

Auditor Size, Audit Market Concentration, and Audit Quality: Chinese Evidence

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Abstract

This study examines whether auditor market concentration affects the positive association between auditor size and audit quality, as measured by the propensity to issue modified audit opinions and the magnitude of discretionary accruals. Individual auditors with deep clienteles possess superior experience and expertise, and they are less likely to economic dependence on a particular client. We posit that in a high competition (low concentration) market, large auditors are more likely to supply higher audit quality. Using data from Shanghai and Shenzhen Stock Exchanges for the period 2008-2020, we find evidence that the larger size of individual auditors is prone to issue modified audit reports, and clients exhibit less aggressive earnings management behavior as auditors operate in the highly competitive environment.

Keywords: Audit Size; Individual Auditors, Audit Quality, Audit Markets, Market Concentration

1. Introduction

In this study, we investigate whether the positive association between individual auditor size and audit quality is higher for auditors in a highly competition market. The most common and well researched indicator of audit quality is whether an audit firm is one of the Big N (DeFond and Francis 2005; Carcello 2005). Previous literature (see Francis, 2004) has been largely conducted the audit quality analysis at the audit firm or individual office level [1,2,3]. For example, Choi et al. (2009) and Francis and Yu (2009) [4] find that large city offices provide better quality audit services compared with smaller city offices of the same audit firm, indicating that audit quality is audit-office-specific rather than audit-firm-specific. The importance of individual auditors in determining audit quality has received increasing attention from policy-makers and academics in recent years. In a recent review paper, DeFond and Francis (2005) [1] indicate that the audit quality analysis be push from the audit firm or office level down to the individual auditor level. Gul et al. (2011) [5] provide evidence that the effects of individual auditors on the quality of audit reporting and clients' earnings quality are both statistically and economically significantly. These studies highlight the need for continued research on the effect of audit size on audit quality at the individual auditor level.

Market structure has played a significant role in the audit quality. Particularly, in the literature on audit market concentration, it has demonstrated trends in auditor concentration over time [6,7,8] and the effect of concentration on audit quality [9,10]. The empirical evidence concerning the relationship between audit market concentration and audit quality, however, has shown conflicting findings. While some studies has found that higher market concentration is associated with higher audit quality [11,9], part of research has verified that higher market concentration is related to lower audit quality [12,13,10]. The effect of market concentration on audit quality is therefore an important issue that remains unresolved.

High market concentration is the result of lack of competition [6]. Unlike United States or United Kingdom, Chinese audit market exhibits a high degree of competition, that is, the market is not dominated by Big N audit firms [14]. We argue that audit market structure has an impact on the association between the size of individual auditors and audit quality. On the one hand, DeAngelo (1981b) [15] suggests that auditors with a large number of clients are more likely to provide higher audit quality because an auditor's economic dependence on that client is trivial for large auditors, and large auditors possess greater total collateral and hence have more to lose in audit failure, compared with small auditors.

Hence, in a highly competitive audit market (i.e., less bargaining power resting with auditor), auditors with deep clienteles are less economically count on particular client and more likely to resist client pressure for aggressive financial reporting. In addition, as audit market is less concentrated (i.e., higher competitive), auditors are face with greater competitive threat from rivals, and thus auditors with more clients or engagement, and review hours may promote their knowledge, experience, ability, and expertise to detect misstatement. On the other hand, large auditor firms are prone to make huger capital investments in people (Beattie, et al., 2003) and have more cost pressure in comparison with small auditor firms. Hence, large auditors under a highly competitive market may have low-balling behavior to maintain or increase profit margins. Moreover, the increased risk for clients to replace auditors originating from a less audit market concentration may cause large auditors to accommodate the clients' need to keep a particular client. Although substantial audit research has been carried out to investigate the importance of the auditor size on audit quality, there is relatively little empirical evidence on how the audit market structure affects the relationship between the size of individual auditor level and audit quality.

Therefore, this study investigates whether the audit market concentration affects the positive association between individual auditor size and audit quality. Using a sample of all listed firms in the Shanghai and Shenzhen Stock Exchanges from 2008 to 2020 with available data, we find that larger auditors are more likely to give modified audit opinions and their clients adopt less aggressive earnings management behavior when the audit market is highly competitive (lowly concentration, as measured by the Herfindahl index). These results imply that in a highly competitive environment, large auditors (auditors with deep clienteles) are less economically count on particular client and more likely to resist client pressure to allow opportunistic reporting. Their more engagement or review hours also promote their auditor-specific attributes to provide better quality audit service.

Our study contributes to the literature on audit quality. Prior studies generally show that audit quality, as measured by earnings-returns coefficients (ERCs), discretionary accruals, going-concern opinions and propensity to meet or miss analysts' forecasts, is higher for firms audited by large audit firms (offices) [4,16]. Prior research also provides conflicting evidence on the effect on market structure on audit quality [9,13,10]. There have not been any studies that examine the interaction between the size of individual auditor level and market structure in determining audit quality. Our results show that audit market competition interacts with individual auditor size in affecting audit quality in terms of modified audit opinions and discretionary accruals.

The rest of the paper is structured as follows. Section 2 provides background information about the audit market in China, reviews prior literature, and develops testable hypothesis. Section 3 discusses our data and methodology. Section 4 presents empirical results, and Section 5 concludes the paper.

2. Background and Hypothesis Development

2.1 The Audit Market in China

The institution of Certified Public Accountants (CPAs) in China is relatively immature compared to developed Western economies. Over the last few decades, economic reform and taking on an open door policy which leads to a sharp increase in the demand for external auditing. The Chinese Institute of Certified Public Accountants (CICPA), constituted under the auspices of the National Ministry of Audi in 1992, is in charge of the management and regulation of CPAs. At the early 1990s, the government approved to a select set of accounting firms to audit public companies. Since the new CPA firms are short of capital, they are affiliated with existing institutions and thus three types of auditing firms came out, including government-affiliated and university-affiliated audit firms, and audit firms that are joint ventured with an international audit firm. The government-affiliated firms are the dominant group with a share well in excess of 75 % of the audit market in terms of number of clients [14]. The large proportion of government-affiliated firms may indicate that the government's desire to possess highly control of the economy [17,18]. Meanwhile, the government is also a major shareholder, either directly or indirectly, of most listed firms. The close tie between government and CPA firms leads to concerns with the virtue and reliability of the auditor's monitoring role in the governance process. Although the government of China has a regulatory framework in place for establishing a credible auditing profession, there are still considerable institutional characteristics that obstruct the supply of, and demand for, independent audits.

However, Chen et al. (2000) [19] indicate that the government of China has been adopted several steps to improve audit quality. First, the certified Public Accountants Act was promulgated in late 1993, which clearly makes the CPA liable to remunerate compensation to the principal and other stakeholders who may incur a loss due to the CPA's actions (No. 42). , Second, the Chinese Securities Regulatory Commission (CSRC) instituted in the mid-1990s enforces the so-called disaffiliated program to separate CPA firms from government agencies beginning in 1997. Hence, CPA firms are transformed into partnerships or limited liability companies. Lastly, the CSRC has made it mandatory for publicly traded firms to be audited by auditors specially designated to implement such services. To acquire such designation, individual CPAs have to pass additional professional examinations.

Additionally, unlike developed countries (e.g., U.S. and U.K.) where the majority of publicly listed firms are audited by the Big 4 audit firms, the Chinese audit market presents a fierce completion. Xia and Lin (2003) [20] report that the concentration ratio of top 4 (top 8) auditors is 30.32 % (44.70%) in 2001. Chen et al. (2007) [21] also find that the mean share of Big 5 (now the Big 4) auditors in statutory audit market accounts for 26% during the period 1995-2003. This low concentration may be attributable to imperfect institutional setting, poor governance structure, and poor audit and reporting [14,22,23]. Thus, the Chinese Institute of Certified Public Accountants (CICPA) issued the comments

on promoting accounting firms toward big and strong on May 26, 2007, and the General Office of the State Council (GOSC) promulgated the Notice of forwarding the several opinions of the CPA industry of China on October 13, 2009 in order to promote the audit service quality and accelerate the development of the CPA industry. However, according to the information on Chinese top 100 accounting firms issued by CICPA on April 30, 2010, the market share of Big 4 auditors is merely 43.93 % in terms of audit fees.

2.2 Auditor Size and Audit Quality

The quality of audit services is determined by the probability that an auditor will both discover and report breaches in the client's accounting system [24]. The former relates to the auditor's technical capability, whereas the latter depends on the auditor's independence from clients. Watts and Zimmerman (1981) [25] argue that larger audit firms are related to higher audit quality audit because they have a comparative advantage in monitoring individual auditor behavior. DeAngelo (1981b) [15] suggests that audit quality is directly associated with the size of audit firms but for a different reason. It is posited that audit firms earn client-specific quasi-rents because of technological advantages of incumbent auditors. Larger firms have greater number of clients and stand to lose more client-specific quasi-rents if a loss in reputation occurs. For this reason, large firms are prone to supply a higher level of audit quality in order to avoid a loss in reputation and therefore audit firm size can serve as a proxy for audit quality. Moreover, Francis and Wilson (1988) [26] indicate that international audit firms have well brand name reputations and are inclined to protect their reputation by providing high quality audit services to clients. Motivated by these arguments, empirical research has demonstrated that large international audit firms (i.e., Big 4, 5, 6, or 8) are of higher audit quality and are more conservative [27,28,29].

As large audits firms comprise many city-based practice offices, DeAngelo (1981b) [15] argue that the association between audit quality and audit firm size can be applied to the office level. The economic importance of a client may not be large relative to a Big audit firm, but it could be very important to one of the firm's offices [30]. In the case of office level studies, for example, Francis and Yu (2009) [4] provide evidence that office size of Big 4 auditors is positively associated audit quality because larger offices have greater in-house expertise and experience than smaller ones. Choi et al. (2010) [16] also report that large local offices are less likely to compromise audit quality with regard to a particular client (i.e., economic dependence), and hence provide higher quality audit service.

Further, DeFond and Francis (2005) [1] contend that the audit quality analysis can move from audit firm or office level to individual auditor level due to individual auditors may differ in dimensions of audit quality in terms of independence and competence. Recent studies that have attempted to explore the role of individual auditors in determining audit quality. For example, Chen et al. (2010) [23] show that client importance measured at

the individual auditor level, but not at the audit office or firm level, damages audit quality in China in terms of a lower probability of issuing a modified audit opinion (MAO). They interpret this as evidence that individual partners are more likely to compromise audit quality for economically importance clients when the institutions for investor protection are weak. In addition, Gul et al. (2011) [5] find that individual auditors have a positive impact on the quality of audit reporting. They also indicate that the individual auditor effects on audit quality can be partially explained by several auditors' characteristics such as personal educational background, Big 4 (5) audit firm experience, rank in the audit firm, and political background.

2.3 Concentration and Audit Quality

In the field of industrial organization economics literature, concentration traditionally viewed as an essential dimension of market structure because of its critical role in determining market power and business behavior and thus performance [31]. A higher level of concentration in the industry is the results of lack of competition (Danos and Eichenseher, 1986) [6] and represents a higher likelihood of the formation of a cartel which firms may tacitly coordinate production and pricing to enhance the joint and individual profits of its members by restricting output [32]. However, high concentration may also permit the achievement of efficiency gains arising from economies of scale due to increases in firm size [33,6]. Accordingly, concentration on the supply side has the potential to affect the volume, price, variety and quality of audit service.

The concentration concept has been applied to the audit market as well. Due to financial statements that are prepared by clients, the purpose of the auditor is to add credibility to the financial statements through limiting misstatement risk [34]. In the literature on audit market concentration, it has demonstrated trends in auditor concentration over time [6,7,8] or the effect of concentration on audit fees (e.g., Pearson and Trompeter, 1994; Iyer and Iyer, 1996) and audit quality [35,36,9]. In particular, the sparse empirical research on the relation between concentration and audit quality has ambiguous results.

As argued by Boone et al. (2012) [13], auditors with high market concentration are prone to reduce the need to please clients without fear of being replaced by a more compliant auditor ("opinion-shopping") as well as strengthen their professional values and traditional commitment to maintain independence. In addition, the reduced opportunity for clients to replace auditors could enable auditors to play the watchdog role more effectively by "pushing-back" harder, and thus better serve investors by limiting the bias in reported financial statements. Part of empirical evidence has shown that higher audit concentration is related to higher audit quality. For example, Hackenbrack et al. (2000) [11] find the evidence of higher audit quality in a regime with restrictions on bidding (low price competition), which indicates a negative association between competition and audit quality. Kallapur et al. (2010) also provide evidence that higher concentration

in metropolitan U.S. audit markets is related to higher accruals (audit) quality. On the other hand, policy makers have devoted more attentions to the risks posed by auditor concentration for audit quality (GAO; Government Accountability Office, 2003, 2008) [37,38]. The limited choice of clients stemming from market concentration could promote complacency among auditors, which contributes to self-satisfaction, less rigorous audit procedures, and a reflexive confidence in the clients, thereby leading to a more lenient and less skeptical approach to the audits [38]. Moreover, high market concentration may reduce the incentives of auditors to provide better audit quality due to the lack of competition and facilitate tacit collusion among auditors in conscious parallel behavior (Shepherd, 1997). Specially, Boone et al. (2012) [13] find evidence that Big 4 auditors allow their clients greater discretion to manipulate earnings to meet or beat analysts' forecast when the Big 4 have a more dominant market position (market share) in a city. In addition, using a cross-country sample, Francis et al. (2012) [10] show that in countries where there is a high degree of market concentration within the dominant Big 4 group (i.e., Big 4 audit market dominated by one or two Big firms), clients perform lower earnings (audit) quality.

2.4 Hypothesis

Auditor must compete in a competitive market (i.e., low audit concentration) because it is easier and less costly for the client to switch the auditor than it is for the auditor to switch lost business [39]. That is, auditors have incentive to concede audit quality as for retaining a particular client depends on the economic importance of the client relative to the auditor's client portfolio. In addition, large-size (Big 4) auditors are prone to make huge capital investments in people (Beattie, et al., 2003) and have more cost pressure than small-size auditors. An increase in competition reduces the profits that can be earned from a client so that large size of audit partners is more likely to pursue economies of scale to reduced costs and maintain or increase profit margins. Hence, highly competitive market may lead large size of audit partners to conduct cut-throat pricing with possibly detrimental audit quality [40]. Moreover, in audit markets with less concentration, the increased risk for clients to switch auditors may encourage a "negotiation" mentality and make large auditors more inclined towards accommodate the clients' need to manipulate finance statements. Besides, market competition may also cause large auditors to have "low-balling" behavior and encourage their clients to have "opinion-shopping" behavior (Beattie et al., 2003). From this perspective, it suggests that large size of audit partners is more likely to jeopardize their independence to keep a particular client when audit market is less concentrated.

However, less market concentration could strengthen the positive effect of the size of individual auditors on audit quality. DeAngelo (1981b) [15] suggests that auditors with a large number of clients are inclined to provide higher audit quality due to an auditor's economic dependence on that client is trivial for large auditors, and large auditors possess greater total collateral and hence have more to lose in audit failure, compared with small auditors. Hence, in a

highly competitive audit market (i.e., less bargaining power resting with auditor), auditors with deep clienteles are less economically count on particular client and more likely to resist client pressure for aggressive financial reporting. In addition, a highly competitive audit market may increase the incentives of auditors to conduct high-quality audits. Auditors with more engagement hours have greater opportunities to acquire experience and expertise with regarding to detect and report material problems in the financial statements of their clients, or request clients to correct the statements before issuance (Francis and Yu, 2009) [4]. As audit market is less concentration, auditors are face with greater competitive threat from rivals, and thus auditors with more clients or engagement or review hours may promote their knowledge, experience, ability, and expertise to detect misstatement. From this perspective, our discussion above suggests that large size of audit partners is less likely to compromise their independence for any one client and possess more auditor-specific attributes to provide high quality of audit service as audit market is less concentrated. Due to these conflicting arguments, we test the following hypothesis stated in the two competing alternative forms (H1a and H1b):

H1a: *ceteris paribus*, the positive association between audit quality and the size of individual audit partners will be stronger in less concentrated audit markets.

H1b: *ceteris paribus*, the positive association between audit quality and the size of individual audit partners will be weaker in less concentrated audit markets.

This hypothesis is tested using two proxies for audit quality: modified audit opinions and discretionary accruals.

3. Research Methodology

3.1 Sample

We begin with a sample of 21,175 non-financial A-share firm-year observations listed on the Shanghai and Shenzhen Stock Exchanges for the years 2008 to 2020. Our data are retrieved mainly from the Taiwan Economic Journal Database (TEJ), including audit opinions, the identities of audit firms and individual signing auditors, return and accounting data. The identity of audit office is hand collected from the firms' annual reports provided by CSRC. After deleting observations with missing values, our final sample includes 15,037 firm-years for modified audit opinion test and 14,703 firm-years for discretionary accruals test.

3.2 Measurement of Auditor Size

China's Independent Auditing Standard (CIAS) requires that audit opinions are signed by at least (and normally) two auditors (i.e., engagement and review auditors), so as to clarify who was responsible for the audits performed. Following prior research (e.g., Chen et al., 2010; Choi et al., 2010), we use clients' total assets and number of clients to capture auditor size. Thus, we measure the size of auditor level, ASIZE, in two ways: (1) the sum of natural log of total assets for audit clients by the signing auditors, denoted by ASIZE1, and (2) the sum of natural log of number of

audit clients by the signing auditors, denoted by ASIZE2.

3.3 Measurement of Auditor Market Concentration

Several studies have argued that audit markets are indeed local

[41,42]. We follow prior research (e.g., Eichenseher and Danos, 1981; Wootton et al., 1994; Bandyopadhyay and Kao, 2004) [43,44,45] and use a Herfindahl index to measure auditor market concentration, defined as follows:

$$HI = \sum_{k=1}^{K_i} \left(\frac{SQSALES_{ki}}{SQSALES_i} \right)^2 \quad (1)$$

where, K_i is the total number of local audit offices serving the i th audit market in China. The variable $SQSALES_{ki}$ ($SQSALES_i$) denotes the sum of square roots of clients' sales revenue of local office k (all local offices) in the i th market. Low values of HI imply low levels of auditor concentration and thus high levels of competition.

3.4 Research Design

3.4.1 Modified Audit Opinion

To test the association between auditor size, concentration, and modified audit opinion, we estimate the following logistic regression model (firm and year subscripts are omitted for brevity):

$$\begin{aligned} MAO = & \beta_0 + \beta_1 ASIZE + \beta_2 NEGHI + \beta_3 ASIZE * NEGHI + \beta_4 OFSIZE + \beta_5 OSPEC \\ & + \beta_6 ASPEC + \beta_7 BIG4 + \beta_8 SIZE + \beta_9 MB + \beta_{10} SG + \beta_{11} CA + \beta_{12} QUICK + \beta_{13} DEBT \\ & + \beta_{14} ALT + \beta_{15} LOSS + \beta_{16} ROA + \beta_{17} CFO + \beta_{18} DIV + \beta_{19} AGE + \beta_{20} LMAO \\ & + YrDum + IndDum + \varepsilon \end{aligned} \quad (2)$$

where

<i>MAO</i>	=	1 if the firm receives a modified audit opinion, and 0 otherwise;
<i>ASIZE</i>	=	auditor size metrics, <i>ASIZE1</i> and <i>ASIZE2</i> , as defined earlier;
<i>NEGHI</i>	=	negative value of Herfindahl index of the clients' sales by audit office: $(-1) * HI$, where <i>HI</i> is defined earlier; ⁹
<i>TENURE</i>	=	number of consecutive years that the auditor has audited the firm's financial statements;
<i>OSIZE</i>	=	natural log of the sum of the total assets for all clients of a local engagement office;
<i>OSPEC</i>	=	1 if the audit office has the greatest market share in terms of total assets audited in the industry, and 0 otherwise;
<i>ASPEC</i>	=	1 if the auditor has the greatest market share in terms of total assets audited in the industry, and 0 otherwise;
<i>BIG4</i>	=	1 if a firm employs a Big 4 auditor, and 0 otherwise;
<i>SIZE</i>	=	natural log of the book value of total assets;
<i>MB</i>	=	market-to-book ratio;
<i>SG</i>	=	percentage change in sales over the prior year;
<i>CA</i>	=	Ratio of current assets to total assets;
<i>QUICK</i>	=	Ratio of current assets less inventories, to current liabilities;
<i>DEBT</i>	=	ratio of total debts to total assets;
<i>ALT</i>	=	a score computed using Altman's (1983) [59] bankruptcy model, that is $ALT = 0.717 * (\text{working capital}/\text{total assets}) + 0.847 * (\text{retained earnings}/\text{total assets}) + 3.107 * (\text{earnings before interest and taxes}/\text{total assets}) + 0.42 * (\text{book value of equity}/\text{total liability}) + 0.998 * (\text{sales}/\text{total assets})$;
<i>LOSS</i>	=	1 if the firm's net income is negative, and 0 otherwise;
<i>ROA</i>	=	operating income divided by lagged total assets;
<i>CFO</i>	=	operating cash flow scaled by lagged total assets;
<i>DIV</i>	=	1 if the firm pays dividends, and 0 otherwise;
<i>AGE</i>	=	number of years since the listing date;
<i>LMAO</i>	=	1 if the firm receives a modified audit opinion in the previous year.

We control for various factors that could affect auditors' propensity to issue modified audit opinions in equation (2). Following prior research (e.g., Francis and Yu, 2009; Reichelt and Wang, 2010), we control for auditor tenure (*TENURE*) since it may affect auditor's propensity to issue modified audit report. We also include audit office size (*OFSIZE*) and auditor industry expertise (*OSPEC* and *ASPEC*) since auditors in large office and specialized auditors are more competent in their audit reporting decisions (Dopuch and Simunic, 1980, a,b; Gul et al., 2003) [47,48]. We include a dichotomous Big 4 audit firm variable (*BIG4*) as Big N audit firms are more conservative and provide a higher quality of audit service than other auditors (Francis and Krishnan, 1999) [28].

Additionally, prior research finds several firm characteristics to be associated with auditor reporting. We control for client size (*SIZE*) since auditor's financial dependence from a large client, larger firms are less likely to receive a modified opinion (Nelson et al., 2002) [49]; however, larger clients can also incur higher litigation risk to the auditor (Reynolds and Francis, 2000) [30]. In addition, firms with greater growth opportunities, proxied by higher market-to-book ratio (*MB*) and higher sales growth rate (*SG*), have greater propensity to avoid receiving modified opinions that may impede future fund raising and growth (Farinha and Viana, 2009) [50]. Prior research (Lai and Gul, 2008) [51] also finds that firms have more current assets (*CA*) and liquid resource (*QUICK*) are less likely to receive a modified audit opinion. We further control for leverage (*LEV*), Risk for bankruptcy (*ALT* and *LLOSS*), and profitability (*ROA*) because firms with poor financial situation or higher financial and operating risk have higher going-concern

problems. [50,23,52]. We control for operating cash flows (*CFO*) because high-cash firms are less likely to receive audit [14]. In addition, we follow Farinha and Viana (2009) [50] and include a dichotomous dividend payment variable (*DIV*) since the dividend-payment firms are associated with higher earnings quality and less likely to receive a modified audit opinion. Firm age (*AGE*) is also controlled since Chinese firms are more susceptible to financial distress after they have depleted the capital raised from their initial public offerings, and younger firms are less likely to receive modified opinions [14]. We also control for the effect of receiving a modified audit opinion in the prior year (*LMAO*) because there is a persistence in auditors' reporting decision (Lai and Gul, 2008). Lastly, we include year dummies (*YrDum*) and industry dummies (*IndDum*) to control for the fixed effects of fiscal year and industry.

3.4.2 Discretionary Accruals

As pointed by Myers et al. (2003) [53], accruals-based earnings quality is a broad measure of audit equality while modified audit opinions are associated with only a few extreme occurrences and thus unable to differentiate audit quality in a broad cross-section of firms. We compute discretionary accruals based on the augmented Jones model of Ball and Shivakumar (2006) [54], which suggest that accounting accruals incorporate economic loss in a timelier than economic gain and are a piecewise linear function of current-period operating cash flows. We define total accruals (*TA*) as net income from continuing operations minus operating cash flows. To obtain the discretionary accruals (*DA*) in a given year, we regress the following:

$$TA_{jt}/A_{jt-1} = \gamma_1 [1/A_{jt-1}] + \gamma_2 [\Delta REV_{jt}/A_{jt-1}] + \gamma_3 [PPE_{jt}/A_{jt-1}] + \gamma_4 [CFO_{jt}/A_{jt-1}] + \gamma_5 [DCFO_{jt}] + \gamma_6 [(CFO_{jt}/A_{jt-1}) \times DCFO_{jt}] + \varepsilon_{jt} \quad (2)$$

where, for firm *j* and in year *t* (or *t-1*), *TA* is the total accruals; *A* is the total assets; ΔREV is the change in net revenue; *PPE* is the gross property, plant and equipment; *CFO* is the operating cash flows; *DCFO* is a dummy variable equal to 1 if *CFO* is negative,

and 0 otherwise; and ε is the random residual term. Similar to previous studies, we estimate equation (2) for each industry and year with a minimum of 20 observations. *DA* are then estimated as:

$$DA_{jt} = [TA_{jt}/A_{jt-1}] - \hat{\gamma}_1 [1/A_{jt-1}] - \hat{\gamma}_2 [(\Delta REV_{jt} - \Delta REC_{jt})/A_{jt-1}] - \hat{\gamma}_3 [PPE_{jt}/A_{jt-1}] - \hat{\gamma}_4 [CFO_{jt}/A_{jt-1}] - \hat{\gamma}_5 [DCFO_{jt}] - \hat{\gamma}_6 [(CFO_{jt}/A_{jt-1}) \times DCFO_{jt}] \quad (3)$$

where $\hat{\beta}$ is the estimated parameters from equation (2) and ΔREC is the change in net receivables.

We run the following model to test the association between auditor size, concentration, and discretionary accruals (firm and year subscripts are omitted for brevity):

$$NEGADA = \omega_0 + \omega_1 ASIZE + \omega_2 NEGHI + \omega_3 ASIZE * NEGHI + \omega_4 TENURE + \omega_5 OFSIZE + \omega_6 OSPEC + \omega_7 ASPEC + \omega_8 BIG4 + \omega_9 SIZE + \omega_{10} RVOL + \omega_{11} MB + \omega_{12} SG + \omega_{13} DEBT + \omega_{14} ALT + \omega_{15} LOSS + \omega_{16} ROA + \omega_{17} CFO + \omega_{18} AGE + \omega_{19} LTA + \varepsilon \quad (4)$$

where

NEGADA = negative value of absolute discretionary accruals defined as $(-1)*|DA|$, where *DA* is estimated by the augmented Jones model of Ball and Shivakumar (2006), defined earlier;

RVOL = standard deviation of 12 monthly stock returns over the current fiscal year;

LTA = Last year's absolute accruals deflated by beginning total assets.

All other variables are as previously defined.

Equation (4) includes a set of various control variables that could affect the level of discretionary accruals. We control for auditor tenure (*TENURE*) since firms with short auditor-client relationship exhibit higher magnitude of discretionary accruals (Meyer et al., 2003). Prior research also finds that larger office size (*OSIZE*) is related to audit quality (e.g., Francis and Yu, 2009; Choi et al., 2010). In addition, we include two dummies for office and individual levels of industry audit specialists (*OSPEC* and *ASPEC*) because prior studies (e.g., Lim and Tan, 2008; Reichelt and Wang, 2010) [55] suggest that industry specialist auditors have clients with lower abnormal accruals. Previous studies (e.g., Becker et al., 1998; Francis et al., 1999) [27,28] find that Big N auditors are effective in constraining managers' abilities to manipulate reported earnings via discretionary accruals choices; hence, we include the dummy variable, *BIG4*.

We control for firm size (*SIZE*) since large firms tend to have more stable and predictable operations and thus report a lower level of accrual estimation errors and discretionary accruals than small firms [56]. In addition, firms with higher return volatility (*RVOL*)

and higher growth, proxied by higher market-to-book ratio (*MB*) and higher sales growth (*SG*), have greater incentive to manage earnings so as to meet market expectations [57,58]. Prior research (e.g., Becker et al., 1998) AS[27] also finds that firms with more debt (*DEBT*) have incentives to boost reported earnings due to debt covenant constraints. Furthermore, financially distressed (*ALT*) and loss-reporting (*LOSS*) firms have a negative association with accruals quality [59,16]. We include contemporaneous accounting performance (*ROA*) because previous research indicates that estimated discretionary accruals are positively associated with earnings performance [60,61]. Prior research also documents that operating cash flows (*CFO*) are negatively related to discretionary accruals [62]. Firm age (*AGE*) is added since accruals differ with changes in firm life cycle [53]. Finally, we follow Ashbaugh et al. (2003) and include last year's accruals (*LTA*) to control for variations in the reversal of accruals over time. Industry and year indicator variables are not added in Equation (4) since abnormal accruals are estimated by every year and industry.

4. Results and Analyses

4.1 Descriptive Statistics

Table 1 reports descriptive statistics on our main regression variables. About 6.8% of the sample observations receive modified audit opinions (*MAO*). The mean (median) absolute value for discretionary accruals (*ADA*) estimated based on Ball and Shivakumar (2006) is 0.044 (0.030). For two measures of the size of individual auditor (*ASIZE*), the mean values of *ASIZE1* and *ASIZE2* is 16.277 and 1.733, respectively. In addition, mean concentration (the Herfindahl index) is 0.105, suggesting that Chinese audit market is relatively less concentration.

Table 1: Summary Statistics

This table reports descriptive statistics of the variables used in the analysis. The variables are defined as follows: *MAO* equals 1 if the firm receives a modified opinion and 0 otherwise. *NEGADA* is the negative value of absolute discretionary accruals $(-1)*|DA|$, where *DA* is obtained by applying the augmented Jones model of Ball and Shivakumar (2006). *ASIZE1* is the sum of natural log of total assets for audit clients by the signing auditors. *ASIZE2* is the sum of natural log of number of audit clients by the signing auditors. *NEGHI* is the negative value of Herfindahl index of clients' sales revenue by auditor office. *TENURE* is the number of years that the auditor has audited the firm's financial statements. *OSIZE* is the natural log of the sum of the total assets for all clients of a local engagement office. *OSPEC* equals 1 if the audit office is the industry leader in terms of total assets audited in the industry, and 0 otherwise. *ASPEC* equals 1 if the auditor is the industry leader in terms of total assets audit in the industry, and 0 otherwise. *BIG4* equals 1 if the firm's auditor is one of the Big 4 audit firms, and 0 otherwise. *SIZE* is the natural log of the book value of total assets. *MB* is market to book ratio. *SG* is the sales growth ratio. *CA* is the ratio of current asset tot total assets. *QUICK* is the ratio of current assets minus inventories, to current liabilities. *DEBT* is the ratio of total debt to total asset. *ALT* is a score from Altman's (1983) bankruptcy model. *LOSS* equals 1 if a firm reports a loss, and 0 otherwise. *ROA* is return on assets. *CFO* is operating cash flows scaled by lagged total assets. *DIV* equals 1 if the firm pays dividends, and 0 otherwise. *AGE* is the number of years since listing date. *RVOL* is the standard deviation of 12 monthly stock returns for the current fiscal year. *LMAO* is last year's *MAO*. *LTA* is the absolute value of total accruals in the previous year.

Variables	n	Mean	Median	1st Quartile	3rd Quartile	Std. Dev.
<i>MAO</i>	15,037	0.068	0.000	0.000	0.000	0.252
<i>NEGADA</i>	14,703	-0.044	-0.030	-0.058	-0.013	0.045
<i>ASIZE1</i>	15,037	16.277	16.282	15.573	17.002	1.072
<i>ASIZE2</i>	15,037	1.733	1.792	1.386	2.197	0.621

<i>NEGHI</i>	15,037	-0.105	-0.081	-0.153	-0.042	0.077
<i>TENURE</i>	15,037	8.176	7.000	4.000	12.000	5.234
<i>OSIZE</i>	15,037	20.014	19.701	18.170	22.082	2.069
<i>OSPEC</i>	15,037	0.326	0.000	0.000	1.000	0.469
<i>ASPEC</i>	15,037	0.016	0.000	0.000	0.000	0.125
<i>BIG4</i>	15,037	0.080	0.000	0.000	0.000	0.272
<i>SIZE</i>	15,037	14.385	14.238	13.649	14.979	1.073
<i>MB</i>	15,037	4.356	3.240	1.980	5.230	3.856
<i>SG</i>	15,037	0.220	0.145	-0.011	0.337	0.501
<i>CA</i>	15,037	0.539	0.550	0.385	0.693	0.207
<i>QUICK</i>	15,037	1.381	0.905	0.590	1.442	1.650
<i>DEBT</i>	15,037	0.471	0.476	0.331	0.613	0.194
<i>ALT</i>	15,037	1.172	1.152	0.790	1.556	0.695
<i>LOSS</i>	15,037	0.112	0.000	0.000	0.000	0.316
<i>ROA</i>	15,037	0.046	0.042	0.013	0.079	0.077
<i>CFO</i>	15,037	0.055	0.049	0.000	0.107	0.101
<i>DIV</i>	15,037	0.519	1.000	0.000	1.000	0.500
<i>AGE</i>	15,037	6.448	6.000	3.000	10.000	4.391
<i>RVOL</i>	15,037	0.150	0.120	0.090	0.169	0.115
<i>LMAO</i>	15,037	0.061	0.000	0.000	0.000	0.238
<i>LTA</i>	15,037	0.078	0.057	0.026	0.105	0.075

4.2 Multivariate analyses

4.2.1 Modified opinion test

We report the results of the logistic regression in table 2. As shown in table 2, the coefficients on *ASIZE1* and *ASIZE2* are positive and significant at the 1% level. This suggests that audit services provided by large individual auditors are of more likely to issue modified audit reports. Also, the coefficient on *NEGHI* is positive and significant across all columns (consistent with Boone et al., 2012), suggesting that firms are more likely to receive modified opinion when the auditor market is less concentrated (i.e., more competitive). Results in columns (2) and (4) show that the coefficients on the interaction *ASIZE1*NEGHI* and *ASIZE2*NEGHI* both are positive and significant at the 1% level,

indicating that firms audited by the large size of individual auditors are more likely to receive modified audit opinions when audit market competition increase. This supports our hypothesis and suggests that large individual auditors provide higher audit quality when the audit market exhibits a high level of competition.

For the set of control variables, our results indicate that the larger offices size is associated with higher likelihood of issuing modified opinion. In addition, firms with smaller currents assets and liquid resource, and poor financial performance, operating cash flow, dividend payout, and higher leverage, bankruptcy risk, as well as older firms, are more likely to receive modified audit opinions.

Table 2: Modified Audit Opinion Model

This table reports the regression results of modified opinion on auditor size, market concentration, and control variables. See table 1 for the definition of the variables used in the regression. Year and industry fixed effects are included but not reported for brevity. z-statistics, based on robust standard errors with firm-level clustering, are given in parentheses. *, **, ***: denote significance at the 10%, 5%, and 1% levels (two-tailed), respectively.

Variables	Predicted sign	Dependent variable: <i>MAO</i>			
		Coefficient (z-statistic)	Coefficient (z-statistic)	Coefficient (z-statistic)	Coefficient (z-statistic)
		(1)	(2)	(3)	(4)
<i>Intercept</i>	?	-5.176*** (-4.61)	-5.176*** (-4.61)	-4.847*** (-4.61)	-4.847*** (-4.61)

<i>ASIZE1</i>	+	0.136*** (2.60)	0.140*** (2.68)		
<i>ASIZE2</i>	+			0.210*** (2.85)	0.210*** (2.85)
<i>NEGHI</i>	+ / -	0.033** (2.37)	0.030* (1.92)	0.030** (2.19)	0.030** (2.19)
<i>ASIZE1*NEGHI</i>	?		0.024*** (2.76)		
<i>ASIZE2*NEGHI</i>	?				0.060*** (2.70)
<i>TENURE</i>	+	0.001 (0.13)	0.001 (0.12)	0.005 (0.49)	0.006 (0.49)
<i>OSIZE</i>	+	0.077** (2.09)	0.076** (2.09)	0.079** (2.15)	0.079** (2.15)
<i>OSPEC</i>	+	-0.003 (-0.03)	-0.004 (-0.03)	-0.011 (-0.10)	-0.011 (-0.10)
<i>ASPEC</i>	+	0.425 (1.36)	0.420 (1.34)	0.451 (1.45)	0.451 (1.45)
<i>BIG4</i>	+	0.007 (0.03)	0.006 (0.03)	0.012 (0.06)	0.012 (0.06)
<i>SIZE</i>	?	-0.093 (-1.38)	-0.094 (-1.39)	-0.077 (-1.26)	-0.077 (-1.26)
<i>MB</i>	-	0.015 (1.18)	0.015 (1.17)	0.015 (1.24)	0.015 (1.24)
<i>SG</i>	-	-0.084 (-0.87)	-0.084 (-0.87)	-0.084 (-0.86)	-0.084 (-0.86)
<i>CA</i>	-	-0.672** (-2.28)	-0.672** (-2.28)	-0.670** (-2.28)	-0.671** (-2.28)
<i>QUICK</i>	-	-0.132*** (-3.49)	-0.132*** (-3.50)	-0.132*** (-3.48)	-0.132*** (-3.50)
<i>DEBT</i>	+	1.407*** (3.63)	1.403*** (3.63)	1.404*** (3.62)	1.406*** (3.63)
<i>ALT</i>	-	-0.515*** (-3.56)	-0.516*** (-3.57)	-0.513*** (-3.55)	-0.514*** (-3.55)
<i>LOSS</i>	+	0.623*** (3.87)	0.623*** (3.87)	0.620*** (3.85)	0.620*** (3.85)
<i>ROA</i>	-	-6.321*** (-5.35)	-6.319*** (-5.35)	-6.349*** (-5.37)	-6.348*** (-5.38)
<i>CFO</i>	-	-1.777*** (-3.20)	-1.778*** (-3.21)	-1.772*** (-3.20)	-1.772*** (-3.20)
<i>DIV</i>	-	-0.656*** (-5.18)	-0.656*** (-5.18)	-0.652*** (-5.15)	-0.652*** (-5.15)
<i>AGE</i>	+	0.020 (1.29)	0.020 (1.28)	0.020 (1.29)	0.020 (1.29)
<i>LMAO</i>	+	2.559*** (20.99)	2.559*** (20.99)	2.557*** (20.97)	2.557*** (20.97)
<i>YrDum</i>		Included	Included	Included	Included
<i>IndDum</i>		Included	Included	Included	Included

<i>Pseudo-R</i> ²		0.412	0.414	0.412	0.415
<i>n</i>		15,037	15,037	15,037	15,037

4.2.2 Accruals testAS

We report the regression results for the absolute discretionary accruals in table 3. The results show that the coefficients on *ASIZE1* and *ASIZE2* are positive and significant at the 1% or 5% level, and the coefficient on *NEGHI* is positive and slightly significant. This suggests that firms audited by large size of individual auditors and the higher level of audit market competition are associated with lower absolute levels of discretionary accruals. More importantly, the coefficients on the interaction *ASIZE1*NEGHI* and *ASIZE2*NEGHI* are positively significant at the 1% level, indicating that firms audit by large individual auditors have lower

magnitude of abnormal accruals as audit market competition increases. This results also support our hypothesis that individual auditor size is associated with higher audit quality when the auditors operate in a highly competitive market.

Looking at the control variables, we find that the firms with longer auditor tenure and audited by auditor industry specialist have lower abnormal accruals magnitude. In addition, firms with more growth opportunities, higher return volatility and bankruptcy risk, and losses are associated with higher abnormal accruals magnitude.

Table 3: Discretionary Accruals Model

This table reports the regression results of discretionary accruals on auditor size, market concentration, and control variables. See table 1 for the definition of the variables used in the regression. t-statistics, based on robust standard errors with firm-level clustering, are given in parentheses. *, **, ***: denote significance at the 10%, 5%, and 1% levels (two-tailed), respectively.

Variables	Predicted sign	Dependent variable: <i>NEGADA</i>			
		Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)
		(1)	(2)	(3)	(4)
<i>Intercept</i>	?	0.036*** (4.55)	0.036*** (4.52)	0.041*** (5.41)	0.041*** (5.42)
<i>ASIZE1</i>	+	0.002*** (3.30)	0.002*** (3.33)		
<i>ASIZE2</i>	+			0.001** (2.16)	0.001** (2.10)
<i>NEGHI</i>	+ / -	0.0002* (1.74)	0.0002* (1.68)	0.0002* (1.76)	0.0003* (1.89)
<i>ASIZE1*NEGHI</i>	?		0.0004*** (2.70)		
<i>ASIZE2*NEGHI</i>	?				0.0007*** (2.82)
<i>TENURE</i>	-	-0.000 (-1.56)	-0.000 (-1.56)	-0.000** (-2.09)	-0.000** (-2.09)
<i>OSIZE</i>	-	-0.001*** (-2.79)	-0.001*** (-2.79)	-0.001*** (-2.85)	-0.001*** (-2.82)
<i>OSPEC</i>	-	-0.002* (-1.93)	-0.002* (-1.93)	-0.002** (-2.03)	-0.002** (-2.02)
<i>ASPEC</i>	-	-0.004* (-1.71)	-0.004* (-1.72)	-0.005* (-1.84)	-0.005* (-1.85)
<i>BIG4</i>	-	-0.001 (-0.41)	-0.001 (-0.41)	-0.000 (-0.30)	-0.000 (-0.30)
<i>SIZE</i>	-	-0.003*** (-4.58)	-0.003*** (-4.59)	-0.002*** (-4.64)	-0.002*** (-4.64)

<i>RVOL</i>	+	0.008** (2.19)	0.008** (2.19)	0.008** (2.17)	0.008** (2.17)
<i>MB</i>	+	0.001*** (9.96)	0.001*** (9.98)	0.001*** (10.00)	0.001*** (10.02)
<i>SG</i>	+	0.002* (1.71)	0.002* (1.71)	0.002* (1.70)	0.002* (1.70)
<i>DEBT</i>	+	-0.002 (-0.59)	-0.002 (-0.59)	-0.002 (-0.62)	-0.002 (-0.62)
<i>ALT</i>	-	-0.004*** (-4.58)	-0.004*** (-4.57)	-0.004*** (-4.59)	-0.004*** (-4.59)
<i>LOSS</i>	+	0.077*** (34.42)	0.077*** (34.42)	0.077*** (34.46)	0.077*** (34.46)
<i>ROA</i>	+	0.145*** (8.66)	0.145*** (8.66)	0.145*** (8.65)	0.145*** (8.65)
<i>CFO</i>	-	0.002 (0.47)	0.002 (0.47)	0.002 (0.46)	0.002 (0.46)
<i>AGE</i>	?	-0.000 (-0.64)	-0.000 (-0.63)	-0.000 (-0.72)	-0.000 (-0.71)
<i>LTA</i>	?	0.040*** (7.98)	0.040*** (7.99)	0.040*** (7.98)	0.040*** (7.97)
<i>Adjusted-R²</i>		0.244	0.248	0.244	0.247
<i>n</i>		14,703	14,703	14,703	14,703

5. Conclusion

An important aspect of the development of the Chinese capital market is the role of auditing. Unlike the developed countries (e.g., United States and United Kingdom), the Chinese domestic audit market is deficient in Big N auditing firms as well as characterized by newly formed audit firms, and thus leading to the increased audit competition. We posit and provide evidence that the positive effect of individual auditor size on audit quality is conditional on audit market competition (concentration). We find that audit quality as measured by the increased propensity to issue modified audit opinion and lower discretionary accruals, is generally enhanced for the larger size of individual auditors operate in a competition environment. This higher audit quality provided by large size of individual auditors can be attributed to they are less likely to economically depend on the particular client and obtain more experience and expertise with the client through more audit effort [64-68].

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