Does the accountant shortage impair efficient resource allocation?

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Abstract

This study explores the relation between a firm's investment in accounting-based human capital and the quality of its investment decisions. To investigate this, we track the yearly employment levels of accountants within firms and find a positive association with investment efficiency. Importantly, we control for the effects of improved external financial reporting quality. Cross-sectional results support our prediction that employing accountants can improve decision making by mitigating internal information frictions. To strengthen our inferences, we also examine a negative shock to the supply of accountants and find consistent results in both instrumental variables and difference-in-differences analyses. Our study contributes to both the literature on investment efficiency and the growing body of literature emphasizing the importance of investing in human capital by focusing on one potential benefit of such investment in the accounting function.

1. Introduction

Popular opinion often regards the accounting function within firms as a cost center and views investment in the accounting process as a mere compliance exercise. Consistent with this opinion, these investments not only carry a direct cost but also the opportunity cost of foregoing the next-best use of those funds. They also do not directly generate revenue. In this study, we explore one potential benefit to investments in accounting-based human capital, namely, improved decision making within the firm. We acknowledge that these investments likely result in improved external financial reporting quality which has been shown to decrease cost of capital and litigation risk, and increase investment efficiency (Lambert, Leuz, and Verrecchia 2007; Affleck-Graves, Callahan, and Chipalkatti 2002; Francis, Nanda, and Olsson 2008; Palmrose and Scholz 2004; Biddle and Hilary 2006; McNichols and Stubben 2008). However, we are more interested in whether investment in accounting-based human capital might also result in improved decision making by firm managers through a reduction in internal information frictions.

There are several different forms of internal information frictions that might impair the quality of decision making within the firm and might be mitigated through an investment in accounting-based human capital. First, such an investment could curb unintentional and intentional errors and improve the accuracy and timeliness of internal accounting reports used to make decisions. Second, it could help reduce information asymmetry between top executives and division managers. As a result, top managers can more effectively identify profitable projects and monitor lower-level managers. Third, it can reduce uncertainty in internal capital markets and improve the overall knowledge of the people involved in the decision-making process. This allows them to focus on the most relevant aspects of a potential investment decision and how that decision

fits with the rest of the organization. All these reductions in internal information frictions have the potential to improve decision making within the firm.

This question of whether employing accountants is associated with improved decision making, and specifically improved investment decisions, is particularly relevant in the current environment, when so many outlets are reporting shortages of accounting professionals (Maurer, 2023; Estrada, 2023). The number of total bachelor's and master's degrees granted has declined every year since 2016 and was over 18% lower in 2022 than in 2016 (AICPA 2023). If the number of accountants employed at a firm is associated with higher-quality investment decisions, then one implication of this declining trend in the number of accountants is a potential deterioration in the quality of capital allocation within firms.

To investigate this issue, we study data from the universe of LinkedIn profiles covering employment positions from 2010 to 2020. We proxy for investment in the human capital of the accounting department with the number of accountants employed by a firm each year and refer to this construct throughout the study as employing accountants. We use this count measure because it is directly related to the reported shortage in the total number of accountants entering the profession. Specifically, for each firm, we count the number of employees each year that a third-party data provider, Revelio, classifies as working as an accountant based on the individual's job title and description on their LinkedIn resume. While employing accountants could impact many different decisions within the firm, we choose to study investment decisions because the choice of where to deploy capital is central to the success of a business, and because prior literature offers accepted measures of investment efficiency. Specifically, we examine whether the number of accountants is positively associated with the investment efficiency of the firm. We find evidence supporting this hypothesis, which highlights one value of investing in the accounting function.

A more straightforward effect of employing accountants is the potential to improve external financial reporting quality.[1] Additionally, the literature shows that improved financial reporting quality is associated with improved investment efficiency (Biddle and Hilary 2006; Biddle et al., 2009). Thus, to conclude that the main effect we document is, at least partially, a result of reduced internal information frictions, we must control for any effects through external reporting quality. We do this in two ways. First, our analyses include direct controls for financial reporting quality. Our results are robust to including several different accrual-based and restatement-based reporting quality controls, either individually or collectively.

Second, we conduct cross-sectional tests based on the expected relative benefits of employing more accountants. We expect firms with more internal information frictions to benefit more from employing more accountants. Divisional managers often have better information about internal investment opportunities than top managers. Top managers must overcome this information asymmetry to make efficient investment decisions. Thus, we expect that employing accountants is more positively associated with investment efficiency when internal information frictions exacerbate this information asymmetry. We expect more severe internal information frictions in firms with more and more diverse business segments, firms facing more complicated investment opportunity environments, and firms whose top executive teams have less experience together. Consistent with our predictions, the association between employing accountants and investment efficiency is stronger for these firms. We also find that employing accountants in the firm's headquarters state is more positively associated with investment efficiency than employing accountants in other locations. This is consistent with the physical proximity of the accountants and the decision makers decreasing information frictions.

[1]We do find a positive association between employing accountants and a variety of measures of financial reporting quality in untabulated analyses.

This battery of cross-sectional results also helps alleviate general endogeneity concerns. It is possible that an omitted variable is related to both the employment of accountants and investment decisions. However, given our cross-sectional results, for this omitted firm-type variable to drive our findings, it also needs to be related to each of our cross-sectional variables. Specifically, it needs to be associated with the internal complexity of firms, the complexity of investment opportunities, and the collective experience of the executive team.

Nevertheless, we further tackle endogeneity concerns by studying a shock to the number of accountants employed by firms within a state. Specifically, we examine the staggered implementation of the rule that requires CPA applicants to obtain 150-credit hours of post-secondary schooling to become a licensed CPA. Barrios (2022) documents that the implementation of this rule decreased the number of entrants to the accounting profession and had no measurable impact on the quality of accountants. We build on this finding and use this setting as a negative shock to the number of accountants employed by firms headquartered in these states.

We use this shock in two ways. First, we estimate a typical two-stage, instrumental variable specification where we instrument for employing accountants with whether the firm's headquarters state adopted a 150-credit hour rule two or more years ago. We introduce this lag because it will take time for the new rules to affect the number of accountants entering the profession. Here, we study the six states that passed a 150-credit hour rule between 2010 and 2020, when we have LinkedIn data. The first stage of this analysis documents a negative and significant association between the passage of a 150-credit hour rule and employing accountants. When we dig deeper, we find that this association is driven entirely by employing accountants within the headquarters state. This is unsurprising because only these accountants are affected by the newly adopted rule. Given this, we focus on accountants employed in the headquarters state in the second stage, and

the analysis continues to support a positive association between employing accountants and investment efficiency.

Next, we expand the sample to include all states' implementations of the 150-credit hour rule from 1990 to 2020 and run a generalized staggered difference-in-differences analysis to examine the changes in investment efficiency around the implementation of the 150-credit hour rule for each state. Our analysis shows that in the years following the adoption of the 150-credit hour rule, firms within a state experience a decrease in investment efficiency. Importantly, this relation is again robust to controlling for various measures of accounting quality, suggesting that the effects of employing additional accountants on investment efficiency are not only due to improved external financial reporting quality.

As a final exploratory analysis, we examine whether our results are primarily related to employing junior or senior-level accountants. Revelio classifies each job held by an individual on a seniority scale from 1 to 4 based on the job title, job description, and prior experience of the individual. We find that our results are primarily associated with firms employing lower levels of junior accountants. At first glance, this finding may seem counterintuitive, but we believe it aligns well with the current state of the accounting profession. The shortage of accountants, as documented in numerous stories in the popular press recently, largely relates to a lack of lower-level staff accountants. While these are not likely to be individuals making decisions within a firm, they are a vital component of information creation within the firm. Furthermore, without an adequate supply of these lower-level accountants, senior accountants would be forced to spend more time compiling accounting reports and less time understanding, interpreting, and communicating the implications of those reports.

Our study makes several contributions. First, we contribute to the growing literature that examines the effects of human capital investment at lower levels of the firm. Regarding accounting employees, Armstrong, Kepler, Larcker, and Shi (2023) find that the pay of staff-level accountants is positively related to the firm's accounting quality when their pay is fixed, but in the presence of contingent pay the association becomes negative. Liang, Lourie, Nekrasov, and Yeung (2022) find that the proportion of accountants who are female is negatively correlated with internal control weaknesses. Chen, Cheng, Chow, and Liu (2020) document that the competence of accounting employees is associated with financial reporting quality and earnings response coefficients. Dambra, Khavis, and Lin (2023) document that accounting-employee flows are positively associated with firms filing annual reports late, disclosing internal control weaknesses, and restating their financials. We add to this growing body of literature by showing that employing more accountants is positively associated with investment efficiency. Moreover, we explore the potential channels and provide evidence that employing more accountants is associated with better decision making, particularly in the face of higher internal information frictions.

Next, we contribute to the vast investment efficiency literature. Several studies highlight the existence of information frictions that create a link between financing and investment decisions (Myers 1977; Myers and Majluf 1984; Childs, Mauer, and Ott 2005). Building on these findings, studies also show that improved financial reporting quality can alleviate these frictions and improve investment efficiency (Biddle and Hillary, 2006; Biddle et al. 2009; Balakrishnan, Core, and Verdi 2014; Garcia-Lara, Osma, and Penalva 2016). We add to this literature by providing evidence that investment in accounting-based human capital can reduce internal information frictions and improve decision making and investment efficiency.

Third, our study contributes to the literature that examines the role of internal information quality in corporate decision making. Prior studies employ observable financial reporting measures to proxy for internal information quality and investigate corporate decisions, such as tax planning or patent-related innovation (e.g., Gallemore and Labro 2015; Huang, Lao, and McPhee 2020). Two recent papers study the effect of internal control systems on different concepts of efficiency. Imdieke, Li, and Zhao (2023) find that the presence of an audit of a firm's internal controls over financial reporting is associated with improved operational efficiency. Christensen, Lynch, and Partridge (2023) find that firms with a material change to internal controls due to the pending adoption of ASC 842 experience an increase in investment efficiency. We add to this literature by focusing on firms' investment in accounting-based human capital, which is often viewed as a compliance exercise with little tangible benefit. We find that this investment improves decision making within the firm by alleviating internal information frictions.

Finally, we contribute to the current discussion about the shortage of accounting professionals in the business world. A recent Wall Street Journal article discussed how a lack of accountants affects the quality of financial statements of large public companies (Maurer 2023). A Fortune Magazine article discusses the potential for the 150-credit hour rule needs to be changed to address this shortage (Estrada 2023). Several state legislatures have begun the process of creating alternative pathways to obtain a CPA licensure to alleviate the 150-credit hour rule constraint.[2] Our paper informs all these discussions and suggests that a shortage of accountants, particularly lower-level staff accountants, could also impact the quality of firms' investment decisions.

[2] https://www.nysscpa.org/news/publications/the-trusted-professional/article/two-state-societies-seek-alternatives-to-150-hour-rule-090623

2. Prior Research and Hypotheses Development

2.1 Related literature

2.1.1 Workforce function and financial reporting quality

While extensive prior studies examine top executives' involvement in and influence on corporate reporting decisions, recent growing literature highlights the active roles played by the entire workforce in general and accounting employees particularly. Call, Campbell, Dhaliwal, and Moon Jr. (2017) argue that high quality employees can provide superior information as inputs to executives and better identify and uncover intentional misreporting. They find that firms with highly educated employees, proxied by a higher average education level at firm headquarters' MSAs, exhibit higher accrual quality, fewer internal control violations, and fewer restatements. Godsell, Huang, and Lao (2022) use state-level adoptions of wrongful dismissal laws to capture variation in rank-and-file employees' incentives to resist value-destructive activities and document a significant decline in real activity management following adoption of such laws. [3]

Because accounting employees are directly involved in the production and processing of accounting information, they are instrumental in shaping firms' financial reporting outcomes, and thus, the information managers use to make decisions. However, few studies trace the source of financial reporting determinants to accounting personnel, because data at the job function level are rarely publicly available. Using proprietary compensation data for 384 unique firms from 2000 to 2004, Armstrong et al. (2023) show that accounting employees' compensation structure is associated with a firm's financial reporting quality, and senior executives' contractual incentives strengthen this relation. Specifically, they find that highly paid accounting employees have incentives to mitigate manipulation; however, when that pay is contingent, compensation

[3] Another stream of literature investigates how employees as users of financial outcomes shape firms' financial reporting practices (e.g., Dou, Khan, and Zou 2016; Ji and Tan 2019).

manipulation becomes more likely. Liang et al. (2022) find that rank-and-file accounting employees' risk-aversion, proxied by the proportion of female accountants, is negatively associated with the likelihood of future internal control weaknesses. Chen et al. (2020) find that firms with higher-quality accountants, as proxied by Big N work experience and CPA designation, have a lower probability of accounting irregularities, lower discretionary accruals, better internal control, and fewer unintentional accounting errors.

2.1.2 Financial reporting and investment efficiency

Extant research studies whether and why financial reporting and disclosure affect corporate investment decisions (see Roychowdhury, Shroff, and Verdi 2019 and Ferracuti and Stubben 2019 for more comprehensive discussions). Within the agency framework, information asymmetry between external capital providers and firm management gives rise to both adverse selection and moral hazard problems. The adverse selection channel argues that high-quality financial information can better describe the value of assets in place and investment opportunities. Consequently, external capital providers are more willing to supply capital, enabling financially constrained firms to invest more efficiently. Biddle and Hilary (2006) show that accounting quality is positively associated with investment efficiency and interpret their results as consistent with both adverse selection and moral hazard channels. Biddle et al. (2009) extend the findings of Biddle and Hilary (2006) by empirically showing that high accounting quality reduces both adverse selection and moral hazard costs associated with under- and overinvestment. Recent studies explore more exogenous variation in the adverse selection issue, such as the remediation of internal control weaknesses (Cheng, Dhaliwal, and Zhang 2013) and adoptions of more transparent accounting standards (e.g., Dou, Wong, and Xin 2019; Naranjo, Saavedra, and Verdi 2022) and associate them with improved investment efficiency.

The moral hazard channel proposes that information asymmetry allows managers to invest in projects that serve their personal interests of empire building or shirking rather than maximizing firm value (Jensen 1986; Bertrand and Mullainathan 2003). By increasing transparency, higher quality financial reporting facilitates monitoring by external capital providers and motivates managers to invest in a manner that aligns with shareholders' preferences. Hope and Thomas (2008) show that after the adoption of SFAS 131, which decreases transparency, firms experience higher sales growth but lower profits, consistent with management's empire building. Francis and Martin (2010) and Bushman, Piotroski, and Smith (2011) find that timely loss recognition enhances monitoring and discourages managers from empire building.

Information asymmetry can arise between external stakeholders other than shareholders and management. Chen, Hope, Li, and Wang (2011) show that among private firms where moral hazard conflicts between management and shareholders are less pronounced, financial reporting quality still improves investment efficiency and attribute the influence to creditors' demand for earnings information.

2.1.3 Internal information quality and corporate decisions

It has long been argued that a firm's internal information environment is crucial to corporate decisions (Hemmer and Labro 2008; Horngren, Datar, Foster, Rajan, and Ittner 2012). Using detailed survey data, Ittner and Michels (2017) show that firms' internal forecasting and planning processes are positively associated with the accuracy of their earnings forecasts. Chen, Martin, Roychowdhury, Wang, and Billett (2018) find that the information asymmetry between divisional and top managers impair firms' external reporting quality in the form of less accurate, more biased, less specific, and less frequent management forecasts. Gallemore and Labro (2015)

show that firms with high internal information quality can tax plan more effectively and enjoy lower effective tax rates.

A few recent studies examine investment decisions. Shroff, Verdi, and Yu (2014) show that a better external information environment helps multinational corporations mitigate information frictions within the firm and lead to better investment decisions. Heitzman and Huang (2019) show that high-quality internal information allows managers to adjust their investment decisions according to internal performance signals to achieve greater efficiency. Huang et al. (2020) find that high-quality internal information is positively associated with patent-related innovation.

It is inherently challenging to measure firms' internal information environment because it is largely unobservable to outsiders. Most studies try to infer internal information quality using observable external reporting characteristics, such as days between fiscal year ends and earnings announcement dates, management forecast accuracy, absence of internal control weakness or unintentional accounting errors, and differences in trading returns between top- and middle-level management. Christensen et al. (2023) take advantage of the preparation periods for ASC 842 adoption by certain firms, which improves their internal information quality during the transition years. They find that these firms exhibit higher investment efficiency due to lowered moral hazard risks within the firm.

2.2 Hypothesis Development

Given the well-documented link between external reporting quality and investment efficiency, we expect that if investment in accounting-based human capital improves reporting quality, it will also result in improved investment efficiency. However, we are more interested in

whether such an investment can improve investment efficiency through reduced internal information frictions.

Accounting employees' main job function is to analyze, record, summarize, and report the results of a business's activities to facilitate decision making. External financial reports facilitate decision making by current and potential capital providers. On the other hand, internal reports help firm managers make decisions about how to deploy capital and run the business. We expect a larger presence of the accounting department to improve a company's decision making in the following ways. First, employing more accountants can reduce the likelihood of both unintentional and intentional errors and improve the accuracy and timeliness of internal accounting reports used in decision making. An understaffed accounting department may have to work extra hours, rush to meet deadlines, or become less diligent, all of which result in higher chances of making errors. These types of unintentional errors or mistakes are not uncommon, and even honest mistakes can be extremely costly.[4]

A larger accounting department can also reduce the likelihood of intentional misreporting. This effect is likely to occur through the opportunity leg of the fraud triangle. The fraud triangle argues that the combination of motive, rationalization, and opportunity often results in fraud. By increasing the size of the accounting department, a firm can increase the number of eyes on the financial reporting system. This facilitates monitoring of the reporting system and makes it more difficult for parties to collude and intentionally misstate the financial statements. When collusion is required, there is an increased risk that one party will either steal from or cheat another party or

[4] In 2014, Bank of America reported that an honest accounting mistake had led the bank to report $4 billion more capital than it actually had. Upon the discovery of this mistake, the regulator required the bank to suspend a share buyback and a planned increase in dividend. The bank's stock lost 6.3 percent of its value.

cooperate with authorities, decreasing the benefits and increasing the costs to all other parties (McCarthy, Hagan, and Cohen 1998; Free and Murphy 2015).

Second, employing more accountants may improve reporting systems and help top managers improve communications with and monitoring of division managers. Survey evidence from Graham, Harvey, and Rajgopal (2005) suggests that divisional managers have an information advantage over top managers about investment opportunities. This information asymmetry allows segment managers to distort information about relative investment opportunities across divisions (Rajan, Servaes, and Zingales 1998; Scharfstein and Stein 2000). Analytical models by Harris, Kriebel, and Raviv (1982), Antle and Eppen (1985), Harris and Raviv (1996, 1998), and Bernardo, Cai, and Luo (2001, 2004) predict a negative relation between the information asymmetry about the division's investment opportunities and the amount of capital investment. To better allocate capital across organizational units, firms exert active monitoring and design incentive contracts based on both firm and division performance measures (Wulf 2002, 2004). A better accounting function is likely to facilitate monitoring by top managers and produce high-quality input for performance evaluation of divisional managers, leading to more efficient internal capital allocation.

Third, employing more accountants may help reduce uncertainty in internal capital markets, which refers to the imperfect information about the prospects of future projects. Uncertainty can cause investment inefficiency even absent information asymmetry (Roychowdhury et al. 2019; Ferracuti and Stubben 2019) and high uncertainty is associated with inefficient investment (Bloom, Bond, and Van Reenen 2007). Recent studies suggest that managers find capital planning and investing more difficult with increased operational uncertainty (KPMG 2007; Aberdeen 2012; Ittner and Michels 2017) and practitioners and academics call for

firms to invest in and develop more sophisticated internal management accounting practices to reduce uncertainty and facilitate planning (Guo and Zhong 2023). As a result, we expect that a better accounting function will help produce high-quality internal information to assist CEOs in selecting investment projects.

In summary, we expect investment in accounting-based human capital to be negatively associated with internal information frictions and thus positively associated with the quality of investment decisions. We state our hypothesis as follows:

H1: Investment in accounting-based human capital is positively associated with the investment efficiency of that firm.

While it may seem reasonable that investment in accounting-based human capital would improve internal information quality, there are several reasons why this association may not be present. First, human capital may not be as important of a determinant of the quality of outputs from the accounting function as other factors. Two recent papers find evidence that internal controls and internal control quality are associated with firm efficiency (Imdieke et al. 2023; Christensen et al. 2023), so it might be that as long as strong controls are in place, the human capital of the department is less important. Second, accountants may not be incentivized to take actions that improve investment efficiency and thus may not have a measurable effect on internal information frictions. For example, Armstrong et al. (2023) find that accountants' contingent compensation is negatively associated with reporting quality. Finally, it is possible that the size of the accounting department is not, or is conversely, associated with corporate decisions. Bonner (1999) suggests that a larger team does not necessarily perform better than a smaller team or individual in judgement and decision-making processes. Brown and Hugon (2009) document that earnings forecasts made by analyst teams are less accurate than those made by individuals.

Ultimately, the association between accounting-based human capital and investment decisions is an open research question.

3. Research Design and Data

3.1. Investment in the human capital of the accounting department

We use the universe of resumes posted on the social networking site LinkedIn.com to measure our main construct of interest, investment in the human capital of the accounting department. We obtain this data from Revelio, a third-party data provider. Revelio began scraping LinkedIn for resumes in 2014, and at that time captured the entire work history of any individual whose resume was posted on LinkedIn.

The dataset we obtained from Revelio includes an employee ID, the firm ID, the start and end dates of the employee's employment at that firm, the state of employment for U.S.-based employees, and the employee's official job title for all individuals who worked at a firm listed on Compustat. In addition, Revelio translates each employee's official job title into a standardized list of either 7, 150, or 500 job titles. We use the list of 150 job titles and identify anyone who is assigned the title of either 'Accountant' or 'Auditor' as an accountant. Employees assigned these standardized titles have several million unique official job titles. We search the official job titles for keywords and find that approximately 1.5% of the titles contain a reference to accounts payable, 0.5% to accounts receivable, 0.5% to budgeting, 1.0% to cost accounting, 8.3% to analyst, 9.0% to audit, 6.1% to tax, and 3.8% to treasurer.

Our main variable of interest is the natural log of one plus the number of accountants employed by the firm which we label *LnAcct*. We use the number of accountants rather than a scaled measure because it is directly related to the current shortage of accounting professionals. We use the log transformation because we expect that adding an additional accountant to a team

of 10 accountants will have a larger impact than adding an additional accountant to a team of 100 accountants. The log transformation allows us to capture this concavity in our tests.

3.2. External reporting quality

We want to conclude that any effects we find in our analysis are not driven by a potential positive association between employing accountants and external reporting quality. To this end we calculate several measures of external reporting quality to include as control variables in our tests. First, we calculate the absolute value of discretionary accruals, computed using the following modified Jones model (Jones 1991; Dechow, Sloan, and Sweeney 1995) estimated in the cross-section by industry and year:

$$TA_{it}/AT_{it-1} = \beta_0 + \beta_1 (1/AT_{it-1}) + \beta_2 (\Delta Rev_{it} - \Delta AR_{it})/AT_{it-1} + \beta_3 PPE_{it}/ AT_{it-1} + \varepsilon_{it} \quad (1)$$

The dependent variable, TA_{it}/AT_{it-1}, is firm i's total accruals in year t deflated by total assets at the end of year t-1. ΔRev_{it} (ΔAR_{it}) is firm i's change in revenue (accounts receivable) between year t and year t-1, scaled by total assets at the end of year t-1. PPE_{it} is firm i's gross book value of property, plant, and equipment at the end of year t scaled by total assets at the end of year t-1. We use the absolute value of the residuals from this regression as our first measure of financial reporting quality ($|DA|$). Next, we follow Kothari, Leone, and Wasley (2005) and include ROA_{it-1} as an additional independent variable in Equation (1). ROA_{it-1} is firm i's earnings before extraordinary items during year t-1, scaled by total assets at the beginning of year t-1. Our second measure of financial reporting quality, $|PA\ DA|$, is the absolute value of the residuals from this revised regression.

Our third measure of financial reporting quality is based on the Dechow and Dichev (2002) model of working capital accruals, as modified by McNichols (2002). We use the absolute value of the residual from the following model estimated in the cross section by industry and year as a

measure of accrual quality, |*DD DA*|:[5]

$$\Delta WC_{it}/AT_{it-1} = \beta_0 + \beta_1 CFO_{it-1}/AT_{it-1} + \beta_2 CFO_{it}/AT_{it-1} + \beta_3 CFO_{it+1}/AT_{it-1} + \beta_4 \Delta Rev_{it}/AT_{it-1} + \beta_5 PPE_{it}/AT_{it-1} + \varepsilon_{it} \quad (2)$$

The dependent variable, $\Delta WC_{it}/AT_{it-1}$, is firm *i*'s change in working capital over year *t* deflated by total assets at the end of year *t*-1. Working capital is calculated as current assets less cash and cash equivalents minus current liabilities plus debt in current liabilities. CFO_{it} is firm *i*'s cash flows from operations in year t, which is measured as income before extraordinary items less the change in working capital less depreciation and amortization. The other variables are as defined above for Equation (1). Our final measure of financial reporting quality is *Restatement,* a binary variable equal to one if the current year's financials are ultimately restated. Otherwise, it is equal to zero. Untabulated analyses show a negative association between each of these measures and employing accountants.

3.3. Association between investment efficiency and number of accountants

Our hypothesis is not conditional on whether a firm is more likely to underinvest or overinvest and predicts a positive association with investment decision making for all firms. Therefore, we follow prior literature and measure unconditional investment efficiency as the absolute value of the residual from the following industry-year regressions (McNichols and Stubben, 2008; Biddle et al. 2009; and Goodman, Neamtiu, Shroff, and White 2014):

$$Inv_{it+1}/At_{it} = \beta_0 + \beta_1 Q_{it} + \beta_2 CFO_{it+1}/At_{it} + \beta_3 ((\Delta At)/At_{it-1}) + \beta_4 Inv_{it}/At_{it-1} + \varepsilon_{it+1} \quad (3)$$

The dependent variable, Inv_{it+1}, is firm *i*'s investment in year *t*+1. Investment is measured as the sum of capital expenditures, research and development, and acquisitions minus the cash received from the sales of property, plant, and equipment. Q_{it} is a proxy for "total" Tobin's Q and

[5] We require a minimum of 10 observations in each industry-year to estimate models (1) and (2).

is the ratio of the firm's capital market value to its replacement cost.[6] Other variables are as defined above. We multiply the absolute value of the residuals by negative one so the measure *Investment Efficiency* is increasing in efficiency.[7]

We then use the following model to initially examine Hypothesis 1:

$$\begin{aligned} \textit{Investment Efficiency}_{it+1} = {} & \beta_0 + \beta_1 \textit{LnAcct}_{it-1} + \beta_2 \textit{MVE}_{it} + \beta_3 \textit{MTB}_{it} + \beta_4 \textit{Inv Vol}_{it} + \beta_5 \textit{Sales Vol}_{it} \\ & + \beta_6 \textit{OCF Vol}_{it} + \beta_7 \textit{OCF}_{it} + \beta_8 \textit{Dividend}_{it} + \beta_9 \textit{Age}_{it} + \beta_{10} \textit{OpCycle}_{it} + \beta_{11} \textit{Loss}_{it} \\ & + \beta_{12} \#\textit{Analysts}_{it} + \beta_{13} \textit{Slack}_{it} + \beta_{14} \textit{Zscore}_{it} + \beta_{15} \textit{Capital Intensity}_{it} + \beta_{16} \textit{K-Structure}_{it} \\ & + \beta_{17} \textit{LnMKT}_{it-1} + \beta_{18} \textit{LnHR}_{it-1} + \beta_{19} \textit{LnEng}_{it-1} + \lambda_j + \theta_t + \varepsilon_{it} \end{aligned} \quad (4)$$

The dependent variable in Equation (4) is *Investment Efficiency*. We follow prior research in selecting our control variables (e.g., Biddle et al., 2009). *MVE* is the natural logarithm of the market value of equity, and *BTM* is equal to total common equity divided by the market value of equity. *Inv Vol* is the firm's investment volatility over the past 10 years scaled by assets at the end of the prior year. We include the volatility of sales (*Sales Vol)* and the volatility of operating cash flows (*OCF Vol*), each calculated over a ten-year period and are scaled by assets at the end of the prior year. *OCF* is cash flow from operations scaled by sales. *Dividend* is a binary variable equal to one if the firm has paid dividends in the current year and zero otherwise, *Age* is the number of years since the firm appeared on Compustat, and *Op Cycle* is the sum of the inventory period and the accounts receivable period. *Loss* is an indicator variable that equals one if the firm reports a net loss during the current year and zero otherwise. *#Analysts* is the number of analysts following the firm according to I/B/E/S. *Slack* is the ratio of cash to property, plant, and equipment, *Zscore* is Altman's Z and proxies for bankruptcy risk, and *Capital Intensity* is the net value of property,

[6] This variable is the Tobin's Q proxy as computed in Peters and Taylor (2017). It was collected directly from the WRDS database.

[7] We acknowledge potential issues associated with using residuals from a first stage model as the dependent variable in a second stage regression as described in Chen, Hribar, & Melessa (2018). However, we do not implement the solutions proposed in that paper because the authors state that they are not appropriate when an absolute value transformation is applied to the residuals.

plant, and equipment scaled by assets. *K-Structure is* the ratio of long-term debt to the sum of long-term debt and market value of equity.

When making hiring decisions with limited budgets, firms face tradeoffs of hiring more accountants vs. other kinds of employees, such as marketing, human resources, or engineering personnel, which might also affect corporate operating decisions. To account for the potential impact of these alternative departments, we explicitly control for the number of marketing, human resources, and engineering employees (*LnMkt, LnHR, and LnEng*). Finally, we include industry and year fixed effects to control for time-invariant omitted variables that are constant at the industry level and any time trend, respectively.[8]

3.4. Cross sectional variation in internal information friction

Our first effort to address endogeneity concerns is to examine different subsets of firms, where we expect the impact of employing accountants on internal information frictions, and thus investment efficiency, to be the strongest. First, we expect that firms with more and more diverse business segments will benefit more from improved internal information quality. Theoretical studies argue that firms with a larger number of, and more diverse business segments face a more complex internal information environment and higher inter-unit agency problems (Wulf 2004; Marino and Matsusaka 2005). Bens, Berger, and Monahan (2011) provide empirical support for

[8] We include industry rather than firm fixed effects for two reasons. First, many of the prior papers that study investment efficiency include industry fixed effects in an effort to control for cross industry differences. Second, and more importantly, recent research suggests that potential problems might outweigh the benefits of including group fixed effects when there is limited within-group variation in the key variable of interest (deHaan 2021; Armstrong et al. 2022; Whited et al. 2022). For our sample, regressing the key variable of interest, number of accountants, on firm fixed effects results an adjusted R^2 of 96.3%. In comparison, regressing this variable on industry and year fixed effects results an adjusted R^2 of 5.9%. While no prescriptive cutoffs for are given for deeming an adjusted R^2 too high (i.e., too little variation left in the key independent variable to explain the variation in the dependent variable), Armstrong et al. (2022) use the data from Armstrong et al. (2019) for illustration and consider an adjusted R^2 of 99.2% a sign of "extreme level of absorption" and the estimates are sensitive to a handful of observations. As a result, we do not include firm fixed effects in our main analyses. In untablated results when we replace industry fixed effects with firm fixed effects, results are qualitatively similar but less significant.

these claims. Managers of these firms face a more difficult decision of allocating resources across a broader set of segments. On the other hand, a firm with only one or two segments, or where most of its activity is concentrated in one segment, would not be as affected by internal information frictions because the firm and information are more centralized. Thus, we expect that employing accountants has a larger impact on investment efficiency for firms with more business segments and more dispersed business segments. We measure these constructs with the number of business segments reported by a firm (*#Segments*) and a Herfindahl–Hirschman index based on the proportion of a firm's total revenue that comes from each of their business segments (*SegmentsHHI*), respectively. If the effect of employing accountants on investment efficiency occurs through a reduction in internal information frictions, we expect the effect to be stronger in the subset of firms with a higher number and less concentrated business segments.

Second, we argue that firms with more complex investment environments are prone to higher internal information frictions (Black, Dikolli, and Dyreng 2014; Huang et al. 2020) and should benefit more from employing more accountants. We use two measures to capture this: the length of product development cycles (*ProdCycle*), and capital intensity (*CapitalIntensity*). Longer product development cycles mean that the costs and benefits of projects will not be known with certainty until further into the future, increasing the information asymmetry between division managers and top managers. Following Huang et al. (2020), we use the industry-level R&D amortizable life to proxy for *ProdCycle* because products with longer development cycles usually have longer amortizable lives.[9] Similarly, firms with higher capital intensity are likely to face more complex information environments regarding their investment decisions. *CapitalIntensity* is measured as the net value of property, plant, and equipment scaled by total assets.

[9] The data on amortizable lives are available on Professor Aswath Damodaran's website (http://people.stern.nyu.edu/adamodar/New_Home_Page/spreadsh.htm).

Finally, studies show that factors such as geographic dispersion and the absence of clear communication channels amplify information asymmetry between top and division managers (Rajan, Servaes, and Zingales 1998; Scharfstein and Stein 2000; Shroff, Verdi, and Yu 2014). Thus, we expect employing accountants to be more effective at reducing internal information frictions when the top management team has less experience together and when the top management team has more direct access to those accountants. We focus on the collective experience of the top management team because they likely work as a group to identify, collect, and digest relevant information before making important firm decisions. We follow Huang et al. (2020) and measure *TopExp* as a count of the number of years that the executives listed in ExecuComp have been together at the firm. We restart this count when two or more of the executives leave the firm. Generally, these top executives include CEO, CFO, COO, chairperson, president, and vice president. To formally test each of these predictions, we augment Equation (4) by adding each of these cross-sectional variables and an interaction term between each variable and *LnAcct.*

We measure the access of the top management team to the accountants by modifying our main variable of interest, *LnAcct.* Specifically, instead of counting all accountants, we separately count (and take the natural log of) the accountants employed in the firm's headquarters state (*LnAcctHQ*) and those employed outside the firm's headquarters state (*LnAcctNonHQ)*. We expect the effects to be stronger for accountants working in the firm's headquarters state, and thus closer in proximity to the top management team. To formally test this prediction, we augment Equation (4) by replacing *LnAcct* with both *LnAcctHQ* and *LnAcctNonHQ*.

3.5. Shock to the number of accountants

To further mitigate endogeneity concerns we identify a plausibly exogenous shock to the pool of accountants available for employment. We use the setting identified in Barrios (2022) of the state-level implementation of rules requiring candidates for the CPA exam to earn 150 credit hours of college courses before obtaining their license. Barrios (2022) finds that these rules, adopted at various times by various states, decreased the number of entrants into the accounting profession and had no effect on the overall quality of incoming accountants.

We use this shock in two ways. First, we use adoption of a 150-credit hour rule in a firm's headquarters state as an instrument for employing accountants in a typical two-stage least squares instrumental variables specification. However, only six states passed one of these laws during the sample period, which potentially limits the generalizability of this analysis. For this reason, we also take a separate approach of expanding the sample to include almost all states that implemented a 150-credit hour rule at any time. We then re-examine equation (4) but replace $LnAcct_{t-1}$ with *150-Hour Rule*. To account for the lag between rule passage and the reduction in available accountants and the subsequent effect on investment efficiency, we assign $150\text{-}Hour\ Rule_t$ a value of one if the state passed a 150-credit hour requirement at least three years ago and a value of zero if it has not yet passed the requirement. Intermediate periods are set to missing. This design is a generalized staggered difference-in-differences, where a negative coefficient estimate on *150-Hour Rule* suggests a positive association between accounting-based human capital and investment efficiency because the shock reduces the number of available accountants.

3.6. Sample Selection

The sample period for our main analyses is 2011 to 2020. We begin the sample in 2011 because Revelio starts collecting resume data from LinkedIn in 2014. However, at that time, they collected the history of work experience for anyone with a resume currently on LinkedIn. We find

that a sizable portion of employees have employment history dating back to at least 2010. Since our variable of interest is $LnAcct_{t-1}$, we begin our sample in 2011. We begin with the Compustat universe of firm-year observations. We then merge data from Revelio. We eliminate financial firms (SIC 6000-6999) and firms in regulated industries (SIC 4900-4999). Finally, we eliminate observations with missing control variables. The total sample for our main analysis and cross-sectional tests includes 19,561 firm-year observations.

When we use the implementation of 150-credit hour rules as an identification strategy, the sample changes slightly. For the instrumental variables analysis, we exclude the year of and year after adoption of the rule for firms headquartered in that state, as these observations were subject to the rule, but it likely did not significantly affect the supply of potential accountants in the first two years. For the extended period analysis, the sample period begins in 1990 to ensure that we have data from the statement of cash flows and ends in 2020. This sample construction follows the same procedures as our first analysis, except we do not require Revelio data for this sample.

4. Empirical Results

4.1. Descriptive Statistics and Correlations

We provide descriptive statistics in Table 1. The median of *LnAcct* is 2.996, suggesting that the median firm employs more than 19 ((e^2.996)-1) employees that Revelio classifies as accountants based on their LinkedIn job titles. While this number may seem low, it represents a lower bound, as it only counts accountants who post their resume on LinkeIn.[10] The 90th percentile firm employs 181 accountants. The mean of *Investment Efficiency* is -0.078, suggesting that the average absolute value of abnormal investment is 7.8% of lagged total assets. The average |*DD*

[10] We acknowledge that there is a selection issue based on which individuals choose to upload their resume to LinkedIn. While this issue is unavoidable with the data we have, we take some comfort in the fact that LinkedIn tends to cater more towards white collar, college educated jobs which would include accountants.

DA| is 0.041, suggesting that the average firm's absolute discretionary accruals are 4.1% of its total assets. The distributions of control variables are largely in line with prior studies.

Table 2 presents the correlations. As expected, the number of accountants is negatively associated with |*DD DA*|. Further, it is positively associated with investment efficiency. The number of accountants is highly correlated with the other employee types.[11]

4.2. LinkedIn Analyses

Table 3 reports the results of our main analysis testing the association between employing accountants and investment efficiency (H1). Column (1) reports regression results from the model in equation (4) with only the main control variables. Column (2) adds controls for employing individuals in marketing, engineering, and human resources job functions. Columns (3) through (6) separately include one of the different accounting quality measures, |*DD DA*|, |*DA*|, |*PA DA*|, and *Restatement,* respectively. Finally, column (7) includes all four accounting quality variables. The coefficient estimate on *LnAcct* is 0.0055 in column (1) and is significant at the 1% level. More importantly, the magnitude remains highly significant when we further control for other employees and any variation of financial reporting quality as proxied in columns (2) through (7). This suggests that the association between employing accountants and investment efficiency is not only a result of the positive association between employing accountants and external financial reporting quality. These results also imply that there is another channel through which employing accountants is associated with investment efficiency. In the next subsection, we explore variation in internal information frictions as a possible channel that drives this main effect.

4.3. Cross sectional tests

[11] All results are quantitatively unchanged if only accountants are included in the regressions, rather than all of the employee types.

If employing accountants is associated with investment efficiency, because it mitigates internal information frictions, then we expect our main results to be stronger when the firm's internal information environment is more complex. Our first two cross-sectional tests examine whether the main effect is stronger when the firm has more and more dispersed segments. Table 4 presents the results of estimating equation (4) with the addition of #*Segments* and its interaction with *LnAcct* in column (1), and with *SegmentsHHI* and its interaction with *LnAcct* in column (2). The coefficient estimate on the interaction term in column (1) is positive and significant at the 10% level, suggesting that employing accountants is more positively associated with investment efficiency for firms with a larger number of segments. We also calculate the Herfindahl-Hirschman Index (HHI) based on each segment's sales (*SegmentsHHI*), and a higher value suggests more concentrated business activity and lower internal information frictions. The results in column (2) show a negative and significant coefficient on the interaction term, which is consistent with the prediction that employing accountants is more positively associated with investment efficiency for firms with more diverse businesses, where internal information frictions are likely a larger impediment to good decision making.

Our next two cross-sectional tests examine whether the main effect is stronger when the firm makes more complex investment decisions. We measure the complexity of the investment decisions using both a proxy for the length of the production cycle (*ProdCycle*) and the capital intensity of the firm (*CapitalIntensity*). The longer the production cycle, the greater the uncertainty about the potential benefits of any capital investment. The more capital intense a firm is, the larger the share of the firms' resources that go towards investment, making those decisions more important for the overall outcome of the firm. Table 5 presents the results of estimating equation (4) with the addition of *ProdCycle* and its interaction with *LnAcct* in column (1), and with

CapitalIntensity and its interaction with *LnAcct* in column (2). The coefficient estimate on the interaction term in column (1) is positive and significant at the 5% level, suggesting that firms with longer production cycles have a stronger association between employing accountants and investment efficiency. The coefficient estimate on the interaction term in column (2) is positive and significant at the 1% level, suggesting that firms with a larger share of their assets going towards capital investment have a stronger association between employing accountants and investment efficiency.

The final two cross-sectional tests examine whether the main effect is stronger when the top management team is more familiar with one another and when they have more direct access to the accountants in the firm. Table 6 presents the results of estimating Equation (4) with the addition of *TopExp* and its interaction with *LnAcct* in Column (1). The coefficient estimate on the interaction term is negative and significant at the 1% level, suggesting that when the top management team has less experience together, they benefit more from employing accountants. Column (2) presents results of estimating Equation (4) but separates *LnAcct* into *LnAcctHQ,* which is the log of the number of accountants employed in the firm's headquarters state, and *LnAcctNonHQ,* which is the log of the number of accountants employed outside the firm's headquarters state. Results show that employing accountants within the firm's headquarters state is positively and significantly associated with investment efficiency, whereas employing more distant accountants does not have a significant association.

Together, all these results provide evidence that the main association between employing accountants and investment efficiency is stronger in the face of more significant internal information frictions.

4.4. Shock to supply of accountants

It is possible that the initial analyses suffer from potential endogeneity concerns. Firms that care more about the quality of their accounting reports might be more likely to hire more accountants, and might also be the type of firms that make better investment decisions. To further address this concern, we study a shock to the number of accountants employed by firms within a state. Specifically, we examine the implementation of the rule requiring CPA applicants to obtain 150-credit hours of post-secondary schooling before they can become a licensed CPA. Barrios (2022) documents that the implementation of this rule decreased the number of entrants into the accounting profession, while having no measurable impact on the quality of those accountants. We build on this finding and use this setting as a negative shock to the number of accountants employed by firms headquartered in a state.

We first use the implementation of the 150-credit hour requirement in a state as an instrumental variable in a standard two-stage least-squares model. Table 7 presents the results of this analysis. Columns (1), (2), and (3) show the first-stage results when using the rule implementation to instrument for *LnAcct, LnAcctHQ,* and *LnAcctNonHQ*, respectively.[12] Here, we see that it is associated with *LnAcct* in Column (1). This confirms the findings of Barrios (2022) within our sample period for firms that have accountants with resumes on LinkedIn. This also provides evidence that the instrument is relevant. We examine *LnAcctHQ* and *LnAcctNonHQ* separately because the shock only affects the supply of accountants in the firm's headquarters state. Columns (2) and (3) show that the adoption of a 150-credit hour rule is negatively associated with *LnAcctHQ* but positively associated with *LnAcctNonHQ*. This is consistent with firms partially shifting the employment of their accountants to non-headquarters states, where the supply of

[12] *150-Hour Rule* takes a value of 1 if the firm's headquarters state adopted a 150-credit hour requirement at least 2 years ago because it will take a few years for this policy change to impact graduating college students and flow into changes in accounting employees. The intermediate years are set to missing.

accounting labor was not affected. Given this and our previous results, we estimate a second-stage model after instrumenting for *LnAcctHQ* in the first stage. Column (4) presents the second-stage estimation. The variable of interest is $\widehat{LnAcctHQ}$ and we continue to find a positive and significant association with *Efficiency* even after instrumenting for employing accountants at the firm's headquarters state. The Cragg-Donald F Statistic is 38.86, which is much higher than the critical value of 16.38, reported by Stock and Yogo (2005). This suggests that our instrument is not weak. In addition, it is unlikely that a rule whose sole purpose is to change the hours required to sit for the CPA exam would have any effect on investment efficiency, unless that effect is through a change in the supply of accountants (i.e., the exclusion restriction is satisfied). The results above mitigate general endogeneity and correlated omitted variables concerns.

The prior analysis is helpful; however, only six states adopted a 150-credit hour rule during the sample period, for which we have reliable LinkedIn data.[13] Thus, we adopt a separate approach to increase the generalizability of the results to firms headquartered in other states. To do this, we expand the sample to include as many states' implementations of the 150-credit hour rule as possible. This covers the sample period from 1990 to 2020. In Table 8, we present the results of a generalized difference-in-differences analysis examining the changes in investment efficiency around the staggered implementation of the 150-credit hour rule at the state level. This analysis does not rely on LinkedIn data, but instead uses the adoption of a 150-credit hour rule by a state as a negative shock to the supply of, and thus employment of accountants. Again, the dependent variable leads the variable of interest by three years to allow the new rules to manifest fully.

[13] The states that adopted a rule during the sample period are Pennsylvania, Delaware, California, New Hampshire, Vermont, and Colorado. These states represent about 25% of the total sample observations.

Column (1) includes all control variables from the main analysis, except |*DD DA*| and Column (2) adds |*DD DA*|.[14]

The coefficient of *150-Hour-Rule* in column (1) of Table 8 is -0.0035 and significant at the 1% level, suggesting that in the years after the adoption of the 150-credit hour rule in a state where the supply of potential accountants decreases, firms in that state experience a decrease in investment efficiency. Importantly, this relation is robust to controlling for accounting quality in column (2), suggesting that the effects of employing additional accountants on investment efficiency are not only due to improved accounting quality.

4.5 Seniority of accountants

Our final analysis is exploratory in nature and examines whether our main results are more associated with employing higher-level, senior accountants or lower-level, junior accountants. There are reasons why either group may be more important for our results. On the one hand, more senior accountants are likely communicating directly with top management and participating in decision making. They are also likely the accountants deciding which reports are relevant for which decisions and what information should be presented. On the other hand, without an adequate pool of junior accountants to maintain the records and run the reports, senior accountants would be required to allocate more of their time to those tasks and might have less information at their disposal from which they can inform decision makers. Furthermore, to the extent that there is a shortage of accountants, it is more likely at the lower ranks.

To investigate this issue, we rely on the seniority ranking created by Revelio. They provide a seniority score of 1, 2, 3, or 4, depending on the individual's job title, job description, and

[14] We include year and firm fixed effects in all specifications including this shock. This is different from our main analysis because we are specifically seeking exogenous, within firm variation in the employment of accountants in these analyses. While there is still not much within firm variation overall, the shock does introduce some within firm variation and we want to specifically isolate that variation in these analyses.

experience. We create two new accountant variables: *LnAcctSenior*, equal to the natural log of one plus the number of accountants employed by the firm with a seniority score of 3 or 4, and *LnAcctJunior*, equal to the natural log of one plus the number of accountants employed by the firm with a seniority score of 1 or 2.[15] We then replace our main variable, *LnAcct,* with both of these separate variables in our main analysis. The results in Table 9 suggest that the positive association between employing accountants and investment efficiency is more strongly associated with employing junior accountants.

While we did not have an ex-ante prediction about this analysis, the results are consistent with the documented shortage of junior accountants in the business world today. They also provide a better understanding of why we see results when we examine the 150-credit hour rule. This rule change largely affects the supply of newer, junior accountants, not more established senior accountants. If the association between employing accountants and investment efficiency were concentrated among more senior accountants, the 150-credit hour shock would be a less appropriate setting to investigate those effects.

5. Conclusion

This paper examines whether and how investment in accounting-based human capital affects a firm's investment decisions. We find evidence that this type of investment is positively associated with a firm's investment efficiency. Importantly, this relation is robust to controlling for a host of different measures of external financial reporting quality, suggesting that employing accountants might also improve decision making by mitigating internal information frictions. We formally test this possibility by examining the main association of interest in firms with high versus

[15] While there are thousands of unique job titles in the database, some examples of job titles for each level of the seniority scale are as follows: 4 – Accounting Manager, CFO, Vice President; 3 – Chief Accountant, Internal Audit Manager, Senior Accountant; 2 – Accounting Analyst, Associate Accountant, Internal Auditor; 1 – Assistant Accountant, Junior Accountant, Staff Accountant.

low internal information frictions, investment complexity, management cohesion, and access to accountants. We find that the number of accountants is more positively associated with investment efficiency for firms with more and more diverse segments, firms with longer production cycles and more capital intensity, firms with a newer top management team, and firms that employ more accountants in the headquarters state.

We further employ the staggered adoption of the 150-hour rule for CPA exams in different states as an exogenous downward shock to the supply of accountants to mitigate the possibility that our results are driven by omitted variables. We find consistent results in this setting using both a standard two-stage least-squares approach and a generalized difference-in-differences in an expanded sample. Overall, our study provides new insights into how investment in accounting-based human capital affects corporate decisions and also suggests potential consequences of the recent shortage of accounting professionals entering the workplace.

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Appendix - Variable Definitions

Investment Efficiency	The residual from the following industry-year regressions: $Inv_{it+1} = \beta_0 + \beta_1 Q_{it} + \beta_2 CFO_{it+1} + \beta_3 ((\Delta At)/At_{it-1}) + \beta_4 Inv_{it} + \varepsilon_{it+1}$. This model is based McNichols and Stubben (2008), Biddle, Hilary, and Verdi (2009), and Goodman, Neamtiu, Shroff, and White (2014). In order to make the measure increasing in efficiency, the residuals are multiplied by (-1).
LnAcct	The natural log of one plus the number of accountants. This variable is collected from the Revelio database.
LnMkt	The natural log of one plus the number of marketing employees. This variable is collected from the Revelio database.
LnEng	The natural log of one plus the number of engineers. This variable is collected from the Revelio database.
LnHr	The natural log of one plus the number of human resources employees. This variable is collected from the Revelio database.
MVE	The natural log of one plus the market value of equity
MTB	The market to book ratio measured as market value of equity divided by the book value of common equity.
OCF Vol	The volatility of cash flows over the past 10 years scaled by beginning of year assets
Sales Vol	The volatility of sales over the past 10 years scaled by beginning of year assets
Invest Vol	The volatility of investments over the past 10 years scaled by beginning of year assets.
Zscore	Altman's Zscore, computed as: ((3.3*PI) + SALE + (.25*RE) + ((.5*(ACT-LCT))))/AT
Cap-Intensity	The net value of property, plant, and equipment scaled by assets.
K-Structure	A measure of market leverage computed as the ratio of long-term debt to the sum of long-term debt and the market value of equity.
OCF/Sales	Cash flow from operations scaled by sales
Slack	The ratio of cash to property, plant, and equipment.
Dividend	An indicator variable that is equal to 1 if the firm paid a dividend in the current year and 0 otherwise
Firm Age	The number of years since the firm first appeared in the Compustat annual file.
OpCycle	The firm's operating cycle, measured as the log of (((INVT/COGS)*360)+ ((RECT/SALE)*360))
Loss	An indicator variable that is equal to one if the firm's net income in the current year is negative and zero otherwise
#Analysts	The number of analysts following a firm.
|DA|	The absolute value of discretionary accruals, where discretionary accruals are equal to the residual from the following industry-year regressions: $TA_{it} = \beta_0 + \beta_1 (1/ATi_{t-1}) + \beta_2 (\Delta Rev_{it} - \Delta AR_{it}) + \beta_3 PPE_{it} + \varepsilon_{it}$. This model is based on Jones (1991) and Dechow, Sloan, and Sweeney (1995).

|PA DA|	The absolute value of performance adjusted discretionary accruals, where performance adjusted discretionary accruals are equal to the residual from the following industry-year regressions: $TA_{it} = \beta_0 + \beta_1 (1/ATi_{t-1}) + \beta_2 (\Delta Rev_{it} - \Delta AR_{it}) + \beta_3 PPE_{it} + \beta_4 ROA_{it-1} + \varepsilon_{it}$. This model is based on Jones (1991), Dechow, Sloan, and Sweeney (1995), and Kothari, Leone, and Wasley (2005).
|DD DA|	The absolute value of abnormal accruals, where abnormal accruals are equal to the residual from the following industry-year regressions: $\Delta WC_{it} = \beta_0 + \beta_1 CFO_{it-1} + \beta_2 CFO_{it} + \beta_3 CFO_{it+1} + \beta_4 \Delta Rev_{it} + \beta_5 PPE_{it} + \varepsilon_{it}$. This model is based Dechow and Dichev (2002) and McNichols (2002).
Restatement	An indicator variable that is equal to one if the current period's financials are restated and zero otherwise.
#Segments	The number of business segments reported by a firm.
SegmentsHHI	The Herfindahl-Hirschman Index based on segment sales.
ProdCycle	The average number of years of amortizable life in an industry. The data on amortizable lives are available on Professor Aswath Damodaran's website (http://people.stern.nyu.edu/adamodar/New_Home_Page/spreadsh.htm).
LnAcctHQ	The natural log of one plus the number of accountants employed in the firm's headquarter state. This variable is collected from the Revelio database.
LnAcctNonHQ	The natural log of one plus the number of accountants employed outside of the firm's headquarter state. This variable is collected from the Revelio database.
TopExp	The cumulative number of years that the executives listed in ExecuComp have been together at the firm. We restart this count when two or more of the executives leave the firm.
150-hour rule	*150-hour rule* is binary variable equal to one if the firm is headquartered in a state that has adopted the 150-hour rule. Otherwise, it is equal to zero. Observations are set to missing in the year of adoption and the following two years.
LnAcctSenior	The natural log of one plus the number of accountants employed by the firm with a seniority score of 3 or 4. This variable is collected from the Revelio database.
LnAcctJunior	The natural log of one plus the number of accountants employed by the firm with a seniority score of 1 or 2. This variable is collected from the Revelio database.

Table 1 – Descriptive Statistics

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	N	Mean	SD	p10	p50	p90
Investment Efficiency$_{t+1}$	19,561	-0.078	0.100	-0.171	-0.049	-0.009
LnAcct$_{t-1}$	19,561	3.055	1.617	1.099	2.996	5.209
LnMkt$_{t-1}$	19,561	2.268	1.816	0.000	2.079	4.836
LnEng$_{t-1}$	19,561	3.249	2.219	0.000	3.135	6.292
LnHr$_{t-1}$	19,561	1.717	1.686	0.000	1.386	4.143
|DD DA|	19,561	0.041	0.046	0.004	0.025	0.096
MVE	19,561	6.746	2.185	3.763	6.829	9.552
MTB	19,561	3.606	7.609	0.574	2.264	8.410
OCFVol	19,561	0.067	0.071	0.018	0.044	0.137
SaleVol	19,561	0.250	0.247	0.059	0.179	0.504
InvestVol	19,561	0.077	0.079	0.016	0.054	0.157
Zscore	19,561	0.956	1.510	-0.516	1.093	2.464
Capital Intensity	19,561	0.254	0.231	0.040	0.170	0.636
K-structure	19,561	0.190	0.211	0.000	0.122	0.505
OCF/Sales	19,561	-0.152	1.440	-0.140	0.087	0.276
Slack	19,561	3.070	6.868	0.045	0.673	7.739
Dividend	19,561	0.411	0.492	0.000	0.000	1.000
Firm Age	19,561	24.065	17.569	5.000	20.000	53.000
OpCycle	19,561	4.585	0.816	3.562	4.675	5.489
Loss	19,561	0.352	0.478	0.000	0.000	1.000
#Analysts	19,561	9.809	9.242	0.000	7.000	23.000

Notes: This table presents descriptive statistics for the variables used in the analyses. All variables are defined in the Appendix.

Table 2 – Correlations

Variables	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*	*(13)*	*(14)*	*(15)*	*(16)*	*(17)*	*(18)*	*(19)*	*(20)*	*(21)*
(1) Efficiency$_{t+1}$	1.00																				
(2) LnAcct$_{t-1}$	**0.09**	1.00																			
(3) LnMkt$_{t-1}$	**0.07**	**0.79**	1.00																		
(4) LnEng$_{t-1}$	**0.06**	**0.79**	**0.60**	1.00																	
(5) LnHr$_{t-1}$	**0.07**	**0.86**	**0.82**	**0.73**	1.00																
(6) |DD DA|	**-0.13**	**-0.23**	**-0.18**	**-0.20**	**-0.19**	1.00															
(7) MVE	**0.04**	**0.72**	**0.63**	**0.62**	**0.71**	**-0.24**	1.00														
(8) MTB	**-0.05**	**0.06**	**0.12**	**0.03**	**0.11**	**0.04**	**0.21**	1.00													
(9) OCF/Sales	**0.06**	**0.19**	**0.20**	**0.18**	**0.14**	**-0.15**	**0.17**	-0.01	1.00												
(10) Dividend	**0.08**	**0.31**	**0.22**	**0.26**	**0.26**	**-0.19**	**0.34**	-0.02	**0.16**	1.00											
(11) Firm Age	**0.10**	**0.30**	**0.20**	**0.31**	**0.28**	**-0.18**	**0.25**	**-0.05**	**0.14**	**0.42**	1.00										
(12) OpCycle	-0.01	**-0.05**	**-0.07**	**0.15**	**-0.02**	**0.05**	**-0.02**	-0.01	**-0.07**	**-0.02**	**0.11**	1.00									
(13) Loss	**-0.06**	**-0.25**	**-0.22**	**-0.21**	**-0.22**	**0.22**	**-0.37**	-0.01	**-0.27**	**-0.35**	**-0.25**	0.01	1.00								
(14) SaleVol	0.01	**-0.10**	**-0.10**	**-0.13**	**-0.12**	**0.15**	**-0.25**	**-0.05**	**0.05**	**-0.08**	-0.02	**-0.13**	**0.04**	1.00							
(15) OCFVol	**-0.09**	**-0.33**	**-0.30**	**-0.27**	**-0.28**	**0.34**	**-0.38**	0.00	**-0.34**	**-0.24**	**-0.16**	-0.02	**0.30**	**0.40**	1.00						
(16) InvestVol	**-0.13**	**-0.19**	**-0.22**	**-0.15**	**-0.19**	**0.18**	**-0.25**	**-0.04**	**-0.20**	**-0.22**	**-0.15**	**-0.03**	**0.26**	**0.22**	**0.48**	1.00					
(17) Zscore	**0.15**	**0.22**	**0.23**	**0.15**	**0.18**	**-0.23**	**0.25**	0.01	**0.46**	**0.30**	**0.22**	**-0.09**	**-0.55**	**0.20**	**-0.42**	**-0.40**	1.00				
(18) CapitalIntensity	**0.07**	**-0.02**	**-0.21**	**-0.04**	**-0.13**	**-0.08**	**-0.06**	**-0.11**	**0.08**	**0.07**	**0.03**	**-0.29**	**0.02**	**-0.06**	**-0.06**	**0.07**	**-0.05**	1.00			
(19) K-Structure	**0.06**	**0.15**	0.02	**0.07**	**0.05**	**-0.08**	**-0.09**	**-0.17**	**0.08**	**0.02**	**0.04**	**-0.12**	**0.12**	**-0.07**	**-0.15**	**0.08**	**-0.09**	**0.35**	1.00		
(20) Slack	**-0.06**	**-0.18**	**-0.11**	**-0.17**	**-0.10**	**0.17**	**-0.04**	**0.09**	**-0.27**	**-0.20**	**-0.20**	0.00	**0.18**	**-0.03**	**0.28**	**0.09**	**-0.22**	**-0.37**	**-0.25**	1.00	
(21) #Analysts	**0.05**	**0.60**	**0.52**	**0.52**	**0.61**	**-0.18**	**0.75**	**0.13**	**0.12**	**0.17**	**0.12**	**-0.05**	**-0.18**	**-0.17**	**-0.24**	**-0.14**	**0.09**	**0.09**	0.02	**-0.04**	1.00

Notes: This table presents correlation coefficients between all variables used in the main analysis. Bolded coefficients represent statistical significance at the 1% level. All variables are defined in the Appendix.

Table 3 – The relationship between accountants and investment efficiency

VARIABLES	(1) *Efficiency*	(2) *Efficiency*	(3) *Efficiency*	(4) *Efficiency*	(5) *Efficiency*	(6) *Efficiency*	(7) *Efficiency*
$LnAcct_{t-1}$	0.0055***	0.0042***	0.0039***	0.0040***	0.0040***	0.0042***	0.0039***
	(0.0000)	(0.0064)	(0.0091)	(0.0084)	(0.0087)	(0.0064)	(0.0098)
$LnMkt_{t-1}$		0.0004	0.0004	0.0004	0.0003	0.0004	0.0004
		(0.7208)	(0.6697)	(0.7314)	(0.7398)	(0.7188)	(0.6764)
$LnEng_{t-1}$		0.0003	0.0002	0.0003	0.0003	0.0003	0.0002
		(0.7627)	(0.7886)	(0.7650)	(0.7644)	(0.7657)	(0.7922)
$LnHr_{t-1}$		0.0011	0.0011	0.0012	0.0012	0.0011	0.0011
		(0.3848)	(0.3719)	(0.3347)	(0.3268)	(0.3816)	(0.3501)
|*DD DA*|			-0.1786***				-0.1674***
			(0.0000)				(0.0000)
|*DA*|				-0.0445***			0.0060
				(0.0001)			(0.7858)
|*PA DA*|					-0.0533***		-0.0225
					(0.0000)		(0.3069)
Restatement						0.0013	0.0019
						(0.6193)	(0.4478)
MVE	-0.0052***	-0.0053***	-0.0054***	-0.0055***	-0.0055***	-0.0053***	-0.0055***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
MTB	-0.0004***	-0.0004***	-0.0004***	-0.0004***	-0.0004***	-0.0004***	-0.0004***
	(0.0003)	(0.0002)	(0.0009)	(0.0005)	(0.0005)	(0.0002)	(0.0010)
OCFVol	0.0236	0.0232	0.0473***	0.0300	0.0324*	0.0233	0.0489***
	(0.2002)	(0.2080)	(0.0097)	(0.1036)	(0.0790)	(0.2058)	(0.0076)
SaleVol	-0.0062	-0.0061	-0.0039	-0.0048	-0.0047	-0.0061	-0.0037
	(0.1726)	(0.1784)	(0.3809)	(0.2931)	(0.2924)	(0.1794)	(0.4143)
InvestVol	-0.0975***	-0.0971***	-0.0991***	-0.0977***	-0.0979***	-0.0971***	-0.0993***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Zscore	0.0069***	0.0070***	0.0066***	0.0065***	0.0064***	0.0070***	0.0064***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Capital Intensity	0.0335***	0.0340***	0.0340***	0.0343***	0.0341***	0.0340***	0.0340***

	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
K-structure	0.0123***	0.0124***	0.0114**	0.0121***	0.0121***	0.0123***	0.0112**
	(0.0063)	(0.0060)	(0.0106)	(0.0072)	(0.0070)	(0.0064)	(0.0119)
OCF/Sales	-0.0006	-0.0006	-0.0005	-0.0004	-0.0005	-0.0006	-0.0005
	(0.3777)	(0.3725)	(0.4394)	(0.5522)	(0.4636)	(0.3695)	(0.4487)
Slack	0.0006***	0.0006***	0.0007***	0.0006***	0.0006***	0.0006***	0.0007***
	(0.0001)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Dividend	0.0003	0.0004	0.0002	0.0003	0.0003	0.0004	0.0002
	(0.8723)	(0.8332)	(0.9186)	(0.8940)	(0.8978)	(0.8296)	(0.9269)
Firm Age	0.0003***	0.0003***	0.0003***	0.0003***	0.0003***	0.0003***	0.0003***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
OpCycle	0.0053***	0.0053***	0.0058***	0.0052***	0.0052***	0.0053***	0.0058***
	(0.0003)	(0.0003)	(0.0001)	(0.0004)	(0.0004)	(0.0003)	(0.0001)
Loss	0.0055**	0.0054**	0.0062***	0.0053**	0.0057***	0.0054**	0.0063***
	(0.0105)	(0.0115)	(0.0036)	(0.0130)	(0.0072)	(0.0118)	(0.0032)
#Analysts	0.0007***	0.0007***	0.0006***	0.0007***	0.0007***	0.0007***	0.0006***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Observations	19,561	19,561	19,561	19,561	19,561	19,561	19,561
R-squared	0.0661	0.0660	0.0714	0.0672	0.0675	0.0660	0.0715
Industry FE	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES

Notes: This table presents the results of estimating Equation (4). The dependent variable is a measure of investment efficiency based on the models in McNichols and Stubben (2008), Biddle et al. (2009), and Goodman et al. (2014). The independent variable of interest is $LnAcct_{t-1}$ which is equal to the natural log of one plus the number of accountants employed at the firm in the prior year (measured using Revelio data). All variables are defined in the Appendix. This specification includes year and industry fixed effects in all columns. The numbers in parentheses are p-values. Standard errors are clustered by firm. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 4 – Internal information complexity and the relationship between accountants and investment efficiency

VARIABLES	(1) *Efficiency*	(2) *Efficiency*
$LnAcct_{t-1}$	0.0030	0.0074***
	(0.1117)	(0.0009)
#Segments	-0.0022	
	(0.1190)	
$LnAcct_{t-1}$*#Segments	0.0006*	
	(0.0656)	
SegmentsHHI		0.0107
		(0.1994)
$LnAcct_{t-1}$*SegmentsHHI		-0.0040*
		(0.0649)
$LnMkt_{t-1}$	0.0000	0.0001
	(0.9842)	(0.9056)
$LnEng_{t-1}$	0.0001	0.0001
	(0.9225)	(0.9327)
$LnHr_{t-1}$	0.0009	0.0009
	(0.4842)	(0.4995)
|*DD DA*|	-0.1863***	-0.1873***
	(0.0000)	(0.0000)
Observations	17,978	17,917
Adjusted R-squared	0.0697	0.0695
Controls	YES	YES
Industry FE	YES	YES
Year FE	YES	YES

Notes: This table presents the results of estimating equation (4) with the addition of *#Segments*, and *SegmentsHHI* as well as their interactions with $LnAcct_{t-1}$ in columns (1) and (2), respectively. *#Segments* is the number of unique business segments reported by the firm, and *SegmentsHHI* is the Herfindahl-Hirschman Index based on segment sales. The dependent variable is a measure of investment efficiency based on the models in McNichols and Stubben (2008), Biddle et al. (2009), and Goodman et al. (2014). All variables are defined in the Appendix. This specification includes year and industry fixed effects in both columns. The numbers in parentheses are p-values. Standard errors are clustered by firm. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 5 – Investment environment complexity and the relationship between accountants and investment efficiency

VARIABLES	(1) *Efficiency*	(2) *Efficiency*
$LnAcct_{t-1}$	0.0017	0.0009
	(0.4305)	(0.5804)
ProdCycle	-0.0017*	
	(0.0506)	
$LnAcct_{t-1}$*ProdCycle	0.0005**	
	(0.0205)	
CapitalIntensity		0.0075
		(0.4274)
$LnAcct_{t-1}$* CapitalIntensity		0.0095***
		(0.0001)
$LnMkt_{t-1}$	0.0014	0.0008
	(0.2612)	(0.4217)
$LnEng_{t-1}$	0.0003	-0.0001
	(0.7481)	(0.9222)
$LnHr_{t-1}$	-0.0001	0.0018
	(0.9270)	(0.1245)
|*DD DA*|	-0.1828***	-0.1784***
	(0.0000)	(0.0000)
Observations	13,564	19,561
Adjusted R-squared	0.0720	0.0725
Controls	YES	YES
Industry FE	YES	YES
Year FE	YES	YES

Notes: This table presents the results of estimating Equation (4) with the addition of *ProdCycle*, *CapitalIntensity*, and their interactions with $LnAcct_{t-1}$ in Columns (1) and (2), respectively. *ProdCycle* is the average number of years of amortizable life in an industry, and *CapitalIntensity* is the net value of property, plant, and equipment scaled by assets. The dependent variable is a measure of investment efficiency based on the models in McNichols and Stubben (2008), Biddle et al. (2009), and Goodman et al. (2014). All variables are defined in the Appendix. This specification includes year and industry fixed effects in both columns. The numbers in parentheses are p-values. Standard errors are clustered by firm. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 6 – Geographic and communication frictions and the relationship between accountants and investment efficiency

VARIABLES	(1) *Efficiency*	(2) *Efficiency*
$LnAcct_{t-1}$	0.0057**	
	(0.0124)	
TopExp	0.0021***	
	(0.0000)	
$LnAcct_{t-1}$* *TopExp*	-0.0004***	
	(0.0002)	
$LnAcctHQ_{t-1}$		0.0039***
		(0.0001)
$LnAcctNonHQ_{t-1}$		0.0003
		(0.8250)
$LnMkt_{t-1}$	0.0015	0.0005
	(0.2890)	(0.6265)
$LnEng_{t-1}$	0.0001	0.0005
	(0.9206)	(0.5458)
$LnHr_{t-1}$	-0.0004	0.0016
	(0.8016)	(0.1782)
|*DD DA*|	-0.2425***	-0.1782***
	(0.0000)	(0.0000)
Observations	11,282	19,561
Adjusted R-squared	0.0686	0.0719
Controls	YES	YES
Industry FE	YES	YES
Year FE	YES	YES

Notes: This table presents the results of estimating Equation (4) with the addition of *TopExp* as well as its interaction with $LnAcct_{t-1}$ in column (1). *TopExp* is the cumulative number of years that the executives listed in ExecuComp have been together at the firm. This count restarts when two or more of the executives leave the firm. In Column (2), $LnAcct_{t-1}$ *is* decomposed into accountants employed in the headquarters state ($LnAcctHQ_{t-1}$) and accountants employed elsewhere ($LnAcctNonHQ_{t-1}$). The dependent variable is a measure of investment efficiency based on the models in McNichols and Stubben (2008), Biddle et al. (2009), and Goodman et al. (2014). All variables are defined in the Appendix. This specification includes year and industry fixed effects in both columns. The numbers in parentheses are p-values. Standard errors are clustered by firm. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 7 – The relationship between accountants and investment efficiency – 2SLS

VARIABLES	(1) *LnAcct*	(2) *LnAcctHQ*	(3) *LnAcctNonHQ*	(4) *Efficiency*
150-Hour Rule	-0.0208**	-0.0777**	0.0832**	
	(0.0293)	(0.0465)	(0.0448)	
$\widehat{LnAcctHQ}$				0.0895**
				(0.0414)
LnMkt	0.1292***	0.1042***	0.1265***	-0.0078
	(0.0000)	(0.0000)	(0.0000)	(0.1349)
LnEng	0.2123***	0.1643***	0.2243***	-0.0095
	(0.0000)	(0.0000)	(0.0000)	(0.2127)
LnHr	0.1670***	0.1370***	0.1595***	-0.0056
	(0.0000)	(0.0000)	(0.0000)	(0.3273)
|*DD DA*|	-0.0233	-0.0962	0.1445	0.0540**
	(0.7801)	(0.2840)	(0.1353)	(0.0207)
Observations	17,665	16,340	15,714	15,542
Adjusted R-squared	0.9811	0.9537	0.9497	-0.1945
Controls	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES
State FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Cragg-Donald F Statistic				38.86

Notes: This table presents the results of estimating the impact of the *150-hour rule* on accountants employed (1st stage of 2SLS) and the results of estimating the impact of fitted *LnAcctHQ* on investment efficiency (2nd stage of 2SLS). In Column (1), the dependent variable is *LnAcct*. In columns (2) and (3), this variable is split between accountants employed in the firm's headquarters state and those employed in other states, respectively. These dependent variables are transformed by adding 1 and then taking the natural log of the sum. The independent variable of interest is *150-hour rule* which equals one if the firm is headquartered in a state that has adopted the 150-hour rule. Otherwise, it equals zero. Observations are set to missing in the year of adoption and the year following adoption. The dependent variable in column (4) is a measure of investment efficiency based on the models in McNichols and Stubben (2008), Biddle et al. (2009), and Goodman et al. (2014). The independent variable of interest is $\widehat{LnAcctHQ}$ which is the predicted values of *LnAcctHQ* from Column (2). Observations with less than one accountant are eliminated in Columns (1) and (3). Observations with less than one accountant in the headquarters state are eliminated in Columns (2) and (4). All variables are defined in the Appendix. This specification includes state, firm, and year fixed effects in all columns. The numbers in parentheses are p-values. Standard errors are clustered by state. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 8 – The impact of the 150-hour rule on investment efficiency

VARIABLES	(1) *Efficiency*	(2) *Efficiency*
150 Hour Rule	-0.0035***	-0.0033***
	(0.006)	(0.008)
|*DD DA*|		-0.1068***
		(0.0000)
Observations	75,824	75,824
Adjusted R-squared	0.1637	0.1659
Controls	YES	YES
Firm FE	YES	YES
State FE	YES	YES
Year FE	YES	YES

Notes: This table presents the results of estimating an amended version of Equation (4), where the independent variable of interest is *150-hour rule* instead of $LnAcct_{t-1}$. *150-hour rule* is equal to one if the firm is headquartered in a state that has adopted the 150-hour rule. Otherwise, it is equal to zero. Observations are set to missing in the year of adoption and the following two years. The dependent variable is a measure of investment efficiency based on the models in McNichols and Stubben (2008), Biddle et al. (2009), and Goodman et al. (2014). All variables are defined in the Appendix. This specification includes state, firm, and year fixed effects in both columns. The numbers in parentheses are p-values. Standard errors are clustered by state. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 9 – The relationship between accountant seniority and investment efficiency

VARIABLES	(1) *Efficiency*	(2) *Efficiency*
$LnAcctJunior_{t-1}$	0.0048***	0.0041**
	(0.0004)	(0.0103)
$LnAcctSenior_{t-1}$	0.0012	0.0006
	(0.4371)	(0.7179)
$LnMkt_{t-1}$		0.0003
		(0.7884)
$LnEng_{t-1}$		0.0002
		(0.8399)
$LnHr_{t-1}$		0.0008
		(0.5351)
$\|DD\ DA\|$		-0.1786***
		(0.0000)
Observations	19,561	19,561
Adjusted R-squared	0.0663	0.0716
Controls	YES	YES
Industry FE	YES	YES
Year FE	YES	YES

Notes: This table presents the results of estimating a modified version of Equation (4), in which $LnAcct_{t-1}$ *is* decomposed into junior accountants ($LnAcctJunior_{t-1}$) and senior accountants ($LnAcctSenior_{t-1}$). The dependent variable is a measure of investment efficiency based on the models in McNichols and Stubben (2008), Biddle et al. (2009), and Goodman et al. (2014). All variables are defined in the Appendix. This specification includes year and industry fixed effects in both columns. The numbers in parentheses are p-values. Standard errors are clustered by firm. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.