Is Audit Committee Equity Compensation Related to Audit Fees?*

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ABSTRACT

Section 301 of the Sarbanes-Oxley Act (SOX) implicitly assumes that audit committees can independently determine audit fees. Critics of section 301 have questioned this assumption in particular, and the efficacy of section 301 more generally. In response, the SEC issued a concept release in 2015 calling for public disclosure of the process that audit committees follow for determining auditor compensation. Motivated by these calls and the widespread use of stocks and options to compensate firms' independent directors, we examine the relation between equity compensation granted to audit committee members and audit fees. Using a sample of 3,685 firm-year observations during 2007–2015, we find a negative relation between audit committee equity compensation and audit fees, consistent with larger equity pay inducing audit committee members to compromise independence by paying lower audit fees. These findings are robust to controlling for endogeneity, firm size, alternative measures of equity compensation, alternative samples, and an alternative treatment of extreme values. We further show that larger equity compensation is associated with lower earnings quality. We also find that the negative effect of equity compensation on audit fees is stronger when city-level audit market competition is high. However, this negative relation disappears when (i) firms face high litigation risk, (ii) auditors have stronger bargaining power, (iii) the audit committee includes a high proportion of accounting experts, and (iv) auditors are industry experts. Our results are relevant for regulators and investors.

Keywords: audit committee, audit fees, auditor independence, equity compensation

Y a-t-il une relation entre la rémunération en actions des membres d'un comité d'audit et les frais d'audit?

RÉSUMÉ

L'article 301 de la loi Sarbanes-Oxley (SOX) suppose implicitement que les comités d'audit peuvent déterminer les frais d'audit de façon indépendante. Les critiques relatives à l'article 301 ont remis en question cette supposition et, de façon plus générale, l'efficacité de l'article 301. En

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réponse à ces critiques, la SEC a fait paraître en 2015 un document de consultation demandant que soit rendu public le processus mis en œuvre par les comités d'audit pour déterminer la rémunération des auditeurs. Dans la foulée de ces demandes et de l'utilisation répandue des actions et options pour rémunérer les administrateurs indépendants des sociétés, nous examinons la relation entre la rémunération en actions accordée aux membres des comités d'audit et les frais d'audit. À partir d'un échantillon de 3 685 observations année-entreprises portant sur la période 2007 à 2015, nous constatons une relation négative entre la rémunération en actions des comités d'audit et les frais d'audit, ce qui cadre avec l'hypothèse voulant qu'une rémunération en actions plus élevée incite les membres des comités à compromettre leur indépendance en payant des tarifs d'audit plus faibles. Ces résultats sont robustes pour la prise en compte de l'endogénéité, de la taille des sociétés, d'autres mesures de rémunération par actions, d'autres échantillons et d'une autre méthode de traitement des valeurs extrêmes. Nous établissons également qu'une rémunération en actions plus importante est associée à des résultats de plus faible qualité. Nous constatons enfin que l'effet négatif de la rémunération en actions sur les frais d'audit est plus marqué lorsque la concurrence sur le marché de l'audit à l'échelle de la ville est forte. Toutefois, cette relation négative disparaît lorsque i) les sociétés font face à des risques de litige élevés, ii) les auditeurs disposent d'un plus grand pouvoir de négociation, iii) le comité d'audit comprend une forte proportion d'experts comptables et iv) les auditeurs sont des experts du secteur d'activités. Nos résultats sont pertinents pour les organismes de réglementation et les investisseurs.

Mots clés : comité d'audit, frais d'audit, indépendance des auditeurs, rémunération par actions

1. Introduction

We investigate the relation between audit fees and equity compensation (i.e., stocks and options) granted to audit committee (AC) members. Over the past decades, audit pricing has raised serious concerns because management could determine audit fees in the auditors' favor when it makes the auditor compensation decision (Choi et al. 2010; Kinney and Libby 2002) and, as a result, the auditors could view their role as serving management rather than users of financial statements (SEC 2003) and thus potentially compromise their independence. To address these threats to auditor independence, section 301 of the Sarbanes-Oxley Act (SOX) requires that ACs be directly responsible for the compensation of auditors. By empowering ACs to determine auditor compensation, regulators expect to eliminate management's influence over the auditor and to better align the auditor's incentives with those of the board and shareholders.

Although regulators assume that AC members will independently determine audit fees under section 301 (Doty 2014), there is no post-SOX empirical evidence on whether ACs actually exercise this responsibility in an independent manner. This study examines whether AC independence is affected by equity compensation which, in turn, influences AC members' audit fee decisions. Our research question is important for several reasons. First, if the empirical evidence shows that equity compensation can align the interests of AC members with those of shareholders, then regulators and investors will have confidence in firms' financial reporting quality because AC members will not compromise independence in fulfilling their section 301 responsibilities. If, however, the empirical evidence shows the opposite result, then the requirements under section 301 may instill false confidence in investors that AC members who receive large equity compensation are able to mitigate managerial influence during the auditor hiring and audit fee negotiation processes. Second, governance activists have recently called for greater transparency from ACs regarding how they appoint, compensate, and monitor external auditors (e.g., Audit Committee Collaboration 2013). This interest in transparency is in part due to the concern that, even though the obligations of ACs have expanded over the years, required AC disclosures in this area predate SOX (Ernst & Young 2017). Third, regulators have also noted the possibility that ACs may not be effectively complying with section 301. For example, the SEC issued a concept release in 2015 that proposed new disclosure requirements relating to AC assessments of the auditors. The SEC indicated that such disclosure "may include a description of the nature of the audit committee's involvement in

evaluating and approving the auditor's compensation" (SEC 2015, 39) because it helps investors understand and evaluate AC performance (White 2014; Whitehouse 2014).[1] Overall, the activists' reports and SEC (2015) suggest that the efficacy of section 301 has become a regulatory concern and regulators believe that this concern cannot be mitigated if investors do not know how auditor compensation is determined. Given the scarcity of empirical evidence on whether ACs make audit fee decisions independently and the factors that affect their independence, our study attempts to fill this void by addressing these important issues and responding to the calls for more research on the interactions between ACs and audit quality (CAQ 2015; DeFond and Zhang 2014).

We focus on equity compensation because stocks and options, which are widely used to compensate AC members (Engel et al. 2010),[2] may tie AC members' wealth to a firm's short-term and long-term financial performance (Millstein 2002). Because the objectivity of AC members in determining appropriate audit fee levels may decrease when their compensation creates conflicts that induce them to compromise independence (Magilke et al. 2009), equity compensation raises a potentially serious concern not addressed by SOX that could harm AC independence. The auditing literature shows that option compensation is associated with a higher likelihood of restatements (e.g., Archambeault and Hermanson 2008), earnings management (e.g., Bedard et al. 2004), beating analyst forecasts (e.g., Campbell et al. 2015), and waiving misstatements to avoid missing earnings forecasts (e.g., Keune and Johnstone 2015). In contrast, the corporate governance literature indicates that it may be beneficial to have outside directors own equity because equity ownership aligns their interests with those of shareholders (e.g., Fama and Jensen 1983; Monks and Minow 2011) and provides incentives for monitoring (e.g., Beasley 1996). In addition, AC members have strong incentives to maintain their reputation due to potential litigation exposure (Naiker and Sharma 2009; Naiker et al. 2013) and discipline by the labor market (Srinivasan 2005). These findings suggest that equity compensation may not affect AC independence because of the potential litigation risk and reputation loss. Overall, the preceding discussion indicates that despite all AC members being required under SOX section 301 to be fully independent, the mixed results reported in the corporate governance and auditing literatures suggest that the net effect of equity compensation on AC independence remains an empirical question. We provide evidence on this relation.

Following Sengupta and Zhang (2015), we use the ratio of the sum of stocks and options to total compensation to examine the effect of AC equity compensation on the quality of firms' financial statements, which is influenced by how effectively ACs determine the audit fee level. Using a sample of 3,685 firm-year observations from 2007 to 2015, we find a negative association between audit fees and AC equity compensation ratio. Our results indicate that a one-unit increase in AC equity compensation ratio is associated with a reduction of $297,710 in audit fees. This negative association is robust to controlling for endogeneity using a change model, including firm fixed effects, and controlling for omitted time-variant variables. We also find a negative relation between four proxies for earnings quality (i.e., performance-adjusted discretionary accruals, restatement likelihood, and two aggregate measures of real earnings management) and AC equity compensation ratio. Overall, our main results show that a larger equity compensation motivates ACs to choose a lower audit fee level, which, in turn, leads to poorer earnings quality.

1. This concept release was formally included in the SEC's rulemaking agenda in July 2017, but did not result in major changes to date. Instead, the SEC takes a monitoring approach and encourages public firms to voluntarily disclose their audit committee activities (Austin et al. 2018).
2. We find that the ratio of equity compensation to total compensation ranges between 74 and 84 percent during Engel et al.'s (2010) 2000–2004 sample period. We also document that, over the post-SOX period 2007–2015, the average percentage of firms that grant equity compensation to their ACs is about 96%. These statistics indicate that the use of AC equity compensation is even more pervasive. We provide detailed discussion in the section "Sample selection."

We conduct a battery of additional analyses to examine whether our main results are attributable to certain firm, AC, and auditor characteristics. We find that audit market competition at the city-level accentuates the negative relation between equity compensation and AC independence and leads to even lower audit fees. However, this negative relation disappears when (i) firms face high litigation risk, (ii) auditors have stronger bargaining power, (iii) ACs include a high proportion of accounting experts, and (iv) auditors are industry experts.

We also conduct several sensitivity tests to assess the robustness of our findings. First, we use the natural log of equity compensation (Kim et al. 2015; Sengupta and Zhang 2015) and AC chairs' equity delta and vega (which measure the sensitivity of equity holdings to changes in stock price and volatility of stock return, respectively) as alternative measures of equity compensation. We also use the natural log of cash compensation as a placebo test to examine whether it is the equity compensation and not the cash compensation that impairs AC independence. Second, we create a firm size-matched sample to test whether our results are influenced by the size effect. Third, we use a robust regression based on the MM-estimation as an alternative way to control for extreme values. Fourth, we drop firms that do not pay equity compensation to their ACs. Fifth, we restrict the sample to the postfinancial crisis period (2011–2015). Overall, the results of these robustness tests are consistent with our primary findings.

Our study makes several contributions to the auditing literature. First, although recent research uses earnings management measures (e.g., Bedard et al. 2004), restatement likelihood (e.g., Archambeault and Hermanson 2008), internal control weaknesses (e.g., Naiker and Sharma 2009), and approval for procuring nonaudit services from the current auditors (e.g., Naiker et al. 2013) to capture AC effectiveness, no prior study has examined whether equity compensation relates to AC independence, which in turn influences AC determination of audit fees. Our study provides a first attempt at addressing this question. Second, even though section 301 mandates that all AC directors be fully independent, it is possible that these directors satisfy this requirement when they are newly appointed but become less independent as they keep receiving equity compensation during their tenure. Our results suggest that increasing the responsibilities of ACs without considering their compensation is insufficient for the effective functioning of ACs. In particular, requiring ACs to be directly responsible for audit fee determination may not improve financial reporting quality as intended because AC members who receive larger equity compensation may compromise their independence. Third, DeFond and Zhang (2014) call for future auditing studies to examine the relatively less understood reasons why firms have incentives to demand audit quality. In response to this call, we show that higher equity compensation may induce AC members to compromise independence by paying lower audit fees, thereby resulting in lower demand for audit quality. Fourth, even though we find that equity compensation attenuates AC independence in determining appropriate audit fees, we also find that this negative effect disappears when auditors are industry experts with stronger bargaining power and the AC includes more accounting experts. These conditions provide regulators with insights into whether new regulations are needed to alter the balance of bargaining power between the clients and the auditors. Fifth, prior studies find that market competition is positively associated with restatement likelihood because audit firms may be forced to compete more strongly on audit fees (e.g., Numan and Willekens 2012). Our results imply that ACs that receive larger equity compensation may take advantage of this audit market competition to reduce audit fees to an even lower level. In this regard, we provide insight into how audit market competition and AC equity compensation may jointly affect AC audit fee decisions.

The remainder of this paper is organized as follows. Section 2 reviews related research and develops our hypotheses. Section 3 describes the basic research design, including the dependent and independent variable measures, econometric models, and sample selection procedures. Section 4 discusses the empirical findings and section 5 concludes the study.

2. Related literature and the relation between audit fees and AC equity compensation

Overview of related literature

Equity compensation and audit committee independence

Although section 301 of SOX requires that members of an AC be fully independent, it does not specify how AC members should be compensated to maintain their independence. Because equity compensation could induce ACs to compromise independence, AC members may have conflicting objectives that will affect their audit fee decisions. Recent empirical studies examining how equity compensation influences AC independence provide mixed evidence. On the one hand, some studies find that AC equity compensation is associated with larger discretionary accruals (e.g., Bedard et al. 2004), higher likelihood of restatement (e.g., Archambeault and Hermanson 2008), beating analyst earnings benchmarks (e.g., Campbell et al. 2015), and income misstatements (e.g., Keune and Johnstone 2015). On the other hand, Sengupta and Zhang (2015) find that larger AC equity compensation is associated with higher disclosure quality (measured by management earnings guidance and dispersion of analyst forecasts) and lower cost of equity capital.

Our study differs from these recent studies in several ways. First, although Archambeault and Hermanson (2008), Bedard et al. (2004), and Campbell et al. (2015) show that options granted to ACs are associated with lower earnings quality, they do not explore the underlying reason *why* AC equity compensation jeopardizes earnings quality. Our study provides a view into this "black box" by showing that equity payments may impair AC independence because equity compensation ties AC members' wealth to firms' stock prices. If equity payments make ACs less effective, they may purchase less audit effort by paying lower audit fees, which, in turn, may result in lower quality earnings. Second, management earnings guidance is only applicable to a subset of firms that make these voluntary disclosures (Chen et al. 2015). Therefore, it is unclear whether Sengupta and Zhang's (2015) findings are also valid for firms that do not make such voluntary disclosures. Third, because management earnings guidance is not subject to audit, the relation between disclosure quality and determination of audit fees is weak, at best. Fourth, although ACs are directly responsible for the quality of "firms'" financial reporting, as reflected in earnings quality, they are less likely to be responsible for the quality of management guidance. Fifth, prior studies use output-based financial statement characteristics to measure the effectiveness of ACs. Unlike those studies, we examine how AC equity compensation relates to the audit fee decision (which is a direct and input-based measure of AC effectiveness). Because ACs are responsible for determining audit fees but there is little archival research on whether ACs are capable of exercising this responsibility and what factors may adversely affect the AC audit fee decision, our study provides empirical evidence that may bear important regulatory implications.

Threats to audit committee effectiveness

Naiker and Sharma (2009) find that former audit partners who are affiliated with a firm's current auditors enhance AC oversight effectiveness, which in turn improves internal controls and financial reporting quality. In a related study, Naiker et al. (2013) show that the presence of former audit partners on the ACs is negatively associated with the procurement of nonaudit services from the current auditors. Both studies conclude that the three-year cooling-off period required by the NYSE and NASDAQ is not necessary. Christensen et al. (2018) further find that affiliated partners serving on the ACs are associated with improved audit quality and a reduction in audit fees and fieldwork time, suggesting that AC affiliation affects both the quality and the efficiency of the audit. From a different perspective, Badolato et al. (2014) argue that the requirements of financial expertise and independence result in lower status (as measured by the sum of the number of directorships and number of directors graduated from elite schools) for ACs relative to management. They find that ACs with both financial expertise and high relative status exhibit lower levels of earnings management. Financial expertise alone cannot ensure AC effectiveness.

Our study differs from these three studies in two notable ways. First, whereas these studies use the presence of former audit partners affiliated with the current auditor and AC status as the threats to AC effectiveness, we examine whether equity compensation impairs or enhances the monitoring efficacy of ACs. Given the widespread use of equity to compensate AC members (Engel et al. 2010), our results inform about the implications of AC compensation practices. Second, whereas Naiker and Sharma (2009) and Naiker et al. (2013) use internal control weaknesses and purchase of nonaudit services, respectively, to capture the effectiveness of ACs, we examine how AC equity compensation relates to the audit fee decision. Although SOX was passed more than a decade ago, there is little archival research using post-SOX data on factors related to AC audit fee determination. We provide empirical evidence on this issue.

Audit committees and audit fees

More effective ACs may be associated with lower audit fees due to auditors' lower audit risk assessment or ACs' lower demand for audit effort given their own monitoring effectiveness. However, more effective ACs may also be associated with higher audit fees due to higher demand for external monitoring to protect their reputational capital and reduce their litigation risk (Carcello et al. 2002; Carcello et al. 2011). Using pre-SOX data, prior studies provide mixed evidence on the association between AC characteristics and audit fees. For example, some research finds that audit fees increase in AC percentage of outside directors' accounting or financial expertise (e.g., Carcello et al. 2002), experience, and size (e.g., Vafeas and Waegelein 2007). This result is consistent with effective ACs demanding greater audit effort. In contrast, other research reports that audit fees are negatively associated with AC expertise (e.g., Krishnan and Visvanathan 2008), which is consistent with effective ACs being associated with lower audit risk and lower demand for external monitoring. Engel et al. (2010) use both pre- and post-SOX data and find that total compensation and cash retainers paid to the ACs are positively correlated with the demand for monitoring of the financial reporting process (proxied by firm-size-deflated total audit fees).

Two recent studies use post-SOX data to investigate the association between executives' influences on ACs and audit fees. Bruynseels and Cardinaels (2014) show that ACs are less effective when CEOs have nonprofessional social ties with the AC members, leading to less demand for audit effort as captured by audit fees. In contrast, Beck and Mauldin (2014) find that, during the 2008–2009 crisis period, there is a larger audit fee reduction when the CFOs are more powerful and a smaller audit fee reduction when the ACs are more powerful.

Our study differs from this strand of literature in three important ways. First, even though Engel et al. (2010) find that the demand for monitoring of financial reporting is an important determinant of AC compensation, they do not explore whether and how equity compensation influences the effectiveness of ACs. Second, whereas prior studies test whether executives influence AC audit fee decisions, we test whether ACs that receive more equity compensation select a higher or a lower level of audit fees. Third, because CEO social ties and CFO power are not publicly observable, it is not feasible for regulators to implement rules to mitigate the adverse effects of these executive influences on AC effectiveness. By contrast, because all listed firms are mandated to disclose director compensation in their proxy statements, AC equity compensation is publicly observable to market participants. Therefore, our study provides evidence based on which regulators could potentially specify restrictions on AC compensation practices.

Relation between audit fees and AC equity compensation

According to agency theory, managers may take actions that maximize their own personal wealth rather than shareholders' wealth due to a lack of alignment in managers' and shareholders' interests (Jensen and Meckling 1976). One way that firms can mitigate this agency problem is by having a board of directors that monitors management on behalf of the shareholders. In our context, this would be an AC that specifically monitors management's financial reporting quality to reduce

agency costs. Prior studies find that economic incentives may motivate ACs to focus on their own interests rather than on the interests of the other stakeholders (e.g., Dalton et al. 2003; Hillman and Dalziel 2003). Prior studies also find that when managers and AC members have incentives, they are likely to process information in a manner consistent with those incentives (e.g., Campbell et al. 2015). Overall, because principals (shareholders) delegate authority to the agents (ACs or managers) and agents' decisions affect the principals' financial benefits, agency theory deals with the conflict between principals and agents (Jensen and Meckling 1976). Therefore, we adopt the agency framework to explain whether the use of equity compensation could strengthen or weaken AC monitoring efforts on behalf of shareholders and thereby lead to stronger or weaker financial reporting oversight.

Although audit fees can be used in both demand-side and supply-side studies (DeFond and Zhang 2014), the demand side is more relevant to our study for the following reasons. First, our objective is to examine whether equity compensation influences AC audit fee decisions and the resulting earnings quality. Taking a demand-side perspective is appropriate in our setting because ACs are directly responsible for determining audit fees. Therefore, examining how auditors react to AC equity compensation will not directly address our research questions. Second, most AC studies take a demand-side perspective to examine factors that may enhance or impair AC effectiveness (e.g., Archambeault and Hermanson 2008; Beck and Mauldin 2014; Bruynseels and Cardinaels 2014; Campbell et al. 2015; Engel et al. 2010; Keune and Johnstone 2015) and audit fees are often used to test AC competencies in these demand-side studies (DeFond and Zhang 2014). Third, even though section 301 of SOX requires that ACs be directly responsible for determining audit fees to eliminate CEO/CFO influence over the auditors, these executives may offer large equity compensation to induce AC members to agree with or support management's earnings management decisions by purchasing less audit or demanding lower audit quality. Therefore, the AC agency problem is even more critical from the demand-side perspective and is especially so because investors and regulators believe that ACs can independently determine audit fees after SOX but ACs may in fact compromise independence due to high equity compensation.

Using the alignment and entrenchment theories examined in the agency literature, we reason that when AC members receive larger equity compensation from the firm, they face the following possible choices. First, following alignment theory (Jensen and Meckling 1976; Lambert et al. 2007) and prior governance literature (e.g., Fama and Jensen 1983; Monks and Minow 2011), larger equity compensation may align AC members' interests with shareholders' interests and thereby lead to more effective ACs. Because more effective oversight enhances a firm's internal governance system, ACs may demand less external monitoring from their auditors, which suggests a reduction in audit fees. We refer to this scenario as the AC *less demand* choice.[3]

Alternatively, more effective ACs may also demand higher audit quality in order to enhance the integrity of the firm's financial statements (Carcello et al. 2011), maintain their reputation capital (Fama 1980), and avoid litigation exposure (Naiker and Sharma 2009; Naiker et al. 2013). Prior research documents that ACs are sensitive to risk (e.g., Krishnan and Visvanathan 2008). Because ACs have a direct influence on the scope of auditors' work (Beasley et al. 2009; Carcello et al. 2002), AC demand for high-quality audits usually requires greater audit effort, which suggests an increase in audit fees. We refer to this scenario as the AC *more demand* choice.

Second, following entrenchment theory (Jensen and Ruback 1983; Shleifer and Vishny 1989), entrenched AC members may be more willing to tolerate managers' earnings manipulation to drive up stock price so that they can derive personal benefit from exercising options or selling stocks. Regulators and the financial press have expressed serious concern about whether equity compensation compromises AC independence, because stocks and options tie AC members' wealth to firms' short-term and long-term financial performance (Millstein 2002). Prior studies indicate that economic

3. By reducing audit fees, we mean that ACs still pay the normal audit fees but do not pay extra audit fees.

incentives may motivate ACs to focus on their own interests rather than on the interests of the other stakeholders (e.g., Dalton et al. 2003). If AC members' choice is consistent with self-interest, they are likely to demand less external auditing, which suggests a reduction in audit fees. We refer to this scenario as the *high incentive* choice because ACs have a high incentive to cut audit fees.

To the extent that ACs are responsible for determining audit fees and equity compensation impairs their independence, audit fee determination likely plays an important role in explaining the negative relation between AC equity compensation and earnings quality (Archambeault and Hermanson 2008; Campbell et al. 2015). Specifically, less independent ACs are likely to pay higher audit fees to induce the auditors to compromise independence through economic bonding to the firms, which may lead to lower earnings quality (Choi et al. 2010). This reasoning suggests an increase in audit fees. Because ACs have a low incentive to cut audit fees, we refer to this scenario as the *low incentive* choice.

Given that the preceding discussion indicates that the relation between audit fees and AC equity compensation cannot be ex ante predicted but can only be addressed empirically, we do not present formal hypotheses.

3. Research design

Regression model

We employ the following audit fee model (1) to examine the relation between audit fees and AC equity compensation (for brevity, we omit firm and year subscripts):

$$\begin{aligned} Ln(AF) = {} & \alpha_0 + \alpha_1 AC\_EBC\% + \alpha_2 SIZE + \alpha_3 FOREIGN + \alpha_4 SEGMENT + \alpha_5 CURRENT \\ & + \alpha_6 INVREC + \alpha_7 ROA + \alpha_8 LOSS + \alpha_9 MB + \alpha_{10} LEV + \alpha_{11} CFO + \alpha_{12} SPECIAL \\ & + \alpha_{13} RD + \alpha_{14} RESTRUCTURE + \alpha_{15} MA + \alpha_{16} RET\_VOL + \alpha_{17} ICW \\ & + \alpha_{18} CEO\_DELTA + \alpha_{19} CEO\_VEGA + \alpha_{20} CFO\_DELTA + \alpha_{21} CFO\_VEGA \\ & + \alpha_{22} CEO\_CHANGE + \alpha_{23} BDSIZE + \alpha_{24} BDIND + \alpha_{25} ACSIZE + \alpha_{26} TENURE \\ & + \alpha_{27} AUDIT\_CHANGE + \alpha_{28} BIG4 + \alpha_{29} LOG(NAS) + Industry\ and\ Year\ FE + \varepsilon. \end{aligned} \quad (1)$$

We provide detailed variable definitions in the Appendix.

Model (1) relates our primary dependent variable, the natural log of audit fees (*Ln(AF)*), to AC equity compensation (*AC_EBC%*). We follow Sengupta and Zhang (2015) and measure *AC_EBC%* as the average of the equity compensation ratios across all AC members of a firm. We control for both demand-side and supply-side audit fee determinants in model (1), using control variables identified in prior research (e.g., Beardsley et al. 2019; Chen et al. 2015; Engel et al. 2010; Kim et al. 2015). In addition, because we focus on the demand side to develop the relation between audit fees and AC equity compensation, we include more supply-side determinants to strengthen the reliability of our results. From the supply-side perspective, we consider five major types of firm-specific characteristics: *operational complexity* (*SIZE*, *FOREIGN*, and *SEGMENT*); *operating risks* such as liquidity (*CURRENT*), profitability (*ROA* and *LOSS*), inherent risk (*INVREC*), and future growth opportunity (*MB*); *financial risks* such as leverage (*LEV*), cash flow from operations (*CFO*), special items reported in the income statement (*SPECIAL*), R&D expenditure (*RD*), debt restructuring (*RESTRUCTURE*), merger and acquisition (*MA*), and stock return volatility (*RET_VOL*); *control risk* (*ICW*); *governance risks* such as CEO and CFO equity incentives (*CEO_DELTA*, *CEO_VEGA*, *CFO_DELTA*, and *CFO_VEGA*) and CEO turnover (*CEO_CHANGE*). From the demand-side perspective, we control for board characteristics such as board size (*BDSIZE*), board independence (*BDIND*), and AC size (*ACSIZE*). We also include auditor characteristics such as auditor tenure (*TENURE*), auditor turnover (*AUDIT_CHANGE*), auditor quality (*BIG4*), and nonaudit service fees (*LOG(NAS)*). We provide detailed variable definitions in the Appendix.

TABLE 1
Analyses of AC equity compensation

Panel A: Distribution by year

Year	Firms not offering equity compensation		Firms offering equity compensation		Numbers of firm-year observations	
	Number	Percentage of observations in each year (%)	Number	Percentage of observations in each year (%)	Number	Percentage of total (%)
2007	26	6.44	378	93.56	404	10.96
2008	22	5.02	416	94.98	438	11.89
2009	19	4.55	399	95.45	418	11.34
2010	20	4.76	400	95.24	420	11.40
2011	13	2.95	427	97.05	440	11.94
2012	12	2.85	409	97.15	421	11.42
2013	14	3.25	417	96.75	431	11.70
2014	21	5.22	381	94.78	402	10.91
2015	7	2.25	304	97.75	311	8.44
Total	154	4.18	3,531	95.82	3,685	100.00

Panel B: Distribution by industry

Industry (SIC Code)	Number	Percentage of total observations
Agriculture (0100–0999)	15	0.41
Mining and construction (1000–1999)	82	2.23
Food (2000–2111)	183	4.97
Textiles and printing/Publishing (2200–2799)	178	4.83
Chemicals (2800–2824, 2840–2899)	148	4.02
Pharmaceuticals (2830–2836)	160	4.34
Extractive (1300–1399, 2900–2999)	269	7.30
Durable manufacturing (3000–3999, excluding 3570–3579 and 3670–3679)	782	21.22
Transportation (4000–4899)	231	6.27
Utilities (4900–4999)	311	8.44
Retailing (5000–5999)	512	13.89
Services (7000–9999, excluding 7370–7379)	231	6.27
Computers (3570–3579, 3670–3679, 7370–7379)	583	15.82
Total	3,685	100.00

Panel C: Distribution by type of AC compensation

Year	Average amount of annual compensation ($)			Compensation structure (%)	
	Cash	Equity	Total	Cash	Equity
2007	81,844.68	187,215.65	272,023.14	43.31	56.73
2008	76,102.49	144,203.79	221,032.59	45.16	54.86
2009	78,856.17	174,925.09	254,047.08	39.96	60.06
2010	90,497.23	179,033.45	270,370.54	41.16	58.92
2011	87,514.37	183,983.96	272,049.80	40.61	59.44
2012	90,116.63	167,002.12	257,059.29	40.55	59.48

(The table is continued on the next page.)

TABLE 1 (continued)

Panel C: Distribution by type of AC compensation

	Average amount of annual compensation ($)			Compensation structure (%)	
Year	Cash	Equity	Total	Cash	Equity
2013	86,378.62	205,042.67	291,263.85	39.78	60.26
2014	88,353.08	204,217.49	292,520.45	40.11	59.91
2015	95,283.15	211,072.59	306,293.28	41.31	58.71
Average	86,105.16	184,077.42	270,740.00	41.33	58.71

Notes: Figures reported in panel C represent the dollar amounts and ratios of the average cash and equity compensation a firm pays to *all* its AC members in each year. The cash compensation does not include meeting fees.

In addition to the variables listed above, we include year and industry fixed effects to control for the potential effects of macroeconomic, regulatory, and industry-specific factors on audit fees (Adams and Ferreria 2009) and report *t*-statistics that are corrected for heteroskedasticity.

Sample selection

The initial sample consists of 9,374 firm-year observations with complete board characteristics and compensation data in BoardEx for the years 2007 through 2015. We exclude 1,893 observations representing firms in the financial services industry because firms from this industry have different financial reporting characteristics. We lose 663, 198, and 172 observations when we merge this sample with Audit Analytics, Compustat, and CRSP, respectively. We also lose 1,829 observations with missing data in ExecuComp when we compute CEO's and CFO's delta and vega. We truncate observations that fall in the top and bottom 1% of the sample distributions of the dependent and all continuous independent variables, resulting in a final sample of 742 firms with 3,685 firm-year observations.

Table 1 reports the distributions of our sample. Panel A shows that the yearly percentage of firms that do not offer equity compensation to their ACs decreased from a high of 6.44% in 2007 to a low of 2.25% in 2015. This result is consistent with the current trend of widespread use of stocks and options to compensate firms' outside directors. Over the sample period, about 96% of the observations offer equity compensation. The last two columns of panel A indicate that the sample is evenly distributed over 2007–2015, except for the last year when there are fewer observations.[4] Panel B shows that Durable manufacturing (21.22%), Computer (15.82%), Retailing (13.89%), Utilities (8.44%), Extractive (7.30%), and Services (6.27%) account for about 73% of the sample.

Table 1, panel C reports the average amounts and proportions of total cash and equity compensation paid to the ACs in our sample. BoardEx provides only the total amount of equity compensation and does not separate meeting fees but includes them in "Others" and "Total Compensation." Therefore, the total cash compensation reported in panel C does not include meeting fees and we do not decompose equity compensation into stock and option components. Panel C indicates that the average cash compensation increases while the cash proportion

4. We checked the raw compensation data and found that, as compared to 2007–2014, year 2015 has the smallest number of observations in BoardEx.

TABLE 2
Descriptive statistics (N = 3,673)

Variables	Min	Q1	Mean	Median	Q3	Max	SD
Ln(AF)	12.795	14.402	15.051	15.076	15.672	17.328	0.910
AC_EBC%	0.000	0.486	0.587	0.596	0.723	1.000	0.207
SIZE	4.736	7.856	8.708	8.796	9.708	12.252	1.419
FOREIGN	0.000	0.000	0.376	0.000	1.000	1.000	0.485
SEGMENT	0.000	4.000	6.362	6.000	9.000	22.000	3.723
CURRENT	0.476	1.180	2.005	1.686	2.485	7.858	1.188
INVREC	0.020	0.095	0.212	0.194	0.295	0.680	0.137
ROA	−0.227	0.062	0.106	0.100	0.146	0.371	0.072
LOSS	0.000	0.000	0.118	0.000	0.000	1.000	0.322
MB	−18.834	1.585	3.194	2.483	3.952	29.405	3.270
LEV	0.000	0.126	0.241	0.238	0.343	0.829	0.158
CFO	−0.025	0.019	0.030	0.028	0.039	0.093	0.016
SPECIAL	0.000	1.000	0.823	1.000	1.000	1.000	0.381
RD	0.000	0.000	0.503	1.000	1.000	1.000	0.500
RESTRUCTURE	0.000	0.000	0.478	0.000	1.000	1.000	0.500
MA	0.000	0.000	0.536	1.000	1.000	1.000	0.499
RET_VOL	0.026	0.039	0.046	0.047	0.054	0.061	0.010
ICW	0.000	0.000	0.017	0.000	0.000	1.000	0.129
CEO_DELTA	4.553	139.159	773.917	349.864	794.828	17343.530	1530.470
CEO_VEGA	0.000	22.697	181.997	104.068	257.423	1405.400	218.795
CFO_DELTA	0.478	27.467	113.541	65.213	145.019	983.069	133.471
CFO_VEGA	0.000	5.299	44.670	25.277	61.980	404.217	55.357
CEO_CHANGE	0.000	0.000	0.104	0.000	0.000	1.000	0.305
BDSIZE	4.000	8.000	9.473	9.000	11.000	16.000	2.509
BDIND	0.600	0.889	0.935	1.000	1.000	1.000	0.086
ACSIZE	3.000	4.000	4.554	4.000	5.000	8.000	1.185
TENURE	1.000	3.000	7.690	8.000	16.000	32.000	8.004
AUDIT_CHANGE	0.000	0.000	0.018	0.000	0.000	1.000	0.135
BIG4	0.000	1.000	0.964	1.000	1.000	1.000	0.185
LOG(NAS)	0.000	12.181	12.871	13.329	14.268	16.645	2.542

Notes: This table presents the descriptive statistics of all variables used in our analyses. See Appendix for the definitions of variables. For ease of readability, we report the original means and medians of *SEGMENT, BDSIZE, ACSIZE* and *TENURE*. In the regressions, we use the natural log values of these numbers.

decreases during 2007–2014 and then increases in 2015. In contrast, the average equity compensation increases and the equity proportion remains relatively stable at around 60% between 2009 and 2014 and decreases slightly in 2015. Lastly, the average total compensation paid in 2015 is 38.57% larger than the amount in 2008. This large increase implies that the demand for AC monitoring increased during our sample period, consistent with recent survey reports (e.g., National Association of Corporate Directors (NACD) 2015).

Table 2 reports the descriptive statistics for all variables used in the study. The mean of *Ln* (*AF*) is 15.051, which is comparable to the mean of 14.095 reported in Kim et al. (2015). On average, the ratio of equity compensation to total compensation across all AC members in a firm is 58.7%. We note that firms have 93.5% independent directors serving on their boards and only 1.7% of the firms have internal control weaknesses. In addition, almost 97% of the firms are audited by a Big 4 auditor. These statistics suggest that our sample firms have good internal and

TABLE 3
Pearson correlation coefficients

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1)	1.000														
(2)	**0.035**	1.000													
(3)	**0.780**	**0.048**	1.000												
(4)	**0.108**	0.020	**−0.084**	1.000											
(5)	**0.373**	**−0.033**	**0.161**	**0.263**	1.000										
(6)	**−0.300**	0.024	**−0.406**	**0.152**	**0.091**	1.000									
(7)	−0.022	**−0.063**	**−0.228**	**0.062**	**0.089**	**0.143**	1.000								
(8)	−0.016	**0.107**	−0.004	0.010	**−0.043**	**0.113**	**0.217**	1.000							
(9)	**−0.077**	**−0.099**	**−0.170**	**0.043**	−0.021	0.026	−0.017	**−0.482**	1.000						
(10)	0.022	**0.129**	−0.001	−0.010	**−0.034**	0.013	**0.046**	**0.350**	**−0.170**	1.000					
(11)	**0.166**	**−0.041**	**0.262**	**−0.108**	**−0.079**	**−0.327**	**−0.195**	**−0.160**	**0.104**	**0.028**	1.000				
(12)	**−0.159**	**0.147**	**−0.086**	0.002	**−0.107**	**0.096**	**−0.037**	**0.679**	**−0.314**	**0.268**	**−0.263**	1.000			
(13)	**0.254**	0.012	**0.108**	**0.101**	**0.161**	**−0.049**	**−0.072**	**−0.189**	**0.143**	**−0.040**	**0.157**	**−0.206**	1.000		
(14)	**0.229**	**0.096**	**−0.076**	**0.239**	**0.339**	**0.265**	**0.090**	**0.032**	0.010	**0.149**	**−0.182**	−0.006	**0.212**	1.000	
(15)	**0.276**	0.022	**0.070**	**0.169**	**0.222**	0.009	**0.046**	**−0.126**	**0.129**	0.000	**0.085**	**−0.158**	**0.441**	**0.351**	1.000
(16)	**0.162**	**0.045**	0.014	**0.099**	**0.170**	**0.032**	**0.071**	**0.030**	−0.027	0.011	**−0.036**	−0.022	**0.193**	**0.204**	**0.142**
(17)	**−0.079**	**0.042**	**−0.035**	0.018	**−0.030**	**0.066**	0.000	0.027	**−0.037**	**−0.048**	**−0.057**	0.015	−0.001	−0.012	−0.025
(18)	−0.001	**−0.048**	**−0.075**	0.025	0.016	0.003	0.018	**−0.082**	**0.096**	−0.019	0.016	**−0.035**	**0.033**	**0.033**	0.027
(19)	**0.099**	**0.132**	**0.128**	−0.001	**−0.055**	−0.004	−0.016	**0.146**	**−0.097**	**0.109**	−0.013	**0.140**	−0.026	−0.001	**−0.040**
(20)	**0.426**	**0.103**	**0.410**	**0.047**	**0.139**	**−0.055**	**−0.029**	**0.167**	**−0.143**	**0.114**	−0.008	**0.096**	**0.070**	**0.182**	**0.106**
(21)	**0.258**	**0.184**	**0.306**	−0.017	0.011	**−0.052**	0.020	**0.222**	**−0.168**	**0.198**	**−0.035**	**0.174**	−0.025	**0.071**	−0.025
(22)	**0.348**	**0.127**	**0.355**	0.027	**0.077**	−0.019	−0.002	**0.162**	**−0.134**	**0.102**	−0.013	**0.099**	**0.052**	**0.162**	**0.083**
(23)	**0.039**	−0.016	0.014	0.024	0.023	−0.009	0.010	**−0.053**	**0.066**	−0.013	−0.002	**−0.037**	**0.038**	**0.029**	**0.065**
(24)	**0.552**	−0.019	**0.605**	**−0.045**	**0.138**	**−0.321**	**−0.099**	−0.010	**−0.112**	−0.005	**0.223**	**−0.127**	**0.142**	−0.015	**0.123**
(25)	**−0.047**	**0.099**	**−0.102**	0.019	−0.001	**0.081**	0.004	**0.033**	**0.028**	**0.027**	**−0.058**	**0.066**	0.005	**0.107**	**0.049**
(26)	**0.324**	**−0.057**	**0.348**	**−0.079**	**0.084**	**−0.221**	0.012	−0.017	**−0.041**	0.008	**0.154**	**−0.106**	**0.073**	−0.005	**0.055**
(27)	**0.245**	0.015	**0.280**	**−0.043**	**0.070**	**−0.087**	**0.030**	**0.091**	**−0.096**	**0.076**	**0.044**	0.024	0.003	**0.054**	**0.061**
(28)	**−0.053**	**−0.030**	**−0.065**	**0.043**	−0.006	0.026	0.000	**−0.056**	**0.063**	−0.026	0.003	**−0.049**	**0.027**	−0.005	−0.002
(29)	**0.225**	**0.059**	**0.257**	0.004	**0.061**	**−0.124**	**−0.112**	**0.045**	**−0.048**	**0.041**	**0.125**	**0.033**	**0.076**	0.026	**0.063**
(30)	**0.550**	**0.052**	**0.459**	**0.081**	**0.200**	**−0.150**	−0.019	**0.033**	**−0.097**	0.034	**0.087**	**−0.084**	**0.160**	**0.192**	**0.203**

(The table is continued on the next page.)

TABLE 3 (continued)

	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)
(16)	1.000														
(17)	−0.022	1.000													
(18)	0.012	**−0.040**	1.000												
(19)	**0.034**	−0.016	**−0.029**	1.000											
(20)	**0.074**	**0.063**	−0.025	**0.286**	1.000										
(21)	**0.045**	−0.007	**−0.051**	**0.266**	**0.384**	1.000									
(22)	**0.076**	**0.084**	**−0.048**	**0.182**	**0.718**	**0.625**	1.000								
(23)	−0.025	−0.006	0.018	**−0.107**	**−0.111**	**−0.040**	−0.008	1.000							
(24)	0.002	**−0.029**	**−0.036**	0.001	**0.277**	**0.139**	**0.218**	**0.033**	1.000						
(25)	0.017	**0.045**	0.021	−0.009	−0.022	**−0.049**	**−0.051**	**−0.041**	**−0.277**	1.000					
(26)	−0.010	−0.020	−0.010	−0.024	**0.110**	0.023	**0.054**	0.010	**0.513**	**0.055**	1.000				
(27)	−0.018	**0.035**	−0.025	**0.043**	**0.175**	**0.115**	**0.152**	0.015	**0.280**	−0.021	**0.212**	1.000			
(28)	**0.047**	**−0.074**	**0.029**	−0.020	**−0.039**	−0.017	**−0.043**	−0.020	**−0.045**	−0.001	**−0.029**	**−0.150**	1.000		
(29)	0.045	0.010	0.002	**0.059**	**0.112**	**0.092**	**0.106**	0.012	**0.220**	−0.016	**0.101**	**0.190**	**−0.050**	1.000	
(30)	**0.104**	−0.022	−0.011	**0.071**	**0.254**	**0.163**	**0.230**	0.016	**0.375**	**−0.070**	**0.186**	**0.198**	**−0.056**	**0.158**	1.000

Notes: In this table, (1) = *Ln(AF)*; (2) = *AC_EBC%*; (3) = *SIZE*; (4) = *FOREIGN*; (5) = *SEGMENT*; (6) = *CURRENT*; (7) = *INVREC*; (8) = *ROA*; (9) = *LOSS*; (10) = *MB*; (11) = *LEV*; (12) = *CFO*; (13) = *SPECIAL*; (14) = *RD*; (15) = *RESTRUCTURE*; (16) = *MA*; (17) = *RET_VOL*; (18) = *ICW*; (19) = *CEO_DELTA*; (20) = *CEO_VEGA*; (21) = *CFO_DELTA*; (22) = *CFO_VEGA*; (23) = *CEO_CHANGE*; (24) = *BDSIZE*; (25) = *BDIND*; (26) = *ACSIZE*; (27) = *TENURE*; (28) = *AUDIT_CHANGE*; (29) = *BIG4*; (30) = *LOG(NAS)*. See Appendix for variable definitions. Correlation coefficients that are significant at the 0.10 level or better are in bold.

external governance. Lastly, a board has about 10 directors and an AC has about 5 independent directors.

Table 3 presents Pearson correlation coefficients between the dependent and the independent variables. First, the correlation between *Ln(AF)* and *AC_EBC%* is positive and significant. Because this correlation is pairwise, the coefficient sign may differ in the multivariate analysis that controls for relevant differences. Second, *Ln(AF)* is negatively related to *CURRENT* and *CFO* (significant at the 0.05 level or better), implying that auditors charge lower audit fees if clients are less risky due to their high liquidity and cash flow from operations. Third, *Ln(AF)* is positively related to *SIZE*, *FOREIGN*, *SEGMENT*, *LEV*, *RESTRUCTURE*, *MA*, *CEO_VEGA*, and *CFO_VEGA* (significant at the 0.05 level or better), which indicates that auditors charge higher audit fees if firms are riskier due to higher complexity, operating losses, higher financial leverage, debt restructuring, mergers, and CEO/CFO equity incentives. Fourth, *Ln(AF)* is positively associated with *BDSIZE* and *ACSIZE* (significant at the 0.01 level), indicating that larger boards and ACs are likely to pay higher audit fees. These results show that board governance is positively related to audit fees.[5]

4. Empirical results

Main results

Relation between audit fees and AC equity compensation

We report the estimation results of model (1) in Table 4. The adjusted R^2 is 0.823, indicating that the model explains a large portion of the variation in audit fees. The coefficient on *AC_EBC%* is negative and significant at the 0.05 level, implying that the higher the proportion of AC equity compensation, the lower the audit fees. Using the mean value of *Ln(AF)* as the reference point (the raw value is exp(15.051) = $3,440,062), this coefficient indicates that a one-unit increase in *AC_EBC%* is associated with a reduction of $297,710 in raw audit fees.[6,7] These results are consistent with the *less demand* choice scenario and also with the *high incentive* choice scenario. We attempt to distinguish between these two scenarios in the following section.

Whereas we find a negative association between audit fees and AC equity compensation, recent studies report a positive association between audit fees and CEO/CFO equity incentives (e.g., Billings et al. 2014; Chen et al. 2015; Kim et al. 2015). Three possible reasons may explain this difference. First, prior audit fee studies usually adopt a supply-side perspective to examine whether auditors are able to incorporate certain risks related to management compensation into their fee determination. Because CEO and CFO equity incentives are regarded as sources of risk (i.e., equity vega induces risk-taking behavior), auditors will charge

5. The univariate correlations between *Ln(AF)* and *LOSS* and *BDIND* are negative, suggesting that lower audit fees are associated with firms incurring operating losses or with more independent directors on the boards. In addition, the correlation between *Ln(AF)* and *ICW* is not significant. However, the regression results of our model (1) show that the coefficients on *LOSS*, *ICW*, and *BDIND* are all positive and significant at the 0.05 level or better. These results suggest that after controlling for correlated variables that affect audit fees, *LOSS*, *ICW*, and *BDIND* are positively associated with audit fees, consistent with prior studies.

6. We find that a one standard deviation (0.207, see Table 2) increase in *AC_EBC%* is associated with an audit fee reduction of $59,104 (i.e., [exp(0.083 × 0.207) − 1] × $3,440,062). This amount is important because it is almost equal to the highest salary level the Big 4 pay to an entry-level staff (Corporate Finance Institute 2020). In response to such audit fee reduction, an audit firm may choose to reduce the recruitment of new audit staff or assign less experienced auditors to each audit engagement. These human resources policies will harm audit firms' long-term audit quality because their human capital will decrease.

7. Because the audit fees are log-transformed, it may not be necessary to delete observations in the top and bottom 1% of *Ln(AF)*. We therefore reestimate model (1) after including the additional 29 observations. Untabulated results show that the coefficient on *AC_EBC%* is negative (i.e., −0.066) and significant at the 0.10 level ($p < 0.059$), which represents an audit fee reduction of $46,998 (i.e., −0.066 × 0.207 × exp(15.051)). This robustness check indicates that our main results reported in Table 4 are not sensitive to truncating observations for *Ln(AF)*.

TABLE 4
Relation between audit fees and AC equity-based compensation (N = 3,685)

	Dep. = Ln(AF)	
Variables	Coeff.	*t*-stat.
Intercept	9.166	48.26***
AC_EBC%	−0.083	−2.61***
SIZE	0.482	55.68***
FOREIGN	0.078	5.22***
SEGMENT	0.120	8.31***
CURRENT	−0.045	−6.22***
INVREC	1.233	14.36***
ROA	0.326	1.83*
LOSS	0.117	4.77***
MB	−0.002	−0.73
LEV	0.005	0.08
CFO	−3.484	−5.07***
SPECIAL	0.116	5.68***
RD	0.155	6.33***
RESTRUCTURE	0.058	3.59***
MA	0.037	2.62***
RET_VOL	−1.299	−0.60
ICW	0.228	3.68***
CEO_DELTA	0.000	−0.02
CEO_VEGA	0.000	6.21***
CFO_DELTA	0.000	1.15
CFO_VEGA	0.000	−1.31
CEO_CHANGE	0.045	2.12**
BDSIZE	0.235	6.11***
BDIND	0.411	4.81**
ACSIZE	−0.014	−0.44
TENURE	−0.015	−1.87*
AUDIT_CHANGE	−0.059	−1.11
BIG4	0.016	0.37
LOG(NAS)	0.031	8.28***
Industry and Year FE	Included	
Adj. R^2	0.821	

Notes: This table presents the results of estimating the relation between audit fees and AC equity compensation. The dependent variable is the natural log of total audit fees. See Appendix for variable definitions. All the *t*-statistics are corrected for heteroskedasticity. *, **, and *** denote two-tailed significance levels at 10%, 5%, and 1%, respectively.

higher audit fees. In contrast, we take a demand-side approach to examine whether AC independence is affected by equity compensation which, in turn, influences AC audit fee decisions. Second, we estimate a lagged change model in which we regress the change in *Ln(AF)* (from $t-1$ to t) on the change in *AC_EBC%* (from $t-2$ to $t-1$), the change in stock returns (from $t-1$ to t), and the changes in all other control variables (from $t-1$ to t) in model (1). The coefficient on the change in *AC_EBC%* is 0.018, which is not significantly different from zero (t = 1.01). This result suggests that auditors do not regard the change in AC equity compensation (from $t-2$ to $t-1$) as a risk source and react by increasing audit fees (from $t-1$ to t). Therefore, the supply-side story may not be as appropriate for our study. Third, we re-estimate model (1) after

removing *AC_EBC%*. The results show that the coefficients on *CEO_VEGA* and *CFO_VEGA* are both positive and significant at the 0.05 level or better ($t = 5.30$, $p < 0.001$ and $t = 2.06$, $p < 0.039$, respectively), consistent with prior supply-side audit fee studies.[8]

Turning to the control variables, the signs of the coefficients are generally consistent with expectations. Audit fees are positively associated with operational complexity (*SIZE*, *FOREIGN*, and *SEGMENT*), inherent risk (*INVREC*), operating risk (*LOSS*), financial risk (*SPECIAL*, *RD*, *RESTRUCTURE*, and *MA*), control risk (*ICW*), audit risk (*CEO_VEGA* and *CEO_CHANGE*), board governance (*BDSIZE* and *BDIND*), and nonaudit service fees (*LOG(NAS)*)[9] (all are significant at the 0.10 level or better). These results imply that auditors are able to adjust audit fees upward in response to clients' risks, consistent with prior studies (e.g., Beardsley et al. 2019; Hogan and Wilkins 2008; Kim et al. 2015). In contrast, audit fees are negatively related to liquidity (*CURRENT*) and cash flow from operations (*CFO*) (significant at the 0.01 level), suggesting that auditors regard firms with higher liquidity or cash flow from operations as less risky and, therefore, charge lower audit fees.[10]

Distinguishing between the alignment and the entrenchment explanations

The results reported in Table 4 are consistent with both the *less demand* and the *high incentive* scenarios but do not distinguish which scenario better describes the observed negative relation between audit fees and AC equity compensation. We attempt to do so with the following tests. Under the *less demand* scenario, equity compensation should induce ACs to monitor firms' financial reporting more closely, which suggests a positive relation between earnings quality and AC equity compensation. In contrast, under the *high incentive* scenario, we should observe a negative relation between earnings quality and AC equity compensation. To distinguish between these two scenarios, we regress earnings quality (*EQ*) proxies on *AC_EBC%* and a set of controls using the following model (2):

$$\begin{aligned} EQ = {} & \alpha_0 + \alpha_1 AC\_EBC\% + \alpha_2 SIZE + \alpha_3 SEGMENT + \alpha_4 CURRENT + \alpha_5 INVREC \\ & + \alpha_6 ROA + \alpha_7 LOSS + \alpha_8 LEVA + \alpha_9 RD + \alpha_{10} SALE\_VOL + \alpha_{11} RET\_VOL + \alpha_{12} ICW \\ & + \alpha_{13} CEO\_CHANGE + \alpha_{14} BDSIZE + \alpha_{15} BDIND + \alpha_{16} ACSIZE + \alpha_{17} TENURE \\ & + \alpha_{18} AUDIT\_CHANGE + \alpha_{19} BIG4 + \alpha_{20} LOGMV + Industry\ and\ Year\ FE + \varepsilon. \end{aligned} \quad (2)$$

We provide detailed variable definitions in the Appendix.

8. Even though section 301 of SOX requires that ACs be directly responsible for determining audit fees to eliminate CEO/CFO's influence over the auditors, AC members and CEOs/CFOs face similar agency conflicts for two reasons. First, prior studies find that economic incentives may motivate ACs to focus on their own interests rather than on the interests of the other stakeholders (e.g., Dalton et al. 2003; Hillman and Dalziel 2003). Prior studies also find that when managers and AC members have incentives, they are likely to process information in a manner consistent with those incentives (e.g., Campbell et al. 2015). Second, as indicated in the section "Relation between audit fees and AC equity compensation," although CEOs/CFOs cannot determine the audit fees, they may offer large equity compensation to induce the AC members to agree with or support management's earnings management decisions by purchasing less audit or demanding lower audit quality. This is the key issue we want to examine in our study.

9. As a robustness check, we reestimate model (1) after replacing *LOG(NAS)* with the ratio of NAS fees to total audit fees. Our results reported in Table 4 remain unchanged using this alternative measure of NAS fees.

10. Different from prior audit fee studies, the coefficients on *BIG4* are not significant in the main test and most of the additional and robustness tests. We provide two explanations for this result. First, we use our final sample to estimate an auditor choice model and find that equity compensation does not influence AC members' Big 4 auditor choice decisions. This finding and the results reported in Table 4 imply that, even though ACs that receive large equity compensation do not want to buy more audit effort from the Big 4 auditors, they select Big 4 auditors as a signal of financial reporting quality to firms' stakeholders. Second, we use the annual medians of *AC_EBC%* to separate our sample into high and low *AC_EBC%* subsamples and reestimate model (1) after excluding *AC_EBC%*. Untabulated results show that the coefficient on *BIG4* is not significant in the high *AC_EBC%* subsample but is significant in the low *AC_EBC%* subsample. These results provide demand-side evidence that ACs appear not to pay a fee premium to the Big 4 when they receive large equity compensation.

In model (2), we use three measures to capture firms' earnings quality: performance-adjusted discretionary accruals (absolute value *Abs_DA* and signed values *Pos_DA* and *Neg_DA*), restatement likelihood (*RESTATE*), and real earnings management (*REM1* and *REM2*). We provide detailed definitions of these measures in the Appendix.

Table 5 reports that the coefficients on *AC_EBC%* are significantly positive at the 0.05 level when the dependent variables are *Abs_DA*, *Pos_DA*, *RESTATE*, *REM1*, and *REM2*, suggesting that earnings quality decreases as the proportion of AC equity compensation increases. These results are consistent with the *high incentive* scenario, which indicates that the negative relation between audit fees and AC equity compensation likely decreases the auditors' probability of detecting earnings management.[11] Our results are also consistent with prior studies that suggest that auditors could decrease audit hours or use less experienced auditors in response to reduced audit fees, which would decrease the likelihood of detecting firms' earnings management (e.g., Beck and Mauldin 2014; PCAOB 2010a, 2010b, 2010c).

Prior research finds that managers may use accrual-based and real earnings management as substitutes (e.g., Zang 2012; Cohen et al. 2008). Based on these findings, Chi et al. (2011) use audit fees to proxy for audit quality and find a positive (negative) association between audit fees and real (accrual-based) earnings management. They interpret their results as evidence that because higher audit quality constrains accrual-based earnings management, firms resort to more costly real earnings management to accomplish their earnings management objectives. However, our Table 5 results imply that audit fees are negatively related to both accrual-based and real earnings management.[12] This apparent inconsistency may be explained by the following two possible reasons. First, because Chi et al. (2011) focus on firms that have strong incentives to manage earnings *upward*, they restrict their sample to firms that meet or just beat earnings benchmarks or issue seasoned equity offerings. Unlike Chi et al. (2011), we place no restrictions on our sample. This difference in sample composition is one possible reason for the apparent inconsistency in the observed relation between audit fees and real earnings management between Chi et al. (2011) and our study. Second, Cohen et al. (2008) and Zang (2012) use both pre- and post-SOX samples (i.e., 1987–2005 and 1987–2008, respectively) to test firms' trade-off between accrual-based and real earnings management. In contrast, we use a more recent, post-SOX only sample (i.e., 2007–2015). It is possible that firms' trade-off strategy has changed in recent years. To provide *indirect* evidence for this conjecture, we follow Beck and Mauldin (2014) and use AC chair tenure and CFO tenure to control for the relative power of the AC chair and the CFO in determining audit fees.[13] Whereas Beck and Mauldin (2014) report a mean of −0.154 for AC chair relative power (which suggests that on average the CFOs are relatively more powerful than the AC chairs) in their 2006–2009 sample, we find that the mean of AC chair relative power is 0.036 (which indicates that on average the AC chairs are relatively more powerful than the CFOs) in our 2007–2015 sample. To better understand the difference in relative power between Beck and Mauldin (2014) and our study, we compute the relative power for three subperiods of our sample: 2007–2009, 2010–2012, and 2013–2015. We find

11. Zang (2012) finds that firms can adjust the extent of accrual-based earnings management based on the observed impact of real earnings management. Although we include *Abs_DA* because firms may potentially substitute accrual-based and real earnings management, as a robustness check, we reestimate our two *REM* models after dropping *Abs_DA*. The empirical results show that the coefficients on *AC_EBC%* (i.e., 0.788 and 0.786 in the *REM1* and *REM2* models, respectively) remain positive and significant at the 0.05 level ($t = 2.45$, $p < 0.015$ and $t = 2.47$, $p < 0.014$, respectively), which indicates that our *REM* results are not affected by the inclusion of *Abs_DA*.

12. We thank an anonymous reviewer for this suggestion regarding prior literature on the substitution of accruals-based and real earnings-based management and the association with audit quality.

13. We sort all firm-year observations into quartiles based on AC chair tenure (*AC_QUARTILE*) and CFO tenure (*CFO_QUARTILE*). Each set of quartile values ranges from 1 to 4. We then create a variable *RELATIVE_AC_CFO* (which equals *AC_QUARTILE − CFO_QUARTILE*) to capture the relative power of the AC chair and the CFO. By definition, *RELATIVE_AC_CFO* ranges from −3 to +3. Positive values of *RELATIVE_AC_CFO* indicate higher AC power relative to CFO power, and vice versa. Therefore, we classify firms with positive and negative *RELATIVE_AC_CFO* as having high and low AC relative power, respectively.

TABLE 5
Relation between earnings quality and AC equity-based compensation

	Dep. = Abs_DA		*Dep. = Pos_DA*		*Dep. = Neg_DA*		*Dep. = RESTATE*		*Dep. = REM1*		*Dep. = REM2*	
Variables	Coeff.	*t*-stat.	Coeff.	*t*-stat.	Coeff.	*t*-stat.	Coeff.	*t*-stat.	Coeff.	*t*-stat.	Coeff.	*t*-stat.
Intercept	0.018	0.95	0.065	2.27**	0.010	0.51	0.764	0.60	1.036	0.74	1.223	0.90
AC_EBC%	0.009	2.08**	0.017	2.35**	−0.002	−0.40	0.597	1.96**	0.767	2.19**	0.776	2.22**
SIZE	−0.002	−1.40	−0.003	−1.27	0.001	1.06	−0.157	−2.44**	−0.027	−0.37	−0.066	−0.92
SEGMENT	0.001	0.33	−0.001	−0.24	−0.002	−1.13	0.130	1.04	0.053	0.57	0.054	0.59
CURRENT	0.003	2.39**	0.002	1.09	−0.001	−1.06	−0.103	−1.60	−0.092	−1.19	−0.091	−1.18
INVREC	−0.018	−1.16	0.020	0.80	0.041	2.41**	−0.386	−0.60	0.921	1.05	0.582	0.67
ROA	−0.048	−1.59	0.160	3.85***	0.231	6.35***	−3.892	−2.83***	−1.104	−1.15	−0.106	−0.11
LOSS	0.026	7.53***	−0.008	−1.82	−0.036	−8.15***	−0.211	−1.06	−0.003	−0.03	0.045	0.40
LEV	0.009	1.18	−0.006	−0.62	−0.032	−3.33***	1.122	2.66***	−0.008	−0.02	0.007	0.02
CFO	1.351	8.77***	−1.567	−4.52***	−2.907	−18.71***	−2.388	−0.44	−1.359	−0.23	−4.258	−0.73
RD	0.007	2.46**	0.006	1.43	−0.005	−1.22	−0.072	−0.36	−0.226	−1.68*	−0.196	−1.50
SALE_VOL	0.027	2.38**	0.009	0.98	−0.035	−2.37**	0.539	1.56	0.170	0.48	−0.040	−0.12
RET_VOL	−0.488	−1.45	−0.657	−1.22	0.391	1.13	10.974	0.59	−18.819	−2.18**	−15.745	−1.88*
ICW	0.000	−0.01	0.014	1.42	−0.001	−0.09	2.981	9.48***	0.061	0.35	0.072	0.44
CEO_CHANGE	0.003	1.03	0.002	0.61	−0.002	−0.66	−0.035	−0.19	−0.225	−1.60	−0.251	−1.83*
BDSIZE	0.001	0.26	0.005	0.53	−0.003	−0.62	−0.343	−1.10	−0.292	−0.77	−0.233	−0.62
BDIND	−0.004	−0.33	−0.026	−1.38	−0.007	−0.65	−2.273	−3.33***	−0.605	−0.80	−0.695	−0.93
ACSIZE	0.008	1.75*	0.003	0.46	−0.007	−1.32	0.328	1.19	0.571	1.61	0.536	1.52
TENURE	0.000	0.05	0.000	0.03	0.000	0.21	0.015	0.21	−0.023	−0.31	−0.025	−0.34
AUDIT_CHANGE	0.004	0.64	0.012	0.94	−0.001	−0.21	0.250	0.63	0.142	0.77	0.104	0.59
BIG4	−0.001	−0.11	−0.001	−0.18	−0.002	−0.34	0.793	1.01	0.532	1.41	0.548	1.46
Abs_DA									1.006	1.22	0.984	1.22
Industry and Year FE	Included		Included		Included		Included		Included		Included	
N	3,629		1,249		2,380		3,568		2,769		2,769	
Adj. R^2/Pseudo R^2	0.313		0.180		0.486		0.124		0.081		0.069	

Notes: This table presents the results of estimating the relation between earnings quality and AC equity compensation. The dependent variables are absolute, positive, and negative performance-adjusted discretionary accruals, restatement likelihood, and two real earnings management measures. See Appendix for variable definitions. All the *t*-statistics are corrected for heteroskedasticity. *, **, and *** denote two-tailed significance levels at 10%, 5%, and 1%, respectively.

that the mean of AC chair relative power increases from −0.034 in 2007–2009 to 0.013 in 2010–2012 and to 0.106 in 2013–2015. This increasing trend in mean value suggests that AC chairs have become more powerful than CFOs since 2010. Because the CFOs are less likely to have the power to influence firms' earnings management although they may have incentives to do so, the substitution effect between accrual-based and real earnings management may have changed over time.

An alternative explanation for the positive relation between *RESTATE* and *AC_EBC%* is that more effective ACs are more likely to detect and report material misstatements, which would lead to a higher restatement likelihood (Srinivasan et al. 2015). If this alternative explanation is valid, restatements for firms that pay larger equity compensation to their ACs should be less severe if the ACs provide stricter oversight. Following Carcello et al. (2011) and Bruynseels and Cardinaels (2014), we classify a restatement as severe if it involves a change in net income of more than 10% of a firm's beginning total assets in the announcement year. We then regress an indicator for restatement severity on *AC_EBC%* and a set of controls used in prior studies. Untabulated results show that the coefficient on *AC_EBC%* is positive and significant at the 0.10 level ($t = 1.72$, $p < 0.088$), suggesting that restatements of firms that pay larger equity compensation to their ACs are more likely to be classified as severe. In fact, the significantly positive coefficients on *AC_EBC%* across our accrual-based and real earnings management measures also provide some evidence that the alternative explanation is not appropriate for interpreting our results.

As in the preceding estimations, the coefficients on *BIG4* are insignificant in the discretionary accruals and real earnings management models. These results are consistent with the results in Table 4, which indicate that ACs receiving large equity compensation are less likely to pay a fee premium to their Big 4 auditors. Because the Big 4 auditors do not earn a fee premium, they are less effective at mitigating firms' earnings management. Another possible reason for these insignificant coefficients is that about 96% of our sample firms are audited by Big 4 auditors (Table 2 shows that the mean of *BIG4* is 0.964). Due to the small variation in *BIG4*, the explanatory power of *BIG4* in the earnings management models could be weak.[14]

Tests of endogeneity

The results in Table 4 show a negative relation between audit fees and AC equity compensation. However, the possibility that this relation is endogenously determined could be a concern in our analysis. The first source of endogeneity is time-invariant unobservable heterogeneity, which arises if there are unobservable firm-specific factors that affect both AC equity compensation and the determination of audit fees. To address this potential endogeneity problem, we use a change model and include firm fixed effects (Kim et al. 2015).

Panel A of Table 6 shows that the coefficient on *ΔAC_EBC%* is negative and significant at the 0.10 level. These results are consistent with the Table 4 results and indicate that the change in equity compensation is negatively related to the change in audit fees. We also re-estimate our regression models after including firm fixed effects. Panel B of Table 6 indicates that the results from the fixed effects regression are consistent with the change analysis results, indicating that the observed negative relation between audit fees and AC equity compensation is robust to controlling for time-invariant unobservable heterogeneity.

The above two approaches may not mitigate the potential endogeneity that could arise when omitted time-variant variables lead to both a change in equity compensation and a change in audit fees. To address this concern, we follow prior research (e.g., Carcello et al. 2002; Vafeas and

14. Recent research using discretionary accruals as measures of audit quality also reports insignificant coefficients on *BIG4*, even though the mean values of *BIG4* are all smaller than ours. For example, the range of the mean value of *BIG4* is between 0.64 and 0.85 in Laurion et al. (2017), Lennox (2016), and Lobo and Zhao (2013). All these studies do not find a significant Big 4 effect in their audit quality models.

TABLE 6
Relation between audit fees and AC equity-based compensation: Controlling for endogeneity

Panel A: Change model (N = 2,679)

	Dep. = Ln(ΔAF)	
Variables	Coeff.	*t*-stat.
Intercept	0.087	2.79***
ΔAC_EBC%	−0.033	−1.83*
ΔSIZE	0.385	11.84***
ΔFOREIGN	−0.015	−1.06
ΔSEGMENT	−0.011	−0.87
ΔCURRENT	−0.001	−0.21
ΔINVREC	0.387	2.25**
ΔROA	−0.114	−1.21
ΔLOSS	0.010	0.89
ΔMB	0.002	1.12
ΔLEV	0.043	0.58
ΔCFO	−0.815	−2.51**
ΔSPECIAL	0.005	0.77
ΔRD	−0.003	−0.05
ΔRESTRUCTURE	0.011	1.55
ΔMA	0.009	1.43
ΔRET_VOL	1.590	1.78*
ΔICW	0.009	0.24
ΔCEO_DELTA	0.000	−1.77*
ΔCEO_VEGA	0.000	−0.68
ΔCFO_DELTA	0.000	0.33
ΔCFO_VEGA	0.000	−0.28
ΔCEO_CHANGE	−0.003	−0.44
ΔBDSIZE	0.065	1.85*
ΔBDIND	0.135	1.38
ΔACSIZE	−0.020	−1.00
ΔTENURE	0.063	3.11***
ΔAUDIT_CHANGE	0.040	1.41
ΔBIG4	0.092	2.05**
ΔLOG(NAS)	0.004	1.81*
Industry and Year FE	Included	
Adj. R^2	0.203	

Panel B: Firm fixed effects model (N = 3,685)

	Dep. = Ln(AF)	
Variables	Coeff.	*t*-stat.
Intercept	11.210	52.07***
AC_EBC%	−0.036	−1.94*
SIZE	0.414	23.40***
FOREIGN	0.006	0.46
SEGMENT	0.009	0.67
CURRENT	−0.014	−2.41**
INVREC	0.474	4.20***

(The table is continued on the next page.)

TABLE 6 (continued)

Panel B: Firm fixed effects model (N = 3,685)

	Dep. = Ln(AF)	
Variables	Coeff.	*t*-stat.
ROA	−0.055	−0.57
LOSS	0.028	2.19**
MB	−0.003	−1.93*
LEV	−0.051	−0.90
CFO	−0.863	−2.40**
SPECIAL	0.013	1.56
RD	0.018	0.45
RESTRUCTURE	0.019	2.33**
MA	0.013	1.76*
RET_VOL	0.854	0.86
ICW	0.070	2.11**
CEO_DELTA	0.000	0.00
CEO_VEGA	0.000	0.03
CFO_DELTA	0.000	−1.21
CFO_VEGA	0.000	−0.68
CEO_CHANGE	0.009	0.89
BDSIZE	0.128	4.35***
BDIND	0.000	0.00
ACSIZE	−0.032	−1.55
TENURE	0.042	3.11***
AUDIT_CHANGE	−0.022	−0.74
BIG4	0.111	2.02**
LOG(NAS)	0.009	3.76***
Industry and Year FE	Included	
Firm FE	Included	
Adj. R^2	0.969	

Notes: This table presents the results of tests of endogeneity. In panel A, the dependent variable is the change in natural log of total audit fees. In panel B, the models include firm, year and industry fixed effects. See Appendix for variable definitions. All the *t*-statistics are corrected for heteroskedasticity. *, **, and *** denote two-tailed significance levels at 10%, 5%, and 1%, respectively.

Waegelein 2007; Krishnan and Visvanathan 2008) and control for AC ability by including the following three additional variables in model (1): AC multiple directorships (measured as the proportion of AC directors with more than three outside directorships in other companies); tenure of AC members (measured as the proportion of AC directors with board tenure of ten or more years); financial expertise (measured as the proportion of AC members who are financial experts). Because affiliated former partners affect AC effectiveness and enhance audit quality (Christensen et al. 2018), we also include an indicator variable that equals one if at least one AC member is a former partner of the company's audit firm, and zero otherwise. Untabulated results show that former partner affiliation is negatively related to audit fees ($t = -1.71$, $p < 0.089$), while the three proxies for AC ability are not. Importantly, the coefficient on *AC_EBC%* remains significantly negative at the 0.05 level after including these additional controls, which suggests that our main results are robust to controlling for omitted time-variant variables.

Additional analyses

To provide a sharper view of how specific firm and AC characteristics may accentuate or attenuate AC effectiveness, we examine how the relation between audit fees and AC equity compensation is influenced by the following five characteristics: firm litigation risk, AC bargaining power, AC accounting expertise, audit market competition, and industry expert auditors. We conduct these additional tests by first partitioning the sample into two subsamples based on the annual medians of each of these characteristics and then estimating model (1) separately for each subsample. We summarize the results of these tests in this section and provide more detailed explanation, discussion, and tabulation of results in the online Appendix.

Table A7 in the online Appendix presents the litigation risk results. The table shows that the coefficient on *AC_EBC%* is significantly negative at the 0.05 level for the low litigation risk subsample but is insignificant for the high litigation risk subsample. That is, audit fees decrease significantly with increase in AC equity compensation for firms in the low litigation risk subsample but do not change for firms in the high litigation risk subsample. These results suggest that the negative effect of equity compensation on AC audit fee determination does not exist when firms face high litigation risk. Given that ACs are more concerned about litigation risk, relative to ACs of firms that face low litigation risk, ACs of firms that face high litigation risk are likely to be more independent, which would lead to higher audit fees. To the extent that the *high incentive choice* scenario is valid, our results indicate that litigation concerns deter AC directors with high equity compensation from sacrificing independence.

Panel A of Table A8 in the online Appendix presents the AC bargaining power results. The panel shows that for the high AC bargaining power subsample, the coefficient on *AC_EBC%* is negative and significant at the 0.05 level. By contrast, the coefficient on *AC_EBC%* for the low AC bargaining power subsample is insignificant. Overall, these results suggest that the negative effect of equity compensation on AC audit fee determination does not exist when ACs have low bargaining power. Therefore, the relative bargaining power of the AC significantly changes the observed negative relation between AC equity compensation and audit fees.

Panel B of Table A8 in the online Appendix presents the AC accounting expertise results. The panel shows that unlike the coefficient on *AC_EBC%* for the low accounting expert subsample, which is negative and significant at the 0.05 level, the corresponding coefficient for the high accounting expert subsample is positive and insignificant. These results suggest that accounting expertise can mitigate the impairment of AC independence due to large equity compensation, and this mitigating effect occurs only when accounting experts represent a high proportion of AC membership. Although prior research provides extensive evidence that AC accounting expertise enhances financial reporting quality (e.g., Bedard et al. 2004; Dhaliwal et al. 2010; Krishnan and Visvanathan 2008), there is a lack of research on whether accounting expertise can mitigate the adverse effect of equity compensation by improving AC independence during the fee determination process. We contribute to the literature by providing empirical evidence on this issue.

Panel C of Table A8 in the online Appendix presents the audit market competition results. The panel shows that the coefficient on *AC_EBC%* is insignificant in the low market competition subsample but is negative and significant at the 0.05 level in the high market competition subsample. These results indicate that the observed negative relation between AC equity compensation and audit fees occurs only when audit market competition is high. In terms of economic significance, for a one standard deviation increase in *AC_EBC%*, the audit fees will decrease by \$68,361 (i.e., $-0.096 \times 0.207 \times \exp(15.051)$) in the high competition subsample. Importantly, this reduction in audit fees is larger than the fee reduction reported in Table 4 (i.e., \$59,104). These results suggest that the negative effect of AC equity compensation on audit fees is stronger when audit market competition is higher. Whereas prior studies report that audit market competition is positively associated with restatements (e.g., Numan and Willekens 2012), our results suggest that ACs receiving larger equity compensation appear to take advantage of the high market

competition to reduce audit fees to an even lower level. We thus contribute to the literature by providing evidence on how audit market competition and AC equity compensation jointly influence AC audit fee decisions.

Table A9 in the online Appendix presents the industry expert auditor results. The table shows that the coefficient on *AC_EBC%* is negative and significant at the 0.05 level in the nonindustry expert subsample, which is consistent with our main results in Table 4. This coefficient is insignificant in the industry expert subsample, which suggests that the negative effect of equity compensation on audit fees is mitigated when auditors are industry experts. Two reasons may explain this finding. First, industry expertise may increase AC concerns that reducing audit fees could draw auditors' attention to AC independence being compromised. Second, industry expertise may increase auditors' negotiation power in determining audit fees (Casterella et al. 2004). In fact, the results reported in Table A9 are consistent with those reported in panel A of Table A8, which show that the coefficient on *AC_EBC%* is insignificant when auditors have high bargaining power. Unlike prior studies that examine the relation between auditor industry expertise and audit fees from a supply-side perspective and provide mixed results, we contribute to the literature by investigating how demand-side ACs react to industry expertise and showing that industry expertise appears to protect auditors from a reduction in audit fees by compromised ACs.

Robustness tests

We briefly summarize the results of robustness tests in this section and provide more detailed explanation, discussion, and tabulation of results in the online Appendix.

First, we reestimate our audit fee model (1) after controlling for differences in firm size and find that the coefficient on *AC_EBC%* is negative and significant at the 0.05 level (panel B of Table A10 in the online Appendix). Second, because firms that do not offer equity compensation to their ACs may have different compensation policies and governance structures, we reestimate model (1) after excluding 154 firm-year observations (see panel A of Table 1) with no AC equity compensation and find that the coefficient on *AC_EBC%* is negative and significant at the 0.10 level (panel A of Table A11 in the online Appendix). Third, we use several alternative measures of AC equity compensation in model (1) and find negative and significant coefficients on these alternative measures (panel B of Table A11 in the online Appendix). Fourth, as a placebo test, we reestimate model (1) after replacing AC equity compensation with AC cash compensation and find an insignificant coefficient on AC cash compensation (panel B of Table A11 in the online Appendix). Fifth, we do not truncate extreme values and use robust regression based on the MM-estimation to estimate model (1). We find that the coefficient on *AC_EBC%* is negative and significant at the 0.05 level (Table A12 in the online Appendix). Sixth, to examine whether our results are sensitive to including the financial crisis period, we reestimate model (1) using firm-year observations during the 2011–2015 postcrisis period. Again, untabulated results show that the coefficient on *AC_EBC%* is negative and significant at the 0.05 level.

5. Summary and conclusions

The role of ACs in enhancing financial reporting quality has received much attention over the past decade. Therefore, evidence on factors that may influence the effectiveness of ACs is of interest to regulators, boards of directors, and investors. Although regulators and the press have expressed concerns about whether equity compensation weakens AC oversight effectiveness, extant literature provides only limited and mixed results on this issue. In this study, we examine whether AC equity compensation enhances or impairs AC determination of audit fees. Using a sample of 3,685 firm-year observations from 2007 to 2015, we find evidence suggesting that equity compensation induces AC members to compromise their independence by paying lower audit fees. We further show that larger equity compensation is associated with lower earnings quality. These results are robust to controlling for endogeneity, firm size differences, alternative

measures of equity compensation, alternative treatment of extreme values, and the effect of the financial crisis.

We further examine how the relation between audit fees and AC equity compensation is influenced by certain firm, AC, and auditor characteristics. We find that the negative effect of equity compensation on AC independence no longer manifests when (i) firms face high litigation risk, (ii) auditors have stronger bargaining power in negotiating audit fees, (iii) most of the AC members are accounting experts, and (iv) auditors are industry experts.

Our results have important implications for regulators, boards of directors, investors, and others. First, although the appointment of auditors and the determination of audit fees are generally viewed as solutions to enhance financial reporting quality, our results indicate that choosing an appropriate level of equity compensation for ACs is also important. Second, whereas SOX and the SEC only require directors to be fully independent before they become AC members, our findings highlight the need for regulatory restrictions on compensation practices so that AC members can maintain independence in fact rather than in appearance and fulfill their duties in determining audit fees. Third, even though we find that equity compensation attenuates AC independence in determining appropriate audit fees, we also find that this negative effect does not hold when the auditors have higher bargaining power and the ACs include more accounting experts. Regulators may consider new regulations that more evenly balance the bargaining power between the ACs and the auditors (e.g., mandatory audit firm rotation) and strengthen the role of accounting experts in ACs. Fourth, regulators have debated how audit market competition influences audit quality. Whereas some argue that high competition is desirable because market consolidation may cause audit quality to decrease (e.g., US Chamber of Commerce 2006), others have expressed concern that high audit market competition motivates opinion shopping and thereby decreases audit quality (PCAOB 2011). We inform this debate by providing evidence that audit market competition and AC equity compensation may jointly affect AC audit fee decisions and the resulting earnings quality. Fifth, while we focus on equity compensation as one major factor that could harm AC effectiveness, future research could examine factors (e.g., tenure of membership, penalties for oversight failures) that may also affect other aspects of AC effectiveness.

Appendix

Variable definitions

Variables	Definitions
Dependent variables	
Ln(AF)	Natural log of total audit fees
Abs_DA	Absolute value of a firm's performance-adjusted discretionary accruals. We follow Kothari et al. (2005) and estimate performance-adjusted discretionary accruals by including return on assets (*ROA*) in the following model: $TA_{it} = \delta_0 + \delta_1 \left(\frac{1}{ASSETS_{it-1}}\right) + \delta_2 \Delta SALES_{it} + \delta_3 PPE_{it} + \delta_4 ROA_{it} + \varepsilon_{it}$, where TA_{it} is total assets, $\Delta SALES_{it}$ is change in sales divided by lagged total assets ($ASSETS_{it-1}$), PPE_{it} is net property, plant, and equipment divided by $ASSETS_{it-1}$, and ROA_{it} is return on assets
RESTATE	An indicator that equals one for firm-years in which a firm's reported earnings are restated, and zero otherwise
REM1	An aggregate measure of real activities management calculated as the sum of *RDISX* and *RPROD*. *RDISX* is the level of abnormal discretionary expenses measured as the residuals from the following industry-year regression:

(The Appendix is continued on the next page.)

Appendix (continued)

Variables	Definitions
	$\frac{DISX_{it}}{Assets_{i,t-1}} = k_0 + k_1 \frac{1}{Assets_{i,t-1}} + k_2 \frac{Sales_{it-1}}{Assets_{i,t-1}} + \varepsilon_{it}$, where *DISX* is discretionary expenses (the sum of advertising expenses, R&D expenses and SG&A expenses) during the year. We multiply the residuals by −1. *RPROD* is the level of abnormal production costs measured as the residuals from the following industry-year regression: $\frac{PROD_{it}}{Assets_{i,t-1}} = k_0 + k_1 \frac{1}{Assets_{i,t-1}} + k_2 \frac{Sales_{it}}{Assets_{i,t-1}} + k_3 \frac{\Delta Sales_{it}}{Assets_{i,t-1}} + k_3 \frac{\Delta Sales_{i,t-1}}{Assets_{i,t-1}} + \varepsilon_{it}$, where *PROD* is production costs (the sum of costs of goods sold and change in inventory) during the year
REM2	An aggregate measure of real activities management calculated as the sum of *RCFO* and *RDISX*. *RCFO is* the level of abnormal cash flow from operations measured as the residuals from the following industry-year regression: $\frac{CFO_{it}}{Assets_{i,t-1}} = k_0 + k_1 \frac{1}{Assets_{i,t-1}} + k_2 \frac{Sales_{it}}{Assets_{i,t-1}} + k_3 \frac{\Delta Sales_{it}}{Assets_{i,t-1}} + \varepsilon_{it}$, where *CFO* is cash flow from operations,*Sales* is annual sales, and *Assets* is total assets. We multiply the residuals by −1
Test variable	
AC_EBC%	Average of the ratio of equity compensation to total compensation across all members of a firm's AC
Control variables	
Supply-side fee determinants	
(1) Firm's operation complexity	
SIZE	Natural log of total assets
FOREIGN	An indicator that equals one if a firm's foreign assets are greater than 0, and zero otherwise
SEGMENT	Natural log of the number of a firm's business and geographic segments
(2) Firm's operating risk	
CURRENT	Current assets / Current liabilities
ROA	Net income before taxes and extraordinary items / Average total assets
LOSS	An indicator that equals one if a firm's net income is less than 0, and zero otherwise
MB	Market to book ratio
(3) Firm's inherent risk	
INVREC	Sum of accounts receivable and inventory / Total assets.
(4) Firm's financial risk	
LEV	Total debt / Total assets
CFO	Cash flow from operations / Average assets
SPECIAL	An indicator variable that equals one if the firm reports special items in the income statement, and zero otherwise
RD	An indicator variable that equals one if the firm reports research and development expenses, and zero otherwise
RESTRUCTURE	An indicator variable that equals one if the firm was involved in a debt restructuring, and zero otherwise
MA	An indicator variable that equals one if the firm was involved in a merger or acquisition activity, and zero otherwise

(The Appendix is continued on the next page.)

Appendix (continued)

Variables	Definitions
RET_VOL	Standard deviation of firm's market-adjusted monthly stock returns measured over the previous 60 months
(5) Firm's control risk	
ICW	An indicator variable that equals one if a firm's auditor indicates material internal control weaknesses, and zero otherwise
(6) Audit risk	
CEO_DELTA	Change in the dollar value of the CEO's equity holdings for a 1% change in stock price
CEO_VEGA	Change in the dollar value of the CEO's equity holdings for a 1% change in the firm's stock return volatility
CFO_DELTA	Change in the dollar value of the CFO's equity holdings for a 1% change in stock price
CFO_VEGA	Change in the dollar value of the CFO's equity holdings for a 1% change in the firm's stock return volatility
CEO_CHANGE	An indicator variable that equals one if a firm changes its CEO, and zero otherwise
Demand-side fee determinants	
BDSIZE	Natural log of the number of board members
BDIND	Percentage of independent directors on the board
ACSIZE	Natural log of the number of AC members
TENURE	Natural log of the auditor's tenure
AUDIT_CHANGE	An indicator variable that equals one if the firm changes its auditor, and zero otherwise
BIG4	An indicator that equals one if a firm is audited by a Big 4 auditor, and zero otherwise
LOG(NAS)	Natural log of total nonaudit service fees plus one

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article:
Online Appendix: Supporting information