the firm's earnings quality if it is highly suitable to the firm but leads to a decline in earnings quality if its suitability is low.

The audit committee has $n > 1$ directors and determines the choice of action through voting. Prior to casting their votes, the directors learn aspects of the new internal control practice. Specifically, director *i*, $i = 1, 2, \ldots, n$, can privately learn the *i*th aspect of the new internal control practice ϕ_i, which is equally likely to be good, $\phi_i = 1$, or bad, $\phi_i = -1$. As ϕ_is represent distinct aspects of the new internal control practice, they are independently distributed.

Collectively, the various aspects of the new strategy stochastically determine its suitability. Specifically, let $\Phi = (\phi_1, \ldots, \phi_n)$ be the set of the directors' information, and $\Gamma(\Phi) = (\sum_{i=1}^{n} \phi_i)$ be the n directors' collective information about the new internal control practice. The probabilities of high and low suitability conditional on $\Gamma(\Phi)$ are as follows:

$$f(\theta = \theta_h | \Gamma(\Phi)) = \frac{1}{2} + \frac{1}{2n}\Gamma(\Phi), \tag{3}$$

$$f(\theta = \theta_l | \Gamma(\Phi)) = \frac{1}{2} - \frac{1}{2n}\Gamma(\Phi). \tag{4}$$

Equations 3 and 4 suggest that positive (negative) collective information, that is, $\Gamma(\Phi) > 0$ ($\Gamma(\Phi) < 0$), is indicative of high (low) suitability. Moreover, as $\Gamma(\Phi)$ increases, high suitability becomes increasingly more likely. In the limit when all the directors receive positive (negative) information, that is, $\phi_i = 1$ ($\phi_i = -1$) for all i, suitability $\theta = \theta_h$ ($\theta = \theta_l$) with certainty. Note that before the directors obtain their information, according to the common prior belief, $\theta = \theta_h$ and $\theta = \theta_l$ are equally likely. Suitability θ is likely to reflect the aggregate of the differences between the two internal control practices in multiple aspects. Collectively, the differences in these aspects determine which one is likely to be a better fit to the company.

Upon obtaining information about θ, each director votes for either $a = 1$ or $a = 0$.[6] In casting her vote, a director does not know the information that other directors have or how each of the other directors votes, but holds rational expectations about others' information and voting strategies. After the directors cast their votes, each vote is revealed, and the audit committee chooses the action to implement based on the simple majority rule, so that the new internal control practice is adopted, that is, $a = 1$, if the number of directors voting for $a = 1$ is greater than the number of directors voting for $a = 0$.

The directors have the same utility function, consisting of two parts. The first part, $u(\theta, a)$, produces a performance preference perfectly aligned with enhancing the earnings quality. Specifically, $u(\theta, a)$ is proportional to the improvement in earnings quality, $v(\theta, a)$, so that $u(\theta, a) = \beta v(\theta, a)$, where constant $\beta > 0$ measures the strength of the directors' preference for enhancing the firm's earnings quality. The directors' preference for enhancing firm's earnings quality may arise directly from their share ownership and/or their reputation concerns. The performance preference incentivizes directors to vote independently.

The second part of the directors' utility function gives rise to a conformity preference—to vote for the same action as the one that the audit committee ends up adopting (Chemmanur & Fedaseyeu, 2012; Gillette et al., 2003; Malenko, 2014). Specifically, we assume that each director faces a personal cost $u_m > 0$ if the action she votes for turns out to disagree with the action that the committee chooses. Thus, the total utility for director i provides as follows:

$$U_i(\theta, a, I_{im}) = u(\theta, a) - I_{im} u_m, \tag{5}$$

where I_{im} is an indicator function that takes the value of 1 if director i's vote disagrees with the audit committee's decision and 0 otherwise. Cost u_m measures the strength of the directors' conformity preference. The conformity preference incentivizes directors to herd.

Appendix A presents a formal analysis of the model. As predicted by the model, in an odd audit committee, the marginal director votes based on her own information, and thus the voting outcomes reflect the director's information regarding which action can better improve the firm's earnings quality. In an even audit committee, on the contrary, the marginal director votes based on her belief of how other directors vote, and thus the voting outcomes do not reflect the director's information on which action improves the firm's earnings quality but reflect the director's conjecture about how to vote consistently with other directors. In summary, an odd audit committee enhances the firm's earnings quality by better aggregating directors' information and making better committee decisions than an even audit committee does. Previous studies show that the improved oversight and function by audit committees leads to increased earnings quality (Abbott, Parker, & Peters, 2004; Anderson, Mansi, & Reeb, 2004; Klein, 2002). For these reasons, we expect that firms with an odd audit committee have better earnings quality than firms with an even audit committee do.

In summary, the discussion above leads to the following empirical implication:

> All else equal, the audit committees with an odd number of directors are associated with better earnings quality than the audit committees with an even number of directors are.

Sample and Descriptive Statistics

Our empirical analysis is performed on firms covered in RiskMetrics, which provides firms' director information. Furthermore, we obtain auditor information from Audit Analytics, stock price information from Center for Research in Security Prices (CRSP), and financial information from Compustat. Our final sample consists of 5,384 firm-year observations with even audit committees and 6,687 firm-year observations with odd audit committees from 1998 to 2010.

The literature argues that a restatement of financial reports is strongly suggestive that the financial statements are of low quality (Dechow, Ge, Larson, & Sloan, 2011; Lennox & Pittman, 2010; Palmrose & Scholz, 2004; Srinivasan, 2005). The Securities and Exchange Commission (SEC) also regards restatements as ''the most visible indicator of improper accounting'' (Schroeder, 2001). We use financial restatements as the primary measure of earnings quality in this study. The data of financial restatements come from Audit Analytics. The database indicates the year the restated financial statements were originally issued, and we use these data to identify the firm-year observations with and without subsequent financial statements during our sample period.

As demonstrated in Table 1, the size of audit committees ranges from 2 to 11,[7] with the majority of three-member audit committees (40.78%) followed by four-member committees (28.10%) and five-member committees (13.31%). Committees with six members or above are only about 6% of our sample.

Table 2 reports the descriptive statistics of variables. Their definitions are detailed in Appendix B. Of the total firm-year observations, 10% of them have subsequent financial restatements. Our sample firms are relatively large with the median total assets of US$2.27 billion. The median firm is 22 years old and has a leverage ratio of 21%, stock volatility of 0.09, and working capital accruals of −0.04. In terms of performance, the median firm is performing well with an annual stock return of 10%, sales growth rate of 7%, market-to-book rate of 0.91, and inverse interest coverage of 0.12. The average boards have nine directors, and 88% of them are independent directors. Moreover, audit committees are usually dominated by independent directors. Considering that RiskMetrics usually covers large firms, it is not surprising to see that 98% of sample firms are audited by the Big Four accounting firms.

Empirical Results

Financial Restatements

To test the relation between odd audit committees and the likelihood of financial restatements, we estimate the following probit equation:

$$\begin{aligned} Restatement_t = {} & \alpha_0 + \alpha_1 Odd_t + \alpha_2 Log(Total\ assets)_t + \alpha_3 Leverage_t + \alpha_4 Sales\ growth_t \\ & + \alpha_5 Negative\ equity_t + \alpha_6 Log(Firm\ age)_t + \alpha_7 Return_t + \alpha_8 Stock\ volatility_t \\ & + \alpha_9 MB_t + \alpha_{10} Loss_t + \alpha_{11} Inverse\ interest\ coverage_t \\ & + \alpha_{12} Working\ capital\ accruals_t + \alpha_{13} Committee\ independence_t \\ & + \alpha_{14} Log(Board\ size)_t + \alpha_{15} Board\ independence_t + \alpha_{16} MA_t \\ & + \alpha_{17} Financing_t + \alpha_{18} Big4_t + \alpha_{19} Log(Audit\ tenure)_t \\ & + Committee\ size\ FE + Industry\ FE + Year\ FE + \varepsilon_t. \end{aligned} \tag{6}$$

The dependent variable is $Restatement_t$, which takes the value of 1 if the financial reports in a given fiscal year are restated subsequently and 0 otherwise. Following prior literature (Dechow et al., 2011; Francis, Michas, & Yu, 2013; Lennox & Pittman, 2010), we control for firm size ($Log(Total\ assets)_t$), leverage ($Leverage_t$), growth opportunities ($Sales\ growth_t$, MB_t), performance ($Return_t$, $Inverse\ interest\ coverage_t$), risk ($Negative\ equity_t$, $Stock\ volatility_t$, $Loss_t$), and age ($Log(Firm\ age)_t$). As Francis et al. (2013) argue that high-

Table 1. Distribution of Audit Committee Size.

No. of directors in audit committees	No. of firm-year observations	%
2	1,370	11.35
3	4,922	40.78
4	3,392	28.10
5	1,607	13.31
6	570	4.72
7	143	1.18
8	50	0.41
9	10	0.08
10	2	0.02
11	5	0.04
Total	12,071	100

Note. The sample consists of 6,687 firm-year observations with an odd audit committee and 5,384 firm-year observations with an even audit committee during 1998-2010.

Table 2. Summary Statistics.

	M	Median	*SD*	P25	P75
Restatement	0.10	0.00	0.30	0.00	0.00
Total assets (million)	13,520	2,265	40,556	805	7,953
Leverage	0.22	0.21	0.18	0.06	0.33
Sales growth	0.05	0.07	0.20	−0.01	0.14
Negative equity	0.01	0.00	0.11	0.00	0.00
Firm age	27.63	22.00	16.73	13.00	43.00
Return	0.15	0.10	0.50	−0.15	0.36
Stock volatility	0.11	0.09	0.06	0.07	0.14
MB	1.27	0.91	1.21	0.48	1.62
Loss	0.14	0.00	0.35	0.00	0.00
Inverse interest coverage	0.47	0.12	0.73	0.05	0.32
Working capital accruals	−0.04	−0.04	0.06	−0.07	−0.01
Committee independence	0.96	1.00	0.20	1.00	1.00
Board size	9.59	9.00	2.73	8.00	11.00
Board independence	0.88	1.00	0.32	1.00	1.00
M&A	0.11	0.00	0.31	0.00	0.00
Financing	0.60	1.00	0.49	0.00	1.00
Big4	0.98	1.00	0.15	1.00	1.00
Auditor tenure	21.05	14.00	20.85	6.00	28.00

Note. The sample consists of 6,687 firm-year observations with an odd audit committee and 5,384 firm-year observations with an even audit committee during 1998-2010. Appendix B provides the variable definitions. MB = market-to-book ratio; M&A = merger and acquisition.

accrual firms are expected to have more restatements, we add the accrual variable (*Working Capital Accruals*$_t$). The model also controls for the size (*Committee size FE)* and independence (*Committee independence*$_t$) of audit committees as these variables may be correlated with the even–odd nature of committee. In particular, the committee size fixed effects include a group of dummy variables to flag the audit committees sized between 2

and 3, between 4 and 5, between 6 and 7, between 8 and 9. By doing so, the comparison between even and odd audit committees is conducted with closely matched committee size. We also control for board size ($Log(Board\ size)_t$) and board independence ($Board\ independence_t$) as two additional independent variables (Beasley, 1996; Dechow, Sloan, & Sweeney, 1996; Klein, 2002). Based on Dechow et al. (2011), we include some measures of firm off-balance sheet activities, for example, acquisition ($M\&A_t$) and financing ($Financing_t$). Lennox and Pittman (2010) suggest that auditors play an important role in preventing financial restatements. Thus, we add two variables to control for accounting firm's characteristics: the $Big4_t$ indicator and the auditor tenure ($Log(Auditor\ tenure)_t$). Finally, *Industry* and *Year* dummy variables are included to control for the industry and time effects.

Table 3 presents the regression results of financial restatements. We report the marginal effects of probit regression. In column 1 of Panel A, the coefficient on *Odd* is −0.016 with a p value of .045, suggesting that odd audit committees are associated with lower likelihood of financial restatements. In column 2, we further control for the firm off-balance sheet activities. The coefficient of *Odd* is −0.015 and significant at the 5% level. Column 3 further includes the auditor variables. The marginal effect of audit committees remains significantly negative. The economic impact of the even–odd nature of audit committees on financial restatements is also sizable. Firms with an odd audit committee have 1.5% lower possibility of restating financial reports than firms with an even audit committee do, relative to the unconditional probability of 10% for all sample firms. The results of control variables show that loss firms are more likely to restate financial reports, and firms issuing securities have greater incentives to misreport.

As illustrated in Table 1, few audit committees have more than five members. To examine whether our results are driven by these particularly large committees, we exclude the audit committees with more than five members in column 4 and still find a negative and significant coefficient on the *Odd* indicator variable.

Overall, Table 3 reveals that audit committees with an odd number of directors have better earnings quality (lower likelihood of financial restatement) than the ones with an even number of directors. This relation is robust after controlling for various firm, committee, and board characteristics.

Interactive Analysis

Our theoretical arguments suggest that the improved voting efficiency of odd audit committees is likely to be especially beneficial to firms, in which directors are more likely to have different opinions.[8] To test this prediction, we use two variables to proxy for the firm's information environment: R&D expense and stock return volatility. Firms with high R&D expense and high stock volatility usually have more uncertainty, and thus directors are more likely to have a heterogeneous preference toward firms' decisions. In columns 1 and 2 of Table 4, we flag the *high R&D* indicator and *high stock volatility* indicator based on their sample median values, respectively. The interactions, *Odd* × *High R&D* and *Odd* × *High stock volatility*, both attract significant and negative coefficients.[9] Consistent with our expectation, the difference in odd and even audit committees is greater when firms have greater uncertainty (directors are more likely to have different information).

Furthermore, our theory suggests that the difference in earnings quality between firms with odd and even audit committees narrows when the ownership by audit committee members (directors' performance preference) increases. In column 3, we introduce the *High*

Table 3. The Even–Odd Nature of Audit Committees and Financial Restatements.

Dependent variable = restatement dummy	Full sample (1)	Full sample (2)	Full sample (3)	Excluding committees with more than five members (4)
Odd	−0.016**	−0.015**	−0.015**	−0.015*
	(0.045)	(0.047)	(0.044)	(0.067)
Log(Total assets)	0.005	0.005	0.004	0.004
	(0.159)	(0.205)	(0.284)	(0.322)
Leverage	−0.018	−0.042	−0.041	−0.050
	(0.526)	(0.159)	(0.161)	(0.102)
Sales growth	0.006	0.002	0.003	0.002
	(0.706)	(0.891)	(0.852)	(0.911)
Negative equity	0.016	0.024	0.024	0.033
	(0.754)	(0.643)	(0.645)	(0.541)
Log(Firm age)	−0.000	−0.000	−0.002	−0.005
	(0.990)	(0.978)	(0.797)	(0.551)
Return	−0.002	−0.001	−0.001	0.001
	(0.796)	(0.886)	(0.880)	(0.905)
Stock volatility	0.096	0.084	0.086	0.081
	(0.167)	(0.220)	(0.209)	(0.253)
MB	−0.005	−0.007	−0.007	−0.009*
	(0.267)	(0.145)	(0.137)	(0.094)
Loss	0.029***	0.028***	0.028***	0.030***
	(0.007)	(0.007)	(0.008)	(0.006)
Inverse interest coverage	−0.003	−0.003	−0.002	−0.005
	(0.648)	(0.703)	(0.765)	(0.503)
Working capital accruals	0.027	0.028	0.029	0.035
	(0.582)	(0.560)	(0.554)	(0.496)
Committee independence	0.026	0.027	0.027	0.029
	(0.130)	(0.113)	(0.109)	(0.102)
Log(Board size)	0.029	0.030	0.028	0.028
	(0.181)	(0.169)	(0.196)	(0.210)
Board independence	−0.019	−0.019	−0.020	−0.023
	(0.175)	(0.160)	(0.148)	(0.117)
M&A		0.000	0.001	0.002
		(0.960)	(0.933)	(0.873)
Financing		0.023***	0.023***	0.027***
		(0.002)	(0.002)	(0.001)
Big4			0.032	0.030
			(0.152)	(0.209)
Log(Auditor tenure)			0.004	0.007
			(0.348)	(0.154)
Committee size FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	12,071	12,071	12,071	11,291
Pseudo R^2 (%)	3.46	3.68	3.76	3.69

Note. The sample consists of 6,687 firm-year observations with an odd audit committee and 5,384 firm-year observations with an even audit committee during 1998-2010. The dependent variable is the indicator variable of financial restatements, which takes the value of 1 if the financial reports in the fiscal year are restated subsequently and 0 otherwise. *Odd* is a dummy variable, taking the value of 1 if an odd number of directors are in the audit committee and 0 otherwise. Appendix B provides the definitions of the other variables. *Committee size FE* includes a group of dummy variables to flag the audit committees sized between 2 and 3, between 4 and 5, between 6

(*continued*)

and 7, between 8 and 9. *Industry FE* is based on two-digit SIC code. All continuous variables are winsorized at the top and bottom 1%. The table presents the marginal effects of probit regression. The *p* values based on robust standard errors clustered at the firm level are reported in parentheses. MB = market-to-book ratio; M&A = merger and acquisition; FE = fixed effect; SIC = Standard Industrial Classification.
***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

director ownership indicator based on the sample median of dollar-value director ownership in the audit committee, which equals the total shares owned by audit committee members times the stock price at the end of fiscal year. We find that the coefficient on *Odd* × *High director ownership* is positive and significant at the 5% level. This result indicates that the contrast in earnings quality between even and odd audit committees is more evident when directors in the audit committee have lower ownership.

Our theory also predicts that the even–odd effects are likely to diminish as the size of the audit committee increases. In column 4, we define the *Big committee* indicator based on the sample median size of audit committees and include the interaction *Odd* × *Big committee* in the regression. The coefficient on the interaction is positive and significant at the 5% level. Thus, consistent with our prediction, the impact of odd audit committees in increasing earnings quality is greater for firms with smaller audit committees.

Finally, directors in the audit committee are more likely to conform when they face entrenched management, and thus have stronger conformity preference. Given that the conformity preference is the underlying driving force for the even–odd effects, the difference in earnings quality between firms with odd and even audit committees is expected to be stronger when firms are controlled by entrenched management. Using CEO tenure as a proxy for managerial entrenchment, we define the *High CEO tenure* indicator variable (a proxy for more entrenchment) based on the sample median value of CEO serving years and include the interaction, *Odd* × *High CEO tenure*, in the regression. Consistent with the prediction above, we find a negative and significant coefficient on interaction, implying that the effect of odd audit committees on enhancing firms' earnings quality is greater when there is more severe managerial entrenchment problem.

Instrument Approach

To address the possible endogeneity problem of the even–odd nature of audit committees, we use the two-stage least squares (2SLS) regression. In the first stage, we estimate the propensity of a firm to have an odd audit committee. The instrumental variable is the prevalence of odd audit committees in the state in which the firm is located, which is measured as the ratio of the number of companies with an odd audit committee to the total number of companies in the firm's state. We expect an individual firm to share a similar propensity to have an odd audit committee as its peer firms in the same geographic region, because these firms tend to face a similar labor market pool (Knyazeva, Knyazeva, & Masulis, 2013). In other words, the instrument is likely to satisfy the relevance condition. Furthermore, due to the exogeneity of state-level variables, there are no clear reasons to believe that the instrument affects earnings quality after directly controlling for various firm characteristics. Thus, the instrument is also likely to satisfy the exogeneity condition. The other control variables used in the first-stage regression include the full set of variables in Table 3.

Table 4. Interactive Analysis.

Dependent variable = restatement dummy	(1)	(2)	(3)	(4)	(5)
Odd	−0.009	−0.003	−0.029***	−0.031**	−0.000
	(0.302)	(0.748)	(0.002)	(0.014)	(0.985)
Odd × High R&D	−0.026*				
	(0.089)				
Odd × High stock volatility		−0.027**			
		(0.031)			
Odd × High director ownership			0.028**		
			(0.032)		
Odd × Big committee				0.035**	
				(0.045)	
Odd × High CEO tenure					−0.037**
					(0.011)
High R&D	−0.002				
	(0.893)				
High stock volatility		0.031***			
		(0.001)			
High director ownership			−0.029***		
			(0.004)		
Big committee				−0.037***	
				(0.005)	
High CEO tenure					0.026**
					(0.016)
Log(Total assets)	0.005	0.005	0.005	0.004	0.004
	(0.218)	(0.222)	(0.207)	(0.352)	(0.272)
Leverage	−0.044	−0.041	−0.041	−0.041	−0.042
	(0.132)	(0.161)	(0.165)	(0.171)	(0.158)
Sales growth	0.003	0.001	0.004	0.003	0.004
	(0.829)	(0.930)	(0.770)	(0.843)	(0.805)
Negative equity	0.023	0.024	0.023	0.024	0.027
	(0.657)	(0.645)	(0.659)	(0.645)	(0.614)
Log(Firm age)	−0.003	−0.002	−0.003	−0.003	−0.002
	(0.754)	(0.815)	(0.753)	(0.720)	(0.805)
Return	−0.001	−0.001	−0.000	−0.001	−0.001
	(0.806)	(0.890)	(0.938)	(0.902)	(0.901)
Stock volatility	0.096	−0.004	0.078	0.084	0.086
	(0.156)	(0.959)	(0.256)	(0.219)	(0.207)
MB	−0.006	−0.007	−0.006	−0.007	−0.007
	(0.255)	(0.161)	(0.209)	(0.161)	(0.128)
Loss	0.030***	0.028***	0.027**	0.029***	0.029***
	(0.004)	(0.007)	(0.011)	(0.007)	(0.006)
Inverse interest coverage	−0.001	−0.002	−0.002	−0.002	−0.002
	(0.891)	(0.795)	(0.753)	(0.780)	(0.752)
Working capital accruals	0.026	0.026	0.027	0.029	0.028
	(0.585)	(0.598)	(0.578)	(0.549)	(0.561)
Committee independence	0.027	0.027	0.025	0.029*	0.027
	(0.113)	(0.107)	(0.143)	(0.092)	(0.106)
Log(Board size)	0.026	0.028	0.028	0.022	0.029
	(0.219)	(0.195)	(0.200)	(0.284)	(0.181)

(continued)

Table 4. (continued)

Dependent variable = restatement dummy	(1)	(2)	(3)	(4)	(5)
Board independence	−0.018	−0.020	−0.020	−0.021	−0.020
	(0.179)	(0.149)	(0.156)	(0.127)	(0.150)
M&A	0.001	0.000	0.001	0.001	0.001
	(0.946)	(0.959)	(0.953)	(0.900)	(0.901)
Financing	0.023***	0.024***	0.024***	0.024***	0.023***
	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
Big4	0.032	0.033	0.034	0.032	0.032
	(0.163)	(0.144)	(0.125)	(0.158)	(0.162)
Log(Auditor tenure)	0.005	0.004	0.004	0.004	0.005
	(0.327)	(0.338)	(0.339)	(0.343)	(0.322)
Committee size FE	Yes	Yes	Yes	No	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	12,071	12,071	12,071	12,071	12,071
Pseudo R^2 (%)	3.90	3.92	3.93	3.74	3.91

Note. The sample consists of 6,687 firm-year observations with an odd audit committee and 5,384 firm-year observations with an even audit committee during 1998-2010. Appendix B provides the variable definitions. *Committee size FE* includes a group of dummy variables to flag the audit committees sized between 2 and 3, between 4 and 5, between 6 and 7, between 8 and 9. *Industry FE* is based on two-digit SIC code. All continuous variables are winsorized at the top and bottom 1%. The table presents the marginal effects of probit regression. The *p* values based on robust standard errors clustered at the firm level are reported in parentheses. MB = market-to-book ratio; FE = fixed effect; SIC = Standard Industrial Classification.
***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

As shown in column 1 of Table 5, we find that the coefficient on state prevalence is positive and significant at the 1% level. This means that a firm is more likely to have an odd audit committee when the percentage of companies with odd audit committees is high in the firm's state.

In the second stage, we obtain the predicted *Odd* indicator based on the first-stage probit regression and use it in the regression of financial restatements. Column 2 reports the second-stage results, which are generally consistent with our prior findings. Specifically, in the second stage the coefficient on *Odd* is negative and significant at the 5% level, indicating that after controlling for self-selection bias, odd audit committees are still associated with lower probability of financial restatements.

Alternative Measures of Earnings Quality

As pointed out by Dechow, Ge, and Schrand (2010), no single measure can perfectly capture a firm's earnings quality. As a robustness check, in this section we use four other measures for earnings quality: discretionary accruals, cash flow predictability, earnings informativeness, and timely loss recognition.

In Panel A of Table 6, we use the discretionary accruals to measure earnings quality. Discretionary accruals are estimated based on the modified Jones model (Dechow et al., 1995; Jones, 1991). Appendix C states the estimation method in detail. We find significant and negative coefficient on the *Odd* indicator in both ordinary-least-squares (OLS) and

Table 5. Two-Stage Least Squares Regression.

	First stage predicting *Odd* indicator (1)	Second stage on financial restatements (2)
State-level odd	3.841***	
	(0.000)	
Predicted Odd		−0.375**
		(0.049)
Log(Total assets)	0.055**	0.029
	(0.021)	(0.224)
Leverage	−0.094	−0.264
	(0.620)	(0.141)
Sales growth	−0.010	0.015
	(0.941)	(0.864)
Negative equity	0.167	0.153
	(0.502)	(0.595)
Log(Firm age)	0.265***	−0.004
	(0.000)	(0.948)
Return	0.109*	−0.003
	(0.058)	(0.945)
Stock volatility	−1.598***	0.475
	(0.002)	(0.252)
MB	−0.046*	−0.046
	(0.089)	(0.125)
Loss	0.061	0.155***
	(0.469)	(0.010)
Inverse interest coverage	0.002	−0.012
	(0.961)	(0.771)
Working capital accruals	0.903**	0.209
	(0.031)	(0.481)
Committee independence	0.384**	0.207*
	(0.011)	(0.074)
Log(Board size)	1.691***	0.225
	(0.000)	(0.103)
Board independence	0.502***	−0.099
	(0.000)	(0.224)
M&A	−0.046	0.006
	(0.571)	(0.916)
Financing	−0.064	0.141***
	(0.231)	(0.002)
Big4	−0.190	0.219
	(0.240)	(0.167)
Log(Auditor tenure)	0.023	0.029
	(0.399)	(0.309)
Committee size FE	Yes	Yes
Industry FE	Yes	Yes
Year FE	Yes	Yes
Observations	12,071	12,071
Pseudo R^2 (%)	32.59	3.76

Note. The sample consists of 6,687 firm-year observations with an odd audit committee and 5,384 firm-year observations with an even audit committee during 1998-2010. *State-level odd* equals the number of companies with an odd audit committee divided by the total number of companies in the firm's state. Appendix B provides the definitions of the other variables. *Committee size FE* includes a group of dummy variables to flag the audit committees sized between 2 and 3, between 4 and 5, between 6 and 7, between 8 and 9. *Industry FE* is based on

(*continued*)

two-digit SIC code. All continuous variables are winsorized at the top and bottom 1%. The *p* values based on robust standard errors clustered at the firm level are reported in parentheses. MB = market-to-book ratio; FE = fixed effect; SIC = Standard Industrial Classification.
***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

2SLS regressions, implying that an odd audit committee is associated with lower discretionary accruals than an even audit committee.

The dependent variable in Panel B of Table 6 is cash flow predictability, calculated as the absolute value of residuals obtained from the regression of future cash flows from operations on prior period's earnings components (Barth et al., 2001; Dechow et al., 1998). Appendix D presents the variable construction in detail. Higher residuals imply lower quality of reported earnings. We find that the coefficients on *Odd* are negative and significant, indicating that an odd audit committee is associated with higher cash flow predictability.

In Panel C of Table 6, we define earnings quality as earnings informativeness, measured by the earnings response coefficients (Fan & Wong, 2002; Francis et al., 2005; Warfield et al., 1995). Greater earnings informativeness implies higher earnings' explanatory power for stock returns, and thus better earnings quality. The dependent variable is the 12-month cumulative stock return ending 3 months after the fiscal year-end at *t*, and the key independent variable is the interaction *Net income* × *Odd*. Panel C shows that the coefficient on *Net income* is significantly positive, indicating that stock market positively reacts to higher income. The coefficient on *Net income* × *Odd* is also positive and significant in both OLS and 2SLS regressions, indicating that earnings are more informative in an odd audit committee than in an even audit committee.

In Panel D, we examine timely loss recognition—an important attribute to financial reporting quality (Ball & Shivakumar, 2005). Existing literature provides ample evidence that earnings are of higher quality when firms recognize losses in a more timely manner (Ball et al., 2000; Ball et al., 2003; Basu, 1997). Following Ball and Shivakumar (2005), we construct an interaction $\Delta NI_{t-1} \times D\Delta NI_{t-1} \times Odd_t$ to capture the incremental loss recognition for firms with an odd audit committee relative to firms with an even audit committee. The results in Panel D show that the coefficient on $\Delta NI \times D\Delta NI \times Odd$ is negative and significant at the 1% level in both regressions, suggesting that an odd audit committee recognizes loss in a more timely manner than an even committee.

Overall, the results that an odd audit committee is associated with better earnings quality are robust to various measures of the quality of earnings.

Conclusion

This article applies voting theory to audit committees and finds that the even–odd characteristic of audit committees is related to the committees' voting efficiency and corporate earnings quality. A director in an odd audit committee tends to vote based on her own preference (i.e., vote independently), because she faces an even number of other committee members who are more likely to have a balanced opinion due to the nature of evenness. In contrast, a director in an even audit committee tends to vote to conform to the committee's majority (i.e., herd), because she faces an odd number of other committee members who are more likely to have dominant opinion due to the nature of oddness. Based on this intuition, we hypothesize that the audit committee with an odd number of directors can enhance earnings quality by enabling better aggregation of directors' information and improving board voting efficiency relative to the audit committee with an even number of directors.

Table 6. Alternative Measures of Earnings Quality.

Panel A: Discretionary Accruals.

	OLS (1)	2SLS: Second stage (2)
Odd	−0.005**	−0.010**
	(0.013)	(0.043)
Log(Total assets)	−0.003***	−0.003***
	(0.000)	(0.001)
ROA	−0.491***	−0.491***
	(0.000)	(0.000)
Leverage	0.005	0.005
	(0.401)	(0.360)
MB	0.007***	0.006***
	(0.000)	(0.000)
Loss	−0.004	−0.004
	(0.184)	(0.170)
CFO	0.328***	0.328***
	(0.000)	(0.000)
Lagged accruals	−0.024*	−0.024*
	(0.061)	(0.065)
Committee independence	0.004	0.005
	(0.218)	(0.176)
Log(Board size)	0.005	0.006
	(0.215)	(0.125)
Board independence	−0.005**	−0.005*
	(0.038)	(0.054)
Committee size FE	Yes	Yes
Industry FE	Yes	Yes
Year FE	Yes	Yes
Observations	15,024	15,024
R^2 (%)	23.45	23.43

Panel B: Cash Flow Predictability.

	OLS (1)	2SLS: Second stage (2)
Odd	−0.057***	−0.362***
	(0.001)	(0.000)
Size	0.006	0.008
	(0.288)	(0.213)
ROA	−0.200**	−0.206**
	(0.049)	(0.041)
Leverage	−0.052	−0.035
	(0.213)	(0.400)
Sales growth	0.227***	0.211***
	(0.000)	(0.000)
PPE	0.035	0.033
	(0.232)	(0.255)
Herfindahl	0.829**	0.924***
	(0.010)	(0.005)
Gross margin	−0.008	−0.001
	(0.859)	(0.985)
Operating cycle	0.000***	0.000***

(continued)

Table 6. (continued)

Panel B: Cash Flow Predictability.

	OLS (1)	2SLS: Second stage (2)
	(0.004)	(0.005)
Segment	−0.029***	−0.031***
	(0.003)	(0.002)
Committee independence	−0.009	0.028
	(0.788)	(0.376)
Board size	−0.031	0.037
	(0.360)	(0.300)
Board independence	−0.050**	−0.044*
	(0.031)	(0.060)
Committee size FE	Yes	Yes
Industry FE	Yes	Yes
Observations	13,550	13,550
R^2 (%)	10.12	10.32

Panel C: Earnings Informativeness.

	OLS (1)	2SLS: Second stage (2)
Net income	0.828***	0.777***
	(0.000)	(0.000)
Net income × *Odd*	0.190**	0.998**
	(0.020)	(0.031)
Net income × *Size*	−0.000	−0.017
	(0.999)	(0.535)
Net income × *Leverage*	0.554**	0.606***
	(0.018)	(0.006)
Net income × *MB*	−0.055	−0.053
	(0.452)	(0.483)
Net income × *Loss*	−1.457***	−1.500***
	(0.000)	(0.000)
Net income × *Committee independence*	−0.120	−0.079
	(0.105)	(0.335)
Net income × *Board size*	−0.320	−0.492*
	(0.130)	(0.052)
Net income × *Board independence*	−0.140*	−0.201**
	(0.053)	(0.027)
Net income × *Committee size FE*	Yes	Yes
Industry FE	Yes	Yes
Observations	17,743	17,743
R^2 (%)	5.59	5.63

Panel D: Timely Loss Recognition.

	OLS (1)	2SLS: Second stage (2)
ΔNI	−0.014	0.163
	(0.957)	(0.572)
DΔNI	−0.065***	−0.077***
	(0.002)	(0.000)

(continued)

Table 6. (continued)

Panel D: Timely Loss Recognition.

	OLS (1)	2SLS: Second stage (2)
Odd	−0.006***	−0.016***
	(0.001)	(0.002)
ΔNI × DΔNI	−0.306***	−0.337***
	(0.000)	(0.000)
ΔNI × Odd	0.074	0.195
	(0.131)	(0.235)
DΔNI × Odd	0.003	−0.008
	(0.355)	(0.503)
ΔNI × DΔNI × Odd	−0.093***	−0.817***
	(0.009)	(0.000)
Size	0.005***	0.004***
	(0.000)	(0.000)
ΔNI × Size	−0.012	−0.009
	(0.509)	(0.632)
DΔNI × Size	0.002	0.002
	(0.211)	(0.116)
ΔNI × DΔNI × Size	−0.008	0.003
	(0.604)	(0.870)
Leverage	−0.043***	−0.038***
	(0.000)	(0.000)
ΔNI × Leverage	0.016	−0.070
	(0.869)	(0.485)
DΔNI × Leverage	0.004	0.001
	(0.741)	(0.893)
ΔNI × DΔNI × Leverage	−0.031	0.062
	(0.609)	(0.326)
Committee independence	−0.001	0.001
	(0.701)	(0.772)
ΔNI × Committee independence	0.030	−0.018
	(0.796)	(0.880)
DΔNI × Committee independence	0.009	0.010
	(0.258)	(0.204)
−NI × DΔNI × Committee independence	−0.078	0.052
	(0.377)	(0.579)
Board size	−0.000	0.000
	(0.622)	(0.612)
ΔNI × Board size	0.005	−0.048
	(0.966)	(0.675)
DΔNI × Board size	0.011	0.014*
	(0.133)	(0.081)
ΔNI × DΔNI × Board size	−0.075	0.117
	(0.411)	(0.286)
Board independence	0.003	0.003
	(0.248)	(0.234)
ΔNI × Board independence	0.043	0.046
	(0.501)	(0.475)
DΔNI × Board independence	−0.007	−0.006
	(0.183)	(0.279)

(continued)

Table 6. (continued)

Panel D: Timely Loss Recognition.

	OLS (1)	2SLS: Second stage (2)
$\Delta NI \times D\Delta NI \times$ *Board independence*	−0.013	0.028
	(0.753)	(0.513)
Committee size FE	Yes	Yes
$\Delta NI \times$ *Committee size FE*	Yes	Yes
$D\Delta NI \times$ *Committee size FE*	Yes	Yes
$\Delta NI \times D\Delta NI \times$ *Committee size FE*	Yes	Yes
Industry FE	Yes	Yes
Observations	18,065	18,065
R^2 (%)	12.21	12.40

Note. This table presents the robustness check of alternative earnings quality measures. *Odd* is a dummy variable, taking the value of 1 if an odd number of directors are in the audit committee and 0 otherwise. Appendix B provides the definitions of other variables. *Committee size FE* includes a group of dummy variables to flag the audit committees sized between 2 and 3, between 4 and 5, between 6 and 7, between 8 and 9. *Industry FE* is based on two-digit SIC code. All continuous variables are winsorized at the top and bottom 1%. OLS = ordinary least squares; ROA = return on assets; MB = market-to-book ratio; FE = fixed effect; SIC = Standard Industrial Classification. The *p* values based on robust standard errors clustered at the firm level are reported in parentheses. Panel A presents the analysis of discretionary accruals. Panel B presents the analysis of cash flow predictability. Panel C presents the analysis of earnings informativeness. Panel D presents the analysis of timely loss recognition. 2SLS = two-stage least squares.
***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Supporting this hypothesis, we empirically find that an odd audit committee is associated with lower likelihood of financial restatements, compared with an even audit committee. Furthermore, the cross-sectional variations in the benefits of odd audit committees are consistent with improved voting efficiency as the source of these benefits. Taken together, our findings help establish a link between the even–odd nature of audit committees and corporate earnings quality.

Finally, although our article focuses on audit committees, the basic economic mechanisms could be applied to the general board voting. It is likely that board voting efficiency has important implication for various corporate decisions, such as investment, mergers and acquisitions, and CEO turnover. Examining these issues could be an interesting area for future research.

Appendix A

Analysis of the Model

We denote directors' voting profile as (k^0, k^1), when (k^0, k^1) of them vote for $a = 0$ and k^1 of them vote for $a = 1$.

Suppose first that n is an odd number. Given voting rule $k_R = (n+1)/2$, profile $((n - 1) / 2, (n - 1) / 2)$ is the pivotal case, where the marginal director's vote determines the audit committee's choice of action. Therefore, the pivotal case motivates the marginal director to vote independently based on her own information. Consider next a non-pivotal

case (k^0, k^1), where $k^0 < k^1$. In this case, the audit committee chooses $a = 1$ independent of the marginal director's vote, and by voting for $a = 1$, the marginal director avoids the disconformity cost. Therefore, the marginal director will bias toward $a = 1$ regardless of her independent information. Similarly, in the case of (k^1, k^0), the marginal director will bias toward $a = 0$. However, as the ϕ_is are uncorrelated, the marginal director views profiles (k^0, k^1) and (k^1, k^0) as equally likely. Thus, these two paring non-pivotal cases leave the marginal director indifferent between voting for $a = 1$ and for $a = 0$. Thus, in aggregate, the non-pivotal cases do not produce a strict preference for the marginal director between the two internal control practices. This suggests that, in an odd audit committee, each director voting independently based on her own information is the equilibrium strategy.

Suppose next that n is an even number. Given voting rule $k_R = (n/2) + 1$, the marginal director is pivotal when the other directors' voting profile is $((n / 2) - 1, n / 2)$. Clearly, in this case, the marginal director will vote independently based on her own information. However, among the $(n - 1)$ (odd number) non-pivotal cases, the case $(n / 2, (n / 2) - 1)$ does not have an equally probable paring non-pivotal case. In this case, the audit committee adopts action $a = 0$ regardless of how the marginal director votes. For this reason, the marginal director strictly prefers to vote for $a = 0$ to be on the ''winning side,'' even though her own preference is for $a = 1$. Because of the conformity preference, the non-pivotal cases collectively produce a strict bias for the marginal director to vote for $a = 0$.

In summary, for an even audit committee, the conformity preference can conflict with the performance preference, and the directors may no longer vote informatively. In particular, even after observing a good (bad) aspect of the new internal control practice, a director may vote for $a = 0$ $(a = 1)$ if he expects that other directors' votes are likely to lead the audit committee to stick to the existing internal control practice (adopt the new internal control practice).

Appendix B

Variable Definition.

Variable	Definition
Auditor tenure	The number of years that the company is audited by the same accounting firm.
Big4	A dummy variable, taking the value of 1 if the company is audited by one of Big Four accounting firms and 0 otherwise.
Big committee	A dummy variable, taking the value of 1 if the number of directors in the audit committee is no less than the sample median value and 0 otherwise.
Board independence	A dummy variable, taking the value of 1 if more than half of directors on the board are independent and 0 otherwise.
Board size	The number of directors on the board.
CFO	The operating cash flows scaled by total assets.
CFO predictability	The absolute value of the residuals obtained by the regression of future operating cash flows on prior period's earnings components for each fiscal year and each two-digit SIC code industry with at least 30 observations.
Committee independence	A dummy variable, taking the value of 1 if more than two thirds of directors in the audit committees are independent and 0 otherwise.

(continued)

Appendix B. (continued)

Variable	Definition
DΔNI	A dummy variable, taking the value of 1 if *ΔNI* is negative and 0 otherwise.
Discretionary accruals	The absolute value of discretionary accruals estimated by the modified Jones model for each fiscal year and each two-digit SIC code industry with at least 30 observations.
Financing	A dummy variable, taking the value of 1 if the company issues new debt or equity during the year and 0 otherwise.
Firm age	The number of years that the company is listed on Compustat.
Gross margin	The gross margin.
Herfindahl	The competition index, calculated as the sum of squares of firms' market shares in the industry (two-digit SIC code).
High CEO tenure	A dummy variable, taking the value of 1 if the year of CEOs serving in the firm is no less than the sample median value and 0 otherwise.
High director ownership	A dummy variable, taking the value of 1 if the dollar-value ownership of all audit committee members is no less than the sample median value and 0 otherwise.
High R&D	A dummy variable, taking the value of 1 if the firm's R&D expenditures scaled by sales are no less than the sample median value and 0 otherwise.
High stock volatility	A dummy variable, taking the value of 1 if the firm's standard deviation of monthly stock returns over the fiscal year is no less than the sample median value and 0 otherwise.
Inverse interest coverage	The ratio of interest expense to operating income before depreciation. The ratio is capped at 2.00 and is assigned a value of 2.00 if operating income before depreciation is negative.
Lagged accruals	The prior year's total accruals scaled by total assets.
Leverage	The ratio of total debts to total assets.
Variable	Definition
Loss	A dummy variable, taking the value of 1 if the income before extraordinary items is negative and 0 otherwise.
M&A	A dummy variable, taking the value of 1 if the company has an acquisition contributing to sales during the year and 0 otherwise.
MB	The market-to-book rate.
Negative equity	A dummy variable, taking the value of 1 if the book value of equity is negative and 0 otherwise.
Net income	The income before extraordinary items divided by the market value of equity at the beginning of the fiscal year.
ΔNI	The change in net income scaled by total assets.
Odd	A dummy variable, taking the value of 1 if an odd number of directors are in the audit committee and 0 otherwise.
Operating cycle	The operating cycle (in days), calculated as $[(AR_t + AR_{t-1}) / 2 \div (Sale / 360)] + [(INV_t + INV_{t-1}) / 2 \div (COGS / 360)]$, where *AR* is the firm's accounts receivable, *Sale* is the firm's sale, *INV* is the firm's inventory, and *COGS* is the firm's cost of goods sold.
PPE	The net plant, property, and equipment divided by total assets.
Restatement	A dummy variable, taking the value of 1 if the financial reports in the fiscal year are restated subsequently and 0 otherwise.
Return	The 12-month cumulative stock return ending 3 months after the fiscal year-end.

(continued)

Appendix B. (continued)

Variable	Definition
ROA	The income before extraordinary items divided by total assets.
Sales growth	The growth rate in sales.
Segment	The number of business segments.
Stock volatility	The standard deviation of monthly stock returns over the fiscal year.
Total assets	The firm's total assets in million.
Working capital accruals	The working capital accruals, calculated as ([Δ*Current assets* − Δ*Cash and short-term investments*] − [Δ*Current liabilities* – Δ*Debt in current liabilities* – Δ*Taxes payable*] – *DEPR*) ÷ *Average total assets*, where Δ*Current assets* is the change of current assets, Δ*Cash* and *short-term investments* is the change of cash and short-term investments, Δ*Current liabilities* is the change of current liabilities, Δ*Debt* in current liabilities is the change of debt in current liabilities, Δ*Taxes payable* is the change of income taxes payable, and *DEPR* denotes the depreciation and amortization expenses.

Note. MB = market-to-book ratio; SIC = Standard Industrial Classification; ROA = return on assets.

Appendix C

Estimation of Discretionary Accruals

We first estimate the parameters of the following equation for each fiscal year and each two-digit SIC industry code with at least 30 observations:

$$Accrual_t = \alpha_1 1/Asset_{t-1} + \alpha_2 \Delta REV_t + \alpha_3 PPE_t + \varepsilon_t, \quad (7)$$

where $Accrual_t$ = total accruals at t, scaled by total assets at $t - 1$; total accruals are the income before extraordinary items minus operating cash flows; $Asset_{t-1}$ = total assets at $t - 1$; ΔREV_t = change in revenues at t, scaled by total assets at $t - 1$; and PPE_t = net property, plant, and equipment at t, scaled by total assets at $t - 1$.

We then use the estimated parameters to calculate expected accruals (*EAccrual*) by Equation 8:

$$EAccrual_t = \hat{\alpha}_1 1/Asset_{t-1} + \hat{\alpha}_2(\Delta REV_t - \Delta AR_t) + \hat{\alpha}_3 PPE_t, \quad (8)$$

where ΔAR_t = change in accounting receivables at t, scaled by total assets at $t - 1$.

The discretionary accruals equal to the absolute value of difference between $Accrual_t$ and $EAccrual_t$. We take the absolute value in the regression because earnings management can involve either income-increasing or income-decreasing accruals to meet earnings targets (Klein, 2002; Reynolds and Francis, 2000; Warfield, Wild, & Wild, 1995).

Appendix D

Measure of Cash Flow Predictability

We estimate the following equation to calculate the measure of cash flow predictability:

$$CFO_{t+1} = \delta_0 + \delta_1 CFO_t + \delta_2 \Delta AR_t + \delta_3 \Delta INV_t + \delta_4 \Delta AP_t + \delta_5 DEPR_t + \delta_6 OTHER_t + \varepsilon_{t+1}, \quad (9)$$

where CFO_t = operating cash flows at t, scaled by total assets at $t - 1$; ΔAR_t = change in accounts receivable at t, scaled by total assets at $t - 1$; ΔINV_t= change in inventory at t, scaled by total assets at $t - 1$; ΔAP_t = change in accounts payable at t, scaled by total assets at $t - 1$; $DEPR_t$ = depreciation and amortization expenses at t, scaled by total assets at $t - 1$; and $OTHER_t$ = net of all other accruals at t, scaled by total assets at $t - 1$; all other accruals are calculated as ($EARN - (CFO + \Delta AR + \Delta INV - \Delta AP - DEPR)$), where $EARN$ is the income before extraordinary items.

We estimate the above equation for each fiscal year and each two-digit SIC code industry with at least 30 observations. The empirical measure of cash flow predictability is the absolute value of residuals: $CFO\ predictability = |\varepsilon_{t+1}|$.

Authors' Note

All errors are the responsibility of the authors.

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Notes

1. A partial list of the previous studies include Klein (2002); Abbott, Parker, and Peters (2004); Anderson, Mansi, and Reeb (2004); and Krishnan (2005).
2. http://www.aicpa.org/ForThePublic/AuditCommitteeEffectiveness/AuditCommitteeBrief/DownloadableDocuments/AnOftenOverlookedResource_apr2010.pdf
3. http://www.corpgov.deloitte.com/binary/com.epicentric.contentmanagement.servlet.ContentDeliveryServlet/USEng/Documents/Deloitte%20Periodicals/Audit%20Committee%20Brief/ACbrief_May2012.pdf
4. Reading from Figure 1, for example, the average Tobin's Q is 2.1 and 1.7 for five-member and seven-member boards, respectively. In contrast, for four-member, six-member, and eight-member boards, the averages of Tobin's Q assume much smaller values of 1.6, 1.55, and 1.5, respectively.
5. Director conformity preference has been used previously by several theoretical studies to provide insights to a multitude of empirical regularities of corporate boards (Chemmanur & Fedaseyeu, 2012; Gillette, Noe, and Rebello, 2003; Malenko, 2014).

6. Implicitly, we are assuming that the directors cannot choose to abstain. In our model, this is without loss of generality, as directors will either vote based on own information when performance preference dominates conformity preference, or vote to conform to the majority opinion. Thus, even if abstention is allowed, directors will not invoke that option.
7. There are 153 firm-year observations with only one member in the audit committees. As these observations are extreme cases, we exclude them in our analysis.
8. If every director has the same preference toward a choice, there is no difference between an odd and an even audit committee.
9. We follow Ai and Norton's (2003) approach to compute the marginal effects of interaction terms.

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