CEO Equity Incentives and Financial Misreporting: The Role of Auditor Expertise

Sudarshan Jayaraman and Todd Milbourn[#]

April 2014

Abstract

Prior studies find inconsistent evidence regarding the effect of CEO equity incentives on financial misreporting. We argue that this inconsistency stems from not considering detection mechanisms that mitigate the effect of equity incentives on misreporting by limiting the ability of managers to carry out such manipulative activities. Using auditor industry expertise as one such detection mechanism, we document that CEO equity incentives are positively associated with misreporting only in sub-samples where auditor expertise is low, but not where expertise is high. The implication of these results is that auditor expertise lowers the cost of granting equity-based incentives, and that firms audited by an industry expert grant their CEOs greater equity incentives. We find strong evidence in favor of this implication. Controlling for previously identified determinants of CEO equity incentives, we find that firms audited by an industry expert grant their CEOs 14 percent more equity incentives than firms audited by a non-expert. To address endogeneity concerns, we use the collapse of Arthur Andersen as a quasi-natural experiment and find analogous evidence. Overall, our study documents the critical role of detection mechanisms in the link between CEO contracting and financial misreporting.

Olin Business School, Washington University in St. Louis, Campus Box 1133, One Brookings Drive, St. Louis, MO 63130. Contact author: milbourn@wustl.edu. We appreciate very helpful comments from two anonymous referees, the editor (John Harry Evans), Amir Amel-Zadeh, Chris Armstrong, Nick Dopuch, Gerald Garvey, Eitan Goldman, Radha Gopalan, Todd Gormley, Allison Koester, Adair Morse, Doug Skinner and seminar participants at the Penn State Accounting Research conference and University of Illinois at Chicago. We thank Lauren Barth and Sisi Ren for excellent research assistance. Any errors are our own.

1. Introduction

A large literature in accounting and finance tests whether CEOs with equity-based incentives manipulate their financial statements.[1] The overall evidence in this literature is inconclusive, with some studies documenting a positive association (Burns and Kedia, 2006; Bergstresser and Phillipon, 2006; Denis, Hanouna and Sarin, 2006; Efendi, Srivastava and Swanson, 2007; Harris and Bromiley, 2007), and others failing to find such an association (Armstrong, Jagolinzer and Larcker, 2010; Baber, Kang and Liang, 2007; Erickson, Hanlon and Maydew, 2006).

While the above studies differ in their research designs, empirical measures and sample periods, none of them considers the role of detection mechanisms that would limit the ability of managers to successfully carry out any misreporting, assuming that equity incentives do indeed encourage misreporting. We posit effective auditing as one such mechanism and argue that incorporating it in a CEO contracting-financial misreporting framework is likely to shed light on the preceding inconsistent findings. Following the auditing literature, we use auditor industry expertise to capture the effectiveness of auditing and examine how it affects the association between CEO equity incentives and financial misreporting. First, we replicate the positive association between CEO equity incentives, defined as delta, the sensitivity of the CEO's equity portfolio to the stock price, and the likelihood of misreporting, based on the comprehensive set of class action lawsuits identified by Dyck, Morse and Zingales, 2010.

Second, we condition our sample on whether the auditor is an industry expert and find that the positive association between misreporting and CEO incentives is concentrated in the

[1] We use the terms "misreporting" or "financial misreporting" to refer to actions taken by managers to induce opacity into reported financial statements. As these activities are not directly observable, we use instances of class-action lawsuits to infer the presence of such activities.

subsample of non-industry-expert auditors. We are unable to detect any association between misreporting and CEO equity incentives in the sub-sample of auditors that are industry experts. Further, we uncover these results in both univariate as well as multivariate tests, indicating that our inferences do not reflect selective inclusion or exclusion of control variables.

Third, we verify that our inferences are robust to using the propensity-score based matching design suggested by Armstrong, Jagolinzer and Larcker (2010). They argue that using a propensity score design that achieves maximum variation in the variable of interest, while minimizing variation in the control variables, is a superior econometric approach to matching on the outcome variable. We concur and replicate their results by using the propensity-score matching technique and confirm that there is no statistical association between the frequency of misreporting and CEO equity incentives in the full sample. However, when we split the sample based on auditor expertise, we again find that CEO equity incentives are associated with a higher frequency of misreporting – but only in the subsample of non-expert auditors. In the high auditor expertise subsample, we find that CEO incentives correlate with a *lower* frequency of misreporting.[2] Overall, our results are robust to using alternative empirical methodologies and provide an economic rationale for the prior inconsistent evidence between CEO equity incentives and financial misreporting.

An implication that emerges from the above tests is that effective auditing reduces the costs of granting equity-based incentives by deterring managers from manipulating financial statements. If that is true, then optimal contracting theories predict that these firms should grant more equity-based incentives to their CEOs. For example, Goldman and Slezak (2006) examine how the

[2] Although this result is interesting, further exploration is beyond the scope of our current study. Our hypotheses merely predict that CEO equity incentives do *not* correlate with more frequent misreporting in the presence of greater auditor expertise. Therefore, we leave this issue to future research.

potential for misreporting influences managerial equity-based incentives. They argue that while more equity incentives induce better strategic decisions and greater effort, they also encourage the manager to misreport performance to artificially inflate the stock price, especially if the misreporting is unlikely to be detected. Their model predicts that CEOs will be granted more equity incentives when misreporting is more likely to be detected. Our framework allows us to test this prediction.

We find strong evidence in favor of this optimal contracting story. Controlling for previously identified determinants of CEO incentives, firms audited by an industry expert grant their CEOs an average of 14 percent more equity incentives than those audited by a non-expert. These results are robust to additional sensitivity tests such as restricting the sample to Big Five auditees, using alternative measures of both auditor expertise and equity-based incentives, and to including the top five executives rather than only the CEO. To further validate our inferences, we exploit variation across industries in the extent to which earnings matter for determining the stock price and find that auditor expertise is positively associated with CEO incentives only in industries where earnings matter for stock price informativeness. Overall, these results are consistent with optimal contracting theories where equity-based incentives are, at least in part, granted by trading off the benefits of effort with the costs of financial misreporting.

A lingering concern that remains is the endogeneity of auditor expertise. For example, it could be that more aligned CEOs with greater equity incentives select expert auditors to bind themselves to greater monitoring. To address this endogeneity, we use the demise of Arthur Andersen (AA) as a quasi-natural experiment of forced auditor changes (Blouin, Grein and Rountree, 2007; Dyck, Morse and Zingales, 2011). Our identifying assumption uses firms' switch to a new auditor around AA's demise as a quasi-exogenous shock to auditor expertise. We use a

difference-in-differences design to compare changes in CEO incentives for AA clients with an expert auditor in the post period to those without an expert auditor. A distinct advantage of this within-firm approach is that it implicitly controls for *all* time-invariant differences across firms that might be correlated with auditor expertise. Evidence from this event-study methodology fully validates our cross-sectional inferences. We find that AA firms audited by an expert auditor in the post-period experience an average of 17 percent larger increase in CEO incentives as compared to AA firms audited by a non-expert in the post-period. A final concern here is that although a firm's decision to switch auditors is exogenous, its choice of the incoming auditor is not. To mitigate this concern, we use a two-stage approach where we model the probability of selecting an industry expert auditor in the first stage and control for the inverse Mills ratio in the second stage. Our results are robust to this correction as well. Overall, these time-series tests complement our cross-sectional inferences on the important effect of auditor expertise on CEO equity incentives.

Our study first contributes to the CEO contracting-financial misreporting literature by providing an economic rationale for the inconsistent evidence in prior studies. We show that detection mechanisms such as auditor expertise mitigate the effect of equity incentives on misreporting by limiting the ability of managers to misreport financial statements. Second, our evidence documents an important role for financial statement verification in the way managers are incentivized. While the economic consequences of auditing have focused on improvements to the information environment (Ball, Jayaraman and Shivakumar, 2012) and a 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 incentives is an important one because CEO incentives have wide implications for managerial risk-taking (Coles

et al., 2006) and the efficient functioning of corporate governance structures (Admati and Pfleiderer, 2009; Edmans, 2009; Bharath, Jayaraman and Nagar, 2013).

Next, Section 2 lays out the hypotheses and Section 3 presents the empirical strategy. Section 4 reports the main results and includes our robustness tests. Section 5 concludes.

2. Motivation and hypotheses

In the following section, we motivate our empirically testable hypotheses.

2.1. CEO equity incentives and financial misreporting

In the aftermath of accounting scandals at the turn of the century, many academics, regulators, and the media have questioned whether managerial compensation contracts are the culprits behind these acts of reporting transgressions. Greater equity incentives allegedly 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."

On the other hand, others express a healthy skepticism of these interpretations. 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." So whether equity incentives are truly to blame for manipulative reporting behavior remains an unanswered empirical question.

Several studies test the above assertions by examining the association between misreporting and CEO incentives. While this literature is burgeoning, the overall evidence is inconclusive. Armstrong et al. (2010) point out that the above view implicitly ignores the effect of actions by monitors in curbing the misreporting. Thus, even if one were to entertain the possibility that CEO incentives encourage misreporting, one would not necessarily observe a positive association *ex post* if there are mechanisms in place that would detect the misreporting. We argue that one reason for the mixed evidence owes to the lack of conditioning on such detection mechanisms that arguably mitigate the positive association between CEO equity incentives and misreporting. We follow the auditing literature and posit that auditor expertise is one such mechanism. Support for this claim comes from prior studies that provide evidence of the link between auditor industry expertise and the detection of misreporting.

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. Solomon et al. (1999) find that auditors who are industry experts are more likely to detect financial reporting misstatements that are intentional and hence more egregious. Gunny et al. (2007) find that auditors with industry expertise are less likely to be found deficient or severely deficient by the PCAOB (Public Company Accounting Oversight Board). Finally, Balsam, Krishnan and Yang (2003) and Krishnan (2003) document that abnormal accruals are smaller for companies audited by industry experts; and Reichelt and Wang (2010) show that auditor industry expertise is associated with smaller income-increasing and income-decreasing abnormal accruals

and a lower likelihood of meeting or beating analysts' earnings forecasts by one penny per share. Our primary hypothesis is thus as follows:

> *H1: Auditor expertise mitigates the positive association between CEO equity-based incentives and financial misreporting.*

2.2. Effect of auditor expertise on CEO incentives

The above hypothesis implies that auditor expertise reduces the costs of granting equity incentives by reducing the likelihood of misreporting. If so, then optimal contracting theories predict that these firms should grant their CEOs more equity-based incentives. For example, Goldman and Slezak (2006) present a model where the manager exerts effort that positively affects output while also engaging in misrepresentation of performance (Peng and Roell, 2008; Laux and Laux, 2009). Shareholders determine the optimal level of stock-based incentives by trading off the benefits of higher effort with the costs of greater misreporting. The prediction from their model is that firms with a higher detection likelihood of misreporting grant their CEO's more equity incentives. The intuition is that the greater probability of detection reduces the manager's incentives to indulge in misreporting, thereby reducing the ex-ante costs of granting equity-based incentives.

It is pertinent to distinguish between auditor expertise as a "detection mechanism" and other forms of corporate governance that act as "monitoring mechanisms." In a single-task agency setting, where the manager can only influence the stock price via his effort, the agency literature has traditionally characterized monitoring mechanisms, including debt and large shareholding, as substitutes for CEO equity incentives. The intuition is that these mechanisms can monitor the actions of the manager, and thus reduce the need to grant equity-based incentives to the manager. For example, Ittner et al. (2003, 103) note that:

> "Corporate governance mechanisms provide an alternative to the explicit use of equity-based incentives. For example, holders of large blocks of stock have greater incentive to monitor the actions of managers and greater power to force managers to allow monitoring to occur…Similarly, bondholders have incentives to restrict managers' ability to take actions that transfer wealth from bondholders to shareholders and/or managers…Consequently, the use of equity-based incentives should be lower when external monitoring is greater."

However, the optimal tradeoffs become more complex in a multi-tasking framework. For example, Goldman and Slezak (2006) allow the manager to influence the stock via both effort and misreporting. They model the "monitoring environment" to represent the collection of parameters that directly affect misreporting. These include the probability of detection, reflecting auditor expertise, the penalty if detected, and the cost of hiding misreporting activities. They find that equity-incentives are *increasing* in the detection probability and in the penalty of misreporting. It is pertinent to note that Goldman and Slezak (2006) do not allow the "monitoring environment" to influence managerial effort. Thus, the overall effect of monitoring mechanisms on equity incentives depends on their relative influence on effort versus on misreporting. As better monitoring of the manager's effort *reduces* the need to grant equity incentives, better monitoring of the financial reporting process actually *increases* the ability to grant equity based incentives, therefore, the overall effect of monitoring mechanisms on equity incentives is ambiguous. In contrast, since auditors are less likely to influence the manager's effort directly, the effect of auditor expertise on CEO equity incentives operates only through the misreporting channel, thereby offering an unambiguous prediction. Thus, our second hypothesis is:

H2: Firms offer more equity incentives to CEOs when they are audited by an industry expert.

2.3. Role of stock price sensitivity to earnings

We expect the effect of auditor expertise on CEO equity incentives to vary depending on the extent to which earnings matter for stock prices. Because managers' incentives to manipulate earnings stem from their desire to influence the stock price, we expect the effect of auditor expertise on CEO incentives to be more pronounced in industries where earnings play a relatively more important role in determining the stock price. Thus our third hypothesis is:

> *H3: The influence of auditor expertise on CEO equity incentives is more pronounced in industries where earnings are relatively more important in determining the stock price.*

3. Research design

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

3.1. Primary variables

3.1.1. Financial misreporting (LAWSUIT)

It is difficult to construct an appropriate empirical measure of misreporting since this managerial action is unobservable (Armstrong et al., 2010). We therefore follow prior studies and infer misreporting based on "extreme" outcomes where misreporting is likely to have occurred. In particular, we follow Armstrong et al. (2010) and Dyck, Morse and Zingales (2010) by using an indicator variable *LAWSUIT* to denote firm-years during which the firm faced a securities class action lawsuit in the Stanford Securities Class Action Clearinghouse (SSCAC) database. The advantage of this database is not only that it encompasses most cases of misreporting including restatements and AAERs, but also that Dyck et al. apply several filters to exclude frivolous and

dismissed cases, and most importantly make these data publicly available.[3] In particular, Dyck et al. describe how they exclude cases where the lawsuit occurred due to reasons such as IPO underwriter allocation cases, mutual fund timing and late trading cases and analyst cases involving false provision of favorable coverage.

3.1.2. CEO equity incentives (EQINC)

Following prior studies, such as Armstrong et al. (2010), Burns and Kedia (2006), Core and Guay (1999) and Erickson et al. (2006), we measure CEO equity incentives as the portfolio delta, defined as the dollar change in the CEO's equity portfolio value for a 1 percent change in the firm's stock price. We estimate delta based on the methodology in Core and Guay (1999, 2002) and denote this measure of CEO equity-based incentives as *EQINC*.

3.1.3. Auditor expertise (EXPERTISE)

Following Reichelt and Wang (2010), we define auditor expertise based on the auditor's annual market share of audit fees within a two-digit SIC category and use their two definitions of industry expertise. Definition 1 (*EXPERTISE1*) measures industry expertise by auditor dominance and is defined as an indicator that takes the value of 1 if in a particular year the auditor has the largest market share in a two-digit SIC category and if its market share is at least ten percentage points greater than the second largest industry leader. A sufficiently larger market share, as Reichelt and Wang (2010) argue, ensures that the industry leader is dominant. Definition 2 (*EXPERTISE2*) measures industry expertise assuming that auditor expertise increases with industry market share and that a sufficiently large market share exists. Specifically, an audit firm is an industry specialist if in a particular year it has a market share greater than 35 percent in a two-

[3] We thank the authors for making these data available at http://faculty.chicagobooth.edu/adair.morse/research/data.html

digit SIC category.[4] We use a composite measure of auditor expertise (*EXPERTISE*) that is set to 1 if either measure indicates that the auditor is an industry expert. We verify in subsequent tests that our results are robust to using the individual measures and also to using the continuous measure of market share, similar to Reichelt and Wang (2010).

Following Reichelt and Wang (2010), we define *EXPERTISE* over the period 2003 to 2007. We start in 2003 because that is the first year of the Big Four, and restrict the sample period to end by 2007 because sample coverage on Audit Analytics declined drastically from 2007 onwards (Reichelt and Wang, 2010). To provide insight into the auditor expertise variable, we provide descriptive statistics similar to Reichelt and Wang (2010). For each year, we present the number of unique two-digit industries for which each of the Big Four auditors (Deloitte, Ernst & Young, KPMG and PwC) are the experts. Table 1 presents these values for each individual expertise measure. PwC is the expert for the most industries, followed by Ernst & Young, Deloitte, and KPMG. These ordinal rankings are consistent across the two measures and are similar to those reported in Reichelt and Wang (2010). For example, Reichelt and Wang (2010) report that PwC is the industry expert based on *EXPERTISE2* in 18 industries, followed by Ernst & Young in 14 industries, Deloitte in 10 industries, and KPMG in 4. In our sample, these values correspond to 17 industries for PwC, 12 industries for Ernst & Young, 9 industries for Deloitte and 4 industries for KPMG.

3.2. Sample construction

3.2.1.Financial misreporting and auditor expertise

[4] Following Neal and Riley (2004) and Reichelt and Wang (2010), we define the breakpoint as 1.2 times the inverse of the average number of unique auditors in each industry, which is 3.45. This amounts to 35 percent ($1.2*3.45^{-1}$).

To test hypothesis *H1* concerning the role of auditor expertise in the link between CEO equity incentives and misreporting, we merge four databases: (i) data on lawsuits from 1994 to 2004 from Dyck et al. (2010), (ii) data on CEO equity incentives from Execucomp, (iii) data on auditor expertise from 2003 to 2007 from Audit Analytics; and (iv) data on control variables from Compustat and IRRC (now Risk Metrics). To circumvent the limited overlap between the 1994-2004 lawsuit database and the 2003-2007 auditor expertise database, we assume that auditors we identify as industry experts in each of the years from 2003 to 2007 based on Audit Analytics would have also been industry experts during the years from 1994 to 2002. In the combined sample that covers the 1994 to 2004 period, we set the indicator *EXPERTISE* to 1 if the auditor has remained an industry expert in each of the years from 2003 to 2007. This stricter definition of auditor expertise also eliminates artificial variation in the variable due to temporary fluctuations in auditor market share.[5] The final sample comprises 7,427 firm-year observations over the period 1994 to 2004, of which 201 firm-years or 2.71 percent of the sample involve a lawsuit concerning an accounting or other misreporting, and so the indicator *LAWSUIT* is set to 1 for these firm-years. These observations involve 87 unique firms.[6]

We include several variables shown by prior studies to be related to CEO incentives. These variables form the input to the propensity-score based matching model that we estimate following Armstrong et al. (2010). Because larger firms and those with greater monitoring difficulties grant more equity based incentives (Demsetz and Lehn, 1985; Armstrong et al., 2010), we include firm size (*SIZE*), defined as the log of market value of equity. We also include the market-to-book ratio (*MB*), leverage (*LEV*), defined as total debt divided by total assets, and stock return volatility

[5] We thank an anonymous referee for this suggestion.
[6] Following Dyck et al. (2010), we delete firms with assets of less than $750 million. Our results are, however, robust to the inclusion of these firms.

(*RETVOL*) as controls for the underlying economic environment. Further, following Core, Holthausen and Larcker (1999) and Armstrong et al. (2010) we include variables to capture differences in the corporate governance environment. We use the Gompers et al. (2003) G-index (*GINDEX*), the size of the board (*BOARDSIZE*), the number of affiliated directors on the board (*AFFLDIR*), the presence of interlocking directorships (*INTLCKDIR*), whether the CEO is also the chairman of the board (*CEO_COB*), whether substantial shareholders in the firm are allowed cumulative voting (*CUMVOTE*), the proportion of institutional ownership (*INSTOWN*), and CEO tenure (*TENURE*). We present detailed variable definitions and data sources in the Appendix.

3.2.2.Financial misreporting and auditor expertise

To test hypothesis *H2*, which predicts a positive influence of auditor expertise on CEO equity incentives, we use a sample that comprises the intersection of all firms with compensation data from ExecuComp, auditor expertise data from Audit Analytics, accounting data from Compustat, and stock price data from CRSP. This sample consists of 7,149 firm-year observations across 1,836 unique firms between the years 2003 and 2007.

As control variables, we include the log of total sales (*LNSALE*) because prior studies show that firm size is an important determinant of equity incentives. Because larger firms grant their executives more compensation (Gabaix and Landier, 2008), we expect the coefficient on *LNSALE* to be positive. Following Ittner et al. (2003), we use leverage (*LEV*) to capture monitoring by debt holders and expect a negative association with equity incentives. Prior studies find that the investment opportunity set affects equity incentives (Clinch, 1991; Smith and Watts, 1992; Gaver and Gaver, 1993; and Baber et al, 1996), so we include 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*) to capture the investment opportunity set. Consistent with prior studies, we expect a

positive coefficient on *MB*, *R&D*, and *ADVT*. We use both accounting (*ROA*) and stock price (*RET*) based measures to capture prior performance.

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*) because Jayaraman and Milbourn (2012) show that firms with greater stock liquidity grant their executives more equity-based incentives. They argue 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 and industry indicators, and cluster the standard errors by firm. With all control variables defined as of the beginning of the year, our empirical specification is:

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

Hypothesis *H2* predicts $\beta_1 > 0$ because auditor expertise allows for more equity incentives.

4. Results

4.1. Financial misreporting and auditor expertise

4.1.1. Descriptive statistics

Table 2, Panel A presents descriptive statistics. The mean value of *LAWSUIT* is 0.027, indicating that 2.7 percent of the sample pertains to firm-years with a lawsuit. This proportion closely resembles the 3.4 percent that Armstrong et al. (2010) report. The mean value of *EQINC* is 706.426, which suggests that a 1 percent increase in the stock price increases the value of the average CEO's equity portfolio by $706,426. The mean value of *EXPERTISE* (0.081) indicates that approximately 8 percent of the sample is audited by an industry expert.[7]

4.1.2. The role of auditor expertise in CEO equity incentives and financial misreporting

Table 2, Panel B reports results on the role of auditor expertise in the association between CEO equity incentives and misreporting. The "Full sample" results replicate prior studies. We estimate a probit model of the likelihood of misreporting (Pr (*LAWSUIT* = 1)) as a function of CEO incentives (*EQINC*) and control variables (*SIZE*, *LEV* and *MB*). We present univariate and multivariate evidence, where following Burns and Kedia (2006), we include industry and year fixed effects. Consistent with Armstrong et al., results for Model (1) and Model (2) in Table 2, Panel B show that the coefficient on *EQINC* is positive and significant indicating that the likelihood of misreporting is higher in firms with greater equity incentives granted to the CEO.

To evaluate the role of auditor expertise in the association between CEO incentives and misreporting, in Models (3) – (6) in Table 2, Panel B we split the sample based on whether the auditor is an industry expert and estimate the probit model within each sub-sample. Splitting the sample rather than estimating interaction terms allows the coefficients on all the control variables to also vary between the two groups (Armstrong et al., 2010).

[7] The 8 percent representation might seem low because we use a stringent measure by setting auditor expertise to 1 only if the auditor is an industry expert for *all* the years in the Audit Analytics sample for the period 2003-2007. Using a traditional measure around the same 2003-2007 period gives an average of 23 percent.

The results in Table 2, Panel B starkly illustrate that CEO equity incentives do *not* influence the likelihood of misreporting when the firm is audited by an industry expert. In particular, the coefficient on *EQINC* is insignificant in both specifications in the "High auditor expertise" subsample. The higher likelihood of misreporting associated with CEO incentives is concentrated in firms *not* audited by an industry expert as seen by the positive and significant coefficient on *EQINC* in the "Low auditor expertise" subsample. These results are consistent with hypothesis *H1* and indicate that detection mechanisms, such as auditor expertise, mitigate the association between CEO equity incentives and misreporting. Further, because we obtain these results in univariate and multivariate specifications, our inferences are less likely to be driven by the inclusion or exclusion of select controls.

To reinforce our results, we further classify lawsuits based on whether they are accounting-related. We expect the effect of auditor expertise in mitigating misreporting to exist only for accounting-related lawsuits.[8] We classify lawsuits as accounting-related and non-accounting-related based on source documents underlying the lawsuits and, in conjunction with data on accounting irregularities from Hennes et al. (2008), classify these lawsuits into accounting-fraud related versus all others, such as non-timely disclosure of relevant news, price fixing concerns, insider trading allegations etc.[9] We then re-estimate the probit model for each of these types of lawsuits. Consistent with our prediction, we find in Table 2, Panel C that the mitigating effect of auditor expertise on lawsuit likelihood is concentrated in accounting-related lawsuits. For non-

[8] We thank an anonymous referee for this excellent suggestion.
[9] We obtained the underlying source document from Adair Morse's webpage at the following link: http://faculty.haas.berkeley.edu/morse/research/papers/Whistleblowers%20in%20US%20frauds%20final.pdf

accounting related lawsuits, CEO incentives are positively associated with the likelihood of a lawsuit even when the firm is audited by an expert auditor.[10]

4.1.3. Propensity-score based matching

Armstrong et al. (2010) argue that prior studies incorrectly select control firms based on matching on the outcome variable, which here is financial misreporting. They posit that using a propensity score design that achieves maximum variation in the variable of interest, here equity incentives, while minimizing variation in the control variables, is a superior econometric approach to matching on the outcome variable. Using this improved empirical design, they document no association between CEO incentives and misreporting. Therefore, following Armstrong et al., we first estimate a propensity-score model for the probability that the CEO will receive high equity incentives conditional on observable features of the contracting environment. Second, we identify matched-pairs with the smallest propensity-score differences and examine the covariate balance between the treatment and control samples. Finally, we examine the relationship between equity incentives and misreporting by assessing whether the frequency of misreporting differs significantly between the treatment and control groups.

Step 1 in Table 2, Panel D presents results of the propensity-score model where we estimate the likelihood of receiving high equity incentives using the median as the cutoff (Pr (*EQ_HIGH* =

[10] We urge the readers to interpret these results cautiously for two reasons. First, the classification of lawsuits into accounting-related and non-accounting related is subjective. For example, we found several cases where it was difficult to unambiguously classify the lawsuits into accounting-related versus not accounting-related, so we supplemented our classification with that in Hennes et al. (2008). While we drop these ambiguous cases from either classification, it is difficult to gauge the sensitivity of our results to classifying lawsuits based on other criteria. Second, we start to slice the data more and more thinly as we introduce additional levels of differencing. In particular, we start with 201 firm-years where *LAWSUIT*=1. The first split is based on auditor expertise where we have 18 firm-years where *LAWSUIT*=1 in the *EXPERTISE*=1 subsample (3.00 percent of the sample of 601 observation) and the remaining 183 firm-years in the *EXPERTISE*=0 subsample (2.68 percent of the sample of 6,826 observations). When we slice the *EXPERTISE*=1 subsample further into accounting-related and non-accounting related and omit the ambiguous cases, we have 1 firm-year where *LAWSUIT*=1 and is an accounting-related lawsuit; and 9 firm-years where *LAWSUIT*=1 and is a non-accounting related lawsuit. We therefore provide only univariate evidence.

1)) based on the economic determinants discussed in Section 3.2.1.[11] Consistent with Armstrong et al., we find that CEO incentives are greater at larger firms, firms with growth opportunities, and firms with longer-tenured CEOs. Further, we find lower incentives in firms with more leverage, lower values of *GINDEX*, non-affiliated directors, greater voting rights for large shareholders, and firms without CEO duality. Further, the propensity model has a reasonable explanatory power of 24 percent, similar to the 27 percent documented by Armstrong et al.

Table 2, Panel D2 presents results that verify covariate balance across the 3,601 pairs generated from Step 1 using the "nearest-neighbor" matching technique. As argued by Armstrong et al. (2010), covariate balance is achieved if both the treatment and control groups appear similar along their observable dimensions except for their level of equity incentives. To assess covariate balance, we test in Table 2, Panel D2a whether the mean value of each determinant differs across the treatment and control groups.[12] In addition to *t*-tests, we also report normalized differences, defined (Imbens and Rubin, 1997) as the difference in means scaled by the average of the two within-group standard deviations. Normalized differences are invariant to sample sizes and are therefore a more reliable way of assessing covariate balance. A normalized difference of 0.25 or less indicates acceptable balance.

We start with equity incentives (*EQINC*) followed by the economic determinants. The treatment group has mean incentives of around $1.4 million, compared to $72,000 for the control group. Thus, there is a substantial difference in equity incentives between the two groups with a normalized difference of 0.642. The subsequent rows indicate that the propensity-score model does a good job of selecting control firms with similar economic determinants as treatment firms. In

[11] While we exclude year and industry fixed effects to remain consistent with Armstrong et al., our results are robust to including these fixed effects.
[12] Untabulated results based on the median are similar.

particular, none of the normalized differences approaches the cutoff of 0.25, with the highest being -0.139 for *INSTOWN*. For those cases where the *t*-test indicates statistical difference, the economic differences are quite negligible. For example, return volatility is significantly different between the two groups, but the averages are 0.105 and 0.110 for the treatment group and the control group, respectively. The statistical significance arises due to the large sample size for these tests, which further justifies using normalized differences. Overall, these results suggest that the covariates are generally well balanced across the treatment and control samples.

To further assess whether the differences between the two samples are important, in Table 2, Panel D2b we re-estimate the propensity score model on the matched sample. The pseudo *R*-square of this regression is 0.012 or 1.2 percent, as compared to 24 percent for the one in Table 2, Panel D1. We also re-estimate the propensity score model on a matched sample now based on the "farthest-neighbor-match" that *maximizes* the distance between the propensity scores. This specification returns a pseudo *R*-square of 37 percent. We interpret these results as evidence that any differences between the matched samples are unimportant.

Table 2, Panel D3 presents the comparison of the frequency of misreporting across the propensity-score based matched samples. Consistent with Armstrong et al. (2010), we find no statistical difference (*p*-value = 0.898) in the number of firm-years with lawsuits between the two groups in the full sample. In particular, there are 124 lawsuit firm-years in the high incentives treatment group as compared to 126 in the low incentives control group. This is especially striking given the substantial difference in *EQINC* between the two groups as reported in the last two columns. Overall, we find similar evidence to Armstrong et al. (2010) using the propensity-score based matching model.[13]

[13] We note that the total number of misreporting firm-years for this test is 250, as compared to 201 for the probit analyses. This difference reflects (i) the latter is based on the overall sample, while the former is based on a matched-

However, when we split the propensity-based matched sample based on auditor expertise and present the number of lawsuit firm-years across the individual sub-samples, the results are again striking.[14] In the high auditor expertise sub-sample, there are significantly *fewer* lawsuit firm-years in the treatment group compared to the control group (7 vs. 53), with this difference being statistically significant (*p*-value < 0.001). Armstrong et al. (2010) also find some evidence of a lower frequency of misreporting in firms with more equity-based incentives. There is a sizable difference in equity-based incentives between the two groups ($1.6 million vs. $0.069 million), indicating that lack of power is not an issue. Turning to the low auditor expertise sub-sample, there are 117 lawsuit firm-years in the treatment group versus only 73 in the control group, with this difference also being statistically significant (*p*-value = 0.003). Here too, there is a large gap in equity incentives between the two groups ($1.3 million vs. $0.072 million). Overall, we find that CEO incentives are associated with *more frequent* misreporting when auditor expertise is low, but *less frequent* misreporting when auditor expertise is high. Thus, our inferences are robust to using the propensity-score based matching design of Armstrong et al. and suggest that auditor expertise mitigates the association between CEO incentives and financial misreporting by acting as an effective detection mechanism.

4.2. The effect of auditor expertise on CEO equity incentives

4.2.1. Descriptive statistics

Evidence from Section 4.1 indicates that auditor expertise mitigates the costs of granting equity incentives to the CEO by reducing misreporting. This implies that firms audited by an industry expert should grant their CEOs more equity-based incentives, which we now examine.

sample design of 3,601 pairs, and (ii) the nearest-neighbor matching estimator is performed with replacement, which means that multiple observations with *LAWSUIT*=1 can be used to form the low equity-incentives group.

[14] There are only 18 observations where the two observations in the matched pair get allocated to different auditor expertise groups. All results are robust to deleting these observations.

Table 3, Panel A presents descriptive statistics. The values of *EQINC* indicate that a 1 percent change in the stock price increase the value of the CEO's portfolio by a mean (median) of $698,645 ($193,221). These values are similar to those reported in recent studies such as Chava and Purnanandam (2010) and Jayaraman and Milbourn (2012). The mean value of *EXPERTISE* (0.229) indicates that 22.9 percent of the sample firms (1,636 firm-year observations) are audited by an industry expert (*EXPERTISE* = 1). The mean values for the individual expertise measures (*EXPERTISE1* and *EXPERTISE2*) are 0.172 and 0.205, respectively, similar to the 0.12 and 0.21 reported by Reichelt and Wang (2010), even though they use a larger sample that is not restricted to Execucomp firms. Our sample is made up of relatively large S&P 1500 firms, which is typical of the ExecuComp database. In particular, our average firm has annual sales of around $1.5 billion (mean *LNSALE* = 7.299). With mean LEV = 0.225 approximately 23 percent of the assets of the sample firms are financed by debt. The sample firms are generally growing, as seen by the average market-to-book ratio of 2.996, and with average R&D and advertising expenditures of 0.039 and 0.009 respectively. The average firm reports *ROA* of 0.036 and an annual stock return of 0.141. Overall, our sample is comparable to those used in prior studies.

4.2.2. Multivariate evidence

This section presents results of testing Hypothesis *H2*, which predicts that firms grant their CEOs more equity incentives when they are audited by an industry expert. Table 3, Panel B presents results of the multivariate regression of *EQINC* on *EXPERTISE* and controls. The first set of regressions entitled "Entire sample" includes all firm-year observations. The second, entitled "Constant sample" only includes firm-years where the auditor is an industry expert throughout the sample period. Doing so removes artificial variation in the *EXPERTISE* measure due to using

concrete cutoffs.[15] Thus, out of the 1,636 firm-years where the auditor is an industry expert, the auditor is an industry-expert for only part of the sample period in 951 firm-years, and is an industry-expert for the entire sample period for 685 firm-years. In addition to deleting the former, we also delete 857 firm-year observations where the firm appears in the sample only once, thus giving us a final sample of 5,341 observations (7,149 – 951 – 857).

The Model (1) and Model (3) specifications in Table 3, Panel B present results for all auditees, while the Model (2) and Model (4) specifications restrict the sample to Big Four auditees. Consistent with hypothesis *H2*, the coefficient on *EXPERTISE* is positive and significant in both specifications in the "Entire sample," indicating that CEO incentives are larger when an industry expert is the auditor of the firm. In terms of economic significance, auditor expertise, which here is represented by the indicator variable *EXPERTISE*, increases CEO equity incentives by 14 percent.[16] Further, the coefficient on *EQINC* remains positive and significant in both specifications of the "Constant sample," indicating that our results are robust to defining auditor expertise stringently, similar to that in the misreporting tests. The coefficient on *EQINC* is more than twice in magnitude as compared to the full sample, indicating that it removes measurement error in estimating auditor expertise, as expected.

4.2.3. Role of stock price sensitivity to earnings

To bolster our inferences, we examine the role of stock price sensitivity to earnings in the effect of auditor expertise on CEO incentives. If auditor expertise lowers the cost of granting equity

[15] Another way to deal with the artificial variation is to set *EXPERTISE* to 1 for all firm-years if the auditor is an expert in any one year. However, doing so confounds real variation with artificial variation. For example, in case of slowly-decaying market share, the auditor's market share might be 36 percent in one year, 34 percent in the next, 30 percent thereafter, 25 percent after that and so on. In this case, classifying the auditor as an expert in all years would be erroneous. On the other hand, if market share jumped back to 36 percent in the third year, it would be artificial variation. Since the correct classification depends on what happens in subsequent years and leads to a "look-ahead" bias, we avoid this bias by using the "Constant sample."

[16] As equity incentives are expressed in logs, the economic magnitude is derived as exp(0.13)-1.

incentives by decreasing the likelihood of misreporting, then hypothesis *H3* predicts that our results should be pronounced in settings where earnings play a relatively more important role in determining stock prices.[17] To test *H3*, we define stock price sensitivity to earnings at the industry level, using the 3-day earnings announcement returns. We split our sample into high and low sensitivity to earnings based on the median and estimate the above regression within each sub-group. Table 4 presents these results. Consistent with hypothesis *H3*, the coefficient on *EXPERTISE* is positive and significant only in the high stock price sensitivity group. Auditor expertise does not matter for CEO equity incentives in settings where earnings play a relatively less important role in determining the stock price. These tests provide further assurance that our results emanate from the detection channel that we hypothesize.

4.2.4. Endogeneity of auditor expertise

An unaddressed concern is the endogeneity of auditor expertise, and in particular reverse causality where more aligned CEOs with greater equity incentives select expert auditors. Rather than building a full-fledged structural model that explicitly incorporates all the costs and benefits of auditor expertise, we use a presumably exogenous shock to auditor expertise to alleviate endogeneity concerns. Our identification strategy uses the demise of Arthur Andersen (AA) as a quasi-natural experiment of forced auditor changes (Blouin, Grein and Rountree, 2007; Dyck, Morse and Zingales, 2011). We use firms' switch to a new auditor around AA's demise as a quasi-exogenous shock to auditor expertise and examine *within-firm changes* in CEO incentives.[18] We compare changes in CEO incentives of AA clients that employed an expert auditor in the post-AA period with those that did not. This difference-in-differences design controls for *all* time-invariant differences across firms that could be correlated with auditor expertise.

[17] We thank an anonymous referee for suggesting this test.
[18] We thank an anonymous referee for this suggestion.

We construct our sample following the methodology in Blouin et al. (2007) and use Audit Analytics to identify U.S. companies that were audited by AA prior to 2002, excluding Enron, and have CEO compensation data on Execucomp. We compute the average level of CEO equity incentives in the pre period (2000 to 2002) and the post period (2003 to 2007), and define $\Delta EQINC$ as the change in equity incentives between the two periods.[19] We define changes in each control variable analogously. We define *EXPERTISE* as an indicator variable if the new auditor is an industry expert. To examine how a shock to auditor expertise influences *changes* in equity incentives, we regress $\Delta EQINC$ on *EXPERTISE* and controls.

Figure 1 presents graphical evidence for the 209 firms in the sample.[20] The vertical axis plots firm-level changes in equity incentives ($\Delta EQINC$) around the event period while the horizontal axis indicates whether the incoming auditor is an industry expert. The vertical bar corresponding to *EXPERTISE*=1 is higher than that corresponding to *EXPERTISE*=0 indicating that CEO incentives increase more for firms that choose an expert auditor in the post period as compared to those that do not choose an expert auditor.

Table 5, Panel A presents confirmatory statistical evidence. Model 1 consists of only AA clients around the event (194 observations). The coefficient on *EXPERTISE*, which is an indicator variable denoting AA firms with an expert auditor in the post-period, is positive (0.158) and significant (*t*-stat = 3.19), indicating that CEO equity incentives around mandatory auditor switches increased more for AA firms audited by an industry expert in the post period as compared to those that were not. Model 2 expands the sample to include all firms (901 observations) and incorporates an additional indicator *AA* to denote Arthur Andersen clients. The coefficient of

[19] Our results are robust to using 2003-2005 as the post period.
[20] This compares to 407 firms in Blouin et al. (2007) who are not constrained by Execucomp data.

interest is *EXPERTISE*AA*, which is again positive and significant, indicating that the increase in CEO equity incentives for AA clients around the event survives the inclusion of non-AA clients as the control group. The coefficient of 0.173 indicates that CEO incentives increase by 19 percent more for firms with an industry expert in the post period.

A final concern is that while a firm's decision to switch auditors is exogenous, its choice of the new auditor is not. To mitigate this selection-bias, we adopt a two-stage approach where we model the likelihood of selecting an industry expert auditor based on economic determinants in the first stage and incorporate the inverse Mills ratio in the second stage. We follow Blouin et al., (2007) and include as our economic determinants, firm size (*LNMVE*), whether or not Arthur Andersen was the industry expert in the pre-period (*PRE_EXPERTISE*), leverage (*PRE_LEV*), growth opportunities (*PRE_MB*), the extent of discretionary accrual usage (*PRE_ABSACCR*), whether the firm was making a loss (*PRE_LOSS*), the amount of free cash flows to capture agency problems (*PRE_FCF*), and the number of segments and foreign sales to capture firm complexity (*PRE_SEG* and *PRE_FOREIGN*). We expect the likelihood of selecting an industry expert to increase in size, prior period expertise, agency conflicts, and complexity.

The first specification of Table 5, Panel B presents results of the first stage. Several of the variables enter the specification as expected, and in particular, *PRE_EXPERTISE*, which is positive and significant, indicating that the likelihood of selecting an expert auditor is higher if the old auditor was an industry expert. The second specification presents results of the second stage with the inverse Mills ratio (*MILLS*) included as an additional control. The coefficient on *EXPERTISE*AA* remains positive (0.218) and significant (*t*-stat = 2.12), indicating that our results are robust to addressing the self-selection of the incoming auditor. Further, the coefficient on *AA* is negative (-0.105) and significant (*t*-stat = -1.88), indicating that AA clients that chose a non-

expert auditor in the post-period experienced a decrease in CEO equity incentives (a removed treatment effect), which is consistent with our hypotheses. Overall, these time-series tests around mandatory auditor switches complement our cross-sectional analyses and suggest that our inferences are not driven by the endogeneity of auditor expertise.

4.3. Robustness tests

We subject our inferences to several additional robustness tests, and find that our results survive in all cases.

4.3.1. Alternative measures of auditor expertise

Following Reichelt and Wang (2010), we verify the robustness of our results to replacing the composite measure of auditor expertise with the two underlying measures *EXPERTISE1* and *EXPERTISE2* and also to using the continuous auditor market share variable (*SHARE*). Results in Table 6, Panel A indicate that the coefficients on *EXPERTISE1*, *EXPERTISE2* and *SHARE* are all positive and significant, suggesting that our inferences are robust to using alternative measures of auditor expertise.

4.3.2. Scaled measure of CEO incentives

Our results are also robust to using a scaled measure of CEO equity incentives. In particular, we define *EQINC_ALT* as the ratio of stock option delta divided by the CEO's salary and present results based on this measure in Table 6, Panel B. While the coefficient on *EXPERTISE* is slightly below conventional significance levels in Model (1) and Model (2), it is positive and significant with a *p*-value of 0.066 in Model (3) which uses the more stringent audit expertise measure based on the constant sample.

4.3.3. Top five executives

Following Erickson et al. (2006), we use *EQINC* of the top five executives rather than just the CEO and tabulate these results in Table 6, Panel C. The coefficient on *EXPERTISE* remains positive and significant in both specifications indicating that our results are robust to using this alternative definition.

4.3.4. Are the results driven by a few industries?

We perform additional tests to ensure that our results are not driven by a few industries. We focus on the high stock price sensitivity industries because there is no effect of auditor expertise on CEO equity incentives in the low sensitivity industries. We identify the top five industries with the largest representation and delete each of these individually. These industries are Financial institutions (SIC code 60 – 16 percent of the sample), Industrial and Commercial Machinery and Computer Equipment (SIC code 35 – 14 percent of the sample), Photographic, medical and optical Instruments (SIC code 38 – 14 percent of the sample), Health services (SIC code 80 – 5 percent of the sample) and Transportation equipment (SIC code 37 – 4.6 percent of the sample). We find that the coefficient on *EXPERTISE* remains positive and significant in every case. The untabulated coefficients and *t*-stats are (0.206 and 2.06); (0.252 and 2.52); (0.238 and 2.35); (0.201 and 2.11) and (0.211 and 2.28) respectively. Our overall results are not driven by just a few industries.

5. Conclusion

We revisit the mixed findings on the association between CEO equity incentives and financial misreporting. We argue that even if CEO incentives increased the likelihood of misreporting, one might not observe a positive association *ex post* if there were detection mechanisms in place to limit the manager's ability to carry out the misreporting. Using auditor

industry expertise as one such mechanism, we provide strong evidence that the positive association between CEO incentives and financial misreporting is concentrated in sub-samples where the auditor is *not* an industry expert. We find no association between CEO incentives and misreporting in firms audited by an industry expert.

An implication of the above results is that, by reducing the costs of financial misreporting, auditor expertise allows firms to grant their CEOs more equity-based incentives. We find strong evidence in favor of this prediction as well. Controlling for previously identified determinants of CEO equity incentives, firms audited by an industry expert grant their CEOs 14 percent more equity-based incentives. To alleviate endogeneity concerns, we use mandatory auditor switches around the demise of Arthur Andersen as an exogenous shock to auditor expertise and find consistent evidence.

Our first contribution is to incorporate the role of detection mechanisms, such as auditor expertise, within the CEO contracting-financial misreporting literature. Second, we broaden the role of effective auditing in the efficient functioning of firms. While the economic consequences of auditing have focused on improvements to the information environment and lower cost of financing, we show that financial statement verification plays an important role in the design of managerial incentives. This link is important, given that CEO incentives have been shown to have wide implications for managerial risk-taking (Coles et al., 2006) and the efficient functioning of corporate governance structures (Admati and Pfleiderer, 2009; Edmans, 2009; Bharath, Jayaraman and Nagar, 2013).

References

Admati, A., and P. Pfleiderer, 2009, The wall street walk and shareholder activism: Exit as a form of voice, *Review of Financial Studies* 22, pg. 2645-2685.

Aggarwal, R., Samwick, A., 1999. The other side of the trade-off: The impact of risk on executive compensation. *Journal of Political Economy*, Vol. 107, pp. 65–105.

Anderson, R., S. Mansi, and D. Reeb, 2004, Board characteristics, accounting report integrity, and the cost of debt, *Journal of Accounting and Economics*, Vol. 37 (3), pg. 315-342.

Armstrong, C., A. Jagolinzer, and D. Larcker, 2009, Chief executive officer equity incentives and accounting irregularities, *Journal of Accounting Research*, Vol. 48 (2), pg. 225-271.

Baber, W., S. Janakiraman, and S. Kang., 1996, Investment opportunities and the structure of executive compensation, *Journal of Accounting & Economics* 21, no. 3: 297-318.

Baber, W., S. Kang, and L. Liang, 2007, Shareholder rights, corporate governance and accounting restatement, working paper, Georgetown University, 2007.

Ball, R, S. Jayaraman, and L. Shivakumar, 2012, Audited financial reporting and voluntary disclosure as complements: A test of the confirmation hypothesis, *Journal of Accounting & Economics*, Vol. 53, pg. 136-166.

Balsam, S., J. Krishnan, and J. S. Yang, 2003, Auditor industry specialization and earnings quality, *Auditing: A Journal of Practice and Theory* 22: 71–97.

Bergstresser, D., and T. Philippon, 2006, CEO incentives and earnings management, *Journal of Financial Economics*, Vol. 80 (3), pg. 511-529.

Bharath, S., S. Jayaraman, and V. Nagar, 2013, Exit as governance: An empirical analysis, *Journal of Finance*, Vol. 68 (6), pg. 2515-2547.

Blouin, J., B. Grein, and B. Rountree, 2007, An analysis of forced auditor change: The case of former Arthur Andersen clients, *The Accounting Review*, Volume: 82 (3), pg. 621-650.

Burns, N., and S. Kedia, 2006, The impact of performance-based compensation on misreporting, *Journal of Financial Economics, Vol.* 79, pg. 35–67.

Bushman, R. M., and A. J. Smith, 2001, Financial accounting information and corporate governance, *Journal of Accounting & Economics* 32, no. 1-3: 237-333.

Chava, Sudheer, and Amiyatosh Purnanandam, 2010, CEOs versus CFOs: Incentives and corporate policies, *Journal of Financial Economics*, 97, pg. 263-278.

Clinch, G., 1991, Employee compensation and firms research-and-development activity, *Journal of Accounting Research* 29, no. 1: 59-78.

Coles, J. L., N. D. Daniel, and L. Naveen, 2006, Managerial incentives and risk-taking, *Journal of Financial Economics*, Vol. 79 (2), pg. 431-468.

Core, J., and W. Guay, 1999, The use of equity grants to manage optimal equity incentive levels, *Journal of Accounting & Economics* 28: 151–84.

Core, John, and W. Guay, 2002, Estimating the value of employee stock option portfolios and their sensitivities to price and volatility. *Journal of Accounting Research* 40, 613–630.

Core, J. E., R. W. Holthausen, and D. F. Larcker, 1999, Corporate governance, chief executive officer compensation, and firm performance, *Journal of Financial Economics* 51, 371-406.

Craswell, A. T., J. R. Francis, and S. L. Taylor, 1995, Auditor brand name reputations and industry specializations, *Journal of Accounting and Economics* Vol. 20, pg. 297–322.

DeFond, M. L.; J. R. Francis, and T. J. Wong, 2000, Auditor industry specialization and market segmentation: Evidence from Hong Kong, *Auditing: A Journal of Practice and Theory* 19: 49–66.

Demsetz, Harold, and Kenneth Lehn, 1985, The structure of corporate ownership: Causes and consequences, *Journal of Political Economy* 93, 1155-1177.

Denis, D., P. Hanouna, and A. Sarin, 2006, Is there a dark side to incentive compensation? *Journal of Corporate Finance*, Vol. 12 (3).

Dyck, A., A. Morse, and L. Zingales, 2010, Who blows the whistle on corporate fraud? *Journal of Finance*, Vol. 65 (6), pg. 2213-2253.

Dyck, A., A. Morse, and L. Zingales, 2013, How pervasive is corporate fraud? University of Toronto working paper.

Edmans, A., 2009, Blockholder trading, market efficiency, and managerial myopia, *Journal of Finance* 64, pg. 2481 - 2583.

Efendi, J., A. Srivastava, and E. Swanson, 2007, Why do corporate managers misstate financial statements? The role of option compensation and other factors, *Journal of Financial Economics* 85: 667-708.

Erickson, M. M. Hanlon, and E. Maydew, 2006, Is there a link between executive equity incentives and accounting fraud? *Journal of Accounting Research* 44: 113-143.

Gabaix, X., and A. Landier, 2008, Why has CEO pay increased so much? *Quarterly Journal of Economics*, Vol. 123 (1), pg. 49-100 .

Garvey, G., and T. Milbourn, 2003, Incentive compensation when executives can hedge the market: Evidence of relative performance evaluation in the cross-section, *Journal of Finance* 58 pp. 1557–1582.

Gaver, J. J., and K. M. Gaver, 1993, Additional evidence on the association between the investment opportunity set and corporate financing, dividend, and compensation policies, *Journal of Accounting & Economics* 16, no. 1-3: 125-60.

Goldman, E., and S. L. Slezak, 2006, An equilibrium model of incentive contracts in the presence of information manipulation, *Journal of Financial Economics* 80, no. 3: 603-26.

Gompers, P., J. Ishii, and A. Metrick, 2003, Corporate governance and equity prices, *Quarterly Journal of Economics* 118, 107-155.

Gunny, K., G. Krishnan and T. Zhang, 2007, Is audit quality associated with auditor tenure, industry expertise, and fees? Evidence from PCAOB opinions, UC Boulder working paper.

Harris, J., and P. Bromiley, 2007, Incentives to cheat: The influence of executive compensation and firm performance on financial misrepresentation, *Organization Science*, Vol. 18 (3), pg. 350-367.

Hennes, K., and A. Leone, and B. Miller, 2008, The importance of distinguishing errors from irregularities in restatement research: The case of restatements and CEO/CFO turnover, *The Accounting Review*, Vol. 83, 1487-1520.

Imbens, G.W., and D.B. Rubin, 1997, Baynesian inference for causal effects in randomized experiments with noncompliance, *Annals of Statistics*, 25, 305-327.

Ittner, C. D., R. Lambert, and D. Larcker, 2003, The structure and performance consequences of equity grants to employees of new economy firms, *Journal of Accounting & Economics* 34, no. 1-3: 89-127.

Jayaraman, S., and T.T. Milbourn, 2012, The role of stock liquidity in executive compensation, *The Accounting Review*, Vol. 87 (2), pg. 537-563.

Jensen, M., 2003, Paying people to lie: The truth about the budgeting process, *European Financial Management*, Vol. 9(3), pg. 379-406.

Krishnan, G. V., 2003, Does big 6 auditor industry expertise constrain earnings management? *Accounting Horizons* 17 (2003): 1–16.

Lambert, R., and D. Larcker, 1987, An analysis of the use of accounting and market measures of performance in executive-compensation contracts, *Journal of Accounting Research* 25: 85-129.

Laux, C., and V. Laux., 2009, Board committees, CEO compensation, and earnings management, *Accounting Review* 84, no. 3: 869-91.

Neal, T. L., and R.R. Riley, Jr., 2004, Auditor industry specialist research design, *Auditing: A Journal of Practice and Theory* 23: 169–77.

Peng, L., and A. Roell, 2008, Manipulation and equity-based compensation, *American Economic Review* 98, no. 2: 285-90.

Petersen, M. A., 2009, Estimating standard errors in finance panel data sets: Comparing approaches, *Review of Financial Studies* 22, no. 1 (2009): 435-80.

Pittman, J.A., and S. Fortin, 2004, Auditor choice and the cost of debt capital for newly public firms, *Journal of Accounting & Economics*, Vol. 37 (1), pg. 113-136.

Prendergast, C., 2000, What trade-off of risk and incentives? *American Economic Review* Papers and Proceedings, 90: 421–25.

Prendergast, C., 2002, The tenuous trade-off between risk and incentives, *Journal of Political Economy* 110: 1071–102.

Reichelt, J. K., and D. Wang, 2010, National and office-specific measures of auditor industry expertise and effects on audit quality, *Journal of Accounting Research* 48 (3): 647–686.

Solomon, I., M. Shields, and O.R. Whittington, 1999, What do industry-specialist auditors know? *Journal of Accounting Research*, Vol. 37, No. 1, pp. 191-208.

Smith, C. W., and R. L. Watts., 1992, The investment opportunity set and corporate financing, dividend, and compensation policies, *Journal of Financial Economics* 32, no. 3: 263-92.

Appendix: Variable definitions and sources

Variable	Description	Source
ADVT	Advertising expenditures scaled by annual sales	Compustat
AFFILDIR	Number of affiliated (i.e., linked) directors on the board	Risk Metrics
BOARDSIZE	Number of directors on the board	Risk Metrics
CEO_COB	Indicator denoting that the CEO is also the Chairman of the Board	Risk Metrics
CUMVOTE	Indicator denoting whether the substantial shareholder is allowed cumulative voting	Risk Metrics
EQINC	CEO equity-based incentives, defined as the dollar change in the CEO's portfolio for a 1% change in the stock price	ExecuComp
EXPERTISE	Indicator denoting industry expertise of the auditor. Takes the value 1 if either *EXPERTISE1* or *EXPERTISE2* is 1.	Audit Analytics
EXPERTISE1	Indicator variable that takes 1 if the auditor has the largest market share in a two-digit SIC category and if its market share is 10 percent points or more greater than the second largest industry leader.	Audit Analytics
EXPERTISE2	Indicator variable that takes 1 if in a particular year, the auditor has a market share greater than 35.	Audit Analytics
GINDEX	The Gompers et al. (2003) governance index	Risk Metrics
INSTOWN	Institutional ownership as a ratio of shares outstanding	Risk Metrics
INTLCKDIR	Indicator variable denoting the presence of interlocking directorships	Risk Metrics
LAWSUIT	Indicator variable denoting firm-years where a class action lawsuit claims the presence of an accounting (or other) irregularity.	Dyck et al. (2010)
LEV	Leverage defined as long term debt divided by assets	Compustat
LIQ	Stock liquidity and is defined as the log of turnover (shares traded divided by shares outstanding)	CRSP
LNSALE	The log of annual sales in millions	Compustat
MB	The market to book ratio defined as market value of equity (shares outstanding times closing stock price) divided by book value	Compustat
R&D	Research and development expense scaled by annual sales	Compustat
RET	Annual stock return	CRSP
RETVOL	Stock return volatility defined as the standard deviation of five annual observations.	CRSP
ROA	Return on assets defined as earnings before extraordinary items divided by total assets	Compustat
ROAVOL	ROA volatility defined as the standard deviation of five annual observations.	Compustat
SIZE	The log of total assets in millions	Compustat
STAGBOARD	Indicator variable that denotes whether the company has a staggered board in place.	Risk Metrics
TENURE	Number of years that the CEO has been in place.	Risk Metrics

TABLE 1: Descriptive statistics of the auditor expertise variable (over the period 2003 to 2007)

The auditor expertise (*EXPERTISE*) variable is defined based on audit fees data on Audit Analytics for the period from 2003 to 2007. The following panel presents descriptive statistics of this variable for the Big Four auditors during the period 2003 to 2007. *EXPERTISE1* is an indicator variable that denotes if in a particular year the auditor has the largest market share in a two-digit SIC category and if its market share is at least 10% points greater than the second largest industry leader. *EXPERTISE2* is an indicator variable that denotes if in a particular year, the auditor has a market share greater than 35%.

***EXPERTISE1*:**

Year / Firm	2003	2004	2005	2006	2007	Average
Deloitte	7	8	7	6	9	7
Ernst & Young	9	10	13	10	12	11
KPMG	3	4	2	1	2	2
PwC	14	15	15	13	10	13

***EXPERTISE2*:**

Year / Firm	2003	2004	2005	2006	2007	Average
Deloitte	9	11	7	8	11	9
Ernst & Young	10	13	11	12	13	12
KPMG	4	7	4	3	3	4
PwC	16	18	19	17	14	17

TABLE 2: Auditor expertise, CEO equity incentives and accounting irregularities

PANEL A: Main variables

The sample in this panel consists of firms with compensation data on Execucomp, accounting data on Compustat, auditor data on Audit Analytics and stock return data on CRSP. It covers the period from 1994 to 2004. *EXPERTISE* is an indicator variable that denotes auditor industry expertise. It is based on two measures – (i) if the auditor has the largest market share in a two-digit SIC category and if its market share is at least 10% points greater than the second largest industry leader, or (ii) if the auditor has a market share greater than 35%. As these measures are computed for the period 2003-2007, *EXPERTISE* for this panel is coded as 1 based on whether the firm's auditor is an industry expert (as defined above) during the entire period from 2003 to 2007. *LAWSUIT* is an indicator variable denoting firm-years where the lawsuit claims the presence of an accounting (or other) irregularity. These data are obtained from Dyck et al. (2010). *EQINC* denotes equity incentives (in $ '000s) and is defined as the dollar change in the CEO's portfolio for a 1% change in the stock price. *SIZE* denotes the log of total assets in millions. *MB* denotes the market to book ratio defined as market value of equity divided by book value. *LEV* indicates leverage defined as long term debt divided by assets. *RETVOL* denotes stock return volatility over the past five years. *GINDEX* is the Gompers et al. (2003) measure of governance. *STAGBOARD* is an indicator variable that denotes whether the company has a staggered board in place. *AFFILDIR* denotes the number of affiliated directors on the board. *INTLCKDIR* denotes the presence of interlocking directorships. *CUMVOTE* denotes whether the substantial shareholder is allowed cumulative voting. *INSTOWN* denotes the ownership of institutional investors. The size of the board is denoted by *BOARDSIZE*. *CEO_COB* indicates CEO duality where the CEO is also the chairman of the board. *TENURE* denotes the number of years that the CEO has been in place.

Variable	Obs.	Mean	Median	S.D.	Min	Max
LAWSUIT	7,427	0.027	0.000	0.162	0.000	1.000
EQINC	7,427	706.426	132.471	2103.448	0.861	16037.376
EXPERTISE	7,427	0.081	0.000	0.273	0.000	1.000
SIZE	7,427	8.514	8.251	1.375	6.648	12.633
MB	7,427	3.105	2.215	3.015	-1.563	19.995
LEV	7,427	0.271	0.266	0.160	0.000	0.768
RETVOL	7,427	0.098	0.083	0.058	0.015	0.756
GINDEX	7,427	9.625	10.000	2.651	2.000	17.000
STAGBOARD	7,427	0.624	1.000	0.484	0.000	1.000
AFFILDIR	7,427	1.600	1.000	1.600	0.000	12.000
INTLCKDIR	7,427	0.121	0.000	0.326	0.000	1.000
CUMVOTE	7,427	0.003	0.000	0.051	0.000	1.000
INSTOWN	7,427	0.095	0.000	0.139	0.000	0.833
BOARDSIZE	7,427	10.813	10.000	3.084	4.000	39.000
CEO_COB	7,427	0.827	1.000	0.379	0.000	1.000
TENURE	7,427	6.181	4.000	6.735	-6.000	33.000

TABLE 2, PANEL B: Probit model: {Pr (*LAWSUIT*=1)}

The dependent variable (*LAWSUIT*) is an indicator variable denoting firm-years where the lawsuit claims the presence of an accounting (or other) irregularity. *EQINC* denotes equity incentives (in $ '000s) and is defined as the dollar change in the CEO's portfolio for a 1% change in the stock price. *SIZE* denotes the log of total assets in millions. *MB* denotes the market to book ratio defined as market value of equity divided by book value. *LEV* indicates leverage defined as long term debt divided by assets. *EXPERTISE* is an indicator variable that denotes auditor industry expertise. It takes the value of one if either (i) the auditor has the largest market share in a two-digit SIC category and if its market share is at least 10% points greater than the second largest industry leader, or (ii) if the auditor has a market share greater than 35%. As these measures are computed for the period 2003-2007, *EXPERTISE* for this panel is coded as 1 based on whether the firm's auditor is an industry expert (as defined above) during the entire period from 2003 to 2007. All regressions contain robust standard errors. In addition, the multivariate models include year and industry fixed effects. *P*-values are based on two-tailed tests.

	Full sample				High auditor expertise (*EXPERTISE*=1)				Low auditor expertise (*EXPERTISE*=0)			
	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)		Model (6)	
	Coeff.	*p*-val.	Coeff.	*p*-val.	Coeff.	*p*-val.	Coeff.	*p*-val.	Coeff.	*p*-val.	Coeff.	*p*-val.
Intercept	-2.275	<0.001	-4.552	<0.001	-2.090	<0.001	-14.617	<0.001	-2.300	<0.001	-4.208	<0.001
EQINC	0.068	<0.001	0.074	0.002	0.045	0.372	-0.005	0.964	0.071	<0.001	0.080	0.002
SIZE			0.268	<0.001			0.386	0.009			0.269	0.000
LEV			0.865	0.001			2.049	0.167			0.752	0.004
MB			-0.011	0.395			-0.060	0.419			-0.013	0.332
Year effects	No		Yes		No		Yes		No		Yes	
Ind. effects	No		Yes		No		Yes		No		Yes	
Pseudo R^2	0.009		0.230		0.004		0.477		0.009		0.226	
Obs.	7,427		7,427		601		601		6,826		6,826	

TABLE 2, PANEL C: Distinguishing between accounting-related and non-accounting-related lawsuits

The dependent variable in the first two specifications is an indicator variable denoting firm-years pertaining to an accounting-related lawsuit, while that in the next two specifications pertains to a non-accounting-related lawsuit. The latter includes cases such as non-timely disclosure of relevant news, price fixing concerns, insider trading allegations etc. In addition to the underlying source documents, data on errors versus irregularities from Hennes et al. (2008) have been used to classify lawsuits into accounting versus non-accounting related. *EQINC* denotes equity incentives (in $ '000s) and is defined as the dollar change in the CEO's portfolio for a 1% change in the stock price. *EXPERTISE* is an indicator variable that denotes auditor industry expertise. It takes the value of one if either (i) the auditor has the largest market share in a two-digit SIC category and if its market share is at least 10% points greater than the second largest industry leader, or (ii) if the auditor has a market share greater than 35%. As these measures are computed for the period 2003-2007, *EXPERTISE* for this panel is coded as 1 based on whether the firm's auditor is an industry expert (as defined above) during the entire period from 2003 to 2007. All regressions contain robust standard errors. In addition, the multivariate models include year and industry fixed effects. *P*-values are based on two-tailed tests.

	Accounting-related lawsuits				Non-accounting-related lawsuits			
	High auditor expertise (*EXPERTISE*=1)		Low auditor expertise (*EXPERTISE*=0)		High auditor expertise (*EXPERTISE*=1)		Low auditor expertise (*EXPERTISE*=0)	
	Model (1)		Model (2)		Model (3)		Model (4)	
	Coeff.	*p*-val.	Coeff.	*p*-val.	Coeff.	*p*-val.	Coeff.	*p*-val.
Intercept	-1.893	<0.001	-2.743	<0.001	-2.676	<0.001	-2.642	<0.001
EQINC	-0.310	<0.001	0.078	0.004	0.103	0.084	0.064	0.011
Year effects	No		No		No		No	
Ind. effects	No		No		No		No	
Adj. R^2	0.121		0.012		0.022		0.008	
Obs.	601		6,826		601		6,826	

TABLE 2, PANEL D: Propensity-score based matching model

PANEL D1 – Estimating propensity scores

The dependent variable in the probit model is an indicator variable *EQINC_HIGH* that denotes whether CEO incentives are above the sample median. *SIZE* denotes the log of market value of equity in millions. *MB* denotes the market to book ratio. *LEV* indicates leverage. *RETVOL* denotes stock return volatility over the past five years. *GINDEX* is the Gompers et al. (2003) measure of governance. *STAGBOARD* is an indicator variable that denotes whether the company has a staggered board. *AFFILDIR* denotes the number of affiliated directors on the board. *INTLCKDIR* denotes the presence of interlocking directorships. *CUMVOTE* denotes whether the substantial shareholder is allowed cumulative voting. *INSTOWN* denotes the ownership of institutional investors. The size of the board is denoted by *BOARDSIZE*. *CEO_COB* indicates CEO duality where the CEO is also the chairman of the board. *TENURE* denotes the number of years that the CEO has been in place. *MANIPULATE* is an indicator variable denoting the lawsuit period. *EXPERTISE* is an indicator variable that denotes auditor industry expertise. The probit regression contains robust standard errors. *P*-values are based on two-tailed tests.

	Probability of High Equity Incentives Pr (*EQINC_HIGH*=1)	
	Coeff.	*p*-val.
Intercept	-3.425	<0.001
SIZE	0.487	<0.001
MB	0.059	<0.001
LEV	-0.770	<0.001
RETVOL	3.960	<0.001
GINDEX	-0.045	<0.001
STAGBOARD	0.058	0.147
AFFILDIR	0.087	0.000
INTLCKDIR	-0.074	0.160
CUMVOTE	-0.811	0.015
INSTOWN	0.201	0.127
BOARDSIZE	-0.096	0.000
CEO_COB	0.094	0.040
TENURE	0.056	0.000
Year effects	No	
Ind. Effects	No	
Pseudo R^2	0.239	
Obs.	7,427	

TABLE 2, PANEL D2 – Verifying covariate balance

This panel presents data for 3,601 pairs that have been matched based on the propensity-score model in Step 1. Treatment firms are those with high CEO equity incentives while the control firms have low CEO incentives. "Norm. diff." denotes normalized differences between the two samples. *EQINC* denotes equity incentives (in $ '000s) and is defined as the dollar change in the CEO's portfolio for a 1% change in the stock price. *SIZE* denotes the log of market value of equity in millions. *MB* denotes the market to book ratio defined as market value of equity divided by book value. *LEV* indicates leverage defined as long term debt divided by assets. *RETVOL* denotes stock return volatility over the past five years. *GINDEX* is the Gompers et al. (2003) governance index. *STAGBOARD* is an indicator variable denoting whether the company has a staggered board in place. *AFFILDIR* denotes the number of affiliated directors on the board. *INTLCKDIR* denotes the presence of interlocking directorships. *CUMVOTE* denotes whether the substantial shareholder is allowed cumulative voting. *INSTOWN* denotes the ownership of institutional investors. The size of the board is denoted by *BOARDSIZE*. *CEO_COB* indicates CEO duality where the CEO is also the chairman of the board. *TENURE* denotes the number of years that the CEO has been in place. *P*-values are based on two-tailed tests.

Panel D2a: Test of differences

	***N* = 3,601 pairs**			
	Treatment (Mean)	**Control (Mean)**	***p*-val.**	**Norm. diff.**
EQINC ($'000s)	$1,331.809	$71.495	<0.001	0.642
SIZE	8.658	8.603	0.091	0.039
MB	3.836	4.111	0.005	-0.067
LEV	0.246	0.255	0.020	-0.057
RETVOL	0.105	0.110	<0.001	-0.073
GINDEX	9.25	9.276	0.669	-0.010
STAGBOARD	0.584	0.552	0.005	0.065
AFFILDIR	1.681	1.638	0.257	0.027
INTLCKDIR	0.129	0.106	0.002	0.072
CUMVOTE	0.001	0.001	0.414	0.000
INSTOWN	0.112	0.134	<0.001	-0.139
BOARDSIZE	10.607	10.641	0.632	-0.011
CEO_COB	0.854	0.865	0.198	-0.032
TENURE	7.701	6.909	<0.001	0.102

TABLE 2, PANEL D2b: Re-estimating the propensity model on the matched sample

The first (second) specification is based on a matched sample that minimizes (maximizes) the distance between the propensity scores of the high and low equity incentives groups. *P*-values are based on two-tailed tests.

	Nearest neighbor match		Farthest neighbor match	
	Pr (*EQINC_HIGH*=1)		Pr (*EQINC_HIGH*=1)	
	Coeff.	*p*-val.	Coeff.	*p*-val.
Intercept	-0.206	0.117	1.319	<0.001
SIZE	0.069	<0.001	0.216	<0.001
MB	-0.013	0.001	-0.102	<0.001
LEV	-0.159	0.101	-0.419	<0.001
RETVOL	-0.708	0.002	-2.112	<0.001
GINDEX	-0.011	0.135	-0.228	<0.001
STAGBOARD	0.155	<0.001	1.691	<0.001
AFFILDIR	0.007	0.511	0.112	<0.001
INTLCKDIR	0.160	0.001	0.578	<0.001
CUMVOTE	0.372	0.489	5.744	<0.001
INSTOWN	-0.527	<0.001	3.268	<0.001
BOARDSIZE	-0.018	0.003	-0.118	<0.001
CEO_COB	-0.055	0.219	-0.240	<0.001
TENURE	0.009	<0.001	0.038	<0.001
Year effects	Yes		Yes	
Ind. Effects	Yes		Yes	
Pseudo R^2	0.012		0.370	
Obs.	7,202		7,202	

TABLE 2, PANEL D3: Comparing frequencies of financial misreporting across matched pairs

This panel presents data for 3,601 pairs that have been matched based on the propensity-score model in Step 1. Treatment firms are those with high CEO equity incentives while the control firms have low CEO incentives. The first two columns present the number of lawsuit firm-years in each of these groups respectively. The last two columns present the mean level of equity-incentives across these groups with $EQINC_T$ denoting equity incentives for the treatment group and $EQINC_C$ denoting equity incentives for the control group. The first row presents results for the entire sample while the next two rows split the sample based on auditor expertise. *P*-values are based on two-tailed tests.

	Treatment High Equity Incentives	**Control** Low Equity Incentives	*p*-value of diff. in occurrence	**Treatment** Mean Equity Incentives in $ '000s $EQINC_T$	**Control** Mean Equity Incentives in $ '000s $EQINC_C$
Full sample	124	126	0.898	$1,331.809	$71.495
High auditor expertise (*EXPERTISE* = 1)	7	53	0.000	$1,594.113	$69.634
Low auditor expertise (*EXPERTISE* = 0)	117	73	0.003	$1,314.327	$71.694

TABLE 3: The effect of auditor expertise on CEO equity incentives

PANEL A: Descriptive statistics

The sample for this panel covers the period from 2003 to 2007 for firms with compensation data on Execucomp, accounting data on Compustat, auditor data on Audit Analytics, accounting data on Compustat and stock return data on CRSP. *EQINC* denotes equity incentives (in $ '000s) and is defined as the dollar change in the CEO's portfolio for a 1% change in the stock price. *EXPERTISE* is an indicator variable that denotes auditor industry expertise. It takes the value of one if either (i) in a particular year the auditor has the largest market share in a two-digit SIC category and if its market share is at least 10% points greater than the second largest industry leader (denoted by *EXPERTISE1*), or (ii) in a particular year, the auditor has a market share greater than 35% (*EXPERTISE2*). *LNSALE* denotes the log of total sales in millions. *LEV* indicates leverage defined as long term debt divided by assets. *MB* denotes the market to book ratio defined as market value of equity divided by book value. *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. *ROA* denotes return on assets, defined as the ratio of earnings before extraordinary items to total assets while *RET* denotes the annual stock return. *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). Compensation data are measured as of the end of the year while all other variables are computed as of the beginning of the year.

Variable	Obs.	Mean	Median	S.D.	Min	Max
EQINC	7,149	698.645	193.221	1,659.629	0.000	16,691.480
EXPERTISE	7,149	0.229	0.000	0.420	0.000	1.000
EXPERTISE1	7,149	0.172	0.000	0.377	0.000	1.000
EXPERTISE2	7,149	0.205	0.000	0.404	0.000	1.000
LNSALE	7,149	7.299	7.172	1.574	3.662	11.457
LEV	7,149	0.225	0.205	0.185	0.000	0.915
MB	7,149	2.996	2.270	3.018	-11.009	23.759
R&D	7,149	0.039	0.000	0.087	0.000	0.760
ADVT	7,149	0.009	0.000	0.023	0.000	0.166
ROA	7,149	0.036	0.039	0.094	-0.675	0.288
RET	7,149	0.141	0.079	0.516	-0.832	5.170
ROAVOL	7,149	0.053	0.023	0.095	0.001	0.847
RETVOL	7,149	0.561	0.352	0.819	0.061	8.783
LIQ	7,149	0.166	0.138	0.105	0.024	0.588

TABLE 3, PANEL B: Multivariate evidence on the relation between auditor expertise and CEO equity incentives

The first two specifications (Models 1 and 2) are based on the entire sample while the next two specifications (Models 3 and 4) are based on a "Constant sample" where the firm's auditor is an industry expert in every year of the sample. The dependent variable is the log of CEO equity incentives (*EQINC*). *EXPERTISE* is an indicator variable that denotes auditor industry expertise. *LNSALE* denotes the log of total sales. *LEV* indicates leverage. *MB* is the market to book ratio. *R&D* and *ADVT* refer to research and development and advertising expenditures respectively. *ROA* denotes return on assets, defined as earnings before extraordinary items scaled by assets while *RET* denotes the annual stock return. *ROAVOL* and *RETVOL* represent volatility of *ROA* and *RET* respectively. *LIQ* denotes stock liquidity. Detailed definitions are in Table 1. All regressions contain year and industry fixed effects and robust standard errors clustered by firm. *P*-values are based on two-tailed tests.

	Entire sample				Constant sample			
	All auditees (Model 1)		Big 4 auditees (Model 2)		All auditees (Model 3)		Big 4 auditees (Model 4)	
	Coeff.	*p*-val.	Coeff.	*p*-val.	Coeff.	*p*-val.	Coeff.	*p*-val.
Intercept	1.811	<0.001	1.812	<0.001	1.879	<0.001	1.838	<0.001
EXPERTISE	0.130	0.038	0.127	0.044	0.277	0.039	0.300	0.027
LNSALE	0.408	0.000	0.409	0.000	0.404	0.000	0.413	0.000
LEV	-0.073	0.711	-0.049	0.810	-0.248	0.291	-0.260	0.291
MB	0.072	0.000	0.074	0.000	0.071	0.000	0.071	0.000
R&D	1.687	0.000	1.706	0.000	1.469	0.001	1.370	0.003
ADVT	0.147	0.933	0.299	0.876	0.377	0.849	0.545	0.807
ROA	2.019	0.000	1.841	0.000	2.030	0.000	1.871	0.000
RET	0.100	0.002	0.116	0.001	0.084	0.014	0.099	0.005
ROAVOL	-0.776	0.025	-0.929	0.011	-0.650	0.085	-0.819	0.041
RETVOL	0.003	0.938	0.014	0.681	-0.005	0.899	0.011	0.783
LIQ	1.047	0.001	0.880	0.008	1.276	0.001	1.141	0.003
Year effects	Yes		Yes		Yes		Yes	
Ind. effects	Yes		Yes		Yes		Yes	
Adj. R^2	0.33		0.33		0.34		0.34	
Obs.	7,149		6,809		5,341		5,050	

TABLE 4: Role of stock price sensitivity to earnings

The dependent variable is the log of CEO equity incentives (*EQINC*). High sensitivity denotes industries with high sensitivity of stock price to earnings, defined as the 3-day earnings announcement returns. All other variables are similar to those defined in Panel B of Table 3. All regressions contain year and industry fixed effects and robust standard errors clustered by firm. *P*-values are based on two-tailed tests.

	High sensitivity				Low sensitivity			
	All auditees (Model 1)		Big 4 auditees (Model 2)		All auditees (Model 3		Big 4 auditees (Model 4)	
	Coeff.	*p*-val.	Coeff.	*p*-val.	Coeff.	*p*-val.	Coeff.	*p*-val.
Intercept	1.694	<0.001	1.659	<0.001	1.905	<0.001	1.925	<0.001
EXPERTISE	0.210	0.022	0.214	0.021	0.032	0.706	0.025	0.774
LNSALE	0.443	0.000	0.443	0.000	0.392	0.000	0.393	0.000
LEV	-0.228	0.446	-0.162	0.592	-0.091	0.739	-0.078	0.785
MB	0.065	0.000	0.067	0.000	0.071	0.000	0.072	0.000
R&D	2.169	0.039	2.127	0.039	1.368	0.002	1.393	0.002
ADVT	-3.702	0.183	-2.832	0.359	2.806	0.264	2.636	0.334
ROA	2.315	0.000	2.127	0.000	1.860	0.000	1.656	0.000
RET	0.107	0.053	0.101	0.071	0.087	0.019	0.118	0.003
ROAVOL	-0.688	0.329	-0.724	0.308	-0.686	0.087	-0.896	0.038
RETVOL	0.011	0.834	0.035	0.496	-0.005	0.904	0.000	0.998
LIQ	0.945	0.102	0.898	0.125	1.000	0.017	0.771	0.072
Year effects	Yes		Yes		Yes		Yes	
Ind. effects	Yes		Yes		Yes		Yes	
Adj. R^2	0.36		0.36		0.31		0.31	
Obs.	3,282		3,136		3,867		3,673	

TABLE 5: Changes in equity-based compensation around mandatory auditor switches

PANEL A: Difference-in-differences

The dependent variable is the change in CEO incentives ($\Delta EQINC$) around the demise of Arthur Andersen. The pre-period is from 2000 to 2002 while the post period is from 2003 to 2007. The sample in Model 1 comprises of 194 instances of forced auditor changes for AA clients while that in Model 2 also includes non-AA clients as the control group. *EXPERTISE* is an indicator variable that denotes whether the incoming auditor is an industry expert. All control variables are defined as changes between the pre and post periods. *P*-values are based on two-tailed tests.

	AA clients (Model 1)		All Big 4 clients (Model 2)	
	Coeff.	*p*-val.	Coeff.	*p*-val.
Intercept	0.041	0.400	0.122	0.010
EXPERTISE	0.158	0.003	-0.009	0.897
AA			-0.080	0.145
*EXPERTISE*AA*			0.173	0.044
ΔLNSALE	0.122	0.730	-0.310	0.433
ΔLEV	-0.002	0.014	0.000	0.205
ΔMB	0.073	0.115	-0.012	0.706
ΔR&D	0.529	0.007	0.088	0.604
ΔADVT	0.678	0.328	1.177	0.245
ΔROA	0.008	0.016	0.002	0.256
ΔRET	0.001	0.693	0.010	0.255
ΔROAVOL	-0.020	0.055	-0.044	0.000
ΔRETVOL	0.004	0.912	0.097	0.050
ΔLIQ	0.079	0.192	0.134	0.050
Adj. R^2	0.16		0.04	
Obs.	194		901	

TABLE 5, PANEL B: Controlling for self-selection

The dependent variable in the first-stage is the probability that the incoming auditor is an industry expert (*EXPERTISE*=1). All determinants are defined as of the pre-period, where *LNMVE* denotes market value of equity, *PRE_EXPERTISE* denotes expertise of the previous auditor, *LEV* is leverage, *MB* is the market to book ratio, *ABSACCR* indicates absolute value of accruals, *LOSS* is an indicator for negative earnings, *FCF* is free cash flows, *SEG* represents number of segments and *FOREGIN* is the ratio of foreign sales to total sales. The dependent variable in the second-stage is $\Delta EQINC$ around the demise of Arthur Andersen and *MILLS* denotes the Inverse Mills ratio. *P*-values are based on two-tailed tests.

	First-stage Pr [*EXPERTISE*=1]		Second-stage OLS with *MILLS*	
	Coeff.	*p*-val.	Coeff.	*p*-val.
Intercept	-1.952	<0.001	0.315	0.042
PRE_LNMVE	0.034	0.338		
PRE_EXPERTISE	1.739	<0.001		
PRE_LEV	0.814	0.004		
PRE_MB	0.022	0.215		
PRE_ABSACCR	-0.994	0.044		
PRE_LOSS	0.070	0.702		
PRE_FCF	0.048	0.937		
PRE_SEG	0.064	0.028		
PRE_FOREIGN	-0.055	0.829		
EXPERTISE			-0.100	0.371
AA			-0.105	0.066
*EXPERTISE*AA*			0.218	0.038
ΔLNSALE			-0.470	0.206
ΔLEV			0.000	0.418
ΔMB			-0.014	0.673
ΔR&D			-0.102	0.552
ΔADVT			0.823	0.419
ΔROA			0.005	0.034
ΔRET			0.010	0.250
ΔROAVOL			-0.046	0.000
ΔRETVOL			0.099	0.044
ΔLIQ			0.146	0.043
MILLS			-0.104	0.136
Pseudo/Adj. R^2	0.31		0.05	
Obs.	931		820	

TABLE 6: Robustness tests

PANEL A: Alternative measures of auditor expertise

The dependent variable is *EQINC*. *EXPERTISE1* is an indicator variable that denotes if the auditor has the largest market share in a two-digit SIC category and if its market share is at least 10% points greater than the second largest industry leader. *EXPERTISE2* is an indicator variable that denotes if the auditor has a market share greater than 35%. *SHARE* denotes auditor market share. All other variables are as defined in Table 3. *P*-values are based on two-tailed tests.

	All firms (Model 1)		All firms (Model 2)		All firms (Model 3)	
	Coeff.	*p*-val.	Coeff.	*p*-val.	Coeff.	*p*-val.
Intercept	1.807	<0.001	1.809	<0.001	1.734	<0.001
EXPERTISE1	0.114	0.088				
EXPERTISE2			0.108	0.096		
SHARE					0.544	0.039
LNSALE	0.410	<0.001	0.409	<0.001	0.403	<0.001
LEV	-0.070	0.721	-0.070	0.721	-0.078	0.692
MB	0.072	<0.001	0.072	<0.001	0.072	<0.001
R&D	1.679	<0.001	1.689	<0.001	1.642	<0.001
ADVT	0.124	0.944	0.124	0.944	0.124	0.944
ROA	2.031	<0.001	2.018	<0.001	2.005	<0.001
RET	0.099	0.002	0.100	0.002	0.101	0.002
ROAVOL	-0.772	0.026	-0.775	0.025	-0.769	0.027
RETVOL	0.004	0.912	0.003	0.932	0.005	0.888
LIQ	1.051	0.001	1.045	0.001	1.044	0.001
Year effects	Yes		Yes		Yes	
Industry effects	Yes		Yes		Yes	
Adj. R^2	0.33		0.33		0.33	
Observations	7,149		7,149		7,149	

TABLE 6, PANEL B: Scaled measure of CEO equity incentives

The dependent variable is a scaled measure of CEO equity incentives defined as the dollar change in the CEO's portfolio for a 1% change in the stock price scaled by annual salary. *EXPERTISE* is an indicator variable that denotes auditor industry expertise. All other variables are as defined in Table 3. *P*-values are based on two-tailed tests.

	All auditees (Model 1)		Big 4 auditees (Model 2)		Big 4 auditees and constant sample (Model 3)	
	Coeff.	*p*-val.	Coeff.	*p*-val.	Coeff.	*p*-val.
Intercept	0.039	0.067	0.033	0.133	0.037	0.155
EXPERTISE	0.010	0.163	0.011	0.134	0.030	0.066
LNSALE	0.023	<0.001	0.023	<0.001	0.024	<0.001
LEV	-0.026	0.259	-0.022	0.362	-0.022	0.439
MB	0.008	<0.001	0.008	<0.001	0.008	<0.001
R&D	0.113	0.023	0.123	0.016	0.083	0.144
ADVT	0.015	0.935	0.011	0.958	0.005	0.983
ROA	0.199	<0.001	0.183	<0.001	0.192	<0.001
RET	0.006	0.067	0.008	0.032	0.005	0.187
ROAVOL	-0.046	0.269	-0.057	0.204	-0.042	0.382
RETVOL	-0.001	0.783	0.000	0.971	-0.002	0.583
LIQ	0.137	<0.001	0.126	0.001	0.139	0.001
Year effects	Yes		Yes		Yes	
Industry effects	Yes		Yes		Yes	
Adj. R^2	0.27		0.27		0.29	
Observations	7,148		6,808		5,049	

TABLE 6, PANEL C: All executives

The dependent variable is average equity incentives for the top five executives. *EXPERTISE* is an indicator variable that denotes auditor industry expertise. All other variables are as defined in Table 3. *P*-values are based on two-tailed tests.

	All auditees (Model 1)		Big 4 auditees (Model 2)	
	Coeff.	*p*-val.	Coeff.	*p*-val.
Intercept	0.552	<0.001	0.560	<0.001
EXPERTISE	0.093	0.048	0.094	0.047
LNSALE	0.413	<0.001	0.412	<0.001
LEV	-0.287	0.049	-0.302	0.048
MB	0.052	<0.001	0.054	<0.001
R&D	2.305	<0.001	2.224	<0.001
ADVT	0.021	0.985	0.320	0.795
ROA	1.608	<0.001	1.475	<0.001
RET	0.079	0.001	0.089	<0.001
ROAVOL	-0.623	0.007	-0.573	0.023
RETVOL	0.057	0.013	0.071	0.005
LIQ	1.074	<0.001	0.992	<0.001
Year effects	Yes		Yes	
Industry effects	Yes		Yes	
Adj. R^2	0.42		0.42	
Observations	7,078		6,730	

FIGURE 1: Change in equity-based compensation around mandatory auditor switches

The vertical axis plots firm-level changes in equity incentives ($\Delta EQINC$) around the demise of Arthur Andersen while the horizontal axis indicates whether or not the new auditor is an industry expert.