Research Article

The Moderating Effects of Client Bargain Power on the Associations between Audit Market Concentration, Audit Fees, and Audit Quality: Evidence from Thailand

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ABSTRACT

Regulators and policymakers have concerned that high audit market concentration by the Big 4 audit firms raises audit fees and harms audit quality. We contribute evidence to validate these concerns. By analyzing data of 2,434 firm-year observations from 606 unique companies traded on the Stock Exchange of Thailand from 2016 till 2020, our evidence indicates that although audit market concentration by the Big 4 audit firms is relatively high, the concentration does not impact audit fees and audit quality. However, client bargain power might lead audited companies to have more bargain buy and success in negotiating audit fees. Auditors are thus price takers, not price setters. With the low audit fees, audit firms would have less motivation to have quality competition and insufficient resources put into audit processes. Low motivation and insufficient resources might harm audit quality in the long run. Regulators, policymakers and audit firms should be concerned with the impact of client bargain power on audit fees and further look for ways to make audited companies and all stakeholders place more value on audits.

Keywords: Audit Market Concentration, Client Bargain Power, Audit Fees, Audit Quality, Thailand

อิทธิพลกำกับของอำนาจการต่อรองของลูกค้าที่มีต่อความสัมพันธ์ของการกระจุกตัวของตลาดสอบบัญชี ค่าสอบบัญชี และคุณภาพการสอบบัญชี : หลักฐานจากประเทศไทย

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บทคัดย่อ

หน่วยงานกำกับดูแลและหน่วยงานกำหนดนโยบายมีความกังวลว่า การกระจุกตัวของตลาดสอบบัญชีของสำนักงานสอบบัญชีบิ๊กโฟร์ จะทำให้ค่าสอบบัญชีสูงขึ้นในขณะที่คุณภาพการสอบบัญชีลดลง ผู้วิจัยให้หลักฐานเพื่อพิสูจน์ข้อกังวลดังกล่าว จากการวิเคราะห์ข้อมูล 2,434 ค่าสังเกตรายปีของบริษัทจำนวน 606 บริษัทที่จดทะเบียนในตลาดหลักทรัพย์แห่งประเทศไทยช่วงปี พ.ศ. 2559 ถึง พ.ศ. 2563 หลักฐานของผู้วิจัยบ่งชี้ว่า แม้ว่าการกระจุกตัวของตลาดสอบบัญชีของสำนักงานสอบบัญชีบิ๊กโฟร์จะอยู่ในระดับสูง แต่การกระจุกตัวไม่ส่งผลกระทบต่อค่าสอบบัญชีและคุณภาพการสอบบัญชี แต่อย่างไรก็ดี อำนาจการต่อรองของลูกค้าอาจเป็นมูลเหตุให้บริษัทลูกค้าผู้สอบบัญชีมีอำนาจในการซื้อและประสบความสำเร็จในการต่อรองค่าสอบบัญชี ดังนั้นผู้สอบบัญชีจึงไม่ใช่ผู้ที่กำหนดราคาแต่เป็นผู้ยอมรับราคา ด้วยค่าสอบบัญชีที่ต่ำ สำนักงานสอบบัญชีอาจมีแรงจูงใจไม่มากนักในการแข่งขันกันด้วยคุณภาพและอาจมีทรัพยากรที่ไม่เพียงพอในกระบวนการการตรวจสอบ ซึ่งอาจส่งผลต่อคุณภาพการสอบบัญชีในระยะยาวในที่สุด หน่วยงานกำกับดูแล หน่วยงานกำหนดนโยบาย และสำนักงานสอบบัญชีควรกังวลถึงผลกระทบของอำนาจการต่อรองของลูกค้าที่มีต่อค่าสอบบัญชีและควรหาวิธีการที่จะทำให้บริษัทลูกค้าผู้สอบบัญชีและผู้มีส่วนได้เสียทุกภาคส่วนให้คุณค่ากับการสอบบัญชีมากขึ้น

คำสำคัญ: การกระจุกตัวของตลาดสอบบัญชี อำนาจการต่อรองของลูกค้า ค่าสอบบัญชี คุณภาพการสอบบัญชี ประเทศไทย

1. Introduction

Regulators and policymakers have raised their concerns about the impact of audit market concentration by the Big 4 audit firms on audit pricing, audit quality and market competition (Francis, Michas, & Seavey, 2013; Gunn, Kawada, & Michas, 2019). In the United States (US), the General Accounting Office (GAO) investigated audit market concentration after the passage of the Sarbanes-Oxley Act in 2002 (Gunn et al., 2019). However, the investigation concluded that audit market concentration did not affect audit fees. The increases in audit fees are explained by the new accounting and auditing standards requirements and the rise in staff costs. According to Francis et al. (2013), after the series of audit failures, the United Kingdom (UK)'s House of Lords investigated audit market concentration in the UK. It obtained a report that audit market concentration was suspected to be one of the significant causes of audit firms' poor performance during the financial crisis. The European Commission has also been concerned with the dominance of the Big 4 audit firms and proposed recommendations and reforms to reduce audit market concentration (e.g., audit firm rotation every six years, ban on non-audit service).

Academic studies have validated regulators' and policymakers' concerns but provided inconsistent findings. Cross-country evidence by Francis et al. (2013) and Gunn et al. (2019) indicates that audit market concentration by the Big 4 audit firms undermines audit quality. Gunn et al. (2019) also find that audit market concentration increases audit fees. For specific-country evidence, Huang, Chang, and Chiou (2016) provide evidence from China that audit market concentration increases audit fees and audit quality. For cross-city evidence, Boone, Khurana, and Raman (2012) and Eshleman and Lawson (2017) provide inconsistent evidence from the US. On the one hand, Boone et al. (2012) find that audit market concentration at the city level lowers audit quality as auditors are more tolerable to earnings management. On the other hand, Eshleman and Lawson (2017) find that audit market concentration at the city level increases audit fees and audit quality.

Our study investigates whether the associations between audit market concentration, audit fees and audit quality are moderated by client bargain power. It broadens evidence of audit market concentration among listed companies in the Stock Exchange of Thailand (SET) provided by Pratoomsuwan (2017) and Bungkilo and Chanaklang (2020). There are quite a few approved audit firms as auditors and audit firms of listed companies must be assessed and approved by the Thailand Securities and Exchange Commission (SEC). As of January 2022, 32 approved audit firms (SEC, 2022) provide audit services to 846 listed companies (SET, 2022). With a few approved audit firms, the audit market amongst listed companies is described as oligopolies and is dominant by the Big 4 audit firms (Pratoomsuwan, 2017). The Big 4 audit firms' market shares measured by the number of

clients is roughly 68% (Gunn et al., 2019). Pratoomsuwan (2017) finds that audit market concentration leads the Big 4 audit firms to have more market power, become price setters, and earn high audit fee premiums. Pratoomsuwan (2017) thus calls for regulators' awareness of the oligopolistic and uncompetitive audit market. Bungkilo and Chanaklang (2020) provide further evidence that a 1 per cent increase in the concentration ratio leads the audit firms to have bargain sales to increase 1.44 per cent increase in audit fees. Bungkilo and Chanaklang (2020) also find a positive relationship between audit market concentration and audit quality measured by the auditor's likelihood of issuing modified audit opinions. Bungkilo and Chanaklang (2020) call for regulators' awareness that the audit market concentration may reduce local audit firms' ability to compete in the audit market and develop their specific industry expertise.

Our study differs from Pratoomsuwan (2017) and Bungkilo and Chanaklang (2020). First, as we are concerned with the impact of client bargain power on audit fees and quality, we include client bargain power measured by relative size in our analyses. Pratoomsuwan (2017) and Bungkilo and Chanaklang (2020) observe only the client's absolute size impact. Second, as Bungkilo and Chanaklang (2020) suggested, we use other definitions and measures of audit market concentration. Bungkilo and Chanaklang (2020) use concentration ratio (CR) to measure audit market concentration, but we use Herfindahl-Hirschman Index (HHI) to do so. Moreover, Bungkilo and Chanaklang (2020) use audit fees to measure audit firms' audit activities. However, we use total clients' sales audited by an audit firm as an alternative measure. Third, to observe the impact of audit market concentration on audit fees, we use both the transformation of audit fees and the audit fees scaled by the squared root of total assets. Whist Bungkilo and Chanaklang (2020) use only audit fees. Fourth, we use a different measure of audit quality from Bungkilo and Chanaklang (2020). We use Kothari, Leone, and Wasley (2005)'s performance-adjusted abnormal accruals but Bungkilo and Chanaklang (2020) use the likelihood of auditors to issue modified audit opinions.

Our study provides interesting findings that audit market concentration does not impact audit fees and audit quality as regulators and policymakers' concerns. However, large clients with economic importance to audit firms seem to have more bargaining power to negotiate audit fees, and auditors are price takers, not price setters. Our inconsistent evidence with Pratoomsuwan (2017) and Bungkilo and Chanaklang (2020) should interest regulators, policymakers and audit firms. Client bargain power might lead to less quality competition amongst audit firms and low audit fees and might, in turn, harm audit quality in the long run.

The remainder of this paper is organized as follows. Section 2 provides a literature review and hypothesis development. Section 3 shows our method. Section 4 reports our results, whilst Section 5 gives our discussion and conclusion.

2. Literature Review and Hypothesis Development

2.1 Audit and its Demand and Supply

Porter, Simon, and Hatherly (2010, p. 3) define an audit as "a systematic process of objectively gathering and evaluating evidence relating to assertions about economic actions and events in which the individual or organization making the assertions has been engaged, to ascertain the degree of correspondence between those assertions and established criteria, and communicating the results to users of the reports in which the assertions are made."Audit supply is licensed and regulated, thereby being limited by nature. Audit supply is also controlled by audit firms that earn audit fees from clients. DeFond and Zhang (2014) suggest that audit fees add value to stakeholders. Therefore, demand for audit is motivated by the auditor's independence and competency. Similar to the demand of audits, supply for audit is also driven by two factors: clients' motivation to demand higher audit quality and client competency (DeFond & Zhang, 2014). As ethical concern increases from information asymmetry between management and external stakeholders (Jensen & Meckling, 1976), the need for independent monitoring from third parties is evident. Most studies in this stream of research use agency theory to explain the demand for audits. For example, DeFond and Zhang (2014) find that demand for audit is consistent with agency costs by increasing the demand for high audit quality.

2.2 Audit Market

The supply of audits is dominated by a few firms, particularly the large audit firms (Danos & Eichenseher, 1982). Prior literature on supply of audit mainly focuses on the motivation for independence (DeFond & Zhang, 2014). Supply of the audit market is competitive and characterized by price competition (Danos & Eichenseher, 1982). According to the differentiation of audit service, the audit market is related to the size of audit firms (DeAngelo, 1981). Generally, the type of audit firm can be classified by size into two main groups: the Big 4 audit firms and non-Big 4 audit firms. They have been characterized by client size as large and small client markets. In Thailand, the Big 4 audit firms consist of Ernst & Young, PricewaterhouseCoopers ABAS, KPMG Poomchai and Deloitte Touche Tohmatsu Jaiyos. Both groups' competition in the audit market is considered unequal. The big 4 audit firms have larger, more sophisticated and more complex clients than non-Big 4 audit firms. The Big 4 audit firms have higher competition for large clients than non-Big 4 audit firms. Therefore,

the audit market concentration of the Big 4 audit firms influences large clients. Dunn, Kohlbeck, and Mayhew (2019) find that the largest four clients in each audit market are more likely to share the same audit firms. Interestingly, the Big 4 audit firms have significantly higher audit fees than non-Big 4 audit firms (Francis, 1984). However, the audit market is country-specific by nature due to the regulation and licensing of auditors (Francis et al., 2013).

According to a few competitors and market share, the audit market can range from monopoly to perfect competition. If a few audit firms dominate the audit market, this audit market is stated as market concentration and oligopoly. And if the market is dominated by one audit firm, this market is referred to monopoly. Clients who chose the Big 4 audit firms focus not only on audit cost but also on audit quality, auditor competence, international reputation, etc. After Arthur Andersen had collapsed, audit market concentration has been widely concerned and called for a study, particularly in the US. (Gunn et al., 2019).

Audit market concentration might be harmful because no competition decreases the Big 4 audit firms' motivations to conduct high audit quality. Francis et al. (2013) examine the concentration of supply of audits in the US. According to Francis et al. (2013, p.328), "if two Big 4 (audit) firms dominate the overall Big 4 market share in a country, there is an even greater level of market concentration in that country compared to a country in which the Big 4 (audit firms) have equal market shares." Regulators are concerned that concentration may threaten the quality of audits because concentration may reduce competition. Thus, motivation to provide high audit quality may decrease. In this sense, audit market concentration may lead to low audit quality due to clients having fewer choices of audit firms and doing opinion shopping (DeFond & Zhang, 2014). Previous studies (e.g. Boone et al., 2012; Kallapur, Sankaraguruswamy, & Zang, 2010; Numan & Willekens, 2012) primarily interested in audit market concentration within the US. These studies examine variation in market structure and audit concentration. Numan and Willekens (2012) evaluate the impact of market structure on audit fees at the city level. They find that auditor–client industry alignment and industry market share distance to the closest competitor can enhance audit fees. Boone et al. (2012) investigate the impact of market structure on earning quality by examining an observation's restrictive sample focused on clients' likelihood of meeting or beating the consensus earnings forecast. These clients have missed the point in the lack of income-increasing flexible accruals. Their findings reveal that the Big 4 audit firms are more tolerant to their clients' earnings management when they have more market power in a city. In contrast, Kallapur et al. (2010) use abnormal accruals in their analysis and find that accruals in cities which more audit market concentration have smaller accruals. This research provides conflicting results which need further studies in other countries and a large setting.

Carson, Redmayne, and Liao (2014) analyze the Australian audit market. They indicate that there is a high market concentration. According to Carson et al. (2014), audit market concentration is measured by three main factors: market share (MS), concentration ratio (CR) and Herfindahl-Hirschman Index (HHI). HHI is the most commonly used to measure concentration in recent literature (Francis et al., 2013; Gunn et al., 2019; Huang et al., 2016). In Australia, the increased regulation leads to rising of market concentration and audit fees (Carson et al., 2014). We recognize literature on country-specific of Big 4 audit market concentration. This literature discusses that although Big 4 audit firms operate a global network, each country constitutes a different regulation and audit market.

Audit market concentration has increased over time (Danos & Eichenseher, 1982), audit fees, and audit quality may be affected. Consequently, there is concern about the impact of audit market concentration on audit fees and audit quality in the audit market literature. However, the previous study results are conflict based on country-specific levels. Given the conflicting results in the literature, the research focuses on contributing to previous literature by investigating the impact of audit market concentration on audit fees and audit quality within the audit firms in Thailand. Thailand is a low investor protection country (Leuz, Nanda, & Wysocki, 2003) with a strong secrecy (Hope, Kang, Thomas, & Yoo, 2008) and uncertainty avoidance culture (Kitiwong & Srijunpetch, 2019). Therefore, the demand for and supply of audits are different from other countries. Evidence from Thailand may then provide a unique context that may contribute to the existing literature.

2.3 Impact of Audit Market Concentration on Audit Fees

Although previous literature on audit market concentration has developed overtime (Danos & Eichenseher, 1982; Kallapur et al., 2010), particularly the impact of concentration on audit fees (e.g. Gunn et al., 2019; Huang et al., 2016; Numan & Willekens, 2012; Simunic, 1980), research on consequences of audit market concentration toward audit fees in the individual country is limited. The findings of the existing evidence are controversial. Concerning audit fees, early research focuses on the study of the US, which make a conclusion that the audit market is classified by price competition (Danos & Eichenseher, 1982). Consequentially, there are concerns that concentration will lead to lower competition. This means that a higher level of concentration leads to higher audit fees.

However, previous studies on market concentration and audit fees of the local audit market provide conflicting results. Given the contradictory empirical evidence in the literature, an oligopoly in the audit market predicts that audit fees can be set between monopoly and perfect competition pricing (Nicholson & Snyder, 2012). This means that market concentration does not always lead to higher audit fees. This explanation support Economy theory in terms of pricing decisions in an

oligopoly. The study of Numan and Willekens (2012) and Eshleman and Lawson (2017) find that clients of audit firms with higher concentration pay lower audit fees, especially for non-Big 4 audit firms' clients (Eshleman & Lawson, 2017). The study by Huang et al. (2016) argue that audit market concentration in China is associated with higher audit fees. However, market concentration impacts the fees of small audit firms and a minimal impact on large audit firms, which are provided by the study of Evans Jr and Schwartz (2014). Pratoomsuwan (2017) investigated the Big N fee premium in Thailand based on one-year cross-sectional data. Bungkilo and Chanaklang (2020) provide further evidence of three-year cross-sectional data which is consistent with Pratoomsuwan (2017) that audit market concentration increases audit fees. The findings demonstrate that the power of Big 4 audit firms leads to high audit fee premiums. Therefore, according to the existing evidence of the impact of audit market concentration on audit fees from Thailand, our first hypothesis is stated in the alternative form as:

H1: Audit market concentration has a positive effect on audit fees.

2.4 Impact of Audit Market Concentration on Audit Quality

The impact of audit market concentration on audit quality has different results. The inconsistent results on the relationship between market concentration and audit quality were provided by the current evidence. The conflicting in the results of previous studies has been explained by Economy theory and perception of quality theory. Based on Nicholson and Snyder (2012), Economy theory can be used to explain these conflicting result because the higher economy of scale increases the professional level of auditing and decreases audit cost and hence higher audit quality. Audit firms develop their specific industry expertise, thereby having high audit quality and capturing high market share (Gunn et al., 2019). However, dominant audit firms may lack of quality competition as a few competitors in the oligopoly audit market. Considering the demand side, a wide variation in the nations' cultures may lead to the difference in the perception of audit quality. One of the reasons for the conflicting in the results of previous studies has been explained by perception of quality theory (Zeithaml, 1988). According to Zeithaml (1988), perceived value is defined as "the consumer's overall assessment of the utility of a product or service based on perceptions of what is received and what is given." The perceived quality can be considered in creating audit service quality to the clients. Perceived quality refers to different clients' perceptions in relation to different cultures. Evidence of a conflicting impact of audit market concentration on audit quality is supported by perceived quality. Clients who perceive high audit quality, high auditor competence, and high international reputation may choose the Big 4 audit firms rather than non-Big 4 audit firms.

Some empirical evidence indicates that audit market concentration affects audit quality. For example, the study by Francis et al. (2013) presents that audit market concentration can impact audit quality in a cross-country setting. They find that audit market concentration within the Big 4 audit firms leads to diminishing audit quality. One reason why audit firms provide low audit quality is clients have the motivation to report profits rather than losses (Francis et al., 2013). Also, Gunn et al. (2019) provide the evidence of international level by the Big 4 audit firms across countries and they find that high audit market concentration under complex clients, international operations, and using IFRS provides low audit quality. However, studying the individual country provides mixed results. For example, Huang et al. (2016) provide a contrast result that high audit market concentration in China leads to high audit quality.

Recent studies among Thai listed companies, Bungkilo and Chanaklang (2020) point out that high audit market concentration leads to the high market power of the audit firms. They also found a positive relationship between audit market concentration and audit quality. Thus, from Bungkilo and Chanaklang (2020)'s evidence, our second hypothesis is stated in the alternative form as:

H2: Audit market concentration has a positive effect on proxies of poor audit quality.

2.5 Moderating Effect of Client Bargain Power

Previous evidence documented that client bargain power impacts audit fees. Owing to their importance to audit firms, clients with more bargain power might better negotiate audit fees (Casterella, Francis, Lewis, & Walker, 2004), thereby being able to lower audit fees (Bandyopadhyay & Kao, 2004; Carson & Fargher, 2007; Ettredge, Fuerherm, & Li, 2014). Client bargain power is bonded with client size. According to Casterella et al. (2004), by comparison to a large client, a small client is lesser important to an audit firm. Therefore, it has lesser bargain power to negotiate audit fees and becomes a price taker. On the other hand, a large client with greater importance to an audit firm has greater bargain power to negotiate audit fees and become a price negotiation. Similar to Gunn et al. (2019), we then consider the moderating effect of client bargain power on the association between audit market concentration and audit fees. Client bargain power is included in our analyses as the moderating variable and our third hypothesis is stated in the alternative form as:

H3: Strong client bargain negatively moderates the positive effect of audit market concentration on audit fees.

Client bargain power influences audit quality as audit quality reflects the results of the negotiations between auditors and clients during the audit process (Gibbins, Salterio, & Webb, 2001). A party

with more bargain power generally succeeds in the negotiation (Asthana & Boone, 2012). Owing to a stronger client bargain power, auditors may use more reciprocal strategies in their negotiations with clients (Asthana & Boone, 2012) and be even more tolerable to clients' earnings management (Sharma, Sharma, & Ananthanarayanan, 2011). Clients with a stronger bargain power thus succeed in negotiating their aggressive accounting choices (Carcello & Nagy, 2004; Nelson, Elliott, & Tarpley, 2002). Therefore, a stronger client bargain power is associated with a lower audit quality (Asthana & Boone, 2012; Barnes, 2004; Hatfield, Agoglia, & Sanchez, 2008). We follow Gunn et al. (2019) to observe the moderating effect of client bargain power on the association between audit market concentration and audit quality. Our fourth hypothesis is stated in the alternative form as:

H4: Strong client bargain power positively moderates the positive effect of audit market concentration on proxies of poor audit quality.

3. Research Methodology

3.1 Measures of Audit Market Concentration

For literature on audit market concentration, there are three measures of the market concentration, which include market share (MS), concentration ratio (CR) and Herfindahl-Hirschman Index (HHI) (Carson et al., 2014). Table 1 shows these three measures and their interpretations. The previous literature (e.g., Francis et al., 2013; Gunn et al., 2019; Huang et al., 2016) generally uses HHI. Nonetheless, they used different measures of an audit firm's audit activities. These various measures include audit fees, numbers of clients, client total sales and client total assets (e.g., Bigus & Zimmermann, 2008; Carson et al., 2014; Francis et al., 2013; Gunn et al., 2019). This indicates that none of these measures is superior to others.

Our measure of audit market concentration differs from that of Bungkilo and Chanaklang (2020)'s study in Thailand. First, Bungkilo and Chanaklang (2020) follow Pearson and Trompeter (1994) to use CR to measure audit market concentration. However, we follow the current mainstream literature on the audit market concentration (e.g., Francis et al., 2013; Gunn et al., 2019; Huang et al., 2016) to use HHI instead of CR. Second, Bungkilo and Chanaklang (2020) used audit fees to measure audit firms' audit activities. But by contrast, we follow Francis et al. (2013) and Cabán-García and Cammack (2011) to use total clients sales audited by an audit firm as an alternative measure. Third, Bungkilo and Chanaklang (2020) define audit market concentration as the dominance of the top-three largest audit firms in each industry in each year. We, however, determine audit market concentration as the dominance of the Big 4 audit firms like the literature field's mainstream (Francis et al., 2013; Gunn et al., 2019).

Table 1 Concentration Measures and Bigus and Zimmermann (2008)'s Interpretations

Measure		Formula	Concentration Interpretation		
			Low	Medium	High
MS_{ijt}	$\frac{\sum ACTIVITIES_{ijt}}{\sum_{i=1}^{n} ACTIVITIES_{ijt}}$	MS_{ijt} is market share of an audit firm i in industry j in year t, $\sum ACTIVITIES_{ijt}$ is the summation of audit activities performed by an audit firm i in industry j in year t, and $\sum_{i=1}^{n} ACTIVITIES_{ijt}$ is the summation of audit activities performed by audit firm i = 1,....., n in industry j in year t.	N/A	N/A	N/A
CR_{Njt}	$\frac{\sum_{I=1}^{N} ACTIVITIES_{ijt}}{\sum_{i=1}^{n} ACTIVITIES_{ijt}}$	CR_{Njt} is the summation of audit activities performed by the N-dominant audit firms in industry j in year t and $\sum_{I=1}^{N} ACTIVITIES_{ijt}$ is the summation of audit activities performed by the dominant audit firm I = 1,....., N in industry j in year t.	$CR_{3jt} < 0.10$ $0.35 \le CR_{4jt} < 0.50$ $0.45 \le CR_{8jt} < 0.70$	$0.10 \le CR_{3jt} < 0.25$ $0.50 \le CR_{4jt} < 0.65$ $0.70 \le CR_{8jt} < 0.85$	$CR_{3jt} \ge 0.25$ $CR_{4jt} \ge 0.65$ $CR_{8jt} \ge 0.85$
HHI_{Njt}	$\sum_{I=1}^{N} \left(\frac{\sum ACTIVITIES_{ijt}}{\sum_{i=1}^{n} ACTIVITIES_{ijt}} \right)$	HHI_{Njt} is Herfindahl-Hirschman Index of the N-dominant audit firms in industry j in year t.	$HHI_{Njt} < 0.10$	$0.1 \le HHI_{Njt} \ge 0.18$	$HHI_{Njt} > 0.18$

3.2 Measure of Client Bargain Power

By adapting Gunn et al. (2019) and Casterella et al. (2004), we use relative size ($LCLI$) to measure client bargain power. Casterella et al. (2004) indicate that relative size measures the importance of a client to auditors. It is used to consider the extent to which a client is large relative to all companies in a specific industry. We consider that a client is important to an auditor and has strong bargain power if it has a large portion of total assets in a specific industry. Following Gunn et al. (2019), $LCLI$ is coded as 1 if a client's total assets exceed the 25th percentile value for all clients clustered by industry and year, and 0 otherwise.

3.3 Measures of Audit Quality

Our measures of audit quality also differ from that of Bungkilo and Chanaklang (2020). Bungkilo and Chanaklang (2020) used the likelihood of auditors to issue modified audit opinions as a measure of audit quality and left room for future studies to use other efforts. Importantly, they also pointed to their study's limitation that the number of observations receiving modified audit opinions is relatively small. The number is approximately 4% of their samples. We follow Gunn et al. (2019) and Francis et al. (2013) to use three measures of audit quality: the absolute value of Kothari et al. (2005)'s performance-adjusted abnormal accruals ($ABSABACC$), income-increasing abnormal accruals ($ABSABACCPOSI$) and the probability of reported profit ($PROFIT$). The prediction of Kothari et al. (2005)'s performance-adjusted abnormal accruals is based on the industry-year cluster as follows:

$$TACC = \delta + \theta_1\left(\frac{1}{LA}\right) + \theta_2\left(\frac{\Delta SALE - \Delta AR}{LA}\right) + \theta_3\left(\frac{PPE}{LA}\right) + \theta_4(ROA) + e,$$

where $TACC$ = the total accruals, LA = the lagged total assets, $\Delta SALE$ = the change in sales, ΔAR = the change in accounts receivable, PPE = the gross property, plant, and equipment, and ROA = the return on assets ratio.

According to Gunn et al. (2019), the analysis of the absolute value of abnormal accruals is better than that of the signed value of abnormal accruals. When analyzing pool data of the signed value of abnormal accruals, the offset between the observations with the value of income-decreasing (negative) abnormal accruals and those with the value of income-increasing (positive) abnormal accruals leads the overall effect to close to zero. Therefore, it is difficult to capture the actual impact of abnormal accruals. On the other hand, the analysis of the absolute value of abnormal accruals better observes the extreme value of accruals, thereby better capturing the actual effect of abnormal accruals. We further analyze the group of samples with positive abnormal accruals as management, in general,

has more incentive to engage in income-increasing earnings management than income-decreasing earnings management if their bonus or compensation is tied with earnings per share (Graham, Harvey, & Rajgopal, 2005). The likelihood of reported profit is also used to measure audit quality. Francis et al. (2013) indicate that management is, by nature, incentivized to avoid reporting losses or to over-report profits; therefore, firms with reported profits have lower audit quality than firms with reported losses.

3.4 Empirical Model

Our empirical models are based on the previous studies (e.g., Eshleman & Lawson, 2017; Francis et al., 2013; Gunn et al., 2019). For testing on the impact of audit market concentration and client bargain power on audit fees, our empirical model is as follows:

$$\begin{aligned} LNFEE \text{ or } FEESCA = {} & \alpha + \beta_1 HCLISALE + \beta_2 LCLI + \beta_3 SIZE + \beta_4 ROE + \beta_5 LOSS + \beta_6 LEV \\ & + \beta_7 MB + \beta_8 SALEG + \beta_9 CASH + \beta_{10} ABSABACC + \beta_{11} NEWAUDF + \beta_{12} CA + \beta_{13} INVAR \\ & + \beta_{14} BIG4 + YFIXE + INDFE + MARFE + \varepsilon. \end{aligned}$$

For testing on the impact of audit market concentration and client bargain power on audit quality, our empirical model is as follows:

$$\begin{aligned} ABSABACC \text{ or } ABSABACCPOSI \text{ or } Pr(PROFIT) = {} & \alpha + \beta_1 HCLISALE + \beta_2 LCLI + \beta_3 SIZE \\ & + \beta_4 ROE + \beta_5 LOSS + \beta_6 LEV + \beta_7 MB + \beta_8 SALEG + \beta_9 CASH + \beta_{10} NEWAUDF + \beta_{11} CA \\ & + \beta_{12} INVAR + \beta_{13} BIG4 + YFIXE + INDFE + MARFE + \varepsilon. \end{aligned}$$

Similar to the previous literature on the audit fees (Evans Jr & Schwartz, 2014; Gunn et al., 2019; Huang et al., 2016), we use the transformation of audit fees (*LNFEE*) as our dependent variable. Following Gunn et al. (2019), we also use *FEESCA* as an alternative choice of measuring our dependent variable as we worry that the transformation of audit fees might confound our results. As mentioned earlier, *HCLISALE* is the Big 4 audit firms' market Herfindahl Index based on total clients' sales whilst *LCLI* is the measurement of client bargain power. *ABSABACC, ABSABACCPOSI* and *PROFIT* are our measures of audit quality.

Other control variables are derived from the previous studies. See Appendix A for all variable definitions[1]. Client's absolute size (*SIZE*) is measured clients' complexity and is the important predictor of audit fees (Ettredge et al., 2014). According to Simunic (1980), traditional audit focuses more on the statement of financial position. Asset valuation seems to be difficult to audit and is more associated with audit failure. *SIZE* is computed as the natural logarithm of total assets as similar to Evans Jr and Schwartz (2014), Averhals, Van Caneghem, and Willekens (2020) and Huang et al. (2016). The total current assets divided by total assets (*CA*), the total cash and cash equivalent divided by total assets (*CASH*), the summation of inventory and accounts receivable divided by total assets (*INVAR*), leverage (*LEV*) and profitability (*ROE* and *LOSS*) are controlled for client risks. The market value of equity divided by the total book value of shareholders' equity (*MB*) and the percentage of change in sales from the previous year (*SALEG*) are controlled for client growth. Audit firm changes (*NEWAUDF*) and types of audit firms (*BIG4*) are controlled for their impacts of and on audit fees and audit quality, respectively. Year fixed effects (*YFIXE*) and industry fixed effects (*INDFE*) are included in the models to capture the specific impacts of each industry and each year. As our sample includes listed companies from the SET and mai boards of the Stock Exchange of Thailand. The market fixed effect (*MARFE*) is used to capture the effect of the different market environments of these two boards.

3.5 Sample and Data Collection

Table 2 presents our sample selection. Our initial samples include 707 listed companies traded on the SET and mai boards of the Stock Exchange of Thailand from 2016 till 2020. After dropping observations with missing data and outliers, we have final samples of 606 companies with 2,434 firm-year observations. Data on audit fees were collected from the companies' annual reports. All financial data were collected from the companies' financial statements. The companies' annual reports and financial statements were derived from www.sec.or.th and the companies' websites. For data on the companies' market capitalizations, we collected them from Refinitiv Eikon Datastream.

[1] Similar to Gunn et al. (2019), we use the same control variables for audit fee and audit quality models. Gunn et al. (2019) note that this is to simultaneously test the impacts of audit fees, audit quality and audit market concentration. The test observes whether audit market concentration increases/decreases audit fees together with audit quality. Gunn et al. (2019) highlight that this simultaneous test would help readers easily compare the effect of audit market concentration on audit fees and audit market concentration on audit quality. As shown in Appendix A, all control variables are generally used in previous studies of audit fees and audit quality.

Table 2 Sample Selection

	Companies	Observations
List companies traded on the Stock Exchange of Thailand as of 31 January 2022	846	
Less: Companies under rehabilitation	(3)	
Financials and property fund & REITs	(136)	
Initial samples from 2016 till 2020	707	3,535
Less: Companies audited by the Office of the Auditor General of Thailand	(3)	(23)
Observations with missing data on audit fees and necessary variables/Observations with outliers	(98)	(1,078)
Final samples	606	2,434

Note: To deal with outliers, all continuous variables are winsorized at 1st and 99th percentiles.

4. Results

4.1 Descriptive Statistics

Table 3 shows audit market concentration by the Big 4 audit firms. The overall level of concentration is high. The HHI is, on average, 0.36. By comparison to other industries, industrials and resources have the greatest concentration (0.42) whilst consumer product has the least concentration (0.20). The concentration among industrials lessened but that of resources rose.

Table 3 Audit Market Concentration Based on Total Clients' Sales by Industry and Year

Industry	HHI					
	2016	2017	2018	2019	2020	Overall
Agro & Food Industry	0.39	0.37	0.38	0.37	0.41	0.38
Consumer Product	0.21	0.19	0.18	0.21	0.20	0.20
Industrials	0.48	0.50	0.54	0.27	0.30	0.42
Property & Construction	0.32	0.32	0.33	0.31	0.31	0.32
Resources	0.46	0.33	0.33	0.52	0.46	0.42
Services	0.45	0.35	0.34	0.35	0.41	0.38
Technology	0.32	0.33	0.32	0.32	0.35	0.33
Overall	0.40	0.36	0.37	0.33	0.35	0.36

Table 4 reports descriptive statistics of small clients versus large clients. Following Gunn et al. (2019), we clustered our samples into two groups: small companies and large companies. Large clients are companies with total assets greater than the 25th percentile value for all companies clustered by industry and year. Small clients pay audit fees of approximately 1.829 million Thai Baht or 0.2% of the squared root of total assets, whilst large clients pay audit fees of roughly 5.501 million Thai Baht or 0.1% of the squared root of total assets. The audit fees scaled by the squared root of total assets of large clients are lesser than those of small clients. In comparison to small clients, large clients are more likely to report profits but report lesser abnormal accruals. Audit market concentration by the Big 4 audit firms among small clients and large clients are high and not different.

Table 4 Descriptive Statistics of Small Clients Versus Large Clients

Variable	Small Clients LCLI = 0 (n = 621)		Large Clients LCLI = 1 (n = 1,813)		Pairwise Difference in Mean
	Mean	Std. dev.	Mean	Std. dev.	
LNFEE	0.456	0.504	1.170	0.863	–0.714***
FEESCA	0.002	0.002	0.001	0.001	0.002***
FEE	1.829	1.263	5.501	12.221	–3.671***
PROFIT	0.671	0.470	0.825	0.380	–0.154***
HCLISALE	0.361	0.087	0.362	0.087	–0.001
SIZE	6.789	0.571	9.001	1.371	–2.212***
ROE	0.010	0.172	0.064	0.136	–0.054***
LOSS	0.671	0.470	0.825	0.380	–0.153***
LEV	0.335	0.185	0.462	0.209	–0.127***
MB	1.855	1.448	1.841	1.613	0.014
SALEG	0.013	0.242	0.027	0.232	–0.014
CASH	0.109	0.118	0.070	0.075	0.040***
ABSABACC	0.060	0.053	0.051	0.048	0.009**
NEWAUDF	0.320	0.467	0.270	0.444	0.051***
CA	0.521	0.221	0.435	0.225	0.086***
INVAR	0.277	0.187	0.261	0.210	0.016***
BIG4	0.395	0.489	0.677	0.468	–0.282***
MARFE	0.451	0.498	0.902	0.298	–0.451***

*** and ** denote significant levels at 0.01 and 0.05 for a two-tailed test, respectively. See Appendix A for all variable definitions.

4.2 Correlations

Table 5 presents the Pearson correlation matrix for all variables used in our empirical models. The largest correlations are between *LOSS* and *ROE* (coef. = 0.698) and between *CA* and *INVAR* (coef. = 0.720) but their VIF values are lesser than the threshold of 10.0. This indicates that multicollinearity is not of our empirical models' concern. VIF values (untabulated results) of *LCLI* and *SIZE* are 2.01 and 2.82, respectively. Therefore, they represent different measures as we expected. *LCLI* measures client relative size which represents client bargain power. On the other hand, *SIZE* measures the client's absolute size which represents the client's complexity.

4.3 Model Estimation

Table 6 shows our regression results of the test on audit market concentration, client size and audit fees. R^2s for our *LNFEE* and *FEESCA* models are 0.568 and 0.471, respectively, whilst those of Gunn et al. (2019) are 0.748 and 0.389, respectively. This indicates that our models' performances are moderately well as compared to those of Gunn et al. (2019). The coefficients of *HCLISALE* are insignificant for both models. The null form of hypothesis H1 that audit market concentration has none of the effects on audit fees is then accepted. The coefficient of *LCLI* is negative and significant at P-value < 0.001 for *FEESCA* model. However, the coefficient of *LCLI* is insignificant for *LNFEE* model. This is evidence that large clients with high bargain power pay lowers than small clients when comparing audit fees scaled by the squared root of total assets. The coefficients of *HCLISALE*LCLI* are insignificant for both models. The null form of hypothesis H3 that strong client bargain power does not moderate the positive effect of audit market concentration on audit fees is then accepted. This indicates that *LCLI* negatively impacts audit fees and *HCLISALE* does not moderate the impact. The coefficients of *SIZE*, which is controlled for client absolute size, are significant for both models but with different signs. For *LNFEE* model, the coefficient is positive but for *FEESCA* model the coefficient is negative. This indicates that in general audit fees paid by large clients are higher than those paid by small clients. On the other hand, when considering audit fees together with audit works measured by client total assets, audit fees paid by large clients are lower than those paid by small clients. This might be evidence that audit firms undercharge their larger clients because of clients' strong bargain power.

Table 5 Pearson Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) *LNFEE*	1.000															
(2) *FEESCA*	**-0.090**	1.000														
(3) *ABSABACC*	**-0.060**	**0.086**	1.000													
(4) *LCLI*	**0.368**	**-0.548**	**-0.083**	1.000												
(5) *HCLISALE*	0.007	-0.033	**-0.054**	0.004	1.000											
(6) *SIZE*	**0.696**	**-0.592**	**-0.124**	**0.621**	0.029	1.000										
(7) *ROE*	0.005	**-0.240**	-0.031	**0.159**	0.028	**0.190**	1.000									
(8) *LOSS*	0.010	**-0.206**	-0.039	**0.163**	0.040	**0.174**	**0.698**	1.000								
(9) *LEV*	**0.433**	**-0.193**	**0.068**	**0.264**	0.036	**0.419**	**-0.191**	**-0.139**	1.000							
(10) *MB*	**0.075**	0.031	0.027	-0.004	**0.093**	**0.063**	**0.207**	**0.132**	**0.067**	1.000						
(11) *SALEG*	**0.049**	-0.029	0.021	0.026	**0.055**	**0.050**	**0.223**	**0.197**	**0.047**	**0.091**	1.000					
(12) *CASH*	**-0.079**	**0.202**	0.014	**-0.194**	0.003	**-0.183**	**0.052**	**0.058**	**-0.306**	**0.066**	-0.017	1.000				
(13) *NEWAUDF*	**-0.059**	**0.062**	0.031	**-0.049**	**0.130**	**-0.073**	0.000	0.003	-0.016	0.089	0.021	0.029	1.000			
(14) *CA*	**-0.223**	**0.170**	**0.234**	**-0.166**	**-0.119**	**-0.294**	**0.085**	**0.072**	**-0.167**	**-0.082**	-0.014	**0.311**	**0.052**	1.000		
(15) *INVAR*	**-0.165**	0.023	**0.177**	-0.035	**-0.095**	**-0.162**	**0.051**	0.031	**0.055**	**-0.169**	-0.008	**-0.115**	0.019	**0.720**	1.000	
(16) *BIG4*	**0.387**	**-0.159**	**-0.046**	**0.252**	**0.049**	0.398	**0.140**	**0.132**	**0.110**	**0.140**	0.010	**0.059**	-0.030	**-0.069**	**-0.069**	1.000

Correlations in bold are significant at a P-value lesser than 0.05 for a two-tailed test. See Appendix A for all variable definitions.

Table 6 Regression Results of the Test on Audit Market Concentration, Client Size and Audit Fees

	Sign	LNFEE			FEESCA		
		Coefficient	t	P > t	Coefficient	t	P > t
HCLISALE	+	0.2279	0.9	0.367	–0.0004	–0.61	0.539
LCLI	–	–0.0773	–0.78	0.434	–0.0009***	–3.93	0.000
*HCLISALE*LCLI*	–	–0.2500	–1	0.315	0.0006	1.01	0.314
SIZE	+	0.3816***	22.14	0.000	–0.0003***	–19.27	0.000
ROE	–	–0.4167***	–3.67	0.000	–0.0010***	–3.4	0.001
LOSS	+	–0.0940**	–2.56	0.010	–0.0001	–1.2	0.229
LEV	+	0.6798***	9.47	0.000	0.0002	1.53	0.126
MB	?	0.0008	0.1	0.921	0.0000***	2.85	0.004
SALEG	?	0.1528***	2.89	0.004	0.0001	1.7	0.090
CASH	+	0.3595**	2.32	0.020	0.0005	0.69	0.488
NEWAUDF	?	0.1560***	4.03	0.000	0.0003***	3.49	0.000
ABSABACC	–	0.1170	0.52	0.604	0.0000	–0.12	0.902
CA	+	0.2111	2.2	0.028	0.0004	1.02	0.309
INVAR	+	–0.3146***	–3.28	0.001	–0.0004	–1.01	0.311
BIG4	+	0.2375***	10	0.000	0.0002***	5.98	0.000
INDFE	?	Yes			Yes		
YFIXE	?	Yes			Yes		
MARFE	?	Yes			Yes		
Intercept	?	–2.804***	–16.69	0.000	0.0032***	10.81	0.000
N		2,434			2,434		
R^2		0.5684			0.4714		

***and ** denote significant levels at 0.01 and 0.05 for a two-tailed test, respectively. Robust standard errors are used to correct heteroscedasticity. See Appendix A for all variable definitions.

Table 7 reports the regression results of the test on audit market concentration, client size and audit quality. R^2s for our *ABSABACC* and *ABSABACCPOS* models are 0.095 and 0.127, respectively, whilst those of Gunn et al. (2019) are 0.199 and 0.280, respectively. Area under ROC curve of our probit model *Prob.*(*PROFIT* = 1) is 0.783 whilst that of Gunn et al. (2019) is 0.801. This indicates that our models' performances are moderately well as compared to those of Gunn et al. (2019). None of the coefficients of *HCLISALE, LCLI* and *HCLISALE*LCLI* is significant in all models. The null form of hypothesis H2 that audit market concentration has none of the effects on proxies of poor audit quality and the null form of hypothesis H4 that strong client bargain power does not moderates the positive effect of audit market concentration on proxies of poor audit quality are thus accepted. Similar to Gunn et al. (2019), there are contradictory results for *SIZE*. The coefficients of *SIZE* are negative and significant for *ABSABACC* and *ABSABACCPOS* models but the coefficient of *SIZE* is positive and significant for *Prob.*(*PROFIT* = 1) model. There are contradictory results for models *ABSABACC* and *ABSABACCPOS* as we and Gunn et al. (2019) expected that *SIZE* has the positive relationships with the proxies of poor audit quality[2]. This indicates that larger size clients have more audit quality than smaller size clients if we use performance-adjusted abnormal accruals and income-increasing abnormal accruals as proxies for poor audit quality. However, larger size clients have lesser audit quality than smaller size clients if we use the probability of reported profit as proxies for poor audit quality.

2 Gunn et al. (2019) left the doubt about the contradictory results without explanation.

Table 7 Regression Results of the Test on Audit Market Concentration, Client Size and Audit Quality

	Sign	ABSABACC			ABSABACCPOS			Prob. (PROFIT = 1)		
		Coefficient	t	P > t	Coefficient	t	P > t	Coefficient	t	P > t
HCLISALE[3]	+	−0.0200	−0.87	0.383	0.0407	1.19	0.235	−0.0277	−0.04	0.970
LCLI[4]	+	−0.0043	−0.46	0.645	0.0085	0.59	0.556	0.1500	0.51	0.610
*HCLISALE*LCLI*	+	0.0157	0.67	0.505	−0.0257	−0.70	0.483	0.6725	0.88	0.376
SIZE	+	−0.0045***	−4.75	0.000	−0.0031*	−2.21	0.027	0.2862***	7.87	0.000
ROE	+	0.0043	0.40	0.687	0.0189	1.03	0.301			
LOSS	−	−0.0036	−1.09	0.276	−0.0013	−0.28	0.777			
LEV	−	0.0276***	4.64	0.000	0.0214**	2.50	0.013	−2.2897***	−11.55	0.000
MB	+	0.0012	1.70	0.088	−0.0001	−0.08	0.938	0.2060***	6.82	0.000
SALEG	?	0.0017	0.35	0.727	0.0062	0.82	0.410	1.2026***	5.85	0.000
CASH	?	−0.0301*	−2.01	0.044	−0.0851***	−3.94	0.000	−0.1242	−0.25	0.805
NEWAUDF	?	0.0048	1.31	0.192	0.0086	1.51	0.130	0.0048	0.05	0.963
CA	?	0.0533***	5.90	0.000	0.0735***	5.65	0.000	0.5544	1.94	0.053
INVAR	?	−0.0069	−0.69	0.493	−0.0140	−0.95	0.340	0.5829	2.02	0.043
BIG4	?	0.0003	0.13	0.895	−0.0011	−0.33	0.741	0.0951	1.36	0.175

[3] Signs of our coefficients are consistent with those of Gunn et al. (2019). Gunn et al. (2019) found a significantly negative relationship between client bargain power and proxy for poor audit quality measured by abnormal accruals. They found an insignificantly positive relationship between client bargain power and proxy for poor audit quality measured by income-increasing abnormal accruals and an insignificantly negative relationship between client bargain power and proxy for poor audit quality measured by the incidence for reporting profit.

[4] Signs of our coefficients are consistent with those of Gunn et al. (2019), except for *ABSABACC* model. The inconsistence may be because Gunn et al. (2019) used cross-country data whilst we used data of specific country.

Table 7 Regression Results of the Test on Audit Market Concentration, Client Size and Audit Quality (Cont.)

	Sign	ABSABACC			ABSABACCPOS			Prob. (PROFIT = 1)		
		Coefficient	t	P > t	Coefficient	t	P > t	Coefficient	t	P > t
INDFE	?	Yes			Yes			Yes		
YFIXE	?	Yes			Yes			Yes		
MARFE	?	Yes			Yes			Yes		
Intercept	?	0.0588***	4.76	0.000	0.0236	1.27	0.203	−1.8263***	−4.19	0.000
N		2,434			1,197			2,434		
R^2		0.0945			0.1270			n/a		
Area under ROC curve		n/a			n/a			0.7825		

***, ** and * denote significant levels at 0.01, 0.05 and 0.10 for a two-tailed test, respectively. Robust standard errors are used to correct heteroscedasticity. See Appendix A for all variable definitions. *LOSS* and *ROE* are dropped from the model *Prob.(PROFIT = 1)* because they perfectly predict with *PROFIT*

5. Discussion and Conclusion

Our study broadens evidence of audit market concentration among listed companies in the Stock Exchange of Thailand provided by Pratoomsuwan (2017) and Bungkilo and Chanaklang (2020). We add to evidence that audit market concentration by the Big 4 audit firms is quite high. However, we do not find evidence that the audit market concentration leads the Big 4 audit firms to have more market power and then become price-setters. Interestingly, we find evidence that large clients, who are of economic importance to audit firms, have more bargains buy at reduced audit fees and then become price setters instead of price takers. Our evidence is inconsistent with those of Pratoomsuwan (2017) and Bungkilo and Chanaklang (2020) indicating that audit market concentration leads the audit firms to have more market power and then become price-setters. These inconsistencies may be because Pratoomsuwan (2017) and Bungkilo and Chanaklang (2020) observe only the impact of client absolute size on audit fees but not the impact of client bargain power measured by client relative size on audit fees. However, we observe both impacts. In addition, our definition and measure of audit market concentration differ from those of Bungkilo and Chanaklang (2020). Our evidence also deviates from Gunn et al. (2019)'s cross-country evidence of the Big 4 audit firms' clients and Huang et al. (2016)'s Chinese evidence that audit market concentration increases audit fees. However, our evidence is consistent with Evans Jr and Schwartz (2014)'s US evidence that audit market concentration marginally affects large clients' audit fees. Furthermore, our evidence also indicates that audit market concentration does not impact audit quality measured by abnormal accruals and the likelihood of reporting profit. This evidence differs from that of Bungkilo and Chanaklang (2020) who find that audit market concentration has a positive relationship with audit quality measured by the auditor's likelihood of issuing modified audit opinion. Our evidence also departs from cross-country evidence by Francis et al. (2013) and Gunn et al. (2019) indicating that audit market concentration by the Big 4 audit firms undermines audit quality. In addition, it is inconsistent with that of Huang et al. (2016) showing that audit market concentration increases audit quality in China. This mixing evidence highlights that the effects of audit market concentration on audit fees and audit quality might vary from country to country by nature according to the regulation (Francis et al., 2013) and other institutional factors (e.g., level of investor protection and culture).

Our evidence should be of regulators, policymakers and audited clients' interests. It suggests that they should be less concerned that audit market concentration would increase audit fees and harm audit quality. However, they should be concerned that client bargain power, especially for large clients, may lead audit firms to undercharge their audit fees even when auditors perform their jobs quite well. With the low audit fees, audit firms would have less motivation to have quality

competition. Insufficient audit fees cause difficulty for audit firms to allocate sufficient resources and more effort into the audit processes (Huang et al., 2016). The less quality competition and the insufficient audit fees may in turn harm audit quality in the long run. To lessen the client dominance and bargain buys, regulators, policymakers and audit firms should look for ways to make audited companies and all stakeholders place more value on audits.

Our study is subject to some limitations and calls for future studies. First, using different definitions and measures of audit market concentration may yield different findings from ours. Future studies should revisit the study on audit market concentration among listed companies in the Stock Exchange of Thailand by using alternative definitions and measures of audit market concentration. Second, owing to insufficient data, we exclude audit tenure and non-audit fees from our analyses. Future studies should consider including these two variables in the analysis because these two variables might have a significant impact on audit fees and audit quality. Third, we ignore the impact of audit firms' market segmentation. As found by Pratoomsuwan (2017), the Big 4 audit firms are differentiated themselves from each other. Future studies should explore audit firms' market segmentation. Audit firms should be clustered into groups based on their clients' total assets and audit fees. This will help us gain more understanding of the audit market structure and the competition within and between groups of audit firms.

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Appendix A. Variable definitions

Variable		Definition	Previous Study
Dependent Variables:			
LNFEE	=	The natural logarithm of the total audit fees in million Thai Baht	Gunn et al. (2019); Huang et al. (2016); Evans Jr and Schwartz (2014); Averhals et al. (2020)
FEESCA	=	The total audit fee divided by the squared root of a client's total assets	Gunn et al. (2019)
ABSABACC	=	The company's absolute value of Kothari et al. (2005)'s performance-adjusted abnormal accruals	Gunn et al. (2019); Francis et al. (2013)
ABSABACCPOSI	=	1 if the company's signed value of Kothari et al. (2005)'s performance-adjusted abnormal accruals is greater than or equal to zero and 0 otherwise	Gunn et al. (2019); Francis et al. (2013); Bandyopadhyay, Chen, and Yu (2014)
PROFIT	=	1 if a company report net profit greater than or equal to zero and 0 otherwise	Gunn et al. (2019)
Test Variables:			
HCLISALE	=	The Big 4 audit firms' market Herfindahl Index based on total clients sales	Francis et al. (2013); Cabán-García and Cammack (2011)
LCLI	=	1 if a company's total assets are greater than the 25-percentile clustered by industry and year and 0 otherwise	Gunn et al. (2019)
Control Variables:			
SIZE	=	The natural logarithm of a client's total assets in million Thai Baht	Bandyopadhyay et al. (2014); Eshleman and Lawson (2017)
ROE	=	The net income divided by total shareholders' equity	Gunn et al. (2019)

Variable		Definition	Previous Study
LOSS	=	1 if a company reported loss and 0 otherwise	Francis et al. (2013); Gunn et al. (2019); Eshleman and Lawson (2017)
LEV	=	The total liabilities divided by total assets	Gunn et al. (2019); Francis et al. (2013); Bandyopadhyay et al. (2014); Huang et al. (2016); Eshleman and Lawson (2017)
MB	=	The market value of equity divided by total book value of shareholders' equity	Gunn et al. (2019); Huang et al. (2016)
SALEG	=	The percentage of change in sales from the previous year	Gunn et al. (2019); Francis et al. (2013); Eshleman and Lawson (2017)
CASH	=	The total cash and cash equivalent divided by total assets	Gunn et al. (2019); Francis et al. (2013)
NEWAUDF	=	1 if a company change audit firm and 0 otherwise	Gunn et al. (2019); Eshleman and Lawson (2017)
CA	=	The total current assets divided by total assets	Evans Jr and Schwartz (2014); Eshleman and Lawson (2017)
INVAR	=	The summation of inventory and accounts receivable divided by total assets	Averhals et al. (2020); Huang et al. (2016); Eshleman and Lawson (2017)
BIG4	=	1 if a company is audited by one of the Big 4 audit firms and 0 otherwise	Bandyopadhyay et al. (2014); Huang et al. (2016); Eshleman and Lawson (2017)
YFIXE	=	The year fixed effects	Gunn et al. (2019); Francis et al. (2013); Huang et al. (2016)
INDFE	=	The industry fixed effects	Gunn et al. (2019); Francis et al. (2013); Huang et al. (2016)
MARFE	=	The market fixed effects	Huang et al. (2016)