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1 Introduction

Occupational licensing requires individuals to fulfill minimum requirements in human capital investment and be certified by license bureaus before legally working in a profession. Firms, by employing licensed professionals in their production function, may achieve a higher, desired quality of output. Because of the lack of data available and a suitable policy context, the quality hypothesis of licensing has been focused on individual outcomes, and attention has yet to be brought to the firm level. The quality effect of occupational licensing at the firm level is of paramount importance for large corporations, especially because their operational efficiency concerns a broad array of stakeholders.

In this paper, we evaluate to what extent the recruitment of licensed professionals affects the outcomes of publicly-traded corporations, whose performance can affect investors and stakeholders at-large throughout the economy. In 2002, the Sarbanes-Oxley Act of 2002 (SOX) was passed as a response to several accounting scandals of publicly-traded corporations, and one of the mandates requires publicly traded firms to disclose whether the corporate board's audit committee includes a "financial expert."[1] We utilize SOX as a shock to study within-firm spillovers — the extent to which corporate management regards licensed professionals as a low-cost option for compliance and culminates in changes to the composition of the audit committee with respect to specific credentials which may qualify a director as a "financial expert." We then evaluate whether the increased presence of licensed professionals in the audit committee leads to actual improvements in the audit quality of a firm, measured by the probability of refiling a financial statement.

Our inquiry about licensed professionals and corporate governance leverages the insights of the economics of occupational licensing.[2] In classical economic theory, license requirements offer job protection and higher wages to license-holders, but lower the wages

[1] We discuss the background and detail of the SOX Section 2.1.

[2] Kleiner and Soltas (2023) provide a discussion of the welfare implications of occupational licensing.

and employability of non-licensed workers (Friedman, 1962). By contrast, proponents of occupational licensing argue that occupational licensing protects consumers from low-quality products and services (Leland, 1979). In our setting, the SOX disclosure mandate of "financial expert" is in effect an input requirement on the audit committee in which the presence of licensed professionals at the expense of the non-licensed may be necessary to alleviate the misaligned incentives (Shapiro, 1986). Our focus is not to conclude the overall effectiveness of SOX. Instead, our analysis on publicly-traded companies links the trade-off of licensure regulation to a novel context by looking at firm responses to a quasi-licensure mandate and evaluate the quality effect in a high-stake context, namely the accuracy of financial statements. We also use the unique context of board room composition to study the employment spillover of licensed professionals on professionals with other qualifications.

We take advantage of the rich data available from BoardEx for the years 2000–2018. The data are organized as a director-firm-year panel with a large sample of 5,241 firms varying considerably in their market capitalization. Crucially, the data allow us to manually identify specific "financial expert" qualifications of directors and whether the director serves on the audit committee. Due to the description of a "financial expert" in SOX, we identify certified public accountants (CPA), chartered financial analysts (CFA), certified management accountants (CMA), and attorneys (JD) as potential "financial experts." Notably, the extant literature on "financial experts" has examined CPAs and a variety of career-based experiences (Anderson et al., 2004; Sharma and Iselin, 2012; Bryan et al., 2013; Qiao et al., 2018). Agrawal and Chadha (2005) also consider CFAs in addition to career-based experience. We are among the first to study the substitution among professionals of different credential status from the firm's standpoint.

As a result of our data work, we can identify a strong response by firms to increase the proportion of CPAs on the board and audit committee after the passage of SOX. Analyzing director-level data, we show that CPAs are more likely to be board members and

be appointed to the audit committee after SOX. In our saturated model, we control for director characteristics, time-varying firm characteristics, and firm and year fixed effects. Our identification comes from the differential impact of SOX on license holders relative to non-licensed directors, which is analogous to the difference-in-differences approach with non-licensed directors acting as the control group. We find that the passage of SOX raises the probability of CPAs serving on the audit committee by about 8 percentage points. The increased presence is at the expense of other types of professionals (e.g. non-licensed/certified directors). Using a Cox hazard model, we also find that CPAs have a 23% lower hazard ratio for exiting the board after SOX. Overall, the appointment of CPAs after SOX confirms the classical rent-seeking argument that occupational licensing generates benefits to existing practitioners at the expense of outsiders (Friedman, 1962).

Next, we investigate if SOX improves the audit quality of a corporate board by increasing the presence of license-holders on the audit committee, a channel coinciding with the quality argument of occupational licensing (Leland, 1979; Shapiro, 1986). Assessing the causal impact of licensed directors on firm outcomes is challenging because the employee composition of a firm responds to industrial policies (Plemmons, 2022). To circumvent the endogeneity concern over the committee composition, we leverage firm-level data from Audit Analytics and analyze the effect of an increased presence of licenses on financial restatements — an objective measure of audit quality. Conditional on the panel fixed effects (firm and year), we exploit the idiosyncratic firm-by-year variation in the proportion of directors on the audit committee with a CPA, CFA, CMA, or JD license to determine the impact on the likelihood of restatement. We find a precise zero effect on financial restatements. The richness of our data provides enough statistical power to rule out an effect size as small as one-tenth of the standard deviation of the restatement variables. The null result is also robust to the type of financial statement (annual or quarter) and firm size.[3]

[3]While previous research also shows that the CPA exam does not improve the quality of a CPA candidate, we advance the discussion on the quality impact of CPAs by looking at firm-level outcomes (Barrios, 2022; Carpenter and Stephenson, 2006; Meehan and Stephenson, 2020).

Although our analysis on restatements is endowed with a rich firm-year panel that addresses firm heterogeneity, a major concern of the null effect is reverse causality – the negative relationship between the increased presence of CPAs, or other licenses, on auditing errors may be biased to zero because firms that are more likely to refile may preemptively add CPAs, or other licenses, to the audit committee. We find firm characteristics that correlate with the probability of a restatement do not predict the presence of license holders on the audit committee. We also show that firms do not respond to financial restatements by appointing additional directors with any of the four licenses we examine to the audit committee in the future.

Our discussion connects the economics of occupational licensing into a novel and high-stakes context, the boardroom of publicly-traded companies. Empirical studies find that occupational licensing creates entry barriers that hurt non-licensed workers.[4] By contrast, licensing distributes benefits to workers who successfully acquire the license.[5] We document the increased presence of CPAs at the expense of other professionals, that speaks to the understudied spillover of occupational licensing on the 'out-group' (Cai and Kleiner, 2020; Dodini, 2023; Kleiner and Park, 2010), with a novel fact about within-firm substitution pattern between licensed and unlicensed employees. The context of corporate board offers a unique aspect of employment spillover, that the use of CPAs for compliance crowds out the appointment of professionals without any credentials. Our results showing that CPAs experience longer duration on the board after the passage of SOX also offers another novel aspect to measure the license "premium" other than wage and employment (Blair and Chung, 2019; Kleiner and Krueger, 2013).

At the same time, a vast majority of empirical research finds that licensing has min-

[4]Recent estimates show that occupational licensing generally reduces aggregate employment opportunities by about 20% (Blair and Chung, 2019; Kleiner and Soltas, 2023). Industry/group-specific estimates also include public school teachers (Chung et al., 2021), real estate agents (Chung, 2022), immigrants (Chung, 2023), and skilled trades (Blair and Fisher, 2022).

[5]Licensed individuals, on average, earn 4% to 10% more than their unlicensed counterparts (Kleiner and Krueger, 2013). Studies also find that the license premium varies by demographics (Blair and Chung, 2022; Cassidy and Dacass, 2021; Law and Marks, 2009; Xia, 2021).

imal impacts on quality.[6] Our work analyzes very rich data about board members and landmark legislation in the history of firm management, allowing us to offer crucial insights regarding the consequence of occupational licensing at a broader level. Because of the absence of detailed administrative data, we are among the first to evaluate the quality effect of licensing using firm-level variables.[7] We show that SOX acts very similarly to licensing regulations when it mandates the disclosure of a "financial expert" in an attempt to ensure financial statement quality. Analogous to many findings in the licensing literature, we find that SOX is effective at changing the composition of the audit committee (a benefit to license holders), but that the change in composition does not lower the probability a firm refiles a financial statement (the lack of a quality improvement).

2 Institutional Background

To understand SOX and refiled financial statements, we need to understand what requirements SOX has for firms and how a restatement is triggered. Section 2.1 discusses the details of SOX. Section 2.2 discusses how and why financial statements are restated.

2.1 The Sarbanes-Oxley Act of 2002

The Sarbanes-Oxley Act mandates that publicly-traded firms "...disclose whether or not, and if not, the reasons therefor, the audit committee of that issuer is comprised of at least 1 member who is a financial expert" (Sarbanes-Oxley Act of 2002, §407). SOX §407 continues with the following guidance for the term "financial expert."

[6] Profession-specific evidence includes consumer ratings for florists (Carpenter, 2012), work completion rates for roofers (Skarbek, 2008), foreclosures for mortgage brokers (Kleiner and Todd, 2009), patient outcomes for nurse practitioners (Kleiner et al., 2016), patient care quality for social workers (Bowblis and Smith, 2018), and consumer satisfaction on a digital transaction platform (Farronato et al., 2020). An exception is by Anderson et al. (2020), who find that the implementation of midwife licensing in the early 1900s reduced maternal mortality.

[7] Among the few, Zapletal (2019) analyzes confidential business-level data in the US Census and examines the licensing effect on job flows. Plemmons (2022) web scrapes firm-level data and finds that the state-level stringency of licensure affects firm locations.

> In defining the term "financial expert" for purposes of subsection (a), the Commission shall consider whether a person has, through education and experience as a public accountant or auditor or a principal financial officer, comptroller, or principal accounting officer of an issuer, or from a position involving the performance of similar functions–
>
> (1) an understanding of generally accepted accounting principles and financial statements;
> (2) experience in–
> (A) the preparation or auditing of financial statements of generally comparable issuers; and
> (B) the application of such principles in connection with the accounting for estimates, accruals, and reserves;
> (3) experience with internal accounting controls; and
> (4) an understanding of audit committee functions.

Looking at the description of "financial expert," it becomes clear that directors with experience in public accounting, managerial accounting, financial analysis, and certain areas of the law would qualify as "financial experts." Therefore, we focus our analysis on certified public accountants, chartered financial analysts, certified management accountants, and lawyers. While SOX allows for non-licensed directors to be qualified as "financial experts", it is possible that firms would prefer to appoint directors with licenses and certifications to provide a readily-made justification for the director to qualify as a "financial expert." Essentially, the presence of a license or certification may give firms a low-cost method to "check the regulatory box."

In addition to the requirements for a "financial expert" on the audit committee, SOX also stipulates that the audit committee be comprised exclusively of independent directors. Due to the independence stipulation, we restrict our data set to only include inde-

pendent directors.

Failure to comply with the standards brought forth by SOX include penalties of "equitable relief," where the penalty is based on the seriousness of the costs to shareholders (Sarbanes-Oxley Act of 2002, §305). Given the punishment standard is equitable relief, firms may have an incentive to place "financial experts" on the audit committee as a signal that any accounting failures are honest mistakes made in good faith in order to decrease the amount of potential penalties.

2.2 Refiling a Financial Statement

Refiling a financial statement can be triggered by three different groups: the firm, the auditor, or the Securities and Exchange Commission (SEC). The SEC requires a restatement to be filed for material errors. "The determination of whether an error is material is an objective assessment focused on whether there is a substantial likelihood it is important to the reasonable investor" (Munter, 2022). Firms announce refiled financial statements via a form 8-K. Certain restatements, referred to as "little r" restatements, do not merit the release of an 8-K and can be noted in corrected values on later, regularly-scheduled filings. On the other hand, significant errors which require a form 8-K are referred to as "Big R" restatements. Big R restatements also require additional work and disclosures on behalf of the auditor (Tan and Young, 2015). Due to the subjectivity of the criteria for requiring a form 8-K, firms often try to hide Big R restatements and file them as little r restatements in a process referred to as a "stealth restatement" (Hee and Chan, 2010).

Refiling a financial statement is costly to firms in at least 4 ways. First, there are the direct costs of fines or other punishments meted out on the firm and management team. Second, there are direct costs of payments to auditors for additional work. Third, there are indirect costs of the loss of shareholder confidence, which may lead to the decline of the firm's market capitalization. Fourth, there are the indirect costs of diverting employees from productive tasks toward the preparation of refiling financial statements.

3 Data

We use data available from BoardEx for the years 2000–2018 for data on individual directors of publicly-traded companies in the United States [dataset] (BoardEx, 2020). We pair the BoardEx data with financial data for the firms from Compustat and data on refiled financial statements for the firms from Audit Analytics [dateset] (Compustat, 2022; Analytics, 2022). We restrict the director observations to only include independent directors due to the SOX requirement that audit committee members be independent.[8] Due to data availability from Audit Analytics, we follow Li and Wahid (2018) and restrict the firm-level analysis to firm-years that occur during or after 2002. The data set after merging contains 289,641 director-firm-years across 44,547 firm-years.[9]

From the BoardEx data, we hand match data on qualifications obtained by the directors to create several variables of interest for the directors, including CPA, CFA, CMA, and JD. The four variables are indicator variables equal to one if the director has a certified public accountant (CPA) license, a chartered financial analyst (CFA) charter, a certified management accountant (CMA) certification, or has passed the Bar exam or holds a law degree (henceforth, referred to as a lawyer or JD).[10] We also hand match data on committee memberships to identify directors who served on the audit committee and create an indicator variable equal to one for directors serving on the committee.

The descriptive statistics for characteristics of individual directors can be found in the top-half of Table 1. 11% of the directors have a CPA license, 1% have a CFA certification,

[8] BoardEx provides a variable for non-executive directors. We use non-executive directors as our definition of independent.

[9] We drop 58,503 non-independent director-firm-year observations from the initial set of 348,144 director-firm-year observations. In the firm-level sample, we drop 2,247 firm-year observations that occur prior to 2002. We also drop financial firms from the dataset. We keep director-firm-year observations that occur prior to 2002 to see how directors differ before and after SOX.

[10] A list of which licenses or certifications, known by BoardEx as "qualifications" we use to label the directors with a CPA, CFA, CMA, or JD is available upon request. Due to the nature of the data, the four variables on licensure and certification are not time-varying. The lack of variation by time in the licensure data is not a concern because it is unlikely that directors, who tend to be placed on boards in their early 50s, would attain a license after being placed on the board. Also, acquiring a new license in higher-skilled professions requires additional years of investment in training and education.

very few (less than 0.5%) have a CMA certification, and 11% are lawyers. Roughly half of the director-year observations are for directors serving on the audit committee. The average director is also about 61 years old and has a tenure of 7.2 years. 13% of the directors are women. The average number of outside directorships held by directors in addition to their appointment on the focal firm's board is 0.55.

The proportion of directors with a particular license or certification has changed over time in a manner which is consistent with SOX causing an increase in the demand for CPAs, but not for CFAs, CMAs, or lawyers, on the board. The time-series plot in Figure 1 shows that the proportion of directors with a CPA license has more than doubled after the passage of SOX in 2002. At the same time, the proportion of directors who are lawyers, CFAs, or CMAs has changed very little. Consistent with Friedman's (1962) expectations for licensure laws, the figure shows that firms may have targeted CPAs as a response to SOX. Figure 2 shows the proportion of newly-appointed directors who have a license in the given year. The figure unequivocally shows a large spike in demand for CPAs on the board immediately after the passage of SOX. 15 years after SOX, the proportion of newly-appointed directors who have a CPA is higher than the year before SOX. Figure 3 confirms the theory that firms targeted CPAs after SOX because the proportion of audit committee members with a CPA triples after SOX, whereas the proportion of audit members who are CFAs or CMAs stays roughly constant and the proportion who are lawyers declines slightly. Finally, Figure 4 shows that the proportion of firms with at least one CPA on the audit committee nearly tripled in the post-SOX period, up to nearly 60%. Interestingly, Figure 5 shows that firms did not tend to employ more than one CPA on the audit committee at a time. The five time-series plots paint a story which is consistent with SOX acting as a licensure law for CPAs on the board, by securing their employment at the expense of non-license holders.

The descriptive statistics for firm characteristics can be found in the bottom half of Table 1. The average audit committee size is about 3.45. Combining the audit committee

size with data in Figure 3 implies that about 0.7 directors serving on an average audit committee hold a CPA license. The average firm in the data must refile a financial statement about 8% of the time. Of the refiled financial statements, 72% refile a quarterly statement and 18% refile an annual statement.

4 The Effect of SOX on Directors

To illuminate how firms responded to SOX's disclosure requirements, we examine two aspects of directorships before and after the passage of SOX. First, we estimate the probability of service on the audit committee before and after SOX. Second, we estimate the hazard a director exits the board before and after SOX. Examining both aspects of directorships allow us to observe how firms are using directors (via membership) and valuing directors (via exiting the board).

4.1 Audit Committee Appointment

One way in which SOX attempts to improve the accounting statement reliability of publicly-traded companies is to change the composition of the audit committee by mandating the disclosure of one "financial expert." We estimate how firms adapted to the mandate by examining the effect having a CPA, CFA, CMA, or JD has on the probability a director serves on the audit committee. We find that, after SOX, CPAs on a board have a 97% chance of serving on the audit committee.

4.1.1 Empirical Model

We estimate a linear probability model to assess the extent to which SOX changes the probability an independent director with a particular credential serves on the audit committee. Formally, for an independent director i in firm f in year t,

$$Audit_{i,f,t} = \alpha_0 + \alpha_1 CPA_i + \alpha_2 CFA_i + \alpha_3 CMA_i + \alpha_4 JD_i$$
$$+ \alpha_5 SOX_t + \alpha_6 CPA_i \times SOX_t + \alpha_7 CFA_i \times SOX_t + \alpha_8 CMA_i \times SOX_t + \alpha_9 JD_i \times SOX_t +$$
$$\Theta X_{i,t} + \Gamma Z_{f,t} + \theta_f + \epsilon_{i,f,t} \quad (1)$$

where $Audit_{i,f,t}$ is an indicator that equals 1 if the director is chosen to serve on the audit committee. CPA_i, CFA_i, CMA_i, and JD_i are indicator variables equal to 1 if the director has a CPA, CFA, CMA, or JD. SOX_t equals 1 for years after the implementation of SOX in 2002, whereas $CPA_i \times SOX_t$ measures the interaction effect of SOX for CPAs, $CFA_i \times SOX_t$ measures the interaction effect of SOX for CFAs, $CMA_i \times SOX_t$ measures the interaction effect of SOX for CMAs, and $JD_i \times SOX_t$ measures the interaction effect of SOX for lawyers. The model is analogous to a difference-in-differences strategy. α_1 through α_4 captures the difference between individuals with and without the relevant credential, whereas α_5 isolates the structural break common to all board members and firms due to SOX. α_6 through α_9 are the coefficients of interest which measure the treatment effect of SOX on the probability a licensed director serves on the audit committee. We use directors without any of the four credentials as the control group for identification of the impact of SOX, which is analogous to a difference-in-differences (DID) strategy.

To probe the impact that various suites of controls have on the estimates, we explore four models for each credential. We begin with a baseline specification that only includes the credential indicators, SOX_t, and the credential-by-SOX variables . To further isolate individual differences, individual characteristics ($X_{i,t}$: age, gender, time served on the board, and number of outside directorships) are added in a second model. A vector of time-varying firm controls ($Z_{f,t}$: net sales, Tobin's q, return on assets, and board size) is added in the third model. Firm fixed effects (θ_f) are added in the fourth and final model. In all models, standard errors are clustered at the firm level to allow treatment

assignments to be correlated within a firm.

4.1.2 Results

Table 2 shows the extent to which the SOX regulation affects license holders. In each column, the estimate for the base term of 'CPA' indicates that directors with a CPA have a higher probability of serving on the audit committee. In all four specifications, we find a similar increase of around 25 percentage points in the likelihood of appointment to the audit committee for CPAs compared to their unlicensed counterparts. CFAs also experience a similar effect to CPAs, while CMAs and JDs do not change the likelihood of appointment to the audit committee.

We now turn to the interaction terms, which measure the differential impacts of SOX on various license holders. In Column 4, the passage of SOX further increased the probability for a CPA to serve on the audit committee by 10.8 percentage points. Relative to the decline that all directors experience after SOX of 3.2 percentage points and based on the baseline estimate, CPAs are 33.9 percentage points more likely than unlicensed directors to serve on the audit committee. We also observe a positive coefficient for CMAs, but the magnitude is not significant. The empirical results on CPAs and CMAs echo the raw pattern in Figure 2, where we contrast the proportion of new directors with various licenses. Right after the passage of SOX, firms added CPAs to the board at more than double the rate which prevailed pre-SOX. On the other hand, we do not see an apparent shift in the appointment of CMAs.

The sharp impact of SOX on CPAs stands in direct contrast to CFAs and JDs. Relative to unlicensed directors, the base term indicates that CFAs in general are more likely to serve on the audit committee (about 22 percentage points). However, the probability a CFA serves on the audit committee after SOX has a statistically insignificant decline in the full specification. The negative interaction effect also applies to JDs. Although the combined interaction effect for CFAs and JDs is not statistically significant, the estimated

coefficient is close to the exact negative of SOX's impact on CPAs.

The results from the linear probability models are consistent with the notion that the passage of SOX created a licensure effect for CPAs on corporate boards by securing employment for CPAs. Based on the full specification in Column 4, SOX increases the probability a CPA serves on the audit committee by a net of 7.6 percentage points. We do not see a similar effect for the other licenses. Because of the non-result for CFAs, CMAs, and attorneys, along with the raw patterns in the time series plots shown in Figure 1 to 5, we focus on CPAs in the discussion throughout the rest of the paper.

4.2 Appointment Duration

In addition to the likelihood of appointment, we leverage our rich director-level panel and evaluate whether firms act differently regarding directors who are "financial experts" after SOX by keeping them on the board longer. We test whether the directors with licenses or certifications which qualify them to be "financial experts" have a higher or lower probability of leaving the board after the passage of SOX. Our test for the hazard of leaving the board of directors is a significant contribution to the occupational licensure literature, which, due to data limitations, has not previously been able to examine the impact of licensure on job continuity.

4.2.1 The Cox Hazard Model

To understand whether firms held onto directors that counted as "financial experts" based on the licenses that we observe, we estimate a Cox hazard model to determine the hazard of a director leaving the board of directors at a given firm. Directors are considered to be under hazard beginning in the year that they are first appointed to the board. We define a director as leaving the corporate board in year t if the firm is observed in subsequent years without the director on the board. Therefore, the sample now ends in 2017 because we do not observe the firms again after 2018.

The Cox hazard model that we estimate is given by

$$h(t) = h_0(t)exp(\beta_1 CPA_i + \beta_2 CFA_i + \beta_3 CMA_i + \beta_4 JD_i$$
$$+ \beta_5 SOX_t + \beta_6 CPA_i \times SOX_t + \beta_7 CFA_i \times SOX_t + \beta_8 CMA_i \times SOX_t + \beta_9 JD_i \times SOX_t +$$
$$\Theta X_{i,t} + \Gamma Z_{f,t}), \quad (2)$$

where the coefficient of interest for CPAs is β_6 and the control variables are the same as those used in Equation 1. The above specification again resembles a difference-in-differences strategy nested within a duration model.

4.2.2 Results

The results from estimating Equation 2 are provided in Table 3. In the baseline specification (Column 1), without firm or director controls, the base terms for the four licenses indicate that the appointment duration for directors with either of the licenses does not differ from their unlicensed counterparts. Essential for our study, the effect size of having a CPA on appointment duration is both economically and statistically small.

By contrast, SOX changed the firm's treatment of CPAs. As indicated by the interaction term, SOX differentially reduced the likelihood of leaving the board by 26.7% for CPAs. We observe a similar effect on CMAs, but the estimate is not statistically significant. At the same time, SOX had essentially zero differential impact on the appointment duration for CFAs and JDs. The differential impact of SOX on CPAs is invariant to controlling for director characteristics in Column 2 and firm characteristics in Column 3.

Because of our rich individual data, the appointment duration result provides a novel aspect to measure the license 'premium' other than wage and employment. The results on appointment likelihood and appointment duration are consistent with the employment-protection aspects of licensure, especially for CPAs. From another angle, among the four eligible credentials, CPAs stand out by offering a particular value to firms when they

need to disclose the appointment of a "financial expert" as mandated by SOX. In the next section, we explore alternative data that measures firm-level audit quality to understand whether the appointment of CPAs to the audit committee effectively minimizes accounting errors as intended by SOX.

5 Firm Restatements

The goal of SOX is to improve the quality of reporting on financial statements. In fact, the first line of SOX states "To protect investors by improving the accuracy and reliability of corporate disclosures made pursuant to the securities laws, and for other purposes" (Sarbanes-Oxley Act of 2002). We showed in Section 4 that firms responded to SOX's requirements by adding CPAs to the board and the audit committee. We now examine how the proportion of audit committee members with a CPA is related to the probability that a firm refiles a financial statement. We find that increases in the proportion of audit committee members with a CPA does not decrease the probability a firm refiles a financial statement. Therefore, we find, through the channel of required disclosures of a "financial expert" on the board, that SOX does not improve the "accuracy and reliability of corporate disclosures" (Sarbanes-Oxley Act of 2002).

5.1 Empirical Model

Building on the earlier results which show firms added CPAs to the board and audit committee in the wake of SOX, we investigate whether the increased presence of CPAs on the audit committee improves the financial statements issued by a firm. To evaluate the effect on the quality of financial statements, we use the incident of a refiled financial statement (any, annual, or quarter) as the outcome variable.

In Section 4, we used a difference-in-difference (DID) approach to examine the effects of SOX on license holders. In this section, since SOX is passed in 2002 and our data

on restatements begins in 2002, the DID approach is impractical when we do not have a pre-2002 comparison. Furthermore, the DID approach is not appropriate even if we had the full time series of data. Because SOX changes numerous features of corporate governance at the same time, using the DID design (with a treatment indicator of 'SOX') on the restatement outcome may capture the impacts of SOX on restatements for reasons other than the presence of CPAs.

To estimate the direct impact of the presence of "financial experts" on the audit committee on the incidence of restatements after SOX goes into effect, we use a linear probability model with the proportion of the audit committee holding a specific license as the variable of interest. We estimate the following firm fixed effect model:

$$Refiled_{f,t} = \beta_0 + \beta_1 CPA_{f,t} + \beta_2 CFA_{f,t} + \beta_3 CMA_{f,t} + \beta_4 JD_{f,t} + \Gamma Z_{f,t} + \theta_t + \theta_f + e_{f,t}. \quad (3)$$

The indicator $Refiled_{f,t}$ equals 1 if an error is found in the financial statement for firm f in year t and leads to a refiled financial statement. Initially, we estimate the regression for any refiled financial statement. Then, we run separate analyses for annual or quarterly financial statements due to the differences in standards applied to the two kinds of statements. $CPA_{f,t}$ is the variable of interest and measures the proportion of audit members who have a CPA. If SOX is effective, we would expect that an increased proportion of audit committee members with a CPA reduces the probability of a refiled financial statement and β_1 will be less than 0.

Continuing with the covariates, $\Gamma Z_{f,t}$ includes the same set of time-varying firm controls employed in Equation 1. We also include the average age and tenure of directors on the audit committee as well as the proportion of the audit committee that is female and the committee size. Again, in the full specification, we use firm fixed effects (θ_f). Therefore, our identification comes from within-firm variation across years in the proportion

of audit committee members with a CPA. Our identifying assumption is that the unmeasured within-firm variation of refiling a financial statement is orthogonal to the annual CPA assignment on the audit committee. To check potential endogeneity, we assess the extent to which time-varying unobservable characteristics of the firm and audit committee may bias our estimates in Section 6.1 after presenting the main results.

5.2 Results

The results from estimating Equation 3 are presented in Table 4. In Column 1, we find that an increased presence of CPAs on the audit committee has a precise zero impact on financial restatements. The null impact is quantitatively and qualitatively the same when we control for firms' time-invariant heterogeneity in Column 2. The precision of the estimate also allows us to rule out an effect size as small as -0.024 percentage points, which is almost one-tenth of the standard deviation of the restatement variable.

Because the importance of quarterly statements and annual statements differ, from Column 3 to Column 6, we separate the analysis by the type of financial statement. The null effect holds regardless of whether we examine quarterly statements or annual statements. Because we estimated 6 models with and without firm fixed effects, finding a null result for all specifications provides strong evidence that the proportion of the audit committee with a CPA is not related to the probability a firm must refile a financial statement.

Based upon Equation 3, the proportion of the audit committee that has a CPA does not impact the probability of refiling a financial statement. Based upon Equation 1, firms responded to SOX's regulations by adding directors with CPA licenses to the audit committee. The two findings together are very interesting because they show that SOX is effective at changing the behavior of firms (adding CPAs to the board and the audit committee), but does not change outcomes (the need to refile a financial statement). Therefore, SOX may be coming up short of its stated goal of protecting "... investors by improving

the accuracy and reliability of corporate disclosures" via the channel of the "financial expert" (Sarbanes-Oxley Act of 2002).

5.3 Heterogeneity

Depending on the firm's size, the use of the auditor and audit committee in filing financial statements may vary. Smaller firms may depend more heavily on the auditor and audit committee for the creation of financial statements. Larger firms may have large, internal accounting departments which create their own financial statements and simply have the auditor and audit committees confirm the contents. Due to the heterogeneous nature of the auditor relationship, we test whether the proportion of the audit committee with a license has a different impact on the probability of refiling a financial statement at small, medium, and large firms.

We define firms as small, medium, or large based on their average amount of real total assets across the sample period. First, we take the average amount of real total assets for each firm in the sample, which generates 5,241 averages. Second, we generate the 33rd percentile and 67th percentile of the distribution of the average amount of real total assets. Third, we label small, medium, and large firms as those whose average falls in the first, second, or third tercile of the distribution. The process generates a time-invariant measure of firm size.

We estimate Equation 3 including firm fixed effects on each of the firm groups separately and present the results in Table 5. We find that none of the firm groups have a significant relationship between the proportion of CPAs on the audit committee and the probability of refiling a financial statement. Interestingly the strongest result comes for small firms, which may be unlikely to have large accounting departments within the firm. Therefore, we may expect CPAs to have the largest impact on the probability the firm refiles a financial statement for small firms, which is what we find, albeit with point estimates that are statistically insignificant.

6 Addressing Endogeneity Concerns

We show in Section 4 that SOX is effective at changing the composition of the audit committee by increasing the probability a CPA serves on the committee. In Section 5, we show that the proportion of the audit committee with a CPA does not decrease the probability the firm refiles a financial statement. However, there are concerns that endogeneity could be influencing the results. For instance, if firms which are more likely to refile a financial statement recognize the fact and choose to add more CPAs to the audit committee, the estimates will be positively biased and erroneously equal to zero.

To alleviate the endogeneity concerns, we estimate several tests. First, we estimate a balancing test to show that firm fixed effects capture the endogeneity. Second, we show that firms who have refiled a financial statement do not respond by increasing the proportion of the audit committee with a CPA. Because firms do not respond to refiled financial statements by increasing the proportion of the audit committee with a CPA, we can infer that they would not increase the proportion of the audit committee with a CPA beforehand.

6.1 Balancing Tests

In Table 6, we regress our variable of interest — the percent of audit members with a CPA — on firm characteristics. The idea of the balancing test is to check if the presence of CPAs on the audit committee systematically differs by firm type. If firm characteristics have predictive power for the presence of CPA audit members, the magnitude and the sign of the correlation inform us about the direction of potential biases. We also contrast the balancing test with and without firm fixed effects to show their role in limiting selection.

Comparing column 1 and column 2, the firm fixed effects slightly improve the characteristic balance because the correlation between CPA representation and return on assets becomes insignificant, both economically and statistically. Conditional on the firm fixed

effects in column 2, the average board tenure, the board size, and the committee size are significantly related to the credential proportion of an audit committee. We believe the imbalance in these firm characteristics do not impose a substantial concern over the validity of our restatement results because these characteristics do not predict the restatement likelihood as shown in column 2, 4, and 6 in Table 4.

6.2 Reverse Causality

The null impact on restatements could potentially be explained by the bias due to reverse causality: a company anticipating a high chance of restatements appoints a CPA to avoid potential errors. The negative selection into CPA recruitment may offset the positive effect CPAs bring to the audit committee, which explains the zero impact we identify.

To probe the possibility of reverse causality, we regress the future proportion of CPAs on the audit committee on the firm's restatement records (and other characteristics at year t). The test relies on the intuition of Bayesian updating by the firm. The firm only has a noisy estimate of the probability that a restatement will occur. When a restatement does occur, the firm increases the estimate of the probability. Therefore, if firms endogenously add CPAs to the audit committee, providing negative selection bias and a positive correlation between the proportion of CPAs on the audit committee and the refiling rate, we would expect firms to add CPAs to the audit committee after experiencing a financial restatement.

We examine the proportion of CPAs on the audit committee one or two years after the year in question. In the first two columns of Table 7, we show that having a refiled financial statement from year t does not increase the proportion of CPAs on the audit committee the next year. The result holds without firm fixed effects (column 1) and with firm fixed effects (column 2). The results are mirrored in Table 8 which shows that the proportion of CPAs on the audit committee two years later does not respond to refiled financial statements either.

Taken together, the concern over negative selection and reverse causality bias is minimal in our case. Therefore, the results presented in Section 5 are not biased by endogeneity or reverse causality.

7 Conclusion

The Sarbanes-Oxley Act of 2002 requires firms to change their governance structures in order to ensure that investors were protected from low-quality financial statements. One channel used by SOX to change governance is the disclosure requirement of one "financial expert" on the audit committee. SOX also imposes a standard of "equitable harm" to determine penalties for firms, executives, and directors. The combination of the "financial expert" and "equitable harm" requirements led firms to change the composition of the board and the audit committee.

Combining the background of SOX and assembling rich data on publicly-traded firms from 2000–2018, we revisit the quantity-quality trade-off of occupational licensing at the firm level – an important aspect that receives little attention due to the lack of suitable data and policy context. We find that after SOX firms began to appoint more CPAs to the board. The CPAs also tended to serve on the audit committee. In fact, after SOX, CPAs have a 97% probability of serving on the audit committee. We also find that CPAs have a lower risk of leaving the board after the implementation of SOX.

On the quality effect, we do not find that an increased representation of CPAs on audit committees has led to a lower probability of refiling a financial statement. In fact, we find a precise zero effect, regardless of the type of restatements and firm sizes. Our results show that SOX is effective at securing appointments onto corporate boards for CPAs. However, the increased representation of CPAs on audit committees has not achieved the desired outcome of ensuring financial statement accuracy. That is not to say that SOX is not effective in any capacity. Rather, we leverage the uniqueness of board member

appointments and the timing of SOX to study the impacts of occupational licensing in a novel context.

The null result on financial restatement can be explained if we assume that firms optimally appoint directors to the audit committee, regardless of the requirements of SOX or licenses of directors. For instance, a director may have experience and a knack for auditing financial statements. A firm wishing to avoid a restatement would do well to appoint the director to the audit committee, regardless of SOX or other regulations. Optimization of the audit committee that occurs regardless of SOX reduces the impacts of the regulation.

Future work should continue looking at structural changes of licensure on corporate boards tied to SOX. The future work can target three directions. The first is to look at a broader swath of licenses that may categorize a director as a "financial expert." The second is to look at other firm outcomes tied to "financial experts" and license holders on the corporate board. The third is to look at licenses broadly, even those not linked to SOX, to see if there is a relationship between license holders and corporate outcomes.

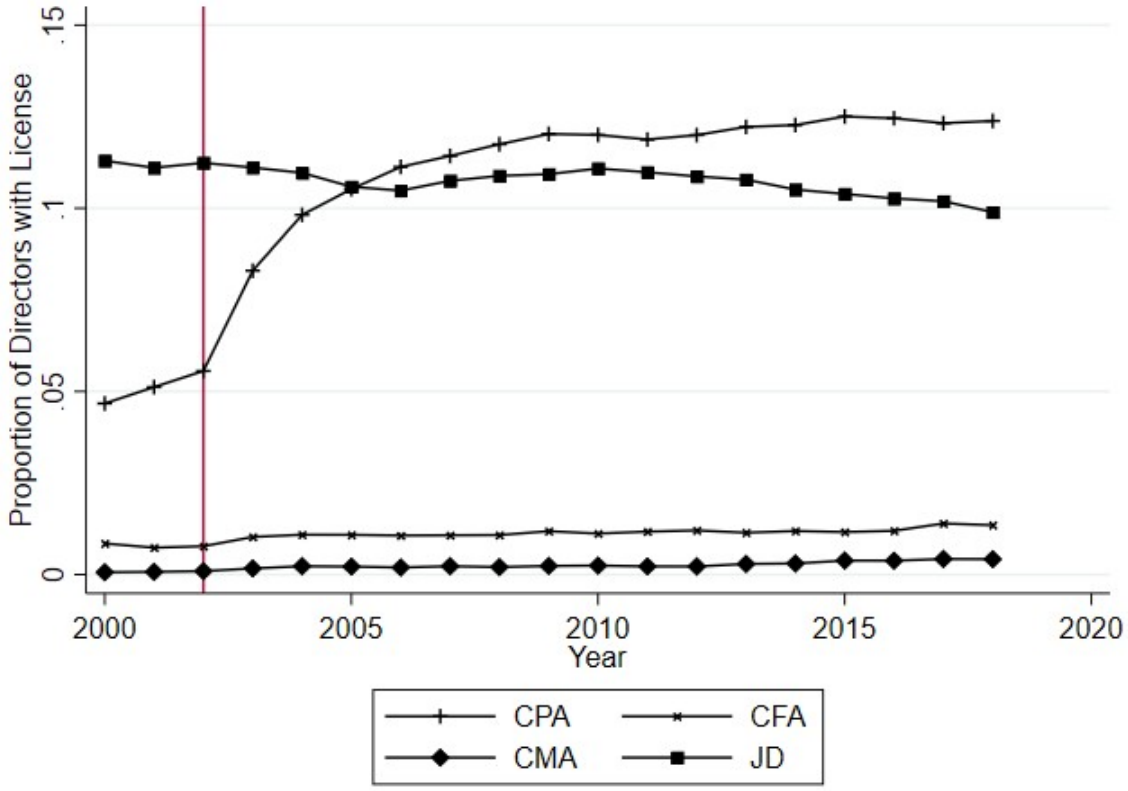
8 Appendix

Table 1: **Descriptive Statistics**

	Observations	Mean	S.D.
Director Characteristics			
CPA	289,913	0.11	0.31
CFA	289,913	0.01	0.11
CMA	289,913	0.003	0.05
JD	289,913	0.11	0.31
Audit	289,913	0.55	0.50
Age	289,311	61.10	9.14
Female	289,913	0.13	0.33
Tenure	289,913	7.24	6.73
Outside Directorships	289,913	0.55	0.85
Firm Characteristics			
Audit Committee Size	44,547	3.45	1.12
ln(Sales)	44,547	6.22	2.32
Tobin's q	44,547	2.11	2.41
Return on Assets	44,547	0.05	0.30
Refiled Financial Statement	44,547	0.08	0.27
Refiled Quarterly Statement	3,388	0.72	0.45
Refiled Annual Statement	3,388	0.18	0.39

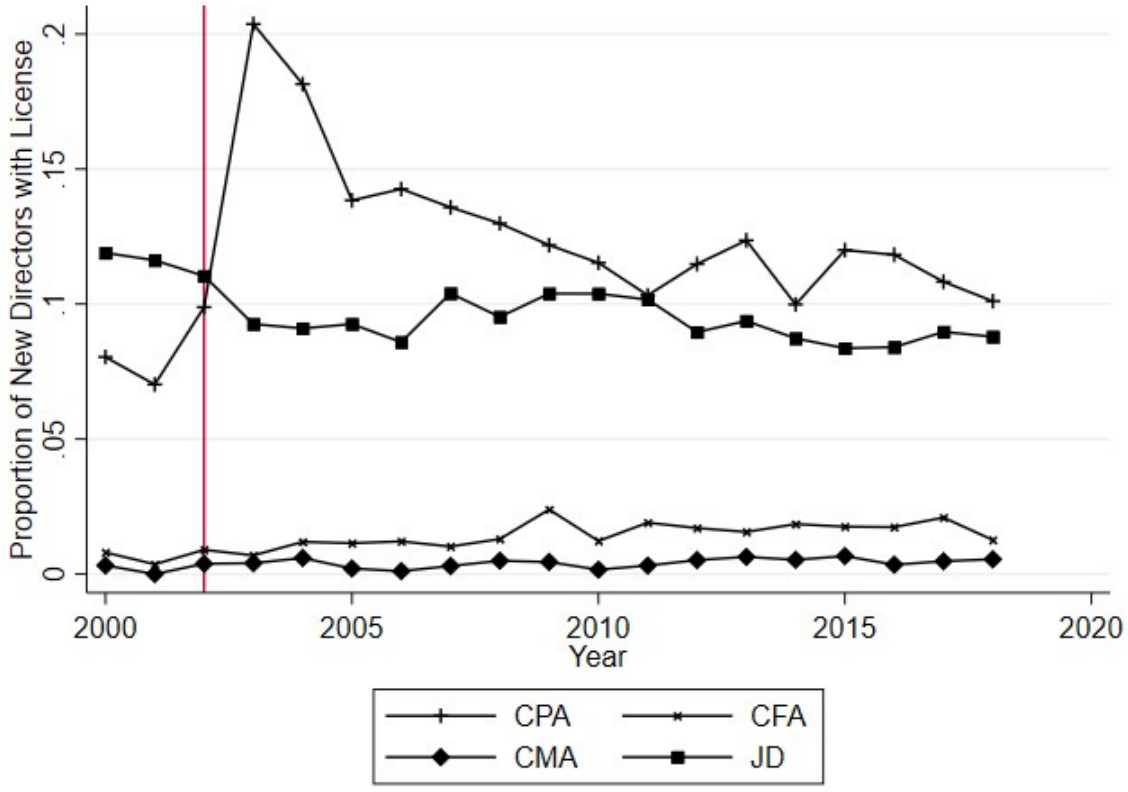
Source: BoardEx, Audit Analytics, Compustat. There are 35,990 unique directors and 5,241 unique firms in the dataset. The data only include independent directors due to restrictions of audit committee members by SOX. *CPA* is an indicator variable equal to one if the director is a certified public accountant. *CFA* is an indicator variable equal to one if the director is a chartered financial analyst. *CMA* is an indicator variable equal to one if the director is a certified management accountant. *JD* is an indicator variable equal to one if the director has a *juris doctorate* or has passed a Bar exam. All four indicator variables are hand-created using BoardEx's qualifications data and are not time-varying. *Audit* is an indicator variable equal to one if the director sits on the audit committee. The variable is hand-created using BoardEx data on committee membership, is time-varying, and may include committees that serve purposes additional to the audit committee. *Age* is the director's age in the year of observation. *Female* is an indicator variable equal to one if the director is a woman. *Tenure* is the length of time the director has served on the board. *Outside Directorships* counts the number of additional boards the director serves on in addition to the focal firm. *Audit Committee Size* is the size of the audit committee for the firm. *ln(Sales)* is the natural log of net sales, recorded in millions of dollars. We calculate *Tobin's q* the same as Adams and Ferreira (2009): $\frac{Book\,Value\,of\,Assets - Shareholder\,Equity + Market\,Value\,of\,Equity}{Book\,Value\,of\,Assets}$. *Return on Assets* are measured as $\frac{Operating\,Income\,Before\,Depreciation}{Total\,Assets}$. *Refiled Financial Statement* is an indicator equal to one if the firm had to subsequently refile a financial statement from a given year. *Refiled Quarterly Statement* is an indicator variable equal to one if the refiled financial statement is a 10-Q. *Refiled Annual Statement* is an indicator variable equal to one if the refiled financial statement is a 10-K. Only firm-years with observable audit committees are included in the director-level and firm-level sample.

Figure 1: **Proportion of Directors with a License**



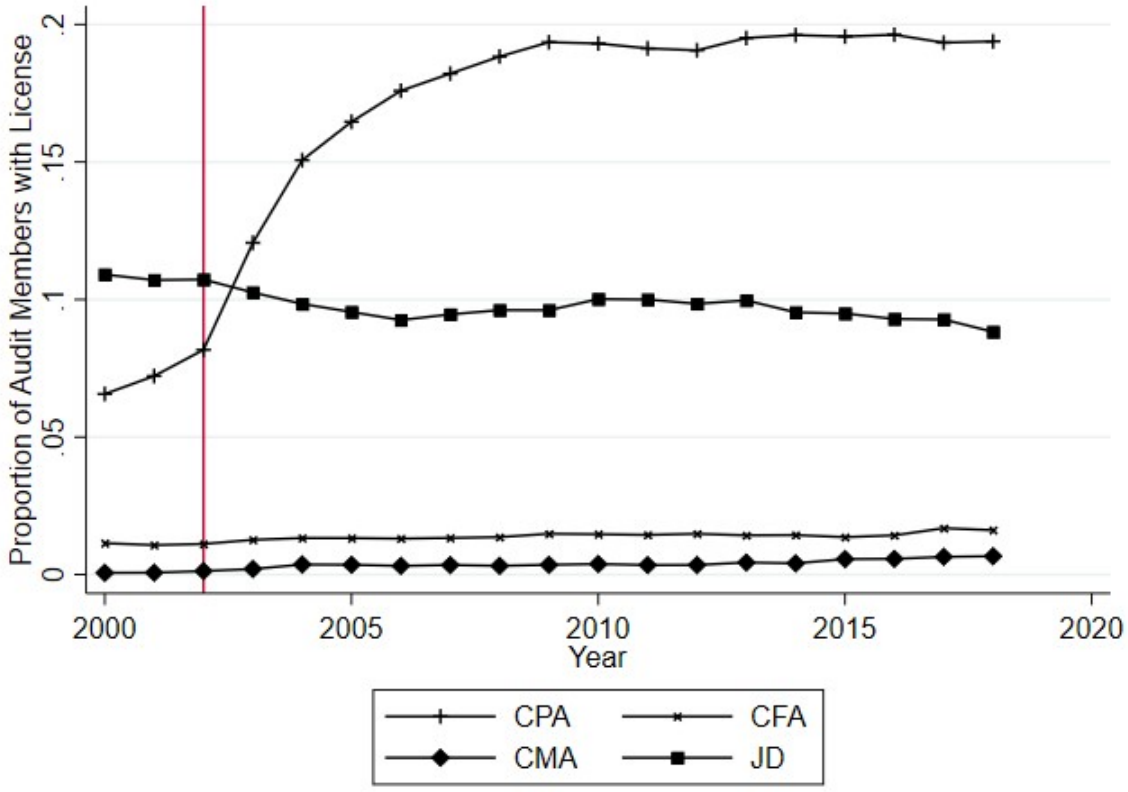
Source: BoardEx, Audit Analytics, Compustat.
All variables are measured as in Table 1. The time-series plot shows the proportion of directors with a given license or certification in the year of observation. The license and certification data are not time-varying so all movements in the proportion are driven by the addition or removal of directors from observed corporate boards. Therefore, the results for the CPA license are particularly strong in the sample and show that firms actively increased the proportion of directors with a CPA license after the passage of SOX by adding CPAs to the board or removing non-CPA directors.

Figure 2: **Proportion of New Directors with a License**



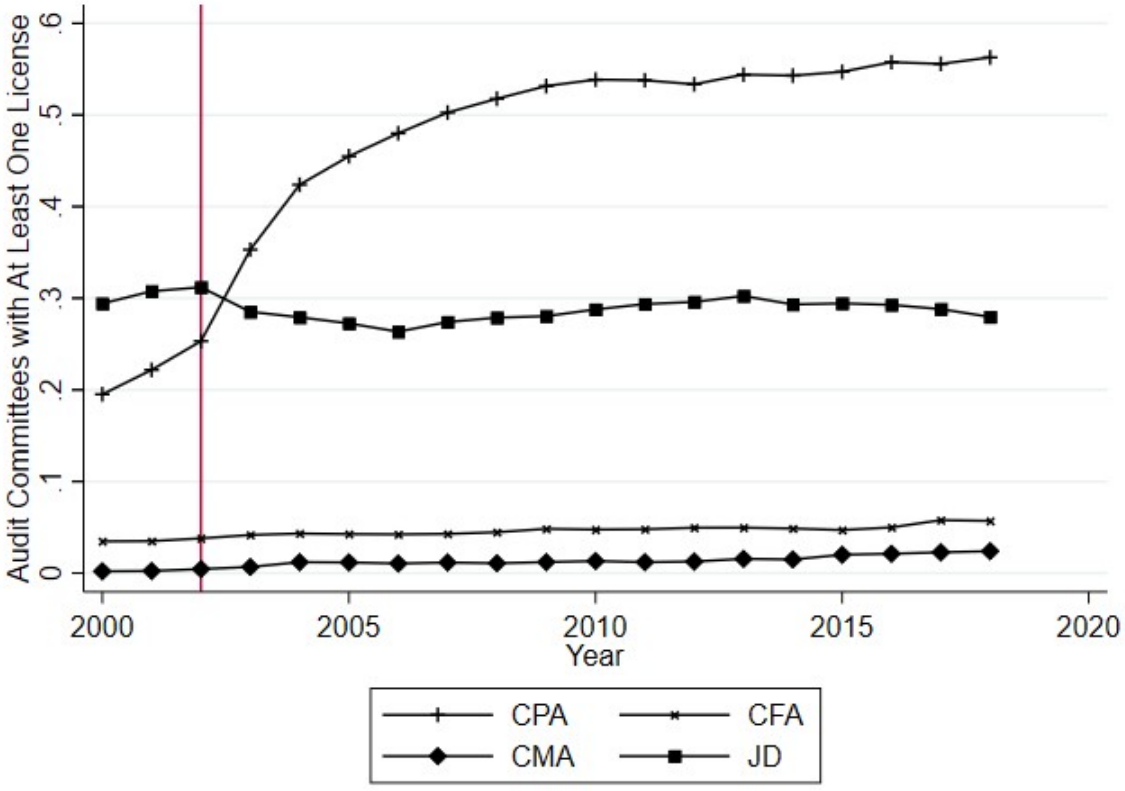
Source: BoardEx, Audit Analytics, Compustat.
All variables are measured as in Table 1. The time-series plot shows the proportion of newly-appointed directors with a given license or certification in the year of observation. Newly-appointed directors are defined as directors with less than one year of tenure. The results show that after the passage of SOX, firms added more CPAs to their boards. The result strongly suggests that firms responded to SOX's requirements by adding CPAs.

Figure 3: **Proportion of Audit Committee Members with a License**



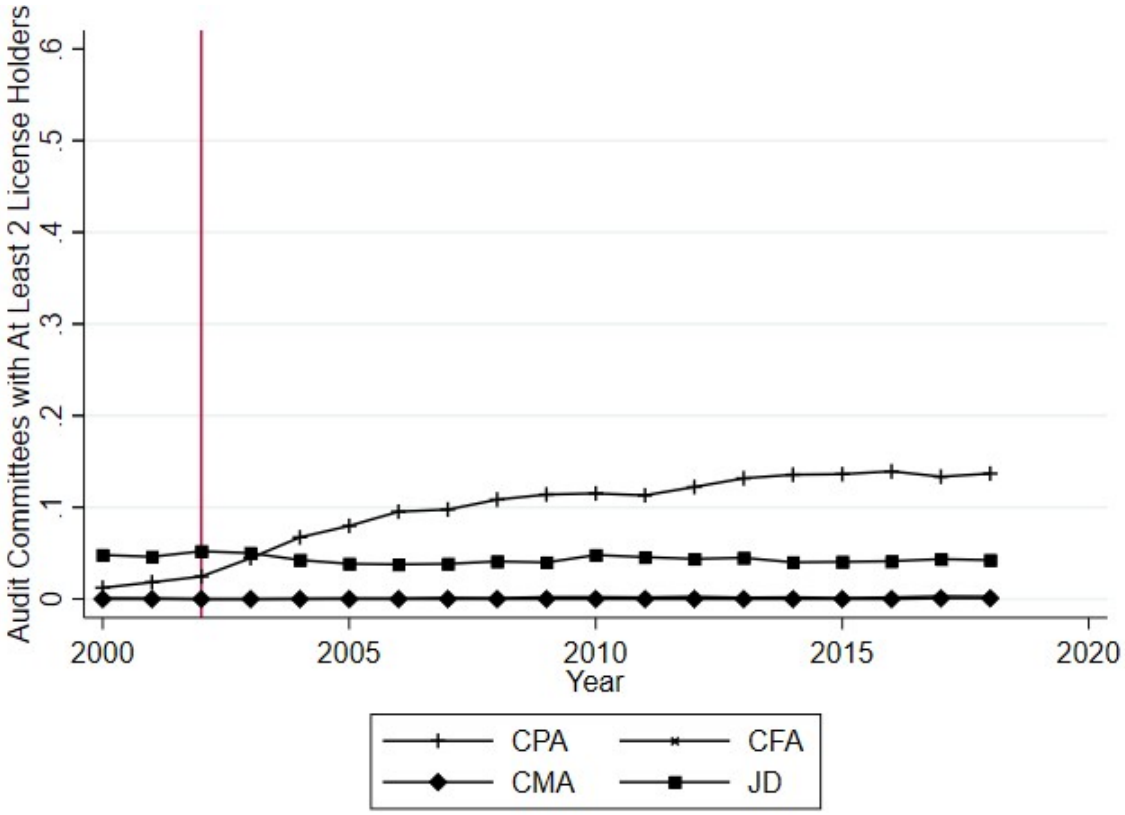
Source: BoardEx, Audit Analytics, Compustat.
All variables are measured as in Table 1. The time-series plot shows the proportion of directors serving on the audit committee with a given license or certification in the year of observation.The license and certification data are not time-varying so all movements in the proportion are driven by the addition or removal of directors from the audit committee. The results show a strong shift in firm preferences to have CPAs serve on the audit committee.

Figure 4: **Proportion of Audit Committees with At Least One License Holder**



Source: BoardEx, Audit Analytics, Compu stat.
All variables are measured as in Table 1. The time-series plot shows the proportion of audit committees with at least one director holding a given license or certification in the year of observation. Therefore, as opposed to Figures 1–3, the figure above uses firm-years as the observations. The license and certification data are not time-varying so all movements in the proportion are driven by the addition or removal of directors from the audit committee. The results show that after the passage of SOX, more firms included CPAs on the audit committee. The result strongly suggests that firms responded to SOX's requirements by placing CPAs on the audit committee.

Figure 5: **Proportion of Audit Committees with At Least Two License Holders**



Source: BoardEx, Audit Analytics, Compu stat.
All variables are measured as in Table 1. The time-series plot shows the proportion of audit committees with at least two director holding a given license or certification in the year of observation. Similar to Figure 4, the observations in the above time-series plot are for firm-years. The license and certification data are not time-varying so all movements in the proportion are driven by the addition or removal of directors from the audit committee. The results show that after the passage of SOX, more firms included at least 2 CPAs on the audit committee, but the increase is not as strong as seen in Figure 4. The result strongly suggests that firms responded to SOX's requirements by placing CPAs on the audit committee.

Table 2: **Probability a Director Serves on the Audit Committee**

	(1)	(2)	(3)	(4)
CPA	0.250***	0.249***	0.228***	0.262***
	(0.020)	(0.019)	(0.019)	(0.019)
CFA	0.230***	0.229***	0.216***	0.216***
	(0.050)	(0.049)	(0.048)	(0.054)
CMA	-0.120	-0.146	-0.129	-0.148
	(0.171)	(0.176)	(0.169)	(0.153)
JD	-0.021	-0.015	-0.014	-0.022
	(0.016)	(0.016)	(0.016)	(0.016)
SOX	-0.010**	-0.017***	-0.050***	-0.037***
	(0.005)	(0.005)	(0.005)	(0.005)
CPA×SOX	0.109***	0.106***	0.108***	0.107***
	(0.019)	(0.019)	(0.019)	(0.019)
CFA×SOX	-0.093*	-0.081	-0.079	-0.075
	(0.051)	(0.051)	(0.049)	(0.055)
CMA×SOX	0.229	0.250	0.244	0.252
	(0.172)	(0.177)	(0.170)	(0.154)
JD×SOX	-0.020	-0.022	-0.021	-0.020
	(0.016)	(0.016)	(0.016)	(0.016)
Age		0.004***	0.004***	0.004***
		(0.000)	(0.000)	(0.000)
Female		-0.011	0.017**	0.013*
		(0.007)	(0.007)	(0.007)
Tenure		-0.005***	-0.005***	-0.006***
		(0.000)	(0.000)	(0.000)
Outside Directorships		-0.017***	-0.006***	-0.003
		(0.002)	(0.002)	(0.003)
ln(Sales)			0.006***	-0.005***
			(0.001)	(0.002)
Tobin's q			0.000	0.002***
			(0.001)	(0.000)
ROA			0.013**	0.017***
			(0.006)	(0.004)
Board Size			-0.039***	-0.032***
			(0.001)	(0.001)
Constant	0.525***	0.362***	0.663***	0.685***
	(0.005)	(0.017)	(0.017)	(0.021)
Firm Fixed Effects?	No	No	No	Yes
Observations	289,913	289,311	289,258	289,258
Number of Firms				5,238
R-squared	0.053	0.059	0.087	0.066

Source: BoardEx, Audit Analytics, Compustat
All variables are defined as in Table 1. The dependent variable is an indicator variable equal to one if the director serves on the audit committee. *CPA* is an indicator equal to one if the director has a CPA license. *CFA* is an indicator equal to one if the director has a CFA charter. *CMA* is an indicator equal to one if the director has a CMA certification. *JD* is an indicator equal to one if the director is an attorney. *SOX* is an indicator variable equal to one if the year is 2003 or later. $CPA \times SOX$, $CFA \times SOX$, $CMA \times SOX$, and $JD \times SOX$ are the interactions between the relevant license variable and *SOX*. The interaction terms are the variables of interest. The control group is composed of directors without at least one of the four licenses or certifications we are interested in. All standard errors are corrected for heteroskedasticity and clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1

Table 3: **Cox Hazard Model for Leaving the Board**

	(1)	(2)	(3)
CPA	0.036	0.017	0.066
	(0.110)	(0.110)	(0.110)
	[1.037]	[1.017]	[1.068]
CFA	0.113	0.110	0.129
	(0.244)	(0.244)	(0.244)
	[1.119]	[1.116]	[1.138]
CMA	0.385	0.402	0.319
	(1.005)	(1.005)	(1.005)
	[1.469]	[1.494]	[1.376]
JD	-0.073	-0.078	-0.081
	(0.075)	(0.075)	(0.075)
	[0.930]	[0.925]	[0.922]
SOX	0.801***	0.799***	0.853***
	(0.026)	(0.026)	(0.026)
	[2.228]	[2.223]	[2.347]
CPA×SOX	-0.267**	-0.248**	-0.264**
	(0.113)	(0.113)	(0.113)
	[0.766]	[0.780]	[0.768]
CFA×SOX	-0.022	-0.028	-0.029
	(0.252)	(0.252)	(0.252)
	[0.978]	[0.972]	[0.971]
CMA×SOX	-0.292	-0.296	-0.215
	(1.015)	(1.015)	(1.015)
	[0.746]	[0.744]	[0.806]
JD×SOX	-0.057	-0.054	-0.053
	(0.079)	(0.079)	(0.079)
	[0.944]	[0.948]	[0.948]
Female		-0.097***	-0.136***
		(0.023)	(0.024)
Age		-0.003***	-0.004***
		(0.001)	(0.001)
Outside Directorships		-0.004	-0.019**
		(0.008)	(0.008)
Board Size			0.066***
			(0.003)
ln(Sales)			-0.014***
			(0.004)
Tobin's q			-0.015***
			(0.004)
ROA			-0.223***
			(0.015)
Observations	285,917	285,323	285,272
χ^2 Statistic	1,426.00***	1,436.99***	2006.84***

Source: BoardEx, Audit Analytics, Compustat
All variables are defined as in Table 1. Hazard ratios for select variables are presented in brackets. $CPA \times SOX$, $CFA \times SOX$, $CMA \times SOX$, and $JD \times SOX$ are the interaction between the relevant license variables and SOX. The interaction terms are the variables of interest. A director is considered to have exited the board when they are observed serving on the board for the last time in year t and the firm is observed at least once after year t. Due to the definition of exit, there are no exits defined during the year 2018, which is the last year of observation in the sample. *** p<0.01, ** p<0.05, * p<0.1

Table 4: **Probability of a Refiled Financial Statement**

	Any Restatement		Quarterly Restatement		Annual Restatement	
Proportion CPA	-0.000	0.000	0.005	0.007	-0.002	-0.007
	(0.006)	(0.012)	(0.005)	(0.010)	(0.002)	(0.005)
Proportion CFA	-0.047***	-0.015	-0.033**	0.006	-0.012	-0.016
	(0.017)	(0.027)	(0.015)	(0.020)	(0.007)	(0.010)
Proportion CMA	-0.040	0.048	-0.028	0.021	-0.013	-0.000
	(0.047)	(0.074)	(0.034)	(0.060)	(0.015)	(0.019)
Proportion JD	0.015*	0.013	0.009	0.007	0.002	-0.003
	(0.008)	(0.015)	(0.007)	(0.012)	(0.003)	(0.006)
Average Age	-0.000	-0.001*	-0.000	-0.001*	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Proportion Female	-0.017**	-0.010	-0.012*	-0.012	-0.006	-0.004
	(0.008)	(0.012)	(0.007)	(0.010)	(0.004)	(0.005)
Average Tenure	-0.002***	0.000	-0.001***	0.000	-0.000	-0.000
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)
Committee Size	0.001	0.003	0.001	0.003	0.000	-0.000
	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)
Board Size	-0.003***	-0.002	-0.002***	-0.001	-0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)
ln(Sales)	0.003***	0.008***	0.002***	0.005**	0.001***	0.004***
	(0.001)	(0.003)	(0.001)	(0.002)	(0.000)	(0.001)
Tobin's q	-0.004***	-0.002***	-0.002***	-0.001***	-0.001***	-0.000**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
ROA	-0.021***	-0.014*	-0.012***	-0.010	-0.004**	-0.006**
	(0.005)	(0.008)	(0.004)	(0.007)	(0.002)	(0.002)
Constant	0.107***	0.067**	0.062***	0.053*	0.007	-0.005
	(0.018)	(0.033)	(0.015)	(0.029)	(0.006)	(0.014)
Year Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects?	No	Yes	No	Yes	No	Yes
Observations	44,527	44,527	44,527	44,527	44,527	44,527
R-squared	0.011	0.008	0.008	0.007	0.002	0.001

Source: BoardEx, Audit Analytics, Compustat
Total number of firms is 5,236. All variables are defined as in Table 1. *Any Restatement* is an indicator variable equal to one if the firm refiles a financial statement from year *t*. *Quarterly Restatement* is an indicator variable equal to one if the restatement is from a 10-Q. *Annual Restatement* is an indicator variable equal to one if the restatement is from a 10-K. *Average Age, Proportion Female,* and *Average Tenure* are based on directors serving on the audit committee. All specifications include year fixed effects and the standard errors are clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1

Table 5: **Probability of a Refiled Financial Statement by Firm Size**

	All Firms	Small Firms	Medium Firms	Large Firms
Proportion CPA	0.000	-0.018	0.010	-0.001
	(0.012)	(0.021)	(0.021)	(0.020)
Proportion CFA	-0.015	-0.042	-0.020	0.003
	(0.027)	(0.042)	(0.042)	(0.056)
Proportion CMA	0.048	0.226	-0.055	0.075
	(0.074)	(0.173)	(0.097)	(0.119)
Proportion JD	0.013	0.039	0.019	-0.008
	(0.015)	(0.029)	(0.027)	(0.022)
Average Age	-0.001*	-0.001	-0.001	-0.001
	(0.000)	(0.001)	(0.001)	(0.001)
Proportion Female	-0.010	0.031	0.008	-0.033*
	(0.012)	(0.026)	(0.022)	(0.017)
Average Tenure	0.000	0.000	0.002	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Committee Size	0.003	0.007	0.004	0.001
	(0.002)	(0.005)	(0.004)	(0.003)
Board Size	-0.002	-0.002	-0.004	-0.001
	(0.001)	(0.003)	(0.003)	(0.002)
ln(Sales)	0.008***	0.002	0.019***	0.009*
	(0.003)	(0.004)	(0.005)	(0.005)
Tobin's q	-0.002***	-0.001	-0.003	-0.005*
	(0.001)	(0.001)	(0.002)	(0.003)
ROA	-0.014*	0.013*	-0.054**	-0.169***
	(0.008)	(0.008)	(0.024)	(0.042)
Constant	0.067**	0.121*	-0.001	0.112*
	(0.033)	(0.071)	(0.060)	(0.066)
Year Fixed Effects?	Yes	Yes	Yes	Yes
Firm Fixed Effects?	Yes	Yes	Yes	Yes
Observations	44,527	11,487	14,667	18,373
Number of Firms	5,236	1,727	1,781	1,728
R-squared	0.008	0.009	0.010	0.013

Source: BoardEx, Audit Analytics, Compustat
All variables are defined as in Table 1. We define firms as small, medium, or large based on their average amount of total assets across the sample period. First, we take the average amount of total assets for each firm in the sample. Second, we generate the 33rd percentile and 67th percentile of the distribution of the average amount of total assets. Third, we label small, medium, and large firms as those whose average falls in the first, second, or third tercile of the distribution. The process generates a time-invariant measure of firm size. *Average Age*, *Proportion Female*, and *Average Tenure* are based on directors serving on the audit committee. All specifications include year fixed effects and the standard errors are clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1

Table 6: **Balancing Tests for the Proportion of Licenses on the Audit Committee**

	Percent of audit committee members who have a:							
	CPA		CFA		CMA		JD	
Average Age	-0.000	-0.001	-0.001***	-0.001***	-0.000	-0.000	0.000	0.000
	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Proportion Female	-0.013	0.026*	0.000	-0.005	0.004*	-0.001	-0.004	0.025*
	(0.018)	(0.015)	(0.005)	(0.005)	(0.002)	(0.002)	(0.013)	(0.014)
Average Tenure	-0.003***	-0.004***	0.001**	0.000	-0.000***	-0.000	0.002***	0.001**
	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
Committee Size	-0.030***	-0.020***	0.000	-0.000	0.000	0.000	-0.001	0.002
	(0.003)	(0.002)	(0.001)	(0.001)	(0.000)	(0.000)	(0.002)	(0.001)
Board Size	0.001	0.007***	-0.000	0.000	0.000	0.000	-0.001	-0.001
	(0.002)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
ln(Sales)	0.000	0.000	-0.001**	-0.000	0.000	-0.000	0.001	0.000
	(0.002)	(0.002)	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(0.002)
Tobin's q	-0.002*	-0.000	-0.000	0.000	-0.000	0.000	0.000	0.001**
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
ROA	0.039***	-0.001	0.006**	0.001	0.000	-0.000	-0.012*	-0.008*
	(0.009)	(0.004)	(0.002)	(0.002)	(0.001)	(0.001)	(0.007)	(0.005)
Constant	0.222***	0.180***	0.061***	0.067***	0.003	0.005	0.096***	0.096***
	(0.034)	(0.037)	(0.012)	(0.015)	(0.004)	(0.004)	(0.027)	(0.029)
Year Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects?	No	Yes	No	Yes	No	Yes	No	Yes
Observations	44,527	44,527	44,527	44,527	44,527	44,527	44,527	44,527
Number of Firms		5,236		5,236		5,236		5,236
R-squared	0.039	0.060	0.005	0.006	0.003	0.005	0.004	0.005

Source: BoardEx, Audit Analytics, Compustat
All variables are defined as in Table 1. The dependent variable is the proportion of the audit committee that holds a particular license. *Average Age, Proportion Female,* and *Average Tenure* are based on directors serving on the audit committee. All specifications include year fixed effects and cluster the standard errors at the firm level. *** p<0.01, ** p<0.05, * p<0.1

Table 7: **License Proportion on the Audit Committee One Year After Restatement**

	Percent of audit committee members at $t+1$ who have a:							
	CPA		CFA		CMA		JD	
Refiled Financial Statement$_t$	0.002	0.002	-0.003**	-0.000	-0.001	0.000	0.008**	0.004
	(0.005)	(0.003)	(0.001)	(0.001)	(0.001)	(0.000)	(0.004)	(0.002)
Average Age	-0.000	-0.001**	-0.001***	-0.001**	-0.000	-0.000	0.000	0.000
	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Proportion Female	-0.021	0.014	-0.000	-0.003	0.005**	-0.001	-0.004	0.023*
	(0.020)	(0.015)	(0.005)	(0.004)	(0.003)	(0.002)	(0.014)	(0.013)
Average Tenure	-0.003***	-0.002***	0.001**	0.000	-0.000***	-0.000	0.002***	0.001
	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
Committee Size	-0.025***	-0.006***	0.000	0.000	0.000	0.001*	-0.001	-0.000
	(0.003)	(0.002)	(0.001)	(0.001)	(0.000)	(0.000)	(0.002)	(0.001)
Board Size	-0.000	0.004***	-0.000	0.000	0.000	-0.000	-0.001	-0.001
	(0.002)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
ln(Sales)	-0.000	0.001	-0.001**	-0.000	0.000	-0.001*	0.001	-0.002
	(0.002)	(0.002)	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(0.002)
Tobin's q	-0.002	-0.000	-0.000	-0.000	-0.000	0.000**	-0.001	0.000
	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
ROA	0.046***	-0.004	0.005*	-0.000	0.001	0.002**	-0.014	-0.004
	(0.012)	(0.005)	(0.003)	(0.002)	(0.001)	(0.001)	(0.009)	(0.005)
Constant	0.254***	0.196***	0.053***	0.041***	0.002	0.005	0.092***	0.101***
	(0.036)	(0.036)	(0.012)	(0.014)	(0.004)	(0.004)	(0.029)	(0.027)
Year Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects?	No	Yes	No	Yes	No	Yes	No	Yes
Observations	38,219	38,219	38,219	38,219	38,219	38,219	38,219	38,219
R-squared	0.029	0.031	0.004	0.003	0.003	0.005	0.004	0.003

Source: BoardEx, Audit Analytics, Compustat
Number of firms is 4,879. All variables are defined as in Table 1. The dependent variable is the proportion of the audit committee that holds a specific credential one year after year t. *Refiled Financial Statement* is an indicator variable equal to one if the firm refiles a financial statement from year t. *Average Age*, *Proportion Female*, and *Average Tenure* are based on directors serving on the audit committee. All control variables are based on year t. All specifications include year fixed effects and cluster the standard errors at the firm level. *** p<0.01, ** p<0.05, * p<0.1

Table 8: **License Proportion on the Audit Committee Two Years After Restatement**

	Percent of audit committee members at $t+2$ who have a:							
	CPA		CFA		CMA		JD	
Refiled Financial Statement$_t$	0.005	0.002	-0.003**	-0.000	-0.000	0.000	0.007*	0.003
	(0.005)	(0.003)	(0.001)	(0.001)	(0.001)	(0.000)	(0.004)	(0.002)
Average Age	-0.000	-0.001*	-0.000**	-0.000	0.000	0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Proportion Female	-0.023	0.008	0.002	-0.001	0.006**	-0.002	-0.009	0.009
	(0.021)	(0.014)	(0.006)	(0.004)	(0.003)	(0.002)	(0.014)	(0.012)
Average Tenure	-0.002***	-0.001*	0.001**	0.000	-0.000***	-0.000	0.002***	0.001*
	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
Committee Size	-0.024***	-0.003	0.001	0.000	0.000	0.001**	-0.000	0.000
	(0.003)	(0.002)	(0.001)	(0.000)	(0.000)	(0.000)	(0.002)	(0.001)
Board Size	-0.000	0.003**	-0.000	0.000	-0.000	-0.000	-0.000	-0.001
	(0.002)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
ln(Sales)	-0.000	0.000	-0.001**	0.000	0.000	-0.000	0.001	-0.002
	(0.002)	(0.003)	(0.001)	(0.001)	(0.000)	(0.000)	(0.002)	(0.002)
Tobin's q	-0.002	0.000	-0.000	-0.000	-0.000	0.000	-0.001	0.001
	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
ROA	0.046***	0.002	0.005	-0.002	-0.000	0.000	-0.012	-0.003
	(0.013)	(0.005)	(0.003)	(0.002)	(0.001)	(0.001)	(0.010)	(0.006)
Constant	0.272***	0.197***	0.045***	0.021	0.001	0.003	0.090***	0.131***
	(0.038)	(0.037)	(0.012)	(0.013)	(0.004)	(0.004)	(0.031)	(0.028)
Year Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects?	No	Yes	No	Yes	No	Yes	No	Yes
Observations	32,613	32,613	32,613	32,613	32,613	32,613	32,613	32,613
R-squared	0.025	0.017	0.004	0.001	0.003	0.005	0.004	0.003

Source: BoardEx, Audit Analytics, Compustat
Number of firms is 4,404. All variables are defined as in Table 1. The dependent variable is the proportion of the audit committee that holds a specific credential two years after year t. *Refiled Financial Statement* is an indicator variable equal to one if the firm refiles a financial statement from year t. *Average Age*, *Proportion Female*, and *Average Tenure* are based on directors serving on the audit committee. All control variables are based on year t. All specifications include year fixed effects and cluster the standard errors at the firm level. *** p<0.01, ** p<0.05, * p<0.1

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