The Impact of Audit Committee Information Technology Expertise on the Reliability and Timeliness of Financial Reporting

Musaib Ashraf
Michigan State University

Paul N. Michas
Dan Russomanno
The University of Arizona

ABSTRACT: We examine whether information technology expertise on audit committees impacts the reliability and timeliness of financial reporting. We find a reduction in the likelihood of material restatement, a reduction in the likelihood of information technology-related material weaknesses (which account for 55 percent of all reported material weaknesses), and more timely earnings announcements at firms with audit committee information technology expertise. These findings are robust to controlling for a firm's other information technology attributes, as well as when using entropy balanced samples, and we mitigate endogeneity concerns with evidence that our findings hold in a subsample of firms that all possess overall high-quality information technology. Finally, a difference-in-differences analysis, inclusion of firm fixed effects, and a falsification test largely support our assertion that the quality of financial reporting is significantly improved by the presence of an audit committee information technology expert.

JEL Classifications: M41; M15.

Data Availability: All data used in the study are publicly available.

Keywords: audit committee; board of directors; corporate governance; information technology; financial reporting reliability; financial reporting timeliness.

I. INTRODUCTION

This study examines whether information technology (IT) expertise on the audit committee (AC) affects the reliability and timeliness of firms' financial reporting, which are two important characteristics of high-quality financial reporting (Financial Accounting Standards Board [FASB] 1980). IT encompasses "automated [and computerized] means of originating, processing, storing, and communicating information" (American Institute of Certified Public Accountants [AICPA] 2006, AU 314) and enables firms to record, process, and report large volumes of accounting data. Accordingly, the American Accounting Association (AAA 2018) notes that "the importance of accounting information systems is vital, given the essentially *total reliance of accounting and auditing on computerized information systems*" (emphasis added). Effective IT also enhances a firm's ability to implement effective internal controls, which promotes high-quality financial reporting (AICPA 2006, AU 314; Geerts, Graham, Mauldin, McCarthy, and Richardson 2013; Nolan and McFarlan 2005). Given financial

reporting's integral dependence on IT and the AC's duty to oversee financial reporting (DeZoort, Hermanson, Archambeault, and Reed 2002), it follows that having an IT expert on the AC may benefit the reliability and timeliness of financial reporting.

IT risks are the risks information technology poses to financial reporting when IT results in poor internal controls, accounting information, or cybersecurity. AC IT expertise may be relevant to the AC's ability to act as an effective monitor of IT risks because of the AC's role in overseeing the technology financial reporting depends on (Deloitte 2012). When AC members provide IT expertise, the AC is better able to identify potential IT-related risks, discuss these risks with management, and evaluate management's contingency plans to mitigate and tackle these risks. Consistent with this notion, Deloitte (2012, 1) argues that "IT literacy is an essential competency for the AC" and recommends that boards consider recruiting someone with a strong IT background to the AC, since IT drives accounting and financial reporting systems now more than ever.

Despite the importance of IT to financial reporting and the AC, KPMG's (2014) global survey of ACs finds that AC members are not comfortable in their understanding of technology. This survey points to a gap between IT expertise and financial expertise on ACs. Specifically, 36, 53, and 11 percent of AC members surveyed rate their understanding of *current and emerging technology risks* as limited, good, and excellent, respectively. In contrast, 1, 41, and 58 percent of AC members rate their understanding of *financial reporting and control risks* as limited, good, and excellent, respectively. Thus, a starkly higher (lower) percentage of AC members report a *limited* (an excellent) understanding of technology relative to financial reporting.

To this end, we spoke with several AC members to hear their perspectives on the importance of IT expertise on ACs. One AC chairperson from a *Fortune* 500 firm with significant regulatory experience expressed a need to not only have AC members that understand IT, but also a need to ensure that this IT expertise is kept current due to the changing nature of IT. Another AC chairperson from a smaller public firm expressed the need for IT expertise on ACs so they can better assist the company in the integration and maintenance of information systems, as well as maximizing the efficiency and effectiveness in the hiring of employees with relevant IT experience. A third AC director with over 30 years of IT experience noted that AC IT experts "bring a capability that others don't necessarily bring." He expressed that "some people's voice [on the AC] carries more weight in certain parts of the conversation than others due to [their] particular expertise . . . my voice carried more weight when it came to information systems and cybersecurity." Overall, these AC members conveyed a message that AC IT expertise reduces the risks IT poses to financial reporting and helps prevent and resolve IT-related control issues.

Accordingly, we posit that AC IT experts address IT risks by enhancing the AC's knowledge and experience, independent monitoring, and authority on IT matters that impact financial reporting. We argue that these three mechanisms allow the AC IT expert to help improve the effectiveness (i.e., achieving oversight objectives) and efficiency (i.e., minimum wasted time and effort) in ACs achieving their financial reporting responsibilities. Taken together, we predict that AC IT expertise benefits the reliability and timeliness of financial reporting.

To test our predictions, we identify IT experts on ACs based on their professional background. An AC director is deemed an IT expert if she or he has, during her or his career, worked as an IT officer (chief information officer or a related IT management role). Next, we test the association between AC IT expertise and the reliability of financial reporting with proxies for low-quality financial reporting: restatements and material weaknesses. Further, because timeliness is an important characteristic of high-quality financial reporting (e.g., FASB 1980, 2010), we test the association between IT expertise on the AC and earnings announcement lags (i.e., the number of days between a firm's fiscal year-end date and its earnings announcement date).

In our main analyses, we find strong evidence that AC IT expertise is significantly associated with a lower likelihood of material "Big R" restatements and IT-related material weaknesses. Further, we find a strong negative and significant association between AC IT expertise and earnings announcement lags (i.e., earlier earnings announcements). These findings are also economically significant. After controlling for other common determinants of each outcome, we find that firms with IT expertise on the AC are 32 percent less likely to have a material restatement, 32.6 percent less likely to have an IT-related material weakness, and announce earnings two days earlier (or about 4 percent faster relative to the sample mean). Taken together, our results suggest that firms benefit from greater reliability and timeliness of financial reporting when there is IT expertise on the AC. Our material weakness finding is particularly interesting because IT-related material weaknesses account for a large percentage of total material weaknesses. Specifically, when analyzing the entire Audit Analytics database during our sample years, we find that 55 percent of material weaknesses relate to IT. Consequently, AC IT expertise is associated with a reduction in the types of material weaknesses that comprise the *majority* of all material weaknesses. Further, in all analyses, we control for a firm's IT characteristics to the best of our ability to mitigate the possibility that our findings are driven by the overall quality of a firm's underlying IT (which we are unable to measure directly due to data availability challenges).

To ensure that our results are robust to functional form misspecification and to address possible selection bias on observables, we rerun our main analyses using entropy balanced samples and find that our results are consistent. To further address possible endogeneity concerns that AC IT expertise may be correlated with the underlying quality of a firm's IT, we rerun our main analyses on a subsample of *InformationWeek* 500 firms. Extant research recognizes these firms as possessing high-quality IT (e.g., Hamilton and Stekelberg 2017; Kim, Song, and Stratopoulos 2018), which allows us to hold overall IT quality relatively constant in this subsample. This allows us to better isolate whether the presence of an AC IT expert affects

financial reporting over and above the overall quality of a firm's IT. Our results in the *InformationWeek* 500 subsample are robust for restatements and earnings announcements, but not for material weaknesses. Further, our results are robust to a battery of supplementary tests that we summarize in Section IV (e.g., a difference-in-differences analysis, the inclusion of firm fixed effects, and a falsification test). Finally, we provide evidence consistent with investors recognizing the improvement in financial reporting due to AC IT experts: firms with AC IT expertise exhibit larger earnings response coefficients, lower cost of equity, and a lower risk of being sued by investors in a securities fraud class action lawsuit.

Our findings should be of interest to corporate boards, regulators, auditors, and academic researchers. Specifically, we find that IT expertise on the AC improves financial reporting, which is the fundamental responsibility of the AC on corporate boards and a concern to other stakeholders. Further, stock exchange and government regulators may consider our findings in the future when evaluating how ACs should be comprised with respect to their governance role over financial reporting. Moreover, auditors can incorporate our financial reporting findings associated with IT expertise on ACs when evaluating audit risks related to clients' IT and IT-related internal controls designed to prevent misstatements. Finally, we identify an important board characteristic for future research to consider when investigating the consequences of IT-related risks and how voluntary AC characteristics affect firms' financial reporting (DeFond and Zhang 2014, 307). Overall, our evidence supports assertions by the audit profession and AC members that IT expertise is a characteristic relevant to the AC's monitoring role. Our findings are also timely given that the integral relationship between IT and financial reporting is strengthening over time, with a growing dependence on "Big Data" and data analytics.

II. RELATED LITERATURE AND HYPOTHESES DEVELOPMENT

Information Technology and Financial Reporting

Firms invest significant resources in IT. In 2015, the worldwide amount spent on IT was $3.4 trillion, or roughly 5 percent of worldwide gross domestic product (Gartner 2017). Further, IT spending can comprise more than 50 percent of capital expenditures for firms (Nolan and McFarlan 2005), and the market generally reacts positively to these investments (Dehning, Richardson, and Zmud 2003). Accordingly, IT is an important pillar of accounting information systems, which are systems of processes and procedures that help to collect, record, manage, and report accounting and financial information (Mancini, Vaassen, and Dameri 2013). As modern accounting information systems are now computerized, it follows that financial reporting is integrally dependent on IT, and practitioners and academics emphasize the relationship between IT and financial reporting. For example, the American Accounting Association (2018) notes that accounting and auditing are "totally reliant" on computerized information systems. Likewise, in their discussion regarding the conversion from U.S. generally accepted accounting principles to international financial reporting standards, the AICPA (2010, 2) encourages firms to involve the IT department "throughout the planning process to evaluate how the proposed accounting changes will impact the financial systems (transactional or reporting)."

Relatedly, Masli, Peters, Richardson, and Sanchez (2010) find that firms that implement IT to monitor internal controls show a lower likelihood of reporting material weaknesses, smaller increases in audit fees, and smaller increases in audit report lags after the Sarbanes-Oxley Act of 2002 (SOX). Moreover, Dorantes, Li, Peters, and Richardson (2013) find that implementation of enterprise systems improves the quality of management forecasts. Similarly, Brazel and Dang (2008) find that the implementation of enterprise resource planning systems is associated with earlier earnings announcements when firms want to disseminate good news. Finally, Holder, Karim, Lin, and Pinsker (2016) provide evidence that stronger IT is associated with timelier 8-K reporting of complex events. (See Masli, Richardson, Sanchez, and Smith [2011] for a detailed review of the relevant literature.)

The aforementioned dependence of financial reporting on IT is higher today than ever. For example, Lawrence, Minutti-Meza, and Vyas (2018) provide evidence that data breaches (i.e., failures in IT and cybersecurity) are positively associated with future internal control material weaknesses, restatements, Securities and Exchange Commission (SEC) comment letters, and audit fees. Similarly, Warren, Moffitt, and Byrnes (2015) theorize that "Big Data" will "significantly impact" accounting and financial reporting. As a whole, these studies report an integral relationship between IT and financial reporting. By examining the presence of an AC member with knowledge and experience, independent monitoring, and authority on IT matters that impact financial reporting, our study investigates an important governance aspect of IT and its impact on financial reporting.

Audit Committees and Financial Reporting

The AC primarily oversees the firm's financial reporting process (Blue Ribbon Committee 1999; Klein 2002b). Three key AC responsibilities include ensuring the quality of financial reports, oversight of internal controls, and hiring and overseeing the external auditor (DeZoort et al. 2002). Prior to SOX, AC independence varied. Research examining this pre-SOX period finds that AC independence shows a negative association with abnormal accruals (Klein 2002a), a lower likelihood of SEC sanctions for fraudulent or misleading financial reporting (Abbott, Park, and Parker 2000), and a lower likelihood of restatements (Abbott, Parker, and Peters 2004). However, beginning in 2003, Section 301 of SOX and the SEC (2003c) mandate full AC independence

by prohibiting "insiders" from serving on ACs for public firms. SOX also makes ACs (rather than management) responsible for negotiating audit fees. Beck and Mauldin (2014) find evidence of larger (smaller) audit fee reductions in the presence of more powerful CFOs (ACs). Their findings suggest that regulation may provide investors a false sense of security regarding auditor independence due to the complex relationship between the CFO and the AC.

Additionally, SOX requires firms to disclose the names of their "financial experts" and whether these experts are independent of management when they serve on its AC (SEC 2003a). In contrast, SOX is silent about the disclosure of other types of expertise, such as IT expertise, on the AC. Accordingly, much of the extant research focuses on consequences associated with financial expertise on ACs. Bedard and Gendron (2010) provide a review of this literature. Some key findings within this literature indicate the presence of accounting financial expertise on ACs is associated with accruals quality (Dhaliwal, Naiker, and Navissi 2010) and a lower likelihood of restatements (Cohen, Hoitash, Krishnamoorthy, and Wright 2014). Moreover, AC financial experts are associated with an improvement in internal controls (Krishnan 2005), and financial experts on the AC with higher relative status are associated with fewer accounting irregularities (Badolato, Donelson, and Ege 2014).

Few studies examine nonfinancial or nonaccounting AC expertise. Carcello and Neal (2003) find that firms with AC governance expertise have a lower probability of dismissing the external auditor following a new going concern report. Further, Krishnan, Wen, and Zhao (2011) find higher accruals quality and lower discretionary accruals at firms with AC legal expertise. Finally, Cohen et al. (2014) report that AC directors with both accounting and industry expertise are more effective financial reporting monitors compared to those with only accounting expertise.

Even fewer studies examine AC IT expertise in a financial reporting context. Using survey responses, Hadden, Hermanson, and DeZoort (2003) analyze the role of ACs in overseeing IT risk and find that the level of AC IT expertise is *not* associated with actual AC oversight of IT. Relatedly, Li, Lim, and Wang (2007) do not find an association at conventional levels of significance for AC IT experience when predicting IT-related material weaknesses in their full model. Rather, they conclude that their hypothesis of more IT experience on ACs benefiting IT internal controls is only *partially* supported after removing certain control variables.

Overall, the existing literature that investigates AC IT expertise reaches no agreement on the oversight impact of AC IT expertise, and does not explore the issue in nearly the depth and rigor as we do. We extend this literature by identifying AC directors with actual and direct IT experience (i.e., CIO experience and related IT management roles) rather than simply being employed at some point at an IT-related firm. Our finer definition avoids measurement noise from including people who worked at IT firms, but in non-IT roles. Thus, our measure achieves stronger construct validity by *not including* people who simply have some exposure to IT while *including* those who possess the deep knowledge and experience, independent monitoring, and authority on IT matters necessary to enhance the AC's oversight over financial reporting. We further extend this stream of research by examining other financial reporting outcomes (i.e., restatements and announcement lags), in addition to IT-related material weaknesses, and provide evidence on investor perceptions of AC IT expertise. Most importantly, we present strong evidence of a negative and significant association between AC IT expertise and IT-related material weaknesses that is robust to controlling for a firm's other IT attributes, common control variables associated with each financial reporting outcome, and alternative research designs.

How Does IT Expertise on Audit Committees Affect Financial Reporting?

While it is the duty of the board of directors as a whole to monitor management's activities, oversight over financial reporting is specifically delegated to ACs (Krishnan et al. 2011), and ACs oversee firms' IT function as it relates to financial reporting.[1] Thus, the AC is a salient place within a firm's corporate governance structure where the focus on IT and financial reporting intersect. Given the AC's duty to act on behalf of shareholders and enforce high-quality financial reporting, an AC IT expert is well positioned to influence IT and the management of IT in a way that benefits financial reporting from the top downward.

As we describe in detail in Section III, we define IT expertise on the AC as the presence of an AC member who possesses experience working as an IT officer, such as a chief information officer (CIO), or in a related IT management role (hereafter, IT experts).[2] We posit that AC IT experts provide the AC with knowledge and experience, independent monitoring, and authority on IT matters that impact financial reporting. Following a discussion of each of these mechanisms, we present our hypotheses.

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[1] We reviewed 10,165 AC charters and note that all charters discuss oversight over all aspects of financial reporting, and 1,045 *explicitly* reference oversight over IT, most often in the context of internal controls.

[2] CIOs are senior executives responsible for internal business policies, processes, and procedures related to the information systems of a firm (Lawry, Waddell, and Singh 2007; Rouse 2015; Synnott and Gruber 1981). They are responsible for both (1) the performance of information systems, and (2) the information management needs of key users and executives (Earl 1996; Rockart 1982; Schubert 2004). CIOs interact with and address the needs of CFOs and their supporting personnel as they relate to accounting and financial information. In Deloitte's (2015) survey of 1,200 CIOs, 72 (92) percent of CIOs report that they meet with CFOs at least weekly (monthly), and 72 percent claim that a relationship with CFOs is important in order to succeed as a CIO (Kark, White, and Briggs 2015). This interaction ensures that CIOs have opportunities to understand how accounting information systems manage and process financial data while exposing CIOs to financial reporting. This allows AC members with experience as a CIO to advocate for IT matters and to be "skilled communicator[s] who do not hide behind technology jargon or talk down to board members" (Nolan and McFarlan 2005, 8).

IT Knowledge and Experience

First, IT knowledge and experience help the AC to make informed IT-related financial reporting decisions by understanding the impact IT and IT risks can have on financial reporting. Many policies and procedures that support internal control over financial reporting rely on IT platforms, and AC directors with IT expertise understand the role these platforms play with respect to internal controls. Consequently, AC IT experts possess a comparative advantage in preventing and remediating IT-related control deficiencies, thus lowering internal control risks to financial reporting. By lowering these risks, we posit that the reliability of financial reporting will benefit given that material weaknesses are associated with poor financial reporting quality (e.g., Dechow, Ge, and Schrand 2010; Rice and Weber 2012).

Moreover, AC IT expertise can reduce the information risk to financial reporting (i.e., the risk that the information inputs to financial reporting or the information outputs from financial reporting systems are of low quality [Francis, LaFond, Olsson, and Schipper 2005]). The more complex firm operations are, the greater the information risks IT has regarding financial reporting, such as the accuracy and completeness of the transactions recorded by the financial reporting system. In order to report financial data, the accounting information system supporting each segment and point of sale requires a correct mapping to the firm's central financial reporting system. An AC director with deep knowledge of how a firm's information systems communicate is better able to inquire about or identify areas of information risk, such as data validation processes that financial reporting depends on. This is increasingly important as firms rely on middleware, a type of software that allows otherwise incompatible applications to communicate and aggregate information from a firm's various IT systems (Schantz and Schmidt 2002; Schmidt 2002).

Relatedly, cybersecurity risk is an important information risk that IT presents to financial reporting (Deloitte 2015). An AC IT expert's cybersecurity knowledge enables him or her to better identify actual or potential cybersecurity concerns by asking pointed questions of management and helping the AC better understand the scope and significance of data security breaches. This positions the AC to better oversee management and to advise on cybersecurity risks related to financial reporting. Mitigating these risks improves financial reporting, as poor cybersecurity is associated with future restatements and material weaknesses (Lawrence et al. 2018).

Independent Monitoring of IT Matters

Second, the AC consults with non-AC IT personnel, such as the firm's CIO or an externally hired IT consultant, if the AC has an IT-related question. Having someone on the AC that can monitor and communicate intelligently with IT personnel enhances the AC's understanding of a firm's IT systems.[3] Perhaps more importantly, the literature has shown that independence is important for high-quality financial reporting. For example, Klein (2002a) finds that greater board and AC independence is associated with higher financial reporting quality. Moreover, Krishnan et al. (2011) argue that attorneys on the AC are better monitors of the firm due to their independence compared to a corporate attorney who is a firm employee. Thus, being independent of management allows the AC IT expert to critically evaluate information provided to the AC by IT personnel rather than accepting it at face value. For example, ACs monitor management's progress in addressing objectives under the AC's purview. This requires ACs to assess the adequacy of management (i.e., whether the "correct" management is in place) and management's plans to accomplish a certain goal (e.g., whether management is performing tasks as effectively and efficiently as possible). An independent IT expert is in a better position to effectively evaluate the information provided by management and outsiders to the AC, which, in turn, improves its monitoring role over management.

Authority on IT Matters

Finally, the AC IT expert increases the AC's IT-related credibility and, thus, enhances its authority over management. This allows the AC to more effectively and efficiently win management's "buy-in" at the negotiating table regarding the AC's IT-related directives (in terms of attention, time, and resources devoted). Obtaining this buy-in is critical because management is ultimately responsible for firm operations and implementing the AC's directives.

Taken together, IT experts provide the AC with knowledge and experience, independent monitoring, and authority on IT matters that should benefit financial reporting. Thus, we hypothesize:

H1: Information technology expertise on the audit committee is positively associated with the reliability of financial reporting.

Aside from reliability, another aspect of financial reporting is the relevance of financial information. Statement of Financial Accounting Concepts (SFAC) No. 2 identifies timeliness as a characteristic that makes accounting information relevant (FASB

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[3] Nolan and McFarlan (2005) and Redman and Sweeney (2013) note that it is a common complaint that IT staff and non-IT staff are often unable to communicate effectively due to a misunderstanding (or perceived misunderstanding) of each other's duties.

1980). If financial reporting is not timely, then its usefulness to stakeholders is diminished. If AC IT experts serve as better monitors of IT-related risks, as we argue above, then it is less likely that IT-related matters arise after the end of a firm's fiscal year, either during the external audit or during a firm's internal year-end processes. Similarly, an independent AC director that possesses IT-related knowledge, experience, and authority can assist in efficiently resolving IT-related matters that arise after year-end. Addressing IT-related matters during the year or more efficiently after year-end should lead to timelier financial reporting. Therefore, we hypothesize:

H2: Information technology expertise on the AC is positively associated with the timeliness of financial reporting.

III. RESEARCH DESIGN

Dependent, Test, and Control Variables

We estimate the following logistic regression to test H1 and ordinary least squares regression to test H2:

$$\Pr(DEP\_VAR_{it} = 1) \text{ or } (DEP\_VAR_{it}) = \int (IT\,AC\,Expertise,\,IT/Corporate\,Goverance/Firm/Auditor\,Characteristics,$$
$$Industry/Year\,Fixed\,Effects) \qquad (1)$$

where *DEP_VAR* is one of the following outcome variables: *MATERIAL_RESTATE, IT_MATERIAL_WEAKNESS,* or *DAYS_TO_EARNINGS*.

To test H1, we analyze the effect of AC IT expertise on the likelihood a firm restates its financial statements and the likelihood a firm reports an IT-related material weakness. Restatements are a salient measure used in the literature to proxy for unreliable financial reporting (e.g., Dechow et al. 2010; Francis and Michas 2013). The variable *MATERIAL_RESTATE* equals 1 if firm *i* restates its financial statements for year *t* under Item 4.02, and 0 otherwise.[4] Further, a material weakness indicates a design or operating deficiency in internal control over financial reporting such that "there is a reasonable possibility that a material misstatement will not be prevented or detected on a timely basis" (Public Company Accounting Oversight Board [PCAOB] 2007, AS5), and material weaknesses are associated with lower-quality financial reporting (e.g., Dechow et al. 2010). The variable *IT_MATERIAL_WEAKNESS* equals 1 when the auditor's SOX 404 report indicates the firm reports at least one IT-related material weakness in year *t,* and 0 otherwise.[5] A negative association between AC IT expertise and the likelihood of *MATERIAL_RESTATE* and/or *IT_MATERIAL_WEAKNESS* would be evidence consistent with H1.

To test H2, we analyze the effect of AC IT expertise on the amount of time it takes a firm to issue its earnings announcement for the year. The variable *DAYS_TO_EARNINGS* equals the number of days between firm *i*'s fiscal year-end date for year *t* and its earnings announcement date for year *t*. A negative association between AC IT expertise and *DAYS_TO_EARNINGS* would be evidence consistent with H2 (i.e., more timely reporting manifested as earlier earnings announcements).

Our variable of interest, *IT_EXPERTISE*, equals 1 if firm *i* has at least one IT expert on the AC in year *t,* and 0 otherwise. An AC director is deemed an IT expert if she or he has worked during their career as a (1) chief information officer, or (2) director, vice president, senior vice president, head, manager, or general manager of information technology, information, information services, information systems, or information management.[6] We focus on CIOs and IT roles because, as we discuss in Section II, we theorize that these IT roles provide exposure to and experience dealing with accounting information, how accounting information systems manage and process data, and the ability to communicate with accountants about a firm's accounting-related IT infrastructure. This exposure, combined with knowledge and experience of IT, should assist IT experts in their capacity as an AC director overseeing the financial reporting process.[7]

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[4] Audit committees oversee annual *and* quarterly financial reporting. Thus, *MATERIAL_RESTATE* equals 1 if either the 10-K or a 10-Q for year *t* is restated under Item 4.02, and 0 otherwise.

[5] We identify IT-related material weaknesses using the following category codes in Audit Analytics: 22 (information technology, software, security and access), 42 (segregations of duties/design of controls), 76 (journal entry control issues), 12 (untimely or inadequate account reconciliations), 77 (non-routine transaction control issues), or 57 (treasury control issues).

[6] Our main results are generally consistent (directional effects remain unchanged with qualitatively similar statistical significance) if we define an IT expert only as someone with experience as a chief information officer (untabulated).

[7] We choose to focus on AC directors with experience working in an IT-related role to balance strong internal construct validity with external validity, as well as statistical conclusion validity. The incidence rate of *IT_EXPERTISE* increases roughly threefold and the measure is still negatively associated with our three main dependent variables when using an expanded definition that includes AC directors with work experience as a CEO of an IT-related firm (untabulated). However, statistical significance is weaker at $p \leq 0.10$ (one-tailed). Weaker statistical significance is not entirely surprising because this expanded definition introduces significant noise into the measure, since not all CEOs of IT-related firms possess deep knowledge of business IT and financial reporting systems.

We include four types of controls in all multivariate analyses: IT, governance, and firm/auditor characteristics, as well as industry and year fixed effects. IT characteristics help to disentangle the effect of our test variable that measures the presence of AC IT expertise from a firm's IT quality and the overall emphasis placed on IT by the firm. IT quality is an unobservable firm characteristic that we cannot measure directly due to the lack of available public or proprietary data.[8] In response to this limitation, we include four IT control variables that we posit are correlated with IT quality: *IT_CAPEX, CIO, BOARD_IT_NONAC,* and *MANAGEMENT_IT*.[9] Appendix A presents detailed definitions for all of these and subsequently discussed variables.

We do not make directional predictions for these IT control variables because of a proverbial "chicken or the egg" problem with IT quality and financial reporting characteristics. For example, a positive association between IT quality and our (inverse) measures of reporting quality would be consistent with firms making improvements in IT in order to improve financial reporting reliability and timeliness moving forward. In contrast, a negative association would be consistent with higher-quality IT having already achieved this goal. It is unclear *a priori* which of these competing effects is stronger, on average, or whether they affect different firms differently (e.g., small compared to large firms). We also do not implement robust research designs regarding these variables that are able to mitigate reverse causation or endogeneity (as we do with our main AC IT expertise test variable). Thus, the signs and significance levels on our IT quality control variables may not reflect an accurate overall conclusion on the association between IT quality and financial reporting. However, our goal here is simply to control for overall IT quality to reduce the chance that we draw spurious inferences on our main test variable of interest, *IT_EXPERTISE.*

Further, governance and firm factors may be correlated with a firm's IT quality and financial reporting. The following controls isolate our test variable of interest from such confounds while separating the effect of AC IT expertise from other kinds of expertise possessed by AC members in all of our multivariate analyses: *ACCT_FINANCIAL_EXPERTISE, AUDIT_COMM_SIZE, BIG4, BOARD_SIZE, BUSY_BOARD, BOARD_INDEPENDENCE, CEO_IS_CHAIRMAN, CEO_IS_FOUNDER, IND_DIRS_TENURE, INST_OWNERSHIP, LEGAL_EXPERTISE, ACQUISITION, FOREIGN, ISSUANCE, LEVERAGE, LOSS, MTB, RESTRUCTURE, ROA, SALES_GROWTH, SEGMENTS,* and *SIZE.* We include expected signs on all control variables in our tables following prior research (e.g., Abbott et al. 2004; Abernathy, Beyer, Masli, and Stefaniak 2014; Badolato et al. 2014; Carcello, Neal, Palmrose, and Scholz 2011; Cohen et al. 2014; Dhaliwal et al. 2010; Klein 2002a; Krishnan 2005; Krishnan et al. 2011).

Finally, we control for other model-specific variables from extant studies. For our restatements model, we include *NEW_AUDITOR, IMPORTANCE_TO_AUDITOR,* and *LOCAL_EXPERT_AUDITOR* (Badolato et al. 2014; Cohen et al. 2014). To disentangle the effect of AC IT expertise from the effect of internal controls on restatements, we also control for *MATERIAL_WEAKNESS.* Similarly, the material weakness model controls for *INV, Z_SCORE, AUDITOR_RESIGNED, FIRM_AGE,* and *ANNOUNCE_RESTATE,* following Ashbaugh-Skaife, Collins, and Kinney (2007), Doyle, Ge, and McVay (2007), and Newton, Persellin, Wang, and Wilkins (2016). Finally, following Chan, K. Chen, T. Chen, and Yu (2012) and Jha and Chen (2015), we include controls associated with audit fees in our earnings announcement lags model: *NEW_AUDITOR, IMPORTANCE_TO_AUDITOR, LOCAL_EXPERT_AUDITOR, CURRENT_ASSETS, QUICK_RATIO, DECEMBER, GOING_CONCERN,* and *MATERIAL_WEAKNESS* (Dao, Raghunandan, and Rama 2012; DeFond and Zhang 2014; Cohen et al. 2014). We also control for *DAYS_TO_FILING,* to ensure that earlier earnings announcements are not simply due to earlier 10-K filings, and *AUDIT_FEES.*

Robustness and Endogeneity

To supplement our main analyses and to provide evidence that our results are robust to possible functional form misspecification and self-selection bias due to observable characteristics, we reestimate Equation (1) in entropy balanced samples and present these results along with our main analyses. We apply this technique to our three models (restatements, material weaknesses, and days to earnings) separately, as each model contains different covariates. We also include all control variables tabulated in our main analyses for each model. As shown in Appendix B, entropy balancing reweights each observation of the control group so that the mean, variance, and skewness of all covariates are balanced (i.e., not statistically different) across the treatment (*IT_EXPERTISE* = 1) and control (*IT_EXPERTISE* = 0) groups (Hainmueller 2012). This helps rule out the possibility that confounding firm characteristics drive our AC IT expertise results.

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[8] Firm-level IT spending data are no longer available either in public form or through proprietary acquisition. In untabulated analyses, we find that the coefficient on *IT_EXPERTISE* remains significant and negative ($p \leq 0.05$) for all three outcome variables when controlling for the following four IT spending measures one at a time: (1) industry IT expenditures (from the Census Bureau's annual Information and Communication Technology Survey) scaled by revenue for the same industry; (2) the natural log of 1 plus capital expenditures, following Masli et al. (2014); (3) predicted IT spending, from Kobelsky, Richardson, Smith, and Zmud's (2008) model developed from proprietary firm-level IT spending data that are no longer available; and (4) new enterprise systems from data provided by Dorantes et al. (2013).

[9] In an untabulated analysis, we replace *MANAGEMENT_IT* with *CEO_IT_EXPERTISE,* which equals 1 if firm *i*'s CEO in year *t* is an IT expert, and 0 otherwise, and note that results are generally consistent (directional effects remain unchanged with qualitatively similar statistical significance).

Furthermore, IT expertise on the AC may be endogenous. If *IT_EXPERTISE* is correlated with a firm's level of IT quality, then our results could be driven by the firm's focus on IT rather than being attributed to the AC IT expert. We address this endogeneity concern by estimating Equation (1) in a subsample of *InformationWeek* 500 firms. The *InformationWeek* 500 is an annual list of 500 firms with innovative IT compiled by *InformationWeek*. Firms applying to the *InformationWeek* 500 must complete a "rigorous application" that is evaluated by independent editors of *InformationWeek* based on quantitative and qualitative factors (Vallis 2012).[10] Extant studies interpret *InformationWeek* 500 firms as possessing relatively high-quality IT (e.g., Hamilton and Stekelberg 2017; Kim et al. 2018). Thus, we mitigate endogeneity concerns by holding IT quality relatively constant among the firms in the *InformationWeek* 500 subsample, as these firms possess relatively high-quality IT and strong overall IT infrastructures.[11]

Sample

Table 1 summarizes our sample selection. We begin with 134,115 firm-year observations in Compustat from 2004 through 2015, and eliminate 27,416 observations with a missing CIK identifier required to merge with other data.[12] We further eliminate 52,360 observations for which AC data in BoardEx is missing, and 10,063 observations that are non-accelerated filers per Audit Analytics (which are not required to have a SOX 404 audit over internal controls). Finally, we delete observations without required data for each specific analysis. The final sample consists of 31,381 firm-year observations for the restatements analysis, 27,449 firm-year observations for the material weaknesses analysis, and 26,411 firm-year observations for the days to earnings announcements analysis.

IV. RESULTS

Descriptive Statistics and Correlations

Table 2 presents descriptive statistics after all continuous variables are winsorized at the 1st and 99th percentiles. About 3 percent of our observations have an IT expert on the AC. To explore our test variable by year (industry), we plot the distribution of *IT_EXPERTISE* in both panels of Figure 1. Panel A shows an increase in *IT_EXPERTISE* over time from a low of 2.8 percent in 2004 to a high of 4.9 percent in 2015. This increase is consistent with our conjecture that the importance of IT is increasing and that firms are increasingly recognizing the need for stronger IT oversight. Furthermore, Panel B shows that the mean values of *IT_EXPERTISE* range from a low of 0.7 percent in the precious metals industry to a high of 9.4 percent in the computer software industry.[13]

Notwithstanding the increase in *IT_EXPERTISE* over time, we mention two plausible reasons why we observe a relatively low incidence rate of IT experts on ACs. First, the average age of an AC director is about 62 years old (Ernst & Young [EY] 2013). This implies that the average AC director started her or his career during the 1960s and 1970s—a time when IT was in its infancy stage. Thus, the average AC director missed the opportunity to work with business IT systems during the prime of her or his career and is less likely to possess the deep IT knowledge and experience required of an AC IT expert. Second, a small labor pool likely exists of IT experts that possess the governance skills required to serve on an AC and who are willing to forgo the opportunity cost of pursuing other lucrative opportunities. A current AC IT expert we talked with believes that candidates with IT knowledge often lack governance skills, which impedes them from serving on the AC. Similarly, a national audit partner at a Big 4 firm equated the level of difficulty in finding a suitable IT expert for the AC as being comparable to the difficulty of finding a "unicorn." Beyond these anecdotal perspectives, Gartner (2016) reports that a top concern for CIOs is the inability to hire IT talent in traditional IT roles. Thus, it follows that it would be even more difficult to hire IT experts for non-traditional roles, such as serving on the AC, at this time.[14]

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[10] During our sample period, *InformationWeek* released its list in September each year and is backward-looking (Ong and Chen 2013; Hamilton and Stekelberg 2017). We construct our sample considerate of this lag and keep a firm in this sample in subsequent years even if it drops off the *InformationWeek* 500 list, as IT quality is unlikely to change year-over-year despite entering and exiting the list each year.

[11] No new firms enter the *InformationWeek* 500 sample after fiscal year 2012, as *InformationWeek* discontinued this list in 2013. As such, we retain existing *InformationWeek* 500 firms in the sample until fiscal year 2015.

[12] The sample begins in fiscal year 2004 due to the enactment of SOX that mandated audits of internal controls and the SEC's requirement to disclose non-reliance ("Big R") restatements (SEC 2003b, 2004, 2006).

[13] For parsimony, we plot Figure 1, Panel B using Fama-French 49 industries. This classification presents IT-related and other industries that make for a useful analysis while presenting a sufficiently limited number of industries to permit a visual examination. In subsequent multivariate analysis, industry fixed effects are based on two-digit SIC codes. Untabulated analyses using Fama-French industry fixed effects are generally consistent (directional effects remain unchanged with qualitatively similar statistical significance).

[14] We look to prospective research to examine whether this incidence rate continues to grow (as it has for accounting and financial AC expertise) into the future.

TABLE 1

Sample Selection

Base Sample	n
Firm-year observations from 2004 to 2015 (Compustat)	134,115
Less: Missing CIK	(27,416)
Less: Missing audit committee data (BoardEx)	(52,360)
Less: Non-accelerated filers (Audit Analytics)	(10,063)
Final base sample	44,276
Total number of individual firms	7,121
Restatements Sample	
Base sample	44,276
Less: Firm-years with missing data for required variables	(12,895)
Final restatements sample	31,381
Material Weaknesses Sample	
Base sample	44,276
Less: Firm-years with missing data for required variables	(16,827)
Final material weaknesses sample	27,449
Days to Earnings Announcements Sample	
Base sample	44,276
Less: Firm-years with missing data for required variables	(17,865)
Final days to earnings announcements sample	26,411

Further, consistent with recent research (e.g., Cohen et al. 2014), Table 2 reports that 74 percent of our sample observations have an accounting expert on the AC. This high incidence rate has increased significantly over time from initial studies examining accounting expertise on the AC. For example, in one of the first studies to examine whether capital markets value financial accounting expertise on ACs, DeFond, Hann, and Hu (2005) find that roughly 17 percent of 813 new director appointments to the AC were accounting financial experts prior to SOX (over the sample period 1993 to 2002).[15] As discussed in Section II, SOX mandates the disclosure of financial accounting expertise on the AC. In contrast, regulatory guidance does not require the disclosure of IT expertise on the AC. Thus, it is unlikely that AC IT expertise will grow as fast as accounting financial expertise on the AC has grown given current regulations and the underlying reasons behind the low incidence rate of AC IT expertise. However, documenting the benefits of AC IT expertise is important given the increased use of IT in modern financial reporting systems. Our investigation is also important given the "voluntary" nature of having IT expertise on the AC, as this voluntary choice provides information to investors and auditors on the financial reporting benefits brought to ACs through IT expertise.

With respect to our outcome measures of interest in Table 2, the 6 percent incidence rate of *MATERIAL_RESTATE,* 3 percent incidence rate of *IT_MATERIAL_WEAKNESS,* and 50.93 average *DAYS_TO_EARNINGS* are all consistent with concurrent and prior literature (e.g., Cohen et al. 2014; Francis, Michas, and Yu 2013; Schroeder 2016). The remaining controls are also generally consistent with prior literature (e.g., Ashbaugh-Skaife et al. 2007; Badolato et al. 2014; Cohen et al. 2014; Dao et al. 2012; Francis et al. 2013; Fung, Gul, and Krishnan 2012).

Table 3, Panels A, B, and C present Pearson correlations. The majority of correlations between our control variables are small, and correlations between *IT_EXPERTISE* and the controls are low as well ($|\rho| \leq 0.07$). The correlations between *IT_EXPERTISE* and our IT controls range between 0.01 and 0.06 ($p \leq 0.01$). As noted previously, these controls proxy for a firm's emphasis on IT and overall IT characteristics. Thus, the significance of these correlations supports the inclusion of these controls when examining the impact of *IT_EXPERTISE*.

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[15] It is reasonable to conclude that a much smaller percent (compared to their 17 percent rate) of total sitting AC members possessed accounting financial expertise during that time frame after considering the data requirements in DeFond et al. (2005).
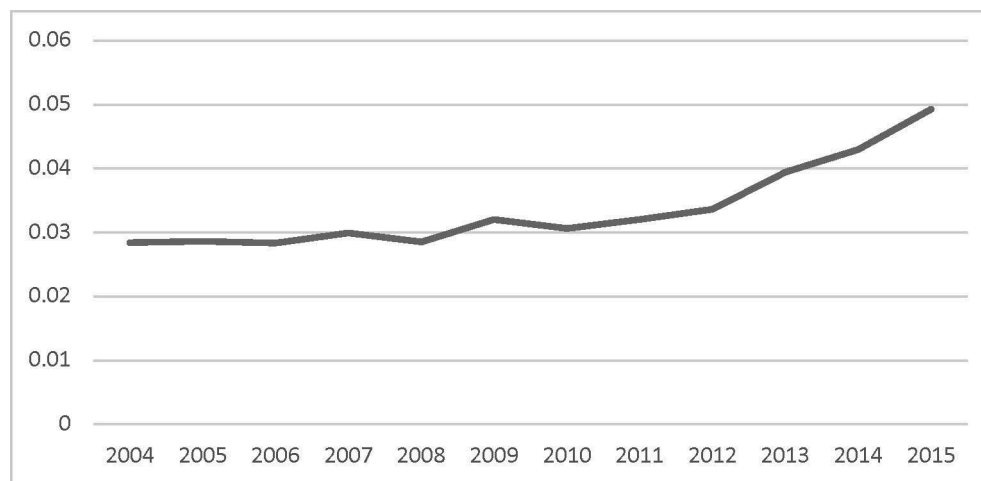
TABLE 2
Descriptive Statistics for Base Sample

Variable	Mean	Std. Dev.	25%	Median	75%
Test Variable					
IT_EXPERTISE (binary)	0.03	0.18	0.00	0.00	0.00
Dependent Variables					
MATERIAL_RESTATE (binary)	0.06	0.23	0.00	0.00	0.00
IT_MATERIAL_WEAKNESS (binary)	0.03	0.18	0.00	0.00	0.00
DAYS_TO_EARNINGS (days)	50.93	21.10	34.00	49.00	63.00
IT Control Variables					
BOARD_IT_NONAC (binary)	0.02	0.14	0.00	0.00	0.00
CIO (binary)	0.23	0.42	0.00	0.00	0.00
IT_CAPEX	0.20	0.43	0.00	0.00	0.22
MANAGEMENT_IT (binary)	0.14	0.35	0.00	0.00	0.00
Governance Control Variables					
ACCT_FINANCIAL_EXPERTISE (binary)	0.74	0.44	0.00	1.00	1.00
AUDIT_COMM_SIZE	4.04	1.16	3.00	4.00	5.00
BIG4 (binary)	0.77	0.42	1.00	1.00	1.00
BOARD_INDEPENDENCE (%)	0.62	0.18	0.54	0.64	0.75
BOARD_SIZE	9.54	3.42	7.00	9.00	12.00
BUSY_BOARD (binary)	0.18	0.38	0.00	0.00	0.00
CEO_IS_CHAIRMAN (binary)	0.44	0.50	0.00	0.00	1.00
CEO_IS_FOUNDER (binary)	0.11	0.32	0.00	0.00	0.00
IND_DIRS_TENURE (years)	6.68	3.97	3.78	6.33	9.08
INST_OWNERSHIP (%)	0.49	0.38	0.04	0.54	0.83
LEGAL_EXPERTISE (binary)	0.37	0.48	0.00	0.00	1.00
Firm Control Variables					
ACQUISITION (binary)	0.09	0.29	0.00	0.00	0.00
FOREIGN (binary)	0.36	0.48	0.00	0.00	1.00
ISSUANCE (binary)	0.35	0.48	0.00	0.00	1.00
LEVERAGE	0.18	0.21	0.00	0.11	0.30
LOSS (binary)	0.33	0.47	0.00	0.00	1.00
MTB	2.77	4.74	1.14	1.88	3.28
RESTRUCTURE (binary)	0.24	0.43	0.00	0.00	0.00
ROA	-0.04	0.29	-0.02	0.02	0.07
SALES_GROWTH (%)	0.14	0.45	-0.02	0.07	0.20
SEGMENTS	2.28	1.78	1.00	1.00	3.00
SIZE ($millions)	3,627.09	9,701.57	171.79	595.77	2,256.90
Other Control Variables					
ANNOUNCE_RESTATE (binary)	0.08	0.27	0.00	0.00	0.00
AUDIT_FEES ($millions)	1.98	3.35	0.38	0.91	2.01
AUDITOR_RESIGNED (binary)	0.01	0.11	0.00	0.00	0.00
CURRENT_ASSETS	0.46	0.27	0.22	0.44	0.67
DAYS_TO_FILING (days)	64.99	12.25	57.00	62.00	74.00
DECEMBER (binary)	0.73	0.44	0.00	1.00	1.00
FIRM_AGE (years)	21.35	15.01	11.00	17.00	27.00
GOING_CONCERN (binary)	0.02	0.14	0.00	0.00	0.00
IMPORTANCE_TO_AUDITOR (%)	0.12	0.20	0.01	0.04	0.12
INV	0.08	0.12	0.00	0.02	0.12
LOCAL_EXPERT_AUDITOR (binary)	0.52	0.50	0.00	1.00	1.00
MATERIAL_WEAKNESS (binary)	0.06	0.24	0.00	0.00	0.00
NEW_AUDITOR (binary)	0.07	0.26	0.00	0.00	0.00
QUICK_RATIO	2.93	4.63	0.94	1.52	2.83
Z_SCORE	1.20	4.57	0.68	1.70	2.85

All variables are defined in Appendix A and winsorized at the 1st and 99th percentiles.

FIGURE 1
Percentage of Audit Committees with IT Expertise

Panel A: Percentage of Audit Committees with IT Expertise by Year

Audit Committee IT Expertise and the Reliability and Timeliness of Financial Reporting

Table 4, Panel A presents our first multivariate results regarding H1 on whether AC IT expertise is associated with higher financial reporting reliability. The coefficient on *IT_EXPERTISE* is negative and significant ($p \leq 0.05$).[16] This evidence is consistent with H1 and suggests that having IT expertise on the AC is associated with a lower likelihood of material restatements.[17] Firms with AC IT expertise are 32 percent less likely to experience a material restatement (odds ratio = 0.680, untabulated). Thus, the impact of AC IT expertise on the reliability of financial reporting is also economically significant.

Table 4, Panel B presents our analyses addressing possible functional form misspecification, self-selection on observables, and endogeneity. The coefficients on *IT_EXPERTISE* in both columns are negative and significant ($p \leq 0.01$ and $p \leq 0.05$). Taken together, our evidence indicates that AC IT expertise is negatively and significantly associated with the likelihood of a material restatement, which is consistent with H1.

Table 5, Panel A presents multivariate results for our second outcome variable of interest for H1. We find that AC IT expertise is negatively and significantly associated with the likelihood of IT material weaknesses ($p \leq 0.05$). Overall, firms with AC IT expertise have a 32.6 percent lower chance of exhibiting an IT-related material weakness (odds ratio = 0.674, untabulated). Importantly, this economically significant reduction affects *the majority of all material weaknesses,* as 55 percent of material weaknesses in the Audit Analytics database during our sample period are related to IT (untabulated). Taken together, this evidence of a negative association between AC IT expertise and the likelihood of IT-related material weaknesses is consistent with H1.

Table 5, Panel B presents IT-related material weakness results using our alternative research designs. The entropy balanced sample results in Panel B support the findings in Panel A ($p \leq 0.05$). However, the coefficient on *IT_EXPERTISE* is negative, but insignificant ($p = 0.334$) for the *InformationWeek* 500 subsample. This exception is not altogether surprising, as these firms have strong IT infrastructures and are less likely to have IT-related material weaknesses overall.[18]

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[16] Consistent with Badolato et al. (2014), all reported p-values are one-tailed when the coefficient sign matches our directional prediction, and are two-tailed otherwise.

[17] Consistent with prior research (e.g., Albrecht, Mauldin, and Newton 2018; Baber, Kang, Liang, and Zhu 2015; Badolato et al. 2014; Archambeault, DeZoort, and Hermanson 2008), we fail to find a significant coefficient on *ACCT_FINANCIAL_EXPERTISE* for our *MATERIAL_RESTATE* analysis. However, some research (e.g., Abbott et al. 2004; Cohen et al. 2014) finds a negative and significant association between financial expertise on ACs and the likelihood of restatements. These differences may be explained by sample periods and time-series trends where accounting financial experts added to ACs in recent years do not have the same impact as those added in earlier years. In an untabulated analysis, we exclude year fixed effects from our model, following Abbott et al. (2004) and Cohen et al. (2014). After doing so, the coefficient on *ACCT_FINANCIAL_EXPERTISE* is negative and significant ($p \leq 0.05$, one-tailed), while the coefficient on *IT_EXPERTISE* remains materially unchanged ($p \leq 0.01$, one-tailed).

[18] Overall, 1.9 percent of firm-year observations show an *IT_MATERIAL_WEAKNESS* in our *InformationWeek* 500 subsample (untabulated) compared to 3 percent in our main sample (see Table 2).

FIGURE 1 (continued)

Panel B: Percentage of Audit Committees with IT Expertise by Fama-French 49 Industries
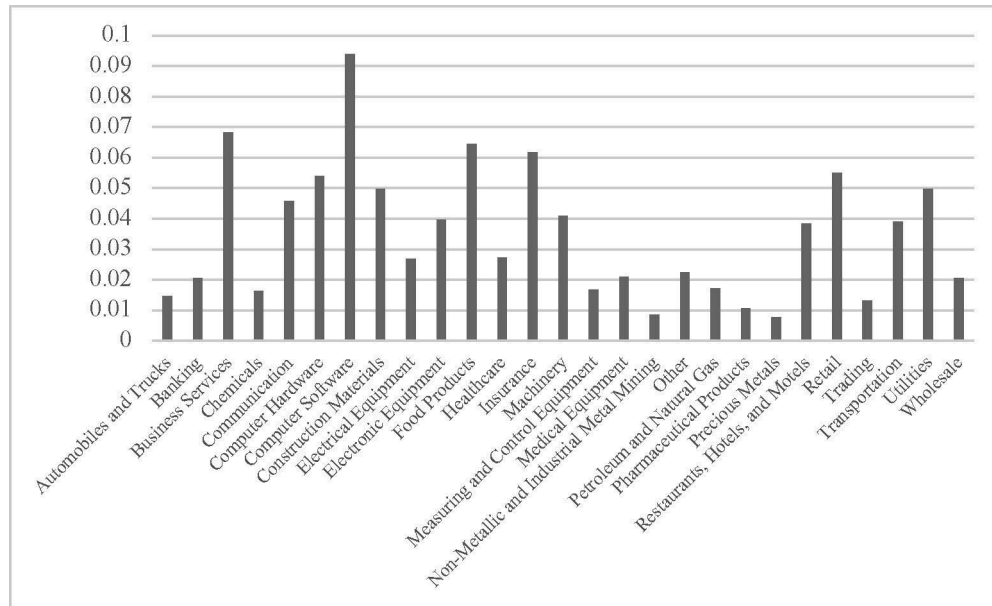

Figure 1 presents the percentage of audit committees with IT expertise by year and industry. The sample period for both Panel A and Panel B is 2004 to 2015. In Panel B, industry is based on Fama-French 49 industry classification. For parsimony, in Panel B, we group all industries with fewer than 500 observations in our sample into the "Other" category.
IT_EXPERTISE is defined in Appendix A.

Table 6, Panel A presents the results of our test of H2 on whether AC IT expertise is associated with timelier financial reporting. Consistent with H2, the coefficient on *IT_EXPERTISE* is negative and significant ($p \leq 0.01$) and indicates that firms with AC IT expertise report earnings more quickly. On average, these firms report earnings two days earlier, or about 4 percent sooner than the sample mean. Further, Table 6, Panel B provides evidence that this result holds after we achieve covariate balance in column (1) and when we utilize the *InformationWeek* 500 subsample of firms possessing high-quality IT in column (2).

Taken together, our results in Tables 4 through 6 provide evidence in support of H1 and H2, and suggest that AC IT experts are associated with more reliable and timelier financial reporting. Given the integral relationship between IT and financial reporting, these findings are important because they provide evidence in support of the assertion that AC IT experts help improve their firms' overall financial reporting environment.

Additional Analyses—Research Designs to Mitigate Endogeneity Concerns

It is possible that IT expertise on the AC is correlated with the quality of a firm's IT or other IT-related characteristics. Further, it is possible that firms that put IT expertise on the AC are fundamentally different from firms that never do, or that IT experts choose to sit on the ACs for firms with existing high-quality financial reporting (i.e., reverse causality). To enable us to better disentangle our treatment effect from these competing explanations, we implement two research designs that mitigate endogeneity concerns.

First, we perform a propensity score matched difference-in-differences analysis to analyze the impact of *IT_EXPERTISE* on our three main dependent variables before and after the addition of an IT expert, compared to firms that never have an IT expert. We match treatment firms (firms with AC IT experts at any point in our sample, *TREAT* = 1) with control firms (firms that never have an AC IT expert, *TREAT* = 0) in year *t,* where year *t* is the first year the IT expert is on the AC. We perform a radius (one-to-many) match, allow a maximum caliper distance of 0.001, and require the match to be within the same industry and year *t*. We then compare four pre- and post-firm-year observations centered around, but excluding, year *t* within the matched sample.

TABLE 3
Pearson Correlations for Base Sample

Panel A: Pearson Correlations for Columns (1)–(10)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) IT_EXPERTISE										
(2) MATERIAL_RESTATE	−0.01									
(3) IT_MATERIAL_WEAKNESS	−0.01	0.23								
(4) DAYS_TO_EARNINGS	−0.06	0.10	0.24							
(5) BOARD_IT_NONAC	0.01	−0.01	0.00	−0.05						
(6) CIO	0.06	−0.02	−0.03	−0.24	0.04					
(7) IT_CAPEX	0.05	0.00	0.00	−0.06	0.05	0.15				
(8) MANAGEMENT_IT	0.05	−0.02	−0.01	−0.14	0.04	0.09	0.06			
(9) ACCT_FINANCIAL_EXPERTISE	0.02	−0.01	0.00	−0.08	0.02	0.05	0.05	0.03		
(10) AUDIT_COMM_SIZE	0.07	−0.03	−0.02	−0.27	0.02	0.16	0.02	0.10	0.13	
(11) BIG4	0.03	−0.02	−0.05	−0.25	0.04	0.18	0.10	0.08	0.10	0.15
(12) BOARD_INDEPENDENCE	0.03	−0.03	−0.01	−0.10	0.01	0.03	0.00	0.03	0.06	0.13
(13) BOARD_SIZE	0.06	−0.01	−0.06	−0.48	0.07	0.32	0.08	0.19	0.08	0.44
(14) BUSY_BOARD	−0.01	−0.01	0.00	−0.05	0.04	0.04	0.03	0.04	0.03	0.05
(15) CEO_IS_CHAIRMAN	0.01	0.02	−0.01	−0.07	0.00	0.06	−0.01	0.04	−0.04	0.00
(16) CEO_IS_FOUNDER	−0.03	0.00	0.00	0.09	−0.01	−0.06	−0.02	−0.02	−0.03	−0.13
(17) IND_DIRS_TENURE	−0.01	−0.03	−0.05	−0.21	−0.01	0.07	0.01	0.05	−0.10	0.04
(18) INST_OWNERSHIP	0.05	−0.02	−0.06	−0.37	0.04	0.23	0.11	0.11	0.10	0.10
(19) LEGAL_EXPERTISE	−0.02	0.00	0.00	−0.03	0.00	0.02	−0.03	0.03	−0.04	0.18
(20) ACQUISITION	0.01	0.04	0.03	0.00	0.01	0.01	0.03	0.01	0.02	−0.03
(21) FOREIGN	0.06	0.00	0.02	−0.17	0.04	0.17	0.13	0.05	0.10	0.04
(22) ISSUANCE	−0.02	0.03	0.03	0.17	−0.02	−0.04	−0.06	−0.05	0.00	−0.10
(23) LEVERAGE	0.00	0.01	0.00	0.03	−0.01	0.06	−0.07	0.02	0.03	0.02
(24) LOSS	−0.03	0.03	0.10	0.38	0.00	−0.17	−0.07	−0.10	0.01	−0.12
(25) MTB	0.02	0.01	0.00	−0.03	0.01	0.01	0.03	−0.01	0.01	−0.03
(26) RESTRUCTURE	0.06	0.02	0.03	−0.13	0.03	0.17	0.09	0.06	0.09	0.09
(27) ROA	0.02	−0.02	−0.07	−0.37	0.02	0.14	0.09	0.09	0.01	0.14
(28) SALES_GROWTH	−0.02	0.04	0.03	0.08	−0.01	−0.07	−0.03	−0.04	−0.02	−0.08
(29) SEGMENTS	0.03	0.01	0.00	−0.10	0.00	0.18	0.05	0.10	0.03	0.16
(30) SIZE	0.07	−0.04	−0.10	−0.53	0.05	0.35	0.09	0.21	0.10	0.28

(continued on next page)

The results of the difference-in-differences analysis are presented in Table 7, Panel A and confirm our main findings regarding restatements and the timeliness of financial reporting when an IT expert joins the AC.[19] The coefficient of interest in this test is on $TREAT * POST$ (i.e., the difference-in-differences estimator). This coefficient is negative and significant for the $MATERIAL\_RESTATE$ ($p \leq 0.05$) and $DAYS\_TO\_EARNINGS$ ($p \leq 0.10$) models.[20] With respect to restatements and reporting timeliness, financial reporting in the post-period is incrementally better for treatment firms that add an IT expert to the AC relative to control firms that do not add such expertise to the AC over the same period. Further, the coefficient on $TREAT$ is insignificant in all three analyses. This suggests that outcomes for treatment firms that add IT experts to the AC are *not* systematically different from other firms *before* the IT expert is added to the AC. Additionally, the coefficient on $POST$ is insignificant in all three analyses, suggesting that outcomes for control firms that never possess an IT expert on the AC are *not* different in the post- compared to the pre-period. For completeness, we report that the coefficient on $TREAT * POST$ is negative, but is not significant at conventional levels in the $IT\_MATERIAL\_WEAKNESS$ model ($p = 0.148$).

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[19] We achieve post-matching covariate balance for 80 percent or more of the covariates in each of our restatements, IT material weaknesses, and earnings announcement lag models in year t (untabulated). All control variables included in our tabulated analyses are also included when calculating propensity scores.

[20] Consistent with conclusions based on the interaction alone, the joint effect of the coefficients on $TREAT + TREAT * POST$ is negative and significant in the $MATERIAL\_RESTATE$ ($p \leq 0.05$) and $DAYS\_TO\_EARNINGS$ ($p \leq 0.01$) models. However, this joint effect is negative, but not significant, in the $IT\_MATERIAL\_WEAKNESS$ ($p = 0.199$) model. We thank an anonymous reviewer for suggesting this untabulated test.

TABLE 3 (continued)

Panel B: Pearson Correlations for Columns (11)–(20), continued from Panel A

	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
(12) *BOARD_INDEPENDENCE*	**−0.02**									
(13) *BOARD_SIZE*	**0.32**	**−0.07**								
(14) *BUSY_BOARD*	**0.15**	**0.04**	**0.09**							
(15) *CEO_IS_CHAIRMAN*	**0.02**	**0.15**	**0.06**	**−0.04**						
(16) *CEO_IS_FOUNDER*	**−0.05**	**0.02**	**−0.17**	0.01	**0.16**					
(17) *IND_DIRS_TENURE*	0.01	**0.21**	**0.17**	**−0.06**	**0.10**	**−0.09**				
(18) *INST_OWNERSHIP*	**0.28**	**0.14**	**0.25**	0.00	**0.09**	−0.03	**0.13**			
(19) *LEGAL_EXPERTISE*	**0.03**	−0.01	**0.10**	**0.03**	0.01	−0.03	0.04	0.00		
(20) *ACQUISITION*	**0.04**	**0.03**	−0.01	0.01	0.02	0.02	−0.03	**0.08**	−0.01	
(21) *FOREIGN*	**0.20**	**0.07**	**0.17**	0.03	0.04	−0.01	**0.08**	**0.31**	−0.05	**0.12**
(22) *ISSUANCE*	0.01	−0.02	**−0.11**	−0.01	−0.01	0.05	**−0.13**	0.00	−0.01	**0.14**
(23) *LEVERAGE*	**0.14**	**−0.08**	**0.08**	0.04	0.03	−0.03	−0.08	0.07	0.05	**0.06**
(24) *LOSS*	**−0.10**	−0.04	**−0.28**	0.06	**−0.12**	0.07	**−0.21**	**−0.31**	−0.01	−0.04
(25) *MTB*	0.03	0.01	0.00	**0.05**	0.00	0.05	−0.05	0.05	0.00	0.01
(26) *RESTRUCTURE*	**0.17**	**0.04**	**0.19**	0.04	−0.02	−0.07	0.01	**0.18**	−0.03	**0.07**
(27) *ROA*	**0.18**	**0.04**	**0.24**	0.00	**0.06**	−0.07	**0.17**	**0.28**	0.03	**0.05**
(28) *SALES_GROWTH*	−0.03	−0.02	**−0.09**	0.02	0.00	0.07	**−0.13**	−0.04	0.00	**0.11**
(29) *SEGMENTS*	**0.19**	0.01	**0.29**	0.02	**0.09**	**−0.09**	**0.11**	**0.21**	**0.07**	**0.08**
(30) *SIZE*	**0.49**	−0.01	**0.61**	**0.15**	**0.11**	−0.06	**0.11**	**0.47**	**0.07**	**0.07**

Panel C: Pearson Correlations for Columns (21)–(29), continued from Panel B

	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)
(22) *ISSUANCE*	**−0.05**								
(23) *LEVERAGE*	−0.03	**0.36**							
(24) *LOSS*	**−0.11**	**0.11**	0.03						
(25) *MTB*	0.04	0.05	−0.06	0.00					
(26) *RESTRUCTURE*	**0.37**	−0.01	**0.08**	0.01	−0.02				
(27) *ROA*	**0.14**	**−0.20**	−0.01	**−0.55**	0.01	0.04			
(28) *SALES_GROWTH*	**−0.06**	**0.14**	0.00	0.00	**0.10**	**−0.10**	−0.03		
(29) *SEGMENTS*	**0.26**	0.01	**0.14**	**−0.18**	−0.03	**0.20**	**0.16**	−0.06	
(30) *SIZE*	**0.30**	0.00	**0.15**	**−0.42**	**0.14**	**0.19**	**0.39**	0.01	**0.37**

Bold values indicate significance at 0.10 level or smaller. For brevity, we tabulate the Pearson correlations for our test variable, dependent variables, and IT, governance, and firm control variables only.
All variables are defined in Appendix A.

Second, we rerun our main analyses except we include firm fixed effects in place of industry fixed effects. We necessarily restrict the sample to firms with variation in the presence of AC IT expertise, resulting in sample sizes as low as 288. Table 7, Panel B presents these results, which are generally consistent with our main findings. The coefficient on *IT_ EXPERTISE* is negative and significant for the *MATERIAL_RESTATE* ($p \leq 0.10$) and *DAYS_TO_EARNINGS* ($p \leq 0.05$) analyses. This provides strong corroborating evidence consistent with IT experts on ACs benefiting the reliability and timeliness of financial reporting given the substantial reduction in sample size after the inclusion of firm fixed effects. Again, for completeness, we report that the coefficient on *IT_EXPERTISE* is negative, but not significant at conventional levels for the *IT_MATERIAL_WEAKNESS* model ($p = 0.186$). Taken together, the preceding results provide additional evidence that the impact on financial reporting reliability and timeliness is due to the AC IT expert and is not likely the result of endogeneity or reverse causality.

Additional Analyses—Falsification Tests

As falsification tests, we analyze the association between *IT_EXPERTISE* and immaterial restatements, which are restatements that are *not* categorized as Item 4.02 non-reliance restatements, and non-IT material weaknesses. The core competency of an AC IT expert is his or her IT-related knowledge and experience, independent monitoring, and authority.

TABLE 4

Audit Committee IT Expertise and Restatements (H1)

Panel A: Main Restatements Analysis

Independent Variables	Pred.	Dependent Variable: Pr($MATERIAL\_RESTATE = 1$)	
		Coefficient	z-statistic
Test variable			
IT_EXPERTISE	−	−0.3862	−2.22**
(p-value)			(0.013)
Control variables			
IT_CAPEX	?	−0.1155	−1.77*
CIO	?	−0.0835	−1.22
BOARD_IT_NONAC	?	−0.1552	−0.68
MANAGEMENT_IT	?	−0.1200	−1.47
ACCT_FINANCIAL_EXPERTISE	−	0.0030	0.05
LEGAL_EXPERTISE	−	0.0859	1.52
AUDIT_COMM_SIZE	−	−0.0494	−1.71**
BOARD_SIZE	?	−0.0046	−0.38
BOARD_INDEPENDENCE	−	−0.2483	−1.29*
CEO_IS_CHAIRMAN	+	−0.0600	−1.04
CEO_IS_FOUNDER	?	0.0553	0.61
IND_DIRS_TENURE	?	0.0053	0.68
BUSY_BOARD	?	0.0721	0.98
INST_OWNERSHIP	−	−0.0555	−0.62
BIG4	−	0.0866	0.95
ISSUANCE	+	0.1363	2.07**
LEVERAGE	+	0.1628	1.02
SALES_GROWTH	+	0.1239	2.01**
LOSS	+	0.1979	2.50***
FOREIGN	+	−0.1253	−1.77*
SEGMENTS	+	0.0166	0.92
ACQUISITION	+	0.2491	2.95***
RESTRUCTURE	+	0.2164	3.24***
ROA	?	0.2096	1.33
MTB	−	0.0013	0.23
SIZE	−	−0.0278	−0.99
NEW_AUDITOR	+	−0.1154	−0.97
IMPORTANCE_TO_AUDITOR	+	−0.3212	−1.80*
LOCAL_EXPERT_AUDITOR	−	0.0256	0.44
MATERIAL_WEAKNESS	+	2.7653	41.61***
Industry Fixed Effects		Yes	
Year Fixed Effects		Yes	
n		31,381	
ROC		0.83	
Pseudo R^2		23.39%	

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TABLE 4 (continued)

Panel B: Alternative Research Designs

Independent Variables	Pred.	Entropy Balanced Sample		*InformationWeek* 500 Firms Only	
		(1)		(2)	
		Coefficient	z-statistic	Coefficient	z-statistic
Test variable					
IT_EXPERTISE	–	−0.40	−2.51***	−1.03	−2.26**
(p-value)			(0.006)		(0.012)
Controls, Industry Fixed Effects, and Year Fixed Effects		Yes		Yes	
n		29,745		4,943	
ROC/Pseudo R^2		0.87/27.58%		0.90/36.03%	

***, **, * Indicate significance at the 0.01, 0.05, and 0.10 levels, respectively, using one-tailed tests when the coefficient sign matches the directional prediction, and two-tailed otherwise, similar to Badolato et al. (2014).
Industry fixed effects are based on two-digit SIC codes. The coefficients on industry fixed effects and year fixed effects are not reported for brevity. The coefficients on control variables in Panel B are not reported for brevity. All models are logistic regressions with robust standard errors.
All variables are defined in Appendix A.

Thus, it is less likely that an AC IT expert will prevent errors in financial statements or internal control material weaknesses that are unrelated to IT. Consistent with this assertion, we find that *IT_EXPERTISE* is *not* significantly associated with either immaterial restatements or non-IT material weaknesses ($p = 0.779$ and $p = 0.298$) in Table 8.

Additional Analyses—Untabulated Sensitivity Tests

First, we perform a subsample analysis to examine whether the IT expertise effect depends on having an accounting financial expert on the AC. In untabulated analyses of subsamples with and without *ACCT_FINANCIAL_EXPERTISE,* the coefficient on *IT_EXPERTISE* in the *MATERIAL_RESTATE* model is negative and significant for the with ($p \leq 0.10$) *and* without ($p \leq 0.01$) subsamples. Similarly, in the *DAYS_TO_EARNINGS* model, the coefficient on *IT_EXPERTISE* is negative and significant for the with ($p \leq 0.01$) *and* without ($p \leq 0.05$) subsamples. However, in the *IT_MATERIAL_WEAKNESS* model, the coefficient on *IT_EXPERTISE* is negative and significant for the without subsample ($p < 0.05$), *but* negative and barely insignificant for the with subsample ($p = 0.106$). Taken together, the *IT_EXPERTISE* effect persists for all outcomes in the subsamples without *ACCT_FINANCIAL_EXPERTISE*. This mitigates the risk that the *IT_EXPERTISE* effect depends on an accounting financial expert on the AC.[21]

Second, IT evolves over time and it is possible that AC directors who have been more recently exposed to business IT systems are more effective in their role as the AC IT expert. To address this possibility, we rerun our main analyses after replacing *IT_EXPERTISE* with the new variable *IT_RECENT,* which equals 1 scaled by the number of years since the AC IT expert for firm *i* last served in a non-AC IT role as of year *t,* and 0 if no IT expert is on the AC. We find that the coefficient on *IT_RECENT* is negative and significant for all three dependent variables ($p \leq 0.10$ or smaller). More importantly, the economic significance of having an AC IT expert that has served in a non-AC IT role within the past year is roughly twofold higher than the overall average impact of simply having an AC IT expert (i.e., *IT_RECENT* = 1 compared to *IT_EXPERTISE* = 1).

Third, ACs oversee the external auditor, which means that the AC may indirectly affect how long the external audit takes. Thus, we replace our earnings announcement lag variable with audit report lag (calculated as the number of days between the fiscal year-end and the date of the audit report) and reperform our financial reporting timeliness analysis. We find that the coefficient on *IT_EXPERTISE* remains negative and significant ($p \leq 0.10$) when we examine audit report lags.

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[21] In untabulated analyses, we delete observations where the AC IT expert is also the AC chairperson (incidence rate = 0.004) and rerun each model. The direction and significance of the coefficient on *IT_EXPERTISE* remains materially unchanged ($p \leq 0.10$ or smaller) for all subsamples. This suggests that the rare occurrence of AC IT experts also being the AC chairperson does not confound our main findings.

TABLE 5

Audit Committee IT Expertise and Material Weaknesses (H1)

Panel A: Main IT Material Weaknesses Analysis

Independent Variables	Pred.	Dependent Variable: Pr(*IT_MATERIAL_WEAKNESS* = 1)	
		Coefficient	z-statistic
Test variable			
IT_EXPERTISE	−	−0.3947	−1.84**
(p-value)			(0.033)
Control variables			
IT_CAPEX	?	−0.0095	−0.12
CIO	?	0.1859	2.04**
BOARD_IT_NONAC	?	0.2528	1.14
MANAGEMENT_IT	?	0.1448	1.40
ACCT_FINANCIAL_EXPERTISE	−	0.1118	1.34
LEGAL_EXPERTISE	−	0.0326	0.43
AUDIT_COMM_SIZE	−	0.0836	2.15**
BOARD_SIZE	?	−0.0696	−3.90***
BOARD_INDEPENDENCE	−	−0.6180	−2.41***
CEO_IS_CHAIRMAN	+	0.0393	0.53
CEO_IS_FOUNDER	?	−0.0561	−0.49
IND_DIRS_TENURE	?	−0.0195	−1.73*
BUSY_BOARD	?	0.1075	1.16
INST_OWNERSHIP	−	−0.3592	−3.20***
BIG4	−	−0.3892	−4.28***
ISSUANCE	+	0.0708	0.86
LEVERAGE	+	−0.0654	−0.36
SALES_GROWTH	+	0.2059	3.17***
LOSS	+	0.5887	6.13***
FOREIGN	+	0.3628	4.23***
SEGMENTS	+	0.1001	4.72***
ACQUISITION	+	0.3165	3.22***
RESTRUCTURE	+	0.0778	0.94
ROA	?	0.0762	0.37
MTB	−	−0.0018	−0.24
SIZE	−	−0.2513	−6.31***
INV	+	0.9799	2.31**
Z_SCORE	−	−0.0355	−3.04***
AUDITOR_RESIGNED	+	1.1470	5.90***
FIRM_AGE	?	0.0017	0.53
ANNOUNCE_RESTATE	+	1.4451	18.00***
Industry Fixed Effects		Yes	
Year Fixed Effects		Yes	
n		27,449	
ROC		0.81	
Pseudo R^2		16.66%	

TABLE 5 (continued)

Panel B: Alternative Research Designs

		Dependent Variable: Pr(*IT_MATERIAL_WEAKNESS* = 1)			
		Entropy Balanced Sample		*InformationWeek* 500 Firms Only	
		(1)		(2)	
Independent Variables	**Pred.**	**Coefficient**	**z-statistic**	**Coefficient**	**z-statistic**
Test variable					
IT_EXPERTISE	−	−0.40	−1.82**	−0.23	−0.43
(p-value)			(0.035)		(0.334)
Controls, Industry Fixed Effects, and Year Fixed Effects		Yes		Yes	
n		26,037		3,988	
ROC/Pseudo R^2		0.86/22.01%		0.88/28.67%	

***, **, * Indicate significance at the 0.01, 0.05, and 0.10 levels, respectively, using one-tailed tests when the coefficient sign matches the directional prediction, and two-tailed otherwise, similar to Badolato et al. (2014).
Industry fixed effects are based on two-digit SIC codes. The coefficients on industry fixed effects and year fixed effects are not reported for brevity. The coefficients on control variables in Panel B are not reported for brevity. All models are logistic regressions with robust standard errors.
All variables are defined in Appendix A.

Additional Analyses—Untabulated Investor Reactions to Audit Committee IT Expertise

In this section, we explore whether investors recognize the higher financial reporting reliability and timeliness associated with AC IT expertise. First, we analyze the effect of AC IT expertise on firms' earnings response coefficients. We regress three-day cumulative market-adjusted abnormal returns around firms' earnings announcement dates on *IT_EXPERTISE,* unexpected earnings (*UE,* calculated as actual earnings per share less consensus analyst forecasted earnings per share, all scaled by stock price), the interaction *IT_EXPERTISE* ∗ *UE,* and relevant controls.[22] Consistent with investors perceiving more reliable financial reporting at firms with AC IT expertise, we find a positive and significant ($p \leq 0.05$) coefficient on *IT_EXPERTISE* ∗ *UE*.

Next, we examine the association between *IT_EXPERTISE* and the cost of equity. We regress firms' implied cost of equity (calculated following Dhaliwal, Judd, Serfling, and Shaikh 2016) on *IT_EXPERTISE* and relevant controls.[23] We find that the coefficient on *IT_EXPERTISE* is negative and significant ($p \leq 0.05$). This evidence is consistent with investors perceiving lower overall financial reporting risk (e.g., information risk) at firms with AC IT expertise.

Finally, we analyze the association between AC IT expertise and the risk of a securities fraud class action lawsuit by investors.[24] We regress *SUED* (which equals 1 if firm *i* is sued by investors in a securities fraud class action lawsuit for year *t,* and 0 otherwise) on *IT_EXPERTISE* and relevant controls.[25] We find that the coefficient on *IT_EXPERTISE* is negative and significant ($p \leq 0.05$). Since Kim and Skinner (2012) report that 89 percent of these lawsuits arise in response to financial reporting failures, this result is consistent with the notion that an improvement in financial reporting due to the presence of AC IT expertise reduces a firm's exposure to litigation.

V. CONCLUSION

In this study, we examine whether information technology (IT) expertise on audit committees (ACs) impacts the reliability and timeliness of firms' financial reporting. IT experts provide the AC with IT-related knowledge and experience, independent

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[22] This analysis includes IT, governance, and firm controls, along with their interactions with *UE*. Following Dee, Lulseged, and Zhang (2015), we also control for the standard deviation of a firm's returns during the year, the absolute value of *UE,* and both interacted with *UE* in our model.

[23] This analysis includes IT, governance, and firm controls. Following Dhaliwal et al. (2016), we also control for a firm's momentum, analyst forecast dispersion, long-term growth rate, value-weighted beta, and idiosyncratic risk.

[24] Lawsuit data are drawn from Stanford's Securities Class Action Clearinghouse, available at: http://securities.stanford.edu/filings.html. These data provide details "relating to the prosecution, defense, and settlement of federal class action securities fraud litigation."

[25] This analysis includes IT, governance, and firm control variables. Following Kim and Skinner (2012), we also control for the firm's market-adjusted abnormal returns during the year, the standard deviation and skewness of those returns, and a firm's trading volume during the year.

TABLE 6

Audit Committee IT Expertise and Earnings Announcement Lags (H2)

Panel A: Main Earnings Announcement Lags Analysis

Independent Variables	Pred.	Dependent Variable: *DAYS_TO_EARNINGS*	
		Coefficient	t-statistic
Test variable			
IT_EXPERTISE	−	−2.0114	−5.69***
(p-value)			(<0.001)
Control variables			
IT_CAPEX	?	0.1092	0.66
CIO	?	−0.9575	−5.74***
BOARD_IT_NONAC	?	−0.8177	−1.61
MANAGEMENT_IT	?	−0.5734	−2.98***
ACCT_FINANCIAL_EXPERTISE	−	−1.1962	−6.77***
LEGAL_EXPERTISE	+	0.4934	3.29***
AUDIT_COMM_SIZE	−	−0.1233	−1.65**
BOARD_SIZE	−	−0.3087	−8.70***
BOARD_INDEPENDENCE	+	0.7770	1.43*
CEO_IS_CHAIRMAN	−	−0.6828	−4.47***
CEO_IS_FOUNDER	?	−1.1324	−4.76***
IND_DIRS_TENURE	?	−0.2398	−11.21***
BUSY_BOARD	?	−0.9894	−5.29***
INST_OWNERSHIP	−	−1.7323	−7.23***
BIG4	−	−1.9859	−7.75***
ISSUANCE	+	1.1199	6.74***
LEVERAGE	+	0.8840	2.06**
SALES_GROWTH	+	1.3395	7.56***
LOSS	+	−0.2427	−1.07
FOREIGN	+	−1.1577	−6.00***
SEGMENTS	+	0.3650	8.16***
ACQUISITION	+	−0.5734	−2.46**
RESTRUCTURE	+	−1.8555	−10.39***
ROA	?	−3.3877	−6.48***
MTB	−	0.0330	2.11**
SIZE	−	−3.0803	−32.63***
NEW_AUDITOR	+	1.5171	3.89***
IMPORTANCE_TO_AUDITOR	+	0.2378	0.54
LOCAL_EXPERT_AUDITOR	−	−0.3924	−2.48***
CURRENT_ASSETS	?	−3.9822	−8.79***
QUICK_RATIO	?	0.1762	8.24***
DECEMBER	?	−0.1998	−1.04
GOING_CONCERN	+	2.6872	3.06***
MATERIAL_WEAKNESS	+	5.1979	12.09***
AUDIT_FEES	?	2.3742	16.61***
DAYS_TO_FILING	+	0.5999	45.52***
Industry Fixed Effects		Yes	
Year Fixed Effects		Yes	
n		26,411	
Adjusted R^2		51.32%	

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TABLE 6 (continued)

Panel B: Alternative Research Designs

		Dependent Variable: *DAYS_TO_EARNINGS*			
		Entropy Balanced Sample		*InformationWeek* 500 Firms Only	
		(1)		(2)	
Independent Variables	Pred.	Coefficient	t-statistic	Coefficient	t-statistic
Test variable					
IT_EXPERTISE	−	−2.16	−6.57***	−2.14	−3.92***
(p-value)			(<0.001)		(<0.001)
Controls, Industry Fixed Effects, and Year Fixed Effects		Yes		Yes	
n		24,836		4,935	
Adjusted R^2		50.75%		50.74%	

***, **, * Indicate significance at the 0.01, 0.05, and 0.10 levels, respectively, using one-tailed tests when the coefficient sign matches the directional prediction, and two-tailed otherwise, similar to Badolato et al. (2014).
Industry fixed effects are based on two-digit SIC codes. The coefficients on industry fixed effects and year fixed effects are not reported for brevity. The coefficients on control variables in Panel B are not reported for brevity. All models are ordinary least squares (OLS) regressions with robust standard errors.
All variables are defined in Appendix A.

monitoring, and authority. Thus, we predict that ACs with IT expertise will be more effective and efficient at achieving their financial reporting responsibilities given that IT expertise is relevant to preventing and resolving IT-related internal control weaknesses, and in reducing IT-related information risks to financial reporting.

    Our results indicate that IT expertise on the AC is negatively and significantly associated with material restatements, IT-related material weaknesses, and earnings announcement lags. In additional robustness analyses, we find no significant association between AC IT expertise and financial reporting outcomes an AC IT expert is less likely to affect (i.e., immaterial

TABLE 7

Research Designs to Mitigate Endogeneity Concerns

Panel A: Difference-in-Differences Analysis—When an IT Expert Joins the Audit Committee

		Dependent Variables					
		Pr(*MATERIAL _RESTATE* = 1)		Pr(*IT_MATERIAL _WEAKNESS* = 1)		*DAYS_TO _EARNINGS*	
		(1)		(2)		(3)	
Independent Variables	Pred.	Coeff.	z-stat.	Coeff.	z-stat.	Coeff.	t-stat.
Test variables							
TREAT	?	0.17	0.66	0.24	0.56	−0.26	−0.24
(p-value)			(0.509)		(0.576)		(0.811)
*TREAT * POST*	−	−0.83	−1.90**	−0.92	−1.05	−2.12	−1.54*
(p-value)			(0.029)		(0.148)		(0.062)
Select control variable							
POST	?	−0.15	−0.81	−0.34	−1.18	0.75	1.01
Other Controls		Yes		Yes		Yes	
n		2,499		2,607		1,747	
ROC/Pseudo or Adjusted R^2		0.76/16.81%		0.84/20.10%		36.77%	

(continued on next page)

TABLE 7 (continued)

Panel B: Firm and Year Fixed Effects

		Dependent Variables					
		Pr(*MATERIAL _RESTATE* = 1)		Pr(*IT_MATERIAL _WEAKNESS* = 1)		*DAYS_TO _EARNINGS*	
		(1)		(2)		(3)	
Independent Variables	**Pred.**	**Coeff.**	**z-stat**	**Coeff.**	**z-stat**	**Coeff**	**t-stat**
Test variable							
IT_EXPERTISE	–	−0.75	−1.50*	−2.40	−0.89	−0.85	−2.03**
(p-value)			(0.067)		(0.186)		(0.021)
Controls, Firm Fixed Effects, and Year Fixed Effects		Yes		Yes		Yes	
n		509		288		1,811	
ROC/Pseudo or Adjusted R^2		0.92/47.25%		0.98/63.83%		81.32%	

***, **, * Indicate significance at the 0.01, 0.05, and 0.10 levels, respectively, using one-tailed tests when the coefficient sign matches the directional prediction, and two-tailed otherwise, similar to Badolato et al. (2014).
In Panel A, we match treatment firms (firms with audit committee IT experts at any point in our sample, *TREAT* = 1) with control firms (firms that never have an audit committee IT expert, *TREAT* = 0) in year *t*, where year *t* is the first year that the IT expert is on the audit committee, and compare four years prior to four years after year *t*. In Panel B, the sample is restricted to firms that exhibit variation in the presence of IT expertise on the audit committee. The coefficients on all fixed effects and control variables are not reported for brevity. All models are logistic or OLS regressions with robust standard errors. All other variables are defined in Appendix A.

restatements and non-IT material weaknesses). Finally, we find corroborating evidence that investors respond more to financial reporting at firms with AC IT expertise in the form of higher earnings response coefficients, that the cost of equity capital is lower at these firms, and that these firms are less likely to be sued in securities fraud class action lawsuits. Taken together, our evidence is consistent with AC IT expertise benefiting the reliability and timeliness of financial reporting.

TABLE 8

Falsification Analysis: The Effect of Audit Committee IT Expertise on Non-IT Outcomes

		Dependent Variables			
		Pr(*IMMATERIAL _RESTATE* = 1)		Pr(*NON_IT_MATERIAL _WEAKNESS* = 1)	
		(1)		(2)	
Independent Variables	**Pred.**	**Coefficient**	**z-statistic**	**Coefficient**	**z-statistic**
Test variable					
IT_EXPERTISE	ns	−0.03	−0.28	0.18	1.04
(p-value)			(0.779)		(0.298)
Controls, Industry Fixed Effects, and Year Fixed Effects		Yes		Yes	
n		31,428		27,559	
ROC/Pseudo R^2		0.69/6.37%		0.77/10.88%	

***, **, * Indicate significance at the 0.01, 0.05, and 0.10 levels, respectively, using one-tailed tests when the coefficient sign matches the directional prediction, and two-tailed otherwise, similar to Badolato et al. (2014).
Industry fixed effects are based on two-digit SIC. The coefficients on all fixed effects and control variables are not reported for brevity. All models are logistic regressions with robust standard errors.

Variable Definitions:
IMMATERIAL_RESTATE = 1 if firm *i* restates its financial statements for year *t not* under Item 4.02, and 0 otherwise; and
NON_IT_MATERIAL_WEAKNESS = 1 when the auditor's SOX 404 report indicates the firm exhibits at least one material weakness in year *t* that is *not* IT-related, and 0 otherwise.
All other variables are defined in Appendix A.

Readers of this study should consider our findings within the context that current regulation and stock exchange listing requirements do not mandate the presence or disclosure of IT expertise on the AC, even though contemporary financial reporting relies on IT. Nonetheless, our findings should be of interest to regulators tasked with setting these requirements, as well as corporate boards responsible for maintaining a qualified AC. From a practitioner perspective, our findings support assertions by the audit profession and statements from current AC members that IT expertise is an important AC characteristic relevant to the AC's monitoring role. Finally, we contribute to the call for research that explores the impacts of "voluntary" AC characteristics (DeFond and Zhang 2014, 307).

An important caveat of our study is the challenge and choice in measuring IT expertise. We restrict our measurement of IT expertise to characteristics strongly indicative of such expertise. In doing so, we maintain strong construct and internal validity with respect to our research question. However, it is possible, and even likely, that we fail to identify some AC members as an IT expert when, in fact, she or he may possess such knowledge and experience. This possibility suggests that the incidence rate of AC IT expertise we report in the study is understated. Future research may develop more precise measures of IT expertise while also allowing such measures to vary based on the specific research setting and question at hand. Further, the incidence rate of AC IT expertise as we measure it is rather low, at about 5 percent in 2015. We conjecture that this is partially due to a relatively small labor pool of people who possess both IT expertise and the ability to sit on an AC, in addition to the design choices we make in measuring IT expertise.

We also note a caveat that our analyses examine only accelerated filers. Thus, we cannot generalize our study's findings to non-accelerated filers. Finally, another caveat is that our results examine some of the "first" IT experts on ACs. Consequently, IT experts added to ACs in the future may not have the same effect as these early IT experts, who are perhaps bringing initial benefits to ACs that may not persist into the future in the same manner.

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APPENDIX A

Variable Definitions

Variable		Definition	Data Source
Test Variable			
IT_EXPERTISE	=	1 if firm *i* has an IT expert on the audit committee in year *t,* and 0 otherwise. An audit committee member is deemed an IT expert if he or she has, during his or her career, worked as a (1) chief information officer, or (2) director, vice president, senior vice president, head, manager, or general manager of information technology, information, information services, information systems, or information management.	BoardEx
Dependent Variables			
MATERIAL_RESTATE	=	1 if firm *i* issues an Item 4.02-restated 10-K or 10-Q filing for year *t* (a "Big R" non-reliance restatement), and 0 otherwise.	Audit Analytics
IT_MATERIAL_WEAKNESS	=	1 when the auditor's SOX 404 report on internal control over financial reporting indicates firm *i* exhibits at least one IT-related material weakness in year *t,* and 0 otherwise. An IT-related material weakness is a material weakness that Audit Analytics categorizes using code 22 (information technology, software, security and access), 42 (segregations of duties/design of controls), 76 (journal entry control issues), 12 (untimely or inadequate account reconciliations), 77 (non-routine transaction control issues), or 57 (treasury control issues).	Audit Analytics
DAYS_TO_EARNINGS	=	The number of days between firm *i*'s fiscal year-end date for year *t* and firm *i*'s earnings announcement date for year *t*.	Compustat
IT Control Variables			
BOARD_IT_NONAC	=	1 if at least one nonaudit committee board member possesses IT expertise, and 0 otherwise.	BoardEx
CIO	=	1 if firm *i* has a chief information officer on the top management team in year *t,* and 0 otherwise.	BoardEx

(continued on next page)

APPENDIX A (continued)

Variable		Definition	Data Source
IT_CAPEX	=	The total number of times firm i mentions IT-related words within ten words of words that indicate investment in their MD&A for year t, scaled by total 10-K length in words and multiplied by 10,000 for expositional convenience. (For any observation for which we cannot extract the MD&A section specifically from the 10-K, we calculate the same variable on the whole 10-K.) IT-related words are: Microsoft Dynamics, NetSuite, Oracle, SAP, Sage, Workday Financial Management, FinancialForce, Unit4, Acumatica, Intacct, Ramco, Epicor, PeopleSoft, Baan, Hyperion, i2, CDC Software, Lawson, Visma, QAD, Global Shop Solutions, Agresso, IFS, Odoo, Deltek, Infor, SYSPRO, Ecount, Priority Software, ePROMIS, E2 Shop System, abas, Deskera, Plentymarkets, Salesforce, Zoho, OroCRM, HubSpot, Act!, Pipedrive, Maximizer, Insightly, Apptivo, InfusionSoft, SugarCRM, SuiteCRM, Base CRM, salesboom, bpm'online, Unleashed, Orderhive, AscendTMS, Verizon Connect, AppointmentPlus, 3PL Warehouse Manager, Acctivate, QuickBase, Cleo, Megaventory, Halo Supply Chain, RapidResponse, Hybrent, VISCO, RizePoint, Avercast, Magaya, Tableau, Qlik, IBM Cognos, Yellowfin, WebFOCUS, TIBCO, SAS, Targit, Izenda, MicroStrategy, BOARD Intelligence, Sisense, Statsbot, Necto, InetSoft, Birst, Domo Technologies, Anypoint Platform, Zapier, Process Street, Dell Boomi, PieSync, Datix Unity, APPSeCONNECT, Pragmatic Works Task Factory, BroadPeak K3, TIBCO Scribe, Centerprise Data Integrator, UiPath, Skyvia, SSIS PowerPack, Autofy, Workato, IBM WebSphere, OneSaas, Informatica PowerCenter, information technology, information systems, enterprise resource planning systems, supply chain management systems, customer relationship management systems, enterprise systems, business intelligence system (Ashraf and Sunder 2019; Dorantes et al. 2013; Gartner 2018; Capterra 2018a, 2018b, 2018c, 2018d). Words that indicate investments are the following (including different forms of each word, as applicable): upgrade, implement, install, integrate, invest, acquire, obtain, design, purchase, configure, plan, use, adopt, move, develop, agree, spend, enhance, improve, expand, modify, capitalize, complete, replace, modernize, initiate, change, advance, boost, increase, capital expenditure, capital lease, capital project, capital commitment, capital expense, and capital resource (Ashraf and Sunder 2019).	10-K Filings
MANAGEMENT_IT	=	1 if firm i in year t shows that at least one senior manager, excluding the chief information officer, has IT expertise, and 0 otherwise.	BoardEx
Governance Control Variables			
ACCT_FINANCIAL_EXPERTISE	=	1 if firm i has an accounting financial expert in year t on the audit committee, and 0 otherwise. An accounting financial expert is defined as someone who has prior experience working as a(n): chief financial officer, accounting officer, chief accountant, controller, certified public accountant, chartered accountant, head of accounting, vice president of accounting, accounting director, vice president of finance, treasurer, or auditor (following Badolato et al. 2014; Cohen et al. 2014).	BoardEx
AUDIT_COMM_SIZE	=	The number of directors on the audit committee for firm i during year t.	BoardEx
BIG4	=	1 if firm i uses a Big 4 auditor in year t, and 0 otherwise.	Audit Analytics
BOARD_INDEPENDENCE	=	The total number of independent board members scaled by total board members for firm i in year t.	BoardEx
BOARD_SIZE	=	The number of directors on the board for firm i during year t.	BoardEx
BUSY_BOARD	=	1 if 50 percent or more independent board members for firm i serve on more than three boards simultaneously in year t, and 0 otherwise.	BoardEx
CEO_IS_CHAIRMAN	=	1 if the CEO is also the chairman of the board for firm i in year t, and 0 otherwise.	BoardEx
CEO_IS_FOUNDER	=	1 if the CEO for firm i in year t is also the founder of the firm, and 0 otherwise.	BoardEx
IND_DIRS_TENURE	=	The average number of years the independent directors for firm i have been board members as of year t.	BoardEx

(continued on next page)

APPENDIX A (continued)

Variable		Definition	Data Source
INST_OWNERSHIP	=	The percentage of firm i owned by institutional investors in year t.	Thomson Reuters
LEGAL_EXPERTISE	=	1 if firm i has a legal expert in year t on the audit committee, and 0 otherwise. A legal expert is defined as someone who possesses prior experience as an attorney, lawyer, or general counsel, or has a Juris Doctor or Doctor of Jurisprudence degree (following Krishnan et al. 2011).	BoardEx
Firm Control Variables			
ACQUISITION	=	1 if there is an acquisition by firm i in year t that contributes to sales or net income.	Compustat
FOREIGN	=	1 if firm i exhibits non-zero pre-tax foreign income in year t, and 0 otherwise.	Compustat
ISSUANCE	=	1 if firm i issues equity or debt in year t equal to or more than 10 percent of total assets in year t, and 0 otherwise.	Compustat
LEVERAGE	=	Long-term debt scaled by total assets for firm i in year t.	Compustat
LOSS	=	1 if firm i exhibits net income less than zero in year t, and 0 otherwise.	Compustat
MTB	=	The market value of equity scaled by book value of equity for firm i in year t.	Compustat
RESTRUCTURE	=	1 if firm i exhibited non-zero restructuring costs in year t, and 0 otherwise.	Compustat
ROA	=	Net income scaled by total assets for firm i in year t.	Compustat
SALES_GROWTH	=	Sales for firm i in year t minus sales for firm i in year $t-1$, all scaled by sales for firm i in year $t-1$.	Compustat
SEGMENTS	=	The number of geographic and business segments for firm i in year t.	Compustat Segments
SIZE	=	The natural log of market value for firm i in year t.	Compustat
Other Control Variables			
ANNOUNCE_RESTATE	=	1 if firm i discloses a restatement in year t.	Audit Analytics
AUDIT_FEES	=	The natural log of audit fees for firm i in year t.	Audit Analytics
AUDITOR_RESIGNED	=	1 if the external auditor for firm i resigned between nine months prior to the fiscal year-end to three months after fiscal year-end for year t, and 0 otherwise (following Ashbaugh-Skaife et al. 2007).	Audit Analytics
CURRENT_ASSETS	=	Current assets scaled by total assets for firm i in year t.	Compustat
DAYS_TO_FILING	=	The number of days between the fiscal year-end date and the 10-K filing for firm i in year t.	Audit Analytics and Compustat
DECEMBER	=	1 if the fiscal year for firm i in year t ends in December, and 0 otherwise.	Compustat
FIRM_AGE	=	The age of firm i in years as of year t.	Compustat
GOING_CONCERN	=	1 if the external auditor issued a going concern opinion for firm i in year t, and 0 otherwise.	Audit Analytics
IMPORTANCE_TO_AUDITOR	=	Total audit fees charged to firm i by audit office j scaled by total audit fees charged to all clients by audit office j in year t.	Audit Analytics
INV	=	Total inventory scaled by total assets for firm i in year t.	Compustat
LOCAL_EXPERT_AUDITOR	=	1 if audit office j for firm i possesses the highest market share of audit fees in Metropolitan Statistical Area y for industry x in year t, and 0 otherwise.	Audit Analytics
NEW_AUDITOR	=	1 if the external auditor for firm i in year t did not audit firm i in year $t-1$, and 0 otherwise.	Audit Analytics
QUICK_RATIO	=	Current assets for firm i in year t less inventory for firm i in year t, all scaled by current liabilities for firm i in year t.	Compustat
Z_SCORE	=	$0.717 * ((\text{current assets} - \text{current liabilities})/\text{total assets}) + 0.847 * (\text{retained earnings/total assets}) + 3.107 * (\text{earnings before interest and taxes/total assets}) + 0.42 * (\text{book value of equity/total liabilities}) + 0.998 * (\text{sales/total assets})$. All terms are calculated for firm i in year t. This variable is calculated following Altman (1983).	Compustat

APPENDIX B

Covariate Balance Pre- and Post-Entropy Balancing

Appendix B presents the covariate balance pre- and post-entropy balancing for the *MATERIAL_RESTATE* (Table 9), *IT_MATERIAL_WEAKNESS* (Table 10), and *DAYS_TO_EARNINGS* (Table 11) samples.

TABLE 9

MATERIAL_RESTATE Sample

Panel A: Before Entropy Balancing

Variable	Firm Years Where *IT_EXPERTISE* = 1 Mean (n = 1,217) (1)	Firm Years Where *IT_EXPERTISE* = 0 Mean (n = 28,528) (2)	Mean Diff. (1) − (2) (3)
IT_CAPEX	0.3191	0.2134	0.1057***
CIO	0.4158	0.2747	0.1411***
BOARD_IT_NONAC	0.0312	0.0198	0.0114**
MANAGEMENT_IT	0.2358	0.1641	0.0717***
ACCT_FINANCIAL_EXPERTISE	0.8118	0.7540	0.0578***
LEGAL_EXPERTISE	0.3164	0.3808	−0.0644***
AUDIT_COMM_SIZE	4.5380	4.0980	0.4400***
BOARD_SIZE	11.1900	10.1000	1.0900***
BOARD_INDEPENDENCE	0.6445	0.6367	0.0078*
CEO_IS_CHAIRMAN	0.4593	0.4761	−0.0168
CEO_IS_FOUNDER	0.0567	0.1079	−0.0512***
IND_DIRS_TENURE	6.5530	7.1400	−0.5870***
BUSY_BOARD	0.1619	0.1677	−0.0058
INST_OWNERSHIP	0.6751	0.5985	0.0766***
BIG4	0.8850	0.8089	0.0761***
ISSUANCE	0.2901	0.3489	−0.0588***
LEVERAGE	0.1802	0.1928	−0.0126***
SALES_GROWTH	0.0878	0.1431	−0.0553***
LOSS	0.2120	0.2426	−0.0306**
FOREIGN	0.5481	0.4274	0.1207***
SEGMENTS	2.6470	2.4540	0.1930
ACQUISITION	0.1126	0.1030	0.0096
RESTRUCTURE	0.4084	0.2794	0.1290***
ROA	0.0256	−0.0030	0.0286***
MTB	3.3510	2.8470	0.5040***
SIZE	7.5040	6.8740	0.6300***
NEW_AUDITOR	0.0378	0.0534	−0.0156***
IMPORTANCE_TO_AUDITOR	0.1103	0.1125	−0.0022
LOCAL_EXPERT_AUDITOR	0.5752	0.5428	0.0324
MATERIAL_WEAKNESS	0.0583	0.0629	−0.0046

TABLE 9 (continued)

Panel B: After Entropy Balancing

Variable	Firm Years Where *IT_EXPERTISE* = 1 Mean (n = 1,217) (1)	Firm Years Where *IT_EXPERTISE* = 0 Mean (n = 28,528) (2)	Mean Diff. (1) − (2) (3)
IT_CAPEX	0.3191	0.3191	0.0000
CIO	0.4158	0.4159	−0.0001
BOARD_IT_NONAC	0.0312	0.0312	0.0000
MANAGEMENT_IT	0.2358	0.2360	−0.0002
ACCT_FINANCIAL_EXPERTISE	0.8118	0.8117	0.0001
LEGAL_EXPERTISE	0.3164	0.3166	−0.0002
AUDIT_COMM_SIZE	4.5380	4.5380	0.0000
BOARD_SIZE	11.1900	11.1800	0.0100
BOARD_INDEPENDENCE	0.6445	0.6444	0.0001
CEO_IS_CHAIRMAN	0.4593	0.4594	−0.0001
CEO_IS_FOUNDER	0.0567	0.0567	0.0000
IND_DIRS_TENURE	6.5530	6.5520	0.0010
BUSY_BOARD	0.1619	0.1620	−0.0001
INST_OWNERSHIP	0.6751	0.6750	0.0001
BIG4	0.8850	0.8848	0.0002
ISSUANCE	0.2901	0.2903	−0.0002
LEVERAGE	0.1802	0.1802	0.0000
SALES_GROWTH	0.0878	0.0878	0.0000
LOSS	0.2120	0.2122	−0.0002
FOREIGN	0.5481	0.5480	0.0001
SEGMENTS	2.6470	2.6460	0.0010
ACQUISITION	0.1126	0.1127	−0.0001
RESTRUCTURE	0.4084	0.4085	−0.0001
ROA	0.0256	0.0256	0.0000
MTB	3.3510	3.3500	0.0010
SIZE	7.5040	7.5030	0.0010
NEW_AUDITOR	0.0378	0.0378	0.0000
IMPORTANCE_TO_AUDITOR	0.1103	0.1103	0.0000
LOCAL_EXPERT_AUDITOR	0.5752	0.5750	0.0002
MATERIAL_WEAKNESS	0.0583	0.0584	−0.0001

***, **, * Indicate significance at the 0.01, 0.05, and 0.10 levels, respectively, using two-tailed tests.

TABLE 10
IT_MATERIAL_WEAKNESS Sample

Panel A: Before Entropy Balancing

Variable	Firm Years Where *IT_EXPERTISE* = 1 Mean (n = 1,117) (1)	Firm Years Where *IT_EXPERTISE* = 0 Mean (n = 24,920) (2)	Mean Diff. (1) − (2) (3)
IT_CAPEX	0.3390	0.2267	0.1123***
CIO	0.3847	0.2597	0.1250***
BOARD_IT_NONAC	0.0310	0.0201	0.0109**
MANAGEMENT_IT	0.2274	0.1531	0.0743***
ACCT_FINANCIAL_EXPERTISE	0.7897	0.7502	0.0395***
LEGAL_EXPERTISE	0.3219	0.3690	−0.0471***
AUDIT_COMM_SIZE	4.4070	3.9640	0.4430***
BOARD_SIZE	10.7000	9.5850	1.1150***
BOARD_INDEPENDENCE	0.6445	0.6288	0.0157**
CEO_IS_CHAIRMAN	0.4637	0.4757	−0.0120
CEO_IS_FOUNDER	0.0587	0.1235	−0.0648***
IND_DIRS_TENURE	6.4750	6.9350	−0.4600***
BUSY_BOARD	0.1565	0.1679	−0.0114
INST_OWNERSHIP	0.6422	0.5788	0.0634***
BIG4	0.8557	0.7853	0.0704***
ISSUANCE	0.3040	0.3594	−0.0554***
LEVERAGE	0.1889	0.1936	−0.0047**
SALES_GROWTH	0.0967	0.1517	−0.0550***
LOSS	0.2592	0.2948	−0.0356**
FOREIGN	0.5778	0.4626	0.1152***
SEGMENTS	2.6430	2.5120	0.1310
ACQUISITION	0.1157	0.1112	0.0045
RESTRUCTURE	0.4042	0.2962	0.1080***
ROA	0.0001	−0.0298	0.0299***
MTB	3.4030	2.9480	0.4550***
SIZE	7.2160	6.5880	0.6280***
INV	0.0878	0.0898	−0.0020
Z_SCORE	1.4880	1.3750	0.1130
AUDITOR_RESIGNED	0.0090	0.0118	−0.0028
FIRM_AGE	26.6300	23.0100	3.6200***
ANNOUNCE_RESTATE	0.0831	0.0883	−0.0052

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TABLE 10 (continued)

Panel B: After Entropy Balancing

Variable	Firm Years Where *IT_EXPERTISE* = 1 Mean (n = 1,117) (1)	Firm Years Where *IT_EXPERTISE* = 0 Mean (n = 24,920) (2)	Mean Diff. (1) − (2) (3)
IT_CAPEX	0.3390	0.3390	0.0000
CIO	0.3847	0.3848	−0.0001
BOARD_IT_NONAC	0.0310	0.0310	0.0000
MANAGEMENT_IT	0.2274	0.2276	−0.0002
ACCT_FINANCIAL_EXPERTISE	0.7897	0.7895	0.0002
LEGAL_EXPERTISE	0.3219	0.3221	−0.0002
AUDIT_COMM_SIZE	4.4070	4.4060	0.0010
BOARD_SIZE	10.7000	10.7000	0.0000
BOARD_INDEPENDENCE	0.6445	0.6444	0.0001
CEO_IS_CHAIRMAN	0.4637	0.4638	−0.0001
CEO_IS_FOUNDER	0.0587	0.0587	0.0000
IND_DIRS_TENURE	6.4750	6.4740	0.0010
BUSY_BOARD	0.1565	0.1566	−0.0001
INST_OWNERSHIP	0.6422	0.6421	0.0001
BIG4	0.8557	0.8556	0.0001
ISSUANCE	0.3040	0.3042	−0.0002
LEVERAGE	0.1889	0.1889	0.0000
SALES_GROWTH	0.0967	0.0967	0.0000
LOSS	0.2592	0.2594	−0.0002
FOREIGN	0.5778	0.5777	0.0001
SEGMENTS	2.6430	2.6430	0.0000
ACQUISITION	0.1157	0.1158	−0.0001
RESTRUCTURE	0.4042	0.4044	−0.0002
ROA	0.0001	0.0001	0.0000
MTB	3.4030	3.4020	0.0010
SIZE	7.2160	7.2150	0.0010
INV	0.0878	0.0877	0.0001
Z_SCORE	1.4880	1.4880	0.0000
AUDITOR_RESIGNED	0.0090	0.0090	0.0000
FIRM_AGE	26.6300	26.6300	0.0000
ANNOUNCE_RESTATE	0.0831	0.0832	−0.0001

***, **, * Indicate significance at the 0.01, 0.05, and 0.10 levels, respectively, using two-tailed tests.

TABLE 11
DAYS_TO_EARNINGS Sample

Panel A: Before Entropy Balancing

Variable	Firm Years Where *IT_EXPERTISE* = 1 Mean (n = 1,051) (1)	Firm Years Where *IT_EXPERTISE* = 0 Mean (n = 23,785) (2)	Mean Difference (1) − (2) (3)
IT_CAPEX	0.3417	0.2345	0.1072***
CIO	0.4225	0.2832	0.1393***
BOARD_IT_NONAC	0.0324	0.0212	0.0112**
MANAGEMENT_IT	0.2322	0.1643	0.0679***
ACCT_FINANCIAL_EXPERTISE	0.8049	0.7646	0.0403***
LEGAL_EXPERTISE	0.3130	0.3742	−0.0612***
AUDIT_COMM_SIZE	4.4670	4.0200	0.4470***
BOARD_SIZE	11.1800	9.9100	1.2700***
BOARD_INDEPENDENCE	0.6439	0.6300	0.0139***
CEO_IS_CHAIRMAN	0.4586	0.4781	−0.0195
CEO_IS_FOUNDER	0.0580	0.1175	−0.0595***
IND_DIRS_TENURE	6.5480	7.0150	−0.4670***
BUSY_BOARD	0.1684	0.1821	−0.0137
INST_OWNERSHIP	0.6993	0.6271	0.0722***
BIG4	0.9096	0.8459	0.0637***
ISSUANCE	0.2997	0.3691	−0.0694***
LEVERAGE	0.1892	0.2052	−0.0160***
SALES_GROWTH	0.0928	0.1490	−0.0562***
LOSS	0.2112	0.2549	−0.0437***
FOREIGN	0.6061	0.4876	0.1185***
SEGMENTS	2.7470	2.6120	0.1350
ACQUISITION	0.1151	0.1158	−0.0007
RESTRUCTURE	0.4234	0.3101	0.1133***
ROA	0.0337	−0.0012	0.0349***
MTB	3.6410	3.0380	0.6030***
SIZE	7.6540	6.9790	0.6750***
NEW_AUDITOR	0.0333	0.0465	−0.0132**
IMPORTANCE_TO_AUDITOR	0.0952	0.1024	−0.0072**
LOCAL_EXPERT_AUDITOR	0.5880	0.5494	0.0386*
CURRENT_ASSETS	0.4403	0.4505	−0.0102
QUICK_RATIO	1.8600	2.7410	−0.8810***
DECEMBER	0.7041	0.7382	−0.0341**
GOING_CONCERN	0.0057	0.0108	−0.0051**
MATERIAL_WEAKNESS	0.0561	0.0621	−0.0060
AUDIT_FEES	14.4900	14.1200	0.3700***
DAYS_TO_FILING	59.5000	63.0900	−3.5900***

TABLE 11 (continued)

Panel B: After Entropy Balancing

Variable	Firm Years Where *IT_EXPERTISE* = 1 Mean (n = 1,051) (1)	Firm Years Where *IT_EXPERTISE* = 0 Mean (n = 23,785) (2)	Mean Difference (1) − (2) (3)
IT_CAPEX	0.3417	0.3416	0.0001
CIO	0.4225	0.4226	−0.0001
BOARD_IT_NONAC	0.0324	0.0324	0.0000
MANAGEMENT_IT	0.2322	0.2324	−0.0002
ACCT_FINANCIAL_EXPERTISE	0.8049	0.8047	0.0002
LEGAL_EXPERTISE	0.3130	0.3133	−0.0003
AUDIT_COMM_SIZE	4.4670	4.4660	0.0010
BOARD_SIZE	11.1800	11.1800	0.0000
BOARD_INDEPENDENCE	0.6439	0.6438	0.0001
CEO_IS_CHAIRMAN	0.4586	0.4587	−0.0001
CEO_IS_FOUNDER	0.0580	0.0581	−0.0001
IND_DIRS_TENURE	6.5480	6.5470	0.0010
BUSY_BOARD	0.1684	0.1686	−0.0002
INST_OWNERSHIP	0.6993	0.6992	0.0001
BIG4	0.9096	0.9095	0.0001
ISSUANCE	0.2997	0.3000	−0.0003
LEVERAGE	0.1892	0.1892	0.0000
SALES_GROWTH	0.0928	0.0928	0.0000
LOSS	0.2112	0.2114	−0.0002
FOREIGN	0.6061	0.6059	0.0002
SEGMENTS	2.7470	2.7460	0.0010
ACQUISITION	0.1151	0.1153	−0.0002
RESTRUCTURE	0.4234	0.4235	−0.0001
ROA	0.0337	0.0337	0.0000
MTB	3.6410	3.6400	0.0010
SIZE	7.6540	7.6530	0.0010
NEW_AUDITOR	0.0333	0.0333	0.0000
IMPORTANCE_TO_AUDITOR	0.0952	0.0952	0.0000
LOCAL_EXPERT_AUDITOR	0.5880	0.5878	0.0002
CURRENT_ASSETS	0.4403	0.4402	0.0001
QUICK_RATIO	1.8600	1.8590	0.0010
DECEMBER	0.7041	0.7038	0.0003
GOING_CONCERN	0.0057	0.0057	0.0000
MATERIAL_WEAKNESS	0.0561	0.0562	−0.0001
AUDIT_FEES	14.4900	14.4800	0.0100
DAYS_TO_FILING	59.5000	59.4900	0.0100

***, **, * Indicate significance at the 0.01, 0.05, and 0.10 levels, respectively, using two-tailed tests.