CEO Equity Incentives and Accounting Manipulation: The Role of Auditor Expertise

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Abstract

Prior studies find inconsistent evidence regarding the effect of CEO equity incentives on accounting manipulation. We argue that this inconsistency stems from non-consideration of detection mechanisms that mitigate the effect of equity incentives on accounting manipulation by inhibiting 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 accounting manipulation 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 more equity incentives (to the tune of 14%) as compared to those audited by a non-expert. To put aside 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.

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1. Introduction

A large literature in accounting and finance tests whether CEOs with equity-based incentives manipulate their reported financial statements.[1] The overall evidence in this literature is inconclusive, with some studies documenting a positive association (e.g., 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 (e.g., 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 inhibit the ability of managers to successfully carry out any manipulation (under the assumption that equity incentives do indeed encourage reporting manipulation). 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 aforementioned 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 the sensitivity of the CEO's equity portfolio to the stock price i.e., delta) and the likelihood of accounting manipulation (based on the comprehensive set of class action lawsuits identified by Dyck, Morse and Zingales, 2010).

[1] We use the terms "accounting manipulation" and "financial misreporting" interchangeably 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.

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 subsample of non-industry-expert auditors. We are unable to detect any association between misreporting and CEO 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 are not on account of 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). These authors convincingly 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 accounting manipulations and CEO 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 accounting manipulations – but only in the subsample of non-expert auditors. In the high auditor expertise subsample, we find that equity incentives correlate with a *lower* frequency of accounting manipulations.[2] Overall, our results are robust to using alternative empirical methodologies and provide an economic rationale for the prior inconsistent evidence between CEO incentives and accounting manipulation.

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

[2] This result is interesting, but further exploration is beyond the scope of our current study. Our hypotheses merely predict that CEO equity incentives do *not* correlate with more frequent accounting manipulations in the presence of greater auditor expertise. We therefore do not examine this result further, and leave it to future research.

statements. If that is true, then optimal contracting theories would predict that these firms should grant more equity-based incentives to their CEOs. For example, Goldman and Slezak (2006) examine how the potential for financial statement manipulation 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 manipulate financial reports to artificially inflate the stock price, especially if the manipulation is unlikely to be detected. Their model predicts that CEOs will be granted more equity incentives when financial misreporting is more likely to be detected. Our framework allows us to take this prediction to the data.

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 more equity incentives (to the tune of 14%) 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 accounting manipulation.

A lingering concern that remains, of course, is the endogeneity of auditor expertise. For example, it could be that CEOs with greater equity incentives are more aligned with shareholders and therefore 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 (e.g., 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. In particular, 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 larger increases in CEO incentives (to the tune of 17%) as compared to AA firms audited by a non-expert in the post-period. A final concern here is that although firms' decision to switch auditors is exogenous, their 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 of the important effect of auditor expertise on CEO equity incentives.

Our study makes two contributions. First, it 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 accounting manipulation by inhibiting 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 (e.g., Ball, Jayaraman and Shivakumar, 2012) and a lower cost of capital (e.g., 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 as 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 (e.g., Admati and Pfleiderer, 2009; Edmans, 2009; Bharath, Jayaraman and Nagar, 2013).

The remainder of the paper is organized as follows: Section 2 lays out the hypotheses and Section 3 the empirical strategy. Section 4 presents the main results and includes our robustness tests. Section 5 concludes.

2. Motivation and hypotheses

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

2.1. CEO equity incentives and accounting manipulation

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. Allegedly, high equity incentives encourage managers to indulge in myopic acts aimed at maintaining stock prices and earnings at artificially high levels in the near term. For example, in his monetary policy report to Congress on July 16, 2002, Alan Greenspan stated that "the highly desirable spread of shareholding and options among business managers perversely created incentives to artificially inflate reported earnings in order to keep stock prices high and rising". Jensen (2003) argues that current compensation schemes are responsible for causing managers to take actions that "game the system" and destroy shareholder value. Put more forcefully, Coffee (2005) identifies stock options as the best explanation for the rise in accounting scandals in the late 1990s and early 2000s, stating that "…absent special controls, more options means more fraud".

On the other hand, others express a healthy skepticism of these interpretations. In particular, Bushman and Smith (2001) discuss the effect of observed incentive contracts on earnings management behavior and note that "this research begs the question of why these contracts exist in the first place. Are the observed contracts at these firms not optimal? After all, any incentives for earnings management could be mitigated by offering flat wage contracts." 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 accounting manipulation and CEO incentives. While this literature is burgeoning, the overall evidence is inconclusive. The above view, as Armstrong et al. (2010) point out, implicitly ignores the effect of actions by monitors in curbing the accounting manipulation. Thus, even if one were to entertain the possibility that CEO incentives encourage accounting manipulation, one would not necessarily observe a positive association *ex post* if there are mechanisms in place that would detect the manipulation. 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 accounting manipulation. We follow the auditing literature and posit that the expertise of the firm's auditor 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 accounting manipulation.

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 due to non-errors (i.e., intentional and hence more egregious). Gunny et al. (2007) find that auditors with industry expertise are less likely to be

found deficient (and also 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 abnormal accruals (both income-increasing and income-decreasing) 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 incentives and accounting manipulation.

2.2. Effect of auditor expertise on CEO incentives

An implication of the above hypothesis is that auditor expertise reduces the costs of granting equity incentives by reducing the likelihood of accounting manipulation. If that is true, then optimal contracting theories would 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, but also indulge in misrepresentation of performance (see also Peng and Roell, 2008 and 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 manipulation. The prediction from their model is that firms with a higher detection likelihood of accounting manipulation should grant their CEO's more equity incentives. The intuition is that the greater probability of detection reduces manager's incentives to indulge in information manipulation, thereby reducing the ex-ante costs of granting equity-based incentives.

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 (such as 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, pg. 103) note that:

> "Corporate governance mechanisms provide an alternative to the explicit use of equity-based incentives. For example, holders of large block 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, things become tricky when one moves to a multi-tasking framework. For example, Goldman and Slezak (2006) allow the manager to influence the stock via both effort and accounting manipulation. They model the "monitoring environment" to represent the collection of parameters that directly affect manipulation: the probability of detection (which is where auditor expertise comes in), the penalty if detected, and the cost of hiding manipulative activities. They find that equity-incentives are *increasing* in the detection probability and in the penalty of manipulation. 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 manipulation. As the former channel reduces equity-incentives, while the latter increases it, 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 accounting manipulation 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. Since managers' incentives to manipulate earnings stems from their desire to maintain the stock price at a high level, we expect the effect of auditor expertise on CEO equity incentives to be pronounced in industries where earnings play an important role in determining the stock price. Thus our third hypothesis is:

H3: The effect of auditor expertise on CEO equity incentives is pronounced in industries where earnings are 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.Accounting manipulation (LAWSUIT)

It is difficult to construct an appropriate empirical measure of accounting manipulation since this managerial action is unobservable (see discussion in Armstrong et al, 2010). As a result, we follow prior studies and infer manipulation based on "extreme" outcomes where manipulation is likely to have occurred. In particular, we follow Armstrong et al. (2010) and Dyck, Morse and Zingales (2010) and use 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 accounting manipulation 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, 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 (see Dyck et al. for details).

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% change in the firm's stock price. We construct this delta measure 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. In particular, we use their two definitions of industry expertise – definition 1 (labeled *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, it defines an industry specialist if in a particular year the auditor has a market share

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

greater than 35% in a two-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 as that is the first year of the Big Four, and restrict the sample period to end by 2007 as sample coverage on Audit Analytics declined drastically from 2007 onwards (see Reichelt and Wang, 2010 for further details). 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 that 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. We find that PwC ranks as the expert for the most number of industries, followed by Ernst & Young, Deloitte, and finally 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, on average, ranks as the industry expert as per the second definition, *EXPERTISE2*, in 18 industries, followed by Ernst & Young in 14, Deloitte in 10, and KPMG in 4. In our sample, these values correspond to 17, 12, 9, and 4, respectively.

3.2. Sample construction

3.2.1. Accounting manipulation and auditor expertise

To test hypothesis *H1* (i.e., the role of auditor expertise in the link between CEO equity incentives and accounting manipulation), we merge four databases – (i) data on lawsuits from

[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% ($1.2*3.45^{-1}$).

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 called Risk Metrics). To circumvent the lack of overlap between the lawsuit database (from 1994 to 2004) and the auditor expertise database (from 2003 to 2007), we assume that auditors that are 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 other words, 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, we contend, is a stricter definition of auditor expertise and one that 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. Out of these observations, 201 firm-years (i.e., 2.71% of the sample) involve a lawsuit claiming the presence of an accounting (or other) manipulation (i.e., the indicator *LAWSUIT* = 1). These 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). For example, as 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, the market-to-book ratio (*MB*), leverage (*LEV*) defined as total debt divided by total assets, and stock return volatility (*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

[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.

differences in the corporate governance environment. In particular, 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 finally, CEO tenure (*TENURE*). We present detailed variable definitions and data sources in the Appendix.

3.2.2. Accounting manipulation 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.

In terms of control variables, we include the log of total sales (*LNSALE*), as prior studies show that firm size is an important determinant of equity incentives. As 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. As prior studies find that the investment opportunity set affects equity incentives (e.g., Clinch, 1991; Smith and Watts, 1992; Gaver and Gaver, 1993; and Baber et al, 1996), we follow Ittner et al. (2003) and include three variables to capture the investment opportunity set – the market-to-book ratio (*MB*), the ratio of research and development expenses to sales (*R&D*) and the ratio of advertising expenses to sales (*ADVT*). Consistent with prior studies, we expect a positive coefficient on *MB*, *R&D*, and *ADVT*.

We use both accounting (*ROA*) and stock price (*RET*) based measures to capture prior performance. *ROA* represents return on assets defined as income before extraordinary items scaled by total assets while *RET* represents the annual stock return.

We also include earnings volatility (*ROAVOL*) and stock return volatility (*RETVOL*) to capture features of the operating environment. *ROAVOL* and *RETVOL* are computed as standard deviations of five annual observations of *ROA* and *RET*, respectively. Prendergast (2000, 2002) argues that firms rely more on stock-based incentives in riskier environments where it is more difficult to monitor the manager's actions. On the other hand, Demsetz and Lehn (1985), Lambert and Larcker (1987), Aggarwal and Samwick (1999) and Garvey and Milbourn (2003) argue that greater volatility captures more noise in the output measure, and firms should therefore reduce stock-based incentives. We, therefore, do not make a directional prediction for *ROAVOL* and *RETVOL*. Finally, we include stock turnover (*LIQ*) as Jayaraman and Milbourn (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. All control variables have been defined as of the beginning of the year. Our empirical specification is as follows:

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

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

4. Results

4.1. Accounting manipulation and auditor expertise

4.1.1.Descriptive statistics

Descriptive statistics are presented in Panel A of Table 2. The mean value of *LAWSUIT* is 0.027, indicating that 2.7% of the sample pertains to firm-years with a lawsuit. This proportion closely resembles the 3.4% that Armstrong et al. (2010) report. The mean value of *EQINC* is 706.426, which suggests that a 1% increase in the stock price increases the value of the average CEO's equity portfolio by $706,426. Around 8% of the sample is being audited by an industry expert, as seen by the mean value of *EXPERTISE*.

4.1.2.CEO equity incentives and accounting manipulation - the role of auditor expertise

Panel B of Table 2 presents results of the role of auditor expertise in the association between CEO equity incentives and accounting manipulation. The first set of results entitled "Full sample" replicates prior studies. We estimate a probit model of the likelihood of accounting manipulation (Pr (*LAWSUIT* = 1)) as a function of CEO incentives (*EQINC*) and control variables (*SIZE*, *LEV* and *MB*). Following Armstrong et al. (2010), we start with univariate results. In addition, we present multivariate evidence, where following Burns and Kedia (2006), we include industry and year fixed effects in addition to the control variables. Turning to the univariate results in Model 1, we find, consistent with Armstrong et al. that the coefficient on *EQINC* is positive and significant. These results also come through in the multivariate results and validate prior inferences that the likelihood of accounting manipulation 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 accounting manipulation, 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 (see Armstrong et al., 2010). These results are presented in specifications entitled "High auditor expertise" and "Low auditor expertise".

The results starkly illustrate that CEO equity incentives do *not* seem to influence the likelihood of accounting manipulations 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 accounting manipulation 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 accounting manipulation. Further, as we obtain these results in univariate and multivariate specifications, our inferences are unlikely 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 accounting manipulation to exist only for accounting-related lawsuits.[7] To classify lawsuits into accounting-related and non-accounting-related, we obtain 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.).[8] We then re-estimate the probit

[7] We thank an anonymous referee for this excellent suggestion.
[8] 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)

model for each of these types of lawsuits. Consistent with our prediction, we find in Panel C, that the mitigating effect of auditor expertise on lawsuit likelihood is concentrated in accounting-related lawsuits. For non-accounting related lawsuits, CEO incentives are positively associated with the likelihood of a lawsuit even when the firm is audited by an expert auditor.[9]

4.1.3. Propensity-score based matching

In a recent study, Armstrong et al. (2010) argue that prior studies incorrectly select control firms based on matching on the outcome variable (i.e., accounting manipulation). They posit that using a propensity score design that achieves maximum variation in the variable of interest (i.e., 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 accounting manipulation. A critical next step for us then is to examine the sensitivity of our inferences to this technique. In particular, we follow Armstrong et al. (2010) and perform the following three steps – (i) we estimate a propensity-score model, i.e., the probability that the CEO will receive high equity incentives conditional on observable features of the contracting environment. Second, we identify matched-

[9] We strongly urge the readers to interpret these results cautiously for two reasons. First, the classification of lawsuits into accounting-related and non-accounting related tends to be subjective. For example, we found several cases where it was difficult to unambiguously classify the lawsuits into accounting-related versus not accounting-related. That was the reason we supplemented our classification with that in Hennes et al. (2008). While we drop these ambiguous cases from either classification, it is hard 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% of the sample of 601 observation) and the remaining 183 firm-years in the *EXPERTISE*=0 subsample (2.68% of the sample of 6,826 observations). Now, when we slice the *EXPERTISE*=1 subsample further into accounting-related and non-accounting related and also omit the ambiguous cases, we have only 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. Thus, we are able to provide only univariate evidence.

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 accounting manipulation by assessing whether the frequency of accounting manipulations differ significantly between the treatment and control groups.

Panel D of Table 2 presents results of each of these steps. The first panel (Step 1) presents results of the propensity-score model where we estimate the likelihood of receiving high equity incentives using the median as the cutoff (i.e., Pr (*EQ_HIGH* = 1)) on the economic determinants used in Armstrong et al. (2010) (see Section 3.2.1).[10] 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%, which is on par with the 27% documented by Armstrong et al.

The second panel (labeled Step 2) 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 Panel A whether the mean value of each determinant differs across the treatment and control groups.[11] In addition to *t*-tests, we also report normalized differences, defined (following Imbens and Rubin, 1997) as the difference in means scaled by the average of the two within-group standard deviations. The advantage of normalized differences

[10] While we exclude year and industry fixed effects to remain consistent with Armstrong et al., our results are robust to including these fixed effects.
[11] Results based on the median are similar and are therefore not tabulated.

is that they are invariant to sample sizes and thus a more reliable way of assessing covariate balance.[12] 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 particular, none of the normalized differences is even close to the cutoff of 0.25, with the highest being -0.139 for *INSTOWN*. Even in cases where there is a statistical difference as per the *t*-test, the economic differences are quite negligible. For example, return volatility is significantly different between the two groups, but the average for the treatment group is 0.105 and 0.110 for the control group. 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, we re-estimate the propensity score model on the matched sample. The pseudo *R*-square of this regression is 0.012 or 1.2%, as compared to 24% for the one in Step 1. 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%. We interpret these results as evidence that any differences between the matched samples are unimportant.

[12] We thank an anonymous referee for this suggestion.

The final panel of Table 2 (entitled Step 3) presents the comparison of the frequency of accounting manipulations 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, the number of lawsuit firm-years are 124 in the high incentives (i.e., treatment) group as compared to 126 in the low incentives (i.e., control) group. This is especially striking given the substantial difference in *EQINC* between the two groups (shown in last two columns). Overall, we find similar evidence to Armstrong et al. (2010) using the propensity-score based matching model.[13]

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 = 0.000). Armstrong et al. (2010) also find some evidence of a lower frequency of accounting manipulations in firms with more equity-based incentives. There is a sizable difference in equity-based incentives between the two groups ($1.6 million vs. $69,634), indicating that lack of power is not an issue. Turning to the low auditor expertise sub-sample, there are *more* lawsuit firm-years in the treatment group than the control group (117 vs. 73), 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. $71,694). Overall, we find that CEO incentives are associated with *more frequent* accounting manipulations when auditor

[13] It is pertinent to note that the total number of "accounting manipulation" firm-years for this test is 250, as compared to 201 for the probit analyses. Two reasons account for this difference – (i) the latter is based on the overall sample, while the latter is based on a matched-sample design of 3,601 pairs, and (ii) the nearest-neighbor matching estimator is performed with replacement, which means that multiple obs. with *LAWSUIT*=1 can be used to form the low equity-incentives group.

[14] There are only 18 observations where the matched pairs get split across the high and low auditor expertise groups. All results are robust to deleting these observations.

expertise is low; but *less frequent* 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 accounting manipulation by acting as an effective detection mechanism.

4.2. The effect of auditor expertise on CEO equity incentives

4.2.1.Descriptive statistics

Descriptive statistics are presented in Panel A of Table 3. The values of *EQINC* indicate that a 1% change in the stock price increase the value of the average CEO's portfolio by $698,645, and that of the median CEO by a more modest $193,221. These values are similar to those reported in recent studies such as Chava and Purnanandam (2010) and Jayaraman and Milbourn (2012). Close to 23% of the sample (i.e., 1,636 firm-year observations) is audited by an industry expert. The values for the individual measures (*EXPERTISE1* and *EXPERTISE2*) are 17% and 21%, respectively. These are similar to the 12% and 21% reported by Reichelt and Wang (2010), even though they use a larger sample that is not restricted to only Execucomp firms. Our sample is made up of relatively large firms (i.e., the S&P 1500), which is typical of the ExecuComp database. In particular, our average firm has annual sales of around $1.5 billion (exp (7.299)). Around 23% of the assets of the firm are financed by debt. The sample firms are generally growing, as seen by the average market-to-book ratio of around 3, and with average R&D and advertising expenditures amounting to 4% and 1% of total sales respectively. The average firm reports *ROA* of around 4% and an annual stock return of 14%. Overall, our sample is comparable to those used in prior studies.

4.2.2.Multivariate evidence

In this section, we present results of Hypothesis *H2*, which predicts that firms grant their CEOs more equity incentives when they are audited by an industry expert. Panel B of Table 3 presents results of the multivariate regression of *EQINC* on *EXPERTISE* and controls. We present two sets of regressions. The first entitled "Entire sample" is self-explanatory and includes all firm-year observations. The second, entitled "Non-varying sample", excludes firm-years where the auditor is an industry expert for only some of the years in the sample. 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 in the case of 951 firm-years, and is an industry-expert all through the sample 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 (7,149 – 951 – 857 = 5,341 observations).

We present two specifications in each case. The first presents results for all auditees, while the next restricts 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 increases CEO equity incentives by 14%.[15] Further, the coefficient on *EQINC* remains positive and significant in both specifications of the "Non-varying sample", indicating that our results are robust to defining auditor expertise in a more stringent fashion, similar to that in the accounting manipulation tests. The coefficient on *EQINC* is more than twice in magnitude as compared to the full sample, indicating that this measure removes measurement error in estimating auditor expertise, as we had contended before.

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

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 indeed lowers the cost of granting equity incentives by decreasing the likelihood of accounting manipulation, then hypothesis *H3* predicts that our results should be pronounced in settings where earnings play an important role in determining stock prices.[16] To test *H3*, we define stock price sensitivity to earnings at the industry level based on 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 unimportant role in determining the stock price. These tests provide further assurance that our results are indeed emanating from the detection channel that we hypothesize.

4.2.4. Endogeneity of auditor expertise

An unaddressed and natural concern is the endogeneity of auditor expertise, and in particular, reverse causality where CEOs with greater equity incentives that are more aligned with shareholders 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 (e.g., Blouin, Grein and Rountree, 2007; Dyck, Morse and Zingales, 2011). In particular,

[16] We thank an anonymous referee for suggesting this test.

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.[17] In particular, 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 are possibly correlated with auditor expertise.

We construct our sample following the methodology in Blouin et al. (2007). In particular, we 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. 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.[18] 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 with an expert auditor in the post period as compared to those without.

Table 5 presents confirmatory statistical evidence. We present two specifications in Panel A – Model 1 consists of only AA clients around the event (194 observations), where *EXPERTISE* is an indicator variable denoting AA firms with an expert auditor in the post-period. Consistent

[17] We thank an anonymous referee for suggesting this test.
[18] This compares to 407 firms in Blouin et al. (2007) who are not constrained by Execucomp data.

with the graphical evidence, the coefficient on *EXPERTISE* is positive and significant, 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 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% more for firms with an industry expert in the post period.

A final concern is that while firms' decision to switch auditors is exogenous, their 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 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. It is comforting that 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. Furthermore, 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 (i.e., a removed treatment effect), which is again consistent with our hypotheses. Overall, these time-series tests around mandatory auditor switches complement our cross-sectional analyses and suggest that our inferences are unlikely to be driven by the endogeneity of auditor expertise.

4.3. Robustness tests

Finally, 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*. We also use the continuous auditor market share variable (*SHARE*) rather than the dichotomous variables. These results are presented in Panel A of Table 6. The estimated coefficients on *EXPERTISE1*, *EXPERTISE2* and *SHARE* are all positive and significant, indicating 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 Panel B of Table 6. The coefficient on *EXPERTISE* continues to remain positive and significant in the full sample and also in the sample of only Big Four auditees.

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 Panel C of Table 6. We find that our results are robust to this alternative definition. In particular, the coefficient on *EXPERTISE* remains positive and significant in both specifications using the top five executives.

4.3.4. Are the results driven by a few industries?

We perform additional tests to ensure that our results are not driven by only 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. In particular, 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% of the sample), Industrial and Commercial Machinery and Computer Equipment (SIC code 35 – 14% of the sample), Photographic, medical and optical Instruments (SIC code 38 – 14% of the sample), Health services (SIC code 80 – 5% of the sample) and Transportation equipment (SIC code 37 – 4.6% of the sample). We find that the coefficient on *EXPERTISE* remains positive and significant in every case. The 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 clearly do not appear to be driven by only a few industries.

5. Conclusion

We revisit the mixed findings on the association between CEO equity incentives and accounting manipulation. We argue that even if CEO incentives increased the likelihood of accounting manipulation, one might not observe a positive association *ex post* if there are detection mechanisms in place that inhibit the manager's ability to carry out the manipulation. Using auditor industry expertise as one such mechanism, we provide strong evidence that the positive association between CEO incentives and accounting manipulation is concentrated in sub-samples where the auditor is *not* an industry expert. We fail to detect an association between CEO incentives and accounting manipulation in firms audited by an industry expert.

An implication of the above results is that auditor expertise allows firms to grant their CEOs more equity-based incentives by reducing the costs of accounting manipulation that potentially accompany such incentive schemes. 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 more equity-based incentives to the tune of 14%. 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 study offers two contributions. First, it incorporates the role of detection mechanisms, such as auditor expertise, within the CEO contracting-financial misreporting literature. Second, it broadens 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 way managers are incentivized. 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 (e.g., Admati and Pfleiderer, 2009; Edmans, 2009; Bharath, Jayaraman and Nagar, 2013).

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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% 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

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.

	Full sample				High auditor expertise (*EXPERTISE*=1)				Low auditor expertise (*EXPERTISE*=0)			
	Univariate		Multivariate		Univariate		Multivariate		Univariate		Multivariate	
	Coeff.	*z*-stat	Coeff.	*z*-stat	Coeff.	*z*-stat	Coeff.	*z*-stat	Coeff.	*z*-stat	Coeff.	*z*-stat
Intercept	-2.275	-23.49	-4.552	-8.22	-2.090	-8.09	-14.617	-9.32	-2.300	-22.13	-4.208	-7.33
EQINC	0.068	3.90	0.074	3.06	0.045	0.89	-0.005	-0.04	0.071	3.84	0.080	3.05
SIZE			0.268	7.92			0.386	2.60			0.269	7.55
LEV			0.865	3.47			2.049	1.38			0.752	2.88
MB			-0.011	-0.85			-0.060	-0.81			-0.013	-0.97
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	

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.

	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)	
	Coeff.	*t*-stat	Coeff.	*t*-stat	Coeff.	*t*-stat	Coeff.	*t*-stat
Intercept	-1.893	-4.31	-2.743	-17.52	-2.676	-8.07	-2.642	-18.51
EQINC	-0.310	-7.03	0.078	2.85	0.103	1.73	0.064	2.55
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	

Panel D: Propensity-score based matching model

Step 1 – 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.

	Pr (*EQINC_HIGH*=1)	
	Coeff.	*z*-stat
Intercept	-3.425	-21.52
SIZE	0.487	26.71
MB	0.059	7.69
LEV	-0.770	-6.94
RETVOL	3.960	11.36
GINDEX	-0.045	-5.98
STAGBOARD	0.058	1.45
AFFILDIR	0.087	6.99
INTLCKDIR	-0.074	-1.41
CUMVOTE	-0.811	-2.43
INSTOWN	0.201	1.53
BOARDSIZE	-0.096	-9.54
CEO_COB	0.094	2.05
TENURE	0.056	19.18
Year effects	No	
Ind. Effects	No	
Pseudo R^2	0.239	
Obs.	7,427	

Step 2 – 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.

Panel A: Test of differences

	***N* = 3,601 pairs**			
	Treatment (Mean)	**Control (Mean)**	***t.* stat**	**Norm. diff.**
EQINC ($'000s)	$1,331.809	$71.495	27.258	0.642
SIZE	8.658	8.603	1.689	0.039
MB	3.836	4.111	-2.844	-0.067
LEV	0.246	0.255	-2.336	-0.057
RETVOL	0.105	0.110	-3.516	-0.073
GINDEX	9.25	9.276	0.428	-0.010
STAGBOARD	0.584	0.552	2.808	0.065
AFFILDIR	1.681	1.638	1.135	0.027
INTLCKDIR	0.129	0.106	3.044	0.072
CUMVOTE	0.001	0.001	0.817	0.000
INSTOWN	0.112	0.134	-5.976	-0.139
BOARDSIZE	10.607	10.641	-0.479	-0.011
CEO_COB	0.854	0.865	-1.288	-0.032
TENURE	7.701	6.909	4.341	0.102

Panel B: 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.

	Nearest neighbor match		Farthest neighbor match	
	Pr (*EQINC_HIGH*=1)		Pr (*EQINC_HIGH*=1)	
	Coeff.	*z*-stat	Coeff.	*z*-stat
Intercept	-0.206	-1.57	1.319	7.42
SIZE	0.069	5.33	0.216	17.26
MB	-0.013	-3.45	-0.102	-14.31
LEV	-0.159	-1.64	-0.419	-3.11
RETVOL	-0.708	-3.06	-2.112	-5.94
GINDEX	-0.011	-1.49	-0.228	-23.66
STAGBOARD	0.155	4.24	1.691	27.70
AFFILDIR	0.007	0.66	0.112	7.54
INTLCKDIR	0.160	3.33	0.578	8.36
CUMVOTE	0.372	0.69	5.744	29.65
INSTOWN	-0.527	-5.23	3.268	17.09
BOARDSIZE	-0.018	-2.96	-0.118	-19.01
CEO_COB	-0.055	-1.23	-0.240	-4.85
TENURE	0.009	4.31	0.038	13.24
Year effects	Yes		Yes	
Ind. Effects	Yes		Yes	
Pseudo R^2	0.012		0.370	
Obs.	7,202		7,202	

Step 3: Comparing frequencies of accounting manipulation 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.

	Treatment	**Control**	***p*. value**	***EQINC*$_T$ (\$ '000s)**	***EQINC*$_C$ (\$ '000s)**
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: Main variables

The sample for this panel covers the period from 2003 to 2007. It comprises of 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

Panel B: Multivariate evidence

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 "Non-varying 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.

	Entire sample				Non-varying sample			
	All auditees (Model 1)		Big 4 auditees (Model 2)		All auditees (Model 3)		Big 4 auditees (Model 4)	
	Coeff.	*t*-stat	Coeff.	*t*-stat	Coeff.	*t*-stat	Coeff.	*t*-stat
Intercept	1.811	9.78	1.812	9.52	1.879	8.73	1.838	8.26
EXPERTISE	0.130	2.07	0.127	2.02	0.277	2.06	0.300	2.21
LNSALE	0.408	16.71	0.409	16.42	0.404	13.73	0.413	13.66
LEV	-0.073	-0.37	-0.049	-0.24	-0.248	-1.06	-0.260	-1.06
MB	0.072	7.41	0.074	7.49	0.071	6.14	0.071	6.03
R&D	1.687	4.28	1.706	4.27	1.469	3.24	1.370	2.93
ADVT	0.147	0.08	0.299	0.16	0.377	0.19	0.545	0.24
ROA	2.019	7.40	1.841	6.52	2.030	7.01	1.871	6.23
RET	0.100	3.13	0.116	3.48	0.084	2.46	0.099	2.79
ROAVOL	-0.776	-2.24	-0.929	-2.55	-0.650	-1.72	-0.819	-2.04
RETVOL	0.003	0.08	0.014	0.41	-0.005	-0.13	0.011	0.28
LIQ	1.047	3.19	0.880	2.63	1.276	3.38	1.141	3.00
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.

	High sensitivity				Low sensitivity			
	All auditees (Model 1)		Big 4 auditees (Model 2)		All auditees (Model 3		Big 4 auditees (Model 4)	
	Coeff.	*t*-stat	Coeff.	*t*-stat	Coeff.	*t*-stat	Coeff.	*t*-stat
Intercept	1.694	5.87	1.659	5.73	1.905	7.33	1.925	7.09
EXPERTISE	0.210	2.30	0.214	2.31	0.032	0.38	0.025	0.29
LNSALE	0.443	12.44	0.443	12.42	0.392	10.80	0.393	10.55
LEV	-0.228	-0.76	-0.162	-0.54	-0.091	-0.33	-0.078	-0.27
MB	0.065	4.24	0.067	4.26	0.071	5.62	0.072	5.70
R&D	2.169	2.07	2.127	2.07	1.368	3.11	1.393	3.09
ADVT	-3.702	-1.33	-2.832	-0.92	2.806	1.12	2.636	0.97
ROA	2.315	4.77	2.127	4.36	1.860	5.52	1.656	4.70
RET	0.107	1.94	0.101	1.81	0.087	2.35	0.118	2.99
ROAVOL	-0.688	-0.98	-0.724	-1.02	-0.686	-1.71	-0.896	-2.08
RETVOL	0.011	0.21	0.035	0.68	-0.005	-0.12	0.000	0.00
LIQ	0.945	1.64	0.898	1.54	1.000	2.40	0.771	1.80
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.

	AA clients (Model 1)		All Big 4 clients (Model 2)	
	Coeff.	*t*-stat	Coeff.	*t*-stat
Intercept	0.041	0.85	0.122	2.67
EXPERTISE	0.158	3.19	-0.009	-0.13
AA			-0.080	-1.48
*EXPERTISE*AA*			0.173	2.06
ΔLNSALE	0.122	0.35	-0.310	-0.79
ΔLEV	-0.002	-2.55	0.000	-1.28
ΔMB	0.073	1.61	-0.012	-0.38
ΔR&D	0.529	2.84	0.088	0.52
ΔADVT	0.678	0.99	1.177	1.17
ΔROA	0.008	2.49	0.002	1.15
ΔRET	0.001	0.40	0.010	1.15
ΔROAVOL	-0.020	-1.97	-0.044	-4.04
ΔRETVOL	0.004	0.11	0.097	2.00
ΔLIQ	0.079	1.32	0.134	2.00
Adj. R^2	0.16		0.04	
Obs.	194		901	

Panel B: Controlling for self-selection

The dependent variable in the first-stage in 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* indicates leverage, *MB* is the market to book ratio, *ABSACCR* indicates the absolute value of accruals, *LOSS* is an indicator denoting negative earnings, *FCF* indicates free cash flows, *SEG* represents the number of segments and *FOREGIN* denotes 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 from the first stage.

	First-stage Pr [*EXPERTISE*=1]		Second-stage OLS with *MILLS*	
	Coeff.	*t*-stat	Coeff.	*t*-stat
Intercept	-1.952	-7.07	0.315	2.08
PRE_LNMVE	0.034	0.96		
PRE_EXPERTISE	1.739	15.40		
PRE_LEV	0.814	2.87		
PRE_MB	0.022	1.24		
PRE_ABSACCR	-0.994	-2.01		
PRE_LOSS	0.070	0.38		
PRE_FCF	0.048	0.08		
PRE_SEG	0.064	2.19		
PRE_FOREIGN	-0.055	-0.22		
EXPERTISE			-0.100	-0.90
AA			-0.105	-1.88
*EXPERTISE*AA*			0.218	2.12
ΔLNSALE			-0.470	-1.28
ΔLEV			0.000	-0.82
ΔMB			-0.014	-0.42
ΔR&D			-0.102	-0.60
ΔADVT			0.823	0.81
ΔROA			0.005	2.16
ΔRET			0.010	1.16
ΔROAVOL			-0.046	-4.22
ΔRETVOL			0.099	2.05
ΔLIQ			0.146	2.07
MILLS			-0.104	-1.51
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.

	All firms (Model 1)		All firms (Model 2)		All firms (Model 3)	
	Coeff.	*t*-stat	Coeff.	*t*-stat	Coeff.	*t*-stat
Intercept	1.807	9.76	1.809	9.77	1.734	9.32
EXPERTISE1	0.114	1.71				
EXPERTISE2			0.108	1.67		
SHARE					0.544	2.06
LNSALE	0.410	16.85	0.409	16.75	0.403	16.28
LEV	-0.070	-0.36	-0.070	-0.36	-0.078	-0.40
MB	0.072	7.42	0.072	7.44	0.072	7.45
R&D	1.679	4.25	1.689	4.28	1.642	4.17
ADVT	0.124	0.07	0.124	0.07	0.124	0.07
ROA	2.031	7.44	2.018	7.40	2.005	7.36
RET	0.099	3.09	0.100	3.14	0.101	3.16
ROAVOL	-0.772	-2.23	-0.775	-2.24	-0.769	-2.21
RETVOL	0.004	0.11	0.003	0.08	0.005	0.14
LIQ	1.051	3.20	1.045	3.18	1.044	3.18
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	

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.

	All auditees (Model 1)		Big 4 auditees (Model 2)	
	Coeff.	*t*-stat	Coeff.	*t*-stat
Intercept	0.039	1.83	0.033	1.50
EXPERTISE	0.010	1.39	0.011	1.50
LNSALE	0.023	8.05	0.023	8.10
LEV	-0.026	-1.13	-0.022	-0.91
MB	0.008	7.30	0.008	7.37
R&D	0.113	2.27	0.123	2.42
ADVT	0.015	0.08	0.011	0.05
ROA	0.199	6.57	0.183	5.81
RET	0.006	1.83	0.008	2.15
ROAVOL	-0.046	-1.11	-0.057	-1.27
RETVOL	-0.001	-0.28	0.000	-0.04
LIQ	0.137	3.68	0.126	3.30
Year effects	Yes		Yes	
Industry effects	Yes		Yes	
Adj. R^2	0.27		0.27	
Observations	7,148		6,808	

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.

	All auditees (Model 1)		Big 4 auditees (Model 2)	
	Coeff.	*t*-stat	Coeff.	*t*-stat
Intercept	0.552	4.20	0.560	4.10
EXPERTISE	0.093	1.98	0.094	1.99
LNSALE	0.413	25.60	0.412	24.61
LEV	-0.287	-1.97	-0.302	-1.98
MB	0.052	6.90	0.054	6.77
R&D	2.305	7.11	2.224	6.49
ADVT	0.021	0.02	0.320	0.26
ROA	1.608	8.02	1.475	7.15
RET	0.079	3.19	0.089	3.51
ROAVOL	-0.623	-2.71	-0.573	-2.27
RETVOL	0.057	2.49	0.071	2.82
LIQ	1.074	4.40	0.992	3.93
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.