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# The Impact of CEO/CFO Outside Directorships on Auditor Selection and Audit Quality

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**ABSTRACT** We examine whether outside directorships of chief executive officer/chief financial officer (CEO/CFO) and resulting network ties to auditors affect auditor selection decisions and subsequent audit quality. The network ties arise when the CEO/CFO of a firm (*home* firm) serves as an outside director of another firm that hires an auditor (*connected* auditor). Using a sample of firms that switch auditors in the post-Sarbanes-Oxley Act period, we find that home firms are more likely to appoint connected auditors. We also find that home firms hiring connected auditors experience a significant decline in subsequent audit quality, compared to those hiring non-connected auditors. Specifically, the increases in the likelihood of misstatements, the magnitude of absolute discretionary accruals, and the propensity to meet or beat earnings benchmarks after home firms appoint connected auditors are significantly greater, compared to those for other firms switching to non-connected auditors. We further find that the decline in audit quality is more pronounced when the network is established at the local office level.

**Keywords:** CEO/CFO outside directorship; Auditor selection; Audit quality; Auditor independence

*JEL codes:* G34; M40; M42

## 1. Introduction

Social network theory suggests that social and professional ties between economic agents influence their behavior and decision-makings (Granovetter, 2005). How these ties affect economic activities has been an important research topic in recent accounting and finance literature. This study examines whether outside directorships of a chief executive officer or chief financial officer (CEO/CFO) and the resulting network ties to auditors affect auditor selection decisions. It also examines how the appointment of such networked auditors influences subsequent audit quality. CEO/CFOs of other firms are preferred candidates for independent outside directors because of

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their strategic leadership and finance/accounting expertise. Despite this preference, little consensus exists on whether such outside directorships are beneficial or harmful to their home firms. While some studies suggest that executives' outside board directorship is related to managerial opportunism and entrenchment (Davis, 1991; Zajac & Westphal, 1996), others argue that it can enhance the home firm's ability to obtain critical information and resources (Bacon & Brown, 1975; Fahlenbrach et al., 2010).<sup>1</sup> Our study provides a unique setting to test these two different views in the context of audits.

This study focuses on a network tie that arises when the CEO/CFO of a firm (*home* firm) serves as an outside director of another firm (*connected* firm) that hires an auditor (*connected* auditor). We call this relationship CEO/CFO-auditor interlocks (or network ties).<sup>2</sup> The CEO/CFO outside directorship provides an important opportunity to learn about an auditor and to build a connection, but the implications of such a connection for the home firm's auditor appointment and subsequent audit outcome have been unexplored in prior studies.

Extant literature proposes two theories, embeddedness and agency views, with respect to executive outside directorship and its contribution to the home firms (Geletkanycz & Boyd, 2011; Ruigrok et al., 2006; Shropshire, 2010). Under the embeddedness view, the CEO/CFOs with outside directorships may prefer to hire a connected auditor through their network ties because familiarity with the auditor can reduce the uncertainty of an incoming auditor and improve communication and the working relationship.<sup>3</sup> Even under the agency view, the CEO/CFOs can still prefer hiring a connected auditor because, by appointing the connected auditor, they could influence auditor reappointment and compensation decisions in both home and connected firms. Consequently, they could be able to exercise greater bargaining power over the connected auditor and increase the chances of more lenient audit judgments. Considering these possibilities, we predict that the presence of CEO/CFO-auditor interlocks increases the likelihood that the home firm will hire a connected auditor when the firm switches its auditor. We further examine whether a home firm's tendency to hire a connected auditor is more pronounced when the home firm aims to hire a new auditor located in the same metropolitan statistical area (MSA) as the connected auditor's office (i.e. when the home firm's network to the connected auditor can be at audit office level rather than audit firm level) because the executives' familiarity with the auditor and bargaining power could be stronger in such a case.<sup>4</sup>

It is *ex ante* unclear, however, in which direction hiring a connected auditor will affect the subsequent audit quality for the home firm. On the one hand, the embeddedness view implies that it has a positive impact on audit quality because greater familiarity arising from a pre-existing relationship between the CEO/CFO and the *connected* auditor improves communication, facilitates information transfers, and allows the auditor to better identify the officer's reporting incentives and the areas of risk in the *home* firm.<sup>5</sup> Under this view, CEO/CFO-auditor ties will reduce audit risk and thus improve audit quality. On the other hand, the agency view suggests that the

<sup>1</sup>Geletkanycz and Boyd (2011) and Ruigrok et al. (2006) call these two views 'the embeddedness view' and 'the agency view,' respectively. We follow these studies and use the same terms.

<sup>2</sup>Among senior executives, we focus on the interlocking of CEO/CFOs because they play the most important roles in financial reporting and auditor selection. We discuss this in detail in section 2.1.

<sup>3</sup>Furthermore, the likelihood of appointing a connected auditor can be higher when the auditor exhibits superior audit quality for the connected firm. We examine this possibility in a later section.

<sup>4</sup>According to the U.S. Census Bureau Office for Management and Budget, a metropolitan statistical area (MSA) refers to a geographical area normally with a large city and its neighboring areas in the U.S. Prior auditing studies often use MSAs to identify the geographic location of a local audit practice office.

<sup>5</sup>Consistent with economic agents with pre-existing relationships enjoying better information flow, Cohen et al. (2008) and L. Cohen et al. (2010) document that Wall Street money managers and financial analysts benefit from their social ties with managers of public firms. Similarly, Engelberg et al. (2012) find that the presence of interpersonal links between firm and bank managers improves monitoring by facilitating the exchange of information between lenders and borrowers.

interlocking relationship can pose a threat to auditor independence because the auditor could become more susceptible to the CEO/CFO's pressure as the CEO/CFO can influence auditor retention and audit fee decisions in both *home* and *connected* firms. Furthermore, organizational research argues that homophily (i.e. an affinity for each other) established by frequent interactions between economic agents reduces potential conflicts and creates mutual trust.<sup>6</sup> In the context of our setting, the established relationship between the CEO/CFO and the *connected* auditor could lead the auditor to overestimate the trustworthiness of the CEO/CFO, resulting in less objective audit risk assessment and insufficient substantive tests, and thereby adversely affecting audit quality. Accordingly, how the appointment of a *connected* auditor will affect subsequent audit quality for the *home* firm is an open question. Therefore, we hypothesize the impact of an appointment of a connected auditor on subsequent audit quality as two competing predictions.

To empirically test our predictions, we first identify auditor switching firms from *Audit Analytics* database and then collect data for CEO/CFOs' board interlocks from *BoardEx* database, both of which cover most public firms in the U.S. Our sample consists of 757 firms that switched to Big 4 auditors during the period 2003–2015. Consistent with our prediction, we find that home firms whose CEO/CFOs have network ties to auditors via outside directorships are more likely to appoint connected auditors. For instance, PricewaterhouseCoopers (PwC) is more likely to be appointed as a new auditor for firms whose CEO/CFO serves as an outside director of another firm that currently hires PwC, relative to other Big 4 firms. We find similar results for other Big 4 auditors. To gain more insights into the hiring of connected auditors, we perform additional analyses after restricting the sample to home firms with at least one connected auditor, and we find the followings. First, we find no evidence that the connected auditor's audit quality for the connected firm is associated with the home firm's likelihood of hiring that auditor. Second, a home firm's tendency to hire a connected auditor is mitigated when its corporate governance is stronger. Finally, a home firm is more likely to hire a connected auditor when such hiring leads to the home and connected firms being audited by the same audit office.

Regarding the audit quality consequences of hiring connected auditors, we make use of a difference-in-differences (DID) research design. Firms switching from a non-connected auditor to a connected (non-connected) auditor comprise a treatment (control) group. For each treatment and control firm, we retain two-year observations immediately before and after auditor change, respectively. Using this DID research design, we find that hiring the connected auditors impairs the subsequent audit quality in home firms. Specifically, home firms hiring the connected auditors are more likely to misstate their financial statements, report greater absolute discretionary accruals, and are more likely to meet or just beat important earnings benchmarks, compared to those switching to non-connected auditors. Furthermore, the decline in audit quality is more pronounced when such hiring leads to the home and connected firms being audited by the same audit office. These findings remain unchanged when we use the propensity score matching approach to mitigate concerns about the systematic differences in observable client firm characteristics. Collectively, our findings suggest that CEO/CFO outside directorships increase the likelihood of hiring a connected auditor and such hiring results in a deterioration of audit quality, consistent more with the agency view.

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<sup>6</sup>Regulators also recognize that familiarity or trust can be a threat to auditor independence. Specifically, Guide to Professional Ethics of the Institute of Chartered Accountants in England and Wales (ICAEW) recommends that auditors avoid situations that may lead them to become over-influenced or to be too trusting of the client's directors and management which could consequently lead to audit staff being too sympathetic to the client interest (para 2.5 of Integrity, Objectivity, and Independence).

Our study contributes to the literature on the effects of top executives' outside directorship on home firms. Prior literature offers conflicting theories and evidence for whether an executive's outside board service will have a positive or negative impact on the home firm. While existing studies examine this issue in the areas of firm performance, corporate governance, CEO compensation, performance of mergers, and sensitivity of CEO turnover-to-performance (Balsmeier et al., 2011; El-Khatib et al., 2015; Fich, 2005; Geletkanycz & Boyd, 2011), we contribute to this literature by examining an unexplored issue of the effect on auditor selection and audit quality. Understanding this issue is important because, although the demand for CEO/CFO service on corporate boards is growing, the resultant network ties to auditors could increase the executive's ability to influence auditors' objective assurance of accounting information.

Our study also contributes to the auditing literature. First, it adds to the auditor selection literature by documenting that CEO/CFO-auditor ties through outside directorships significantly affect auditor selections among Big 4 auditors, particularly when the tie is developed at the local audit office level. Second, we extend the literature on the effect of CEO/CFO-auditor ties on audit quality by examining a new type of ties via CEO/CFO outside directorships.<sup>7</sup>

While prior studies in this literature focus on the ties via audit firm alumni affiliation and education (Baber et al., 2014; Dhaliwal et al., 2015; Geiger et al., 2008; Guan et al., 2016; Kwon & Yi, 2018; Menon & Williams, 2004), this study is distinct from them in the following ways. First, while the negative effect of alumni affiliation and school ties on audit quality in prior studies mirrors psychological bias arising from social connections, our measure of CEO/CFO-auditor interlocks captures the executive's greater bargaining power over auditors because in our setting, auditors may perceive the interlocked CEO/CFOs as more powerful and economically important, given that they can exert influence over auditor retention and audit fee decisions in both home and connected firms. Because prior social connection settings do not involve such bargaining power and economic incentive issues, their results do not directly translate into the implications of our study. Second, our study also highlights that network ties to auditors matter more at the local audit office level than at the audit firm level by providing evidence that clients are more likely to hire auditors connected at local audit office level and exert greater influence over them. This local-level network was not considered in the prior studies on alumni affiliation in the U.S.<sup>8</sup> Third, this study complements the existing literature by adopting a research design that better addresses identification challenges. Unlike prior studies that mainly perform cross-sectional analyses for the analyses of audit quality, we use both a DID research design and a propensity-score matching technique to mitigate potential endogeneity issues.<sup>9</sup> Finally,

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<sup>7</sup>We note that Lennox and Yu (2016) examines the network ties of (both inside and outside) directors and executives to auditors, similar to our study. They find that firms are more likely to appoint auditors with whom directors and executives are acquainted through external directorships and that hiring those auditors is positively associated with auditor tenure and audit quality. Since the roles and incentives of *outside directors* are quite different from those of *executives*, our focus on CEO/CFO-auditor ties establishes a clearer setting to examine top executives' motives for hiring connected auditors (i.e., embeddedness view vs. agency view). Lennox and Yu (2016)'s inconsistent results on audit quality may come from examining the interlocks of executives and outside directors together, despite their different roles and incentives, and/or using a different research design. Our additional analysis with a DID research design in a subsequent section indicates that hiring auditors connected to home firms' AC members through external directorship does not significantly affect subsequent audit quality. Unlike Lennox and Yu (2016), we also document that the effect of CEO/CFO-auditor ties on auditor selection and audit quality is more pronounced when the tie is established at the local office level.

<sup>8</sup>Using audit office data in Audit Analytics, we check whether home firms hire an audit office to which CEO/CFOs have a connection. In alumni affiliation research, it is almost impossible to identify an audit office where an affiliated officer worked in the past. Studies on school ties use non-U.S. data and thus generalizability to the U.S. is uncertain.

<sup>9</sup>Since we use a DID research design in a non-random setting as in prior literature (e.g., Francis et al., 2017; Jiang et al., 2018). Nevertheless, our research design may not completely solve the endogeneity concerns because auditor change does not occur randomly. To further mitigate the endogeneity concerns particularly related to the analysis of subsequent audit quality, we combine our DID research design with propensity-score matching technique, as discussed later. It is also

this study has important regulatory implications regarding CEO/CFO-auditor interlocks. While the Sarbanes-Oxley Act of 2002 (SOX) requires a one-year cooling-off period before an audit firm employee accepts an executive position at a former client, our findings suggest that another form of client-auditor ties can still impair audit quality. Thus, given the potential downside of the CEO/CFO-auditor interlocks on audit quality, regulators should consider developing mechanisms that discourage clients' opportunistic auditor switches, such as disclosure of any existing CEO/CFO-auditor interlocks.

In Section 2, we discuss prior literature and develop hypotheses. Section 3 describes the sample selection and research design. Section 4 discuss empirical results, and section 5 concludes.

## **2. Literature Review and Hypothesis Development**

### *2.1. Social and Professional Networks of Corporate Stakeholders*

Social network theory predicts that social and professional ties between individuals affect their behavior and economic outcomes (Granovetter, 2005). The theory often defines social and business ties in terms of mutual qualities and experiences, such as school ties, geographical origins, family ties, and corporate experience, and emphasizes the importance of these ties in analyzing economic activities in modern industrial society.

In one direction, the theory predicts that social ties enhance trust and facilitate information flows between related individuals because whereas a third party must follow a formal communication protocol, related parties could lower information costs and save communication time. Moreover, related parties are more likely to share proprietary information within the same social network than with a third party. Consistent with this prediction, Cohen et al. (2008) and L. Cohen et al. (2010) document that Wall Street money managers and financial analysts benefit from their social ties with managers of public firms. Similarly, Engelberg et al. (2012) show that school or professional ties between managers of banks and firms improve information flow and lending efficiency, leading to lower borrowing costs.

In contrast, other studies highlight the possibility that social ties can create a deadweight loss by promoting collusion (Hwang & Kim, 2009; Uzzi, 1996) because related parties tend to interpret others' actions in a biased manner, and their ties could promote social conformity to the norm, rather than to economic optimization. Consistent with this argument, several accounting and finance studies examine various ties between executives and independent directors, and find that their ties result in weak corporate governance and poor financial reporting quality (Bruynseels & Cardinaels, 2014; Fracassi & Tate, 2012; Hwang & Kim, 2009).

### *2.2. Embeddedness and Agency Views*

Prior research on social networks propose two theories on executives' outside board service and its contribution to their home firm: embeddedness and agency views (Geletkanycz & Boyd, 2011; Ruijgrok et al., 2006; Shropshire, 2010). The embeddedness view argues that a corporate leader is influenced by relations to other leaders and by the structure of the network of relations such as board interlocks. It also argues that such relations provide an important source of information and communication. Under this view, outside directorships are considered beneficial to the home firms because they afford access to important policies and practices of other firms, which in turn

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noteworthy that firms switch their auditor at a different point in time, so our DID research design is staggered. Hence, we do not believe that our results are driven by macroeconomic factors we are unable to observe.



helps the executives to manage their home firms successfully. For instance, executives sitting on outside boards can learn about other firms' different management styles and alternative strategies without incurring costs to their home firms (Beckman & Haunschild, 2002; Booth & Deli, 1996; Burt, 1987; Larcker & Tayan, 2015). Sitting on other boards also enables executives to establish a network with other directors (Fahlenbrach et al., 2010) and get referrals for clients and suppliers (Larcker & Tayan, 2015). Bacon and Brown (1975) summarize the potential benefits of executives' outside directorships as follows: (a) benchmarking of others, (b) gaining exposure to innovation, (c) obtaining information, (d) gaining exposure to alternative management systems, and (e) receiving counsel.

On the other hand, the agency view suggests that, although executives enjoy financial benefits and other perquisites from outside directorships, little utility is accrued to their home firms (Davis, 1991). Rather, it argues that multiple directorships are an indicator of personal prestige and power. Consistent with this perspective, prior literature shows that top executives who hold outside directorships tend to be more powerful in board decisions and thus in a better position to entrench themselves and to behave opportunistically. For instance, executives receive numerous rewards from outside directorships, including board pay and pension (Yermack, 2004), as well as elevated prestige and standing in social circles (Useem, 1984). This elevated professional standing enables the executives to demand higher pay at home firms (Zajac & Westphal, 1996) and to exercise greater intra-organizational power (Finkelstein, 1992), which increases the possibility of managerial entrenchment. Consistent with this possibility, studies find that top executives' outside board ties are associated with a lower sensitivity of CEO turnover to firm performance (Balsmeier et al., 2011), value-destroying mergers (El-Khatib et al., 2015), and the adoptions of golden parachutes (Wade et al., 1990) and poison pills (Davis, 1991), all of which protect managers' interests at the expense of shareholders. In sum, these studies suggest that outside directorship not only distracts executives from their internal duties but also advances the executives' personal interests at the expense of the home firm and its shareholders.

Among senior executives, we examine the interlocking of CEO/CFO for the following reasons. First, SOX recognizes the role of the two executives in financial reporting by requiring them to certify the fairness of their financial statements. Second, the two executives still influence auditor selection decisions, even though SOX mandates that the audit committee (AC hereafter) be directly responsible for appointment and oversight of auditors (J. Cohen et al. (2010); Dhaliwal et al., 2015; Fiolleau et al., 2013) and that auditors also perceive that CEO/CFOs have powers to switch auditors with little friction with the AC (Gendron & Bédard, 2006). Third, the AC often interacts with the CEO/CFO. CFOs attend most AC meetings, and in some cases, CEOs also attend the meetings. Thus, the two executives have more influence over audit-related matters and financial reporting than other senior executives.

### 2.3. *Hypotheses Development*

A firm's board members and its auditor are endowed with opportunities to interact with each other and build networks. Auditors can access board meeting minutes and attend AC meetings, through which they can interact with board members and executives (Dhaliwal et al., 2016). Auditors also liaise with the board members to discuss critical issues such as financial distress, restructuring, and internal controls (Cohen et al., 2007).<sup>10</sup> When a CEO/CFO of a firm serves on the board of directors of another firm, an important opportunity opens for both the CEO/CFO

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<sup>10</sup>The AICPA's auditing standards in the U.S. (AU section 325) states that auditors are required to directly report to the board of directors if they become aware that 'the oversight of the company's external financial reporting and internal control over financial reporting by the company's audit committee is ineffective.' (<https://pcaobus.org/Standards/Auditing/Pages/AU325b.aspx>)

and the connected firm's auditor to build network ties to each other. From the perspective of the CEO/CFO, the network ties support making informed decisions when their home firm seeks a new auditor because the CEO/CFO can learn about the connected auditor's various attributes, such as audit quality, objectivity, and judgments about risky and controversial issues. Since such knowledge reduces uncertainty regarding auditor replacement in the future, the CEO/CFO director is likely to have incentives to develop and maintain networks with the connected auditor. On the flip side, the connected auditor also has incentives to build network ties with the CEO/CFO director because they provide a good opportunity to expand the pool of future clients. In accordance, we expect that the connected firm can partially play a platform role for developing the network ties between the CEO/CFO director and connected auditor.

According to the embeddedness view, the CEO/CFO's board networks could enable the home firm to make a more informed auditor selection decision because the CEO/CFO has more knowledge about the connected auditor through observations and interactions, thereby reducing uncertainty about an incoming auditor. Moreover, given the pre-existing knowledge and working experience, the CEO/CFO will be able to communicate more effectively and establish a better working relationship with the connected auditor, which is one of the most important factors in selecting auditor (Beattie & Fearnley, 1995; Dodgson et al., 2020; Eichenseher & Shields, 1983; McCracken et al., 2008).<sup>11</sup> In this case, the home firm may prefer to hire the connected auditor when switching auditors.

Under the agency view, the CEO/CFO may prefer to appoint a cozy auditor who can provide more lenient audit judgments. By hiring the connected auditor, the CEO/CFO could exercise greater bargaining power over the auditor because the CEO/CFO can at least indirectly exert influence on auditor reappointment and compensation decisions in both home and connected firms. Prior studies suggest that CEO directors maintain elevated status among independent board members and thus have greater clout in making board- or committee-level decisions (Erkens & Bonner, 2013; Fich, 2005; Westphal & Stern, 2006). In addition, given that CFOs have extensive accounting knowledge and experience, the connected firm's board and AC members are likely to pay more attention to the CFO director's view on accounting/auditing related issues. The elevated status of CEO/CFO directors empowers them to exercise large influence over the AC's perception of the auditor at their connected firm. Thus, the CEO/CFOs may prefer to hire connected auditors at their home firm to the extent that they expect to exert influence over the connected auditor using their greater bargaining power when resolving important issues in auditor-client contracting and audit adjustments for their home firms.

Although those incentives exist, SOX mandated that the AC be directly responsible for appointment and oversight of auditors. If SOX is effective in removing CEO/CFO influence over auditor selection, no relationship between CEO/CFO-auditor interlocks and auditor selection will be observed, especially when the CEO/CFO's preference for the connected auditor is attributable to the agency view. In contrast, if AC members of the home firm largely support hiring auditors preferred by the CEO/CFO, the interlocks may affect the selection of the connected auditor. Prior research finds evidence consistent with the latter case. For instance, Gendron and Bédard (2006) suggest that AC members mostly do not oppose management's decision to not renew the incumbent auditor. Other studies report that managers continue to influence auditor selection and

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<sup>11</sup> McCracken et al. (2008) document that, when audit firms assign their audit partners, they consider client CFOs' preferences for certain partners, suggesting that the relationship between client CFO and audit partner is important for auditing. One interviewee of Dodgson et al. (2020) states, 'Management can express a preference to the AC, because management wants to make sure that they get somebody they can work with and that knows their business and that can deal with issues in a timely manner.' Another interview participant says, 'You're generally not going to see an AC insist on engagement partner that the management team objects to. I think the AC understands the working relationship aspects of this too.' The evidence indicates the importance of the relationship between client executives and auditors.



retention decisions after SOX (J. Cohen et al. (2010); Dhaliwal et al., 2015; Fiolleau et al., 2013). Beck and Mauldin (2014) also find that, even after SOX, CFOs significantly influence audit fee decisions. These results raise doubt about the effectiveness of SOX with respect to controlling management influence over audit-related matters. Therefore, we predict that CEO/CFO-auditor interlocks increase the likelihood that the home firm hires a connected auditor. This prediction leads to the following hypothesis in an alternative form:

**H1:** *A home firm is more likely to appoint a connected auditor when the firm switches its auditor.*

When the home firm switches to a connected auditor, it is unclear how the CEO/CFO-auditor interlocking relation affects subsequent audit quality. The embeddedness view suggests that the relation could have a positive impact on audit quality because of effective communication and information transfers between auditor and client. Prior research also suggests that network ties among economic agents improve information transfer and reduce costs of gathering information (Cai & Sevilir, 2012; Engelberg et al., 2012). As such, the connected auditor has better access to information about managers and their reporting incentives, which in turn helps the auditor to identify audit risk and resolve potential problems in a timely manner. Moreover, improved information transfer will allow the auditor to better understand the client's business model and future plans, details of transactions and accounts, and internal control system. Collectively, these benefits enable the auditor to plan and organize the audit process in more effective ways, thereby improving audit quality.

Alternatively, the CEO/CFO-auditor networks may pose a threat to auditor independence under the agency view. As discussed earlier, hiring a connected auditor may provide the CEO/CFO with greater bargaining power over the auditor because the CEO/CFO can affect audit engagements for both home and connected firms. DeAngelo (1981) documents that auditors have incentives to retain economically important clients. In our setting, auditors may perceive the interlocked CEO/CFOs as more powerful and economically important due to their ability to exert influence over auditor retention and audit fee decisions in both home and connected firms. In fact, prior studies indicate that auditors are less likely to issue a going concern opinion and are more likely to waive proposed audit adjustments for larger clients (McKeown et al., 1991; Nelson et al., 2002). These studies suggest that the connected auditor can be more susceptible to the CEO/CFO's pressure to obtain lenient audit outcomes, thereby inducing lower audit quality.<sup>12</sup>

Moreover, the network ties between the CEO/CFO and auditor could create favoritism bias (i.e. tendency to interpret connected others' intentions and actions favorably) (Guan et al., 2016). Prior studies in sociology argue that frequent interactions between people tend to create ties as well as mutual caring and trust (McPherson et al., 2001; Silver, 1990). The favoritism bias may induce the auditor to overestimate the trustworthiness of the CEO/CFO and to be less skeptical about management representation (Nelson, 2009), which may result in a less objective audit risk assessment and insufficient substantive tests, adversely affecting audit quality.

While several studies in auditing research explore how network ties between client firm executives and auditors affect audit outcomes, these studies mostly concentrate on the effect of the ties via education or audit firm alumni affiliation and provide mixed evidence on audit quality. For example, while Guan et al. (2016) find that the presence of auditors' school ties to the client executives in China is associated with impaired audit quality, Kwon and Yi (2018) document that CEO-auditor school ties in Korea are associated with high-quality audits. In addition, while

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<sup>12</sup>It is possible that the connected auditor is unwilling to compromise independence, despite the CEO/CFO's bargaining power, given that SOX implemented numerous steps to improve audit quality and auditor independence. Moreover, the newly created Public Company Accounting Oversight Board (PCAOB) increased both oversight and penalties for audit-related deficiencies. Under this possibility, the CEO/CFO's great bargaining power may not result in lowered audit quality.

Lennox (2005) and Menon and Williams (2004) find that when audit firm alumni serve as executives of client firms, these firms are less likely to receive going concern opinions and tend to report higher absolute discretionary accruals (consistent with lower audit quality), Geiger et al. (2008) find that these firms exhibit a lower likelihood of the SEC's enforcement actions (consistent with higher audit quality) and that the magnitude of their discretionary accruals is indifferent from others. Extending the sample to the post-SOX period, Dhaliwal et al. (2015) report that audit firm affiliated officers continue to be more likely to appoint their *alma mater* auditors but show that such hiring does not impair auditor independence in the post-SOX period. Other studies examine how the market reacts to the news of hiring an affiliated officer and provide also mixed results (Baber et al., 2014; Geiger et al., 2008).

Overall, prior studies for executive-auditor ties provide mixed evidence on the impact of the ties on audit quality and market response, in line with conflicting predictions based on the embeddedness and agency views. Taken together, the appointment of a connected auditor can either improve or impair the subsequent audit quality for the home firm. These possibilities lead to the following two competing hypotheses:

**H2a:** *Hiring a connected auditor improves audit quality for the home firm.*

**H2b:** *Hiring a connected auditor impairs audit quality for the home firm.*

It is possible that the effect of network ties between CEO/CFOs and auditors is greater when the ties arise at the local level, because their familiarity with each other and the CEO/CFO's bargaining power can be stronger in such a case. To examine this possibility, we further investigate whether the home firm's preference to hire a connected auditor is stronger when such hiring leads to the home firm being audited by the same local audit office as the connected firm. We also examine whether hiring a connected auditor has a greater impact on audit quality when the home and connected firms are audited by the common audit office.<sup>13</sup>

### 3. Sample Selection and Research Design

#### 3.1. Measuring CEO/CFO-Auditor Interlocks

To measure CEO/CFO-auditor interlocks, we first identify CEO/CFOs and their outside directorships using the *BoardEx* database.<sup>14</sup> To comprehensively identify CEO/CFO outside directorships and to focus on the current post-SOX regime, we limit our sample period to 2003–2015.<sup>15</sup> We then collect each firm's auditor identity from *Audit Analytics*. When a CEO/CFO serves as an

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<sup>13</sup>The effect of the network ties on auditor selection and audit quality can be even stronger if the ties are developed with the same engagement audit partner for both home and connected firms. Since the disclosure of engagement audit partner only came into effect in 2017, we do not have enough data to perform meaningful analyses for this possibility.

<sup>14</sup>From the database, CEOs are identified based on the following titles: CEO, interim CEO, co-CEO, group CEO, chief executive (officer), group chief executive (officer), company leader, and group leader. Similarly, CFOs are identified based on the following titles: CFO, co-CFO, interim CFO, group CFO, CFO (part-time), chief financial/finance (officer), and principal financial/finance (officer).

<sup>15</sup>*BoardEx* provides biographical information about senior managers and board members. The database started to collect the information in 2003, backfilling data to 2000. In 2005, *BoardEx* carried out a major extension of its coverage, backfilling data to 2003, which substantially increased the coverage. Our exploration of the database reveals that the number of U.S. firms covered by *BoardEx* increased from 2,028 in 2002 to 4,154 in 2003. Its coverage gradually increases in subsequent years, providing annual data for more than 5,000 firms in recent years. Despite the extended coverage, we might fail to identify some CEO/CFOs' external directorships because *BoardEx* does not cover all public firms in the U.S. However, this failure is likely to bias against our findings.

outside director of another firm hiring a certain auditor, the CEO/CFO is considered to have network ties to the auditor. If a CEO/CFO serves on the boards of multiple firms that hire different auditors, the CEO/CFO is treated as having network ties to each of those auditors.<sup>16</sup>

### 3.2. Sample Selection

The sample selection procedure for auditor choice analysis is outlined in Panel A of Table 1. Starting from an intersection of *Compustat* and *Audit Analytics* 2003 onwards, our initial sample consists of 1,547 firm-year observations involving a switch to Big 4 auditors. We limit the sample to firms switching to Big 4 auditors to make our sample firms relatively homogenous. Furthermore, since very few observations are tied to non-Big 4 auditors, it would be difficult to implement our auditor selection analysis for non-Big 4 auditors. We further exclude 246 observations with a fiscal year end of 2016 or later because our audit quality analyses require two-year observations subsequent to auditor switching. We then eliminate 243 observations with missing SIC codes from *Compustat* or in financial services industries (SIC codes 6000–6999). We also drop 252 observations that are not covered by *BoardEx*. Finally, we remove 49 observations due to a missing value on any of the control variables for auditor selection analysis. Accordingly, we are left with 757 observations switching to Big 4 auditors. Panel B of Table 1 presents yearly distribution of auditor switch sample. We note that the sample is not clustered in a certain year.

To test the impact of hiring connected auditors on subsequent audit quality, we implement a DID research design. In detail, we compare the change in audit quality from the pre- to post-auditor-switch periods for firms switching from a non-connected auditor to a connected one (i.e. treatment firms), to the change for other firms switching from a non-connected auditor to another non-connected one (i.e. control firms). We employ three proxies for audit quality: misstatements, absolute discretionary accruals, and meeting or beating earnings benchmarks (analysts' consensus forecasts and last year earnings). For each treatment and control firm, we retain two-year observations immediately before and after auditor change, respectively. To test with balanced panel data, if any of the required variables during the four consecutive years for a firm are missing, all observations of the firm are dropped.<sup>17</sup> After applying these criteria, our sample for audit quality analysis ranges from 596 (149 unique firms) to 1,680 (420 unique firms).<sup>18</sup>

### 3.3. Research Design

#### 3.3.1. Auditor selection model

To investigate whether auditor switching firms are more likely to appoint a connected auditor among the Big 4, we estimate the following logistic model for each of the Big 4 auditors, adapted from Dhaliwal et al. (2015) and Lennox and Park (2007):<sup>19</sup>

$$XX = \alpha_0 + \alpha_1 ConnXX + \alpha_2 SpecXX + \alpha_3 MatchXX + \alpha_4 AlumniXX + \alpha_5 FBig4 + \varepsilon \quad (1)$$

<sup>16</sup>Among 757 auditor switching firms in the final sample, we find that the CEO/CFOs of 513 firms do not serve as outsider directors of any firms covered by *BoardEx*. The CEO/CFOs of 162 firms serve as outside directors of only one firm in the *BoardEx* universe. The CEO/CFOs of 56 (17, 8, 1) firms have two (three, four, five) external directorships, so some have connections to more than one audit firm.

<sup>17</sup>Our results are qualitatively similar when we use unbalanced panel data without this restriction.

<sup>18</sup>Due to the smaller coverage of I/B/E/S, the sample for the analysis of meeting/beating analysts' consensus forecasts is limited to 596 (149 unique firms). The sample size for this analysis is commonly smaller than for other audit quality analyses such as misstatements or discretionary accruals (e.g., Reichelt & Wang, 2010).

<sup>19</sup>We measure variables in the year immediately before auditor changes, consistent with Lennox and Park (2007) and Dhaliwal et al. (2015). For conciseness, we omit firm and year subscripts.

**Table 1.** Sample selection.

Panel A: Sample Selection for Auditor Selection Analyses	
Firms switching auditors to a Big 4 audit firm 2003 onwards with valid CIK and auditor identity from an intersection of Compustat and Audit Analytics	1,547
Less: Those with a fiscal year end of 2016 or later	(246)
Less: Those in financial services industries (SIC codes 6000–6999) or those without valid SIC codes	(243)
Less: Those not covered by BoardEx	(252)
Less: Those with a missing value on any of the control variables for auditor selection analyses	(49)
Number of firms used in auditor selection analyses	<b>757</b>
Panel B: Yearly Distribution of Auditor Switch Sample	
Year	<i>N</i>
2003	67
2004	60
2005	71
2006	71
2007	64
2008	64
2009	64
2010	45
2011	35
2012	41
2013	63
2014	59
2015	53
Total	757

Panel A details the sample selection process for auditor selection analyses. Panel B provides the yearly distribution of auditor switch sample that is used for auditor selection analyses.

where the dependent variable  $XX$  is an indicator variable equal to one if the incoming auditor is  $XX$ , and zero otherwise, where  $XX$  is *PwC*, *EY*, *Deloitte*, or *KPMG*. For example, *PwC* is equal to one if the firm appoints PwC as its new auditor and zero if the firm appoints one of the other three auditors. Our variable of interest,  $ConnXX$ , is an indicator variable equal to one if the CEO/CFO of the firm serves as an independent director of another firm who hires the auditor  $XX$ , and zero otherwise.<sup>20</sup> Our H1 predicts  $\alpha_1 > 0$ .

Following prior research, we control for several factors that may influence firms' auditor selection.  $SpecXX$  is an indicator variable equal to one if the auditor  $XX$  has the largest market share of audit fees in the industry-year cohort to which the given client belongs, and zero otherwise.  $MatchXX$  is an indicator variable equal to one if the firm is better matched with  $XX$  than with any of the other Big 4 auditors, and zero otherwise, which is estimated based on Lennox and Park's (2007) clientele match model.  $AlumniXX$  is an indicator variable equal to one if the CEO, CFO, or chief accounting officer formerly worked for the auditor  $XX$ , and zero otherwise.<sup>21</sup>  $FBig4$  is an indicator variable equal to one if the predecessor auditor was a Big 4 auditor, and zero otherwise.

<sup>20</sup>Note that firms currently hiring  $XX$  (e.g., PwC) are not able to switch to  $XX$  (e.g., PwC). Thus, we estimate Eq. (1) after dropping firms whose predecessor auditor corresponds to  $XX$ .

<sup>21</sup>Executives' former working experiences in the audit profession are manually collected from proxy statements of our sample firms. Based on this, we construct  $AlumniXX$ . Similarly, we construct two other alumni-related variables,  $AlumniConn$  and  $AlumniAud$ , which serve as a control in regression equation (2) and (3), respectively.

To gain more insights into auditor selection decisions, we limit our sample to home firms with at least one connected auditor and investigate what characteristics of home firms are associated with hiring a connected auditor, conditional on the existence of any connected auditor. Specifically, we examine whether the likelihood of hiring a connected auditor is related to (1) the auditor's audit quality for the connected firm, (2) the strength of the home firm's corporate governance, and (3) whether the home firm hires a new auditor located in the same MSA of the connected auditor's office (i.e. when the home firm's network to the connected auditor can be at audit office level rather than audit firm level).<sup>22</sup> We estimate the following model adapted from Lennox and Park (2007):

$$\begin{aligned} \text{HiringConn} = & \beta_0 + \beta_1 \text{ConnaAQ} + \beta_2 \text{GovIndex} + \beta_3 \text{SameMSA} + \beta_4 \text{SameInd} + \beta_6 \text{MatchConn} \\ & + \beta_7 \text{AlumniConn} + \beta_8 \text{SpecConn} + \beta_9 \text{FBig4} + \beta_{10} \text{LogTA} \\ & + \beta_{11} \text{BankruptcyScore} + \beta_{12} \text{LitIndustry} + \beta_{13} \text{AudDismissal} + \varepsilon \end{aligned} \quad (2)$$

where *HiringConn* is an indicator variable equal to one if the home firm hires its connected auditor, and zero otherwise. *ConnaAQ* is one of *ConnaAQ1* to *ConnaAQ4*. *ConnaAQ1* equals one if the connected firm does not misstate its financial statement in the past two years, and zero otherwise. *ConnaAQ2* (*ConnaAQ3*) equals one if the average of the connected firm's absolute discretionary accruals measured by the modified Jones model (Kothari et al., 2005) in the past two years belong to the lowest quartile, and zero otherwise. *ConnaAQ4* equals one if the connected firm does not meet or just beat last year earnings in the past two years, and zero otherwise. Accordingly, *ConnaAQ* variables are intended to capture audit quality at connected firms in years *t-1* and *t-2* where *t* is the auditor change year. The value of one for *ConnaAQ* indicates high audit quality. *GovIndex* equals one if the home firm's corporate governance index is greater than its median of our sample, and zero otherwise, where the index is a composite measure based on CEO/chairman duality, internally promoted or externally hired CEO/CFO, board independence, the proportion of co-opted directors (i.e. those who joined the board after the CEO appointed), and AC accounting expertise.<sup>23</sup> *SameMSA* equals one if the home firm's incoming auditor's office and the connected auditor's office are located in the same MSA, and zero otherwise. *SameInd* equals one if the home firm and its connected firm are in the same industry based on the two-digit SIC code, and zero otherwise. Definitions for the other control variables are presented in the Appendix.

### 3.3.2. Audit quality models

Following a comprehensive review of DeFond and Zhang (2014), we use three commonly used proxies for audit quality: misstatements, discretionary accruals, and meeting/beating earnings

<sup>22</sup>The most straightforward way to examine whether home firms are more likely to hire auditors from the same connected office is to estimate equation (1) while treating each of the audit offices as a distinct auditor. However, this approach is not feasible because it requires running numerous regressions (for each of the Big 4 audit firms' audit offices, which total more than 250) with only few observations hiring a specific audit office. Alternatively, we use the location of a home firm's incoming auditor's office, which is available *ex post*, to infer where the home firm looks for its incoming auditor. Using this information, we test whether the likelihood of hiring a connected auditor is stronger when the incoming auditor's office and the connected auditor's office are located in the same MSA.

<sup>23</sup>To construct *GovIndex*, we first calculate the sum of the following indicator variables: *I* (the CEO does not hold the position of chairman), *I* (the CEO/CFO is externally hired), *I* (the home firm's board independence is equal to or greater than its median of our sample), *I* (the home firm's co-opted directors is lower than its median of our sample), and *I* (the home firm's AC includes at least one accounting expert) where *I* (.) is the operator to return one if the condition of the argument is satisfied, and zero otherwise. For each of five dimensions, if *I* (.) yields one, then the firm has a strong corporate governance for the dimension. We then define *GovIndex* as one if the sum is equal to or greater than the median of our sample.

benchmarks. These proxies capture complementary dimensions of audit quality, such as both egregious audit failures and mild ‘within GAAP’ earnings management, and both discrete and continuous measures.<sup>24</sup> We obtain inferences from these multiple proxies because each measure has both weaknesses and strengths (DeFond & Zhang, 2014).

DeFond and Subramanyam (1998) find that auditors’ preference for conservative accounting is systematically associated with discretionary accruals in pre- and post-auditor-switch periods. Shu (2000) also argues that auditor changes are associated with increased auditor litigation risk and client financial distress, which could bias our audit quality tests if we perform tests only with the sample of firms that switch to connected auditors. To mitigate these concerns, we employ a DID research design using firms switching from non-connected auditors to connected ones as treatment firms, and firms switching from non-connected auditors to other non-connected ones as control firms.<sup>25</sup> Since we use the changes in audit quality for control firms to capture common auditor change effects, we regard the difference in the changes between treatment and control firms as the incremental effect of hiring connected auditors over the common effects.

To test the effect of hiring a connected auditor on subsequent audit quality for the home firm, we estimate the following model:<sup>26</sup>

$$\begin{aligned} \text{AuditQual} = & \gamma_0 + \gamma_1 \text{Post} + \gamma_2 \text{Treat} + \gamma_3 \text{Post} * \text{Treat} + \gamma \text{Controls} \\ & + \text{Industry dummies} + \text{Year dummies} + \varepsilon \end{aligned} \quad (3)$$

*AuditQual* is a proxy for audit quality: misstatement, absolute discretionary accruals, or meeting/beating earnings benchmarks. Our first proxy is the likelihood of restating financial statements. Restatements are direct and egregious measures of audit quality because they indicate that previously reported financial statements were unreliable and that auditors failed to correct the misstatements (Christensen et al., 2016). For this measure, we define *misstatement* as one if the firm-year financial statements are overstated and thus subsequently restated downward, and zero otherwise.<sup>27</sup> Thus, if hiring a connected auditor leads to lower (higher) audit quality, firms appointing such auditors are more (less) likely to misstate financial statements and thus issue restatements in a subsequent period.

Our second proxy is absolute discretionary accruals. Since Keung and Shih (2014) suggest that performance-matching procedures in Kothari et al. (2005) may introduce noise into measurement of discretionary accruals, we use both performance-matched and unmatched discretionary

<sup>24</sup> Another popular measure of audit quality is the auditor’s propensity to issue going-concern opinions. We are unable to employ this measure because all firms switching to a connected auditor in our sample receive a clean audit opinion for both pre- and post-auditor-switch periods.

<sup>25</sup> Among 757 auditor switching firms, 90 (608) firms switched from a non-connected auditor to a connected (non-connected) auditor, forming our treatment (control) group. These sample sizes are greater than those of Dhaliwal et al. (2015), who find that, among 420 post-SOX Big 4 appointments, 52 (368) firms switched to an affiliated (non-affiliated) auditor. Note that we exclude 48 (11) firms that switched from a connected auditor to a non-connected (another connected) auditor from our audit quality test samples to obtain clean treatment and control firms. Since the number of these firms is too small, we could not implement meaningful tests for the changes in audit quality.

<sup>26</sup> As described in our sample selection process earlier, our sample for audit quality analyses includes two-year observations immediately before and after auditor change respectively. All variables are measured at their-fiscal-year end, so they are time-varying. For conciseness, we omit firm and year subscripts.

<sup>27</sup> Prior studies (e.g., Kim et al., 2003) argue that auditors tend to be more concerned about their clients’ income-increasing misstatements which are more likely intentional and egregious. From the entire population from Audit Analytics, we confirm that about 86% of the restatements are income-decreasing ones that resulted from income-increasing misstatements. While we exclude income-decreasing misstatements from the sample, untabulated results reveal that our results are qualitatively similar irrespective of whether we classify income-decreasing misstatements to misstatement sample or not. When we further limit our misstatement sample to those with *accounting-related* misstatement, we find that our results remain qualitatively similar.



accruals.  $|PMDA|$  is the absolute value of performance-matched discretionary accruals (Kothari et al., 2005) and  $|DA|$  is the absolute value of discretionary accruals estimated from the modified Jones model (Dechow et al., 1995). If CEO/CFO-auditor interlocks lead to lower (higher) audit quality, we expect firms switching to the connected auditor to report greater (smaller) absolute discretionary accruals.

Our third proxy measures the auditor's ability to limit earnings management to meet or just beat two earnings benchmarks: analysts' consensus forecasts and last year earnings. *MeetConsensus* equals one if earnings meet or just beat the latest analysts' consensus earnings forecasts by three cents per share or less, and zero otherwise. *MeetLast* equals one if the firm's earnings in this year meet or just beat its last year earnings by three percent of the market capitalization at the beginning of the year, and zero otherwise.<sup>28</sup> If connected auditors are less (more) likely to detect and constrain earnings management aimed at avoiding negative earnings surprises or earnings decrease, the clients of these auditors are more (less) likely to meet or beat these two benchmarks.

*Treat* equals one if the firm switches to a connected auditor, and zero otherwise. Firms switching from a non-connected auditor to a connected auditor constitute a treatment group ( $Treat = 1$ ), while firms switching from a non-connected auditor to another non-connected auditor are a control group ( $Treat = 0$ ). *Post* is an indicator variable equal to one for the periods subsequent to auditor switch, and zero otherwise.<sup>29</sup> Thus,  $Post * Treat$  captures the incremental change in audit quality for the treatment firms, relative to the control firms.<sup>30</sup> Following prior research, we control for a comprehensive set of client- and auditor-specific characteristics that may affect audit quality (Cohen et al., 2014; Dhaliwal et al., 2015; J. R. Francis et al., 2013; Reichelt & Wang, 2010). Definitions for those control variables are presented in the Appendix. In addition, we include industry dummies to control for time-invariant industry-fixed effects and year dummies to control for possible changes in audit quality over time, respectively.<sup>31</sup> If hiring a connected auditor impairs (improves) the subsequent audit quality for the home firm, we expect  $\gamma_3 > 0$  ( $\gamma_3 < 0$ ).

## 4. Empirical Results

### 4.1. Auditor Selection Analysis

Table 2, Panel A provides the transition matrix of Big 4 appointments for our sample firms. Among 757 sample firms that change auditors, 172 clients of PwC switch to other Big 4 auditors. Likewise, 171, 134, and 105 clients switch from EY, Deloitte, or KPMG, respectively. Also, 175 clients of non-Big 4 firms upgrade their auditors to Big 4 auditors. Among these sample firms, 133 clients switch to PwC as their incoming external auditor, while 228, 177, and 219 firms

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<sup>28</sup>Our untabulated analyses show that the results are qualitatively similar when *MeetConsensus* is defined as one if earnings meet or beat the latest analysts' consensus earnings forecasts by one cent per share or less, and zero otherwise, and *MeetLast* as one if the firm's earnings in this year meet or beat its last year earnings by one percent of the market capitalization at the beginning of the year, and zero otherwise.

<sup>29</sup>Since our auditor switches occur in Compustat fiscal years 2003–2015, the *Post* variable captures years up to 2017.

<sup>30</sup>Ai and Norton (2003) show that, in a logit model with interaction terms, the effect of the interaction term on expected probability can be different in sign from the coefficient loading on the interaction term. However, Puhani (2012) shows that, when the interaction term is simply the product of a treatment group dummy variable (e.g., *Treat*) and a treatment period dummy variable (e.g., *Post*), the sign of the treatment effect is equal to the sign of the coefficient of the interaction term. Based on insights derived from this study, we believe that it is appropriate to infer the sign of the treatment effect based on the sign of the  $Post * Treat$  coefficient, as we have done.

<sup>31</sup>In all models for audit quality tests, continuous variables are winsorized at 1% and 99%, and the *p*-values are calculated with client firm-clustered standard errors.

**Table 2.** Distribution of auditor switches.

		<i>Incoming auditor</i>				Total
		<i>PwC</i>	<i>EY</i>	<i>Deloitte</i>	<i>KPMG</i>	
<i>Predecessor auditor</i>	<i>PwC</i>		57	65	50	172
	<i>EY</i>	40		45	86	171
	<i>Deloitte</i>	38	62		34	134
	<i>KPMG</i>	26	45	34		105
	<i>Non-Big4</i>	29	64	33	49	175
	Total	133	228	177	219	757

  

Incoming Auditor	Connection	#(AudChg)	#(Hire)	%(Hire)	Diff	P-value
<i>PwC</i>	Yes	53	19	<b>35.8%</b>	14.4%	0.016**
	No	532	114	21.4%		
<i>EY</i>	Yes	62	38	<b>61.2%</b>	25.0%	0.000***
	No	524	190	36.2%		
<i>Deloitte</i>	Yes	35	16	<b>45.7%</b>	18.4%	0.019**
	No	588	161	27.3%		
<i>KPMG</i>	Yes	57	28	<b>49.1%</b>	17.0%	0.009***
	No	595	191	32.1%		
Total	Yes	<b>207</b>	<b>101</b>	<b>48.8%</b>	19.5%	0.000***
	No	2,239	656	29.3%		

Panel A reports a transition matrix of auditor changes in our sample. It includes the identities of predecessor and incoming auditors and the number of clients for every combination of them. Panel B provides univariate test results of whether clients with CEO/CFOs connected to XX auditor are more likely to hire XX as their external auditor. #(AudChg) is the number of auditor change. #(Hire) is the number of clients hiring the given auditor XX. % (Hire) is #(Hire) divided by #(AudChg). Diff is differences in %(Hire) between connected sample and unconnected sample. \*, \*\*, \*\*\* indicate statistical difference from zero (two-tailed) at the < 0.10, < 0.05, and < 0.01 levels, respectively.

appoint EY, Deloitte, or KPMG, respectively. This distribution is similar to that reported by Dhaliwal et al. (2015).

Table 2, Panel B provides univariate test results of whether clients tend to hire connected auditors for each of the Big 4 auditors, respectively. It should be noted that firms currently hiring XX auditor are excluded in XX selection analysis because they cannot switch to the same XX auditor. This exclusion leaves 585, 586, 623, and 652 firms for each analysis for selecting PwC, EY, Deloitte, or KPMG, respectively. For example, when we examine whether firms with CEO/CFO-PwC network ties are more likely to hire PwC, we exclude 172 observations with PwC as a predecessor. Among remaining 585 auditor change firms, Panel B reports that the CEO/CFOs of 53 firms are connected to PwC through their outside directorships, while the CEO/CFOs of the other 532 firms do not have such a connection with PwC. More importantly, 19 of 53 firms with CEO/CFO-PwC ties (35.8%) appoint PwC as their new auditor, while 114 of 532 firms without such ties (21.4%) appoint PwC. This difference is statistically significant ( $p$ -value = 0.016), indicating that clients with CEO/CFO-PwC ties are more likely to switch to PwC than clients without such ties. The results are similar for EY (61.2 vs. 36.2% with  $p$ -value < 0.001), Deloitte (45.7 vs. 27.3% with  $p$ -value = 0.019), and KPMG (49.1 vs. 32.1% with  $p$ -value = 0.009). The last row of Panel B shows that the total number of observations with CEO/CFOs having connections with any Big 4 auditors is 207 (53 + 62 + 35 + 57), while the number of observations without such a connection is 2,239 (532 + 524 + 588 + 595). We find that 48.8% of the former

firms appoint connected auditors, while just 29.3% of the latter firms appoint the respective auditors. The difference is statistically significant at  $p < 0.001$ .<sup>32</sup> Overall, our univariate analysis in Table 2 provides preliminary support for H1.

Table 3, Panel A reports descriptive statistics for the variables used in the auditor selection model for each Big 4 auditor. The panel shows that about 10% of the PwC sample have CEO/CFO-PwC ties. Likewise, about 11, 6, and 9% of the sample for EY, Deloitte, and KPMG are connected to EY, Deloitte, and KPMG, respectively.

Table 3, Panel B presents the logistic regression results of auditor selection decisions for each Big 4 auditor. We find positive and significant coefficients on *ConnXX* for all Big 4 auditors. These results suggest that home firms are more likely to hire auditors connected to their CEO/CFOs when they switch auditors, in line with our univariate test results. In the logistic regression, taking an exponential converts a coefficient into an odds ratio. In the analysis of hiring PwC (EY, Deloitte, and KPMG), the odds ratio of *ConnXX* suggests that the odds of hiring PwC (EY, Deloitte, and KPMG) is 1.72 (2.86, 2.08, and 1.92) times greater for firms with CEO/CFO-PwC (EY, Deloitte, and KPMG) ties than those without such ties. Inferences for control variables are generally consistent with previous research (Dhaliwal et al., 2015; Lennox & Park, 2007). For example, firms that hired Big 4 auditors previously (*FBig4*) are more likely to appoint another Big 4 auditor. Consistent with Lennox and Park (2007) and Shu (2000), firms tend to hire well-matched auditors (*MatchXX*). Finally, firms with officers who formerly worked for audit firms are more likely to hire their alumni (*AlumniXX*).<sup>33,34</sup> For robustness, we first perform auditor selection analysis with a multinomial logit model instead of a set of binary ones because a client may consider all Big 4 auditors at the same time. Using a reference group defined as firms that appoint KPMG, we find that firms connected to PwC (Deloitte, EY) are more likely to appoint PwC (Deloitte, EY) over KPMG, giving credence to our previous results. Second, we further preform auditor selection analysis after including year- and industry-fixed effects in the models or after limiting the sample to auditor dismissal observations only. Untabulated results indicate that our main results remain qualitatively similar.

Table 3, Panel C provides logistic regression results of hiring a connected auditor using a sample of home firms with at least one CEO/CFO-auditor interlock. Note that when a home firm has more than one connection, we include the respective pairs in the sample.

Since both the embeddedness and agency views predict a positive relationship between CEO/CFO-auditor ties and the appointment of connected auditors, it is difficult to discern which view drives the results reported in Table 3, Panel B. It seems reasonable, however, to predict that, under the embeddedness view, the likelihood of hiring a connected auditor is higher when the connected auditor exhibits superior audit quality for the connected firm. Thus, we examine whether hiring a connected auditor is associated with observed audit quality at a connected firm. The insignificant coefficients on *ConnAQ1* through *ConnAQ4* in columns (1) to (4) indicate that the likelihood of hiring a connected auditor is not significantly associated with the connected auditor's audit quality. In addition, under the embeddedness view, since the governance body of a home firm would not view hiring a connected auditor as harmful, the strength of the home firm's corporate governance should be positively or insignificantly associated with hiring a connected

<sup>32</sup>When we employ 33.3% as an alternative benchmark, which is a random probability that a Big 4 auditor is switched to one of the other three Big 4 auditors, the difference is still significant at  $p < 0.001$ .

<sup>33</sup>To evaluate the economic importance of *ConnXX* against that of *AlumniXX*, we check whether the coefficient on *ConnXX* is statistically different from that on *AlumniXX* in each of columns (1)–(4). We find that the differences are statistically insignificant in all columns, suggesting that the economic magnitude of the effect of *ConnXX* on auditor selection decisions is comparable to that of *AlumniXX*.

<sup>34</sup>Our results are robust when we add a bankruptcy score, leverage, an indicator for the issuance of debt and equity, board independence, and an indicator for CEO-chairperson duality, following Lennox and Park (2007).

auditor. In contrast, the agency view would predict that home firms with strong corporate governance are more likely to deter such hiring. In all of the four columns in Panel C, the coefficients on *GovIndex* are negative and statistically significant, indicating that home firms with strong

**Table 3.** Auditor selection analyses

Panel A: Descriptive Statistics								
Variable	(1)		(2)		(3)		(4)	
	<i>XX = PwC</i>		<i>XX = EY</i>		<i>XX = Deloitte</i>		<i>XX = KPMG</i>	
	Mean	Std	Mean	Std	Mean	Std	Mean	Std
<i>XX</i>	0.23	0.42	0.39	0.49	0.29	0.46	0.34	0.48
<i>ConnXX</i>	0.10	0.29	0.11	0.31	0.06	0.23	0.09	0.29
<i>SpecXX</i>	0.43	0.50	0.26	0.44	0.19	0.39	0.15	0.36
<i>MatchXX</i>	0.18	0.39	0.59	0.50	0.15	0.35	0.08	0.28
<i>AlumniXX</i>	0.18	0.38	0.14	0.35	0.10	0.30	0.10	0.30
<i>FBig4</i>	0.71	0.46	0.71	0.46	0.72	0.45	0.74	0.45
N	585		586		623		652	

  

Panel B: Regression Results								
Variable	(1)		(2)		(3)		(4)	
	<i>Dep: PwC</i>		<i>Dep: EY</i>		<i>Dep: Deloitte</i>		<i>Dep: KPMG</i>	
	Coeff.	<i>p</i> -value	Coeff.	<i>p</i> -value	Coeff.	<i>p</i> -value	Coeff.	<i>p</i> -value
<i>Intercept</i>	-1.95	0.001***	-1.08	0.001***	-1.63	0.001***	-1.21	0.001***
<i>ConnXX</i>	0.544	0.083*	1.05	0.001***	0.73	0.041**	0.653	0.023**
<i>SpecXX</i>	0.308	0.132	0.185	0.351	-0.08	0.755	0.537	0.026**
<i>MatchXX</i>	0.203	0.440	0.416	0.019**	0.71	0.006***	0.653	0.041**
<i>AlumniXX</i>	0.723	0.003***	0.627	0.011**	0.262	0.376	0.687	0.012**
<i>FBig4</i>	0.48	0.042**	0.178	0.353	0.711	0.001***	0.344	0.083*
N	585		586		623		652	
Pseudo- <i>R</i> <sup>2</sup>	0.032		0.034		0.033		0.037	

  

Panel C: Regression of Hiring Connected Auditors								
<i>Dep: HiringConn</i>								
Variable	(1)		(2)		(3)		(4)	
	Coeff.	<i>p</i> -value	Coeff.	<i>p</i> -value	Coeff.	<i>p</i> -value	Coeff.	<i>p</i> -value
	<i>Intercept</i>	-5.883	0.001***	-3.266	0.083*	-3.579	0.063*	-6.016
<i>ConnAQ1</i>	0.327	0.258						
<i>ConnAQ2</i>			0.514	0.132				
<i>ConnAQ3</i>					-0.347	0.358		
<i>ConnAQ4</i>							0.361	0.175
<i>GovIndex</i>	-0.517	0.066*	-0.825	0.018**	-0.782	0.032**	-0.525	0.062*
<i>SameMSA</i>	0.961	0.001***	0.926	0.003***	0.860	0.007***	0.962	0.001***
<i>SameInd</i>	1.245	0.001***	0.899	0.009***	1.031	0.003***	1.285	0.001***
<i>MatchConn</i>	0.401	0.139	0.515	0.105	0.397	0.222	0.407	0.134
<i>AlumniConn</i>	0.801	0.033**	0.831	0.074*	0.848	0.073*	0.792	0.035**
<i>SpecConn</i>	0.377	0.202	0.410	0.256	0.368	0.310	0.370	0.211
<i>FBig4</i>	-0.148	0.680	-0.477	0.271	-0.336	0.439	-0.108	0.765
<i>LogTA</i>	0.194	0.010***	0.095	0.275	0.106	0.233	0.204	0.006***

(Continued).

**Table 3.** Continued.

Panel C: Regression of Hiring Connected Auditors								
Variable	Dep: <i>HiringConn</i>							
	(1)		(2)		(3)		(4)	
	Coeff.	<i>p</i> -value	Coeff.	<i>p</i> -value	Coeff.	<i>p</i> -value	Coeff.	<i>p</i> -value
<i>BankruptcyScore</i>	0.009	0.717	−0.008	0.803	−0.005	0.866	0.009	0.721
<i>LitIndustry</i>	−0.359	0.211	0.315	0.346	0.399	0.247	−0.350	0.221
<i>AudDismissal</i>	0.263	0.417	0.062	0.881	0.288	0.501	0.255	0.430
N	362		245		231		362	
Pseudo- <i>R</i> <sup>2</sup>	0.135		0.124		0.120		0.136	

Panel A provides descriptive statistics for variables used in auditor selection analyses. Panel B reports the regression results of auditor selection. The dependent variable *XX* (PwC, EY, Deloitte, or KPMG) is an indicator variable equal to one if the incoming audit firm is *XX*, and zero otherwise, where *XX* is PwC (PricewaterhouseCoopers), EY (Ernst & Young), Deloitte, or KPMG. *ConnXX* is an indicator variable equal to one if the CEO/CFO serves as an independent director of another firm who hires the auditor *XX*, and zero otherwise. Panel C provides the regression results of hiring a connected auditor. The sample consists of matched pairs of home and connected firms. When a home firm has more than one connection, we include the respective pairs in the sample. *HiringConn* is an indicator variable equal to one if the home firm hires its connected auditor, and zero otherwise. \*, \*\*, \*\*\* indicate statistical difference from zero (two-tailed) at the < 0.10, < 0.05, and < 0.01 levels, respectively. Variable definitions are included in the Appendix.

corporate governance are less likely to appoint a connected auditor. Therefore, the findings in Panel C are more consistent with the agency view than the embeddedness view.

We also predict that home firms are more likely to hire a connected auditor when such hiring would induce connections at the audit office level. We define *SameMSA* as one if the incoming auditor's office and the connected auditor's office are located in the same MSA (i.e. if the home firm hires a new auditor located in the same MSA as the connected auditor's office), and zero otherwise. Columns (1) to (4) provide evidence consistent with this prediction by reporting that the coefficients on *SameMSA* are positive and significant at  $p < 0.01$ .

Although not the focus of our research, the coefficients on *SameInd* are positive and significant. Aobdia (2015) documents that rivals in the same industry do not share a common auditor if the costs of information spillovers are substantial; however, if the costs are low, they tend to hire a rival's auditor in anticipation of greater industry expertise. The finding suggests that given that the CEO/CFO director in our setting already plays a conduit role between home and connected firms, the costs of information spillovers are not high when home firms hire a connected auditor.

## 4.2. Audit Quality Analysis

### 4.2.1. Descriptive statistics

Table 4, Panel A provides summary statistics for the dependent variables used for our audit quality analyses. Among 1,632 firm-year observations used for the misstatement analysis, about 11.2% misstate their financial statements and subsequently restate them. The mean values of  $|DA|$  and  $|PMDA|$  are 0.056 and 0.091, respectively, which are comparable to those in prior studies. Regarding the sample for meeting/beating analysis, 17.1 (33.0)% of the sample report earnings that meet or just beat analysts' consensus forecasts (last year earnings).

Table 4, Panel B presents descriptive statistics for control variables. The key statistics for control variables are similar to those in prior research (Cohen et al., 2014; Reichelt & Wang, 2010). The mean values of firm size (*LogTA*) and return on assets (*ROA*) are 20.391 and −0.017, respectively. The mean value of non-audit fees paid to external auditors is 15.9% of total fees

**Table 4.** Descriptive statistics for variables used in audit quality analyses

Panel A: Audit Quality Variables								
Variable	N	Mean	P5	P25	P50	P75	P95	
<i>Restatement</i>	1,632	0.112	0	0	0	0	1	
<i>DA</i>	1,280	0.056	0.003	0.017	0.038	0.074	0.165	
<i>PMDA</i>	1,232	0.091	0.005	0.025	0.059	0.119	0.308	
<i>MeetConsensus</i>	596	0.171	0	0	0	0	1	
<i>MeetLast</i>	1,680	0.330	0	0	0	1	1	
Panel B: Control Variables								
<i>LogTA</i>	1,632	20.391	17.817	19.247	20.312	21.413	23.378	
<i>ROA</i>	1,632	-0.017	-0.394	-0.033	0.031	0.077	0.193	
<i>Market-to-Book</i>	1,632	2.937	-0.014	1.246	2.127	3.526	9.213	
<i>Issue</i>	1,632	0.850	0	1	1	1	1	
<i>Leverage</i>	1,632	0.243	0.000	0.047	0.218	0.362	0.651	
<i>FirmAge</i>	1,632	22.928	5.000	11.000	17.000	32.000	56.000	
<i>AltmanZ</i>	1,632	3.050	-1	1	2	4	10	
<i>LitIndustry</i>	1,632	0.272	0	0	0	1	1	
<i>NonAuditFeeRatio</i>	1,632	0.159	0	0.029	0.115	0.240	0.501	
<i>MSALeader</i>	1,632	0.381	0	0	0	1	1	
<i>NationalLeader</i>	1,632	0.248	0	0	0	0	1	
<i>Cimportance</i>	1,632	0.100	0.003	0.012	0.033	0.107	0.447	
<i>Big4</i>	1,632	0.890	0	1	1	1	1	
<i>AlumniAud</i>	1,632	0.155	0	0	0	0	1	
<i>CEOisChair</i>	1,632	0.497	0	0	0	1	1	
<i>BDindep</i>	1,632	0.820	0.600	0.778	0.857	0.889	0.917	
<i>ACexpertise</i>	1,632	0.814	0	1.000	1.000	1.000	1.000	
<i>Accr</i>	1,632	-0.081	-0.275	-0.110	-0.061	-0.023	0.049	
<i>StdSale</i>	1,280	0.253	0.040	0.096	0.172	0.317	0.736	
<i>StdCFO</i>	1,280	0.068	0.014	0.030	0.049	0.082	0.179	
Panel C: Correlation								
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Misstatement</i>	(1)							
<i>DA</i>	(2)	0.04						
<i>PMDA</i>	(3)	0.01	<b>0.51</b>					
<i>MeetConsensus</i>	(4)	0.04	-0.09	0.03				
<i>MeetLast</i>	(5)	0.01	-0.20	-0.17	<b>0.11</b>			
<i>LogTA</i>	(6)	-0.06	-0.16	-0.14	0.01	<b>0.09</b>		
<i>ROA</i>	(7)	-0.02	-0.29	-0.24	0.04	<b>0.23</b>	<b>0.32</b>	
<i>Market-to-Book</i>	(8)	0.01	-0.03	0.03	<b>0.07</b>	<b>0.09</b>	-0.07	-0.11
<i>Issue</i>	(9)	0.03	0.02	0.03	0.00	-0.04	<b>0.07</b>	-0.10
<i>Leverage</i>	(10)	-0.03	0.09	0.00	-0.06	-0.15	<b>0.34</b>	-0.05
<i>FirmAge</i>	(11)	-0.03	-0.06	-0.11	0.00	0.01	<b>0.45</b>	<b>0.15</b>
<i>AltmanZ</i>	(12)	-0.01	-0.18	-0.09	<b>0.10</b>	<b>0.26</b>	-0.08	<b>0.25</b>
<i>LitIndustry</i>	(13)	0.04	0.05	0.04	0.05	0.00	-0.15	-0.15
<i>NonAuditFeeRatio</i>	(14)	0.04	-0.03	-0.04	<b>0.12</b>	0.03	<b>0.08</b>	0.04
<i>MsaLeader</i>	(15)	0.01	-0.03	-0.02	0.00	0.00	<b>0.17</b>	0.04
<i>NationalLeader</i>	(16)	0.00	0.01	0.00	-0.01	0.01	<b>0.10</b>	0.04
<i>Cimportance</i>	(17)	0.04	-0.03	-0.01	0.00	0.00	<b>0.11</b>	0.06
<i>Big4</i>	(18)	-0.09	0.00	0.00	-0.07	0.03	<b>0.23</b>	<b>0.11</b>
<i>AlumniAud</i>	(19)	0.00	0.00	-0.01	-0.05	0.00	-0.01	-0.02
<i>CEOisChair</i>	(20)	-0.01	-0.06	-0.07	0.02	0.06	<b>0.11</b>	<b>0.05</b>
<i>BDindep</i>	(21)	-0.04	0.00	0.00	-0.02	-0.09	<b>0.20</b>	<b>0.09</b>
<i>ACexpertise</i>	(22)	-0.01	0.00	0.02	0.03	-0.02	<b>0.07</b>	<b>0.10</b>
<i>Accr</i>	(23)	0.00	-0.30	-0.25	0.01	<b>0.14</b>	<b>0.18</b>	<b>0.67</b>
<i>StdCFO</i>	(24)	0.05	0.05	0.06	0.00	-0.07	-0.16	0.00
<i>StdSale</i>	(25)	<b>0.09</b>	<b>0.16</b>	<b>0.15</b>	-0.01	-0.11	-0.38	-0.44

(Continued).



**Table 4.** Continued.

Panel C: Correlation									
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	
<i>Leverage</i>	(10)	<b>0.26</b>							
<i>FirmAge</i>	(11)	-0.08	0.05						
<i>AltmanZ</i>	(12)	-0.14	-0.47	-0.09					
<i>LitIndustry</i>	(13)	-0.07	-0.17	-0.16	<b>0.08</b>				
<i>NonAuditFeeRatio</i>	(14)	0.06	0.04	0.05	0.01	0.01			
<i>MsaLeader</i>	(15)	0.00	<b>0.07</b>	<b>0.07</b>	-0.05	0.00	<b>0.08</b>		
<i>NationalLeader</i>	(16)	0.05	0.04	0.05	-0.02	0.00	0.04	<b>0.16</b>	
<i>Cimportance</i>	(17)	0.05	0.04	<b>0.08</b>	-0.05	-0.07	0.00	-0.06	-0.04
<i>Big4</i>	(18)	-0.01	0.06	<b>0.10</b>	-0.06	0.00	0.02	<b>0.20</b>	<b>0.18</b>
<i>AlumniAud</i>	(19)	0.04	0.06	-0.02	-0.01	0.00	0.02	0.03	<b>0.12</b>
<i>CEOisChair</i>	(20)	-0.02	<b>0.10</b>	0.06	0.01	-0.01	<b>0.09</b>	0.04	-0.01
<i>BDindep</i>	(21)	<b>0.08</b>	0.03	<b>0.18</b>	-0.10	-0.11	-0.06	0.04	0.02
<i>ACexpertise</i>	(22)	<b>0.06</b>	0.00	0.02	0.00	-0.05	-0.18	0.00	0.01
<i>Accr</i>	(23)	-0.07	-0.08	<b>0.16</b>	<b>0.12</b>	-0.06	0.06	0.04	0.02
<i>StdCFO</i>	(24)	0.04	-0.07	-0.22	0.06	0.06	0.00	-0.02	0.00
<i>StdSale</i>	(25)	<b>0.07</b>	-0.12	-0.24	0.00	<b>0.17</b>	0.00	-0.04	-0.06
		(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
<i>Big4</i>	(18)	-0.18							
<i>AlumniAud</i>	(19)	-0.07	<b>0.15</b>						
<i>CEOisChair</i>	(20)	0.00	0.03	-0.03					
<i>BDindep</i>	(21)	0.01	<b>0.14</b>	0.05	-0.16				
<i>ACexpertise</i>	(22)	-0.03	0.06	0.00	-0.14	<b>0.24</b>			
<i>Accr</i>	(23)	0.06	<b>0.08</b>	0.01	0.02	<b>0.10</b>	0.06		
<i>StdCFO</i>	(24)	0.03	-0.05	0.01	0.03	-0.03	0.01	-0.02	
<i>StdSale</i>	(25)	-0.07	-0.11	0.04	0.02	-0.04	-0.05	-0.21	<b>0.33</b>

Panel A provides descriptive statistics for audit quality proxies. The statistics for each variable are based on the sample for the respective analysis. Panel B provides descriptive statistics for control variables for audit quality analyses. Panel C presents the correlation between variables. Correlation coefficients statistically significant at  $p < 0.01$  are in bold. The statistics for all variables with the exception of *StdCFO* and *StdSale* are based on the sample for the misstatement analysis. Regarding *StdCFO* and *StdSale*, the statistics are based on the sample for the discretionary accruals analysis. Variable definitions are included in the Appendix.

(*NonAuditFeeRatio*). In addition, 81.4% of our sample have at least one accounting expert on the AC (*ACexpertise*), and board independence (*BDindep*) is 82.0% on average.

Table 4, Panel C reports the correlation matrix. Most of the correlation coefficients between control variables are lower than 0.2. So, multicollinearity does not appear to be an important concern.

#### 4.2.2. Multivariate regression analyses of audit quality

Table 5 reports the regression results of audit quality analyses. As a proxy for audit quality, we employ misstatement in column (1), absolute discretionary accruals in columns (2) and (3), and tendency to meet or just beat earnings benchmarks in columns (4) and (5), respectively. Under the agency (embeddedness) view, we expect that home firms will experience a decline (improvement) in audit quality after hiring a connected auditor, relative to those hiring a non-connected auditor.

In column (1), the coefficient on *Post \* Treat* is positive and significant at  $p < 0.05$ , suggesting that the increase in the likelihood of misstatements subsequent to auditor switch is greater for firms switching to connected auditors than for firms switching to non-connected auditors. A

**Table 5.** Regression of audit quality on hiring connected auditors

Variable	Misstatement		DA		PMDA		MeetConsensus		MeetLast	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
<i>Intercept</i>	-4.985	0.024**	0.075	0.028**	0.113	0.040**	-11.428	0.000***	-4.864	0.000***
<i>Post</i>	-0.759	0.003***	-0.008	0.035**	-0.008	0.176	-0.132	0.666	-0.156	0.314
<i>Treat</i>	-0.861	0.041**	-0.012	0.044**	-0.008	0.340	-0.266	0.710	-0.289	0.315
<i>Post * Treat</i>	1.133	0.033**	0.022	0.008***	0.020	0.083*	1.103	0.209	0.660	0.052*
<i>LogTA</i>	-0.109	0.352	-0.004	0.008***	-0.003	0.211	0.217	0.125	0.213	0.001***
<i>ROA</i>	-0.203	0.788	-0.084	0.000***	-0.119	0.000***	-0.620	0.490	3.454	0.000***
<i>Market-to-Book</i>	0.010	0.675	0.000	0.895	0.000	0.562	-0.019	0.675	0.045	0.009***
<i>Issue</i>	0.484	0.151	0.000	0.847	-0.002	0.807	0.574	0.248	0.091	0.613
<i>Leverage</i>	-0.911	0.190	0.020	0.279	0.020	0.348	-1.393	0.260	-1.691	0.000***
<i>FirmAge</i>	0.000	0.980	0.000	0.079*	0.000	0.976	-0.003	0.779	-0.003	0.515
<i>AltmanZ</i>	-0.031	0.430	0.000	0.380	0.000	0.678	0.022	0.640	0.088	0.002***
<i>LitIndustry</i>	0.238	0.594	0.007	0.349	0.017	0.082*	-0.121	0.831	0.120	0.650
<i>NonAuditFeeRatio</i>	0.720	0.341	-0.015	0.193	-0.028	0.088*	0.564	0.622	0.068	0.881
<i>MSALeader</i>	0.268	0.235	-0.003	0.372	-0.001	0.794	-0.200	0.553	-0.021	0.883
<i>NationalLeader</i>	0.022	0.925	0.000	0.870	0.003	0.663	-0.041	0.881	0.018	0.908
<i>Cimportance</i>	1.004	0.084*	0.006	0.418	0.018	0.138	-0.480	0.653	0.088	0.813
<i>Big4</i>	-0.478	0.181	0.008	0.232	0.013	0.168	-1.076	0.099*	0.256	0.374
<i>AlumniAud</i>	0.052	0.857	-0.003	0.404	-0.002	0.770	-0.403	0.327	0.094	0.609
<i>CEOisChair</i>	-0.138	0.568	-0.003	0.366	-0.007	0.196	0.596	0.051*	0.244	0.091*
<i>BDindep</i>	-0.048	0.974	0.033	0.154	0.009	0.768	0.738	0.743	-2.359	0.008***
<i>ACexpertise</i>	0.132	0.623	-0.002	0.602	0.006	0.442	1.359	0.009***	-0.175	0.410
<i>Accr</i>	0.061	0.958					-1.763	0.326	0.481	0.622
<i>StdCFO</i>			0.105	0.017**	0.103	0.068*				
<i>StdSale</i>			0.004	0.594	0.007	0.567				
<i>Industry F.E.</i>		Yes		Yes		Yes		Yes		Yes
<i>Year F.E.</i>		Yes		Yes		Yes		Yes		Yes
N		1632		1280		1232		596		1680
Pseu-R <sup>2</sup> /Adj-R <sup>2</sup>		0.162		0.141		0.094		0.196		0.197

This table reports regression results of audit quality on hiring connected auditors. *Treat* is an indicator variable equal to one if the firm switches to a connected auditor, and zero otherwise. *Post* is an indicator variable equal to one for the periods subsequent to auditor change, and zero otherwise. \*, \*\*, \*\*\* indicate statistical difference from zero (two-tailed) at the < 0.10, < 0.05, and < 0.01 levels, respectively. *P*-values are calculated using firm-clustered standard errors. Variable definitions are included in the Appendix.

negative coefficient on *Post* is consistent with the declining trend of misstatements over time (Scholz, 2014).<sup>35,36</sup> In columns (2) and (3), we use the absolute value of discretionary accruals estimated by the modified Jones model and performance-matched discretionary accruals as proxies for audit quality, respectively, while in columns (4) and (5), we use meeting or beating analysts' consensus earnings forecasts and last year earnings as proxies, respectively. Consistent with the result in column (1), all coefficients on *Post \* Treat* in columns (2) to (5) are positive, and all but one in column (4) are statistically significant, suggesting that the increases in the magnitude of absolute discretionary accruals and the propensity to meet or beat earnings benchmarks subsequent to auditor changes are significantly greater for firms hiring connected auditors, compared to those for firms hiring non-connected auditors. These results imply that hiring connected auditors leads to a more lenient audit and greater tolerance of earnings management, supporting the agency view in H2b. The signs of control variables are generally consistent with prior research. For brevity, we do not discuss them in detail.

#### 4.2.3. Multivariate regression analyses of audit quality: Same audit office effect

This section examines whether the negative relation between CEO/CFO-auditor interlocks and audit quality is more pronounced when the interlocks are established at the local office level. When home and connected firms appoint auditors from the same local office, the CEO/CFOs are likely not only to have greater bargaining power over the connected auditor but also to form a closer relationship with the auditor. At the same time, this situation will foster information transfer between the CEO/CFO and the audit office. Therefore, the effect of network ties between CEO/CFO and auditor on audit quality can be more pronounced when home and connected firms hire auditors from the same office.

To examine this prediction, we estimate the audit quality models after splitting all CEO/CFO-auditor interlocks into the interlocks through the same office, *Treat (Same Off.)*, and the interlocks through different audit offices of the connected audit firm, *Treat (Diff. Off.)*. In other words, *Treat (Same Off.)* equals one if the firm switches to a connected auditor through the same audit office, and zero otherwise. *Treat (Diff. Off.)* equals one if *Treat* is equal to one and *Treat (Same Off.)* is equal to zero, and zero otherwise. Table 6 presents the results. In all five columns, the coefficients on *Post \* Treat (Same Off.)* are positive and significant, indicating that the firms switching to a connected audit office are more likely to exhibit a decrease in audit quality subsequent to auditor changes, compared to firms switching to a non-connected auditor. To the contrary, the coefficients on *Post \* Treat (Diff. Off.)* are all insignificant except for column (2). The lack of statistical significance in most columns indicates that the decrease in audit quality is less pronounced when the home firms switch to a different audit office of the connected auditor. Collectively, the findings in Table 6 suggest that the negative effect of hiring connected auditors on subsequent audit quality is stronger when the CEO/CFO-auditor interlocks are built at the local office level.

#### 4.2.4. Tests with propensity score matched sample

Despite our research design of a DID model, it remains possible that the difference in firm characteristics between treatment and control samples, rather than our variable of interest (hiring

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<sup>35</sup>When we estimate the misstatement regression in column (1) without the interaction term, *Post \* Treat*, we continue to find that the coefficient on *Post* is negative and statistically significant.

<sup>36</sup>A negative coefficient on *Treat* implies that, in the pre-auditor switch period, treatment firms are less likely to misstate their financial statements, relative to control firms. This outcome could derive from differences in firm characteristics between two groups, such as firm size. To mitigate the concern about differences in firm characteristics, we replicate our analysis using the propensity score matched sample in a subsequent section.

**Table 6.** Regression of audit quality on hiring connected auditors: same office effect

Variable	<i>Misstatement</i>		<i>DA</i>		<i>PMDA</i>		<i>MeetConsensus</i>		<i>MeetLast</i>	
	Coeff.	<i>p</i> -value	Coeff.	<i>p</i> -value	Coeff.	<i>p</i> -value	Coeff.	<i>p</i> -value	Coeff.	<i>p</i> -value
<i>Intercept</i>	- 5.009	0.024**	0.075	0.028**	0.115	0.037**	- 11.484	0.000***	- 4.862	0.000***
<i>Post</i>	- 0.757	0.003***	- 0.008	0.037**	- 0.008	0.168	- 0.139	0.647	- 0.155	0.318
<i>Treat (Same Off.)</i>	- 0.907	0.150	- 0.016	0.054*	- 0.015	0.169	- 0.789	0.279	- 0.448	0.260
<i>Treat (Diff. Off.)</i>	- 0.824	0.117	- 0.009	0.234	- 0.003	0.776	0.345	0.762	- 0.157	0.686
<i>Post * Treat (Same Off.)</i>	1.415	0.082*	0.025	0.025**	0.039	0.035**	1.725	0.041**	1.012	0.047**
<i>Post * Treat (Diff. Off.)</i>	0.790	0.157	0.019	0.072*	0.006	0.634	0.530	0.703	0.363	0.373
<i>LogTA</i>	- 0.110	0.348	- 0.004	0.008***	- 0.003	0.202	0.214	0.124	0.213	0.001***
<i>ROA</i>	- 0.205	0.787	- 0.084	0.000***	- 0.119	0.000***	- 0.658	0.459	3.446	0.000***
<i>Market-to-Book</i>	0.010	0.664	0.000	0.900	0.000	0.523	- 0.015	0.748	0.046	0.007***
<i>Issue</i>	0.487	0.154	0.000	0.841	- 0.001	0.840	0.594	0.235	0.098	0.585
<i>Leverage</i>	- 0.928	0.188	0.020	0.276	0.020	0.362	- 1.367	0.261	- 1.710	0.000***
<i>FirmAge</i>	0.000	0.993	0.000	0.085*	0.000	0.942	- 0.003	0.785	- 0.003	0.507
<i>AltmanZ</i>	- 0.032	0.421	0.000	0.392	0.000	0.682	0.024	0.607	0.087	0.003***
<i>LitIndustry</i>	0.245	0.583	0.006	0.364	0.017	0.075*	- 0.113	0.842	0.120	0.648
<i>NonAuditFeeRatio</i>	0.732	0.337	- 0.015	0.193	- 0.028	0.088*	0.627	0.583	0.070	0.877
<i>MSALeader</i>	0.256	0.258	- 0.003	0.368	- 0.001	0.745	- 0.175	0.607	- 0.025	0.864
<i>NationalLeader</i>	0.042	0.860	0.000	0.870	0.003	0.625	- 0.015	0.957	0.029	0.851
<i>Cimportance</i>	0.983	0.090*	0.006	0.403	0.018	0.138	- 0.551	0.596	0.074	0.843
<i>Big4</i>	- 0.475	0.183	0.008	0.233	0.014	0.156	- 1.005	0.120	0.253	0.380
<i>AlumniAud</i>	0.033	0.909	- 0.003	0.424	- 0.002	0.726	- 0.449	0.284	0.087	0.637
<i>CEOisChair</i>	- 0.132	0.585	- 0.003	0.376	- 0.007	0.200	0.628	0.039**	0.246	0.090*
<i>BDindep</i>	0.000	0.999	0.033	0.161	0.009	0.767	0.690	0.759	- 2.363	0.007***
<i>ACexpertise</i>	0.133	0.622	- 0.003	0.595	0.006	0.438	1.347	0.010**	- 0.175	0.413
<i>Accr</i>	0.069	0.952					- 1.678	0.353	0.521	0.595
<i>StdCFO</i>			0.104	0.018**	0.101	0.070*				
<i>StdSale</i>			0.004	0.604	0.007	0.563				
<i>Industry F.E.</i>		Yes		Yes		Yes		Yes		Yes
<i>Year F.E.</i>		Yes		Yes		Yes		Yes		Yes
<i>N</i>		1632		1280		1232		596		1680
<i>Pseu-R<sup>2</sup>/Adj-R<sup>2</sup></i>		0.163		0.14		0.093		0.198		0.198

This table reports regression results of audit quality proxies on hiring auditors connected through the same office. *Treat (Same Off.)* is an indicator variable equal to one if the firm switches to a connected auditor through the same audit office, and zero otherwise. *Treat (Diff. Off.)* is an indicator variable equal to one if *Treat* is equal to one and *Treat (Same Off.)* is equal to zero, and zero otherwise. *Post* is an indicator variable equal to one for the periods subsequent to auditor change, and zero otherwise. \*, \*\*, \*\*\* indicate statistical difference from zero (two-tailed) at the < 0.10, < 0.05, and < 0.01 levels, respectively. *P*-values are calculated using firm-clustered standard errors. Variable definitions are included in the Appendix.

connected auditors), drives our results of audit quality analyses. In other words, if the control firms do not share similar firm characteristics with the treatment firms, this difference may introduce bias in evaluating the consequences of the treatment effect. To mitigate this concern, we perform a matched-sample analysis based on propensity score matching (PSM), following Lawrence et al. (2011) and Shipman et al. (2017). Note that since we are not able to perform a meaningful PSM analysis for meeting or beating analysts' consensus forecasts due to the small sample size, we use the other four audit quality proxies in this section.

We first calculate the likelihood that a firm switches to a connected auditor (i.e. a propensity score) by estimating a logistic regression model in which the dependent variable equals one if the firm switches to a connected auditor and zero otherwise, and the independent variables are all control variables used in the audit quality model, Eq. (3). We measure the independent variables in the year prior to auditor switch.<sup>37</sup> We match a firm switching to a connected auditor (i.e. a treatment firm) with a firm switching to a non-connected auditor (i.e. a control firm) that has the closest propensity score with replacement.<sup>38</sup>

Table 7, Panel A shows the mean differences in the independent variables between the treatment and control samples before and after PSM. Before the matching, treatment firms are larger (*LogTA*), older in firm age (*FirmAge*), have more independent board of directors (*BDindep*), and are less volatile (lower standard deviation of cash flows from operations, *StdCFO*, and lower standard deviation of sales, *StdSale*) than control firms. After PSM, none of these firm characteristics is significantly different between two samples, indicating that our matching is conducted effectively.

When we replicate our audit quality analyses with the PSM sample, the results are largely consistent with those reported earlier. In Table 7, Panel B (Panel C), we perform regression analyses of audit quality reported in Table 5 (Table 6), based on the PSM matched sample. In Panel B, all coefficients on *Post \* Treat* are positive, two of which are statistically significant in column (1) and (2), providing weak support for the hypothesis that home firms are more likely to experience a decrease in audit quality after switching to a connected auditor, relative to those hiring a non-connected auditor. In panel C, all coefficients on *Post \* Treat (Same Off.)* are positive and significant, offering confirmatory evidence that home firms' audit quality is more likely to be impaired after hiring a connected audit office. On the other hand, all coefficients on *Post \* Treat (Diff. Off.)* are insignificant. In conclusion, our PSM sample tests suggest that the decline in audit quality subsequent to switching to a connected auditor is unlikely to be attributable to the observable difference in firm characteristics.<sup>39</sup>

### 4.3. Additional Analyses

We perform several additional analyses. First, one might argue that AC-auditor ties through outside directorship also affect auditor selection decisions and subsequent audit quality. To examine whether the AC-auditor ties confound our findings, we repeat analyses after controlling for this relationship. We find that AC-auditor ties have no significant impact on auditor selection and

<sup>37</sup>Shipman et al. (2017) state that 'PSM should not include variables in the matching stage that are excluded from MR [multiple regression].' We follow this guideline in performing PSM.

<sup>38</sup>To keep all treatment firms, we do not require a maximum caliper distance in this PSM matching. Our inferences, however, remain similar when we enforce maximum caliper widths of 0.05, 0.1, and 0.3, although the sample size in each analysis becomes smaller. In addition, the results are qualitatively similar when we replicate the analyses without replacement.

<sup>39</sup>One disadvantage of our PSM model is a small sample size relative to the number of predictors, which reduces the statistical power of our tests. To alleviate this concern, we alternatively estimate each model using bootstrap. For each analysis, we generate 100 datasets from the original sample. The number of observations in each of the 100 samples is the same as the number for the original sample. Untabulated results reveal that the results are qualitatively similar.

**Table 7.** Audit quality analyses using propensity score matched sample

Panel A: Differences in Characteristics in the Year prior to Auditor Switch										
Variable	Unmatched Sample					Propensity Score Matched Sample				
	Treatment Sample		Control Sample		Mean Difference	Treatment Sample		Control Sample		Mean Difference
	<i>N</i>	Mean	<i>N</i>	Mean	<i>p</i> -value	<i>N</i>	Mean	<i>N</i>	Mean	<i>p</i> -value
<i>LogTA</i>	62	21.338	346	20.191	0.000***	62	21.338	62	21.129	0.465
<i>ROA</i>	62	-0.014	346	-0.019	0.916	62	-0.014	62	-0.025	0.852
<i>Market-to-Book</i>	62	3.198	346	2.903	0.660	62	3.198	62	3.094	0.908
<i>Issue</i>	62	0.887	346	0.844	0.340	62	0.887	62	0.871	0.785
<i>Leverage</i>	62	0.266	346	0.236	0.274	62	0.266	62	0.283	0.627
<i>FirmAge</i>	62	27.516	346	21.529	0.020**	62	27.516	62	27.516	1.000
<i>AltmanZ</i>	62	2.566	346	3.256	0.107	62	2.566	62	2.579	0.980
<i>LitIndustry</i>	62	0.290	346	0.269	0.733	62	0.290	62	0.274	0.843
<i>NonAuditFeeRatio</i>	62	0.161	346	0.164	0.899	62	0.161	62	0.155	0.833
<i>MSALeader</i>	62	0.339	346	0.393	0.413	62	0.339	62	0.435	0.272
<i>NationalLeader</i>	62	0.177	346	0.246	0.211	62	0.177	62	0.177	1.000
<i>Cimportance</i>	62	0.141	346	0.109	0.211	62	0.141	62	0.121	0.499
<i>Big4</i>	62	0.790	346	0.783	0.901	62	0.790	62	0.790	1.000
<i>AlumniAud</i>	62	0.097	346	0.133	0.392	62	0.097	62	0.097	1.000
<i>CEOisChair</i>	62	0.484	346	0.500	0.817	62	0.484	62	0.484	1.000
<i>BDindep</i>	62	0.844	346	0.815	0.034**	62	0.844	62	0.849	0.748
<i>ACexpertise</i>	62	0.823	346	0.812	0.845	62	0.823	62	0.855	0.629
<i>Accr</i>	62	-0.084	346	-0.084	0.999	62	-0.084	62	-0.084	0.997
<i>StdCFO</i>	53	0.051	267	0.074	0.003***	53	0.051	53	0.051	0.992
<i>StdSale</i>	53	0.184	267	0.263	0.005***	53	0.184	53	0.200	0.629

(Continued).



**Table 7.**  
Continued.

Panel B: Regression of Audit Quality.									
Variable	<i>Misstatement</i>		<i>DA</i>		<i>PMDA</i>		<i>MeetLast</i>		
	Coeff.	<i>p</i> -value	Coeff.	<i>p</i> -value	Coeff.	<i>p</i> -value	Coeff.	<i>p</i> -value	
<i>Post</i>	-1.321	0.107	-0.002	0.670	-0.002	0.814	1.083	0.488	
<i>Treat</i>	-0.82	0.216	-0.009	0.122	-0.02	0.059*	-0.77	0.651	
<i>Post * Treat</i>	2.058	0.042**	0.017	0.072*	0.025	0.127	2.16	0.238	
Controls		Yes		Yes		Yes		Yes	
Industry <i>F.E.</i>		Yes		Yes		Yes		Yes	
Year <i>F.E.</i>		Yes		Yes		Yes		Yes	
<i>N</i>		496		424		408		520	
Pseu- <i>R</i> <sup>2</sup> /Adj- <i>R</i> <sup>2</sup>		0.431		0.1		0.1		0.258	
Panel C: Regression of Audit Quality: Same Office Effect									
Variable	<i>Misstatement</i>		<i>DA</i>		<i>PMDA</i>		<i>MeetLast</i>		
	Coeff.	<i>p</i> -value	Coeff.	<i>p</i> -value	Coeff.	<i>p</i> -value	Coeff.	<i>p</i> -value	
<i>Post</i>	-1.349	0.102	-0.002	0.696	-0.003	0.798	1.167	0.464	
<i>Treat (Same Off.)</i>	-0.724	0.393	-0.015	0.082*	-0.027	0.077*	-2.175	0.242	
<i>Treat (Diff. Off.)</i>	-0.937	0.318	-0.006	0.421	-0.014	0.263	2.565	0.317	
<i>Post * Treat (Same Off.)</i>	2.662	0.015**	0.023	0.069*	0.048	0.041**	4.83	0.023**	
<i>Post * Treat (Diff. Off.)</i>	1.296	0.179	0.013	0.275	0.007	0.650	-1.349	0.634	
Controls		Yes		Yes		Yes		Yes	
Industry <i>F.E.</i>		Yes		Yes		Yes		Yes	
Year <i>F.E.</i>		Yes		Yes		Yes		Yes	
<i>N</i>		496		424		408		520	
Pseu- <i>R</i> <sup>2</sup> /Adj- <i>R</i> <sup>2</sup>		0.438		0.096		0.102		0.261	

This table provides empirical results using propensity score matched sample. Panel A provides mean differences in independent variables of audit quality models between the treatment and control samples before and after propensity score matching. For these comparisons, we use observations in the year prior to auditor switch. The statistics for all variables, except *StdCFO* and *StdSale* are based on the sample for misstatement analysis. Regarding *StdCFO* and *StdSale*, the statistics are based on the sample for discretionary accruals analysis. Panel B reports regression results of audit quality. Panel C reports regression results of audit quality on hiring auditors connected through the same office. To obtain matched samples, the propensity score is calculated from the logistic model in which the dependent variable is equal to one if the firm hires a connected auditor, and zero otherwise and the independent variables are extracted from the respective audit quality regression model. Variable definitions are provided in the Appendix.

have no systematic, consistent evidence on audit quality. More importantly, our main findings remain qualitatively similar after the AC-auditor ties are controlled for in each model.

Second, we examine whether CEO-auditor and CFO-auditor ties have different implications for auditor selection decisions and subsequent audit quality. When we replicate four auditor selection regressions using CEO-auditor ties, untabulated results show all positive coefficients for *ConnXX*, two of which are statistically significant at  $p < 0.05$ . We find comparable results when we test with CFO-auditor ties. Furthermore, when we repeat audit quality analyses, untabulated results indicate that our inferences remain largely similar when we examine CEO-auditor and CFO-auditor interlocks separately.

Third, it is possible that the effect of CEO/CFO-auditor connections on auditor selection decisions and audit quality is stronger when the CEO/CFO serves on the AC of the connected firm because they could build closer network ties, given that the AC oversees all audit-related matters. To examine this issue empirically, we re-perform auditor selection and audit quality analyses after splitting the connection sample firms into two groups depending on whether the CEO/CFO-auditor connection is formed via AC membership at the *connected* firm or non-AC membership. Untabulated results suggest that the two groups do not exhibit significantly different effects on auditor selection decisions and audit quality.<sup>40</sup>

Fourth, when we exclude firms switching from non-Big 4 auditors from the sample, our results from auditor selection analyses remain similar. Regarding audit quality tests, we find qualitatively similar evidence for all measures but  $|DA|$ . When  $|DA|$  is used as a proxy for audit quality, we lose statistical significance.

Fifth, while we focus on the effect of hiring interlocked auditors on the home firm's audit quality, one may suspect that the connected firm's audit quality also changes subsequent to the home firm's appointment of the connected auditor.<sup>41</sup> Our untabulated analyses find that the changes in audit quality for the connected firms of our treatment firms are statistically indifferent from those in connected firms of our control firms, suggesting that the adverse effect of CEO/CFO-auditor ties on audit quality exists only for the home firms.

## 5. Conclusion

This study investigates whether CEO/CFO-auditor interlocks through outside directorship affect auditor selection decisions and whether hiring connected auditors influences subsequent audit quality. Our results show that home firms with such ties are more likely to hire connected auditors. We also find that switching to such connected auditors results in lower audit quality, as evidenced by the increases in the likelihood of misstatements, the magnitude of absolute discretionary accruals, and the propensity to meet or beat earnings benchmarks. This evidence is more pronounced when the connection is built at the local office level.

This study provides useful policy implications. First, while SOX mandates that the AC be solely responsible for auditor selection, our evidence indicates that some managers continue to influence auditor appointment decisions by utilizing their networks. This finding suggests

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<sup>40</sup>A possible reason for insignificant differences is small size of the sample that switched to connected auditors, which could lower statistical powers in our models. Among 757 firms switching to Big 4 auditors, the number of firms with CEO/CFO-auditor ties via AC membership is 143, while that with CEO/CFO-auditor ties via board membership is 244. Moreover, the number of firms switching to *connected* auditors based on AC memberships is only 46, compared to 101 based on board membership.

<sup>41</sup>To examine this possibility, we adopt a DID research design in which we compare the changes in audit quality from the pre- to post-auditor-switch periods for the connected firms of our treatment firms, with the changes in audit quality for other connected firms of our control firms, using the same audit quality proxies.

that the ACs of these firms fail to remove managers' influence over auditor appointment, which eventually leads to lower audit quality. Second, although SOX enforces various mechanisms to strengthen auditor independence and audit quality, our results indicate that external networks between managers and auditors can still undermine auditor independence and audit quality. Thus, this study highlights the importance of AC effectiveness and auditor independence in the presence of CEO/CFO-auditor interlocks.

Our study is subject to several caveats. First, we do not directly operationalize network ties of managers to audit engagement partners. We believe that PCAOB's recent disclosure requirement of engagement audit partner identity would enable advancing this research to the audit partner level, although time is needed to accumulate sufficient data. Second, our analyses are limited to the appointments of Big 4 auditors. Thus, our results may not be generalizable to firms switching to non-Big 4 auditors. Third, the number of firms that switch to connected auditors in our sample is small, which might explain why some results of our audit quality tests are weak.

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No potential conflict of interest was reported by the author(s).

### Data Availability

Data are available from the public sources cited in the text.

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## Appendix: Variable Definitions

Variable:	Definition:
Variables Included in Auditor Choice Analyses	
<i>XX</i>	indicator variable equal to one if the incoming auditor is <i>XX</i> , and zero otherwise, where <i>XX</i> is either PwC, EY, Deloitte, or KPMG.
<i>ConnXX</i>	indicator variable equal to one if CEO/CFOs serve as an independent director of another firm who hires the auditor <i>XX</i> , and zero otherwise.
<i>SpecXX</i>	indicator variable equal to one if the auditor <i>XX</i> has the largest market share of audit fees in the industry-year cohort that the given client belongs to, and zero otherwise.
<i>MatchXX</i>	indicator variable equal to one if the firm is better matched with <i>XX</i> than with any of the other Big 4 auditors, and zero otherwise. Following Lennox and Park (2007) and Dhaliwal et al. (2015), we begin with COMPUSTAT and Audit Analytics to identify Big 4 clients from 2003 to 2012 and estimate four logistic regression models where the dependent variable is each of Big 4 auditors and independent variables are firm size, financial health, and the client’s industry identity (based on two-digit SIC codes). Using estimated coefficients from the four regressions, we measure the degree to which a given client is closely matched with each auditor’s existing clients. For example, a client is better matched with PwC’s clientele if the client’s estimated probability of matching with PwC’s clientele is the highest.

(Continued).



<i>Variable:</i>	<i>Definition:</i>
<i>AlumniXX</i>	indicator variable equal to one if the CEO, CFO, or Chief Accounting Officer (CAO) formerly worked for the auditor XX, and zero otherwise.
<i>Fbig4</i>	indicator variable equal to one if the predecessor auditor was a Big 4 auditor, and zero otherwise.
<i>HiringConn</i>	indicator variable equal to one if the home firm hires its connected auditor, and zero otherwise.
<i>ConnAQ1</i>	indicator variable equal to one if the connected firm does not misstate its financial statement in the past two years, and zero otherwise.
<i>ConnAQ2 (ConnAQ3)</i>	indicator variable equal to one if the average of the connected firm's absolute discretionary accruals measured by the Modified-Jones model (by the Kothari et al.'s (2005) model) in the past two years belong to the lowest quartile, and zero otherwise.
<i>ConnAQ4</i>	indicator variable equal to one if the connected firm does not meet or just beat last year earnings in the past two years, and zero otherwise.
<i>GovIndex</i>	indicator variable if the home firm's corporate governance index is equal to or greater than its median of our sample, and zero otherwise where the index is the sum of the followings: <i>I (the CEO does not hold the position of chairman)</i> , <i>I (the CEO/CFO is externally hired)</i> , <i>I (the home firm's board independence is equal to or greater than its median of our sample)</i> , <i>I (the home firm's co-opted directors is lower than its median of our sample)</i> , and <i>I (the home firm's audit committee includes at least one accounting expert)</i> where <i>I (.)</i> is the operator to return one if the condition of the argument is satisfied, and zero otherwise. For any of five dimensions, if <i>I (.)</i> yields one, it means that the firm has a strong corporate governance for the dimension.
<i>SameMSA</i>	indicator variable equal to one if the home firm's incoming auditor's office and the connected auditor's office are located in the same MSA, and zero otherwise.
<i>SameInd</i>	indicator variable equal to one if the home firm and its connected firm are in the same industry (i.e. two-digit SIC code), and zero otherwise.
<i>MatchConn</i>	indicator variable equal to one if the connected auditor is better matched with the home firm than with any of the other big 4 auditors, and zero otherwise.
<i>AlumniConn</i>	indicator variable equal to one if the home firm's CEO, CFO, or CAO formerly worked for the connected auditor, and zero otherwise.
<i>SpecConn</i>	indicator variable equal to one if the connected auditor has the largest market share of audit fees in the industry-year in the MSA that the given client belongs to, and zero otherwise.
<i>LogTA</i>	natural logarithm of total assets.
<i>BankruptcyScore</i>	bankruptcy score, calculated by $-4.336 + (-4.512 * \text{return on assets}) + (5.679 * \text{debt/assets}) + (0.004 * \text{current ratio})$ .
<i>LitIndustry</i>	indicator variable equal to one if the firm operates in a highly litigious industry defined as industries with SIC codes of 2833–2836, 3570–3577, 3600–3674, 5200–5961, 7370–7370, and zero otherwise.
<i>AudDismissal</i>	Indicator variable equal to one if the home firm dismisses its auditor, and zero otherwise (i.e. if the auditor resigns).
<b>Variables Included in Audit Quality Analyses</b>	
<i>Misstatement</i>	indicator variable equal to one if the earnings for the firm-year are overstated and subsequently restated downward, and zero otherwise.
<i> PMDA </i>	absolute value of performance-matched discretionary accruals by the Kothari et al.'s (2005) model.
<i> DA </i>	absolute value of discretionary accruals estimated by the modified-Jones model.

(Continued).

Variable:	Definition:
<i>MeetConsensus</i>	indicator variable equal to one if the firm's annual earnings meet or beat the latest analysts' consensus earnings forecasts by three cents per share or less, and zero otherwise.
<i>MeetLast</i>	indicator variable equal to one if the firm's annual earnings meet or beat its last year earnings by three percent of the market capitalization at the beginning of the year, and zero otherwise.
<i>Post</i>	indicator variable equal to one for the periods subsequent to auditor switch, and zero otherwise.
<i>Treat</i>	indicator variable equal to one if the firm switches to a <i>connected</i> auditor, and zero otherwise.
<i>Treat (Same Off.)</i>	indicator variable equal to one if the firm switches to a <i>connected</i> auditor through the same audit office, and zero otherwise.
<i>Treat (Diff. Off.)</i>	indicator variable equal to one if <i>Treat</i> is equal to one and <i>Treat (Same Off.)</i> is equal to zero, and zero otherwise.
<i>ROA</i>	return on assets, defined as net income divided by total assets.
<i>Market-to-Book Issue</i>	market value of equity divided by the book value of equity. indicator variable equal to one if the sum of the equity and debt issued during the most recent three years is greater than five percent of total assets, and zero otherwise.
<i>Leverage</i>	The sum of long term debt and debt in current liabilities divided by total assets.
<i>AltmanZ</i>	Probability of bankruptcy based on the Altman's Z score (Altman, 1983).
<i>FirmAge</i>	the number of years the firm has Compustat data.
<i>NonAuditFeeRatio</i>	non-audit service fees divided by total fees paid to the auditor.
<i>MsaLeader</i>	indicator variable equal to one if the firm's auditor is office-level industry specialist auditor following Reichelt and Wang (2010), and zero otherwise.
<i>NationalLeader</i>	indicator variable equal to one if the firm's auditor is the national-level industry specialist auditor following Reichelt and Wang (2010), and zero otherwise.
<i>Cimportance</i>	ratio of the client's audit fees to the audit office's total revenues from audit services.
<i>Big4</i>	indicator variable equal to one if the firm's auditor is one of Big 4 audit firms, and zero otherwise.
<i>AlumniAud</i>	indicator variable equal to one if the firm's CEO, CFO, or CAO formerly worked for the auditor, and zero otherwise.
<i>CEOisChair</i>	indicator variable equal to one if the CEO is the chairperson of the board, and zero otherwise.
<i>BDindep</i>	the proportion of independent directors on the board.
<i>ACexpertise</i>	indicator variable equal to one if audit committee includes at least one accounting expert, and zero otherwise. A director is defined as an accounting expert if he/she has work accounting experience as certified public accountants, CFO, controller, or vice president of finance, following Dhaliwal et al. (2015).
<i>Accr</i>	total accruals divided by total assets.
<i>StdCFO</i>	standard deviation of cash flows from operations scaled by lagged total assets from t-4 to t.
<i>StdSale</i>	standard deviation of sales scaled by lagged total assets from t-4 to t.