The Effect of Auditor Expertise on Executive Compensation

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Abstract

We examine the effect of auditor expertise on managerial equity-based compensation. Consistent with recent theories that predict that firms will grant more equity-based compensation to their managers when financial statement manipulation is more likely to be detected, we find strong evidence that firms audited by an industry expert grant their CEOs more equity-based compensation. Additional tests indicate that these firms also grant their CFOs greater equity-based compensation. However, in contrast, equity-based compensation of all other non-CEO and non-CFO executives is unaffected by whether or not their firms are audited by an industry expert. Our results are robust to a rigorous treatment of endogeneity and suggest that firms consider the financial misreporting effects of equity-based incentives and trade off these costs with the benefits of higher managerial effort when designing compensation contracts.

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1. Introduction

This study examines how auditor expertise influences the amount of equity-based compensation that firms grant to their executives. Our empirical tests are motivated by recent theoretical models (e.g., Goldman and Slezak (2006), Peng and Roell (2008), Laux and Laux (2009)) that examine how the potential for financial statement manipulation influences managerial equity-based compensation. While more equity incentives may induce better strategic decisions and greater effort, they also encourage the manager to manipulate financial reports to artificially inflate the stock price, especially if the manipulation is unlikely to be detected. These theories predict that managers will be granted more equity-based compensation when financial misreporting is more likely to be detected, as the costs of granting such compensation are lower.

Following prior studies that find that greater auditor expertise reduces the incidence of earnings management and improves audit quality (e.g., Craswell et al. (1995), Becker et al. (1998), Francis et al. (1999), Solomon et al. (1999), DeFond et al. (2000), Reichelt and Wang (2010)), we expect firms audited by an auditor with greater industry expertise to grant their executives more equity-based compensation. We find strong evidence in favor of our prediction. In particular, greater the expertise of the firm's auditor, more is the amount of equity-based compensation that firms grant to their CEOs. This result is not only statistically robust, but also economically significant – a one standard deviation increase in auditor expertise increases CEO equity compensation by 1.4% relative to the mean. As most of our sample firms are audited by a Big Five (or Big Four) auditor, our tests effectively compare differences in equity-based managerial compensation between Big Five industry experts versus Big Five non-industry-experts (see Francis (2011) for a discussion of the strengths of such comparisons).

Our results are robust to the inclusion of industry fixed effects, indicating that holding industry characteristics constant, firms that are audited by industry experts are associated with more equity-based CEO compensation than other firms *within that industry*. In addition, our results are also robust to including firm-fixed effects that control for time-invariant differences across firms, suggesting that CEO equity-based compensation *within an individual firm* increases when the expertise of its auditor is greater.

Next, we examine the role of institutional ownership in the relation between auditor expertise and CEO compensation. Institutional shareholders, on account of their large ownership stakes, have both the incentives as well as the means to gather costly private information about earnings (Bushee and Goodman (2007)) and to use this information to monitor managers. For example, Ayers et al. (2011) find that firms monitored by institutional investors are less likely to indulge in financial misrepresentation. We, therefore, expect the effect of auditor expertise on CEO equity-based compensation to be weaker in firms with greater institutional ownership. Consistent with our prediction, we find that the effect of auditor expertise on CEO compensation is much stronger in firms with lower levels of institutional ownership than in those with higher levels. For example, a one standard deviation increase in auditor expertise increases CEO compensation by 2.6% in a firm with no institutional ownership, but by only 0.89% in a firm with median institutional ownership.

To bolster our interpretation that the effect of auditor expertise on compensation stems from the effect that these equity-based incentives, in turn, have on financial reporting manipulation, we examine how auditor expertise influences equity-based compensation of the other executives of the firm, viz., the CFO versus all other non-CEO, non-CFO executives. Recent studies find that CFO equity incentives also have an important effect on financial reporting outcomes (e.g., Chava and Purnanandam (2010), Jiang et al. (2010)). Consistent with

the role of CFO incentives, we find strong evidence that auditor expertise is also positively associated with CFO equity-based compensation and that the presence of institutional investors attenuates this relation. In contrast, we find no evidence of an association between auditor expertise and equity-based compensation of all other executives and also no role for institutional ownership. These results provide additional assurance that the association between auditor expertise and managerial compensation stems from the effect of equity-based incentives on financial misreporting – which are likely to be relevant only for CEOs and CFOs.

The above within-firm variation tests mitigate concerns that our results could be driven by unobserved factors, as in this case, it should influence all executives and not just the CEO and the CFO. However, they do not address the concern that auditor choice is endogenous and could itself be determined by equity-based compensation. For example, it could be that CEOs and CFOs who are better aligned with shareholders on account of their higher equity-based incentives are more willing to select auditors with greater industry expertise in order to bind themselves to greater monitoring. To address the endogeneity of auditor choice, we employ an instrumental variables approach and use the firm's proximity to the closest SEC office as our instrument. Following recent studies (e.g., Kedia and Rajgopal (2011)) that show that firms located closer to the SEC are less likely to commit financial statement fraud, we expect firms located farther from the SEC to be more likely to avail the services of an industry expert auditor. We find strong evidence in favor of our predictions. In particular, the distance of the firm's headquarters from the closest SEC office is strongly and positively related to the firm's choice of auditor expertise and the partial *F*-stat comfortably exceeds the commonly accepted "weak-instrument" threshold (Stock, Wright and Yogo (2002)). Further, the predicted value of auditor expertise is strongly and positively related to CEO and CFO equity-based compensation.

As SEC offices are generally located in larger cities, it could be that our results are driven by a "big city" effect, as opposed to proximity to the SEC. To address this concern, we exploit a recent decision by the SEC to elevate six of its district offices to regional office status.[1] We examine the association between auditor expertise and distance to these district offices both before and after they became regional offices. We find no evidence of an association between firms' choice of auditor expertise and distance to these district offices in the pre-period, but a strong positive effect in the post period, suggesting that it is the distance from the SEC office and not a "big city" effect that is driving our results. Overall, we summarize these results as suggesting that the relation between auditor expertise and equity-based executive compensation is robust to correcting for the endogeneity of auditor expertise.

We perform several additional sensitivity tests. First, to ensure that our results are not a random auditor effect, we assign random values of auditor expertise to our sample auditors and repeat our tests. We find no evidence of an association between equity-based compensation and "pseudo" auditor expertise. Second, we use the presence of a Big Five auditor as an alternate measure of auditor expertise and find consistent results. Third, our results are robust to controlling for differences in other components of compensation across firms. Fourth, we verify that our results are not being driven by other idiosyncratic characteristics of industries such as regulation and litigation risk. Finally, our results are robust to alternate methods of clustering standard errors.

Our study makes several contributions to the literature. First, our evidence suggests an important role of financial statement verification in the way managers are incentivized. While the economic consequences of higher quality auditing have focused on improvements to the

[1]The offices are - Boston, Philadelphia, Atlanta, Forth Worth, Salt Lake City and San Francisco. See Kedia and Rajgopal (2011) and also http://www.sec.gov/news/press/2007/2007-59.htm.

information environment (Ball, Jayaraman and Shivakumar (2011)), lower cost of capital (Anderson et al. (2004), Pittman and Fortin (2004)), our study broadens the role of auditing in the efficient functioning of firms. The link between auditor expertise and managerial compensation is an important one as equity-based incentives have been shown to have wide implications for managerial risk-taking (e.g., Coles et al. (2006)) and the efficient functioning of corporate governance structures (e.g., Admati and Pfleiderer (2009), Edmans (2009), Bharath, Jayaraman and Nagar (2010)).

Second, our study suggests that executive incentives are endogenously determined by the likelihood of detection of financial statement manipulation. This finding helps better evaluate the mixed evidence of the relation between executive incentives and accounting fraud examined in recent studies. For example, Harris and Bromiley (2007), Efendi et al (2007) and Bergstresser and Phillipon (2006) find a positive association between equity-based incentives compensation and earnings management. On the other hand, Baber et al (2007), Erickson et al (2006) and Armstrong et al (2010) do not find such an association. With the exception of Armstrong et al. (2010), most studies assume that executive incentives are exogenous. Our finding challenges this assumption by suggesting that firms consider the information manipulation effects of equity incentives and optimally trade off these costs with the benefits of higher effort when designing compensation contracts.

Third, our study contributes to a nascent literature that examines features of CFO equity incentives and how these differ from those of other executives. While the majority of these studies focus on the consequences of CFO incentives (e.g, Chava and Purnanandam (2010), Feng et al. (2011)), ours is one of the first studies to shed light on its determinants. Fourth, our study contributes to the literature that examines the relation between executive compensation and corporate governance structures (e.g., Hartzell and Starks (2003); Fahlenbrach (2009)). As

Goldman and Slezak (2006, pp. 615-616) rightfully note "…these studies do not consider how the potential for manipulation affects equilibrium contracts." This is an important issue as it speaks to the equilibrium relation between equity-based incentives and financial statement fraud which is at the heart of the debate on the causes of the recent spate of accounting scandals (Ball (2009)). Our results speak more generally to the question of optimality of managerial compensation contracts. While Jensen and Murphy (1990) first point out that pay-for-performance sensitivities may be too low to be reconciled with standard agency models, Bebchuk and Fried (2003) raise the possibility that these low sensitivities might be indicative of poor corporate governance. Our results appear to support the optimal contracting framework of theoretical models such as Goldman and Slezak and the views of Bushman and Smith (2001), and suggest that incentives are optimally chosen by considering the costs and benefits of information misrepresentation that accompany equity incentives.

The remainder of the paper is organized as follows. In Section 2, we lay out our hypotheses. Section 3 contains the empirical strategy and Section 4 presents the empirical results. Robustness tests are included in Section 5 and Section 6 concludes.

2. Motivation and hypotheses

2.1. Detection of information manipulation and equity-based compensation

In the aftermath of recent accounting scandals, many academics, regulators and the media have questioned whether managerial compensation contracts are the culprits behind these acts of financial statement representation. Allegedly, high equity-based incentives encourage managers to indulge in myopic acts aimed at maintaining stock prices and earnings at artificially high levels in the near term. For example, in his monetary policy report to Congress on July 16, 2002, Alan Greenspan stated that "the highly desirable spread of

shareholding and options among business managers perversely created incentives to artificially inflate reported earnings in order to keep stock prices high and rising". Jensen (2003) argues that current compensation schemes are responsible for causing managers to take actions that "game the system" and destroy shareholder value. Put more forcefully, Coffee (2005) identifies stock options as the best explanation for the rise in accounting scandals in the late 1990s and early 2000s, stating that "…absent special controls, more options means more fraud".

There are certainly others who express skepticism at these interpretations. In particular, Bushman and Smith (2001) discuss the effect of observed incentive contracts on earnings management behavior and note that "this research begs the question of why these contracts exist in the first place. Are the observed contracts at these firms not optimal? After all, any incentives for earnings management could be mitigated by offering flat wage contracts…An economic answer to these questions must fully consider the equilibrium from which the empirical observations are drawn."

As noted in the Introduction, Goldman and Slezak (2006) argue that existing models do not consider how the potential for manipulation might affect equilibrium contracts. They present a model where the manager exerts effort that positively affects output, but they allow for the possibility that she can also indulge in misrepresentation of performance. Shareholders determine the optimal level of stock-based incentives by trading off the benefits of higher effort with the costs of greater manipulation. In equilibrium, stock-based compensation is higher for firms where the probability of detection is greater. The intuition is that the greater probability of detection reduces manager's incentives to indulge in information manipulation, thereby reducing the ex-ante costs of granting equity-based incentives. We use auditor expertise to measure the detection likelihood of financial misreporting. Thus, our first hypothesis is:

H1: Firms offer more equity-based compensation to their CEOs when their auditor has greater audit expertise.

2.2. Role of institutional ownership

Institutional investors, on account of their large ownership stakes, have access to private information about underlying earnings (e.g., Bushee and Goodman (2007)). As a result, they are more likely than small, dispersed investors to detect financial misreporting by managers. Consistent with this argument, Ayers et al. (2011) find that firms with a larger share of institutional investors are associated with lower earnings management. We therefore expect institutional investors to be an alternate (monitoring) mechanism that allows for detection of financial reporting manipulation, and consequently the effect of auditor expertise to be attenuated in these firms.[2] This leads to our second hypothesis:

H2: The association between equity-based CEO compensation and auditor expertise is weaker in firms with a greater proportion of institutional investors.

2.3. Within-firm differences in equity-based incentives

While the majority of previous studies focus on CEO incentives and financial statement manipulation, an emerging literature finds that equity-based incentives of the CFO (who is responsible for the financial reporting process) also matter for financial reporting outcomes (e.g., Kim et al. (2011), Chava and Purnanandam (2010) and Jiang et al (2010)). In a related vein,

[2] We do not focus on other monitoring mechanisms such as board structure or board independence for two reasons. First, the ability of these measures to capture effective corporate governance is an extremely contentious issue. Second, the ex-ante predictions based on board structure are unclear. For example, on one hand, the association between executive compensation and auditor expertise is likely to be stronger in more effective boards as these boards are the ones more likely to choose expert auditors. On the other hand, one could argue that the association should be weaker as boards can independently verify the accuracy of financial statements, thereby acting as a substitute for auditor expertise.

Hennes et al. (2008) find that the consequences of financial statement fraud on executive turnover affect the CFO as well. Further, survey evidence in Graham, Harvey, and Rajgopal (2005) suggests that CFOs are also concerned with beating earnings benchmarks and seek to report a smooth series of earnings. Consistent with these voiced concerns, Mergenthaler, Rajgopal and Srinivasan (2008) find that CFO turnover increases following the failure to meet certain earnings benchmarks. Following these studies, we expect auditor expertise to also influence CFO equity-based compensation. Our third hypothesis is:

H3: Firms offer more equity-based compensation to their CFOs when their auditor has greater audit expertise.

3. Research design

In this section, we describe the empirical proxies, motivate our control variables, present our regression specifications and follow that with a description of our sample.

3.1. Empirical proxies

3.1.1. Auditor expertise (EXPERTISE)

We follow prior studies and use auditor industry expertise (*EXPERTISE*) as our measure of the likelihood that financial statement manipulation will be detected, where higher expertise indicates higher audit quality and therefore greater detection likelihood.[3] In particular, we use the proportion of total industry sales that is audited by the auditor as the measure of auditor

[3] We do not use output-based measures of financial reporting quality (*FRQ*) as prior studies show that these measures are influenced by the extent of independent verification of financial statements. We therefore focus on auditor expertise.

expertise. [4] The link between auditor expertise and financial reporting has been well established by prior studies. For example, Becker, DeFond, Jiambalvo and Subramanyam (1998) and Francis, Maydew and Sparks (1999) find that higher audit quality reduces the incidence of earnings management. Craswell, Francis and Taylor (1995) and DeFond, Francis and Wong (2000) find that industry specialists charge a higher price for audits, indicating that they produce higher quality audits. Similarly, Solomon et al. (1999) find that auditors who are industry experts are more likely to detect financial reporting misstatements that are due to non-errors (i.e., those more likely to be intentional and hence more egregious). Gunny et al. (2007) find that auditors with greater industry expertise are less likely to be found deficient (and also severely deficient) by the PCAOB (Public Company Accounting Oversight Board). Finally, Reichelt and Wang (2010) find that clients of industry expert auditors have lower abnormal accruals and are less likely to just meet or beat analysts' earnings forecasts by one penny.

One advantage of our setting is that as most of our sample firms are large, well-established firms that are audited by a Big Five (or Four) auditor, there is a lower likelihood of confounding factors due to extreme differences in client characteristics. In support, Francis (2011) argues that designs (such as ours) that compare Big Five industry expertise with Big Five non-industry expertise are less likely to be plagued by self-section issues due to extreme clientele differences.

3.1.2. Equity-based compensation (EQCOMP)

We define equity-based compensation as the sum of option grants, restricted stock grants and other forms of non-cash compensation (*EQCOMP*). As executive compensation is

[4] We do not use the presence of a Big Five or Big Four auditor to measure auditor expertise as close to 97% of our sample firms are audited by a Big Five auditor. However, our results are robust to using Big Five in a smaller matched sample. These are discussed in the robustness tests in Section 5.2.

highly skewed, we define *EQCOMP* as the log of equity-based compensation plus one. As hypothesis *H3* predicts within-firm variation in equity-based compensation, we compute it individually for three groups of executives -- CEOs (*CEOEQCOMP*), CFOs (*CFOEQCOMP*) and other non-CEO, non-CFO executives (*OTHEQCOMP*).

Following prior studies, we identify CEOs following ExecuComp's classification (data item CEOANN=CEO). Identifying the CFO is more complicated. We classify managers as CFOs based on: (i) if they are flagged as the current CFO (data item PCFO="CFO") or (ii) if their title (data item "TITLEANN") includes one of more of phrases such as: "CFO", "chief financial officer", "treasurer", "controller" and "vice president-finance" (See Appendix 1 for a complete list of ExecuComp titles to identify CFOs). Non-CEO, non-CFO executives are those that are on ExecuComp but are neither CEOs nor CFOs.

3.1.3.Institutional ownership (INST)

We measure the institutional ownership (*INST*) as the ratio of total shares held by these institutions (Thomson Reuters data item SHARES) to total shares outstanding.

3.2. Control variables

We now discuss variables related to managerial compensation used in prior studies and incorporate them in a multivariate regression to ascertain whether the explanatory power of *EXPERTISE* with respect to *EQCOMP* is incremental to that of these characteristics.

As prior studies find that the investment opportunity set affects stock-based compensation (e.g., Clinch (1991), Smith and Watts (1992), Gaver and Gaver (1993), and Baber et al (1996)), we follow Ittner et al. (2003) and include three variables to capture the investment opportunity set – the market-to-book ratio (*MB*), the ratio of research and development expenses to sales (*R&D*) and the ratio of advertising expenses to sales (*ADVT*). Consistent with

prior studies, we expect a positive coefficient on *MB*, *R&D* and *ADVT*. We also control for firm size using the log of total sales (*LNSALE*). As larger firms grant their executives more compensation (Gabaix and Landier (2008)), we expect the coefficient on *LNSALE* to be positive.

As firm complexity influences equity-based compensation, we include the number of segments (*SEG*) and the proportion of foreign sales (*FOREIGN*) to total sales as additional controls. This is especially relevant in our setting as these attributes are shown to be correlated with audit expertise. Following Ittner et al., we use leverage (*LEV*) to capture monitoring by debt holders and expect a negative association with equity compensation. We use both accounting (*ROA*) and stock price (*RET*) based measures to capture prior performance. *ROA* represents return on assets defined as income before extraordinary items scaled by total assets while *RET* represents the annual stock return.

We also include earnings volatility (*ROAVOL*) and stock return volatility (*RETVOL*) to capture features of the operating environment. *ROAVOL* and *RETVOL* are computed as standard deviations of five annual observations of *ROA* and *RET*, respectively. Prendergast (2000, 2002) argues that firms rely more on stock-based incentives in riskier environments where it is more difficult to monitor the manager's actions. On the other hand, Demsetz and Lehn (1985), Lambert and Larcker (1987), Aggarwal and Samwick (1999) and Garvey and Milbourn (2003) argue that greater volatility captures more noise in the output measure and firms should therefore reduce stock-based incentives. We therefore do not make a directional prediction for *ROAVOL* and *RETVOL*. Finally, we include stock turnover (*LIQ*) as Jayaraman and Milbourn (2011) show that firms with greater stock liquidity grant their executives more equity-based compensation. The idea is that by increasing stock price informativeness, greater stock liquidity provides shareholders a more informative signal about the manager's actions.

Following Petersen (2009), we estimate the regressions with year indicators and standard errors clustered by industry each year defined at the 4 digit SIC code level. The year indicator variables control for common shocks, which could cause cross-sectional correlation in the standard errors. The industry-level clustering of standard errors corrects for the possibility of serial correlation attributable to unobserved industry effects. All control variables have been defined as of the beginning of the year.

In addition to the year effects, we include industry fixed effects in our first specification. These industry effects control for time-invariant differences across industries that might be correlated with auditor expertise. This design thus allows us to capture cross-sectional variation in auditor expertise *within* each industry. In addition, we also present a specification with firm fixed effects that control for differences in time-invariant characteristics across firms. As auditor expertise is time-varying within each firm, this specification allows us to track variation in auditor expertise against variation in equity-based compensation *within* each firm, thereby allowing for a more powerful test.

3.3. Multivariate regressions

3.3.1. Effect of EXPERTISE on CEOEQCOMP (hypothesis H1)

To test hypothesis *H1*, we regress *CEOEQCOMP* on *EXPERTISE* and controls. The empirical specification we employ is:

$$\begin{aligned} CEOEQCOMP_{i,t} = {} & \beta_0 + \beta_1 EXPERTISE_{i,t-1} + \beta_2 MB_{i,t-1} + \beta_3 R\&D_{i,t-1} + \beta_4 ADVT_{i,t-1} \\ & + \beta_5 LNSALE_{i,t-1} + \beta_6 SEG_{i,t-1} + \beta_7 FOREIGN_{i,t-1} + \beta_8 LEV_{i,t-1} + \beta_9 ROA_{i,t-1} \\ & + \beta_{10} RET_{i,t-1} + \beta_{11} ROAVOL_{i,t-1} + \beta_{12} RETVOL_{i,t-1} + \beta_{13} LIQ_{i,t-1} + \varepsilon \end{aligned} \quad (1)$$

Hypothesis *H1* predicts that $\beta_1 > 0$ in that greater auditor expertise allows for increased equity-based compensation.

3.3.2. Role of institutional ownership (hypothesis H2)

Hypothesis *H2* predicts that the effect of auditor expertise on equity compensation is weaker in firms with greater institutional ownership. To test this we interact *EXPERTISE* with *INST* as under and expect a negative coefficient on this interaction term.

$$\begin{aligned} CEOEQCOMP_{i,t} = {} & \mu_0 + \mu_1 EXPERTISE_{i,t-1} + \mu_2 EXPERTISE * INST_{i,t-1} + \mu_3 INST_{i,t-1} \\ & + \mu_4 MB_{i,t-1} + \mu_5 R\&D_{i,t-1} + \mu_6 ADVT_{i,t-1} + \mu_7 LNSALE_{i,t-1} + \mu_8 SEG_{i,t-1} \\ & + \mu_9 FOREIGN_{i,t-1} + \mu_{10} LEV_{i,t-1} + \mu_{11} ROA_{i,t-1} + \mu_{12} RET_{i,t-1} + \mu_{13} ROAVOL_{i,t-1} \\ & + \mu_{14} RETVOL_{i,t-1} + \mu_{15} LIQ_{i,t-1} + \varepsilon \end{aligned} \quad (2)$$

Hypothesis *H2* predicts that $\mu_2<0$ in that the presence of institutional investors should partially substitute for auditor expertise and its effect on equity-based compensation.

3.3.3. Effect of EXPERTISE on CFO compensation (hypothesis H3)

Hypothesis *H3* is similar to *H1* except that the outcome variable is now CFO equity compensation (*CFOEQCOMP*). This specification is as follows:

$$\begin{aligned} CFOEQCOMP_{i,t} = {} & \sigma_0 + \sigma_1 EXPERTISE_{i,t-1} + \sigma_2 MB_{i,t-1} + \sigma_3 R\&D_{i,t-1} + \sigma_4 ADVT_{i,t-1} \\ & + \sigma_5 LNSALE_{i,t-1} + \sigma_6 SEG_{i,t-1} + \sigma_7 FOREIGN_{i,t-1} + \sigma_8 LEV_{i,t-1} + \sigma_9 ROA_{i,t-1} \\ & + \sigma_{10} RET_{i,t-1} + \sigma_{11} ROAVOL_{i,t-1} + \sigma_{12} RETVOL_{i,t-1} + \sigma_{13} LIQ_{i,t-1} + \varepsilon \end{aligned} \quad (3)$$

Hypothesis *H3* predicts that $\sigma_1>0$ in that greater auditor expertise should be positively associated with equity-based compensation of the senior financial executive, viz. the CFO.

3.4. Sample

The sample is comprised of all firms with compensation data from ExecuComp, accounting data from Compustat, and stock price data from CRSP. The final sample consists of 24,182 firm-year observations with non-missing CEO compensation data across 2,816 unique

firms between the years 1992 and 2008. Descriptive statistics are presented in Table 1. The annual equity compensation of the average CEO in the sample is $2.7 million, while the median is $1.1 million. These numbers are similar to those reported by recent studies such as Jayaraman and Milbourn (2011). The average CFO in the sample earns significantly less and takes home equity-based compensation of $0.936 million annually. As mentioned before, we use the log values of equity-based compensation in the multivariate regressions.

The mean value of *EXPERTISE* is 0.296 which suggests that the average auditor in the sample audits close to 30% of the total industry's sales. There is a wide-cross sectional variation in auditor expertise in the sample ranging from a minimum of 4.6% to a maximum of 99.6%. It is pertinent to note that the variation in industry expertise that we observe in our sample is not driven by differences in auditor size as a vast majority of our sample firms (96.4%) are audited by a Big Five (or Big Four) auditor.

The sample firms are generally growing as seen by the average market-to-book ratio of 1.98, and R&D and advertising expenditures amounting 4% and 1% of total sales respectively. Our sample is comprised primarily of large firms, which is typical of the ExecuComp database. In particular, the median firm in the sample has annual sales of around $1.1 billion out of which 17% comes from outside the U.S. Around 22% of the assets of the firm are financed by debt. The average firm reports *ROA* of 5.2% and annual stock return of 18.1%. The average firm has 57% of its total shares outstanding held by institutional investors. Overall, our sample is comparable to those used in prior studies.

4. Empirical Results

We now turn to our empirical results. We begin with a univariate analysis to set the stage, and then follow it up with our multivariate analyses.

4.1. Univariate evidence

Figure 1 presents the univariate association between equity-based compensation and auditor expertise. The x-axis plots quintile ranks of auditor expertise and the y-axis plots median values of *EQCOMP* that correspond to these quintiles. The upward sloping curve indicates that greater auditor expertise is associated with higher equity-based compensation, consistent with hypothesis *H1*. Specifically, we find that median *EQCOMP* for firms in the least expertise quintile is $0.883 million, as compared to $1.263 million for firms in the highest quintile of auditor expertise. While this represents a change of 43%, these numbers have to be interpreted cautiously as other determinants of managerial compensation have not yet been accounted for. Nevertheless, these univariate associations are consistent with hypothesis *H1*, and suggest that firms rely more on equity-based compensation when auditor industry expertise is greater.

4.2. Multivariate evidence

4.2.1. Effect of auditor expertise on CEO equity-based compensation

Table 2 presents results of the multivariate regression of CEO equity-based compensation on auditor expertise and controls (eq. (1)). Model 1 includes only year effects while Models 2 and 3 also incorporate industry and firm fixed effects respectively. All specifications include robust standard errors clustered by industry annually. Consistent with hypothesis *H1*, the coefficient on *EXPERTISE* is positive and significant in all three specifications, indicating that firms grant more equity-based compensation to their CEOs when their auditors have greater industry expertise. The coefficient on *EXPERTISE* in the firm-fixed effects specification (Model 3) is 0.319, which suggests that a one standard deviation increase in

auditor expertise (0.298) is associated with a 0.095 points increase in CEO equity compensation which translates to a 1.44% increase relative to the mean (6.580).

The coefficients on the other variables are consistent with inferences from prior studies. Consistent with the positive effect of growth opportunities on equity compensation, the coefficients on *MB, R&D* and *ADVT* are positive albeit generally insignificant. Large firms are associated with larger *EQCOMP*, as represented by the positive coefficient on *LNSALE*. Both earnings as well as stock-based measures of performance are positively associated with equity-based compensation. Confirming the indeterminate relation between risk and incentives (e.g., Prendergast (2000, 2002)), the coefficients on *ROAVOL* as well as *RETVOL* are insignificant. Finally, consistent with Jayaraman and Milbourn (2011), equity-based compensation is positively associated with stock liquidity. Overall, these results provide evidence in favor of our hypothesis that greater auditor expertise is associated with higher equity-based CEO compensation.

4.2.2. Role of institutional ownership

Table 3 presents results of the role of institutional ownership in the association between equity-based compensation and auditor expertise (eq. (2)). Consistent with hypothesis *H2*, the coefficient on the interaction term *EXPERTISE*INST* is negative and significant, while that on the standalone term *EXPERTISE* is positive and significant. These results suggest that the presence of institutional investors weakens the association between equity-based CEO compensation and auditor expertise. In terms of economic significance (based on Model 2 coefficients), a one-standard deviation increase in *EXPERTISE* increases equity-based compensation by 2.6% relative to the mean in firms with no institutional ownership. On the other hand, a similar increase raises compensation by 0.89% in firms with the median level of

institutional ownership. Thus, the presence of large institutional monitoring plays a significant attenuating role in the effect of auditor expertise on equity-based CEO compensation, consistent with our predictions.

4.2.3. Auditor expertise and equity-based compensation of other executives

Although our empirical specifications include a rich set of controls and also industry (firm) fixed effects that control for time-invariant differences across industries (firms), it is possible that unobserved characteristics correlated with auditor expertise and equity-based compensation could be biasing our results. To assuage this concern, we examine within-firm variation in the effect of auditor expertise on managerial compensation. In particular, we examine how auditor expertise influences equity-based compensation of two groups of executives – CFOs and other non-CEO, non-CFO executives.

Building on prior studies that find that equity-based incentives of the CFO also matter for financial reporting outcomes (e.g., Chava and Purnanandam (2010), Jiang et al. (2010)), hypothesis *H3* predicts that auditor expertise will influence CFO compensation as well. In contrast, we do not expect to find any association between auditor expertise and equity-based compensation of the other executives, as our hypothesis is pre-medicated on the role of auditor expertise in mitigating earnings management, which should be relevant only for the CEO and the CFO. Evidence of such intra-firm variation is likely to be strong evidence in favor of our hypothesis and against the alternate interpretation of omitted variable bias as the latter does not predict within-firm variation in managerial compensation.

Table 4 presents the results of hypothesis *H3* – which is that auditor expertise should also influence CFO equity-based compensation (eq. (3)). In addition to examining the association between auditor expertise and CFO compensation, we also explore the role of

institutional ownership. The first two sets of results pertain to CFOs while the next two pertain to all other non-CEO, non-CFO executives. All regressions include year and firm fixed effects. Turning to the CFO results first, the coefficient on *EXPERTISE* is positive and significant, while that on *EXPERTISE*INST* is negative and significant, consistent with hypothesis *H3*. Thus, there is strong evidence that auditor expertise is associated with higher equity-based CFO compensation and that the presence of institutional investors attenuates this association. In terms of economic significance, a one standard deviation increase in auditor expertise increases equity-based CFO compensation by 2.95% in firms with no institutional ownership and by 1.02% in those with the median level of institutional ownership. These effects are similar to those for the CEO, indicating that CFO incentives matter as much for financial reporting outcomes as do CEO incentives.

In contrast, we find no evidence of an association between equity-based compensation of other executives and auditor expertise. The coefficient on *EXPERTISE* is 0.115 and has a *t*-statistic of 1.28. Further, when institutional ownership is introduced, both the stand-alone coefficient on *EXPERTISE* as well as the interaction term *EXPERTISE*INST* are insignificant, indicating again, that institutional ownership plays no role in the association between equity-based compensation of other executives and auditor expertise. Overall, we interpret these results as strong evidence that the link between managerial compensation and auditor expertise is indeed being driven by the underlying mechanism of mitigating financial misreporting, which we (and prior studies) contend is relevant only for CEOs and CFOs.

4.3. Endogeneity of auditor expertise

One limitation of our results thus far is that they implicitly treat firms' choice of auditor expertise as exogenous and do not consider that the selection of an expert auditor might itself

be influenced by executive compensation. For example, if executives with more equity-based compensation who are better aligned with shareholders choose an expert auditor to bind themselves to greater monitoring, then that would explain the positive association between auditor expertise and equity-based compensation that we find. Further, as CEOs and CFOs are more involved in the selection of auditors, it would explain the positive association of auditor expertise with CEO and CFO equity compensation and not with that of the other executives.

To rule out the above and other possible alternate interpretations of the positive association between managerial equity-based compensation and auditor expertise, we rigorously tackle endogeneity of auditor expertise in this section. In particular, we seek to address endogeneity of auditor expertise using an instrumental variables approach, where we regress auditor expertise on our instrument and the other exogenous controls in the first stage and use the predicted value in the compensation regression in the second stage.

A satisfactory treatment of endogeneity, however, requires that our chosen instrument satisfy two criteria – (i) the inclusion criterion, i.e., it be highly correlated with auditor expertise and (ii) the exclusion criterion, i.e., its effect on equity-based compensation come only through auditor expertise. We use the firm's proximity to the closest SEC office as our instrument. Recent studies such as Kedia and Rajgopal (2011) find that firms that are located closer to the SEC are less likely to commit financial statement fraud. They argue that as the SEC is resource constrained, it is more likely to pursue firms that are located closer to its offices. As the effectiveness of SEC monitoring reduces with distance from the SEC offices, we hypothesize that firms farther from SEC offices are more likely to choose an expert auditor. Further, we expect that firms' distance from the SEC office is unlikely to directly influence their compensation practices except through the financial reporting link.

We compute distance from each firm's headquarters to the closest SEC office using latitude and longitude data of the firm's and the SEC office's zip codes. The SEC offices we consider are the SEC headquarters in Washington D.C. and regional offices located in New York City, NY; Miami, FL; Chicago, IL; Denver, CO; Los Angeles, CA. In particular, we compute the distance between the company and the closest SEC office using the Haversine formula.[5]

Panel A of Table 5 provides descriptive statistics of the 25 zip-codes with the most number of firms in our sample. The top 3 zip codes with the most number of firms headquartered are Houston, TX (zip code 77002) with 19 firms; San Jose, CA (zip code 95134) with 19 firms; and New York, NY (zip code 10019) with 18 firms.[6] There is rich variation in distance from the SEC even within these 3 locations, with Houston being around 547 miles from the closest SEC office (Denver, CO), San Jose being 191 miles from its closest SEC office in Los Angeles, CA and New York City being only 2 miles from the SEC office in New York, NY.

Panel B of Table 5 presents results of the two-stage instrumental variables regression that seeks to address endogeneity of auditor expertise. Following prior studies that argue that the effect of geographic proximity is not linear and that information transfers are more likely to occur within a threshold of 100 miles (e.g., Coval and Moskowitz (2001), Kedia and Rajgopal (2011)), we define *DISTANCE* as an indicator variable to denote whether the firm's headquarters is located within 100 miles of the closest SEC office.[7] The first set of columns in Panel B present results of the first stage where we regress *EXPERTISE* on *DISTANCE* and the

[5] Distance between zip code 1 and zip code 2 ($d_{1,2}$) is calculated as $d_{1,2}$ = R * 2 * arcsin (min (1, $\sqrt{a}$)), where R is the radius of the earth (approx, 6378 kilometers) and a = $(\sin(dlat/2))^2$ and + $\cos(lat1)*\cos(lat2)*(\sin(dlong/2))^2$; *dlat* is *lat2* – *lat1* and *dlong* = *long2*-*long1*; where *lat1* and *long1* are the latitude and longitude of zip code 1, and *lat2* and *long2* are the latitude and longitude of the SEC office (see Kedia and Rajgopal (2011) for details).

[6] These numbers indicate the number of ExecuComp firms located in each zip code.

[7] Results are robust to using the continuous *DISTANCE* variable.

other exogenous controls.[8] Consistent with our prediction, the coefficient on *DISTANCE* is positive and significant, indicating that firms' preference for auditor expertise is higher when their headquarters are located farther from the closest SEC office.[9] Further, the partial *F*-stat of our instrument is 16.05 which comfortably exceeds the commonly accepted "weak-instrument" threshold of 8.96 for a single instrument (Stock, Wright and Yogo (2002); Larcker and Rusticus (2010)).

In the second stage, we would like to regress *EQCOMP* on the predicted values of *EXPERTISE* from the first stage. However, one feature of our instrument complicates this approach, viz., that a firm's distance from the closest SEC office is time-invariant. As a result, the coefficient on the predicted value of expertise (*PR_EXPERTISE*) will be subsumed by the firm fixed effects and therefore cannot be estimated. To overcome this limitation, we exploit the within-firm variation feature of our sample. As the effect of auditor expertise is expected to be pronounced for CEOs and CFO relative to the other executives, we estimate a specification with all executives where we interact *PR_EXPERTISE* with an indicator to denote CEOs and CFOs. As this interaction term (*PR_EXPERTISE*CEOCFO*) exhibits variation *within* each firm, it can be estimated with firm fixed effects, while the coefficient on *PR_EXPERTISE* which captures the effect for the other executives will be subsumed by the firm fixed effects.[10]

Results in Panel B indicate that the coefficient on *PR_EXPERTISE*CEOCFO* is positive and highly significant, suggesting that higher endogeneity-corrected, auditor expertise increases equity-based compensation of CEOs and CFOs, relative to all other executives.[11] In

[8] We cluster our errors by zip code annually in these tests. Results are robust to clustering by industry.
[9] Our results are robust to defining an indicator variable to denote high versus low audit expertise (based on the median) and estimating a probit model.
[10] Another advantage of this specification is that the firm fixed effects control for the effect of geographic factors on broad-based stock option plans that influence all executives (Kedia and Rajgopal (2009)).
[11] Our results are robust to including the *CEOCFO* indicator as an exogenous control in the first stage.

terms of economic significance, a one standard deviation increase in the predicted value of auditor expertise increases equity-based compensation of the CEO and the CFO by 0.79% relative to the mean. While this magnitude appears lower than those in the OLS specifications, it should be noted that these are marginal effects and are incremental to those found for other executives.

One obvious characteristic of all the SEC offices in our analysis is that they are located in big cities. Thus, it could be that our instrument is picking up a "large city" effect as opposed to an SEC monitoring effect. To explore this alternative interpretation, we exploit a recent decision by the SEC to elevate six of its district offices to regional office status in 2007.[12] These offices are – Boston, MA; Philadelphia, PA; Atlanta, GA; Forth Worth, TX; Salt Lake City, UT and San Francisco, CA. We examine the association between auditor expertise and distance to these district offices both before and after they became regional offices. If our results are being driven by a "large city" effect, then we should expect a positive association between auditor expertise and *DISTANCE_DISTRICT* (now computed based on these district offices) to come through irrespective of whether they are designated as SEC district offices or regional offices. On the other hand, if our results are unique to proximity to the SEC, then we expect a positive association only in the post-period but not in the pre-period.

To test this prediction, we create an indicator variable *POST* to denote the post SEC decision period and interact it with *DISTANCE_DISTRICT*. Model 1 of Panel C of Table 5 presents the above results. The coefficient on *DISTANCE_DISTRICT* (which denotes the pre-period) is -0.002 with a *t*-statistic of -0.76, suggesting no association between auditor expertise and firms' proximity to SEC district offices in the pre-period. In sharp contrast, the coefficient on *POST*DISTANCE_DISTRICT* is positive and highly significant in the post-period, indicating

[12] See http://www.sec.gov/news/press/2007/2007-59.htm and also Kedia and Rajgopal (2011).

a strong association between auditor expertise and distance from these offices in the post-period.[13]. Thus, firm's choice of auditor expertise is strongly influenced by proximity to SEC offices but only once they are elevated to a regional office status.

One concern with this pre-post analysis is that there might be several factors that might be changing around this period which might confound our inferences. To examine this possibility, we examine the association between auditor expertise and *DISTANCE* (i.e., distance from the original SEC offices) between the pre and post periods. As there was no "shock" to these offices, we do not expect any change in the association between auditor expertise and *DISTANCE* between the two periods. These results are presented in Model 2 of Panel C. As expected, the coefficient on *POST*DISTANCE* is insignificant indicating no change in the association between auditor expertise and distance from the regional SEC offices between the pre and post periods. We interpret these results as providing assurance that our results are not driven by a "big-city" effect but are unique to proximity to an SEC regional office.

As a final test of endogeneity correction, we use the number of prior restatements in the firm's county as an instrument. Kedia and Rajgopal (2011) find that a firm's likelihood of restating its financial statements is lower if more firms in the county have restated their financial statements. Panel D of Table 5 presents consistent evidence. In particular, firm's choice of auditor expertise is decreasing in the number of local prior restaters (as seen by the negative and significant coefficient on *RESTATERS*). Further, the coefficient on *PR_EXPERTISE*CEOCFO* is positive and highly significant, indicating that our results are robust to using this instrument.

Overall, we summarize these results as suggesting that our inferences are robust to correcting for the endogeneity of auditor expertise.

[13] The year fixed effects subsume the coefficient on *POST*, which is omitted.

5. Robustness tests

In this section, we subject our primary results to a battery of robustness tests and find that all of our results remain strong.

5.1. Falsification test

To verify that our results are unique to auditor expertise and are not a "chance" occurrence, we perform a falsification test. In particular, we assign random levels of auditor expertise (denoted by *PSEUDOEXPERTISE*) to each auditor for each year in our sample and examine differences in equity-based compensation across these levels of "pseudo" expertise. Panel A of Table 6 presents these results (all specifications include firm fixed effects). The first set of results pertain to CEOs while the next to CFOs. The coefficient on *PSEUDOEXPERTISE* is insignificant in both specifications with a *t*-statistic of -0.16 for CEOs and 0.01 for CFOs. Overall, these results indicate that our primary results are not on account of a "fluke" auditor effect.

5.2. Presence of a Big Five/Four auditor as a measure of auditor expertise

As our sample is comprised of ExecuComp firms that are large and established, close to 97% of them are audited by a Big Five (or Big Four) auditor. To examine whether our results are robust to using a Big Five/Four auditor to capture auditor expertise, we select an equally-sized sample of Big Four versus non Big Four firms and estimate our primary results. We take care to ensure that the sample is equally-matched with respect to each executive category (CEO, CFO and all other executives) as well. Panel B of Table 6 presents these results (with firm fixed effects). Consistent with our prior evidence, the coefficient on *BIG5*, which denotes a Big Five/Four auditor is positively and significantly associated with CEO equity-based

compensation as well as CFO equity compensation but not with that of the other executives. Thus, our results are robust to using a Big Four/Five auditor to capture auditor expertise.

5.3. Controlling for cash compensation

In this section, we verify that our results are not driven by variation in non-equity based compensation differences across firms. To do so, we control for the amount of cash-based compensation (i.e., salary and bonus) as an additional determinant. Results in Panel C of Table 6 indicate that our results are robust to this additional control. In particular, the coefficient on *EXPERTISE* remains positive and significant in the CEO and CFO regressions and remains insignificant in the other executives regression.

5.4. Differences in industry characteristics

We examine whether our results are being driven by other industry characteristics that might be correlated with auditor expertise. While all our specifications include industry fixed effects, we examine two commonly recognized industry characteristics -- regulation and litigation risk. We define regulated industries (*REGULATED*) as those belonging either to the healthcare industry (SIC codes 5122; 8000-8099); financial services (SIC codes 6000-6999); defense (SIC codes 3700-3799) and transportation and communication (SIC codes 4000-4999). Following Rogers and Stocken (2005), we define high litigation-risk industries (*LITIGATION*) as bio-technology (SIC code 2833-2836 and 8731-8734), computing (SIC codes 3570-3577 and 7370-7374), electronics (SIC codes 3600-3674) and retailing (SIC codes 5200-5961). Panel D presents results based on controlling for these industry characteristics. The coefficient on *EXPERTISE* remains positive and significant in both specifications, indicating that our results are robust to controlling for other industry characteristics.

5.5. Treatment of standard errors

Finally, we examine the robustness of our results to alternate methods of clustering our standard errors. In unreported tests, we find that the coefficient on *EXPERTISE* remains positive and significant when the standard errors are clustered by firm (*t*-statistic is 7.23), by year (*t*-statistic is 6.80) or by both firm and year (*t*-statistic = 5.41).

6. Conclusion

In this study, we examine the effect of auditor expertise on equity-based managerial compensation. Consistent with recent theoretical models that predict that firms will grant their executives more equity-based compensation when the likelihood that financial statement manipulation will be detected is higher, we find more equity-based CEO compensation in firms that are audited by an industry expert. In addition, we find that these firms also grant their CFOs more equity-based incentives but not the other non-CEO, non-CFO executives. We also find that the presence of institutional ownership weakens the relation between auditor expertise and managerial compensation. Our results are robust to a rigorous treatment of endogeneity of auditor expertise.

Our study makes four contributions. First, it helps better evaluate the mixed evidence of the relation between executive incentives and accounting fraud examined in recent studies. Our results suggest that firms consider the information manipulation effects of equity incentives and optimally trade off these costs with the benefits of higher effort when designing compensation contracts. Second, our results point to the important role that auditing plays in influencing the efficient functioning of firms. Third, our study contributes to the literature that examines the relation between executive compensation and corporate governance structures. Finally, our

study is one of the first to examine the underlying economic determinants of CFO compensation and how these differ from those of other executives.

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Appendix 1: List of ExecuComp titles to classify Chief Financial Officer (CFO) (complete title and/or starting with)

"CFO" or
"chief fi"
"treas"
"control" or
"financ"
"v-p-fin"
"exec. v-p & CFO"
"exec. v-p, CFO"
"exec. v-p-finance"
"executive vp & chief finance officer"
"executive vp, chief finance officer & treasurer"
"executive vp-finance"
"president & chief finance office"
"senior vp & chief finance officer"
"senior vp, chief finance officer & treasurer"
"senior vp-finance & chief finance officer"
"sr. v-p & CFO"
"sr. v-p, CFO"
"sr. v-p-fin"
"treas"
"v-p & treas"
"v-p, CFO"
"v-p, treas"
"v-p-finance"
"vice chairman & chief fin"
"vp & chief fina"
"vp & control"
"vp, chief fin"
"vp-finan"

Table 1: Descriptive statistics

The sample consists of 2,816 unique firms between 1992 and 2008 with 24,182 observations with CEO compensation data, 16,516 observations with CFO compensation data and 79,817 observations with all other executives' compensation data. *CEOEQCOMP* denotes annual equity-based compensation of the CEO while *CFOEQCOMP* and *OTHEQCOMP* indicate annual equity-based compensation of the CFO and all other executives respectively. *EXPERTISE* denotes auditor expertise and is defined as the proportion of annual industry sales (using four-digit SIC codes) audited by the auditor. *MB* stands for the market-to-book ratio and is computed as the ratio of market value of assets to book value of assets. *R&D* and *ADVT* denote research and development and advertising expenditures respectively each scaled by annual sales. Missing values of *R&D* and *ADVT* are set to zero. *LNSALE* stands for the log of total sales. *SEGS* denotes the number of segments that the firm operates in. *FOREIGN* represents the proportion of total sales that emanates from other countries. *LEV* denotes leverage and is measured as the ratio of long-term and short-term debt to total assets. *RET* denotes annual stock return while *ROA* denotes return on assets, defined as the ratio of earnings before extraordinary items to total assets. *ROAVOL* and *RETVOL* represent volatility of *ROA* and *RET* respectively defined as the standard deviation of five annual observations. *LIQ* denotes stock liquidity defined as the log of turnover (shares traded divided by shares outstanding). *INST* indicates institutional ownership and is defined as the ratio of shares held by these institutions divided by total shares outstanding. Compensation data are expressed in $ thousands and measured as of the end of the year while all other variables are computed as of the beginning of the year.

Variables	**Obs.**	**Mean**	**Median**	**Std.dev**	**Min**	**Max**
CEOEQCOMP	24,182	2,697.479	1,135.311	3,810.058	0.000	15,925.023
CFOEQCOMP	16,516	935.999	420.181	1,597.017	0.000	15,925.023
OTHEQCOMP	79,817	1,005.358	372.882	1,926.619	0.000	15,925.023
EXPERTISE	24,182	0.296	0.242	0.205	0.046	0.996
MB	24,182	1.976	1.503	1.338	0.816	8.340
R&D	24,182	0.040	0.000	0.103	0.000	0.760
ADVT	24,182	0.010	0.000	0.023	0.000	0.139
LNSALE	24,182	7.092	7.007	1.565	3.220	10.870
SEGS	24,182	2.226	1.000	1.610	1.000	7.000
FOREIGN	24,182	0.169	0.014	0.229	0.000	0.920
LEV	24,182	0.224	0.210	0.178	0.000	0.796
RET	24,182	0.181	0.114	0.495	-0.724	2.444
ROA	24,182	0.052	0.049	0.098	-0.380	0.340
ROAVOL	24,182	0.060	0.032	0.088	0.001	0.588
RETVOL	24,182	0.507	0.357	0.538	0.067	3.926
LIQ	24,182	-5.551	-5.549	0.884	-7.837	-3.560
INST	24,182	0.568	0.621	0.289	0.000	1.000

Table 2: Effect of auditor expertise on CEO compensation

The dependent variable is the log of *CEOEQCOMP*, which denotes equity-based compensation of the CEO. *EXPERTISE* denotes auditor expertise while *MB* stands for the market-to-book ratio. *R&D* and *ADVT* indicate research and development and advertising expenditures respectively. *LNSALE* stands for the log of total sales. *SEGS* denotes the number of segments that the firm operates in. *FOREIGN* represents the proportion of total sales that emanates from other countries. *LEV* denotes leverage while *RET* denotes annual stock return. *ROA* represents return on assets. *ROAVOL* and *RETVOL* represent volatility of *ROA* and *RET* respectively. *LIQ* indicates stock liquidity defined as the log of turnover. All independent variables are measured as of the beginning of the year. All regressions contain robust standard errors clustered by industry annually. In addition, Model 1, 2 and 3 include year fixed effects, year and industry fixed effects and year and firm fixed effects respectively. Detailed variable definitions are in Table 1.

	Model 1		Model 2		Model 3	
	Coeff.	*t*-stat	Coeff.	*t*-stat	Coeff.	*t*-stat
Intercept	2.924	14.31	2.778	13.25	4.128	11.85
EXPERTISE	0.669	7.76	0.434	4.32	0.319	3.00
MB	0.023	1.35	-0.002	-0.13	0.023	1.25
R&D	2.452	13.43	2.270	10.56	-0.094	-0.26
ADVT	0.874	1.49	1.569	2.17	1.389	1.15
LNSALE	0.583	55.93	0.618	51.93	0.327	8.89
SEG	0.016	1.91	0.007	0.78	-0.005	-0.43
FOREIGN	0.532	8.77	0.291	3.69	0.276	2.23
LEV	0.296	3.23	0.336	3.32	-0.671	-4.87
RET	0.317	9.10	0.304	9.38	0.204	6.63
ROA	0.568	2.67	0.773	3.55	0.694	3.03
ROAVOL	0.069	0.30	0.126	0.54	-0.112	-0.41
RETVOL	-0.061	-1.94	-0.030	-0.94	0.012	0.29
LIQ	0.359	17.85	0.369	15.95	0.230	7.64
Year effects	Yes		Yes		Yes	
Industry effects	No		Yes		–	
Firm effects	No		No		Yes	
Adj. R^2	0.26		0.31		0.49	
Observations	24,182		24,182		24,182	

Table 3: Role of institutional ownership

The dependent variable is the log of *CEOEQCOMP*, which denotes equity-based compensation of the CEO. *EXPERTISE* denotes auditor expertise. *INST* represents institutional ownership while *MB* stands for the market-to-book ratio. *R&D* and *ADVT* indicate research and development and advertising expenditures respectively. *LNSALE* stands for the log of total sales. *SEGS* denotes the number of segments that the firm operates in. *FOREIGN* represents the proportion of total sales that emanates from other countries. *LEV* denotes leverage while *RET* denotes annual stock return. *ROA* represents return on assets. *ROAVOL* and *RETVOL* represent volatility of *ROA* and *RET* respectively. *LIQ* indicates stock liquidity defined as the log of turnover. All independent variables are measured as of the beginning of the year. All regressions contain year fixed effects and robust standard errors clustered by industry annually. In addition, Model 1 includes industry fixed effects while and Model 2 incorporates firm fixed effects. Detailed variable definitions are in Table 1.

	Model 1		Model 2	
	Coeff.	*t*-stat	Coeff.	*t*-stat
Intercept	2.349	10.84	3.852	10.95
EXPERTISE	0.813	5.59	0.608	3.54
*EXPERTISE*INST*	-0.772	-3.91	-0.582	-2.39
INST	0.612	6.87	0.607	5.35
MB	0.000	-0.02	0.023	1.22
R&D	2.221	10.39	-0.146	-0.41
ADVT	1.687	2.35	1.237	1.02
LNSALE	0.612	51.32	0.312	8.42
SEG	0.007	0.80	-0.005	-0.46
FOREIGN	0.306	3.89	0.262	2.11
LEV	0.325	3.22	-0.663	-4.83
RET	0.302	9.41	0.204	6.62
ROA	0.654	3.03	0.629	2.76
ROAVOL	0.316	1.34	-0.028	-0.10
RETVOL	-0.023	-0.71	0.012	0.29
LIQ	0.339	14.41	0.210	6.96
Year effects	Yes		Yes	
Industry effects	Yes		–	
Firm effects	No		Yes	
Adj. R^2	0.32		0.49	
Observations	24,182		24,182	

Table 4: Auditor expertise and compensation of other executives

The dependent variable in the first set of regressions is the log of *CFOEQCOMP*, which denotes equity-based compensation of the CFO while that in the next set is *OTHEQCOMP* which represents equity-based compensation of all other executives. All other variables are as defined in Table 3. All regressions contain year and firm fixed effects and robust standard errors clustered by industry annually.

	CFOs				All other executives			
	Model 1		Model 2		Model 3		Model 4	
	Coeff.	*t*-stat	Coeff.	*t*-stat	Coeff.	*t*-stat	Coeff.	*t*-stat
Intercept	3.270	6.81	3.008	6.19	3.557	15.65	3.460	14.89
EXPERTISE	0.255	2.75	0.569	3.08	0.115	1.28	0.188	1.36
*EXPERTISE*INST*			-0.601	-2.08			-0.152	-0.84
INST			0.528	4.13			0.220	2.72
MB	0.055	2.38	0.054	2.33	0.078	6.04	0.077	6.00
R&D	0.753	1.71	0.706	1.62	0.238	0.81	0.218	0.75
ADVT	1.287	0.95	1.100	0.82	0.724	0.86	0.657	0.79
LNSALE	0.306	8.47	0.295	8.16	0.301	12.60	0.294	12.31
SEG	-0.002	-0.17	-0.003	-0.22	0.023	2.78	0.024	2.81
FOREIGN	-0.161	-1.29	-0.183	-1.47	0.079	1.01	0.075	0.95
LEV	-0.238	-1.66	-0.241	-1.69	-0.375	-3.96	-0.368	-3.89
RET	0.174	5.71	0.175	5.74	0.165	8.64	0.166	8.67
ROA	0.853	3.31	0.792	3.11	0.562	3.60	0.536	3.44
ROAVOL	0.004	0.01	0.064	0.23	-0.096	-0.49	-0.068	-0.34
RETVOL	0.084	2.13	0.084	2.14	0.026	1.02	0.026	1.02
LIQ	0.213	6.51	0.196	5.88	0.197	9.65	0.188	9.10
Year effects	Yes		Yes		Yes		Yes	
Industry effects	–		–		–		–	
Firm effects	Yes		Yes		Yes		Yes	
Adj. R^2	0.48		0.48		0.47		0.47	
Observations	16,516		16,516		79,817		79,817	

Table 5: Addressing endogeneity of auditor expertise: Role of proximity to the SEC office

Panel A: Top 25 zip codes (by number of firms)

This panel presents data for the top 20 zip codes of the sample by number of firms headquartered. Distance denotes the distance of the firm's headquarters from the closest SEC regional office.

Sr. no	Zip code	# firms	City, State	Distance (in miles)	Closest SEC office
1	77002	19	Houston, TX	547.21	Denver, CO
2	95134	19	San Jose, CA	190.66	Los Angeles, CA
3	10019	18	New York, NY	2.39	New York, NY
4	60606	17	Chicago, IL	0.37	Chicago, IL
5	95054	16	Santa Clara, CA	190.41	Los Angeles, CA
6	80202	15	Denver, CO	0.00	Denver, CO
7	95035	15	Milpitas, CA	190.28	Los Angeles, CA
8	10017	14	New York, NY	2.13	New York, NY
9	75201	14	Dallas, TX	412.26	Denver, CO
10	10022	13	New York, NY	2.46	New York, NY
11	92121	13	San Diego, CA	64.85	Los Angeles, CA
12	94043	13	Mountain View, CA	193.49	Los Angeles, CA
13	77056	12	Houston, TX	545.24	Denver, CO
14	02451	11	Waltham, MA	114.55	New York, NY
15	10036	11	New York, NY	2.09	New York, NY
16	11747	11	Melville, NY	20.12	New York, NY
17	45202	11	Cincinnati, OH	156.85	Chicago, IL
18	76102	11	Fort Worth, TX	401.00	Denver, CO
19	95131	11	San Jose, CA	188.57	Los Angeles, CA
20	44114	10	Cleveland, OH	189.83	Chicago, IL
21	60045	10	Lake Forest, IL	17.18	Chicago, IL
22	23219	9	Richmond, VA	59.83	Washington, DC
23	55344	9	Eden Prairie, MN	221.97	Chicago, IL
24	77042	9	Houston, TX	543.49	Denver, CO
25	94089	9	Sunnyvale, CA	191.93	Los Angeles, CA

Panel B: Instrumental variables regression

This panel presents results of the two-stage instrumental variables approach. The first stage estimates a regression of *EXPERTISE* on the exogenous controls and the instrument *DISTANCE*, defined as an indicator variable that takes the value of 1 if the firm's headquarters is more than 100 miles away from the closest SEC regional office. In the second stage, the log of equity-based compensation (*EQCOMP*) is regressed on the interaction of the predicted value from the first stage (*PR_EXPERTISE*) and an indicator variable to denote CEOs and CFO (*CEOCFO*). All other variables are as defined in Table 2.

	First stage		Second stage	
	Coeff.	*t*-stat	Coeff.	*t*-stat
Intercept	0.212	9.20	3.624	17.30
DISTANCE	0.012	4.01		
*PR_EXPERTISE*CEOCFO*			0.844	5.95
CEOCFO			0.296	6.70
MB	-0.010	-8.89	0.065	5.19
R&D	-0.087	-6.63	0.284	1.08
ADVT	-0.110	-2.21	0.945	1.28
LNSALE	0.017	15.24	0.307	13.71
SEG	-0.013	-13.65	0.019	2.59
FOREIGN	-0.069	-13.61	0.124	1.67
LEV	-0.043	-5.47	-0.407	-4.50
RET	0.022	8.24	0.170	9.19
ROA	-0.213	-12.65	0.680	4.63
ROAVOL	-0.254	-15.91	-0.036	-0.20
RETVOL	0.002	0.98	0.028	1.18
LIQ	-0.013	-6.95	0.212	11.42
Partial *F*-test of *DISTANCE* (*p*. value)	16.05 (0.000)			
Year effects	Yes		Yes	
Industry effects	No		–	
Firm effects	No		Yes	
Adj. R^2	0.09		0.47	
Observations	24,182		120,509	

Panel C: Elevation of district offices to regional offices

This panel presents results of the regression of *EXPERTISE* on the exogenous controls and the instrument *DISTANCE_DISTRICT*, which is defined as an indicator variable that takes the value of 1 if the firm's headquarters is more than 100 miles away from the closest SEC district office. *DISTANCE* takes the value of 1 if the firm's headquarters is more than 100 miles away from the regular SEC regional offices. *POST* is an indicator variable that takes the value of 1 after 2006 and 0 before. All other variables are as defined in Table 2.

	Model 1		Model 2	
	Coeff.	*t*-stat	Coeff.	*t*-stat
Intercept	0.224	12.66	0.211	11.77
DISTANCE_DISTRICT	-0.002	-0.76		
*POST*DISTANCE_DISTRICT*	0.010	3.94		
DISTANCE			0.013	4.55
*POST*DISTANCE*			-0.005	-1.20
MB	-0.010	-6.03	-0.010	-5.97
R&D	-0.084	-5.80	-0.087	-6.37
ADVT	-0.113	-1.94	-0.111	-1.95
LNSALE	0.017	11.79	0.017	11.80
SEG	-0.013	-3.47	-0.013	-3.46
FOREIGN	-0.070	-4.12	-0.069	-4.22
LEV	-0.043	-1.54	-0.043	-1.51
RET	0.022	2.63	0.022	2.64
ROA	-0.211	-4.38	-0.213	-4.39
ROAVOL	-0.254	-6.50	-0.255	-6.56
RETVOL	0.002	0.42	0.002	0.49
LIQ	-0.013	-5.20	-0.013	-5.27
Year effects	Yes		Yes	
Industry effects	No		No	
Firm effects	No		No	
Adj. R^2	0.09		0.09	
Observations	24,182		24,182	

Panel D: Number of restaters in the region

This panel presents results of the two-stage instrumental variables approach. The first stage estimates a regression of *EXPERTISE* on the exogenous controls and the instrument *RESTATERS*, defined as the number of firms in the firm's county that have restated their financial statements. In the second stage, the log of equity-based compensation (*EQCOMP*) is regressed on the interaction of the predicted value from the first stage (*PR_EXPERTISE*) and an indicator variable to denote CEOs and CFO (*CEOCFO*). All other variables are as defined in Table 2.

	First stage		Second stage	
	Coeff.	*t*-stat	Coeff.	*t*-stat
Intercept	0.281	9.79	3.576	13.38
RESTATERS	-0.016	-6.56		
*PR_EXPERTISE*CEOCFO*			0.826	5.19
CEOCFO			0.312	6.09
MB	-0.014	-10.22	0.067	4.33
R&D	-0.073	-4.40	-0.216	-0.64
ADVT	0.026	0.40	1.664	1.77
LNSALE	0.020	14.38	0.300	10.76
SEG	-0.016	-13.06	0.009	0.94
FOREIGN	-0.060	-8.49	0.070	0.76
LEV	-0.074	-7.34	-0.367	-3.18
RET	0.029	8.10	0.172	7.82
ROA	-0.228	-10.52	0.563	2.90
ROAVOL	-0.314	-12.94	-0.075	-0.35
RETVOL	0.005	1.42	0.055	1.77
LIQ	-0.009	-3.65	0.202	8.62
Partial *F*-test of *RESTATERS* (*p.* value)	43.08 (0.000)			
Year effects	Yes		Yes	
Industry effects	No		-	
Firm effects	No		Yes	
Adj. R^2	0.10		0.48	
Observations	14,924		74,664	

Table 6: Robustness tests

Panel A: "Pseudo" auditor expertise

The dependent variable in the first (second) specification is the log of *CEOEQCOMP (CFOEQCOMP)*, which denotes equity-based compensation of the CEO (CFO). *PSEUDOEXPERTISE* denotes a randomly assigned value of *EXPERTISE* to each auditor for each year. *MB* stands for the market-to-book ratio. *R&D* and *ADVT* indicate research and development and advertising expenditures respectively. LNSALE stands for the log of total sales. *SEGS* denotes the number of segments that the firm operates in. *FOREIGN* represents the proportion of total sales that emanates from other countries. *LEV* denotes leverage while *RET* denotes annual stock return. *ROA* represents return on assets. *ROAVOL* and *RETVOL* represent volatility of *ROA* and *RET* respectively. *LIQ* indicates stock liquidity defined as the log of turnover. All independent variables are measured as of the beginning of the year. All regressions contain year and firm fixed effects and robust standard errors clustered by industry annually. Detailed variable definitions are in Table 1.

	CEO		CFO	
	Coeff.	*t*-stat	Coeff.	*t*-stat
Intercept	4.218	12.15	3.330	6.92
PSEUDOEXPERTISE	-0.006	-0.16	0.000	0.01
MB	0.023	1.22	0.055	2.38
R&D	-0.099	-0.27	0.748	1.70
ADVT	1.272	1.06	1.206	0.89
LNSALE	0.329	8.93	0.308	8.52
SEG	-0.004	-0.33	-0.001	-0.08
FOREIGN	0.285	2.31	-0.152	-1.21
LEV	-0.670	-4.86	-0.239	-1.67
RET	0.206	6.67	0.175	5.75
ROA	0.691	3.02	0.846	3.29
ROAVOL	-0.123	-0.45	-0.011	-0.04
RETVOL	0.013	0.31	0.086	2.16
LIQ	0.231	7.66	0.213	6.51
Year effects	Yes		Yes	
Industry effects	–		–	
Firm effects	Yes		Yes	
Adj. R^2	0.49		0.47	
Observations	24,182		16,516	

Panel B: Presence of a Big Five auditor (*BIG5*) to measure auditor expertise

Results for this panel are based on an equally-matched sample of firms audited by a Big Five versus non-Big Five auditor. The dependent variable in the first specification is the log of *CEOEQCOMP*, in the second is the log of *CFOEQCOMP* and in the third is the log of *OTHEQCOMP*. *BIG5* is an indicator variable that denotes whether or not the firm is audited by a Big Five auditor. *MB* stands for the market-to-book ratio. *R&D* and *ADVT* indicate research and development and advertising expenditures respectively. *LNSALE* stands for the log of total sales. *SEGS* denotes the number of segments that the firm operates in. *FOREIGN* represents the proportion of total sales that emanates from other countries. *LEV* denotes leverage while *RET* denotes annual stock return. *ROA* represents return on assets. *ROAVOL* and *RETVOL* represent volatility of *ROA* and *RET* respectively. *LIQ* indicates stock liquidity defined as the log of turnover. All independent variables are measured as of the beginning of the year. All regressions contain year and firm fixed effects and robust standard errors clustered by industry annually. Detailed variable definitions are in Table 1.

	CEO		CFO		All other executives	
	Coeff.	*t*-stat	Coeff.	*t*-stat	Coeff.	*t*-stat
Intercept	6.638	2.72	9.276	3.55	4.668	4.65
BIG5	0.992	2.26	0.894	2.69	0.255	1.53
MB	-0.148	-1.17	-0.149	-0.91	0.040	0.72
R&D	0.693	0.24	0.691	0.25	-2.069	-1.62
ADVT	2.544	0.52	1.836	0.26	0.593	0.22
LNSALE	0.027	0.09	-0.381	-1.32	0.019	0.16
SEG	-0.080	-0.85	-0.103	-0.98	0.017	0.42
FOREIGN	-0.645	-0.63	-0.759	-0.80	0.013	0.03
LEV	-0.833	-0.71	-0.573	-0.58	-0.401	-0.81
RET	0.442	2.15	0.358	1.84	0.317	3.60
ROA	-1.183	-0.71	1.243	0.95	0.045	0.06
ROAVOL	4.610	1.94	0.516	0.25	-0.073	-0.08
RETVOL	-0.477	-1.75	-0.204	-0.95	-0.041	-0.32
LIQ	0.369	1.87	0.332	1.70	0.151	1.66
Year effects	Yes		Yes		Yes	
Industry effects	–		–		–	
Firm effects	Yes		Yes		Yes	
Adj. R^2	0.48		0.47		0.51	
Observations	1,662		1,318		5,130	

Panel C: Controlling for cash compensation

The dependent variable in the first specification is the log of *CEOEQCOMP*, in the second is the log of *CFOEQCOMP* and in the third is the log of *OTHEQCOMP*. *EXPERTISE* denotes auditor expertise while *MB* stands for the market-to-book ratio. *R&D* and *ADVT* indicate research and development and advertising expenditures respectively. *LNSALE* stands for the log of total sales. *SEGS* denotes the number of segments that the firm operates in. *FOREIGN* represents the proportion of total sales that emanates from other countries. *LEV* denotes leverage while *RET* denotes annual stock return. *ROA* represents return on assets. *ROAVOL* and *RETVOL* represent volatility of *ROA* and *RET* respectively. *LIQ* indicates stock liquidity defined as the log of turnover. *CASHCOMP* denotes the log of annual cash compensation (salary and bonus). All independent variables are measured as of the beginning of the year. All regressions contain year and firm fixed effects and robust standard errors clustered by industry annually. Detailed variable definitions are in Table 1.

	CEO		CFO		All other executives	
	Coeff.	*t*-stat	Coeff.	*t*-stat	Coeff.	*t*-stat
Intercept	1.648	4.21	1.001	1.92	0.561	2.31
EXPERTISE	0.291	2.82	0.245	2.64	0.100	1.09
MB	0.034	1.88	0.061	2.63	0.083	6.43
R&D	0.017	0.05	0.792	1.80	0.274	0.93
ADVT	1.288	1.07	1.003	0.76	0.411	0.50
LNSALE	0.268	7.37	0.237	6.55	0.196	8.17
SEG	-0.009	-0.81	-0.003	-0.20	0.021	2.48
FOREIGN	0.277	2.24	-0.144	-1.16	0.089	1.14
LEV	-0.655	-4.81	-0.245	-1.72	-0.364	-3.85
RET	0.142	4.62	0.137	4.52	0.111	5.82
ROA	0.582	2.58	0.872	3.43	0.521	3.39
ROAVOL	-0.077	-0.28	-0.034	-0.12	-0.077	-0.39
RETVOL	0.012	0.30	0.084	2.13	0.038	1.51
LIQ	0.228	7.64	0.209	6.40	0.195	9.65
CASHCOMP	0.447	14.64	0.479	11.30	0.627	32.89
Year effects	Yes		Yes		Yes	
Industry effects	–		–		–	
Firm effects	Yes		Yes		Yes	
Adj. R^2	0.50		0.48		0.49	
Observations	24,182		16,516		79,817	

Panel D: Controlling for differences in regulation and litigation risk

The dependent variable is the log of *CEOEQCOMP*, which denotes equity-based compensation of the CEO. *EXPERTISE* denotes auditor expertise. *REGULATED* and *LITIGATION* denotes industries that are regulated and those with high litigation risk respectively. *MB* stands for the market-to-book ratio. *R&D* and *ADVT* indicate research and development and advertising expenditures respectively. *LNSALE* stands for the log of total sales. *SEGS* denotes the number of segments that the firm operates in. *FOREIGN* represents the proportion of total sales that emanates from other countries. *LEV* denotes leverage while *RET* denotes annual stock return. *ROA* represents return on assets. *ROAVOL* and *RETVOL* represent volatility of *ROA* and *RET* respectively. *LIQ* indicates stock liquidity defined as the log of turnover. All independent variables are measured as of the beginning of the year. All regressions contain year fixed effects and robust standard errors clustered by industry annually. Detailed variable definitions are in Table 1.

	Regulation		Litigation risk	
	Coeff.	*t*-stat	Coeff.	*t*-stat
Intercept	2.921	14.17	3.129	14.91
EXPERTISE	0.560	7.01	0.584	6.74
REGULATED	0.238	5.95		
LITIGATION			-0.272	-6.91
MB	0.026	1.52	0.029	1.70
R&D	2.546	13.84	2.790	14.93
ADVT	1.456	2.47	1.271	2.15
LNSALE	0.578	56.51	0.589	57.35
SEG	0.015	1.76	0.008	0.97
FOREIGN	0.662	10.47	0.526	8.86
LEV	0.265	2.96	0.200	2.16
RET	0.311	8.92	0.314	9.09
ROA	0.679	3.19	0.593	2.78
ROAVOL	0.142	0.63	0.076	0.33
RETVOL	-0.060	-1.90	-0.046	-1.48
LIQ	0.368	18.23	0.385	18.59
Year effects	Yes		Yes	
Industry effects	No		No	
Firm effects	No		No	
Adj. R^2	0.26		0.26	
Observations	24,182		24,182	

Figure 1: Equity-based compensation across auditor expertise (*EXPERTISE*) quintiles

The x-axis denotes quintiles of *EXPERTISE* while the y-axis plots median values of CEO equity-based compensation (*EQCOMP*) that correspond to these quintiles.