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Corporate employment, red flags, and audit effort ☆

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ABSTRACT

U.S. regulatory agencies and congressional oversight committees have expressed concerns that auditors often neglect red flags embedded in the operating characteristics of firms that misstate their financial reports. This study examines whether labor employment decisions, a major part of a firm's operations, help predict accounting improprieties and consequently play a role in audit planning and pricing. We find that negative abnormal employment changes are associated with a higher likelihood of subsequent financial restatements, accounting irregularities, and lawsuits related to accounting fraud, and generally require greater effort from auditors as manifested by higher audit fees and longer audit report lags. Positive abnormal employment changes are associated with subsequent restatements and longer audit report lags, but not associated with fraud or audit fees. Taken together, the results are consistent with auditors recognizing the individual misstatement risks pertaining to companies' employment decisions. These results suggest that standard setters, regulators, and practitioners should devote more attention to operational statistics to identify potential red flags.

1. Introduction

This study examines the relevance of the information reflected in corporate employment decisions to auditors' risk assessments and their planning and pricing decisions. The Securities and Exchange Commission (SEC) has long targeted auditors and boards of directors who missed or ignored red flags that could have indicated fraudulent activities (e.g., Campbell and Parker, 1992). The former director of the SEC's Division of Enforcement, Andrew Ceresney, has stated that "failure to exercise sufficient professional skepticism in evaluating management representations," particularly "where there are red flags," constitutes a significant class of cases against auditors (Ceresney, 2016). Auditing standards require auditors to consider clients' operations and business environments when assessing firm risk and controls, and one such key factor is firm-level employment decisions (e.g., AU sec. 314, *Understanding the Entity and Its Environment and Assessing the Risks of Material Misstatement*; AU sec. 316, *Consideration of Fraud in a Financial Statement Audit*). Furthermore, auditing standards stipulate

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that analytical procedures used in planning audit engagements should consider operations-based nonfinancial information, such as "number of employees, square footage of selling space, volume of goods produced, and similar information" (e.g., AU sec. 329A, *Analytical Procedures*).

Anecdotal evidence suggests that auditors often fail to adequately investigate clients' economic environment and operating statistics in audits, due to time constraints, failure to obtain corroborating evidence, and the desire to avoid conflict with client management (e.g., PCAOB, 2007; Meyer, 2015; SEC, 2015; Hobson et al., 2017). Furthermore, if management fabricates entries to financial data to hide the true nature of transactions, audit procedures relying on financial data (e.g., accounting books and records) could fail to detect fraud (PCAOB, 2007). For example, the SEC filed civil charges against American International Group, Inc. (AIG) for fraudulent accounting practices from 2000 to 2005 (SEC Litigation Release No. 19560, 2006). AIG had improperly accounted for approximately 66 transactions or items to overstate its financial results by billions, and did so without disclosing to AIG's independent auditors. Nonetheless, the reported number of AIG employees had declined persistently over the 2001–2005 time period (by near half), indicating unusual operating conditions. This case calls attention that auditors who ignore red flags in clients' operations may be overlooking important clues.

Nevertheless, extant research on whether operations-based measures are a useful input to auditing is limited. While research has focused on how inconsistent patterns between hand-collected capacity data (e.g., facilities growth) and financial measures (e.g., revenue growth) are linked to fraud (Brazel et al., 2009), our paper comprehensively analyzes an important aspect of firm-level operational conditions—hiring and firing of employees. In particular, we explore the associations of labor employment decisions in regard to misstatement risk and audit effort, and consider whether a higher or lower level of incremental investment in labor signals red flags.

There are at least four reasons why employment decisions can be useful in assessing risks of financial misstatement. First, Li (2011) contends that labor investment decisions contain important information about true, economic earnings and provide information on the quality of the reported earnings that is incremental to that contained in accounting financial statements. Second, due to high labor adjustment costs, managers must be certain about the changes in demand before changing employment levels (Dixit, 1997). Hence a firm's employment dynamics will facilitate auditors' understanding of the client's business risks and potential sources of misstatements. Third, the PCAOB (2007) contends that analytical procedures can be more effective when integrated with operating statistics that management has less ability to manipulate. Investment in labor has a direct matching relationship with current-year revenues (Pindyck, 1988) and is easily verifiable (Bell et al., 2008) and thus can help auditors generate reliable expectations for their analytical procedures. Finally, whereas there are challenges in collecting operating data (Brazel et al., 2009),[1] all firms have employees and hence the information is available for constructing our understanding of the risk and audit implications of labor employment decisions. Our effort, therefore, is to provide new empirical evidence of whether abnormal employment changes provide a general signal of misstatement risk, which affects audit planning and effort.

We conjecture that labor employment decisions, and specifically, abnormal changes in employment levels reveal early warning signs of accounting fraud and misstatements. We further speculate that, if auditors consider abnormal changes in employment levels as significant risk factors, they shall exert greater effort to detect misstatements and/or charge higher audit fees to cover the elevated audit and business risks.

Abnormal changes in employment levels can indicate different types of misreporting risk. On one hand, when demand for a firm's products falls, they may have a lower level of incremental investment in labor than expected given the change in their economic fundamentals. Under such conditions, shrinking growth and low morale may direct managers and employees to manipulate earnings and perpetrate fraud (Dechow et al., 2011; AU sec. 316). On the other hand, a higher-than-expected level of incremental investment in labor may occur when firms are engaging in empire building. The resulting over-investment problem not only reduces the informativeness of labor investment for future performance (Li, 2011) but also increases business risk and risk of material misstatement (Bentley et al., 2013). Therefore, the incidence of misstatement and the auditor response could be linked to the extent to which the change in employment is unexpectedly higher or lower than suggested by the underlying fundamentals.

Our empirical tests involve a sample of 38,840 firm-year observations from 2004 to 2016. We construct three material misstatement proxies—financial restatements, accounting irregularities, and accounting-related lawsuits using collective information from the Government Accountability Office (GAO) restatement database, the Audit Analytics database of restatements and legal cases, and the Berkeley Center for Financial Reporting & Management (CFRM) database of SEC Accounting and Auditing Enforcement Releases (AAERs). Following prior studies (e.g., Pinnuck and Lillis, 2007), we model the expected level of incremental investment in labor (as proxied by year-over-year percentage change in employee headcounts) based on a number of industry and firm-level variables that explain the normal fundamental demand for labor. We then identify negative (positive) abnormal employment changes, based on whether the actual level of incremental investment in labor is at below (above) the expected level.

After controlling for other determinants of material misstatements identified in the literature, we show that lower-than-expected investment in labor increases the likelihood of financial restatements, accounting irregularities, and lawsuits related to accounting fraud. This finding is consistent with negative abnormal employment changes signaling fraud risk,

[1] Research suggests that most non-financial performance metrics (such as selling space, customer satisfaction, product quality, process improvement, and ethical conduct) are firm-specific qualitative factors and weak indicators of firm performance (e.g., Campbell et al., 2007; Ibrahim and Lloyd, 2011).

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due to managers' incentives to show strong performance. The results also show that higher-than-expected investment in labor is associated with more frequent restatements but not irregularities and lawsuits. This evidence is consistent with positive abnormal employment changes not necessarily being considered as fraud indicators.

Furthermore, we find that both negative and positive abnormal changes in employment levels are associated with longer audit report lags, suggesting that auditors address increased client risks by intensifying their audit effort. We also find that auditors respond to increased fraud risk reflected in negative employment changes by charging a risk premium. However, they do not charge a risk premium when investment in labor is higher than expected, consistent with there being no evidence of fraud. The risk and audit implications of labor employment decisions tend to vary with industry-level union membership rates, while remaining robust after adjusting for endogeneity bias and potentially confounding effects of capital investment decisions, employee treatment policies, other predictors of misreporting, and tone at the top. Finally, we find that positive and negative abnormal employment changes have varying effects on internal control, auditor dismissal, and stock price crash. Overall, our findings suggest that labor employment decisions contain useful information that can aid auditors in assessing client risk and determining audit effort.

We contribute to the literature in several ways. First, we add to the emerging literature that examines the information content of corporate investment for financial reporting quality. Li (2011) proposes a new measure of earnings quality based on the labor and capital investment decisions of firms. He shows that the investment-based earnings-quality measure is associated with more persistent earnings and that the association is reduced when managers overinvest. Motivated by this research, we explore whether labor employment decisions have broad implications for accounting misstatements and audit planning. Our analysis provides useful insights not only to regulators and the investing community, but also to other important capital market participants such as auditors.

We also add to the stream of literature that explores the determinants of material accounting misstatements (e.g., Dechow et al., 2011). There is limited evidence on the usefulness of operations-based measures for fraud detection as the availability and the type of data appear to vary from firm to firm (Brazel et al., 2009). We focus on the usefulness of firm-level employment data, an operations-based measure that is often available to a broad section of firms. Our findings suggest that labor employment decisions provide additional useful information concerning the auditor's assessment of the risk of material misstatement.

We also add to the extensive body of literature on audit pricing. There is little evidence regarding the impact of corporate internal decisions on audit pricing (Causholli et al., 2010; DeFond and Zhang, 2014). We contribute to the literature by providing evidence that abnormal changes in employment levels require auditors to exercise professional skepticism. We show that auditors do respond differently to positive and negative abnormal employment changes and adjust their fees accordingly, providing evidence that auditors consider the different types of potential misstatements that may occur within these firms.

Our findings should inform policy makers and regulators given the claim that auditors seem to have neglected red flags relating to firms' operating characteristics (such as employee dynamics) in large, noteworthy fraud cases. Also, accounting standard setters may find that our results enhance their understanding of the disclosure requirements on workforce changes.

The remainder of our paper is organized as follows. Section 2 discusses the related literature and develops the hypotheses. Sections 3 and 4 detail our research design, sample, and data. Section 5 presents our main findings and additional analyses. Section 6 concludes.

2. Background and hypotheses development

2.1. Anecdotal evidence

In addition to the AIG example provided in the introduction, we present several more examples regarding the economic and accounting implications of labor investment decisions. Anecdotal evidence suggests that corporate employment changes are often seen as a default response to an uncertain future marked by rapid advances in technology, tumultuous markets, and intense competition (Sucher and Gupta, 2018). For example, the pharmaceutical sector has undergone strategic workforce transitions to tighten their focus on core therapeutic areas (Herper, 2011). In emerging sectors, Tesla and Uber have likewise been under pressure to slash overhead costs to streamline operations and improve shareholder value (Conger, 2019; Higgins, 2019). While some argue that companies do layoffs because they're already in bad shape, most practitioners believe that workforce changes should take place under a healthy present, that is, when the company can mobilize the resources needed to attenuate the knock-on effects on employee engagement and performance.[2]

The situations with corporate employment changes indicate not only a change in business operations, but also a likelihood of financial misreporting (e.g., to avoid disappointing investors and losing high valuations). Take Sunbeam as another example, the company announced in 1996 that they would be cutting half of the company's 12,000 employees (e.g., Collins, 1996). Sunbeam's stock had been on the rise since the start of the restructuring (from $12.50 a share to $53 a share), but suddenly fell off, to $22 per share, upon its restatement announcement in June 1998. The SEC investigation showed Sun-

[2] Recognizing the damage layoffs create on employees and performance, Michelin has integrated product planning, territory planning, and restructuring planning into one process (Sucher and Gupta, 2018).

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beam's 1997 profit (audited by Arthur Andersen) was inflated by $95 million, in contrast to the changes occurred in its operations (SEC, 2001).

2.2. Investment in labor and material misstatements

Investment in labor is a relatively new concept in accounting literature. Recent studies have shown that the actual employment level often deviates from the expected level of labor investment predicted by economic fundamentals (e.g., Jung et al., 2014, 2016; Ghaly et al., 2017). To our best knowledge, no study has specifically examined whether unexpected abnormal changes in employment levels provide auditors with unique operation-based information in assessing the risk of material misstatement and planning audit effort. Hence our first objective is to fill this gap in the literature by providing direct evidence on the association between abnormal employment changes and material misstatements.[3]

Investment in labor may capture useful information about firm performance that differs from what is reflected in other variables. Li (2011) contends that managerial investment decisions are informative about earnings quality. Specifically, managers make labor and capital investment decisions based on their private information about the future profitability of the underlying projects. These investment decisions thus should contain more information about the firm's future performance than what can be inferred from financial information per se.

Economists, for their part, assert that investment in labor is both economically significant and conveys important information about the underlying economic conditions for a company. While investments in labor and capital both can lead to increases in future profitability (Cobb and Douglas, 1928), when there is a shift in underlying economic fundamentals, investment in labor is likely to be one of the first investments to change. Therefore, observing hiring and firing patterns can help market participants better assess the value of the firm (e.g., Dixit, 1997; Jung et al., 2016).

Investment in labor also has a direct matching relationship with the current-year revenues that the employees help create (e.g., Pindyck, 1988). The general correlations between reliable operating statistics and reported financial performance can be used to check for reasonableness in the account balances (e.g., PCAOB, 2007). For example, Brazel et al. (2009) examine misstatements in 50 AAER firms and suggest the discrepancy between growth in facilities and growth in revenues may serve as a signal of fraud. Overall, research predicts that investment in labor serves both information and validation roles in auditing.

Although the anecdotal examples suggest that a lower-than-expected level of incremental investment in labor may indicate fraud risk, there is no large-scale empirical evidence to support this idea. Fraudulent reporting often involves incentives to commit fraud and circumstances that allow fraud to occur (e.g., Petroni and Beasley, 1996).[4] AU sec. 316 indicates that high degree of competition, declining demand, employee dissatisfaction, and unstable organization are all risk factors related to misstatements arising from fraudulent reporting.[5] These characteristics that make firms vulnerable to fraud are also associated with negative employment changes (Sucher and Gupta, 2018). Pinnuck and Lillis (2007) find that firms may exhibit a lower-than-expected level of investment in labor due to divesting activities. Dechow et al. (2011) argue that when demand falls, managers would be more inclined to reduce employee headcount in order to boost the bottom line. Furthermore, AU sec. 316 explicitly states "known or anticipated future employee layoffs" as a motivator for committing fraud due to poor employee morale and widespread employee dissatisfaction. In addition, large charges related to restructures would involve subjective judgments or uncertainties that are difficult to corroborate and therefore offer management a great deal of latitude and camouflage. Collectively, these arguments suggest that firms experiencing negative abnormal employment changes carry greater fraud risk.

On the other hand, a higher-than-expected level of incremental investment in labor likely occurs when agency conflicts lead self-interested managers to engage in empire building activities (Jensen, 1986, 1993). While overexuberant hiring is typically associated with excessive growth and excessive investment, other factors, such as managerial overconfidence and avoidance of adjustment costs, can also give rise to labor overinvestment (Tsui et al., 1997; Stein, 2003). Li (2011) argues that labor investment decisions could be less informative about the quality of earnings when managers over-invest due to agency problems, as managers cannot be relied on to truthfully report their private information about the value of an investment. For example, managers may hide information about segment profitability from shareholders lest the revelation of unprofitable segments leads to negative consequences (Hope and Thomas, 2008). Furthermore, Dechow et al. (2011, pp. 19 and 52) note, "A manager who is optimistic and overinvesting is also likely to be optimistic in terms of assumptions and forecasts that relate to asset values and earnings... However, when growth slows, managers may not wish to reveal

[3] Given that optimal employment levels are not always achieved due to high adjustment costs in labor (e.g., Dixit, 1997), deviations from the expected level of labor investment do not necessarily suggest risk. First, it might be more feasible to hold suboptimal employment levels to avoid the costs of adjustments (e.g., hiring, training, and firing). Second, it may be that the benchmark for optimal employment levels is misspecified. Furthermore, underinvestment in labor might be associated with anticipated automation and hence enhanced future performance (positive NPV investment). Finally, overinvestment can effectively nurture employee loyalty and improve employee performance (Tsui et al., 1997).

[4] Research and audit guidance identify three factors—collectively known as the fraud triangle—that lead to fraud: incentive, opportunity, and attitude (see Hogan et al., 2008 for a fraud literature survey). The literature has provided substantial empirical evidence on the first two risk factors (incentive and opportunity), but the third factor (propensity to rationalize fraud) is not easy to observe. Studies have also identified variables related to suspicious accounting that are useful in detecting fraud or earnings management.

[5] AU sec. 316 corresponds with AS 2401, *Consideration of Fraud in a Financial Statement Audit*, after the reorganization of auditing standards (effective as of December 15, 2016).

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the decline in sales or their overinvestment and so resort to aggressive accounting techniques . . ." Bentley et al. (2013) further suggest that excessive growth and resource over-extension produce a high level of outcome uncertainty and this, along with ineffective monitoring, provides an environment for misstatements. They find that prospectors who are aggressive in product and market development are associated with greater incidences of accounting irregularities. Taken together, these arguments and findings suggest that positive abnormal employment changes may indicate heightened client business risk and thus higher risk of material misstatement.[6]

The above discussions suggest that unexpected abnormal changes in employment could be financial reporting red flags which may indicate the existence of fraud and misstatement. Our first set of hypotheses stated in the alternative is as follows:

H1a. Negative abnormal employment changes are positively associated with material accounting misstatements.

H1b. Positive abnormal employment changes are positively associated with material accounting misstatements.

2.3. Investment in labor and audit effort

Our second set of analyses considers whether external auditors view abnormal changes in employment levels as risk factors and respond to the increased risk. The possible existence of fraud and client business risks likely subjects auditors to higher engagement risk, which may affect the audit scope and approach. Auditors may perform more extensive audit procedures, and/or charge a risk premium to compensate for the increased risk, resulting in higher audit fees (Simunic, 1980) and longer audit delays (Ashton et al., 1987).

Prior studies have generated mixed results regarding client risk factors and audit effort (surrogated by audit fees and audit delay).[7] For client financial reporting risk, Johnstone and Bedard (2001) suggest that the presence of misstatement risks, due to either error or fraud, is associated with a higher risk premium in planned fees for audit engagements. Houston et al. (2005) find that auditors' planning and pricing decisions differ, depending upon whether the auditor finds a misstatement due to fraud. Auditors will seek risk premia upon discovering evidence consistent with fraud but not when they find evidence of errors. For client business risk, while Pratt and Stice (1994) find that auditors increase their audit effort for clients in deteriorating financial conditions, they do not find a direct impact of client business risk on risk premia. Similarly, Bell et al. (2001) suggest that a higher business risk increases the number of audit hours, but not the fee per hour. Johnstone (2000) finds that audit partners recommend greater audit effort and higher fees in response to increases in both client business risk and auditor business risk (i.e., the risk of damaged auditor reputation). The positive association between business risk factors and audit fee premia is supported by limited empirical studies (Lyon and Maher, 2005; Bentley et al., 2013).

While the professional standards (e.g., AU sec. 329A) suggest that auditors should consider a client's employment information when planning and performing an audit, we are unaware of any study examining the effect of labor employment decisions on audit effort. The anecdotal examples discussed earlier indicate auditors may neglect red flags relating to the operating characteristics of firms that misstate their financial reports. The nuances reflected in abnormal employment changes, such as declining demand or excessive growth, can provide auditors with a deeper understanding of the client's operations and economic conditions when assessing the risk of material misstatement (e.g., AU sec. 314).[8] Furthermore, auditors are required to perform analytical procedures, which can range from simple comparisons to complex models that require both financial and nonfinancial data, so as to identify red flags that warrant further investigation (e.g., AU sec. 329A; PCAOB, 2007; Knechel et al., 2010).[9] If a lower level of incremental investment in labor signals greater fraud risk, auditors will likely need to implement more robust and thorough audit procedures, which subsequently entail a fee premium. If a higher level of investment in labor indicates client business risk, then auditors will also likely need to invest greater audit effort. Yet it is unclear from prior research whether auditors charge fee premia as a result of increased client business risk. Our second set of hypotheses stated in the null is as follows:

H2a. There is no association between negative abnormal employment changes and the level of audit effort.

H2b. There is no association between positive abnormal employment changes and the level of audit effort.

[6] Business risk refers to the risk that a client's economic condition will deteriorate in the future (Stanley, 2011). AS No. 12 suggests that business risks could affect many accounts and disclosures in the financial statements.

[7] See Hay et al. (2006), Knechel et al. (2013), and Abernathy et al. (2017) for surveys of the relevant literature on audit fees and audit delay and their relevance to audit quality.

[8] See also AS No. 12 (currently AS 2110), *Identifying and Assessing Risks of Material Misstatement*, paragraphs .07–.17, *Obtaining an Understanding of the Company and its Environment*, for audits of fiscal years beginning on or after December 15, 2010.

[9] See also AU sec. 329 (currently AS 2305), *Substantive Analytical Procedures*, for audits of fiscal years beginning on or after December 15, 2010.

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3. Research methods

3.1. Measure of abnormal employment changes

Pinnuck and Lillis (2007) develop a model for assessing the labor employment decisions of firms, which includes various industry and firm-level factors to control for economic fundamentals that explain incremental investment in labor (proxied by change in the number of employees). Research suggests that auditors who develop a more complete model of a client perform a more balanced and accurate risk assessment than those who merely benchmark performance measures (e.g., Knechel et al., 2010). Thus, it is reasonable that auditors might opt to perform a more complex assessment of the risk factors affecting labor employment decisions across industries and firms. Following Pinnuck and Lillis (2007) and Jung et al. (2014), we use the following OLS model (*Eq.* (1)) to estimate the expected incremental investment in labor based on economic fundamentals:

$$\begin{aligned} NET\_HIRE_{it} = {} & \alpha_0 + \alpha_1 SALES\_GROWTH_{it} + \alpha_2 SALES\_GROWTH_{it-1} + \alpha_3 ROA_{it} + \alpha_4 DELTA\_ROA_{it} + \alpha_5 DELTA\_ROA_{it-1} \\ & + \alpha_6 RETURN_{it} + \alpha_7 SIZE\_R_{it-1} + \alpha_8 QUICK_{it-1} + \alpha_9 DELTA\_QUICK_{it} + \alpha_{10} DELTA\_QUICK_{it-1} + \alpha_{11} LEV_{it-1} \\ & + \alpha_{12} LOSSBIN1_{it-1} + \alpha_{13} LOSSBIN2_{it-1} + \alpha_{14} LOSSBIN3_{it-1} + \alpha_{15} LOSSBIN4_{it-1} + \alpha_{16} LOSSBIN5_{it-1} \\ & + Industry\ \ FE + \varepsilon_{it} \end{aligned} \quad (1)$$

where *NET_HIRE* is the percentage change in the number of employees (See the appendix for operational definitions of all variables).

According to Pinnuck and Lillis (2007), growth in sales and profitability are likely to be the fundamental determinants of the incremental investment in labor. Both current year and prior year sales growth (*SALES_GROWTH*) and change in profitability (*DELTA_ROA*) are included to control for the uncertainty as to the time lag between sales growth, changes in profitability, and employment changes. Stock return (*RETURN*) is included to capture firm-level growth as well as any omitted fundamental variables, such as economic conditions. Firm size (*SIZE*) is included to provide an approximation of firm resources that may reduce cash flow problems. Furthermore, the quick ratio (*QUICK*) and change in the quick ratio (*DELTA_QUICK*) are included, to control for labor adjustment costs due to short-term liquidity problems, while leverage (*LEV*) controls for long-term financing needs. The prior year's change in the quick ratio is also included to account for the time lag between the change in liquidity and change in employees. In addition, indicator variables for small loss firms (*LOSSBIN1* to *LOSSBIN5*) are included, to control for the discontinuity in labor employment due to firm-level profitability shocks. Finally, we include industry fixed effects (based on the Fama and French, 1997, 48-industry classification) to control for systematic differences across industries in their labor demand. We estimate pooled OLS regressions with standard errors clustered by firm and year.

The residual estimated from *Eq.* (1), the difference between the actual and predicted changes in employment levels, is used as the proxy for the deviation from the expected level of incremental investment in labor, over and above that explained by economic fundamentals. We use the absolute values of the residuals as a firm-specific proxy for unexpected abnormal changes in employment levels (*AB_NET_HIRE*). We then classify firms based on the signs of the residuals: those with negative (positive) residuals that show lower (higher) than expected incremental investment in labor are defined as negative (positive) abnormal employment changes.[10]

3.2. Abnormal employment changes and material misstatements

To test the implication of labor employment decisions for misstatements (Hypothesis 1), we examine the associations of abnormal employment changes with the probability of subsequent financial restatements (*FUTURE_RESTATE*), accounting irregularities (*IRREGULARITY*), and accounting-related lawsuits (*LAWSUIT*). Specifically, we estimate the following logistic model for the likelihood of misstatements:

$$\begin{aligned} MISSTATE_{it} = {} & \beta_0 + \beta_1 AB\_NET\_HIRE_{it} + \beta_2 WC\_ACCRUAL_{it} + \beta_3 LNASSET_{it} + \beta_4 ROA_{it} + \beta_5 BTM_{it} + \beta_6 SALES\_GROWTH_{it} \\ & + \beta_7 LOSS_{it} + \beta_8 LEV_{it} + \beta_9 AGE_{it} + \beta_{10} MERGER_{it} + \beta_{11} DEBT\_ISSUE_{it} + \beta_{12} EQUITY\_ISSUE_{it} \\ & + \beta_{13} LITIGIOUS_{it} + \beta_{14} BIG4_{it} + \beta_{15} INDSP_{it} + Industry\ FE + \varepsilon_{it} \end{aligned} \quad (2)$$

where *MISSTATE* refers to either *FUTURE_RESTATE*, *IRREGULARITY*, or *LAWSUIT* and is set to one if current year financial reports are subject to restatements, irregularities, or lawsuits in subsequent periods, and zero otherwise. Following prior studies (e.g., Bentley et al., 2013; Demerjian et al., 2013; Hribar et al., 2014), for each of these measures, we identify misstatements in year $t + 1$ onward, i.e., in periods subsequent to year t, when misstatements are incurred. *AB_NET_HIRE* is the absolute value of the residuals (i.e., deviations from predicted incremental investment in labor) estimated from *Eq.* (1). Since Hypothesis 1 predicts an association between misstatements and negative (positive) abnormal employment changes, we partition the sample into subgroups in accordance with the signs of the residuals. A significantly positive coefficient of β_1

[10] We estimate *AB_NET_HIRE* based on the Pinnuck and Lillis (2007) model as this model is conceptually appealing and commonly used in the literature (Jung et al., 2014). In an untabulated analysis, we estimate *Eq.* (1) by industry, by both industry and year, or including year fixed effects. Our inferences remain robust to using alternative estimation approaches.

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suggests that the more deviation from the expected level of incremental labor investment, the more likely that misstatements will occur consistent with our first hypothesis.

Based on prior studies on fraud and misstatement, we control for a series of factors indicative of incentives or opportunities for misreporting, including accruals quality (*WC_ACCRUAL*), firm size (*LNASSET*), profitability (*ROA*), growth (*BTM*; *SALES_GROWTH*), financial distress (*LOSS*, *LEV*), firm age (*AGE*), merger and acquisition activities (*MERGER*), and new financing activities (*EQUITY_ISSUE*, *DEBT_ISSUE*). The accruals quality measure (*WC_ACCRUAL*) is measured based on the Dechow and Dichev (2002) model, as modified by McNichols (2002). The sign of *WC_ACCRUAL* is expected to be positive as prior studies suggest that misstatement years are typically associated with unusually high accruals (Dechow et al., 2011). We also expect a negative coefficient for *AGE*, and a positive coefficient for *LOSS*. Younger firms are more likely to commit fraudulent reporting (e.g., Beneish, 1999). Firms encountering losses are likewise more likely to commit fraudulent reporting in an attempt to disguise what may be temporary difficulties (e.g., Bentley et al., 2013).

Due to the conflicting findings in prior studies, we do not have a directional prediction for the other variables (e.g., Beneish, 1999; Erickson and Wang, 1999; Erickson et al., 2006; Venkataraman et al., 2008; Brazel et al., 2009; Dechow et al., 2011; Bentley et al., 2013; Lobo and Zhao, 2013; Abernathy et al., 2019). Small firms are on average more vulnerable to fraud because they lack stringent accounting controls. However, large firms may face greater agency problems which also leave them more susceptible to reporting fraud. Further, whereas low profitability may give management an incentive to commit fraudulent reporting, some firms achieve abnormally high performance through fraudulent reporting. Although the need to sustain high growth creates an incentive for companies to misstate their financial results, sporadic growth tendencies seem to be more problematic. In addition, whether raising financing is a motivation for fraud is also unclear due to heightened scrutiny and litigation concerns offsetting incentives to manage earnings.

Finally, we control for litigious industries (*LITIGIOUS*) as disclosure varies by differences in legal environments (e.g., Francis et al., 1994). We control for Big 4 auditors (*BIG4*) and auditor industry specialization (*INDSP*) which may increase disclosure quality and reduce the incidence of fraud. Large audit firms and industry specialists might also be more diligent and effective about searching for misstatements because of their superior techniques or because they have more wealth at risk upon audit failure (DeAngelo, 1981; Reichelt and Wang, 2010).

3.3. Abnormal employment changes and audit effort

To test our second hypothesis in regard to the implication of firm-level employment decisions for audit effort, we estimate the following OLS regression:

$$\begin{aligned} AUEFFORT_{it} = {} & \gamma_0 + \gamma_1 AB\_NET\_HIRE_{it} + \gamma_2 ROA_{it} + \gamma_3 LOSS_{it} + \gamma_4 BTM_{it} + \gamma_5 SALES\_GROWTH_{it} + \gamma_6 LEV_{it} \\ & + \gamma_7 WC\_ACCRUAL_{it} + \gamma_8 RESTATEMENT_{it} + \gamma_9 ICW_{it} + \gamma_{10} EQUITY\_ISSUE_{it} + \gamma_{11} DEBT\_ISSUE_{it} \\ & + \gamma_{12} GOING\_CONCERN_{it} + \gamma_{13} LNASSET_{it} + \gamma_{14} INVREV_{it} + \gamma_{15} SQSEGS_{it} + \gamma_{16} FOROPS_{it} + \gamma_{17} MERGERS_{it} \\ & + \gamma_{18} XDOPS_{it} + \gamma_{19} BIG4_{it} + \gamma_{20} INDSP_{it} + \gamma_{21} FYE_{it} + \gamma_{22} INITIAL_{it} + \gamma_{23} AGE_{it} + Industry\ \ FE + \varepsilon_{it} \end{aligned} \quad (3)$$

where the dependent variable, *AUEFFORT*, refers to either audit fees (*AUFEE*) or audit report lags (*AULAG*). The first proxy, *AUFEE*, is measured as the natural logarithm of total audit fees. The second proxy, *AULAG*, is measured as the natural logarithm of the number of days between the fiscal year-end and the auditor's report signing date. Hypothesis 2 predicts no association exists between audit effort and negative/positive abnormal changes in employment; accordingly, our analysis investigates different subsamples based on the signs of the residuals from *Eq.* (1). The coefficient on *AB_NET_HIRE*, γ_1, captures the effect of abnormal employment changes on audit effort. As per Hypothesis 2, we do not have a directional expectation for this coefficient.

Eq. (3) controls for factors previously found to be determinants of audit effort (e.g., Ettredge et al., 2006; Hay et al., 2006; Knechel and Sharma, 2012; Bentley et al., 2013; Hribar et al., 2014; Krishnan and Wang, 2015; Ettredge et al., 2018). We control for various types of audit risks associated with client and engagement attributes: client profitability (*ROA* and *LOSS*); financial leverage (*LEV*); growth opportunities (*BTM* and *SALES_GROWTH*); financial reporting quality as proxied by accruals quality (*WC_ACCRUAL*), restatements of financial reports (*RESTATEMENT*), and material weakness in internal control (*ICW*); corporate financing events (*EQUITY_ISSUE* and *DEBT_ISSUE*); and going-concern opinion (*GOING_CONCERN*). We further include a set of controls for client size and complexity: auditee size (*LNASSET*); total receivables and inventory (*INVREC*); number of business segments (*SQSEGS*); foreign operations (*FOROPS*); incidence of mergers and acquisitions (*MERGERS*); and extraordinary items contained in financial reporting (*XDOPS*). We also control for auditor quality: auditor brand-name premium (*BIG4*) and auditor industry specialization (*INDSP*). Additionally, we control for the timing of audit, set equal to one if the auditee's fiscal year-end is December and zero otherwise (*FYE*). We also control for the change of auditors to rule out low-balling as a possible cause of the fee change, set equal to one if the auditor has been with the client for one year or less, and zero otherwise (*INITIAL*). Finally, we control for the age of the firm (*AGE*) which is related to both auditee size and audit complexity.

Following prior research, we expect audit fees to increase with audit risks and complexity. Specifically, we predict that *AUFEE* increases with *LOSS*, *LEV*, *WC_ACCRUAL*, *RESTATEMENT*, *ICW*, *EQUITY_ISSUE*, *DEBT_ISSUE*, *GOING_CONCERN*, *LNASSET*,

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INVREC, *SQSEGS*, *FOROPS*, *MERGERS*, *XDOPS*, and *AGE*; but decreases with *ROA*, *BTM*, and *SALES_GROWTH*, as prior research shows a significant negative overall result (e.g., Hribar et al., 2014; Krishnan and Wang, 2015). We also expect *AUFEE* to be higher when an audit is performed by high-quality auditors (*BIG4* and *INDSP*) and lower when auditors are relatively new to the engagement (*INITIAL*). We do not have a directional expectation for the coefficient on *FYE*, in that the auditor's busy season is associated with both greater resources and demand for auditing.

Regarding audit report lag (*AULAG*), prior studies suggest that certain client characteristics, such as *LOSS*, *LEV*, *RESTATEMENT*, *ICW*, *GOING_CONCERN*, *INVREC*, *SQSEGS*, *FOROPS*, *XDOPS*, and *INITIAL* would require auditors to do more work, either due to high audit risk or complexity, which will result in more time for audit report completion. In contrast, *ROA*, *LNASSET*, *BIG4*, *INDSP*, *EQUITY_ISSUE*, *DEBT_ISSUE*, *MERGER*, and *AGE* are expected to be negatively associated with *AUDLAG*, whereas the expectation is not clear-cut for *BTM*, *SALES_GROWTH*, and *FYE*. In general, large, high-performing companies have incentives to minimize audit delay because they are usually closely monitored by investors and other stakeholders and therefore face greater pressure to report earlier (Dyer and McHugh, 1975). Similarly, companies competing for capital in the financial markets also face great pressure not to delay their financial reports. Finally, companies audited by high quality auditors are less likely to experience delays as these auditors have more resources.

4. Sample selection and data

Table 1 summarizes the sample selection procedures. We construct our abnormal employment change measure using 92,039 firm-year observations from the intersection between Compustat and Audit Analytics for fiscal years between 2004 and 2016. We delete 22,672 observations from the utilities and financial industries (SIC 4900–4999, 6000–6999), due to the regulated nature of these industries. We then require observations to have necessary data to estimate the expected level of incremental employment using *Eq.* (1). Specifically, we obtain information about number of employees and firm-level fundamentals from Compustat, and security price and return from CRSP. Compustat provides only the total number of employees, and thus we do not have a breakdown of employee headcount by function. The above filters result in a further reduction of 30,337 firm-year observations, providing an initial sample of 39,030 firm-year observations for estimating *Eq.* (1).[11]

To obtain a comprehensive list of misstatements, we rely on three databases prominently used by prior research: (i) the GAO database of restatement announcements, (ii) the Audit Analytics database of restatement announcements, and (iii) the CFRM database of SEC AAERs (e.g., Dechow et al., 2011; Cao et al, 2016). The GAO database was constructed based on Lexis-Nexis text searches, using the key word "restate" or its variations, and covers approximately 2705 restatements between January 1997 and June 2006. The Audit Analytics Restatement database tracks financial restatement disclosures via 8-K reports (since August 2004), other filings, and press releases (since 1995). Our CFRM dataset is comprised of 1330 firm misstatement events, based on 3490 SEC AAERs issued between May 1982 and October 2013.[12] We focus on restatements of the annual reports, as quarterly data are largely unaudited and suffer from missing employment data. Next, among the list of restatements, we further identify irregularities based on (i) the irregularity categorization of GAO restatement data using the methodology outlined in Hennes et al. (2008); (ii) the categorization of fraud-related restatements that were caused by intentional manipulation of financial data per Audit Analytics; and (iii) all AAERs in the CFRM dataset.[13] Finally, we obtain data on shareholder lawsuits related to accounting improprieties from the Audit Analytics litigation database.[14] As selection bias and incomplete data sets are general concerns when analyzing the determinants of earnings manipulation (Dechow et al., 2011), the examination of multiple dimensions of misstatements would validate our results.[15]

We obtain audit fees and audit lag data from Audit Analytics and financial data from Compustat to construct variables in the main analyses. Merging the misstatement sample with the initial sample and imposing these data requirements result in a final sample of 38,840 firm-year observations for estimating *Eqs.* (2) and (3). Among these, 22,600 (16,240) firm years experienced negative (positive) abnormal employment changes.

[11] Our sample displays an industry and yearly distribution (untabulated) that is almost identical to the Compustat population (excluding Financial Services and Utilities).

[12] Whereas AAERs do not necessarily lead to restatements, the CFRM dataset examines each AAER separately to identify whether it involves an alleged GAAP violation and if so, whether the misstated periods pertain to the GAAP violation. A detailed description of the CFRM dataset is available from Dechow et al. (2011).

[13] The Error vis-à-vis Irregularity Classification of GAO Restatement Data is available at Brian Miller's website: https://kelley.iu.edu/bpm/activities/errorandirregularity.html. Since the GAO database only specifies the restatement announcement date/year but not the misstatement period, we consolidate the GAO data with the Audit Analytics restatement database based on restatement announcement dates.

[14] The Audit Analytics litigation database identifies the misstatement periods that we use to determine whether the current year's annual report is subject to a future accounting-related lawsuit. When the information is missing, we code *LAWSUIT* as one if the firm is involved in a lawsuit related to accounting improprieties in the subsequent three-year period, and zero otherwise.

[15] For example, restatement firms are biased toward firms that have made a mistake that is not necessarily intentional. Shareholder lawsuit firms are biased toward firms that have had large stock price declines.

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Table 1
Sample selection procedures.

Cross-section of Compustat and Audit Analytics data from 2004 to 2016	92,039
Less: Observations in the utility and financial service industries (SIC 4900–4999, 6000–6999)	(22,672)
Less: Observations with missing values for variables for estimating the expected level of incremental investment in labor (*Eq.* (1))	(30,337)
Sample for the estimation of *Eq.* (1)	39,030
Less: Observations with missing values for estimating regression models of restatement, fraud, lawsuit, audit fee, and audit lag (*Eqs.* (2) and (3))	(190)
Final sample	**38,840**

The sample period is from 2004 to 2016. We track misstatements disclosed subsequent to the year in which the misstatement originated. The classification of accounting restatements, accounting irregularities, and accounting-related lawsuits is based on collective information from the GAO restatement database, the Audit Analytics restatement and legal data, and the CFRM AAER database.

5. Main results

5.1. Estimating the expected level of incremental investment in labor

Panel A of Table 2 presents the descriptive statistics for the variables used for estimating *Eq.* (1). The mean (median) percentage change in the number of employees (*NET_HIRE*) is 5.14% (2.04%), which is comparable to those reported by prior studies (e.g., Pinnuck and Lillis, 2007; Jung et al., 2014).[16]

Panel B of Table 2 presents the regression results for estimating the expected level of incremental investment in labor (*Eq.* (1)). The model has reasonable explanatory power, with an *R*-squared of 17.68%. Consistent with our expectation and prior studies, the percentage change in employees is positively associated with concurrent and lagged sales growth (*SALES_GROWTH* and $SALES\_GROWTH_{t-1}$), firm profitability (*ROA*), stock return (*RETURN*), firm size ($SIZE\_R_{t-1}$), and the lagged level of and change in liquidity ($QUICK_{t-1}$ and $DELTA\_QUICK_{t-1}$). The percentage change in employees is negatively associated with current profitability (*DELTA_ROA*) and liquidity (*DELTA_QUICK*) changes, as well as the lagged leverage ratio (LEV_{t-1}). The coefficient on *SALES_GROWTH* suggests that a 10% increase in current-period sales is associated with an average 2.31% increase in the level of employment. Additionally, changes in employees are negatively associated with the lagged change in profitability ($DELTA\_ROA_{t-1}$), a finding contrary to those of earlier studies (e.g., Pinnuck and Lillis, 2007) but more consistent with recent findings (e.g., Jung et al., 2016).

5.2. Descriptive analysis

Panel A of Table 3 presents the descriptive statistics for variables used in *Eqs.* (2) and (3). The average abnormal change in employment (*AB_NET_HIRE*) is 12.94%, exhibiting a deviation from expected incremental investment in labor, based on economic fundamentals. In general, the occurrences of subsequent restatements (*FUTURE_RESTATE*), irregularities (*IRREGULARITY*), and accounting-related lawsuits (*LAWSUIT*) are infrequent, as the medians for all three variables are zero. The distributions of the three misstatement rates are consistent with those of prior studies (e.g., Demerjian et al., 2013; Bentley et al., 2013). The average total audit fees is \$783,323 ($e^{13.5713}$), and the mean number of days between the fiscal year-end and the audit report signature date is 68 days ($e^{4.2189}$). All control variables are distributed in a manner that is consistent with prior research (e.g., Dechow et al., 2011; Bentley et al., 2013).

Panel B of Table 3 reports mean misstatement rates, audit fee (as a percentage of total assets), and audit report lag (in number of days) in quartile groups, formed by ranking firms on the magnitude of positive (i.e., investment being higher than expected) and negative (i.e., investment being lower than expected) abnormal employment changes. The lower quartile (Q1) might approximate the expected level of incremental investment in labor, while the upper quartile (Q4) clearly suggests greater deviations from expected investment. We find that both misstatements and audit effort significantly increase as we move from the bottom quartile to the top quartile (p-value < 0.1), with the exception of lawsuits (differences being statistically insignificant). Thus, the extreme quartiles tend to be associated with higher incidences of misstatements and greater audit effort. These findings are similar between negative and positive abnormal employment changes. This characteristic of the data is exploited in further testing of our hypotheses.

5.3. Testing H1: abnormal employment changes and material misstatements

Table 4 presents the regression results from estimating *Eq.* (2). At the overall level, consistent with Hypothesis 1, the deviation from expected incremental labor investment (*AB_NET_HIRE*) is significantly positive in the restatement (β_1 = 0.2893), irregularity (β_1 = 0.9012), and lawsuit (β_1 = 0.5844) models. The positive coefficients on *AB_NET_HIRE* suggest that companies with higher or lower than expected investment in labor are more likely to experience material misstatements. Once

[16] The mean (median) percentage change in the number of employees is reported as 5.43% (1.63%) in Pinnuck and Lillis (2007), while they are reported as 5.86% (2.04%) in Jung et al. (2014). The deviations across studies arise as a result of different sample periods. Pinnuck and Lillis (2007)'s sample period is 1983–2003, and Jung et al. (2014)'s sample period is 1983–2007.

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Table 2
Estimation of the expected level of incremental investment in labor (*NET_HIRE*).

Panel A: Summary statistics (N = 39,030)

Variables	Mean	Std. Dev.	Median	25th Q	75th Q
NET_HIRE	0.0514	0.2576	0.0204	−0.0490	0.1119
SALES_GROWTH	0.1058	0.4104	0.0599	−0.0490	0.1838
$SALES\_GROWTH_{t-1}$	0.1349	0.4544	0.0693	−0.0384	0.1997
ROA	−0.0810	0.4543	0.0309	−0.0660	0.0823
DELTA_ROA	−0.0075	0.3104	−0.0004	−0.0450	0.0362
$DELTA\_ROA_{t-1}$	−0.0023	0.3063	0.0001	−0.0441	0.0382
RETURN	0.1999	1.0378	0.0186	−0.2678	0.3318
$SIZE\_R_{t-1}$	49.2906	28.6400	49.0000	25.0000	74.0000
$QUICK_{t-1}$	2.0272	2.2836	1.3009	0.7901	2.3166
DELTA_QUICK	0.1229	0.7763	−0.0098	−0.2085	0.2111
$DELTA\_QUICK_{t-1}$	0.1348	0.7761	−0.0044	−0.2043	0.2224
LEV_{t-1}	0.2413	0.3408	0.1616	0.0081	0.3311
$LOSSBIN1_{t-1}$	0.0138	0.1166	0.0000	0.0000	0.0000
$LOSSBIN2_{t-1}$	0.0114	0.1063	0.0000	0.0000	0.0000
$LOSSBIN3_{t-1}$	0.0123	0.1104	0.0000	0.0000	0.0000
$LOSSBIN4_{t-1}$	0.0106	0.1022	0.0000	0.0000	0.0000
$LOSSBIN5_{t-1}$	0.0098	0.0987	0.0000	0.0000	0.0000

Panel B: Estimation results

Variables	Pred. Signs	Dependent Variable = *NET_HIRE*
SALES_GROWTH	+	0.2314***
		(0.00)
$SALES\_GROWTH_{t-1}$	+	0.0439***
		(0.00)
ROA	+	0.0120**
		(0.02)
DELTA_ROA	–	−0.0757***
		(0.00)
$DELTA\_ROA_{t-1}$	?	−0.0254***
		(0.00)
RETURN	+	0.0152***
		(0.00)
$SIZE\_R_{t-1}$	+	0.0007***
		(0.00)
$QUICK_{t-1}$	+	0.0061***
		(0.00)
DELTA_QUICK	?	−0.0131***
		(0.00)
$DELTA\_QUICK_{t-1}$	+	0.0253***
		(0.00)
LEV_{t-1}	?	−0.0126**
		(0.04)
$LOSSBINX1_{t-1}$	–	−0.0078
		(0.15)
$LOSSBINX2_{t-1}$	–	−0.0010
		(0.45)
$LOSSBINX3_{t-1}$	–	−0.0021
		(0.42)
$LOSSBINX4_{t-1}$	–	0.0030
		(0.41)
$LOSSBINX5_{t-1}$	–	−0.0094
		(0.18)
CONSTANT	?	−0.1136***
		(0.02)
Industries		Yes
N		39,030
***R*-squared**		0.1768

This table reports the descriptive statistics and parameter estimates from *Eq.* (1) for sample firm-year observations in the period of 2004–2016. Panel A presents descriptive statistics of all variables contained in *Eq.* (1). Panel B presents the parameter estimates for *Eq.* (1). All variables are defined in the appendix. Each continuous variable is winsorized at 1% and 99% to mitigate outliers. The *p*-values, based on standard errors clustered by firm and year, are reported in parentheses. *,**,*** denote significance at the 10%, 5%, and 1% levels, respectively, on a one-tailed test for coefficients with sign predictions and on a two-tailed test for those without sign predictions.

partitioned into the positive and negative abnormal employment change subsamples, the significant positive association between employment decisions and misstatements continues to hold in the negative subsample (*p*-values < 0.05 or better). A one standard deviation (13.44%) abnormal decrease in employment is expected to result in an increase in the likelihood of

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Table 3
Sample descriptive statistics.

Panel A: Summary statistics (n = 38,840)

Variables	Mean	Std. dev.	Median	25th Q	75th Q
FUTURE_RESTATE	0.1628	0.3692	0.0000	0.0000	0.0000
IRREGULARITY	0.0130	0.1131	0.0000	0.0000	0.0000
LAWSUIT	0.0194	0.1378	0.0000	0.0000	0.0000
AB_NET_HIRE	0.1294	0.1471	0.0762	0.0337	0.1608
WC_ACCRUAL	0.1393	0.1620	0.0820	0.0468	0.1593
LNASSET	5.8693	2.4784	5.9630	4.1695	7.5994
ROA	−0.0804	0.4525	0.0310	−0.0659	0.0823
BTM	0.4209	1.2073	0.4330	0.2211	0.7457
SALES_GROWTH	0.1056	0.4098	0.0599	−0.0490	0.1835
LOSS	0.3704	0.4829	0.0000	0.0000	1.0000
LEV	0.2544	0.3821	0.1667	0.0090	0.3392
AGE	2.8874	0.6053	2.8332	2.3979	3.2958
MERGER	0.1078	0.3101	0.0000	0.0000	0.0000
DEBT_ISSUE	0.0676	0.2511	0.0000	0.0000	0.0000
EQUITY_ISSUE	0.0465	0.2105	0.0000	0.0000	0.0000
LITIGIOUS	0.3869	0.4871	0.0000	0.0000	1.0000
BIG4	0.6734	0.4690	1.0000	0.0000	1.0000
INDSP	0.2062	0.4046	0.0000	0.0000	0.0000
AUFEE	13.5713	1.4269	13.6497	12.5776	14.5170
AUDLAG	4.2189	0.3087	4.2195	4.0254	4.3944
RESTATEMENT	0.0878	0.2831	0.0000	0.0000	0.0000
ICW	0.0503	0.2185	0.0000	0.0000	0.0000
GOING_CONCERN	0.0766	0.2660	0.0000	0.0000	0.0000
INVREC	0.2582	0.1881	0.2257	0.1054	0.3699
SQSEGS	1.3506	1.2017	1.4142	0.0000	2.0000
FOROPS	0.4638	0.4987	0.0000	0.0000	1.0000
XDOPS	0.0097	0.0980	0.0000	0.0000	0.0000
FYE	0.3208	0.4668	0.0000	0.0000	1.0000
INITIAL	0.0726	0.2595	0.0000	0.0000	0.0000

Panel B: Distribution of misstatements, audit fees, and audit lags sorted by signed *AB_NET_HIRE* quartiles

		N	*AB_NET_HIRE* Mean	*FUTURE_RESTATE* Mean	*IRREGULARITY* Mean	*LAWSUIT* Mean	*FEE/AT* Mean	*LAG* Mean
Positive AB_NET_HIRE								
	Q1	4,060	0.0148	0.1502	0.0079	0.0151	0.0049	66.8666
	Q2	4,060	0.0534	0.1576	0.0113	0.0160	0.0075	67.7212
	Q3	4,060	0.1226	0.1648	0.0135	0.0162	0.0096	69.2553
	Q4	4,060	0.3930	0.1872	0.0113	0.0202	0.0172	72.9227
	Q4-Q1		0.3782	0.0370	0.0034	0.0051	0.0123	6.0561
	p-value		(0.00)	(0.00)	(0.06)	(0.12)	(0.00)	(0.00)
Negative AB_NET_HIRE	Q1	5,650	0.0180	0.1506	0.0104	0.0191	0.0041	65.2614
	Q2	5,650	0.0535	0.1605	0.0143	0.0228	0.0057	65.1310
	Q3	5,650	0.1047	0.1605	0.0175	0.0226	0.0058	66.8533
	Q4	5,650	0.2934	0.1735	0.0150	0.0218	0.0158	74.7463
	Q4-Q1		0.2754	0.0229	0.0046	0.0027	0.0117	9.4850
	p-value		(0.00)	(0.00)	(0.01)	(0.12)	(0.00)	(0.00)

Panel A presents the descriptive statistics of variables used in estimating *Eqs.* (2) and (3) for our sample. Panel B presents mean misstatements rates, audit fees to total assets (*FEE/AT*), and audit report lags (in number of days; *LAG*) by quartile rankings based on signed abnormal employment changes (*AB_NET_HIRE*). We classify positive (negative) abnormal employment changes as those with higher (lower) than expected incremental investment in labor (estimated based on *Eq.* (1)). All variables are defined in the Appendix. Each continuous variable is winsorized at 1% and 99% to mitigate outliers. *,**,*** denote significance at the 0.10, 0.05 and 0.01 levels, respectively.

restatements, irregularities, and lawsuits by 4.06%, 1.60%, and 1.77%, respectively.[17] The results appear to be less clear-cut in the positive subsample. Specifically, when firms have positive abnormal employment changes, they are more likely to subsequently restate their financial reports (*p*-value < 0.01); however, they are not likely to be more involved in irregularities or lawsuits (which sustain a high inference of fraud). A one standard deviation (21.84%) abnormal increase in employment effectively increases the likelihood of restatements by 3.15%, but in effect does not increase the odds of an irregularity or lawsuit (the marginal effects being only 0.60% and 0.63%, respectively). The weaker association between labor employment decisions and misstatements in the subsample with positive abnormal employment changes is consistent with the finding that the investment decisions of firms are less informative about the quality of earnings when managers tend to overinvest (e.g., Li, 2011).

[17] To provide some perspective about the scale of this issue, the seasonally adjusted monthly lay-off rate ranged between 1.1% and 1.2% (or 12.3–14.4% annualized) across industries and regions between December 2017 and December 2018 (source: The Bureau of Labor Statistics, available at: https://www.bls.gov/news.release/jolts.t05.htm).

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Table 4
Abnormal employment changes (*AB_NET_HIRE*) and misstatements (Hypothesis 1).

Variables	Pred. Signs	(a) *FUTURE_RESTATE*			(b) *IRREGULARITY*			(c) *LAWSUIT*		
		All	Positive	Negative	All	Positive	Negative	All	Positive	Negative
AB_NET_HIRE	+	0.2893***	0.2473***	0.3196**	0.9012***	0.4767	1.3395***	0.5844**	0.3461	0.8882**
		(0.00)	(0.01)	(0.03)	(0.00)	(0.16)	(0.00)	(0.01)	(0.18)	(0.02)
WC_ACCRUAL	+	0.6815***	0.3975***	0.9190***	1.0794***	0.2933	1.4808***	1.2896***	0.6208*	1.6778***
		(0.00)	(0.01)	(0.00)	(0.00)	(0.29)	(0.00)	(0.00)	(0.09)	(0.00)
LNASSET	?	0.0275***	0.0082	0.0398***	0.2070***	0.0649	0.2683***	0.4221***	0.3118***	0.4742***
		(0.00)	(0.55)	(0.00)	(0.00)	(0.13)	(0.00)	(0.00)	(0.00)	(0.00)
ROA	?	−0.0102	−0.0897	0.0544	0.6466***	0.4498	0.8608***	0.3798**	0.4388	0.2831
		(0.81)	(0.12)	(0.37)	(0.00)	(0.17)	(0.00)	(0.02)	(0.11)	(0.17)
BTM	?	0.0374***	0.0499**	0.0357**	−0.0761**	−0.1419***	−0.0331	−0.0384	−0.0270	−0.0198
		(0.00)	(0.02)	(0.02)	(0.01)	(0.01)	(0.37)	(0.31)	(0.65)	(0.64)
SALES_GROWTH	?	0.0991***	0.2459***	0.0355	−0.0987	0.2821*	−0.2371*	0.1970**	0.4276***	0.0949
		(0.00)	(0.00)	(0.41)	(0.36)	(0.05)	(0.09)	(0.02)	(0.01)	(0.35)
LOSS	+	0.2199***	0.1646***	0.2606***	0.3374***	0.1759	0.3915***	0.5853***	0.2909**	0.7051***
		(0.00)	(0.00)	(0.00)	(0.00)	(0.20)	(0.01)	(0.00)	(0.04)	(0.00)
LEV	?	0.1313***	0.1146*	0.1576***	−0.0619	−0.4552*	0.1701	−0.7550***	−0.7437**	−0.6636***
		(0.00)	(0.08)	(0.01)	(0.75)	(0.18)	(0.48)	(0.00)	(0.03)	(0.00)
AGE	–	−0.0894***	−0.0858**	−0.0864***	−0.0814	−0.2313*	−0.0502	−0.0646	−0.4327***	0.0698
		(0.00)	(0.02)	(0.01)	(0.18)	(0.05)	(0.33)	(0.17)	(0.00)	(0.20)
MERGER	?	0.1057**	0.1215*	0.0604	−0.0531	0.1797	−0.1497	0.0724	0.1762	0.0680
		(0.02)	(0.05)	(0.40)	(0.71)	(0.38)	(0.49)	(0.50)	(0.26)	(0.65)
DEBT_ISSUE	?	−0.0163	−0.0174	−0.0231	−0.3489*	−0.2763	−0.4025*	0.0180	0.1372	−0.0486
		(0.78)	(0.85)	(0.76)	(0.07)	(0.44)	(0.08)	(0.89)	(0.56)	(0.74)
EQUITY_ISSUE	?	−0.1745**	−0.1348	−0.2173**	−0.3349	0.0970	−0.7272*	−0.1197	−0.0734	−0.0960
		(0.01)	(0.17)	(0.03)	(0.19)	(0.77)	(0.08)	(0.49)	(0.79)	(0.68)
LITIGIOUS	?	−0.0953*	−0.0444	−0.1232*	0.1766	0.2750	0.1572	0.0309	−0.0419	0.0642
		(0.08)	(0.61)	(0.08)	(0.32)	(0.38)	(0.46)	(0.85)	(0.88)	(0.76)
BIG4	?	0.1351***	0.1095*	0.1647***	−0.1711	0.0461	−0.3120*	−0.2091*	−0.1478	−0.2371
		(0.00)	(0.07)	(0.00)	(0.21)	(0.84)	(0.07)	(0.07)	(0.40)	(0.13)
INDSP	?	0.1978***	0.2497***	0.1668***	0.5210***	0.5802***	0.4886***	−0.3641***	−0.3463***	−0.3668***
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.04)	(0.00)
CONSTANT	?	−2.2045***	−1.6740**	−1.7362***	−5.4487***	−5.2551***	−5.6376***	−6.8094***	−4.6448***	−7.9563***
		(0.00)	(0.03)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Industries		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N		38,840	16,240	22,600	38,840	16,240	22,600	38,840	16,240	22,600
Pseudo R-Sq.		0.0153	0.0173	0.0171	0.0531	0.0575	0.0650	0.0800	0.0731	0.0993

This table reports regression results for estimating *Eq.* (2) for the full sample and subsamples with positive and negative abnormal employment changes. We classify positive (negative) abnormal employment changes as those with higher (lower) than expected incremental investment in labor (estimated based on *Eq.* (1)). All variables are defined in the Appendix. Each continuous variable is winsorized at 1% and 99% to mitigate outliers. The *p*-values, based on standard errors clustered by firm and year, are reported in parentheses. *,**,*** denote significance at the 10%, 5%, and 1% levels, respectively, on a one-tailed test for coefficients with sign predictions and on a two-tailed test for those without sign predictions.

The coefficients on controls are generally consistent with expectations. For example, firms that are large in size, growing rapidly, highly leveraged, incurring losses, and/or having lower accruals quality are more likely to restate in subsequent periods. Taken together, our results provide supporting evidence that, after controlling for other commonly used financial characteristics affecting misreporting, abnormal employment changes represent an underlying determinant of material accounting misstatements.

5.4. Testing H2: abnormal employment changes and audit effort

Table 5 presents the regression results from estimating the audit effort model for audit fees in the first three columns and audit delay in the next three columns. In the full sample (column 1), the positive and significant coefficient for *AB_NET_HIRE* (γ_1 = 0.1004, *p*-value < 0.01) suggests that deviations from expected incremental labor investment are associated with higher audit fees. Further, at the subsample level, we only observe a significantly positive association between *AB_NET_HIRE* and audit fees in the negative abnormal employment change subsample (γ_1 = 0.2783, *p*-value < 0.01), but not in the positive abnormal employment change subsample. An economic interpretation of the coefficient estimate for *AB_NET_HIRE* indicates that, *ceteris paribus*, a one standard deviation (13.44%) abnormal decrease in employment corresponds to a 3.81% ($e^{0.2783 * 0.1344} - 1$) increase in audit fees. Contrarily, the economic significance is minimal for the subsample with positive abnormal employment changes.

The coefficients on control variables are generally consistent with the literature. In particular, higher audit fees are paid by firms that are more complex, seeking external financing, having higher financial reporting risk, and/or engaging Big 4 auditors or industry audit specialists. We additionally control for audit lag (*AULAG*) to test whether audit firms adjust risk premiums in addition to altering the time spent in preparation of the audit report. Consistent with expectation, the coefficient on *AULAG* is significantly positive.

Turning to audit lag, in both the full sample and subsamples, the positive and significant coefficients for *AB_NET_HIRE* (γ_1 = 0.1130, 0.1064, or 0.1219, respectively) suggest that deviations from expected incremental labor investment are associated with longer audit report lags. In particular, *ceteris paribus*, a one standard deviation abnormal decrease in employment (13.44%) extends the audit report lag by 1.16 day (0.1219 * 13.44% multiplied by 71 days—the mean audit report lag for the negative change subsample). A one standard deviation abnormal increase in employment (21.84%) is associated with an average increase of 1.67 days (0.1064 * 21.84% * 72 days—the mean audit report lag for the positive change subsample) in audit report lag. These delays are perceived as significant by capital market participants (Bagnoli et al. 2002). The coefficients on control variables are consistent with those reported in prior relevant studies. In general, firms that are more complex, younger, having higher financial reporting risk, and/or hiring a new audit firm tend to experience longer audit delays.

Collectively, the results in Table 5 suggest that abnormal employment changes are an important economic determinant of audit effort. When clients experience negative abnormal employment changes, auditors will exert more effort and seek higher fees, in response to the increase in fraud risk lending support to the alternative hypothesis for H2a. We document relatively weaker evidence in support of the alternative hypothesis for H2b. Specifically, auditors plan increased hours for clients experience positive abnormal employment changes, but without charging higher premiums consistent with the lack of evidence of fraud. These findings comport with those of prior studies (e.g., Houston et al. 2005), suggesting that labor employment decisions provide auditors incremental information in assessing the possibility of misstatements.

5.5. Additional analyses

5.5.1. Controlling for abnormal capital investment in the material misstatement model

While prior studies (e.g., Li, 2011) have examined capital and labor investment as separate decisions, these decisions may be inter-related. To further mitigate the concern that our results are simply capturing the potential indirect effect of capital or non-labor investment decisions, we conduct two additional sets of tests. First, we re-estimate *Eq.* (2) by including abnormal capital investment as an additional control variable. Consistent with prior research (e.g., Biddle et al., 2009; Chen et al., 2011), we measure abnormal capital investment (*AB_CAP_INVEST*) as deviations from the expected level of investment estimated based on the firm's growth opportunities, with *CAP_INVEST* identifying total non-labor investment.[18]

In Panel A of Table 6, we report the results from re-estimating *Eq.* (2), controlling for *AB_CAP_INVEST*.[19] At the full sample, the coefficients on *AB_NET_HIRE* are significantly positive for all three misstatement models. At the subsample level, negative abnormal employment changes are positively associated with all three proxies of misstatements. In contrast, positive abnormal

[18] More specifically, we estimate the following model to calculate the expected level of investment (Biddle et al., 2009; Chen et al., 2011): $CAP\_INVEST_t = \delta_0 + \delta_1 SALES\_GROWTH_{t-1} + \varepsilon_t$, (4) where *CAP_INVEST* is total non-labor investment, calculated as the sum of capital expenditure, acquisition expenditure, and R&D expenditure less cash receipts from sale of property, plant, and equipment. *SALES_GROWTH* is the prior year's percentage change in sales. We estimate *Eq.* (4) for each industry-year and use the residuals as a firm-specific proxy for abnormal investment (*AB_CAP_INVEST*). Negative (positive) residuals are classified as under-investing (over-investing) in capital.

[19] Consistent with Biddle et al. (2009), the mean (median) capital investment of our sample firms equals 11.95% (7.07%) of prior years' assets (results not tabulated). The inclusion of *AB_CAP_INVEST* did not give rise to multicollinearity concerns across all analyses (Tables 6 and 7), with *VIF*s for *AB_NET_HIRE* and *AB_CAP_INVEST* ranging from 1 to 2.5. In Panel A of Table 6, the coefficient on *AB_CAP_INVEST* is significantly positive in only four out of nine tests. In Panel A of Table 7, the coefficient on *AB_CAP_INVEST* is significantly positive in only one test.

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Table 5
Abnormal employment changes and audit effort (Hypothesis 2).

Variables	Pred. Signs	(a) *AUFEE*			Pred. Signs	(b) *AULAG*		
		All	Positive	Negative		All	Positive	Negative
AB_NET_HIRE	?	0.1004***	−0.0021	0.2783***	?	0.1130***	0.1064***	0.1219***
		(0.00)	(0.94)	(0.00)		(0.00)	(0.00)	(0.00)
ROA	–	−0.1272***	−0.0913***	−0.1672***	–	0.0099**	0.0080	0.0084
		(0.00)	(0.00)	(0.00)		(0.02)	(0.12)	(0.12)
LOSS	+	0.1551***	0.1404***	0.1493***	+	0.0416***	0.0431***	0.0399***
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
BTM	–	−0.0405***	−0.0479***	−0.0367***	?	0.0135***	0.0161***	0.0119***
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
SALES_GROWTH	–	−0.0878***	−0.0633***	−0.1078***	?	−0.0180***	−0.0121*	−0.0225***
		(0.00)	(0.00)	(0.00)		(0.00)	(0.09)	(0.00)
LEV	+	−0.0479***	−0.0356**	−0.0608***	+	0.0389***	0.0416***	0.0359***
		(0.00)	(0.01)	(0.00)		(0.00)	(0.00)	(0.00)
WC_ACCRUAL	+	0.3844***	0.3355***	0.4137***	+	−0.0453***	−0.0338**	−0.0520***
		(0.00)	(0.00)	(0.00)		(0.00)	(0.04)	(0.00)
RESTATEMENT	+	0.1404***	0.1479***	0.1351***	+	0.0454***	0.0413***	0.0480***
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
ICW	+	0.3980***	0.4032***	0.3933***	+	0.2066***	0.2066***	0.2075***
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
EQUITY_ISSUE	+	0.0030	0.0154	0.0044	–	−0.0292***	−0.0291***	−0.0308***
		(0.40)	(0.19)	(0.40)		(0.00)	(0.00)	(0.00)
DEBT_ISSUE	+	0.0582***	0.0766***	0.0455***	–	−0.0678***	−0.0562***	−0.0734***
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
GOING_CONCERN	+	0.1502***	0.1131***	0.1498***	+	0.1112***	0.1038***	0.1144***
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
LNASSET	+	0.5085***	0.4909***	0.5184***	–	−0.0283***	−0.0296***	−0.0267***
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
INVREC	+	0.4900***	0.3777***	0.5782***	+	0.0880***	0.0854***	0.0884***
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
SQSEGS	+	0.0090***	0.0114***	0.0091***	+	0.0079***	0.0089***	0.0070***
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
FOROPS	+	0.3066***	0.2831***	0.3249***	+	−0.0406***	−0.0362***	−0.0438***
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
MERGER	+	0.0758***	0.1003***	0.0854***	–	−0.0426***	−0.0533***	−0.0357***
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
XDOPS	+	0.0982***	0.0822*	0.1057***	+	0.0668***	0.0784***	0.0626***
		(0.00)	(0.07)	(0.00)		(0.00)	(0.00)	(0.00)
BIG4	+	0.3462***	0.3635***	0.3301***	–	−0.0349***	−0.0229***	−0.0446***
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
INDSP	+	0.0774***	0.0744***	0.0764***	–	−0.0033	−0.0008	−0.0047
		(0.00)	(0.00)	(0.00)		(0.19)	(0.45)	(0.16)
FYE	?	−0.0246***	−0.0222**	−0.0267***	?	−0.0280***	−0.0265***	−0.0300***
		(0.00)	(0.02)	(0.00)		(0.00)	(0.00)	(0.00)
INITIAL	–	−0.0158*	−0.0213	−0.0139	+	0.0563***	0.0458***	0.0633***
		(0.10)	(0.12)	(0.20)		(0.00)	(0.00)	(0.00)
AGE	+	0.0594***	0.0472***	0.0553***	–	−0.0483***	−0.0337***	−0.0563***
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
AULAG	+	0.0541***	0.0561***	0.0540***				
		(0.00)	(0.00)	(0.00)				
CONSTANT	?	9.2481***	9.4346***	9.0685***	?	4.5447***	4.4669***	4.6562***
		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
Industries		Yes	Yes	Yes		Yes	Yes	Yes
N		38,840	16,240	22,600		38,840	16,240	22,600
Adjusted *R*-sq.		0.8633	0.8512	0.8704		0.2358	0.2094	0.2563

This table reports regression results for estimating *Eq.* (3) for the full sample and subsamples with positive and negative abnormal employment changes. We classify positive (negative) abnormal employment changes as those with higher (lower) than expected incremental investment in labor (estimated based on *Eq.* (1)). All variables are defined in the Appendix. Each continuous variable is winsorized at 1% and 99% to mitigate outliers. The *p*-values, based on standard errors clustered by firm and year, are reported in parentheses. *,**,*** denote significance at the 10%, 5%, and 1% levels, respectively, on a one-tailed test for coefficients with sign predictions and on a two-tailed test for those without sign predictions.

employment changes are associated with more frequent restatements but generally not with accounting irregularities or accounting-related lawsuits. In short, the empirical results remain qualitatively unchanged from those reported in Table 4.

Second, we examine whether the association between labor employment decisions and misstatements is independent of whether the firm under- or over-invests in capital. Specifically, we partition the sample into four subgroups based on the signs of the residuals from estimating the labor and capital investment models (*Eq.* (1) and *Eq.* (4), respectively). We then estimate *Eq.* (2) using the subgroups and report the results of this analysis in Panel B of Table 6. The relationships are similar to those reported in Table 4 in all except for one case. The only exception is for restatements with negative/positive abnormal

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investment changes in labor/capital (p-value = 0.46). Overall, our misstatement analysis is robust to alternative approaches to controlling for the potentially confounding effect of capital investment.

5.5.2. Controlling for abnormal capital investment in the audit effort model

We follow similar approaches to ensure that the association between labor employment decisions and audit effort is not driven by abnormal capital (non-labor) investment. First, we re-estimate the audit effort model and include *AB_CAP_INVEST* as an additional control. The results for this set of analyses are reported in Panel A of Table 7. For both full sample and subsamples, our results are invariant to the inclusion of the additional control variable, with the signs and magnitudes of the coefficients on the test variable, *AB_NET_HIRE*, being substantially the same.

Second, we partition the full sample and construct four subsets using the same approach as discussed in Section 5.5.1. We then re-estimate the audit effort model (*Eq.* (3)). The results of this analysis are provided in Panel B of Table 7. The findings remain consistent with those reported in Table 5. Overall, our audit effort analysis is robust to alternative approaches to controlling for the confounding effect of capital (non-labor) investment, suggesting that labor employment decisions provide incremental information to auditors relative to capital investment decisions.[20]

5.5.3. Considering the influence of industry unionization

The positive association between labor employment decisions and material accounting misstatements may be affected by the unionization rate. Li (2011) suggests that changes in labor employment are more likely to reflect permanent changes in earnings for heavily unionized firms, as layoffs are more costly for these firms; it is thus unlikely in these cases that managers could easily reduce the cost of labor to boost the bottom line. We therefore expect the positive association between abnormal employment changes and misstatements to be less pronounced in heavily unionized industries, especially when firms have lower than expected investment in labor.

Following prior studies (e.g., Li, 2011; Bova, 2013), we obtain unionization data for the 2004–2016 period from the Union Membership and Coverage Database.[21] We define high unionization industries as those with labor force unionization rates within the top quartile of all industries. We re-estimate *Eq.* (2) within the high vis-à-vis low unionization subsamples and report the results in Table 8. Panel A of Table 8 shows that, in high unionization industries, negative abnormal employment changes are associated with future restatements but have weaker or no association with accounting irregularities and shareholder lawsuits.[22] Panel B of Table 8 shows that results for low unionization industries are qualitatively unchanged from those reported in Table 4, which implies that the association between labor employment decisions and misstatements is more pronounced for firms operating in less unionized industries.

Next, we re-estimate *Eq.* (3) in the high vis-à-vis low unionization sub-samples and report the results in Panels A and B of Table 9. The results remain consistent with those reported in Table 5, with the associations being similar between the two subsamples. Therefore, auditors appear to consider abnormal changes in employment levels, regardless of the industry's level of unionization.

5.5.4. Other analyses

We examine the robustness of our results using several additional analyses (results are untabulated). First, Guo et al. (2016) find that employee treatment policies are an important predictor of employee-related material weaknesses and error-related financial restatements. To ensure that abnormal employment changes convey information beyond personnel-friendly policies, we include firm-level employee treatment policies (proxied by KLD ratings of employee relations) as an additional control variable in our analyses and obtained similar results.

Second, abnormal employment changes could capture changes in firm risk or financial distress. To mitigate this concern, we include in our analyses additional controls for cash flow volatility (measured as the variance of five years' annual cash flow from operations, scaled by sales), financial distress (measured as one if either operating cash flow or income before extraordinary item is negative, and zero otherwise), as well as contemporaneous changes in credit rating (proxied by long-term credit rating). Our inferences remain unchanged.

Third, abnormal employment changes could be correlated with other potential predictors of misstatements. To address this concern, we control for past CEO excessive benchmark beating tendencies (Chu et al., 2019), tax avoidance (proxied by book-tax differences based on McGuire et al., 2012), and accounting opacity (proxied by the Bog Index based on Bonsall et al., 2017).[23] In addition, as the literature indicates strongly that tone at the top influences financial reporting errors,

[20] The additional sets of tests discussed in the current and next sections focus on controlling for abnormal capital investment in the material misstatement and audit effort models. A more appropriate method to control for abnormal capital investment would be to control for this deviation from *Eq.* (1), thus identifying abnormal employment changes not due to these indirect effects. We therefore include our proxy of abnormal capital investment (*AB_CAP_INVEST*) as an additional variable in *Eq.* (1) to obtain abnormal labor investment (*AB_NET_HIRE*) levels not due to *AB_CAP_INVEST*. We obtained similar results (untabulated) using the alternative measure of *AB_NET_HIRE*.

[21] The database, maintained by Barry Hirsch and David Macpherson, is available at www.unionstats.com.

[22] Untabulated analysis shows high unionization industries report significantly lower negative abnormal employment changes, relative to low unionization industries. This confirms the interpretation that lower-than-expected investment in labor is not a useful indicator of misreporting incentives in industries with heavy unionization.

[23] The Bog Index scores for 10-K filings filed since 1994 are available at: https://kelley.iu.edu/bpm/activities/bogindex.html. We thank Brian Miller for this data.

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Table 6
Additional Analyses.

Panel A: Abnormal employment changes and misstatements: Controlling for abnormal capital investment

Variables	(a) *FUTURE_RESTATE*			(b) *IRREGULARITY*			(c) *LAWSUIT*		
	All	Positive	Negative	All	Positive	Negative	All	Positive	Negative
AB_NET_HIRE	0.3349***	0.2910***	0.3957**	1.1570***	0.6786*	1.5993***	0.5780**	0.3203	0.8260**
	(0.00)	(0.00)	(0.02)	(0.00)	(0.08)	(0.00)	(0.02)	(0.21)	(0.03)
AB_CAP_INVEST	0.2685*	0.1618	0.2287	−1.4636**	−0.8408	−2.4751	1.1148***	0.8067*	1.5222**
	(0.07)	(0.40)	(0.37)	(0.03)	(0.22)	(0.11)	(0.00)	(0.09)	(0.02)
Industries	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	38,840	16,240	22,600	38,840	16,240	22,600	38,840	16,240	22,600
Pseudo *R*-Sq.	0.0176	0.0214	0.0184	0.0627	0.0732	0.0735	0.0833	0.0804	0.105

Panel B: Abnormal employment changes and misstatements: Partitioning subgroups by abnormal labor/capital investment

Variables	(a) *FUTURE_RESTATE*				(b) *IRREGULARITY*				(c) *LAWSUIT*			
	labor(+) cap(+)	labor(+) cap(−)	labor (−) cap (+)	labor(−) cap(−)	labor(+) cap(+)	labor(+) cap(−)	labor(−) cap(+)	labor(−) cap(−)	labor(+) cap(+)	labor(+) cap(−)	labor(−) cap(+)	labor(−) cap(−)
AB_NET_HIRE	0.2341**	0.2824**	0.0298	0.4461**	0.3436	0.6908	1.5700**	1.3200***	0.3057	0.5074	1.2300**	0.8371*
	(0.04)	(0.03)	(0.46)	(0.02)	(0.29)	(0.17)	(0.04)	(0.01)	(0.27)	(0.20)	(0.03)	(0.06)
Industries	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	8,500	7,740	8,053	14,547	8,500	7,740	8,053	14,547	8,500	7,740	8,053	14,547
Pseudo *R*-Sq.	0.0221	0.0224	0.0162	0.0213	0.0614	0.0853	0.0757	0.0886	0.0720	0.0891	0.0823	0.126

This table reports two additional analyses controlling for potentially confounding effects of capital (non-labor) investment decisions in testing for Hypothesis 1. Panel A presents the regression results from estimating *Eq.* (2) for the full sample and abnormal employment change subsamples, including abnormal changes in capital investment as an additional control. Panel B presents subsample analyses based on the directions of the abnormal changes in labor (employment) and capital investment. All variables are defined in the Appendix. Each continuous variable is winsorized at 1% and 99% to mitigate outliers. The *p*-values, based on standard errors clustered by firm and year, are reported in parentheses. *,**,*** denote significance at the 10%, 5%, and 1% levels, respectively, on a one-tailed test for coefficients with sign predictions and on a two-tailed test for those without sign predictions.

Table 7
Additional Analyses.

Panel A: Abnormal employment changes and audit effort: Controlling for abnormal capital investment

Variables	(a) *AUFEE*			(b) *AULAG*		
	All	Positive	Negative	All	Positive	Negative
AB_NET_HIRE	0.1150***	0.0141	0.2880***	0.1107***	0.1031***	0.1192***
	(0.00)	(0.32)	(0.00)	(0.00)	(0.00)	(0.00)
AB_CAP_INVEST	−0.3173***	−0.2189***	−0.3625***	0.0191	−0.0184	0.0889***
	(0.00)	(0.00)	(0.00)	(0.25)	(0.39)	(0.00)
AULAG	0.0663***	0.0871***	0.0788***			
	(0.00)	(0.00)	(0.00)			
Industries	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	38,840	16,240	22,600	38,840	16,240	22,600
Adjusted *R*-square	0.8633	0.8471	0.8693	0.2249	0.1860	0.2439

Panel B: Abnormal employment changes and audit effort: Partitioning subgroups by abnormal labor/capital investment

Variables	(a) *AUFEE*				(b) *AULAG*			
	labor(+) cap(+)	labor(+) cap(−)	labor(−) cap(+)	labor(−) cap(−)	labor(+) cap(+)	labor(+) cap(−)	labor(−) cap(+)	labor(−) cap(−)
AB_NET_HIRE	0.0087	−0.0176	0.2874***	0.2804***	0.1166***	0.1049***	0.1189***	0.1218***
	(0.41)	(0.34)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
AULAG	0.0559**	0.0559**	0.0510**	0.0567***				
	(0.02)	(0.02)	(0.04)	(0.00)				
Industries	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	8,500	7,740	8,053	14,547	8,500	7,740	8,053	14,547
Adjusted *R*-sq.	0.8389	0.8607	0.8573	0.8769	0.2250	0.1937	0.2784	0.2501

This table reports two additional analyses controlling for potentially confounding effects of capital (non-labor) investment decisions in testing for Hypothesis 2. Panel A presents the regression results from estimating *Eq.* (3) for the full sample and abnormal employment change subsamples, including abnormal changes in capital investment as an additional control. Panel B presents subsample analyses based on the directions of the abnormal changes in labor (employment) and capital investment. All variables are defined in the Appendix. Each continuous variable is winsorized at 1% and 99% to mitigate outliers. The *p*-values, based on standard errors clustered by firm and year, are reported in parentheses. *,**,*** denote significance at the 10%, 5%, and 1% levels, respectively, on a one-tailed test for coefficients with sign predictions and on a two-tailed test for those without sign predictions.

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Table 8
Abnormal employment changes and misstatements: High vs. low industry unionization.

Variables	(a) *FUTURE_RESTATE*			(b) *IRREGULARITY*			(c) *LAWSUIT*		
	All	Positive	Negative	All	Positive	Negative	All	Positive	Negative
Panel A: High industry unionization									
AB_NET_HIRE	0.4349***	0.2316	0.7862***	1.2723**	0.3956	1.1869*	0.0465	−0.6479	0.0777
	(0.00)	(0.13)	(0.01)	(0.02)	(0.36)	(0.08)	(0.47)	(0.22)	(0.46)
Industries	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	10,216	3,982	6,234	10,216	3,982	6,234	10,216	3,982	6,234
Pseudo R-Sq.	0.0233	0.0311	0.0266	0.0622	0.0886	0.0831	0.1120	0.1510	0.1110
Panel B: Low industry unionization									
AB_NET_HIRE	0.2374***	0.2607**	0.1369	0.7588**	0.3897	1.3053**	0.7330**	0.6165*	1.0855**
	(0.01)	(0.01)	(0.25)	(0.02)	(0.24)	(0.01)	(0.01)	(0.08)	(0.01)
Industries	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	28,624	12,258	16,366	28,624	12,258	16,366	28,624	12,258	16,366
Pseudo R-Sq.	0.0170	0.0196	0.0190	0.0575	0.0548	0.0661	0.0783	0.0643	0.1030

This table reports additional analyses using high vis-à-vis low industry unionization for Hypothesis 1. Panels A and B present the regression results from estimating *Eq.* (2) for highly unionized industries and weakly unionized industries, respectively. All variables are defined in the Appendix. Each continuous variable is winsorized at 1% and 99% to mitigate outliers. The *p*-values, based on standard errors clustered by firm and year, are reported in parentheses. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively, on a one-tailed test for coefficients with sign predictions and on a two-tailed test for those without sign predictions.

Table 9
Abnormal employment changes and audit effort: High vs. low industry unionization.

Variables	(a) *AUFEE*			(b) *AULAG*		
	All	Positive	Negative	All	Positive	Negative
Panel A: High industry unionization						
AB_NET_HIRE	0.1352***	0.0566	0.2496***	0.1290***	0.0821***	0.1860***
	(0.00)	(0.33)	(0.00)	(0.00)	(0.01)	(0.00)
AULAG	−0.0264	−0.0816**	0.0141			
	(0.28)	(0.02)	(0.67)			
Industries	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	10,216	3,982	6,234	10,216	3,982	6,234
R-square	0.8653	0.8579	0.8681	0.2368	0.2138	0.2589
Panel B: Low industry unionization						
AB_NET_HIRE	0.0884***	−0.0219	0.2848***	0.1120***	0.1145***	0.1076***
	(0.00)	(0.49)	(0.00)	(0.00)	(0.00)	(0.00)
AULAG	0.0855***	0.1124***	0.0652***			
	(0.00)	(0.00)	(0.00)			
Industries	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	28,624	12,258	16,366	28,624	12,258	16,366
R-square	0.8609	0.8492	0.8688	0.2603	0.2307	0.2842

This table reports additional analyses using high vis-à-vis low industry unionization for Hypothesis 2. Panels A and B present the regression results from estimating *Eq.* (3) for highly unionized industries and weakly unionized industries, respectively. All variables are defined in the Appendix. Each continuous variable is winsorized at 1% and 99% to mitigate outliers. The *p*-values, based on standard errors clustered by firm and year, are reported in parentheses. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively, on a one-tailed test for coefficients with sign predictions and on a two-tailed test for those without sign predictions.

we further control for tone at the top, proxied by three variables including dual chairman/CEO, board independence, and audit committee member financial expertise (e.g., Krishnan and Visvanathan, 2008; Cohen et al., 2014). The results with the addition of all six control variables suggest that our inferences remain unchanged.

Fourth, Jung et al. (2014) find that poor accounting quality (proxied by accruals quality) leads to inefficient investments in labor. We examine whether abnormal changes in labor predict accounting misstatements and whether it is incrementally informative beyond other earnings quality measures and financial indicators. In doing this, we focus on ex post cases of poor accounting quality (e.g., restatements, irregularities, and lawsuits) and explicitly control for the accruals quality measure (*WC_ACCRUAL*) in our main analysis to help mitigate concerns with endogeneity and reverse causality. The fact that *AB_NET_HIRE* is significant in the presence of other *ex ante* measures further indicates that there is unique information in abnormal employment changes. To further address the potential for endogeneity bias, we regress *AB_NET_HIRE* on *WC_ACCRUAL* to obtain a residual measure of abnormal employment changes that is orthogonal to accrual quality. Our inferences based on the residual measure remain unchanged.

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Finally, we explore additional signaling roles for employment decisions to corroborate our conjectures on the relation of abnormal employment changes and accounting misstatements. We find that positive changes increase the propensity for employee-related material weaknesses but not overall material weaknesses and subsequent auditor dismissals, whereas negative changes increase the propensity for both overall material weaknesses and subsequent auditor dismissals but not employee-related material weaknesses.[24] These findings are consistent with auditors' client-specific, private information related to changes in the riskiness of a client (e.g., Hackenbrack et al. 2014). Further, negative (positive) abnormal employment changes are positively (negatively) related to one-year-ahead crash risk, suggesting managers might conceal negative information or divert company resources for extended periods of time.[25]

6. Conclusion

In this study, we address whether labor employment decisions provide auditors with useful incremental information concerning their client risk assessment and audit pricing. Professional guidance suggests operating statistics can provide crucial information for understanding a client's business and changes in it and thus have incremental value, beyond financial performance measures. We speculate that negative abnormal employment changes may indicate managerial misreporting incentives and increased fraud risk, whereas positive abnormal employment changes may capture the risk of resource overextension. Yet it is unclear whether auditors respond to the increased risks by intensifying audit effort and/or requiring risk premia.

Using proxies for expected and unexpected incremental investment in labor based on economic fundamentals, we find negative abnormal employment changes are associated with greater incidences of subsequent restatements, irregularities, and lawsuits, and generally require greater audit effort, evidenced by higher audit fees and longer audit report lags. This evidence is consistent with increased risks of misstatement due to fraud. In contrast, positive changes are associated only with subsequent restatements and longer audit report lags, consistent with increased business risks. Our results are robust to various controls and alternative measures, but tend to vary by industry unionization. Overall, our findings suggest that firm-level operational characteristics, such as labor employment decisions, provide auditors with useful information in assessing the nature of potential misstatements and the circumstances of their occurrences.

Several caveats to the study are in order. First, while we control for a number of covariates in determining the expected level of incremental investment in labor, there might be some unknown omitted variables that affect both predicted and residual values leading to measurement errors. Second, we only speak to the effect of labor employment decisions on audit effort after controlling for other factors and do not rule out the possibility that auditors may have drawn on additional operation-based indicators. Third, as stated earlier, we do not have information on employee headcount by function. Future research can look into how different types of employment changes, such as shortage in accounting staff and internal audit staff (e.g., Czerney et al., 2019), affect risk of material misstatement. Notwithstanding these caveats, we believe our study provides an important first step that we hope will spur future research into the ways in which auditors incorporate information from other channels into their risk assessments. Finally, to enhance understanding of how capital participants interact, it would be interesting to replicate our study in environments where employment decisions may be shaped by different economic and policy factors than those in the United States.

Appendix A. Variable definitions

Variables	Definition
NET_HIRE	Percentage change in the number of employees
SALES_GROWTH	Percentage change in sales revenue
ROA	Return on assets, measured as income before extraordinary items divided by total assets at the beginning of the year
DELTA_ROA	Change in *ROA*
RETURN	Total annual stock return
SIZE_R	Percentile rank of market value
QUICK	Quick ratio
DELTA_QUICK	Percentage change in the quick ratio
LEV	The sum of debt in current liabilities and total long-term debt divided by total assets
LOSSBIN1	1 if *ROA* ranges from −0.005 to 0, and 0 otherwise
LOSSBIN2	1 if *ROA* ranges from −0.010 to −0.005, and 0 otherwise

[24] This might suggest positive abnormal employment changes increase financial misreporting caused by unintentional (employee) errors due to inadequate employee ability or effort and insufficient support and training.

[25] Following prior studies (e.g., Chen et al., 2001; Kim et al., 2011a, b), we measure firm-specific crash risk using the negative coefficient of skewness (*NCSKEW*), calculated as the negative of the third moment of each stock's firm-specific daily returns divided by the cubed standard deviation.

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Appendix A (*continued*)

Variables	Definition
LOSSBIN3	1 if *ROA* ranges from −0.015 to −0.010, and 0 otherwise
LOSSBIN4	1 if *ROA* ranges from −0.020 to −0.015, and 0 otherwise
LOSSBIN5	1 if *ROA* ranges from −0.025 to −0.020, and 0 otherwise
FUTURE_RESTATE	1 if current year financial reports are subject to restatements in subsequent periods, and 0 otherwise
IRREGULARITY	1 if current year financial reports are subject to irregularities in subsequent periods, and 0 otherwise
LAWSUIT	1 if current year financial reports are subject to accounting –related lawsuits in subsequent periods, and 0 otherwise
AB_NET_HIRE	Abnormal level of hiring, measured as the absolute value of the residual from estimating the following model: $NET\_HIRE_{it} = \alpha_0 + \alpha_1 SALES\_GROWTH_{it} + \alpha_2 SALES\_GROWTH_{it-1} + \alpha_3 ROA_{it} + \alpha_4 DELTA\_ROA_{it} + \alpha_5 DELTA\_ROA_{it-1} + \alpha_6 RETURN_{it} + \alpha_7 SIZE\_R_{it-1} + \alpha_8 QUICK_{it-1} + \alpha_9 DELTA\_QUICK_{it} + \alpha_{10} DELTA\_QUICK_{it-1} + \alpha_{11} LEV_{it-1} + \alpha_{12} LOSSBIN1_{it-1} + \alpha_{13} LOSSBIN2_{it-1} + \alpha_{14} LOSSBIN3_{it-1} + \alpha_{15} LOSSBIN4_{it-1} + \alpha_{16} LOSSBIN5_{it-1} + Industry\ \ FE + \varepsilon_{it}$
WC_ACCRUAL	Accruals quality based on the Dechow and Dichev (2002) model as modified by McNichols (2002), which is the standard deviation of firm-specific residuals estimated from annual industry-level regressions of working capital accruals on lagged, current, and future cash flows from operations, the change in revenue, and PPE
LNASSET	Natural log of total assets
BTM	Book-to-market ratio, calculated as book value of common equity divided by market value of common equity
LOSS	1 if *ROA* is negative, and 0 otherwise
AGE	Natural log of the number of years since the firm was included in the Compustat
MERGER	1 if there is a merger or acquisition, and 0 otherwise
DEBT_ISSUE	1 if the firm issues public debt, and 0 otherwise
EQUITY_ISSUE	1 if the firm has an initial public offering or seasoned equity offering, and 0 otherwise
LITIGIOUS	1 if the company is in a litigious industry (SIC 2833–2836, 3570–3577, 3600–3674, 5200–5961, 7370–7374, and 8731–8734), and 0 otherwise
BIG4	1 if the auditor is a Big 4 auditor, and 0 otherwise
INDSP	1 if the auditor is the industry leader, and 0 otherwise
AUFEE	Natural log of audit fees
AULAG	Natural log of the number of days between the fiscal year-end and audit report date
RESTATEMENT	1 if the firm restates its financial statement during the current year, and 0 otherwise
ICW	1 if there is a material weakness in internal control, and 0 otherwise
GOING_CONCERN	1 if the firm receives a going-concern opinion, and 0 otherwise
INVREC	Sum of inventory and accounts receivables divided by total assets
SQSEGS	Square root of the number of business segments
FOROPS	1 if the absolute value of foreign currency gain or loss exceeds $10,000, and 0 otherwise
XDOPS	1 if the firm has extraordinary items, and 0 otherwise
FYE	1 if the firm's fiscal year-end is December 31, and 0 otherwise
INITIAL	1 if the firm's auditor has been with the client for one year or less, and 0 otherwise
AB_CAP_INVEST	Deviations from the expected level of investment estimated from annual industry-level regressions of total capital (non-labor) investment (the sum of capital expenditure, acquisition expenditure, and R&D expenditure less cash receipts from sale of PPE) on lagged percentage change in sales. We use the absolute value of the residual as a firm-specific measure of abnormal capital investment

Appendix B. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jaccpubpol.2019.106710.

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