DOES AUDIT FIRM SIZE CONTRIBUTE TO AUDIT QUALITY? EVIDENCE FROM TWO EMERGING MARKETS

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Abstract

This study investigated whether the Big N audit firms in emerging markets can provide audits of high quality and mitigate information risk, by comparing the audit quality of Big N audit firms in Taiwan with those in China. The two countries share a similar cultural background and engage in frequent economic exchange; however, they have different legal systems and institutional environments. This study followed previous research in the use of bid-ask spread and discretionary accruals as proxy variables for information asymmetry and audit quality. Our results indicate that politico-economic differences between Taiwan and China influence the effectiveness of independent auditors when it comes to the mitigation of information asymmetry. Big N audit firms in Taiwan helped to mitigate information asymmetry and provided audit services of higher quality, whereas Big N firms in China were better able to constrain earnings management. Our results indicate that market concentration and market share have a stronger influence on reputation incentive and audit quality than does the size of an audit firm. ****

Keywords: Audit Quality, Information Asymmetric, Big N Audit Firms, Bid-Ask Spread, Emerging Markets

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Introduction

This study explored the relationship between the size of audit firms and audit quality. By investigating the mitigation of asymmetric information, we sought to determine whether the theory that large audit firms (hereafter referred to as Big N audit firms) provide higher audit quality (DeAnglelo, 1981) can be supported in emerging markets. The research sample included companies in emerging markets (Taiwan and China), which share a similar cultural background and engage in frequent economic exchange, yet have different legal systems and institutional environments.

Curbing information asymmetry has long been an objective among regulators seeking to strengthen capital markets. High quality auditing can strengthen the effectiveness of accounting information in mitigating information asymmetry between markets participants and enhance investor protection. According to conventional auditing theory, Big N audit firms provide superior audit quality resulting from an incentive to protect their reputation as well as the benefits of resource sharing through economy of scale. Big N audit firms are believed capable of resisting attempts to manage earnings (Becker et al., 1998; Francis et al., 1999), enhancing earnings quality (Francis and Krishnan, 1999), and reducing the costs of capital (Timan and Tureman, 1986; Teoh and Wong, 1993; Pittman and Fortin, 2004). However, the incentive to protect the reputation of auditors is directly correlated with the investor protection afforded by the legal system (Choi et al., 2008; Franics and Wang, 2008). Currently, there is a lack of empirical evidence to prove that Big N audit firms provide better audit quality in emerging markets.

The socialist market economy of China is becoming increasingly integrated with the global economy. To attract investors and foreign capital, the government of China has broadly reformed capital market regulations,[42] with the aim of reducing information asymmetry and boosting market liquidity. Regulations related to accounting

[42] Following the establishment of the stock exchanges in Shenzhen and Shanghai in 1990s, the regulations governing authorization to audit listed companies have been amended on a regular basis.

and auditing have been included in these reforms. In recent years, Chinese authorities have acted on the assumption that increasing the scale of audit firms can improve audit quality and competitive capacity. Therefore, in 2000 the China Securities Regulatory Commission (CSRC) and MOF established rules stating that only audit firms with at least twenty qualified securities auditors would be authorized to audit listed companies. The annual revenue threshold required was also increased to RMB 8 million. In order to qualify to provide auditing services to banking institutions, audit firms must have more than sixty auditors and generate annual revenue exceeding RMB 1.5 million. In implementing these measures, the government was seeking to leverage the factors conventionally associated with audit quality and emphasized in auditing theory. Recent studies, however, have begun to question whether the quality of audits performed by firms in China could actually be enhanced by authorizing only Big N audit firms (e.g., Chan and Wu, 2011; Chen et al., 2011).

In comparison, Taiwan has long adhered to the accounting and auditing regulations established in the U.S. In addition, the audit market and level of development in this area are similar to those found in the U.S. Nonetheless, the legal environment is closer to that of China, as a system of code law, which affords investors less protection. Taiwan and China are both considered emerging markets and the development of the legal systems varies considerably between the countries. The securities and exchange regulations, accounting practices, and auditing market in Taiwan are more centralized, compared to the socialist legal environment and independent development of accounting observed in China. Therefore, this study compared the audit market in Taiwan with that in China, because we believe that these characteristics make the Taiwanese system an excellent candidate for such an investigation. The issue of whether audit firms in Taiwan (without an insurance function) and audit firms in China (with a low market share) can alleviate the information asymmetry of audited companies and achieve higher audit quality remains a matter on contention. The findings of this study serve as a supplement to those of previous studies in the field of international accounting.

Auditing services are credence goods, making it impossible to observe or determine audit quality directly. Accounting information is used as a tool to mitigate information asymmetry between markets participants. Audit quality is a crucial determinant in the quality of information related to public accounting; therefore, the credibility of auditors can be viewed as an indicator of accuracy in accounting information (Francis et al., 1999; Behn et al., 2008; Francis and Wang, 2008). Moreover, high-quality auditors play a crucial role in mitigating information asymmetry between the preparers and users of financial reports (Dye, 1993). Following the lead of previous studies using bid-ask spread as a proxy variable for information asymmetry (Kim and Verreshia, 2001; Zhou, 2007), this study first tested whether discretionary accruals are correlated with information asymmetry in companies in China and Taiwan.[43] We then categorized audit firms according to size and examined whether the relationship between discretionary accruals and the mitigation of information asymmetry is more pronounced in Big N audit firms.

Our results indicate that differences in the politico-economic environments of Taiwan and China influence the effectiveness of independent audit in the mitigation of information asymmetry. Compared to non-Big N firms in Taiwan and audit firms in China, the Big N audit firms in Taiwan helped to mitigate information asymmetry and provided higher audit quality. Compared to non-Big N firms in China, Big N firms in China were better able to constrain earnings management; however, due to their low market share they were not significantly effective in mitigating information asymmetry. Our results indicate that market concentration and market share are more important than the size of an audit firm with regard to reputation incentive and audit quality.

The remainder of the article is organized as follows. Following the institutional background, we summarize prior research and develops research questions. We then present our research design and sample selection process. Further sections discuss our empirical evidence. The last section contains a brief recap and summarizes the key findings of the study.

Institutional Background

Comparing Chinese and Taiwanese audit markets

In contrast to Taiwan and other mature audit markets (e. g., the United States), China did not readopt a system of certified public accountants until the 1980's, when economic reforms and the emergence of Sino-foreign joint ventures necessitated the tightening of auditing and tax-reporting requirements. An initial shortage of qualified auditors forced local audit firms to affiliate themselves with governmental departments or educational institutions to overcome challenges in the areas of human resources, business operations, and finance. This tended to weaken the competitiveness and independence of audit firms, while obscuring the legal obligations to which they are expected to adhere.

Frequent auditing failures reported during the 1990s prompted the MOF to revoke the licenses of

[43] Many auditing studies have conclude that high audit quality are correlated with low discretionary accruals.

auditors involved in fraudulent acts. In addition, in conjunction with the CSRC, authorities are poised to revoke securities-related licenses in an attempt to reform relevant regulations. In recent years, the CSRC has continued establishing reforms, with the aim of increasing economic demand for independent auditors and improving the quality of audit work. The unique environment of the Chinese audit market can be attributed to the political and economic systems in China with the government playing a key role in the development of the audit market. Table 1 outlines the regulatory development of the audit market in China.

Table 1. The Development of Audit Market in China

Period		Events
Before 1990	1979	Foreign investment enterprises were allowed to operate in China.
	1988	The Chinese Institute of Certified Public Accountants (CICPA) was founded.
	1990	The Shanghai Stock Exchange and the Shenzhen Stock Exchange were established.
1991-2000	1991	The first CPA Examination was held by MOF.
	1992	The audit firm disaffiliation program was introduced and audit practitioners are required to choose to be either a public official auditor or a certified public accountant.
	1993	Auditor firms were required to reorganize their entity to either limited liability companies or partnerships.
	1995	The first set of local auditing standards was established.
	1997	An audit firm and its auditors were required to obtain a qualification of practicing securities and futures to become eligible to audit listed companies. The second set of auditing standards became effective.
	1999	The audit firm disaffiliation program was completed.
	2000	CSRC promoted auditor firms merges to enhance the competitiveness.
2001-2010	2001	Dual attestation system was required by listed companies. Listed companies must disclosure audit fee in their financial reports.
	2002	The CICPA started to announce the auditor firms ranking annually.
	2004	The CICPA required auditors to disclose their personal information and conducted auditor practice review and quality assessment on audit firms.
	2005	The Act of the "Acceptance of Tort Cases Caused by Fraudulent Financial Reporting in Security Market" was stipulated to define auditors be held liable for damages to investors.
	2010	The MOF released the "Measures for Administration on the Service Charges of Accounting Firms" that required audit firms to charge audit fees in accordance with government guidance.

Audit firms were initially affiliated with governmental departments, which imposed numerous measures to monitor and manage these firms. Permits were required for all auditing practitioners and the government continued raising the standards to encourage mergers among audit firms. Audit fees were charged according to costing rules and state-owned enterprises were restricted by government regulations with regard to the audit firms they were permitted to deal with. Following the completion of disaffiliation reforms in 1999, local audit firms began merging in 2000 in efforts to expand their scale of operation. Overall, the audit market in China has proven to be relatively efficient and sound since 2000.

Both Taiwan and China utilize systems of code law, which tend not to provide investors with the degree of protection afforded in most western countries. As a result, very few lawsuits are instigated against auditors in Taiwan or China, unlike common law nations where auditors are subject to higher liability. Between 2000 and 2010, only 35 auditors in Taiwan had their licenses to practice revoked and between 1999 and 2009, a total of 63 audit firms were subject to disciplinary action from regulatory authorities. Most audit firms in China operate under a limited liability scheme, which makes it difficult to address the issue of audit quality.

Table 2 illustrates the broad differences between audit firms in Taiwan and China with regard to operational scale, market concentration, audit opinions, mandatory rotation, and restrictions on state ownership, any one of which could influence the quality of audit work.

Comparing capital markets in China and Taiwan

The securities market of China is characterized by high issue costs, a high price-earnings ratio, and the raising of highly excessive funding. The insider

information situation is so severe that it has attracted public criticism from foreign investors and the media. Market commentators have gone so far as to compare the stock market in China with an enormous gambling den, in which the government is the boss, the CSRC is the floor manager, and securities firms and listed companies are dealers profiting enormously through the manipulation of stock prices, while lesser stakeholders and traders are mere gamblers who find themselves at the mercy of a rigged system.

Table 2. A Comparison between the Audit Markets of China and Taiwan

	China	**Taiwan**
Structure and development of audit firms	Regulations instituted in 1997 allowed only those auditors or audit firms qualified to provide financial advice on securities and futures to audit and attest the financial statements of listed companies. The disaffiliation program was completed in 1999 and in 2000 the government began setting threshold limits to encourage audit firms to merge. As of 2011, there were 7,976 audit firms and 97,510 certified auditors but only 48 audit firms qualified to provide services on securities and futures business. Audit firms are one of two types: partnership firms and limited liability firms, the latter being the more common model. The financial statements of listed companies must be audited and attested by the partner and senior auditors.	Laws were passed in 1983 requiring publicly traded companies to retain joint audit firms to audit financial reports. As of 2011 there were 85 such audit firms and 2,905 auditors registered with the Taiwan CPA Association. Audit firms adopt partnership systems. The financial reports of public companies must be audited and attested by at least two auditors from a joint audit firm.
Market concentration	The four international audit firms show a low degree of market concentration, with their clients comprising only 6-7% of market share and their total revenue from attestation service.	The market concentration of the four leading audit firms exceeds 80%; their revenue from attestation services for approximately 60% of total revenue.
Frequency of auditing	Once yearly, only in exceptional circumstances, is an interim auditing report required; quarterly reports are not required to be reviewed or audited.	Four times a year; quarterly reports are reviewed and half-year and annual reports are audited.
Audit opinion	Regulations were passed in 1995 categorizing audit opinions as unqualified opinion, qualified opinion, adverse opinion and disclaimer of opinion. From 2006 onwards, these were commonly referred to as standard audit reports and non-standard audit reports (including the unqualified opinion expressed in explanatory paragraph and non-standard unqualified opinions).	Audit opinions were categorized as unqualified opinions, modified unqualified opinions (i.e., a going-concern explanatory paragraph), qualified opinion, adverse opinion and disclaimer of opinion.
Monitoring and information disclosure	The CPA association in each province reviews and ranks audit firms on a yearly basis. Every five years, a quality check of each audit firm is conducted. If breaches are identified, various levels of action may be taken such as open warning, suspension of business, order for rectification, etc. As of 2001 every listed company has been required to disclose audit fees on its annual financial statement.	As of 1989 all audit firms have been required to disclose their operational information to regulatory authorities. However, authorities do not reveal information on individual firms and do not publicly rank audit firms. The Securities and Futures Bureau announced that from 2002 onwards, listed companies that meet specific criteria (change of audit firms reducing audit fee by 15%; or non-audit fees reaching 25% of audited fees) must disclose audit fee-related information.
	China	Taiwan
Liability of auditors	The Securities Act articulates various penalties for audit firms that include false representations on audit reports, such as order to rectify, confiscate the audit fee, suspension or withdrawal of securities practicing license, fines and warnings.	The Securities Trading Act stipulates that in the event of errors or misrepresentation in auditing reports, authorities may impose penalties of varying severity based on the circumstances, such as formal warnings or a two-year suspension of the right to practice or to revoke such certification6
Mandatory rotation	Rotation clause introduced in 2004 mandates that an auditor rotate off the audit project every five years or from returning to the engagement after a	Mandatory rotation was implemented in 2003 and violators were added to the watch list of the Taiwan Stock Exchange. In 2004 regulations were

	China	Taiwan
	rotation of two years. However, if two auditors have been jointly auditing the same company for five successive years, one of them may continue in this role for one more year. Companies must report their rotational system to the CSRC by mid-May of each year, as well as record such data in the monitoring database of the accounting evaluation institute. The rotational clauses are checked randomly by the CSRC. Essive years have been auditng f two years.	established stipulating that auditors could not jointly audit the same firm for more than a total of five years. Auditing Standard (46, implemented in July 2009, stipulates that an audit partner must rotate off the audit engagement after a fixed period of time (no more than seven years) and with at least two years not involved in the audit afterwards.
Auditing of state-owned enterprises	When retaining auditors, state-owned enterprises must choose from the registry of the appropriate agency in each province. Audit firms may be retained for a period of 2-4 years and the retainer must be approved by the State-Owned Assets Supervision and Administration Commission. The audit fee must be lower than the average market rate. There are also regulations, based on the contract established, for the payment of audit fees.	Based on the Government Procurement Act, commercial tenders are used when retaining audit firms. The audit firm whose tender is accepted does not need to be approved by any authority and there are no constraints on tenure or audit fees.

1. According to statistics released by the Financial Supervision Commission, there are currently 1,702 audit firms in Taiwan, of which 384 (23%) are joint audit firms (including 83 firms which are authorized to audit and attest the financial data of public companies).
2. For example, in the second half of the year the company must distribute profits, increase share capital, and compensate for loss.
3. An audit firm is a type of intermediary institute in China; applicants who wish to be registered with agencies must meet specific criteria.
4. The Bureau of Commodity Price in each region stipulates the general auditing service fee.

The market value of the securities traded in China ranked second in the world in 2010, with more than 2,000 listed companies and 140 million A-share investor accounts. However, the existing political system continues to shelter the governmental institutions and listed companies that engage in insider trading to the detriment of the general public.

The securities market in Taiwan is also oriented toward individual investors and the trade in insider information is rampant. Individual investors and minority shareholders have long been forced to bear the brunt of investment risk because of their position as uninformed traders. According to Baber et al. (2009), the average annual stock turnover rate on the Taiwan Stock Exchange is nearly 300%, considerably higher than the 97% on the New York Stock Exchange. They also pointed out that individual investors account for roughly 90% of all trading volume in Taiwan, such that stocks are broadly held as an important class of assets in many households. According to the World Federation of Exchanges, the Taiwan securities market ranked twentieth in the world during our research period, despite the diminutive size of the nation. This clearly indicates the importance of the market in Taiwan.

The above considerations underscore the serious problem of information asymmetry and insider trading encountered in cross-strait capital markets. According to our investigation, between 2000 and 2010, the market in China showed better liquidity and market breadth, while the market in Taiwan had a greater bid-ask spread (companies in Taiwan showed higher and more widely differing stock prices). Nonetheless, the market in Taiwan also demonstrated less fluctuation in week-by-week bid-ask spreads.

Prior Research and Research Questions

Reduction of information asymmetry through quality financial reporting

One of the main causes of volatility in stock prices is the existence of informed traders and the extent to which they participate in securities trading (Amilhud and Mendelson, 1986; Easley and O'Hara, 1992). Information obtained privately implies an assessment of the future value of company assets that is not based on real-time market assessments. The difference between the quality of information obtained by insiders and external investors (information asymmetry) affects the liquidity of securities as well as trading costs. When a select group of investors is privy to insider information regarding the future value of a company, the other investors face information risk (Hasbrouck, 1991; Easley and O'Hara, 2004; Lamber et al., 2007).

Financial reports are an important source of information for investors and market observers and the most effective means of ensuring communication between insiders and outsiders.

Transparency in disclosure policy and the reliability of accounting information related to earnings can reduce information asymmetry by making the same information publicly available to all investors. Reliable financial information helps market participants to make informed decisions based on a fair assessment of company value and adverse selection problems as well as the future cash flow of the company (Sutton, 1997; Healy and Palepu, 2001; Francis et al., 2005; Lamber et al., 2007). Enhancing the quality of financial reports is arguably the most effective means of lowering the information risk faced by capital traders (Frankel and Li, 2004).

Financial reporting quality enhanced by audit quality

Agency problems often occur between company insiders (managers) and the providers of external capital. A failure on the part of executive managers to cope with conflicts of interests among stakeholders can increase agency costs. These costs can impair company value and have other economic consequences due to the hindering of fundraising efforts, the closing off of sources of capital, and curtailed financing.[44] The demand for independent auditing is borne of the need to reduce agency costs (Chow, 1982; Watts and Zimmerman, 1986).

High quality auditing services provide assurance that financial reports are free from material misstatement.[45] Accurate accounting information can reduce information asymmetry and reduce the information risk faced by those who place their trust in audit reports. This in turn reduces agency problems and the costs associated with information asymmetry. The independence of auditing is a crucial element of all business transactions and the quality of auditing services is a hot topic among the participants in capital markets as well as regulatory agencies. The quality of auditing is defined by the commitment of auditors to provide independent opinions as well as their professional capacity to identify misstatements in financial reports (DeAngelo, 1981; Watts and Zimmerman, 1986). A core research topic in the field of auditing is the identification of factors (i.e., institutional and environmental factors, as well as incentives) capable of improving or detracting from the quality of auditing.

High quality auditing can improve the earnings quality of financial statements; therefore, previous researchers have commonly used discretionary accruals as a proxy variable for audit quality (e.g., Kinney and Martin, 1994; Becker et al., 1998; Francis et al., 1999). The reasoning behind use of discretionary accruals as a proxy variable is the fact that the adjusted financial figures in the audit report represent a negotiated outcome between the auditor and the client. In reality, the quality of auditing depends largely on the ability of auditors to identify inaccuracies or inconsistencies in entries (better auditing capacity). When negotiating the final adjusted entries, a high-quality auditor will be better able to defend his/her position (remain independent) against the wishes of those seeking to manipulate auditing information. Most adjusted entries are related to accruals (in particular discretionary accruals), such that companies audited by a high-quality auditor will present lower discretionary accruals.

Information risk is a common problem faced by investors engaging in transnational investments. Foreign investors prefer companies that present financial reports prepared by high-quality auditors (e.g., Big N audit firms), in the belief that the financial information they provide will reduce information asymmetry and information risk. Engaging high-quality auditors is believed to improve the credibility of reported earnings (Francis et al., 1999; Balsam et al., 2003; Francis and Wang, 2008) and make investors more likely to invest, which exerts a positive influence on company value.

Audit firm size and audit quality

Current auditing theory stipulates that reputation-based incentives, the benefits of resource sharing, and the scale of audit firms are all positively correlated with the credibility of financial reports (DeAngelo, 1981; Teoh and Wong, 1993; Francis and Wang, 2008). Big N audit firms are capable of detecting improperly adjusted entries and earnings management behavior (through stronger auditing ability) as well as countermanding these actions (through stronger independence), to produce audit reports of higher quality (Becker et al., 1998; Francis et al., 1999). However, legal liability may influence the degree to which auditors are motivated to maintain their reputations by standing up to clients, which can lead to transnational differences in earnings quality (Choi et al., 2008; Franics and Wang, 2008). The soundness of corporate governance directly impacts the security of investors as well as earnings quality and the degree of information asymmetry. Most studies based on the U.S. system have concluded that Big N audit firms provide higher audit quality (e.g., Teoh and Wong, 1993; Becker et al., 1998; Francis et al., 1999); however, studies examining the situation across national boundaries have indicated that in countries with lower standards with regard to the protection of investors, Big N audit firms have

[44] Relevant costs may include government fees and the expenses associated with monitoring, gathering and disseminating information.

[45] Independent auditors are tasked with providing an audit opinion as to whether the accounting information (financial reporting) provided by the company complies with generally accepted accounting principles (GAAP).

less incentive to maintain their business reputations (Francis and Wang, 2008). As a result, the quality of the accounting work provided by the big names does not necessarily exceed that of less known audit firms.

Following a study of 39 nations, Choi and Wang (2007) concluded that companies with greater information asymmetry tend to be concentrated in countries with weaker investor protection and could benefit from the services of Big N audit firms, Wang et al. (2012) showed that Big N audit firms in Taiwan provide higher auditing quality, capable of reducing the degree of information asymmetry. Clearly, this remains an issue of contention.

3.4 Research questions

Investor protection in the market environment has a direct influence on audit quality. Taiwan and China both utilize code law systems and auditors on both sides of the strait enjoy limited liability. This study investigated the theory that audit quality can enhance the reliability of financial information (and reduce information asymmetry), to determine whether it remains applicable, despite the differences between markets in Taiwan and China.

A number of recent studies have also examined whether the Chinese efforts to merge audit firms will actually improve audit quality (e.g., Chan and Wu, 2011; Chen et al., 2011). Previous studies on the audit markets in China have failed to reach a consensus regarding a positive correlation between Big N audit firms and audit quality. Thus, the question of whether Big N firms in China can reduce information asymmetry and provide quality audit work remains open to discussion and exploration. To facilitate a more meaningful comparison of audit quality across the Taiwan Strait, this study examined the following research questions:

1. Does audit quality mitigate information asymmetry?
2. If audit quality mitigates information asymmetry, do Big N audit firms provide audit quality high enough to be capable of achieving this end?

Research Design

Discretionary accruals

Following prior studies, this study uses discretionary accruals as a proxy to measure how much room auditors give managers to manipulate earnings, which in turn indicates the quality of audit work. Referring to the research of Cohen, Deyand Lys (2008), we applied Eq. (1) to the sample data and discretionary accruals as the residual.

$$TAC_{it} = \beta_0 + \beta_1 \left(1/ASSETS_{it\text{-}1}\right) + \beta_2 \left(\Delta REV_{it} - \Delta REC_{it}\right) + \beta_3 PPE_{it} + \varepsilon_{it} \quad (1)$$

where, for firm*i*and year *t*,

TCA	total accruals scaled by thebeginning balance of total assets, calculated as the difference between net income and net cash flow divided by the beginning balance of total assets;
ASSETS	total assets;
⊿REV	changes in operating income divided by the beginning balance of total assets;
⊿REC	changes in accounts receivable divided by the beginning balance of total assets;
PPE	property, plant and equipment divided by the beginning balance of total assets.

This study did not investigate specific instances of earnings management or whether the adjustment of earnings upwards or downwards each year is influenced by factors, such as contracts and rights issue. Rather, we used the absolute value of discretionary accruals (*AbsDA*) to measure how much opportunity auditors give managers to manipulate earnings. Specifically, greater *AbsDA* indicated lower audit quality.

Information asymmetry

This study followed previous research in using bid-ask spread as a proxy variable for information asymmetry. This was calculated on any given day by subtracting the last bid price (purchase price) from the last asking price (selling price) and then dividing them by the mean bid price and mean ask price. The annual mean (*Spread*) was adopted as the measuring variable in this study. A higher spread indicates a higher degree of information asymmetry.

Based on the research of Zhou (2007), this study calculated and estimated the bid-ask spread of companies in Taiwan and China. The companies were clustered into weekly units and then categorized according to quartile stock value. We then divided the bid-ask spread from a single week by average trading price. The estimate was the square root of the covariance of the difference

between return on closing price and return on bid price. A higher estimate indicated greater week-by-week fluctuation in the respective group and thus greater volatility in information asymmetry. These variables were then used to measure the difference in information asymmetry between markets in Taiwan and China.

Regression model

This study used *absDA* as the dependent variable to conduct empirical testing to determine whether a significant positive relationship exists between *absDA* and *Spread*. Based on these results, we compared the audit markets of Taiwan and China to explore the link between audit quality and information asymmetry. Referring to previous research, this study controlled for company scale (*Size*), market to book ratio (*MB*), sales growth (*Growth*), leverage (*LEV*), loss in the prior period (*LagLoss*), the standard deviation of operating cash flow (*S_CFO*), the standard deviation of daily return (*S_RET*), total accruals (*TAC*), and the dummy variables by year and industry, to produce the following model:

$$\begin{aligned} absDA_{it} = {} & \alpha + \beta_1 Spread_{it} + \beta_2 Size_{it} + \beta_3 LEV_{it} + \beta_4 MB_{it} + \beta_5 Growth_{it} + \beta_6 LagLoss_{it} \\ & + \beta_7 S\_CFO_{it} + \beta_8 S\_RET_{it} + \beta_9 TAC_{it} \\ & + Year\ fixed\ effects + Industry\ fixed\ effects + \varepsilon_{it} \end{aligned} \quad (2)$$

where, for firm*i* and year *t*,

absDA	abnormal discretionary accruals, estimated from model (1) and multiplied by 100 for presentation;
Spread	the average of the yearly difference between the daily last bid and ask quotes divided by equally weighted average, and multiplied by 100;
Size	natural log of market capitalization;
LEV	leverage ratio;
MB	market value to book value ratio.
Growth	sales growth ratio
LagLoss	dummy variable, 1 if the firm reported a loss in the previous year, 0 otherwise;
S_CFO	standard deviation of operating cash flows over the last three years;
S_RET	standard deviation of daily returns;
TAC	total accruals.

To fulfill gaps in previous research, this study examined the four largest audit firms in Taiwan, as well as four leading international audit firms and four national audit firms in China to determine whether these firms had better audit quality capable of reducing information asymmetry. To define a leading audit firm in China, we referred to the work of Chen et al. (2011) and selected four international audit firms and the national firms which were ranked as the top four based on annual sales revenue. We categorized the samples into two groups: samples which were audited by Big N firms and samples which were not audited by the leading audit firms (non-Big N). We expected that the regression coefficient of spread would be positive and that the sub-samples audited by Big N firms would have higher levels of significance.

Sample

This study obtained research data from the period following the disaffiliation reform, considering that the growth of the audit market in China became increasingly robust after 2000. The samples in this study were as follows: listed companies in Shenzhen and Shanghai stock exchanges from 2000-2010 and all listed companies in Taiwan stock exchange, eliminating those with incomplete financial data and excessively low trading volume (which would prevent the calculation of bid-ask spread). We excluded firms in the finance and insurance industries because of their special industry environment. The total number of firm-year observations obtained from samples was 15,531 and 11,490, respectively; the data source was the Taiwan Economic Journal (TEJ) China database.

Results

Univariate analysis

As shown in Panel A of Table 3, the mean difference between *absDA* and *Spread* for Big N and non-Big N groups in Taiwan were -0.392 and -0.251 with t-statistics of 1.648 and 5.116, indicating that listed companies audited by Big N firms showed significantly better earnings quality and less information asymmetry compared to companies audited by non-Big N firms. For other control variables, the mean difference between *DRet_σ* and *TAC* for the two groups was not statistically significant. Listed companies audited by Big N firms were larger and had a higher growth ratio with fewer instances of prior yearly losses and higher stability of operating cash flow. Our results are consistent with those of previous studies.

Table 3. Descriptive Statistics of Empirical Variables

Panel A: Taiwan sample		Mean			
Variable	Full sample N=11490	Big N N=9540	Non-Big N N=1950	Difference	t-statistics
absDA	0.100	0.030	0.422	-0.392	1.648
Spread	1.367	1.309	1.560	-0.251	5.116
Size	14.657	14.773	14.123	0.650	18.831
LEV	0.418	0.406	0.471	-0.365	18.165
MB	1.571	1.612	1.379	0.233	8.334
Growth	0.322	0.329	0.295	0.034	1.561
Lagloss	0.246	0.241	0.265	-0.024	3.373
CFO_σ	0.741	0.403	2.259	-1.865	2.568
DRet_σ	0.030	0.030	0.029	0.001	0.548
TAC	0.045	0.057	-0.007	0.064	0.950
Panel B: China sample		Mean			
Variable	Full sample N=13556	Big N N=3315	Non-Big N N=10241	Difference	t-statistics
absDA	0.088	-0.286	0.213	-0.499	3.117
Spread	0.216	0.194	0.223	-0.029	11.910
Size	14.149	14.580	14.007	0.573	28.301
LEV	0.487	0.490	0.486	0.004	1.259
MB	4.074	3.864	4.142	-0.278	3.980
Growth	0.039	0.026	0.043	-0.017	2.593
Lagloss	0.085	0.058	0.093	-0.035	7.572
CFO_σ	0.152	0.103	0.211	-0.108	8.385
DRet_σ	0.061	0.084	0.053	0.031	3.682
TAC	-0.011	-0.012	-0.010	-0.002	0.927

absDA is abnormal discretionary accruals, estimated from Eq. (1) and multiplied by 100 for presentation; *Spread* is the average of the yearly difference between the daily last bid and ask quotes divided by equally weighted average, and multiplied by 100 for presentation. *Size* is natural log of market capitalization; *LEV* is leverage ratio; *MB* is market value to book value ratio; *Growth* is sales growth ratio; *LagLoss* is a dummy variable, 1 if the firm report a loss in the previous year and 0 otherwise; *CFO_σ* is standard deviation of operating cash flows over the last three years; *DRet_σ* is standard deviation of daily returns; *TAC* is total accruals.

Panel B shows that listed companies audited by Big N firms in China also presented a noticeably lower level of information asymmetry (difference -0.029; t-statistics= 11.910) and better earnings quality (difference -0.499; t-statistics=3.117), compared to companies audited by non-Big N firms. Similarly, listed companies audited by Big N audit firms tended to be larger with better growth development and fewer instances of losses incurred in the previous period as well as lower standard deviation in operating cash flow. These results are consistent with those of previous studies, and answer some additional doubts posed in previous studies regarding the audit quality for listed companies in China.

It is worth pointing out samples from both sides of the strait had distinct *DRet_σ* and *LEV* for companies audited by Big N firms, compared to companies audited by non-Big N firms. Listed companies audited by Big N firms in Taiwan showed a lower *LEV*, while listed companies in China tended to employ Big N audit firms in an effort to improve credit terms and the conditions for securing loans. Thus, the mean value of *LEV* for companies audited by Big N firms was higher, although the difference is not statistically significant (t-statistics=1.259).

Listed companies in China prefer debt financing via bank loans (Chen et al., 2010), resulting in higher leverage ratios in the China sample. On the other hand, the mean value of *DRet_σ* in the Chinese sample (0.061) was higher than that of the Taiwanese sample (0.030), indicating a higher market volatility risk in the capital market on the mainland. In the Taiwanese sample, no significant difference was observed in the mean value of *DRet_σ* in companies audited by Big N and non-Big N firms (t-statistics=0.548). In the Chinese sample, the mean value of *DRet_σ* in companies audited by Big N firms was significantly higher (t-statistics=3.682), indicating a higher return on investment for companies audited by Big N firms. These results support the criticisms in the media related to imbalances in China's capital markets.

Multiple regression analysis

Table 4 presents our empirical results. Sample data from Taiwan (the leftmost column) show a significant positive association between *absDA* and *Spread* (coefficient 0.120, p value<0.00), indicating that higher earnings quality (as a representation of audit quality) can reduce information asymmetry. However, multiple regression results from China do not support the expected relationship between audit quality and information asymmetry. Thus, the first question regarding the efficacy of audit quality to reduce information asymmetry is supported in the more mature Taiwanese market.

According to data from both Taiwan and China, the relationships among other control variables and *absDA* complied with our expectations. After controlling for yearly and industry effects, we discovered that earnings quality is significantly correlated with large scale companies, low leverage, low operating cash flow variance, low standard deviation in daily returns, and high accruals. Overall, the empirical model in this study provided greater explanatory capacity (goodness of fit) among the Taiwanese companies.

We also sought to determine whether Big N audit firms can reduce information asymmetry by providing higher auditing quality. This study categorized samples as companies audited by Big N and non-Big N firms to identify any cross-strait differences with regard to the effectiveness of audit quality in reducing information asymmetry.

Empirical results demonstrate that the significantly positive correlation between *absDA* and *Spread* appeared only in the sub-sample of Big N firms in Taiwan (coefficient 0.097, p value<0.05). The correlation was significant for non-Big N firms in Taiwan (coefficient 0.090, p value=0.341) but not for Big N firms in China (coefficient 0.423, p value=0.684). In addition, the Chinese sample showed a significant negative correlation, indicating that non-Big N firms are unable to reduce information asymmetry.

Table 4. Audit Quality and Information Asymmetry

$$absDA_{it}=\alpha+\beta_1 Spread_{it}+\beta_2 Size_{it}+\beta_3 LEV_{it}+\beta_4 MB_{it}+\beta_5 Growth_{it}+\beta_6 LagLoss_{it}+\beta_7 CFO\_\sigma_{it}+\beta_8 DRET\_\sigma_{it}+\beta_9 TAC_{it}+Year\ fixed\ effects+Industry\ fixed\ effects+\varepsilon_{it}$$

	Taiwan sample	China sample	Taiwan		China	
			Big N	Non-Big N	Big N	Non-Big N
Intercept	4.963**	6.451***	5.490***	-0.493	4.525**	7.038***
	(0.011)	(0.000)	(0.001)	(0.891)	(0.013)	(0.000)
Spread	**0.120*** **	**-0.932***	**0.097****	**0.090**	**0.423**	**-1.307****
	(0.002)	**(0.093)**	**(0.026)**	**(0.341)**	**(0.684)**	**(0.048)**
Size	-0.357***	-0.167***	-0.375***	-0.051	-0.016	-0.194**
	(0.000)	(0.007)	(0.000)	(0.762)	(0.873)	(0.015)
LEV	2.294***	3.257***	2.264***	3.710***	3.819***	3.181***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
MB	1.047***	0.124***	1.091***	0.673***	0.149***	0.117***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Growth	1.058***	0.116	1.136***	0.829***	0.439	0.037
	(0.000)	(0.356)	(0.000)	(0.000)	(0.107)	(0.793)
Lagloss	-0.180	0.009	-0.111	-0.463	-0.324	0.077
	(0.314)	(0.956)	(0.574)	(0.250)	(0.379)	(0.683)
CFO_σ	1.089***	0.622***	0.859***	24.892***	1.057***	0.503***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
DRet_σ	19.281***	0.725***	19.249**	13.583	0.441*	0.809***
	(0.006)	(0.000)	(0.010)	(0.486)	(0.087)	(0.000)
TAC	9.911***	12.837***	8.425***	12.845***	14.889***	12.310***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
YEAR	*included*			*included*		
IND	*included*			*included*		
N	11490	13556	9540	1950	3315	10241
R^2	0.196	0.095	0.183	0.351	0.119	0.092

absDA is the absolute value of abnormal discretionary accruals. All other variables are identified previously in Table 3.

* Significant at the 10% level.

** Significant at the 5% level.

*** Significant at the 1% level.

Results show that the audit quality of non-Big N firms in Taiwan is significantly correlated with a reduction in information asymmetry; however, the audit quality of Big N firms in China was not significantly correlated with the mitigation of information asymmetry. Non-Big N firms in China were significantly negatively correlated with a reduction in information asymmetry, indicating that when companies are audited by non-Big N audit firms, their earnings quality is not high enough to influence information asymmetry.

Compared with non-Big N firms in Taiwan, the Big N firms were able to mitigate information asymmetry by maintaining earnings quality. This supports our hypothesis that information asymmetry can be reduced through high quality of auditing. Overall, this hypothesis could not be supported in the Chinese market. Nonetheless, compared to non-Big N firms in China, the Big N firms still appear to provide higher quality of auditing, despite a lack of statistically significant correlations.

Conclusion

The aim of research in the field of auditing is to identify factors and systems capable of enhancing the independent objectivity of auditors as well as the factors that may undermine audit quality and thus impair the function of signal accounting information. We conducted a comparative study of the audit markets in Taiwan and China, comparing levels of information asymmetry to determine whether Big N firms in Taiwan and China provide auditing quality sufficient to countermand information asymmetry. High-quality auditing imply accounting data of higher accuracy, capable of reducing information asymmetry, facilitating more reliable decision making, raising the confidence of external investors, and reducing information risk. Considering that the size and reputation of audit firms can positively influence audit quality, the government of China has instituted regulations to promote the merging of audit firms. Researchers have recently begun investigating whether the induced merging of audit firms can actually enhance audit quality. This study is an extension of previous research seeking to compensate for gaps in this area.

Big N audit firms in Taiwan were shown to play an important role in mitigating information asymmetry by providing higher quality of auditing. The Big N audit firms in China enjoyed relative size advantage but had low market share. Although their audit quality was higher than that of non-Big N firms (audited clients had relatively conservative total accruals), these firms were not significantly effective in mitigating information asymmetry. We infer that this may be related to market share. The findings of this study provide both practitioners and lawmakers with the following valuable information: Market concentration and market share are more important than the size of an audit firm with regard to reputation incentive and audit quality. Future research could seek to expand upon and further verify these findings.

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