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The effect of ownership structure and board characteristics on auditor choice: Evidence from Egypt

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Abstract

In this study, we explore the influence of board characteristics and ownership structure on auditor choice decisions in less strictly legal environments, like Egypt. Using a large sample of 899 firm-year observations for the period of 2011 to 2019, we employed logistic and probit regressions. We find that larger boards, institutional ownership, and foreign ownership have a significant and positive association with appointing Big 4 auditors. In contrast, our findings indicate that CEO duality and family ownership are negatively related to Big 4 choice. Our results also show that powerful CEOs (duality) and independent directors are more likely to hire second-tier auditors instead of Big 4, whereas larger board and foreign owners are less likely to hire third-tier auditors. Our results remain robust even after taking audit committee characteristics and endogeneities issues into consideration. Taken together, our research, therefore, provides consistent evidence that different governance and institutional variables can effectively generate economic forces that can support diverging decisions regarding the auditor choice patterns to attenuate agency problems. Our results have important implications for regulators, policymakers, and auditors to understand the drivers of auditor choice and audit market structure.

Keywords: Corporate governance, Big 4, auditor choice, ownership structure, developing countries, agency problems.

JEL Classification M42

1. Introduction

The choice of the independent auditor is a critical part of a complex process intended to preserve financial reporting quality (Knechel et al., 2008; Gerged et al., 2020; Polychronidou et al., 2020). This process is based on agency theory and corporate governance systems. We contribute to the current literature by examining the influence of board characteristics and ownership structure on auditor choice decisions in less strictly legal environments¹, which have a unique governance and ownership structures that create divergent kinds of agency conflicts. El-Dyasty and Elamer (2020), Gerged et al. (2020) and Wang et al. (2008) point out that despite the importance of audit market globally and the significant amount of empirical literature on auditor choice, there has been paucity research on determinants of auditor choice in less strictly legal environments. This paper responds to these calls for research on auditor choice decisions in less strictly legal environments.

Agency theory describes the effects of the separation between ownership and management. Agency problems appear due to complicated firm structure, and murky transactions which may ease confiscation and earnings management (La Porta et al., 1999). Theoretically, managers must behave to maximize the interests of owners in return for compensation. However, due to conflict of interests, the corporate governance concept emerged to mitigate this issue (Cho and Wu, 2014). This concept refers to rules, processes, and laws by which a company is operated, regulated, and controlled. Legally, corporate governance is a term used to depict oversight accountability and balance of power between shareholders, management, and directors (Rezaee, 2007). Accordingly, hiring an independent auditor is an integral part of the corporate governance system. The auditor is serving as a monitoring instrument to constrain the opportunistic behaviour of executive management to mitigate agency problems (Wallace, 2004). Thus, the higher of auditor quality, the more transparent and faithful financial reporting.

Auditing failures and financial scandals, such as Enron, Arthur Anderson, Carillion, and Wirecard scandals raise many concerns regarding the reliability of financial reporting system. Consequently, reforms were inevitable. For instance, the US Congress enacted the Sarbanes-Oxley Act, and great endeavors have been made to reinforce corporate governance mechanisms (Cohen et al., 2004; Dey, 2005; Gerged et al., 2020). Accordingly, a significant strand of studies addressed

¹ We employ the conceptualisations of strong legal environment based on research conducted by Kaufmann et al. (2003), La Porta et al. (1997, 1999, 2006) and Leuz (2010), which measure investor protection, legal enforcement, and governance indicators.

the association between corporate governance mechanisms and auditor choice in both developed and developing countries (e.g. Abdel-Meguid et al., 2014; Alfraih, 2017; Cho et al., 2014; Niskanen et al., 2011; Quick et al., 2018; Wang, 2008; Srinidhi et al., 2014). These studies aimed to understand motivations for appointing audit firms based on internal corporate governance mechanisms and ownership structure. The main conclusion of such studies is that choosing the auditor is a complex decision and is subject to many conflicting factors. In this regard, both auditor size and specialist auditor were used as proxies of audit quality within auditor choice decision (e.g. Abbott and Parker, 2000; Beasley and Petroni, 2001; Cho and Wu, 2014; Darmadi, 2016; Velury et al., 2003; Yang et al., 2019). To our knowledge, none of the previous studies has examined the Egyptian market quantitatively, despite that the changes in corporate governance structure among Anglo-American, Continental European countries, Chinese and emerging countries need separate analyses. Also, there is a lacuna of research on the Egyptian market, albeit the Egyptian regulations and corporate governance systems, with highly concentrated ownership at the same time as lower investor protection, may yield different results. The peculiarity of the Egyptian context could likely affect auditor choice decisions as a monitoring instrument. However, thus far, few studies have explored auditor choice decisions issues in emerging markets, especially Egypt. For example, Abdel-Meguid et al. (2014) and Khelif and Samaha (2016) used qualitative information in terms of surveys and interviews to measure some mechanisms of corporate governance.

To this end, this study uses a sample of public companies in Egypt. This context is of interest because Financial Regulatory Authority (FRA) in Egypt issued several decisions in the past decade to enforce listed companies in the Egyptian Stock Exchange (EGX) to disclose information related board composition, ownership structure, and audit committee. To our knowledge, there is no prior study that examines the effect of this information on auditor choice decision. Another motivation is related to the specialty of the Egyptian context. Egypt is classified as a less strict law environment that has low auditing infrastructure (Khelif and Samaha, 2016). Subsequently, investor protection may not be the same compared to developed countries. Accordingly, investigating auditor choice decision is vital to evaluate the effectiveness of corporate governance mechanisms. Recent decisions of FRA and amendments to listing rules issued by EGX in June 2020 represents the intent of improving corporate governance mechanisms in Egypt. A result of research like the current study may be useful in helping regulatory bodies in Egypt to enhance corporate governance mechanisms. Currently, the new stream of corporate

governance and auditor choice research is concentrated in China and other developed nations. Hence, understand the situation in Egypt is necessary to improve corporate governance mechanisms to ensure investor protection and to enhance the stability of listed companies. Also, it remains to be fully evaluated whether the directly above modifications have led to an increased firm response in terms of auditor choice.

We employ a large sample of 899 firm-year observations for the period of 2011 to 2019 for listed companies in EGX. Auditor choice is measured by audit firm size. Specifically, we consider a change in classifying audit firms. The traditional classification of big audit firms versus non-big audit firms is not valid to describe the audit market in Egypt precisely. Also, previous research suggests that other audit firm categories may provide higher audit quality (El-Dyasty and Elamer, 2020; Kurniawati et al., 2019). For instance, El-Dyasty and Elamer (2020) suggest that Egyptian audit firms affiliated with foreign audit firms such as Tier 2 and tier 3 auditors are delivering higher audit quality. Thus, we classify audit firms to Big 4, Tier 2 auditors, Tier 3 auditors and local firms. Logistic and probit regressions have been employed. Our findings indicate that larger boards, institutional ownership and foreign ownership have a significant and positive association with appointing Big 4 auditors. In contrast, our findings indicate that CEO duality and family ownership are negatively related to Big 4 choice. Our results also show that powerful CEOs (duality) and independent directors are more likely to hire second-tier auditors instead of Big 4. In contrast, larger board and foreign owners are less likely to hire third-tier auditors.

This study contributes to extant auditing literature in several ways. First, it sheds light on how investor sophistication (i.e., ownership structure) influences firms' auditor choice in the Egyptian market. Auditor choice decision may signal information about firms' ownership types when there is a certain percentage of sophisticated investors such as institutional and foreign owners in the market. Thus, our study offers new evidence on the relationship between large shareholder incentives and auditor choice decisions in a weak legal environment. Second, our study shows the interrelationship between internal and external control. Specifically, our results suggest that good corporate governance mandates high audit quality. Our findings indicate that board size, duality and non-executives are vital incentives to demand larger auditors. Third, we use different types of auditors in a weak legal environment to explain the relationship between ownership structure, corporate governance and auditor choice. Our paper responds to recent calls

for research to explore how different forms of ownership affect audit choice (El-Dyasty and Elamer, 2020; Gerged et al., 2020; Wang et al., 2008) in less strictly legal environments. This study, thus, has significant implications for future experimental and archival studies, regulators, policymakers, and auditors to understand the drivers of auditor choice and audit market structure. Lastly, this study also advances our understanding of the effect that foreign ownership has on auditor choice. The results show that, at least in Egypt, foreign owners are likely to hire Big 4. Our findings also suggest that there is a negative association between foreign ownership and firms' propensity to appoint Tier 2 and Tier 3 auditors. This research can additionally help the EFSA in developing or recommending more comprehensive models of auditor choice to improve corporate governance. Altogether, we assert that these unique social, economic, and political issues represent plausible pressures on firms in Egypt and are pertinent for understanding how they would involve in auditor choice.

The rest of this study is organized as follows: Section 2 presents the Theoretical background of corporate governance and the Egyptian context. Section 3 provides a literature review and presents hypotheses development. Section 4 discusses the methodology and the sample. Empirical results and discussion are reported in section 5. Section 6 includes the summary and conclusion.

2. Theoretical background of corporate governance and the Egyptian context

2.1 Corporate Governance

Jensen and Meckling (1976) define agency relationship as a contract between one or more persons (called the principle(s) and another person (called the agent). Based on the contract, the agent must perform some services on behalf of the principal. Accordingly, the principal delegate some decision authority to the agent in return for compensation. The basic idea is to presume that this relationship will achieve the best interest of the party.

Since the principles may lack enough knowledge and have no time to run the company, they permit executive managers to make the necessary decisions to maximize their interests. On the other side, according to the contract, executive managers can maximize their interests through appropriate compensation. Yet, this ideal situation rarely occurs. Executive management could behave to build their empire to maximize its self-interest over the principles' interest (Morck et al., 1988). Therefore, a conflict of interests between shareholders and corporate managers is

representing what is called agency theory that is a major part of economic literature. Such a conflict arises because each party is trying to dominate the company. Shareholders are keen to have cash in return for their investments. Based on that, resources under managers' control could be reduced. In this case, managers may lose power. In contrast, since managers' compensation is based on their performance, they have incentives to enhance company growth beyond optimal size to increase their power. Such actions may involve risky behavior and fraudulent financial acts (Jensen, 1986).

The principal can mitigate agency conflicts by establishing the appropriate incentives for the agent and by incurring monitoring costs and bonding costs to limit the aberrant activities of the agent (Jensen and Meckling, 1976). Monitoring costs are expenditures paid by the principal to measure, observe, and control an agent's behavior. They may include the cost of audits, writing executive compensation contracts, and ultimately the cost of firing managers. These costs will affect managers' compensation. Thus, it will be beard by managers. On the other hand, bonding costs are costs incurred to establish mechanisms to reflect that managers act in the shareholder's best interest (McColgan, 2001). Thus, Bonding costs represent costs incurred to establish corporate governance mechanisms (Licht, 2003). Accordingly, corporate governance mechanisms had been developed and enforced to help in mitigating agency conflicts (Dey, 2005). Cohen et al. (2004) adopted a broad corporate governance structure of interrelationship between various actors and mechanisms. Each of these actors and mechanisms has a considerable effect on agency conflict and assuring financial reporting quality. Actors include courts and legal systems, financial analysts, legislators, regulators, stock exchange, and stockholders. Mechanisms include audit committee, a board of directors, management, external auditor, and internal auditors (Habbash et al., 2013; MohammadRezaei et al., 2020; Nilsson, 2018).

Prior research considered audit firms as one of the essential corporate governance mechanisms. Auditing is a powerful mechanism in reducing information risk arise from information asymmetry between principles (stockholders) and agents (management). Firms with higher agency costs are inclined to choose high-quality auditors to strengthen their corporate governance and accordingly mitigate potential agency costs (Matonti et al., 2016). In this respect, following DeAngelo (1981), Big auditors are most influential in alleviating agency costs (Alfraih, 2017; Beisland et al., 2015; Chou et al., 2014; Quick et al., 2018).

The ownership structure is another important mechanism of corporate governance that affect financial reporting quality. Many agency problems arise from the composition of the

ownership structure. These problems are not limited to contractual relations between owners and management. It is also my extended to the relation between controlling interests and non-controlling interests. The former is called Type I agency problems. In return, the latter is called Type II agency problems (Ho et al., 2013). These agency problems are affecting the process of auditor choice. Family firms and non-family firms may have different motivations to choose the level of audit quality (Khan et al., 2015). Managerial ownership plays a vital role in the corporate governance structure. Managerial ownership can produce incentives to resolve agency conflicts and reduce agency costs (Shan et al. 2019). Other types of ownership may also enhance corporate governance effectiveness and affect auditor choice. These include foreign ownership, institutional ownership, state-owned ownership, and blockholders ownership. Board characteristics are internal corporate governance mechanisms that directly affect financial reporting quality and contribute to alleviating agency costs (Elamer et al., 2020). Prior research investigates the effect of board characteristics within the corporate governance structure (Alfraih, 2017; Karaibrahimoglu, 2013; Karim et al., 2013; Lin and Liu, 2009; Niskanen, 2011). The existence of independent directors and the duality of the CEO and chairperson of the board of directors were the most important characteristics.

2.1 The Egyptian Context

Egyptian stock exchange (EGX) is one of the oldest stock exchanges all over the world. It had officially established in 1909 (<https://www.egx.com.eg/en/History.aspx>). As one of the free economic countries, EGX was one of the most active stock exchanges in the world and ranked as a fifth of the world (Fawzy, 2003; Mecagni and Sourial, 1999). After Egyptian revaluation in 1952 and moving toward socialism though nationalization laws in the 1960s, EGX deactivated. Earlier 1970s, steps had been considered to privatize the economy. Companies law 159/1981 provide a general description of some corporate governance structure. Later, in 1992, Law No. 95 of 1992 was issued on 22 June 1992, known as the Capital Market Law. This law is currently in force, with its Executive Regulations No. 135/1993 issued on 07/04/1993. In the following years, presidential decrees and laws were issued to regulate EGX.

The Financial Regulatory Authority (FRA) was established following Law no. 10 of 2009 and is responsible for supervising and regulating non-banking financial markets (<http://www.fra.gov.eg>). Thus, FRA is supervising EGX. Also, based on the presidential decree

No. 251/2011, FRA is currently administrating The Egyptian Institute of Directors (EIoD) which is responsible for setting corporate governance code in Egypt. The institute establishes in 2003 as the first institute focusing on corporate governance in the Arab region (<http://www.eiod.org>). Since its formation in 2003, EIod has produced guidelines for corporate governance based on international best practices and laws and regulations in Egypt (Afify, 2009) The first code of corporate governance issued by EIod was issued in 2005 (EIoD, 2016). At this time, EIod was operated under ministry on investment, and the code was reviewed by the International Finance Corporation (IFC) and also the World Bank (Samaha et al., 2012).

On the other hand, in 2002, Egypt started to set out rules intended to maintain the implementation of corporate governance practices. The Egyptian Stock Exchange (EGX) issued rules that require listed companies to obligate to guidelines related to company's board members, and audit committees (Nasr. and Ntim, 2018; Abdel-Meguid et al., 2014). EIod (2016) asserts that the Egyptian governance code intends to support and assist Egyptian companies in understanding and applying good governance to fulfil stakeholders' benefits and to achieve the wellbeing of the national economy. FRA is continually eager to improve the dissemination of information related to the board of directors and ownership structure to inform financial statement users about corporate governance structure within Egyptian companies. Decision 31/2011 declared to obligate Egyptian companies to disclose information concerning the board of directors and ownership structure quarterly. In addition, in 2014, listing rules require each company to release information related to the composition of the audit committee, board of directors, and ownership structure in the annual report of management.

Egypt faces a number of external pressures, as in several developing countries, to create a significant alteration in accounting and auditing regulations to liberalize trade in the economy and in particular the financial services. Thus, Egypt has taken substantial actions to bridge the gap between Egyptian Accounting Standards (EAS) and International Accounting Standards (IFRS). Egypt launched those reforms and regulations responding to the key issues highlighted by International Monetary Fund and World Trade Organization as a reversal from past policies, which had led to a backlog of large external and fiscal imbalances. Consequently, Egypt becomes a vibrant market led by the private sector and well incorporated in the international economy. In Egypt, direct investment by foreign investors increased from \$237 million in 2003 to more than \$6,798 million in 2018 (UNCTAD, 2019). Around the same time, the number of companies listed

on the Egyptian market decreased from 978 to 250, but their total market capitalization grew to reach 42,005 million US dollars. Egypt remains the largest FDI recipient in Africa in 2018 (UNCTAD, 2019). These facts suggest how successful has been the Egyptian government's attempts to create a more market-oriented economy and to foster Foreign Direct Investments (Yusuf, 2012).

Building on conceptualizations of strong legal environment used in research conducted by Kaufmann et al. (2003), La Porta et al. (1997, 1999, 2006) and Leuz (2010), which measure investor protection, legal enforcement, and governance indicators, we classified Egypt as a less strictly legal environment. In particular, Kaufmann et al. (2003), La Porta et al. (1997) and Leuz (2010) suggest that Egypt is a less strictly legal environment based on several proxies capturing the effectiveness of the legal enforcement systems. Egypt is characterized by low legal protection enforcement for investors and ownership concentration (Khlif and Samaha, 2016; Samaha et al., 2012). Towards this end, the weak and inefficient enforcement systems in Egypt fostered by a long history of economic instability and frequent government intervention (Nasr and Ntim, 2018; Samaha et al., 2012), have led firms to rely on external auditors to improve firms' capability to bring in outside finance and to take advantage of growth prospects. However, some literature suggests that less strictly legal environments could lead external auditors to give not much consideration to the audit quality (Semba and Kato, 2019). For instance, Bremer and Elias (2007) noticed that audit firms in Egypt have not once been exposed to any misconduct lawsuits.

3. Literature review and hypotheses development

3.1 Ownership structure

Based on agency theory, prior research empirically examines whether auditor choice decisions depend on ownership structure. In this respect, different types of ownership were tested in different countries. The main types are family ownership, managerial ownership, and state-owned and institutional ownership.

3.1.1 Family ownership and auditor choice

Family firms are companies in which founding families continue to hold positions in top management, sit on the board, or are blockholders (Ho and Kang, 2013). Compared to non-family, family firms may encounter a different type of agency problems. The existence of a founding family can mitigate type I agency problems arising from the separation of ownership and

management. The founding family is involved actively in the company's management and monitoring. In contrast, family firms can intensify type II of agency problems between large and small shareholders. Therefore, a controlling family may act to maximize their interests over the interests of other shareholders (Chen et al. 2007). Accordingly, one of the two possible scenarios could occur (Khan et al., 2015). In the case of lower type I agency problems, family firms will not be looking for higher audit quality. In contrast, within type II agency problems, the domination of a controlling family may demand higher audit quality because of incentives to engage in fraudulent activities that increase audit risk.

Prior studies use archival data to investigate the association between family firms, including blockholder ownership and auditor choice in a different environment. In this respect, Fan and Wong (2005) used data from eight countries from East Asia. They report that firms subject to agency problems in the form of blockholder ownership are more likely to appoint Big 5 auditors to provide high audit quality. Leung and Cheng (2014) provide a similar result based on data from Chinese listed firms. Yang et al. (2019) reported that a company whose controller has foreign residency rights is more likely to choose a Big 4 auditor than other companies. In contrast, Lin and Liu (2009) show that firms with larger controlling shareholders are less likely to hire a Top 10 (high-quality) auditor. Leung and Liu (2015) found that choosing Big auditors in terms of Big 4, and second-tier audit firms are associated with the level of blockholder ownership. The lower the level of blockholder ownership, the more chance to select low-quality auditor. In opposite, a higher level of blockholder ownership is associated with Big auditors. However, Xu et al. (2020) found that it is less likely for firms with share pledging controlling shareholders to employ Top 10 audit firms in Chinese listed-firms.

Extant literature also investigated the association between family firms and auditor choice in the Asian continent. Darmadi (2016) uses a sample of public firms listed on the Indonesia Stock Exchange. Results reveal that firms with higher ownership concentration are more likely to hire to mitigate agency problems. However, when the controlling shareholder is a family, the companies do not prefer appointing Big 4 auditors. Khan et al. (2015) use a sample of public limited companies listed on the DSE in Bangladesh. Results indicate that family-owned listed public limited firms in Bangladesh are less interested in appointing Big 4. However, family firms operating in export industries select better quality auditors. Hsu et al. (2018) provide empirical

evidence from Taiwan that has a market dominated by family firms and is characterized by weak shareholder protection. Results indicate that family firms are less likely to appoint a big auditor.

Some studies inspect the association between family forms and auditor choice in Europe and U.S. Niskanen et al. (2011) investigate the demand for audit quality in family firms within Finnish private firms. They conclude family firms are less likely to engage Big 4 auditors. The same results were reported by Ayadi et al. (2020) in the French context. Likewise, Ho and Kang (2013) examine auditor choice within family firms using data from Standard & Poor's S&P 1500 firms and find that family firms are less likely to hire top-tier auditors due to the less severe agency problems between owners and managers. Based on additional analysis, they conclude that the tendency of family firms to hire non-top-tier auditors is stronger when family owners actively monitor their firms. Also, Srinidhi et al. (2014) examine Type 2 agency problems within family firms within the US market. Findings show that strongly governed family firms are more likely to choose higher-quality auditors in the form of greater use of specialist auditors and higher audit efforts. In contrast, weakly governed family demand lower audit effort. Based on the previous discussion, H1 is formulated as follows.

H1: family ownership is significantly related to choosing audit firms in Egypt

3.1.2 Foreign ownership and auditor choice

Prior research investigates the association between foreign ownership and appointing Big 4 audit firms in emerging markets. He et al. (2014) use a sample of China's B-Share market. Before 2001, this market was restricted to the foreign investor. When the market opened to domestic investors, Chinese companies prefer to appoint Big 4 auditors than foreign investors. The authors conclude that the existence of foreign ownership is associated with hiring high-quality auditors. Likewise, Chou et al. (2014) find that an increase of foreign ownership is associated with appointing Big 4 audit firms based on data from 30 countries. Similarly, Kim et al. (2018) use observations from 40 non-US countries and find that firms with higher foreign institutional ownership are more likely to engage Big 4 auditors to reduce information asymmetry. Also, the authors conclude that foreign institutional investors chose higher audit quality when foreign institutional investors came from countries with stronger governance institutions, and when the investee companies are located in countries with higher information asymmetries. Also, Karim and Zijl (2013) report a positive association between Big 4 affiliated auditors and foreign ownership. ÖZCAN (2018) that the

likelihood that a Big 4 auditor is selected is increasing in foreign ownership in Turkey. Hence, H2 is formulated as follows:

H2: foreign ownership is significantly related to choosing audit firms in Egypt

3.1.3 Institutional ownership and auditor choice

A strand of studies examines the association between institutional ownership and auditor choice. Velury et al. (2003) indicate that firms having relatively greater levels of institutional ownership tend to engage high audit quality in the form of industry specialist audit firms. Kane and Velury (2004) report the results of an investigation of the relation between auditor firm size and the level of institutional ownership. Findings support that institutional ownership is positively associated with the audit firm size. Cho and Wu (2014) find a positive association between institutional ownership and appointing high-quality auditors in the form of auditor specialists in Taiwan. Finally, Karim and Ziji (2013) examine the association between ownership structure and auditor choice in Bangladesh. A positive relationship was found between choosing the Big 4 affiliated auditor and institutional ownership. Based on prior research, the following hypotheses are formulated:

H3: Institutional ownership is significantly related to choosing audit firms in Egypt

3.2 Board Characteristics

Prior research examines the association between the board of director's characteristics and auditor choice U.S. Beasley and Petroni (2001) find that the likelihood that a specialist Big 6 auditor is chosen increases with the percentage of outside directors on the board after controlling for auditee size, organizational structure (including ownership), leverage, financial condition, geographic dispersion, a business concentration index, and security issuances. Abdullah et al. (2008) indicate that board independence has a significant relationship with audit firm size. Liu et al. (2015) conclude that powerful CEOs are more likely to hire high-quality auditors (Big auditor) as a signal of superior financial reporting quality.

Previous studies in developing countries examine whether board characteristics affect auditor choice. Lin and Liu (2009) investigate the auditor's choice in china. The empirical results show that firms in which CEO and board chairman are the same person, are less likely to hire a Top 10 (high-quality) auditor. Karaibrahimoglu (2013) inspect the association between corporate governance and auditor choice in term of Big 4 and audit firm industry specialization in Turkey. He finds that firms with a low independent board of directors, large board size are more likely to

choose Big 4 audit firms. In addition, He also concludes that firms with large board sizes are more likely to choose industry specialist audit firms. Also, firms with independent board members, no-CEO duality demand more industry specialist auditors. Karim et al. (2013) examine the impact of corporate governance on auditor quality choice by IPO companies in Bangladeshi firms. They find that CEO-Chair duality is negatively associated with the choice of a higher quality firm.

Furthermore, Beisland et al. (2015) use a unique hand-collected sample of for-profit and nonprofit microfinance institutions from 70 developing countries to analyze the relationships between audit quality and governance mechanisms. The negative association is found between CEO and board Chair duality and hiring Big 4 auditors. Alfraih (2017) finds that board independence, diversity, and size are statistically significant and increase the likelihood that a listed company in Kuwait selects a high-quality in the form of Big 4 audit firms. Duality is inversely related to the likelihood of choosing a Big 4 audit firm. Nasrudin et al. (2017) investigate the determinants of the firm's auditor choice in Malaysia in respect of their corporate governance mechanisms. The results show that firms larger size of the board of directors, with a lower proportion of independent directors on the board, or in which CEO and board of directors chairman are not the same person are more likely to hire a high-quality auditor. ÖZCAN (2018) uses a sample of companies that operate in Turkey. The results indicate that the likelihood that a Big 4 auditor is selected is increasing in the percentage of outside board members. Finally, Soyemi (2020) concludes that independent board members are positively associated with appointing Big 4 auditors in Nigeria. Based on prior research, the following hypotheses are formulated:

H4: Board size is significantly related to choosing audit firms in Egypt

H5: Duality is significantly related to choosing audit firms in Egypt

H6: Board independence is significantly related to choosing audit firms in Egypt

4. Research design

4.1 Sample selection and data sources

A sample of unconsolidated financial statements for non-financial companies listed in EGX is used to test the research hypotheses. The sample covers the period between 2011 and 2019. The sample period starts in 2011 to benefit from regulatory decisions issued by FRA to enforce the listed company to disclose information related to corporate governance mechanisms.

Data were hand-collected from sampled firms' financial statements and the related official information concerning corporate governance mechanisms. This information disclosed on EGX website and is found in audit committee minutes; form to disseminate annual management report, and quarterly form of disclosing information relate to ownership structure and formation of the board of directors. Different sources were used to look for financial statements such as EGX website, companies' websites and financial website (i.e., Mubasher). Only official data in the form of PDF version were considered. The initial sample is 1515 firm-year observations. Furthermore, only information related to non-mandatory single audits were included in the sample. This yields 1090 firm-year observations of single audit only. Since Law 144/1988 require Egyptian companies fully owned by Egyptian state or at least 25% of its ownership structure owned by the Egyptian state are obligated to appoint a governmental audit firm [Accountability State Authority (ASA)], data related to these companies (201 firm-year observations) had been excluded from the sample. In addition, law 159/1981 permits Egyptian companies to appoint more than one auditor; data relate to joint audits were not included in the sample. These two kinds of audits represent only 28% of the Egyptian market and require special consideration in deciding on auditor choice and have been investigated in prior research (e.g. El-Dyasty, 2017). Hence, this study will focus on corporate governance mechanisms of auditor choice. Accordingly, the sample will include 889 company-year observations.

4.2. Measurement of variables and model specification

In our empirical investigation, we use three main kinds of variables. First, auditor choice is our dependent variable. Consistent with prior research, auditor size will be employed as a dependent (e.g. Leung et al., 2014; Leung and Liu, 2015; Darmadi, 2016; Kim et al., 2018, Yang et al. 2019). We will measure auditor size as a dichotomous variable represented by four proxies. First, we used Big 4 vs non-Big 4 affiliated auditors (*BIG*). Second, we also use tier-2 auditors vs non-tier-2 affiliated auditors (*Second*). Third, we also use tier-3 auditors vs non-tier-3 affiliated auditors (*Third*). Lastly, we use local auditors vs foreign-affiliated auditors (*Local*).

Following the literature of corporate governance, the main independent variables are types of ownership (i.e., institutional ownership, foreign ownership, and family ownership) and board characteristics (Board size, duality and non-executives) following extant literature (e.g. Karim et al., 2013; Hsu et al., 2018; Lin and Liu, 2009; Nasrudin et al., 2017; Özcan, 2018). Based on

previous studies, we will use companies' characteristics as control variables (e.g. Ho and Kang, 2013; Matonti et al., 2016, Shan et al., 2019). Specifically, the current study controls for possible omitted variables bias by incorporating a number of control variables that have been discovered to have an influence on auditor choice, namely financial stress score (*ZIM*), firm size (*FSIZE*), firm age (*LnAge*), inherent risk (*Inherent*), profitability (*Return*), current ratio (*CurrentRatio*), and firm loss (*Loss*). Table 1 defines all variables employed in this study.

4.3 Model specification

Following prior research, a logistic regression model will be employed to test research hypotheses (e.g. Ayadi et al.; 2020; Nasrudin et al., 2017; Quick et al., 2018; Soyemi, 2020). Hence, the following model will be used:

$$\begin{aligned} \text{AuditorChoice}_{it} = & \beta_0 + \beta_1 \text{BoardSize}_{it} + \beta_2 \text{Duality}_{it} + \beta_3 \text{Nonexec}_{it} + \beta_4 \text{FOwner}_{it} + \beta_5 \text{instit_own}_{it} + \\ & \beta_6 \text{family_own}_{it} + \beta_7 \text{Zim}_{it} + \beta_8 \text{FSIZE}_{it} + \beta_9 \text{LnAge}_{it} + \beta_{10} \text{Inherent}_{it} + \beta_{11} \text{Return}_{it} + \beta_{12} \text{CurrentRatio}_{it} \\ & + \beta_{13} \text{LossSign}_{it} + \varepsilon_{it} \end{aligned} \quad (1)$$

where,

AuditorChoice denotes audit firm size, *BoardSize* denotes board size, *Duality* refers to CEO duality, *Nonexec* denotes percentage of non-executive members of board of directors, *FOwner* denotes percentage of foreign ownership, *instit_own* denotes percentage of institutional ownership, *family_own* denotes percentage of family ownership, *Zim* denotes financial stress score, *LossSign* denotes firm loss, *Return* denotes return on assets, *FSIZE* denotes Size of a firm, *CurrentRatio* denotes current ratio, *LnAge* denotes Age of a firm, and *Inherent* denotes inherent risk.

Insert Table 1 about here

5. Empirical results and discussion

5.1 Descriptive statistics and bivariate analyses

Table 2 shows descriptive statistics for the variable. Noticeably Big 4 and local auditor have a mean value of 0.27 and 0.35, respectively. The affiliated auditors with Big 4 only control

27 per cent of non-mandatory audit market in Egypt. Also, board size average is 7, with 69 per cent of its members are non-executives. Lastly, foreign ownership ranges from 0 to 99 per cent, with a mean of 17 per cent.

Insert Table 2 about here

The correlation matrix is displayed in table 3. All board characteristics and ownership structure have a significant negative association with Big 4. For instance, CEO duality and family ownership have a significant negative association with Big 4. Where, board size, non-executive members of board of directors, foreign ownership, and institutional ownership have a significant positive association with Big 4. Finally, Fsize and LnAge as control variables have a positive and significant relationship with Big4. In contrast, the current ratio has a negative and significant association with Big 4. Also, board size, non-executive members of board of directors, and institutional ownership have a significant positive association with appointing a tier-2 auditor.

Insert Table 3 about here

5.2. Multivariate regression results and discussion

Table 4 reported the results of logistic regression. Model 1 of Table 4 shows the choice of Big 4 as a dependent variable. Model 1 of Table 4 is significant at 99%, and Pseudo R2 is 0.386. Model 1 of Table 4 suggests CEO duality and family ownership are significant and negatively affected choosing Big 4. In contrast, board size, institutional ownership and foreign ownership are significant and positively affect choosing Big 4. Where we failed to find any significant impact by non-executives. Accordingly, only H1, H2, H4, H5 and H6 are supported. Based on our results, larger boards, institutional ownership and foreign ownership are more likely to hire Big 4. These relationships could indicate that stronger corporate governance can improve hiring Big 4. These findings are consistent with the results of Cho and Wu (2014), Özcan (2018) and Karim and Zijl (2013).

Insert Table 4 about here

We then investigate the impact of ownership structure and corporate governance on the decision to choose Tier-2 auditors in Model 2 of Table 4. Prior research shows that Egyptian auditors affiliated with Big 4 do not provide higher audit quality (El-Dyasty and Alamer, 2020). Accordingly, logistic regression is employed to test research hypotheses in terms of Egyptian audit

firms affiliated with Tier 2 and Tier 3 auditors. Results are presented in Models 2 and 3 of Table 4.

Model 2 of Table 4 shows that the coefficients for board size, duality, and non-executives are both significant and positive in Model 2 (the coefficients are 0.150, 1.043, and 4.000, respectively). This implies that larger boards, powerful CEOs and independent board members are more likely to appoint tier 2 auditors. In contrast, we find that firms which have larger foreign ownership and family ownership (the coefficients are -3.267 and -1.757, while the Z-values are -3.52 and -1.66, respectively). Compare to Model 1, our results imply that larger and independent boards are in prefer to hire tier 2 auditors.

In line with our expectations, the results of Model 3 of Table 4 show that board size and foreign ownership are negative and statistically significant at the 1 per cent level on the propensity to choose a Tier 3 auditor. It implies that stronger corporate governance is less likely to hire tier 3 auditors. Lastly, Model 4 of Table 4 reveals that the coefficient for institutional ownership loads negatively at the 1% level, suggesting that these firms with more institutional ownership are less likely to hire local auditors. This result is line with our prediction that institutional owners are related to more demand for Big 4 auditors.

5.3. Additional analysis

To check the robustness of our main results, several sensitivity tests are employed. First, we extend our analysis of the effect of corporate governance mechanisms on auditor choice in the Egyptian context by checking the robustness of the logistic regression models. We repeat our examination using an alternative regression specification, i.e. Probit regression to check our results against any possible biases or inconsistencies in the logistic regression estimators. Table 5 presents the results. The results of Table 5 show inferences that are consistent with our main findings of Tabl 4.

Insert Table 5 about here

Lastly, the potential endogenous relations between ownership structure, corporate governance, and auditor choice are a concern in our analysis. Endogeneity issues may appear because of unobservable heterogeneity if some primary omitted variables are correlated with the dependent and independent variables or when there is a possible reverse causality between dependent and independents variables. To handle possible endogeneity issues that may be due to

omitted variables (Elamer et al., 2019a, b, 2020, 2021a, b), we include other control variables that may influence both dependent and independent variables. Consistent with the previous research on ownership structure, corporate governance, and auditor choice, we control for audit committee characteristics such as audit committee size, committee meeting and committee expertise (Bala et al., 2018; Drogalas et al., 2020; Felo and Solieri, 2009; Quick et al., 2018). The definitions of those variables are shown in Table 1. The results presented in Table 6 provide consistent evidence that ownership structure and corporate governance variables are consistent with our expectations. Regarding the additional control variables, we find a positive relationship between audit committee size and the propensity to appoint a Big 4 auditor. Remarkably, all audit committee variables are not significant, implying that the audit committee has an insignificant impact when appointing Egyptian audit firms.

Insert Table 6 about here

6. Summary and conclusion

Although the current research on ownership structure, corporate governance and auditor choice is somehow well developed, those relations are less established in weaker environments. It was argued that a good corporate structure requires appointing high-quality audit auditors to protect investors. In this study, we extend this strand of literature by exploring the influence of corporate governance mechanisms and ownership structure on auditor choice decisions in less strictly legal environments, like Egypt. Egypt adopts many regulations to enhance corporate governance. However, a less strictly legal environment and weak auditing infrastructure may lead to appointing low-quality auditors. Listed Egyptian companies have unique corporate governance characteristics. For example, CEO duality is common. In contrast, the audit committee may not play an active role in the oversight of financial activities. Moreover, listing rules set by EGX exempt small and medium companies from appointing an audit committee. Also, until 2020, expertise was not a requirement in forming the audit committee.

In this study, we are seeking to understand the effect of ownership structure and corporate governance on auditor choice in Egypt. Our research uses a large sample of 899 firm-year observations and spans 2011-2019. Our results suggest that larger boards, institutional ownership and foreign ownership have a significant and positive association with appointing Big 4 auditors. In contrast, our findings indicate that CEO duality and family ownership are negatively related to

Big 4 choice. Our results also show that powerful CEOs (duality) and independent directors are more likely to hire second-tier auditors instead of Big 4, whereas larger board and foreign owners are less likely to hire third-tier auditors. Our results remain robust even after taking audit committee characteristics and endogeneities issues into consideration. Taken together, our research, therefore, provides consistent evidence that different governance and institutional variables can effectively shape diverging decisions regarding the auditor choice patterns. Our results may generalize to other developing countries where the agency conflicts are more pronounced.

This study extends the current literature on the determinants of audit choice in several ways. To our knowledge, this study is one of the first papers to differentiate different auditor type categories. Apart from Big 4 vs Non-Big4 and to estimate the determent of appointing each category. Thus, our contribution is as follows. First, it sheds light on how investor sophistication (i.e., ownership structure) influences firms' auditor choice in the Egyptian market. Auditor choice decision may signal information about firms' ownership types when there is a certain percentage of sophisticated investors such as institutional and foreign owners in the market. Thus, our study offers new evidence on the relationship between large shareholder incentives and auditor choice decisions in a weak legal environment. Second, our study shows the interrelationship between internal and external control. Specifically, our results suggest that good corporate governance mandates high audit quality. Our findings indicate that board size, duality and non-executives are vital incentives to demand larger auditors. Third, we use different types of auditors in a weak legal environment to explain the relationship between ownership structure, corporate governance and auditor choice. Our paper responds to recent calls for research to explore how different forms of ownership affect audit choice (El-Dyasty and Elamer, 2020; Gerged et al., 2020; Wang et al., 2008) in less strictly legal environments, like Egypt. This study, thus, has significant implications for results have important implications for future experimental and archival studies, regulators, policymakers and auditors to understand the drivers of auditor choice and audit market structure. Lastly, this study also advances our understanding of the effect that foreign ownership has on auditor choice. The results show that, at least in Egypt, foreign owners are likely to hire Big 4. Our findings also suggest that there is a negative association between foreign ownership and firms' propensity to appoint Tier 2 and Tier 3 auditors.

Our results, thus, have important implications for regulators, policymakers and auditors to understand the drivers of auditor choice audit market structure. First, our results confirm the amending listing rules by EGX to require the existence of expertise in the audit committee that might provide a necessary step to enhance financial reporting quality. This requirement rectifies a longstanding error when forming an audit committee. Without expertise, the audit committee is only representing superficial compliance to listing rules without any effectiveness in fulfilling responsibilities required from audit committee members. Second, it is essential to reconsider exempting small and medium companies from appointing an audit committee. An audit committee formation is vital to enhance financial reporting quality. Third, it is observed that foreign ownership in the Egyptian is weak. One reason may be related to investment opportunities in Egypt. Another reason for that is that financial reporting in Egypt lacks transparency due to ineffectiveness corporate governance mechanisms. Egypt may need to consider reform in corporate governance alongside setting accounting and auditing standards.

Lastly, despite that our results are relevant and robust, our study is subject to several limitations. First, the sample is relatively limited due to data availability as we used 889 firm-year observations from Egypt. Future research may use a larger sample from different setting to examine our tested predictions. Second, future studies may consider expanding our findings by controlling for other factors that may affect auditor choice. These factors may include CEO characteristics, compensation, and audit committee structure. Third, our evidence regarding auditor choice is limited. We assumed that auditor type categories are homogenous. Thus, future research may offer new insights by conducting in-depth qualitative analysis of our questions. Finally, a single country setting is crucial because data collection and analysis are sensitive to the institutional context, but also has some clear caveat as it is difficult to generalize our results to other contexts. Future studies may respond to the calls for international evidence (Kleinman and Lin, 2017; Kleinman et al., 2019).

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Table 1: Variable definitions

Variable	Definition
Auditor choice	<ul style="list-style-type: none"> • BIG 4 is a dummy variable equal to 1 if a Big 4 audit firm exists, and 0 otherwise. • Second is a dummy variable equal to 1 if any of the Egyptian audit firms that affiliate with a foreign audit firm on second-tier exist, and 0 otherwise. • Third is a dummy variable equal to 1 if any of the Egyptian audit firms that affiliate with a foreign audit on third-tier exist, and 0 otherwise. • Local is a dummy variable equal to 1 if any of the local audit firms that exist, and 0 otherwise.
BoardSize	The number of board of directors members.
Duality	Dummy variable equals 1 when the <i>CEO</i> also holds the position of the chairman of the board of directors, 0 otherwise
Nonexec	Percentage of non-executive members of board of directors
FOwner	Percentage of foreign ownership
institue_own	Percentage of institutional ownership
family_own	Percentage of family ownership
CSize	Number of audit committee members
CMeetings	Number of audit committee meetings
CExpertise	Dummy variable equals 1 when at least one audit committee member has financial expertise, 0 otherwise
Fsize	Natural logarithm of total assets
Loss	Dummy variable equals 1 if earnings are negative, 0 otherwise
Return	Net income / total assets
ZIM	Financial stress score, calculated from Zmijewski's (1984) model
CurrentRatio	Percentage of current assets / current liabilities
LnAge	Natural logarithm of Company age
Inherent	Inherent risk measured by (Accounts receivables + Inventory) / Total Assets

Table 2: Descriptive Statistics

variable	N	Mean	Median	SD	min	max
Big	889.00	0.27	0.00	0.44	0.00	1.00
Second	889.00	0.05	0.00	0.20	0.00	1.00
Third	889.00	0.33	0.00	0.47	0.00	1.00
Local	889.00	0.35	0.00	0.48	0.00	1.00
BoardSize	873.00	7.07	7.00	2.71	1.00	17.00
Duality	873.00	0.60	1.00	0.49	0.00	1.00
Nonexec	873.00	0.69	0.75	0.21	0.00	1.00
institue_own	889.00	0.35	0.24	0.34	0.00	1.00
FOwner	889.00	0.17	0.00	0.27	0.00	0.99
family_own	889.00	0.18	0.09	0.25	0.00	3.00
Zim	889.00	0.12	0.01	0.24	0.00	1.00
FSIZE	889.00	19.37	19.22	1.89	13.23	24.47
LnAge	889.00	3.11	3.09	0.66	1.10	4.70
Inherent	889.00	0.43	0.40	0.27	0.00	2.14
Return	889.00	0.03	0.03	0.12	-1.24	0.94
CurrentRatio	889.00	5.94	1.56	18.85	0.02	310.43
LossSign	889.00	0.23	0.00	0.42	0.00	1.00

Table 3: Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(1) Big	1.00																
(2) Second	-0.13*	1.00															
(3) Third	-0.42*	-0.15*	1.00														
(4) Local	-0.44*	-0.16*	-0.52*	1.00													
(5) BoardSize	0.31*	0.18*	-0.11*	-0.26*	1.00												
(6) Duality	-0.29*	0.04	0.03	0.20*	-0.17*	1.00											
(7) Nonexec	0.17*	0.10*	-0.04	-0.17*	0.39*	-0.25*	1.00										
(8) institue_own	0.48*	0.10*	-0.05	-0.44*	0.34*	-0.32*	0.34*	1.00									
(9) FOwner	0.35*	-0.04	-0.13*	-0.21*	0.23*	-0.19*	0.20*	0.44*	1.00								
(10) family_own	-0.31*	-0.08*	0.05	0.26*	-0.27*	0.20*	-0.27*	-0.52*	-0.16*	1.00							
(11) Zim	0.04	-0.03	-0.02	-0.01	-0.09*	-0.02	0.02	0.05	-0.04	0.02	1.00						
(12) FSIZE	0.49*	0.14*	-0.04	-0.47*	0.51*	-0.28*	0.21*	0.50*	0.43*	-0.29*	0.07*	1.00					
(13) LnAge	0.25*	0.11*	-0.02	-0.25*	0.36*	-0.08*	0.19*	0.31*	0.20*	-0.37*	0.05	0.39*	1.00				
(14) Inherent	0.01	0.03	-0.07*	0.04	-0.06	0.02	-0.05	0.02	-0.18*	0.01	0.17*	-0.10*	-0.02	1.00			
(15) Return	0.01	0.03	0.05	-0.07*	0.07*	-0.02	-0.02	-0.02	0.05	0.01	-0.42*	0.08*	-0.05	0.06	1.00		
(16) CurrentRatio	-0.14*	-0.05	-0.03	0.18*	-0.09*	0.03	-0.01	-0.13*	-0.12*	0.04	-0.11*	-0.23*	-0.17*	0.00	0.00	1.00	
(17) LossSign	0.00	-0.05	0.02	0.01	-0.02	-0.01	0.04	0.09*	-0.01	-0.09*	0.28*	-0.03	0.04	-0.10*	-0.51*	0.04	1.00

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 4: Ordered Logistic Regression: The effect of ownership structure and corporate governance on auditor choice

Variables	(1) Big	(2) Second	(3) Third	(4) Local
BoardSize	0.075* (1.86)	0.150*** (2.84)	-0.116*** (-2.93)	0.042 (1.04)
Duality	-0.825*** (-4.02)	1.043* (2.20)	0.047 (0.28)	0.191 (1.01)
Nonexec	-0.656 (-1.04)	4.000** (2.55)	0.291 (0.71)	-0.249 (-0.54)
instit_own	1.782*** (4.13)	-0.071 (-0.13)	0.372 (1.14)	-2.383*** (-6.48)
FOwner	0.775** (2.22)	-3.267*** (-3.52)	-1.533*** (-4.55)	0.589 (1.36)
family_own	-1.524** (-2.16)	-1.757* (-1.66)	0.274 (0.74)	0.012 (0.03)
Zim	-0.829 (-1.45)	-1.754* (-1.79)	-0.003 (-0.01)	0.287 (0.74)
FSIZE	0.546*** (6.91)	0.466*** (2.96)	0.061 (1.09)	-0.498*** (-6.65)
LnAge	0.427* (1.92)	0.425 (1.34)	0.030 (0.22)	-0.063 (-0.41)
Inherent	1.550*** (3.67)	1.121 (1.37)	-0.875*** (-2.92)	0.227 (0.78)
Return	-1.310 (-1.28)	-0.610 (-0.43)	2.141** (2.55)	-1.103 (-1.35)
CurreRatio	-0.178** (-2.01)	-0.601* (-1.80)	-0.005 (-1.19)	0.011 (1.62)
LossSign	-0.086 (-0.33)	-1.115* (-1.86)	0.299 (1.43)	-0.038 (-0.16)
_cons	13.838*** (7.19)	17.131*** (3.56)	1.137 (1.06)	-9.434*** (-6.74)
N	873	873	873	873
Pseudo R ²	0.386***	0.257***	0.055***	0.267***
Wald chi2	212.95	78.45	59.80	201.01

Notes: This table reports ordered logistic regression coefficients and z-statistics in parentheses. * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$. Variables are defined as follows: Big 4 (BIG), tier-2 auditors (Second), tier-3 auditors (Third), local auditors (Local), board size (BoardSize), CEO duality (Duality), percentage of non-executive members of board of directors (Nonexec), percentage of foreign ownership (FOwner), percentage of institutional ownership (instit_own), percentage of family ownership (family_own), financial stress score (ZIM), firm size (FSIZE), firm age (LnAge), inherent risk (Inherent), profitability (ROA), current ratio (Current), inherent risk (Inherent), and firm loss (Loss). Table 1 fully defines all the variables used.

Table 5: Probit regression: The effect of ownership structure and corporate governance on auditor choice

	(1) Big	(2) Second	(3) Third	(4) Local
BoardSize	0.043 [*] (1.83)	0.072 ^{***} (2.86)	-0.070 ^{***} (-3.07)	0.030 (1.28)
Duality	-0.469 ^{***} (-4.00)	0.380 [*] (1.90)	0.031 (0.31)	0.143 (1.33)
Nonexecu	-0.484 (-1.39)	1.516 ^{**} (2.38)	0.175 (0.71)	-0.196 (-0.73)
instit_own	1.041 ^{***} (4.25)	-0.013 (-0.05)	0.241 (1.25)	-1.420 ^{***} (-6.76)
FOwner	0.478 ^{**} (2.36)	-1.534 ^{***} (-3.76)	-0.942 ^{***} (-4.71)	0.353 (1.47)
family_own	-0.879 ^{**} (-2.39)	-0.803 [*] (-1.73)	0.169 (0.76)	0.005 (0.02)
Zim	-0.437 (-1.42)	-1.033 ^{**} (-2.42)	0.003 (0.01)	0.155 (0.69)
FSIZE	0.311 ^{***} (6.96)	0.214 ^{***} (3.28)	0.035 (1.04)	-0.283 ^{***} (-6.87)
LnAge	0.236 ^{**} (1.98)	0.207 (1.43)	0.015 (0.18)	-0.047 (-0.53)
Inherent	0.883 ^{***} (3.79)	0.459 (1.29)	-0.532 ^{***} (-3.01)	0.136 (0.78)
Return	-0.753 (-1.30)	-0.327 (-0.46)	1.307 ^{***} (2.65)	-0.573 (-1.19)
CurreRatio	-0.091 ^{**} (-2.25)	-0.256 ^{**} (-2.16)	-0.003 (-1.26)	0.006 [*] (1.74)
LossSign	-0.076 (-0.51)	-0.416 [*] (-1.66)	0.185 (1.48)	-0.012 (-0.09)
_cons	-7.774 ^{***} (-7.40)	-7.784 ^{***} (-4.27)	-0.656 (-1.00)	5.383 ^{***} (6.87)
N	873	873	873	873
Pseudo R ²	0.386 ^{***}	0.246 ^{***}	0.055 ^{***}	0.266 ^{***}
Wald chi2	224.26	83.34	63.58	241.35

Notes: This table reports probit regression coefficients and z-statistics in parentheses. * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$. Variables are defined as follows: Big 4 (BIG), tier-2 auditors (Second), tier-3 auditors (Third), local auditors (Local), board size (BoardSize), CEO duality (Duality), percentage of non-executive members of board of directors (Nonexec), percentage of foreign ownership (FOwner), percentage of institutional ownership (instit_own), percentage of family ownership (family_own), financial stress score (ZIM), firm size (FSIZE), firm age (LnAge), inherent risk (Inherent), profitability (ROA), current ratio (Current), inherent risk (Inherent), and firm loss (Loss). Table 1 fully defines all the variables used.

Table 6: Endogeneity check: The effect of ownership structure and corporate governance on auditor choice

Variables	(1) Big	(2) Second	(3) Third	(4) Local	(5) Big	(6) Second	(7) Third	(8) Local
BoardSize	0.137*** (2.62)	0.027 (0.32)	-0.081* (-1.78)	-0.037 (-0.73)	0.079*** (2.65)	0.028 (0.71)	-0.051* (-1.89)	-0.018 (-0.62)
Duality	-0.804*** (-2.97)	2.371** (2.26)	-0.073 (-0.35)	0.263 (1.12)	-0.437*** (-2.88)	1.031*** (2.69)	-0.038 (-0.31)	0.190 (1.45)
Nonexecuti	-0.143 (-0.16)	7.582** (2.12)	-0.019 (-0.04)	0.140 (0.23)	-0.084 (-0.16)	3.221*** (2.63)	0.017 (0.06)	-0.005 (-0.01)
institu_own	0.914 (1.54)	1.420 (1.46)	0.830* (1.89)	-2.670*** (-5.68)	0.526 (1.57)	0.565 (1.28)	0.528** (2.01)	-1.591*** (-5.92)
FOwner	1.543*** (3.34)	-5.431*** (-2.73)	-1.763*** (-4.04)	-0.178 (-0.33)	0.879*** (3.33)	-2.499*** (-3.66)	-1.073*** (-4.22)	-0.034 (-0.12)
family_own	-2.802*** (-3.12)	0.583 (0.38)	0.726 (1.32)	-0.441 (-0.80)	-1.625*** (-3.39)	0.060 (0.09)	0.460 (1.41)	-0.276 (-0.86)
CSize	0.329* (1.65)	-0.480 (-1.53)	0.114 (1.23)	0.033 (0.29)	0.151 (1.39)	-0.236 (-1.58)	0.065 (1.16)	-0.006 (-0.10)
CMeetings	0.056 (0.77)	-0.081 (-0.57)	-0.103** (-1.97)	0.044 (0.93)	0.028 (0.70)	-0.082 (-1.04)	-0.060** (-2.04)	0.029 (1.05)
CExpertise	0.129 (0.44)	-0.187 (-0.30)	-0.148 (-0.66)	0.001 (0.00)	0.049 (0.31)	-0.185 (-0.69)	-0.117 (-0.87)	-0.012 (-0.09)
Zim	0.278 (0.37)	-0.964 (-0.91)	-0.971** (-2.07)	0.665 (1.34)	0.236 (0.58)	-0.729 (-1.40)	-0.570** (-2.12)	0.325 (1.16)
FSIZE	0.518*** (4.43)	1.112*** (3.02)	0.100 (1.39)	-0.502*** (-4.43)	0.293*** (4.68)	0.515*** (4.19)	0.057 (1.36)	-0.265*** (-4.69)
LnAge	0.220 (0.76)	1.718*** (4.21)	-0.029 (-0.17)	-0.031 (-0.15)	0.119 (0.75)	1.039*** (4.82)	-0.008 (-0.07)	-0.037 (-0.33)
Inherent	1.996*** (3.70)	-0.230 (-0.15)	-0.955*** (-2.77)	0.380 (1.10)	1.119*** (3.82)	0.206 (0.40)	-0.583*** (-2.81)	0.251 (1.20)
Return	-0.140 (-0.14)	-5.312 (-1.25)	1.379 (1.44)	-0.703 (-0.75)	-0.142 (-0.25)	-2.204 (-1.07)	0.814 (1.44)	-0.398 (-0.71)
CurntRatio	-0.418*** (-3.17)	-0.262 (-1.39)	-0.005 (-1.01)	0.007 (0.88)	-0.240*** (-3.37)	-0.139* (-1.66)	-0.003 (-1.13)	0.004 (1.00)
LossSign	-0.207 (-0.57)	-18.961*** (-6.86)	0.254 (1.04)	0.112 (0.39)	-0.153 (-0.76)	0.000 (.)	0.155 (1.04)	0.102 (0.60)
_cons	25.828*** (9.82)	50.410*** (4.52)	1.591 (1.05)	-9.302*** (-4.05)	-8.189*** (-5.58)	-17.820*** (-5.63)	-0.965 (-1.07)	4.998*** (4.31)
N	607	607	607	607	598	456	607	607
Pseudo R ²	0.452	0.409	0.064	0.301	0.446	0.359	0.064	0.299
Wald chi2	807.74		47.59	156.35	152.05	85.76	51.26	193.33

Notes: This table reports ordered logistic and probit regression coefficients and z-statistics in parentheses. * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$. Variables are defined as follows: Big 4 (BIG), tier-2 auditors (Second), tier-3 auditors (Third), local auditors (Local), board size (BoardSize), CEO duality (Duality), percentage of non-executive members of board of directors (Nonexec), percentage of foreign ownership (FOwner), percentage of institutional ownership (instit_own), percentage of family ownership (family_own), financial stress score (ZIM), firm size (FSIZE), firm age (LnAge), inherent risk (Inherent), profitability (ROA), current ratio (Current), inherent risk (Inherent), audit committee size (CSize), audit committee meetings (CMeetings), audit committee expertise (CExpertise) and firm loss (Loss). Table 1 fully defines all the variables used.