

The 150-Hour Requirement and State Wage Levels
as Determinants of Audit Fees

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SUMMARY: At the very time during which there was an extraordinary increase in the demand for audit services, many states implemented the 150-hour education requirement, potentially leading to reductions in the supply of new CPAs. The convergence of an increase in demand and a decrease in supply is expected to increase the cost of audit labor and audit fees. This study tests whether the adoption of the 150-hour requirement results in increased audit fees. We find that corporations pay, on average, 3% more in audit fees in states that have implemented the requirement than those in states that have not, that audit fees increase as time passes after implementation, and that corporations pay, on average, 4.7% more in audit fees after their state has implemented the requirement than they did before. Additionally, we provide evidence that corporations headquartered in states with higher general wage levels pay higher audit fees.

Key words: Audit fees, wage levels, 150-hour requirement.

Data Availability: The data used in this study are publicly available from the sources identified in the text.

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I. INTRODUCTION

The spectacular financial scandals at the beginning of the new millennium resulted in the widespread perception that financial reporting and audit quality were deficient and significant regulatory action was required to improve financial reporting and the quality of audits. The resulting regulatory actions included the Sarbanes-Oxley Act (U.S. House of Representatives 2002) and the creation of the Public Company Accounting Oversight Board (PCAOB). These new regulations required additional financial disclosures, greater auditor independence, enhanced penalties for rule violations, and external auditor certification of internal controls, adding significant costs to companies including rapidly increasing audit fees over the time period 2000-2004.¹ Criticism of these regulatory changes has focused largely on the financial burden they place on companies relative to the benefits received by investors.

Coinciding with these regulatory changes, twenty-five states implemented the 150-hour education requirement (the 150-hour requirement).² This requirement was intended to increase the quality of new entrants to the profession, and therefore, increase the quality of audits. If the 150-hour requirement achieved its goals, the recent implementations of this requirement were very timely as they coincided with the perceived need to increase the quality of audits. However, because the 150-hour requirement imposes additional costs on students, it potentially reduces the supply of new entrants to the profession at the very time in which there has been an extraordinary increase in the demand for audit services. The convergence of an increase in demand and a decrease in supply of new professionals can reasonably be expected to increase the cost of audit labor. Because auditors are expected to pass labor costs on to clients, the 150-hour

requirement may have significantly increased the financial burden to audit clients over the time period of our study (2000-2004).

Employing cross-sectional and time-series cross-sectional regression models to control for client characteristics, macro-economic variables, and non-supply-related elements of public accounting firms' production functions, including audit quality, we examine if audit fees are positively associated with the adoption of the 150-hour requirement. We find that (1) corporations headquartered in states that have implemented the 150-hour requirement pay an estimated 3% more in audit fees on average than corporations in states that have not implemented the requirement, (2) audit fees continue to increase as time passes after implementation of the 150-hour requirement, even after controlling for other factors that affect fees (including the time period), (3) after controlling for the general increase in audit fees and changes in other factors that affect fees (e.g., firm size), audit fees are an estimated 4.7% higher, on average, for a firm in a state that has implemented the 150-hour requirement compared to the same firm's fees before implementation, and (4) corporations headquartered in states with higher general wage levels pay higher audit fees.

Our results are consistent with higher labor costs associated with a growing shortage of potential audit staff that starts with the implementation of the 150-hour requirement. This evidence provides information useful in the on-going debate about the effects of the requirement. It also contributes to the extant literature on audit fee pricing by providing some evidence as to how audit fees adjust to changes in the supply of audit firm staff, and by demonstrating an association between audit fees and a variable previously unexamined, the general level of wages.³

The paper is organized as follows. The next section discusses the expected costs and benefits of the 150-hour requirement as well as the regulatory implications. The third section develops the hypotheses related to the effect of the 150-hour requirement and state wage levels on audit fees. The fourth and fifth sections contain the methodology and results, respectively. The final section provides the conclusions and limitations of the study.

II. THE 150-HOUR DEBATE

The AICPA's long-term advocacy for additional education culminated in a 1988 vote by the general membership of the AICPA to affirm the requirement of 150 hours of education for all new members after the year 2000. As of March 2007 only seven states have not adopted a 150-hour requirement to sit for the CPA examination or to obtain licensure (California, Colorado, Delaware, New Hampshire, Pennsylvania, Vermont, Virgin Islands), but these seven states account for 19% of the U.S. population. The costs and benefits of the 150-hour requirement to the profession continue to be debated, and state boards of accountancy continue to make revisions to their 150-hour requirements.

There are several indications of the lack of consensus on whether the benefits outweigh the costs. First, not all states have chosen to adopt the requirement. For those states that have implemented 150-hour requirements, terms frequently differ. Some states require completion of 150 hours before a candidate may sit for the CPA examination, others require 150 hours only for licensure. The number and type of accounting and business courses required as part of the 150 hours, and whether or not a Master's degree is required also differs from state to state.

Finally, there have been many recent changes to existing 150-hour requirements and state boards of accountancy continue to consider adoption, revisions, or rescissions. Some states have changed the type and number of accounting and business courses required, while others have

changed whether 150-hour requirement is required to sit for the exam or whether it is only required for licensure (e.g., Hawaii in 2002, South Carolina in 2004, Kentucky in 2006, and Massachusetts in 2007). Colorado originally adopted a 150-hour requirement but repealed the requirement before the rule took effect.⁴ Based on the actions of state boards of accountancy in choosing whether or not to initially implement 150-hour requirements, the terms of how the requirements are implemented, and recent changes to existing requirements, the perceived value of the 150-hour requirement appears to differ from state to state and appears to have changed within states over time.

State boards of accountancy suffer from a lack of practical empirical evidence as they consider the effects of the requirement.⁵ Empirical examination of the effect of the 150-hour requirement on the supply of public accountants is especially important given recent regulatory changes that have caused a sharp increase in the demand for public accountants. Recent anecdotal and empirical evidence suggests that the required internal control attestation has led to significant increases in audit billable hours and audit fees since the Sarbanes-Oxley Act was passed. State boards of accountancy might be more likely to allow alternative paths to certification if the 150-hour requirement is shown to have an impact on audit fees without a corresponding increase in audit quality.

III. HYPOTHESIS DEVELOPMENT

A stated objective of the 150-hour requirement is to improve audits by producing more competent audit staff. That is, the AICPA (AICPA 2003) expects *audit quality* to be impacted by increases in *auditor quality*. If auditor quality increases the efficiency of audits, then the 150-hour requirement has the potential for reducing the cost of performing audits. However, if the 150-hour requirement reduces the supply of new entrants to the profession, then it could

reasonably be expected to raise the cost of performing audits, and therefore, cause increases in audit fees. The AICPA does not specifically address how imposing an additional education requirement might cause changes in the *quantity* of available competent audit staff.

The extant literature suggests that barriers to entry as a result of regulation lead to reductions in the supply of the regulated service and corresponding higher prices (Stigler 1975; Peltzman et al. 1989; Lee et al. 1999). Maurizi (1974) provides a model of the effect of occupation licensing restrictions on the supply and prices of licensed professionals. The model predicts that such restrictions decrease supply and increase price. Maurizi (1974) examines occupational restrictions in eighteen professions and finds reductions in the numbers of licensed professionals in eight of these professions including accounting. Lee et al. (1999) develop an analytical model predicting an increase in audit fees from the barriers to entry associated with the 150-hour requirement.

The AICPA's stated motivation for advocating additional educational requirements is to improve the quality of audits. While we do not believe that these advocates are disingenuous, several studies have found evidence that the motivation for passing the requirement is also consistent with professional protectionism by the public accounting profession. Consistent with the Lee et al. (1999) prediction that existing CPAs benefit from the 150-hour requirement and, therefore, lobby to support adoption, Roberts and Kurtenbach (1998) and Sanders (1999) provide evidence that the adoption of the 150-hour requirement is influenced by the lobbying strength of CPAs in the state. In addition, Young (1988) finds that for states that graded their own exams, pass rates go down during economic downturns. Colbert and Murray (2003) use a case study approach to examine Colorado's rescission of its 150-hour requirement. They find the lobbying

positions of CPAs to generally be in their own best interests, and that CPAs are successful in influencing the first level of regulators, state boards of accountancy.

If the 150-hour requirement is motivated by professional protectionism, advocates would appear to have had some success. Prior research has found that the 150-hour requirement is associated with a 36% reduction in the number of candidates taking the CPA examination and a 31.5% reduction in the number of candidates passing (Allen and Woodland 2006). In addition, this reduction in the number of candidates passing increases monotonically in each of the three years following implementation of the 150-hour requirement. Because the number of candidates passing the CPA exam is a proxy for the entering supply of public accounting firm staff, we expect labor costs to rise as the 150-hour requirement restricts new entrants to the profession, and we expect the effect of the requirement to grow over time. If public accounting firms are unable to combat supply shortages through changes in audit strategy or methodology, the effects of attrition through natural factors such as retirements or changes of profession will compound over time.

Audit fees are determined based on client characteristics, macro-economic variables, and public accounting firms' production functions, including the cost of CPA-qualified audit personnel.⁶ Restrictions in the supply of new entrants to the profession can reasonably be expected to lead to increased labor costs, and therefore, to increases in audit fees. Consistent with prior theoretical and empirical research which finds that restrictions to entry into a profession increases the cost of services, we expect that the effect of the 150-hour requirement to increase audit fees.

However, if the 150-hour requirement yields better prepared, i.e. *higher quality*, CPAs, it is possible that observed increases in audit fees could be due to increased quality of audits, not to

a shrinking supply of potential audit staff. Empirical evidence has found little evidence of an increase in audit quality associated with additional educational requirements. Clikeman et al. (2001) find no increase in new accountants' professional commitment, ethical orientation, and professionalism after the 150-hour requirement. Read et al. (2001) finds an increase in pass rates for first-time candidates in 150-hour states (for the time period 1996-1998), but Grant et al. (2002) find that scholastic aptitude⁷ accounts for the majority of pass rate differences during that same time period. Allen and Woodland (2006) find only a small increase (about 3%) in pass rates after implementation of the 150-hour requirement over the time period 1991-2002. We attempt to control for the potential effects of audit quality in our research design. We investigate three hypotheses regarding the 150-hour requirement and audit fees as follows:

H1: After controlling for other audit fee determinants, audit fees are higher in states that have implemented the 150-hour requirement than in states that have not implemented the requirement.

H2: After controlling for other audit fee determinants, the length of time after implementation of the 150-hour requirement is positively associated with audit fees.

H3: After controlling for other audit fee determinants and firm-level effects, audit fees increase more rapidly after implementation of the 150-hour requirement.

Prior research has investigated numerous determinants of audit fees. These determinants primarily measure the size, risk, and complexity of clients, but also the number of hours audited (e.g., Bell et al. 2001), the mix of labor (e.g., O'Keefe et al. 1994), and the level of audit quality in audits. However, to our knowledge, no study has examined one fundamental determinant of fees, the price of labor. The price of labor is known to vary geographically. Although some audit activity for a given client may take place in numerous locations, most of the labor performed in

an audit takes place at the client's headquarters (e.g., Francis et al. 2005). Therefore, the price of labor at the client's headquarters is expected to influence audit fees. We use a general level of wages in the state of the client's headquarters to proxy for the price of audit labor because it is readily available and because it is a reasonable proxy for the price of auditor labor when artificial restrictions on the supply of audit labor are similar across states. We offer the following additional hypothesis:

H4: After controlling for other audit fee determinants, the level of state wages is positively associated with audit fees.

It is not known whether external auditors compete for labor at the local, state, regional, or national level. We focus on wages at the state level because it is believed that auditors compete for labor over a larger area than the local office (e.g., Jensen and Payne 2003). If auditors compete over regions larger than states, then our measure of state wages will be measured with error. If auditors for labor compete for labor at the national level, then we expect no relationship between the level of state wages and audit fees. Our tests of hypothesis four, therefore, are joint tests of whether labor costs at the client's headquarters affect fees and whether states are the approximate geographic level at which external auditors compete for labor.

IV. METHODOLOGY

We employ cross-sectional and time-series cross-sectional regression analyses to examine if audit fees are positively associated with the implementation of the 150-hour requirement and with state wage levels. We also examine if the effects of the 150-hour requirement are increasing over time. In our cross-sectional models, we control for client characteristics, macro-economic variables, audit quality, and non-supply-related elements of public accounting firms' production functions. Our time-series cross-sectional models also

control for other unspecified characteristics unique to each firm and the local environment in which the firm operates.

For the years 2000-2004, we obtain fees for audit services, restatements, delayed filings, and the location of the auditor offices from Audit Analytics. Other company data are obtained from the COMPUSTAT Annual Industrial database. Data on wages for each state/year was obtained from the U.S. Department of Labor's Bureau of Labor Statistics. We restrict the sample to firms in which the location of the auditor's office, as disclosed in the audit report, is consistent with the client's business location. We also exclude financial institutions and observations with going-concern opinions. Finally, we include only firms with at least two years of data because this is required to estimate the fixed-effects model. All other observations with complete data are used. Variables are winsorized at the upper and lower 1% level. To control for factors influencing fees other than the 150-hour requirement, we rely heavily on the findings of prior audit fees research.⁸ Our models follow:

$$\begin{aligned} \text{LN(AFEES)} = & \alpha + \beta_0\text{LN(ASSETS)} + \beta_1\text{BIGX} + \beta_2\text{EBIT} + \beta_3\text{DACCR} + \beta_4\text{RECV} \\ & + \beta_5\text{INVT} + \beta_6\text{FOREIGN} + \beta_7\text{SEGS} + \beta_8\text{QUICK} \\ & + \beta_9\text{CATA} + \beta_{10}\text{LEV} + \beta_{11}\text{LOSS} + \beta_{12}\text{OPINION} \\ & + \beta_{13}\text{RESTATE} + \beta_{14}\text{LATE} + \beta_{15}\text{Y2001} + \beta_{16}\text{Y2002} + \beta_{17}\text{Y2003} \\ & + \beta_{18}\text{Y2004} + \beta_{19}\text{LN(WAGES)} + \beta_{20}\text{AFTER150} + \text{Industry Fixed Effects} + \varepsilon \quad (1) \end{aligned}$$

$$\begin{aligned} \text{LN(AFEES)} = & \alpha + \beta_0\text{LN(ASSETS)} + \beta_1\text{BIGX} + \beta_2\text{EBIT} + \beta_3\text{DACCR} + \beta_4\text{RECV} \\ & + \beta_5\text{INVT} + \beta_6\text{FOREIGN} + \beta_7\text{SEGS} + \beta_8\text{QUICK} \\ & + \beta_9\text{CATA} + \beta_{10}\text{LEV} + \beta_{11}\text{LOSS} + \beta_{12}\text{OPINION} \\ & + \beta_{13}\text{RESTATE} + \beta_{14}\text{LATE} + \beta_{15}\text{Y2001} + \beta_{16}\text{Y2002} + \beta_{17}\text{Y2003} \\ & + \beta_{18}\text{Y2004} + \beta_{19}\text{LN(WAGES)} + \beta_{20}\text{LN(YEARS150)} \\ & + \text{Industry Fixed Effects} + \varepsilon \quad (2) \end{aligned}$$

$$\begin{aligned}
\text{LN(AFEES)} = & \alpha + \beta_0\text{LN(ASSETS)} + \beta_1\text{BIGX} + \beta_2\text{EBIT} + \beta_3\text{DACCR} + \beta_4\text{RECV} \\
& + \beta_5\text{INVT} + \beta_6\text{FOREIGN} + \beta_7\text{SEGS} + \beta_8\text{QUICK} \\
& + \beta_9\text{CATA} + \beta_{10}\text{LEV} + \beta_{11}\text{LOSS} + \beta_{12}\text{OPINION} \\
& + \beta_{13}\text{RESTATE} + \beta_{14}\text{LATE} + \beta_{15}\text{Y2001} + \beta_{16}\text{Y2002} + \beta_{17}\text{Y2003} \\
& + \beta_{18}\text{Y2004} + \beta_{19}\text{AFTER150} + \text{Firm Fixed Effects} + \varepsilon
\end{aligned} \tag{3}$$

where,

LN(AFEES) = natural log of audit fees (in millions),

LN(ASSETS) = natural log of total assets (in millions),

BIGX = coded 1 if the auditor is a Big 4 firm, 0 otherwise,

EBIT = ratio of earnings before interest and taxes to total assets,

DACCR = ratio of unsigned discretionary accruals to total assets,

RECV = ratio of total receivables to total assets,

INVT = ratio of total inventory to total assets,

FOREIGN = ratio of sales made by foreign subsidiaries to total sales,

SEGS = number of business segments,

QUICK = ratio of current assets (less inventory) to current liabilities,

CATA = ratio of current assets to total assets,

LEV = ratio of total assets to total liabilities,

LOSS = 1 if earnings before extraordinary items is negative in the current or prior year, 0 otherwise,

OPINION = 1 if standard unqualified opinion, 0 otherwise,

RESTATE = 1 if there was a restatement of the financials in the current or prior sample year, 0 otherwise,

LATE = 1 if the financials were filed late in the current or prior sample years, 0 otherwise,

Y2001 = 1 if fiscal year is 2001, 0 otherwise,

Y2002 = 1 if fiscal year is 2002, 0 otherwise,

Y2003 = 1 if fiscal year is 2003, 0 otherwise,

Y2004 = 1 if fiscal year is 2004, 0 otherwise,

LN(WAGES) = natural log of the average wages for all professions in the state of the auditee's headquarters in a given fiscal year,

AFTER150 = 1 if 150-hour requirement has been implemented, 0 otherwise,

YEARS150 = the number of years after implementation of the 150-hour requirement,

Industry Fixed Effects = dummy variables based on 2 digit SIC codes, and
Firm Fixed Effects = dummy variables for each firm.

The control variables are similar to those of several recent papers (Ferguson et al. 2003; Francis et al. 2005) and some are defined exactly as in Francis and Wang (2005). Audit risk increases with client business risk and client complexity, and audit firms are expected to charge higher fees as audit risk increases. We include the natural log of total assets, LN(ASSETS), to control for client size, which may affect fees through increased business risk, increased audit logistical complexity, agency costs, etc., and expect this to be positively associated with audit fees. In addition to the control variable for client size, we also include a dummy variable, BIGX, to control for actual or perceived differences in quality between auditors. Previous studies have demonstrated that Big X auditors receive audit fee premiums over non-Big X auditors (e.g., Palmrose 1986a), so we expect this variable to be positively associated with audit fees.

If audit fees rise after the 150-hour requirement is implemented, there are two plausible explanations. First, as we hypothesize, declines in supply can cause increases in price. Second, increases in quality might also lead to increases in price. Therefore, it is important that we control for audit quality in order to test our theory. In addition to the BIGX control variable, we include unsigned discretionary accruals, DACC, as a proxy for audit quality. Becker et al. (1998) and Francis et al. (1999) find evidence that higher quality auditors constrain discretionary accruals.⁹

To control for client complexity, we use RECV, INVT, FOREIGN, and SEGS, which are expected to be positively associated with audit fees. RECV and INVT measure client complexity associated with receivables and inventory. FOREIGN and SEGS control for client complexity brought about by foreign operations and diverse operations, respectively.

To measure the presence of client litigation risk, we use client leverage (LEV), the presence of a loss in the current or prior fiscal year (LOSS), the ratio of current assets to total assets (CATA), the presence of financial statement restatements (RESTATE) and late filings (LATE) with the expectation that these variables will be positively associated with audit fees. To measure lowered litigation risk, we use the ratio of earnings before interest and taxes to total assets (EBIT) and the ratio of current assets to current liabilities (QUICK), and we expect these variables to be negatively associated with audit fees. Audits with clean opinions and standard language (OPINION) are expected to be associated with lower audit fees. Consistent with Ashbaugh et al. (2003), our first two models include Industry Fixed Effects dummy variables for 2-digit SIC codes to control for cross-sectional industry differences in fees due to industry complexity and risk, but we do not predict the direction of each industry-fee relationship.

Our first hypothesis is concerned with whether audit fees are higher in states that have implemented the 150-hour requirement than in states that have not. To test hypothesis one, we compare the audit fees of observations from states that have implemented the requirement with the audit fees of observations from states that do not require 150 hours for examination or for licensure in model 1 using AFTER150. We consider a state to have implemented the requirement if the state requires 150 hours to sit for the examination, for licensure or for both as it is likely that the costs of additional education are unavoidable in these groups.

Our fourth hypothesis is concerned with whether differences in wages across states are passed on to consumers of audit services, and is tested in models 1 and 2 using LN(WAGES). Although most corporations have activities that span many different states, we expect the majority of the audit activity takes place in the state in which corporate headquarters is located. We restrict the sample to firms in which the location of the auditor's office, as disclosed in the

audit report, is consistent with the client's corporate headquarters. We use the log form of wages because the dependent variable in our regression model is measured in the log form. The coefficient on the LN(WAGES) variable can be interpreted as the percentage change in the dependent variable that results from a 100% change in wages. If the entire cost of the wages differential in a state is passed on to consumers of audit services and our measure of wages is a reliable proxy for the cost of audit wages, we expect the coefficients on the LN(WAGES) to be equal to 1.

Model 2 is also used to test our second hypothesis which is concerned with whether the length of time after implementation of the 150-hour requirement is positively associated with audit fees. The time effects of the 150-hour requirement are measured as the natural log of the number of years after implementation plus one.¹⁰ Using the log form of the variable allows us to interpret the coefficient as a percentage change. We expect the coefficient to be positive, which would imply that the longer the time period after implementation of the 150-hour requirement, the greater the audit fees. This result would be consistent with prior research which found that the number of candidates passing the exam continues to decrease for several years after implementation (Allen and Woodland 2006).

Our cross-sectional models compare audit fees for firms in states that have implemented vs. firms in states that have not implemented the 150-hour requirement. Although the cross-sectional models control for factors known to affect fees including the increase in fees across time and the differential level of wages across states, it is possible that factors other than those identified cause audit fees to be higher in the 150-hour states. Therefore, we employ a two-way fixed effects model which controls for other factors unique to each firm and the environment in which the firm operates to test hypothesis 3. We use a fixed-effects model because the Hausman

test is significant indicating that coefficients are biased in a variable effects model. The two-way fixed effects model is similar to the cross-sectional models except that an intercept variable is included for each firm as well as for each time period. Because the existing level of each firm's characteristics are controlled by the fixed effects, the coefficients in the fixed effects model are interpreted as the effect of the cross-time changes in each firm's characteristics on the change in audit fees. We are able to implement the fixed effects model because our data is (unbalanced) panel data with multiple firm-years for each firm. One disadvantage of the fixed effects model is that it uses a large number of degrees of freedom which reduces the power of the tests. There are 2,767 intercept variables for the 2,768 unique firms with a total of 10,969 firm years. We drop the wages variable in model 3 because the fixed effects are very highly correlated with wages.¹¹ We also drop the industry variables because they are perfectly correlated with the fixed effects.

V. RESULTS

Table 1 Panel A presents implementation dates for states that require 150 hours to sit for the CPA examination or to obtain licensure or both during our sample period. Panel B of Table 1 presents states that have passed the 150-hour requirement but have not implemented the requirement during our sample period. Table 1 Panel C lists states that have not passed a 150-hour requirement. Hawaii and Florida were the first states to implement the requirement, in 1978 and 1983, respectively. The 150-hour requirement was implemented before 1995 in 4 states, between 1995 and 1999 in 14 states, and between 2000 and 2004 in 25 states. Five states have implementation dates scheduled after our sample period, and 7 states do not have current plans to implement a 150-hour requirement.

| insert Table 1 about here |

The descriptive statistics are shown in Table 2, categorized by whether the information from the corporation is drawn from a state and year that has a 150-hour requirement in effect (Implemented) or does not have a 150-hour requirement in effect (Not Implemented). The average audit fees in Implemented and Not Implemented states are \$.908 million and \$1.114 million,¹² respectively, which is somewhat larger than prior research (e.g., Ashbaugh et al. 2003) because our sample period is more recent and audit fees have increased rapidly. The preponderance of Big 4 firms reflects a sample biased towards large, publicly traded companies, also evidenced by the average total assets of \$1,717 million and \$2,320 million for the two categories. On average, the firms in states that have implemented have higher discretionary accruals (.113 vs. .099) and more current and quick assets. They also have less leverage (.442 vs. .501) and are more likely to have a loss (.502 vs. .403) during the sample period. The means and medians of the remainder of the control variables are reasonably consistent with those found in the extant literature.

| insert Table 2 about here |

The sample comprises 43% of firms headquartered in states that have previously implemented the 150-hour requirement and 57% that have not. The average of WAGES is \$38,509 and \$35,032 for the Implemented and Not Implemented categories, respectively. For firms in states that have implemented, the average number of years after implementation is just over five.

The results of the audit fee models are provided in Table 3. The adjusted R-square of each cross-sectional model is .82, which is consistent with prior audit fees studies. The adjusted R-square of the two-way fixed effects model is .928 which is much higher than the cross-sectional models in prior research. Tests of no fixed effects in model 3 are highly significant (p-

value = .0001). Model assumptions such as normalcy of error terms were examined, and no significant problems were detected. Variance inflation factors for the cross-sectional (fixed effects) models were less than three (seven)¹³ for all independent variables except for the INDUSTRY and firm dummy variables, which are highly correlated by construction.

| insert Table 3 about here |

All parameter estimates in the cross-sectional models are statistically significant in the expected direction except for INVT which has an unexpected sign.¹⁴ The year dummy variables indicate that audit fees have risen substantially during the sample period, especially from 2003 to 2004. Our first hypothesis is tested with the AFTER150 variable in model 1. The coefficient of AFTER150 is .030 and is statistically significant ($p < .0001$). This coefficient indicates that audit fees are 3.0% higher for corporations in states that have implemented the 150-hour requirement than for corporations in states that have not implemented the requirement, consistent with our expectation that audit fees are higher after implementation because of a shortage of available audit staff (hypothesis 1).

We expect an increasing effect on audit fees over time because the 150-hour requirement places restrictions on the supply of available staff entering the profession (hypothesis 2), and because prior research has found that the number of candidates passing the CPA exam progressively declines for several years following implementation. Hypothesis 2 is tested in model 2 with LN(YEARS150). Supportive of hypothesis 2, the coefficient on this variable is .036 and statistically significant ($p < .0001$) indicating that a 100% increase in the number of years after implementation results in a 3.6% increase in audit fees.

The cross-sectional models provide evidence that after controlling for other factors that affect audit fees across firms, audit fees are higher for firms in states in which the 150-hour requirement has been implemented vs. other states. However, while the cross-sectional models control for factors expected to be associated with fees, they do not control for unspecified factors unique to each firm. Model 3 is a two-way fixed effects model in which an intercept variable is included for each firm as well as for each time period. Because the existing level of each firm's characteristics are controlled by the fixed effects, the coefficients in the fixed effects model are interpreted as the effect of the cross-time changes in each firm's characteristics on the change in audit fees.

All statistically significant variables in model 3 have the expected sign. However, the following control variables are statistically insignificant: EBIT, RECV, INVT, FOREIGN, SEGS, CATA, LOSS and OPINION. We find no evidence that within-firm cross-time changes in these variables affects fees. This result is different from the current and prior studies cross-sectional models.¹⁵ One explanation for this difference is that changes in these variables for an individual firm may not materially influence audit fees over a period as small as our sample period. In other words, while the cross-sectional models indicate that firms with high RECV, FOREIGN, etc. are the types of firms with high audit fees, the insignificant coefficients in the fixed-effects model indicates that it may not be the high levels of RECV, FOREIGN etc. that are causing fees to be high. An alternative explanation for the difference results in the cross-sectional vs. fixed effects models are that the power of the tests in the fixed-effects model may be lower than in the cross-sectional model. If the within-firm cross-time variation is low, the power of the fixed effects model may be smaller than the cross-sectional models.

Consistent with our expectations in hypothesis 3, the coefficient on AFTER150 in model 3 is .047 and statistically significant ($p < .0001$) indicating that after controlling for the general increase in audit fees and other factors affecting fees, audit fees are an estimated 4.7% higher, on average, for a firm in a state that has implemented the 150-hour requirement compared to the same firm's fees before implementation. The results for the 150-hour variables are consistent between the cross-sectional and fixed-effects models, although the fixed-effects model indicates a slightly larger effect.

Our fourth hypothesis addresses the relationship between the level of state wages and external audit fees. Models 1 and 2 include a variable measuring the general level of wages in each state and year. The coefficient on the LN(WAGES) variable can be interpreted as the percentage change in the dependent variable that results from a 100% change in wages. The coefficients on LN(WAGES) in models 1 and 2 are significantly greater than zero and insignificantly different from one indicating our measure of wages is a reliable proxy for the cost of audit wages, and that the entire cost of the wages differential in a state is passed on to consumers of audit services, supporting hypothesis 4. The empirical connection between wages and audit fees supports our belief that the increased audit fees associated with the 150-hour requirement are likely to be driven by increased labor costs in these jurisdictions.¹⁶

Our findings for the relationship between state wages and audit fees also provide evidence that auditors compete over a geographic area that is approximated by states. If auditors competed for labor at the national level, we would expect to find no relationship between state wages and audit fees. If auditors competed for labor over a regional or local geographic area, then our measure of wages would be measured with error, and therefore, the coefficient on LN(WAGES) would be downward biased. Because the coefficient on LN(WAGES) was greater

than zero but insignificantly different from one, our evidence is consistent with states approximating the geographic areas over which external auditors compete for labor.

VI. CONCLUSIONS AND LIMITATIONS

Recent regulatory changes brought substantial increases in the demand for audit services. Coinciding with this increase in demand was the wide-spread implementation of the 150-hour requirement. Prior research found that the 150-hour requirement led to a reduction in a substantial number of the candidates passing the CPA exam, a proxy for the supply of potential audit firm staff. The convergence of an increase in demand for audit services and a decrease in supply of new professionals had the potential to substantially increase the cost of audit labor and fees during the time period of our study (2000-2004). This study investigated the effects of the 150-hour requirement and state wage levels on audit fees.

We find that the 150-hour requirement is associated with an estimated 3.0-4.7% higher audit fees after controlling for other audit fee determinants, and that this effect is increasing over time. We interpret these findings as evidence that the shortage of available staff caused by the 150-hour requirement increased the cost of labor, and in turn, increased audit fees. Additionally, we provide evidence that differential costs of wages across geographic boundaries are passed on to consumers of audit services. Our evidence suggests that the 150-hour requirement has increased the costs to audit clients. This result is consistent with prior research in fields other than accounting which have found that barriers to entry into a profession raise the cost of services to the consumer. We believe that our results are driven by the increased labor costs associated with the reduced supply of new public accountants. However, no prior study has established a link between the cost of labor and the fees charged by auditors.

The evidence provided by this study is potentially useful to state boards of accountancy and state lawmakers considering the adoption, rescission, or revision of 150-hour requirements. The on-going debate about the effects of the 150-hour requirement has focused on theoretical implications but has been supported with limited empirical evidence. The results of this study are especially useful because they focus on a tangible economic outcome, increased audit fees. Our study also contributes to the extant literature on audit fee pricing by providing evidence as to how audit fees adjust to changes in the supply of audit firm staff, and by demonstrating that audit fees are responsive to the differential level of wages across state boundaries.

There are several potential limitations of the study. First, our audit fees sample comprises relatively large, publicly traded firms. The fee results may not be generalizable to smaller firms. Second, we use the auditee's state of headquarters and the auditor's office location to proxy the state in which audit staff are drawn from, but some audit work is conducted at firm locations in other states. Finally, our methods do not consider the potential of the 150-hour requirement to have effects across state lines. Aspiring CPAs may choose to practice in states that have not yet implemented the 150-hour requirement. Reciprocity agreements may encourage CPAs to cross states lines to practice in states that are in short supply.

¹ Asthana, Balsam, and Kim (2004) find that as a percentage of assets, audit fees increased from 9.4% of client assets to 15.7% over the time period 2000 to 2002. The increase in fees is believed to be caused by several factors including an increase in billable hours resulting from provisions of the Sarbanes-Oxley Act (U.S. House of Representatives 2002). Gullapalli (2005) reports that audit fees rose 40% in 2003 from 2002 for the 30 companies in the Dow Jones Industrial Average. The current study estimates that after controlling for other factors affecting fees (e.g., firm size), audit fees have increased 75.6% - 101.8% over the period 2000-2004.

² We use the term “states” to refer to states and jurisdictions. Twenty-three states implemented the 150-hour requirement during the period 2000-2003 while Arizona and New Mexico implemented during 2004. See Panel A of Table 1 for a list of these states.

³ Jensen and Payne (2003) examine the differential costs of internal client labor, but assume that the costs of external auditor labor are constant across clients.

⁴ Information on education and experience requirements was obtained by directly contacting each state board of accountancy and by reviewing applicable state laws and regulations.

⁵ For example, at its December 13-14, 2004 board meeting, the Accountancy Board of Ohio held a brief discussion of the 150-hour requirement. When a board member inquired if the 150-hour requirement had “worked out as envisioned,” the responses received to this inquiry were anecdotal in nature, and none of the board members or attendees were able to offer empirical data.

⁶ See Simunic (1980), DeAngelo (1981), Palmrose (1986a), Palmrose (1986b), Francis and Simon (1987), Francis and Wilson (1988), Craswell et al. (1995), Behn et al. (1999), Craswell and Francis (1999), and Johnstone and Bedard (2001), among others, for theory and empirical testing of audit fee determinants. See Hay et al. (2006) for a meta-analysis of studies examining the determinants of audit fees.

⁷ We acknowledge that students with higher scholastic aptitude may self select into the profession at least in part because of the appeal of a profession with additional educational requirements.

⁸ See Hay et al. (2006) for a review of prior audit fee literature with cross-sectional models.

⁹ Following Hribar and Collins (2002), we compute total accruals (TOTACC) directly as income before extraordinary items less operating cash flows adjusted for discontinued operations and extraordinary items (Compustat data item #123 – (#308-#124)).

We obtain discretionary accruals (DACC) from the residuals of estimating the following cross-sectional Jones (1991) model for each Fama and French (1997) industry i with 10 more observations in year t :

$$\text{TOTACC}_{i,t} / \text{ASSETS}_{i,t-1} = \beta_0(1/\text{ASSETS}_{i,t-1}) + \beta_1(\Delta\text{SALES}_{i,t} / \text{ASSETS}_{i,t-1}) + \beta_2(\text{PPE} / \text{ASSETS}_{i,t-1}) + \varepsilon_{i,t}$$

¹⁰ The convention of adding one to the underlying number of years allows us to avoid taking the log of zero in states that have not yet implemented the 150-hour requirement.

¹¹ The fixed effects predict wages with an R-square = .996 for a Variance Inflation Factor of 250. The wages variable is redundant once firm and time is controlled.

¹² Measuring the audit fee and total client assets in millions affects the intercept, but not the coefficients of the variable. We measure the audit fee in millions to be consistent with prior research.

¹³ The higher variance inflation factors in the fixed effects model were caused by the correlations with the fixed effects. This suggests that the firm characteristics are more similar across time than across firms.

¹⁴ An examination of annual models (unreported) shows that INVT is positive and significant in 2000, insignificant in 2001, and negative and significant in 2002 and continues to become larger (in absolute value) for 2003 and 2004. We do not have an explanation as to why INVT seems to have a changing effect on fees over time. However, the coefficient on INVT is not significant in the fixed effects model indicating that we find no evidence that within-firm cross-time changes in INVT affects fees.

¹⁵ See Hay et al. (2006) for a review of prior literature which explains audit fees in cross-sectional models.

¹⁶ Although it seems unlikely, one alternative explanation of the link between the general level of wages and audit fees is that auditor profits are higher in states with a higher cost of living.

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Table 1
150-Hour Requirement Implementation Dates

Implementation Dates	States
<i>Panel A: Require 150 hours to sit for the CPA examination or to obtain licensure or both.</i>	
Before 1995	Florida, Hawaii, Tennessee, Utah
1995-1999	Alabama, Arkansas, Georgia, Kansas, Louisiana, Maryland, Mississippi, Missouri, Montana, Nebraska, Rhode Island, South Carolina, South Dakota, Texas
2000-2004	Alaska, Arizona, Connecticut, District of Columbia, Guam, Idaho, Illinois, Iowa, Indiana, Kentucky, Maine, Massachusetts, Michigan, Nevada, New Jersey, New Mexico, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Puerto Rico, Washington, West Virginia, Wisconsin, Wyoming
<i>Panel B: Require 150 hours to sit for the CPA examination or to obtain licensure or both, but implemented after the sample period.</i>	
2005-2009	Minnesota, New York, Virginia
<i>Panel C: Does not require 150 hours to sit for the CPA examination or to obtain licensure.</i>	
	California, Colorado, Delaware, New Hampshire, Pennsylvania, Vermont, Virgin Islands

Information on 150-hour requirements was obtained by consulting the Rules and Regulations, Laws, or websites of State Boards of Accountancy and by contacting State Boards of Accountancy directly.

Table 2
Descriptive Statistics

Variable	Implemented 150-hour N=4,720			Not Implemented N=6,249		
	Mean	Median	Standard Deviation	Mean	Median	Standard Deviation
AFEE (\$ millions)	0.908	0.300	1.886	1.114	0.397	2.150
ASSETS (\$ millions)	1,717	196.7	4,968	2,320	363.9	5,823
BIGX	0.854	1.000	0.353	0.863	1.000	0.344
EBIT	-0.021	0.050	0.244	0.031	0.070	0.197
DACCR	0.113	0.069	0.157	0.099	0.065	0.136
RECV	0.149	0.124	0.121	0.148	0.130	0.114
INVT	0.107	0.060	0.128	0.115	0.065	0.135
FOREIGN	0.095	0.005	0.149	0.087	0.000	0.148
SEGS	1.929	1.000	1.378	2.150	1.000	1.473
QUICK	3.102	1.797	3.750	2.143	1.335	2.679
CATA	0.568	0.586	0.248	0.464	0.465	0.244
LEV	0.442	0.411	0.272	0.501	0.498	0.245
LOSS	0.502	1.000	0.500	0.403	0.000	0.491
OPINION	0.693	1.000	0.461	0.597	1.000	0.491
RESTATE	0.085	0.000	0.279	0.103	0.000	0.304
LATE	0.064	0.000	0.245	0.076	0.000	0.264
Y2001	0.232	0.000	0.422	0.150	0.000	0.357
Y2002	0.198	0.000	0.398	0.231	0.000	0.422
Y2003	0.222	0.000	0.415	0.258	0.000	0.438
Y2004	0.195	0.000	0.397	0.288	0.000	0.453
WAGES (\$ 000)	38.509	39.130	3.328	35.032	34.110	3.822
AFTER150	0.000	0.000	0.000	1.000	1.000	0.000
YEARS150	0.000	0.000	0.000	5.019	3.000	5.057

(continued)

Table 2 (continued)

Variable Definitions

AFEE = audit fees (in millions)

ASSETS = total assets (in millions)

BIGX = coded 1 if the auditor was a Big 4 firm, 0 otherwise

EBIT = ratio of earnings before interest and taxes to total assets

DACCR = ratio of unsigned discretionary accruals to total assets

RECV = ratio of total receivables to total assets

INVT = ratio of total inventory to total assets

FOREIGN = ratio of sales made by foreign subsidiaries to total sales

SEGMENTS = number of business segments

QUICK = ratio of current assets (less inventory) to current liabilities

CATA = ratio of current assets to total assets

LEV = ratio of total assets to total liabilities

LOSS = 1 if earnings before extraordinary items is negative in the current or prior year, 0 otherwise

OPINION = 1 if standard unqualified opinion, 0 otherwise

RESTATE = 1 if there was a restatement of the financials in the current or prior sample years, 0 otherwise.

LATE = 1 if the financials were filed late in the current or prior sample years, 0 otherwise.

Y2001 = 1 if fiscal year is 2001, 0 otherwise

Y2002 = 1 if fiscal year is 2002, 0 otherwise

Y2003 = 1 if fiscal year is 2003, 0 otherwise

Y2004 = 1 if fiscal year is 2004, 0 otherwise

WAGES = average wages for all professions in the state of the auditee's headquarters in a given fiscal year

AFTER150 = 1 if 150-hour requirement has been implemented, 0 otherwise

YEARS150 = number of years after implementation of the 150-hour requirement

Table 3
The Effects of the 150-Hour Requirement and State Wages on Audit Fees

Variable	Expected Sign	Model 1		Model 2		Model 3	
		Parameter Estimate	t-statistic	Parameter Estimate	t-Statistic	Parameter Estimate	t-statistic
Intercept	?	-8.212	-11.09	-9.487	-11.81	4.684	13.33
LN(ASSETS)	+	0.530	135.56	0.53	135.73	0.417	30.19
BIGX	+	0.204	11.31	0.205	11.36	0.397	14.83
EBIT	-	-0.395	-11.42	-0.394	-11.4	-0.041	-1.08
DACCR	+	0.148	3.49	0.147	3.45	0.085	2.52
RECV	+	0.465	7.22	0.466	7.24	-0.101	-1.02
INVT	+	-0.138	-2.09	-0.142	-2.16	0.027	0.22
FOREIGN	+	0.566	14.58	0.565	14.56	-0.006	-0.11
SEGS	+	0.047	11.44	0.047	11.44	0.009	1.18
QUICK	-	-0.035	-14.43	-0.035	-14.44	-0.018	-6.34
CATA	+	0.324	8.34	0.327	8.43	0.020	0.37
LEV	+	0.304	11.57	0.305	11.62	0.293	8.08
LOSS	+	0.089	6.58	0.089	6.55	0.022	1.71
OPINION	-	-0.102	-8.03	-0.102	-8.06	-0.015	-1.46
RESTATE	+	0.080	4.16	0.079	4.14	0.080	4.66
LATE	+	0.248	10.90	0.248	10.91	0.239	11.41
Y2001	+	0.075	3.78	0.069	3.49	0.195	14.34
Y2002	+	0.241	11.29	0.227	10.58	0.426	37.43
Y2003	+	0.389	17.78	0.367	16.35	0.600	48.01
Y2004		0.783	34.20	0.756	31.7	1.018	67.87
LN(WAGES)	+	0.925	13.09	1.045	13.68		
AFTER150	+	0.030	2.19			0.047	2.69
LN(YEARS150)	+			0.036	4.26		
Model R-square		.8215		0.8217		.9283	

N=10,969 firm years with 2,768 firms.

Models 1 and 2 are OLS. Model 3 is a two-way fixed effects model.

The dependent variable is natural log of audit fees (in millions).

LN(ASSETS) is the natural log of total assets (in millions).

LN(WAGES) is the natural log of the average wages for all professions in the state of the auditee's headquarters in a given fiscal year

LN(YEARS150) is the natural log of (the number of years after implementation of the 150-Hour requirement +1).

See Table 2 for descriptions of the remaining variables.

INDUSTRY dummy variables in models 1 and 2 are included in the model but are not shown above for brevity.

Firm Fixed Effects are included in model 3 but are not shown above for brevity.