Auditor rotation and audit quality

Abstract

Auditor rotation is one of the requirements that regulators in many countries impose on auditors to enhance audit quality. Literature suggests that a long and close relationship between the auditor and the client deteriorates auditor independence and this may impair the audit quality. With audit partner rotation, it is expected that the new incoming auditor will enhance auditor independence as well as offer fresh insights to a client, which may lead to a greater audit quality evidenced by greater financial reporting quality. However, the loss of a client-specific knowledge through audit partner rotation may impair audit quality when a new auditor is appointed. These conflicting results of auditor rotation lead to enduring discussion about the benefits of auditor rotation in a number of countries. Most studies on auditor rotation have been carried out in developed countries. This study aims to contribute to the gap in research on the effects of auditor rotation in a developing country, Thailand. Thailand has unique characteristics. Unlike other countries in Southeast Asia region, Thailand has never been colonised and this aspect has influenced its legal and accounting practices. Archival data on 423 listed companies on the Stock Exchange of Thailand from 2006 to 2016 is used to evaluate the audit quality after mandatory audit partner rotation. Following previous studies, the performance-matched modified Jones model is used to measure discretionary accruals as a proxy for financial reporting quality and audit quality in this setting. In the observed period, three compulsory audit partner rotations occurred leading to the study of the effects of those rotations on the changes of the audit quality. It is hypothesised that results of this study will provide evidence of the improvement in audit quality as a consequence of mandatory audit partner rotation.

Keywords: audit partner rotation; discretionary accruals; audit quality; Thailand

1. Introduction

Mandatory auditor rotation has been extensively discussed by both academics and practitioners since the accounting scandals and collapses involving international corporations such as WorldCom and Enron in the United States. The role of auditors and the scope of auditing as well as auditor independence and audit quality have been criticised by different stakeholders (Harris, 2012; Lee, 2015; Stakebrand, 2016).

In order to improve the accuracy and reliability of corporate disclosures, the United States Congress reformed various regulations for both audit and capital markets, including mandatory auditor rotation through the Sarbanes-Oxley Act of 2002 (SOX) Section 203 (General Accounting Office, 2003; Harris, 2012). The aim of the mandatory auditor rotation is to limit the period over which audit services are provided to the same client and thus enhance audit quality (Harris, 2012; Kitiwong, 2014; Lee, 2015).

Prior studies stated that a new auditor brings a new perspective to professional services and promotes auditor independence (Firth, Rui, & Wu, 2012; Healey & Kim, 2003; Jennings, Pany, & Reckers, 2006). However, many studies have found the opposite results that showed decrease in audit quality following auditor rotation because of the loss of client-specific knowledge (Chi, Myers, Omer, & Xie, 2016; Harris, 2012; Lee, 2015; Stakebrand, 2016). Even though there is no conclusive evidence on the effects of auditor rotation, the concept of mandatory auditor rotation is widespread in many countries, including Thailand (Phadungdet, 2014; Pinijorachai, 2007; Thapayom, 2012).

Auditor rotation was introduced in Thailand a decade ago with the aims of improving audit quality and conforming to the requirements of the international standards (Federation of Accounting Professions (FAP), 2013a). However, no study has yet provided explicit evidence of improvements in audit quality as a consequence of mandatory auditor rotation in developing countries, including Thailand.

Unlike other countries in Southeast Asia that had historically been controlled by developed countries, the economic and accounting regimes of Thailand have not been influenced by European colonists because the country has no history of colonisation (Kitiwong, 2014). Thailand's rule of law is a combination of local code law and common law influenced by neighbouring countries (The Central Intelligence Agency, 2015). Thailand is perceived as an emerging code law market with a weak regulatory environment, weak investor protection rights, a bank-oriented financial system and an unsophisticated legal (or financial) regime (Chayasombat, 2010; Iatridis, 2012). These characteristics of Thai financial regime are not likely to lead to a high-quality capital market (Ball, Robin, & Wu, 2003).

Previous studies have shown that large audit firms (Big 4 audit firms) are associated with higher audit quality than the small audit firms, (non-Big 4 audit firms) as Big 4 audit firms have better reputation and networks (DeAngelo, 1981b; Francis, 2004), as well as in-house expertise in detecting material misstatements (Francis, 2004). However, in Thailand, there is no significant difference in audit market segmentation between Big 4 audit firms and non-Big 4 audit firms. This means that the Big 4 audit firms/auditors are not the major audit services supplier. Thus, this type of audit market setting also distinguishes Thailand as a unique setting in obtaining an additional understanding on the effects of mandatory auditor rotation.

1.1 Motivation

There are two motivations for this study. Firstly, there is little known about the impact of mandatory auditor rotation on the audit quality in developing countries, especially Thailand (Chayasombat, 2010; Kitiwong, 2014). Previous studies in Thailand's context have not captured the impact of audit quality on Thailand listed companies after mandated auditor rotation requirements have been introduced in Thailand. These prior studies included only SET100 (top 100 companies on market capitalization of Thailand market) (Pinijorachai, 2007; Thapayom, 2012) and small firm segment (Chayasombat, 2010). Employing earnings management as a proxy of audit quality, Phadungdet (2014) investigated the relationship between the auditor rotation and earnings management and did not make comparison of audit quality before and after the mandatory auditor rotation requirement. Another empirical study by Kitiwong (2014) indicated the relationship between audit tenure and earnings management

but not specifically focused on the mandatory auditor rotation and audit quality. Mixed results from previous studies also prompted this research. Phadungdet (2014) that used earnings management as a representation of audit quality, showed that companies with mandatory auditor rotation had less earnings management than companies without the auditor rotation. On the other hand, Pinijorachai (2007) found no significant change in earnings distortion after audit partner rotation. Also, Thapayom (2012) revealed that the mandatory audit partner rotation is not related to earnings quality. Therefore, the findings of previous studies are contradictory. This proposed study will use 11 years of data (2006-2016) in examining the audit quality as a consequence of mandatory auditor rotation for at least three rotation periods: 2006, 2011, and 2016. This study also includes all companies listed on the Stock Exchange of Thailand (SET). As such, a thorough investigation would provide new evidence on the effect of mandatory auditor rotation on audit quality in a developing country context.

Secondly, the regulatory environment, the economic and accounting regime also make Thailand an interesting setting to investigate the influence of mandatory auditor rotation on audit quality. Thailand's market environment has unique characteristics that are different from big and more developed market environments. Even though it has never been colonised, Thailand has a weak economic environment (Chayasombat, 2010), and an unsophisticated accounting environment (Ball et al., 2003). This has prompted the regulators to adopting the International Code of Ethics for professional accountants based on IESBA's 2012 Edition (the Code) (FAP, 2013b; World Bank Group, 2008) to increase audit quality in this market and improve foreign investors' confidence.That Code is perceived as the best ethical practice and a high quality ethical guideline around the world. Section 290.150 of the IESBA's 2012 Edition Code "Long association of senior personnel (including partner rotation) with an audit client", requires the key engagement auditor to rotate after a certain number of years in order to encourage high quality auditing (FAP, 2013b). Therefore, this study provides evidence whether the adoption of the Code in a developing country such as Thailand, would lead to an improvement in audit quality.

Thus, both the contradicting research evidence and unique characteristics of Thailand context provide the motivations for this study to investigate the impact of mandatory audit partner rotation on audit quality.

1.2 Contributions

This study contributes to the literature on auditor rotation and audit quality in three ways. Firstly, this study provides a contribution to the knowledge of audit quality in a developing country and additional evidence from an emerging market, particularly from Thailand. As this study includes a larger sample of companies and most recent financial statements, the results provide current insights from a developing market with regards to mandatory auditor rotation and audit quality especially from a country known to have weaker regulatory enforcement (Ball et al., 2003; Chayasombat, 2010).

Secondly, evidence from this study provides additional evidence into the effectiveness of mandatory auditor rotation to mitigate familiarity and self-interest threats and thus, auditor independence and audit quality. This evidence is likely to be useful to regulators in Thailand and in other emerging markets with similar characteristics and accounting environment as Thailand such as other South-East Asian countries. Thailand's professional accounting bodies would benefit from the results in their evaluation of the effectiveness of international ethical standards adoption on audit quality. The international regulators of the professional accounting bodies could also use the results of the proposed study to further understand and be aware of various factors affecting effective implementation of the international standards in a developing country. This would perhaps enable the regulators to identify special arrangements and assistance required in implementing the international ethical standards in Thailand and other countries with similar accounting and business environment.

Finally, this study contributes to the agency theory on its application in a developing country within the context of mandatory auditor rotation. The agency theory suggests that "due to the remoteness of the owner from the entity, the complexity of items included in the financial report and competing incentives between the owners and manager, the owners (principals)

have an incentive to hire an auditor (incur a monitoring cost) to assess the truth and fairness of the information contained in the financial report prepared by their managers (agents)" (Moroney, Campbell, & Hamilton, 2014, p. 27). As such, regulatory mechanisms such as mandatory auditor rotation are introduced to align the interests of the agents with the principals, to reduce the scope for information asymmetries and opportunistic behaviour (Institute of Chartered Accountants of England and Wales 2005, p. 6). The main goal of mandatory audit firm rotation is to improve audit quality by ensuring that auditors remain objective, by enhancing their independence. It is based on the assumption that by rotating auditors, excessive familiarity between the auditor and its clients is reduced. However, in a developing country such as Thailand, the success of this regulatory mandatory auditor rotation also depends on the willingness of the rulers and politicians of the country. This has given rise to a great deal of debate on the actual effectiveness of this internationally adopted policy, thus this research is very relevant. Perrow (1986) and Eisenhardt (1989) recommended for the application of the agency structure to richer contexts that involve information asymmetry and self-interest. As such, by using agency theory in Thailand this study would provide a better understanding of various factors affecting the effectiveness of mandatory auditor rotation within the agency framework (Eisenhardt, 1989).

Taken together, evidence from this study will add new insights on whether the mandatory auditor rotation and auditor's independence based on the ethical requirements improve audit quality in Thailand. The effectiveness of both international ethical practices and standards would be of interest to the regulators and professional accounting bodies in Thailand and other countries with similar regulative and legislative environment. Finally, the application of the agency theory/framework in studying mandatory auditor rotation provides additional evidence of various factors affecting the audit quality in a developing country.

2. Conceptual Framework

2.1 Agency Theory

The agency theory developed by Jensen and Meckling (1976) has been used in many studies (Agunda, 2014; Ahmad, 2012; Chayasombat, 2010; Matoke & Omwenga, 2016; Phadungdet, 2014; Stakebrand, 2016; Sulaiman, 2011). It is used to describe the main role of the auditor and audit quality in this study. According to the agency theory, a company consists of a nexus of contracts between shareholders (the principal) and the firm's management (the agent). The principal delegates authorities and duties to the agent through different contracts with the objective of maximising the principal's wealth. This relationship is described as an agency relationship.

Agency theory assumes that the principal and the agent are driven by the needs to maximize their self-interest and that those are incompatible interests. The conflict of interest between the principal and the agent is referred to as the agency problem (Deegan, 2014; Stakebrand, 2016). Theoretically, the agent has to manage the companies by aligning its interests with the principal's interests. The agent also has to deliver all relevant information to the principal and receive remuneration based on their performances. Since the agent has more information than the principal and the principal cannot access all the available information, information asymmetry arises. This information asymmetry increases agency costs to the principal (Deegan, 2014; Watts & Zimmerman, 1983).

In order to reduce the likelihood of increased agency costs, "the principal and the agent engage in contracting to achieve optimality, including the establishment of monitoring processes such as auditing" (Matoke & Omwenga, 2016, p. 373). Auditing would be able to identify whether the agent's interests are aligned to the shareholders' (Jensen & Meckling, 1976). In most cases, "an independent auditor can reduce information asymmetry by assessing the truth and fairness of the information contained in the financial statements prepared by the managers" (Moroney et al., 2014, p. 27). In addition, an auditor also provides assurance about the reliability and credibility to the company's financial statements (Dandago

& Zamro, 2013; Stakebrand, 2016). Thus, an auditor is "the independent link between management and those who rely on the financial statements"(General Accounting Office, 2003, p. 11), especially the shareholders.

In other words, the concept of agency relationship also introduces an independent auditor as an agent of the principal (apart from the company's management) when performing auditing over a company's financial reporting (Institute of Chartered Accountants of England and Wales 2005; Stakebrand, 2016). In this scenario, an auditor is driven by his self-interest in maximising his wealth, through the audit fees payment. Stakebrand (2016) states that "even though indirectly financed by the shareholders, the firm or the firm's audit committee decides on which auditor to hire and pays the audit fee. This gives the auditor incentives to act in the interests of the firm's management instead of the interests of the shareholders" (p.7). This statement leads to a new concern about the threats to auditor's objectivity and independence. That is, an auditor may be tempted to align his other interests with management rather than with shareholders' interests in order to maintain financial incentives arising from client's management relationship for several years. In this way, a close auditor-management relationship may affect the objectivity of the auditor. In order to mitigate this threat, an auditor has to remain sceptical and independent from management. This would improve a monitoring role of auditor over the financial statements (Institute of Chartered Accountants of England and Wales 2005; Stakebrand, 2016; Sulaiman, 2011).

Auditor independence is the cornerstone of the audit profession and is associated with audit quality (Brooks, 2011; Kitiwong, 2014). In this study, auditor independence refers to "the conditional probability of reporting and discovering a breach (in the accounting system) of a given client" (DeAngelo, 1981b, p. 186). Similarly, "An auditor is required to be independent in mind and in appearance in order to express a conclusion, without bias, conflict of interest, or undue influence of others" (IESBA, 2012, p.43). Nonetheless, there are many different circumstances that would create threats to auditor independence, including familiarity and self-interest threats (IESBA, 2012). The familiarity threat stems from the audit tenure where an auditor may have been employed by the same client for a long period of time. Audit tenure forms a close relationship between the client and the auditor, instead of a professional one (Chayasombat, 2010; Tepalagul & Lin, 2015). Auditors' incentives, which are manifested in

ongoing audit fees, create self-interest threat. Both, familiarity and self-interest threats may impair auditor's independence. When independence is compromised, an auditor is less likely to report misstatements which can adversely influence the audit quality. In other words, the lower the degree of auditor independence, the lower the likely quality of audit services (Postma, 2016).

In order to strengthen auditor independence and improve the accuracy and reliability of corporate disclosures, the United States Congress reformed various regulations over both audit and capital markets by introducing mandatory auditor rotation requirement through the Sarbanes-Oxley Act of 2002 (SOX) section 203 (General Accounting Office, 2003; Harris, 2012). A mandatory auditor rotation after a certain number of years is required as a safeguard so that threats to independence could be minimised to an acceptable level (IESBA, 2012). Auditor rotation is meant to encourage auditor independence by shortening the relationship between an auditor and the management (Chen, Lin, & Lin, 2008; Myers, Myers, & Omer, 2003) , this would improve the audit quality and therefore, the financial reporting/earnings quality (Carey & Simnett, 2006; Chi & Huang, 2005; Firth et al., 2012). An opposing argument is that former auditor could lose client-specific knowledge and new auditor's steep learning curve might lead to lower audit quality (Bedard & Johnstone, 2010; Chi et al., 2016; Geiger & Raghunandan, 2002; Myers et al., 2003). While the evidence is inconclusive on this impact of auditor rotation, more evidence is needed as many countries worldwide have started adopting the auditor rotation requirement into their auditing regime.

In conclusion, agency theory based principal-agent relationship can be used to explain an auditor's role in enhancing the financial reporting and audit quality of financial reporting. The theory also infers the need for audit quality and auditor independence through mandatory auditor rotation in minimising the information asymmetry between the principals and the company's management. The inclusion of the auditor as another agent to the principals, which might be driven by his own incentives, makes this area of study worth investigating (Brooks, 2011; DeAngelo, 1981a; Harris, 2012; Stakebrand, 2016; Sulaiman, 2011; Chayasombat, 2010).

2.2 Audit Quality Frameworks

This study uses the framework for audit quality based on International Auditing and Assurance Standards Board (IAASB) 2014 audit quality framework (as per Figure 1 below).

The objectives of the IAASB framework are to "raise awareness of the key elements of audit quality, encouraging key stakeholders to explore ways to improve audit quality, and facilitate greater dialogue between key stakeholders on the topic" (IAASB, 2014b, p.1). This framework includes a wide range of influencing factors that potentially influence the impact on audit quality (Kitiwong, 2014; Stakebrand, 2016).The concept of audit quality is different for each group of stakeholders depending on what they use it for (Catanach & Walker, 1999; Kitiwong, 2014). Thus, the understanding of the different expectations of users and relevant factors is important (IAASB, 2014).

In Thailand context, its professional accounting body, FAP, makes it mandatory for listed companies to adopt this IAASB audit quality framework (FAP, 2013b). As shown in Figure 1, the framework has five elements of audit quality: input, process, output, key interactions supply chain, and contextual factors.

The IAASB's audit quality framework is depicted in Figure 1.

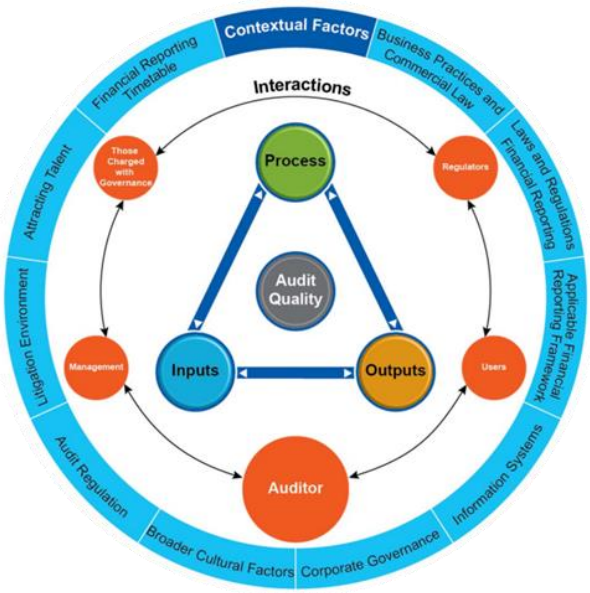

Figure 1: A framework for audit quality by IAASB (2014)

2.2.1 Input factors

The framework ensures that, "quality audits involve auditors: exhibiting appropriate values, ethics and attitudes; and being sufficiently knowledgeable, skilled, experienced, and having sufficient time allocated to them to perform the audit work" (IAASB, 2014, p.6). A number of prior studies have been conducted based on input factors of the IAASB framework for audit quality. For example, the study by Karacaer, Gohar, Aygun, and Sayin (2009) investigate auditors' values. The authors study the role of values in the ethical decision-making processes of Pakistani and Turkish professional auditors. While Kitiwong (2014) investigates auditors' attitude on audit quality in Thailand. Another study by Sweeney, Arnold, and Pierce (2010) examine "the impact of perceived ethical culture of the firm and selected demographic variables on auditors' ethical evaluation of, and intention to engage in, various time pressure-induced dysfunctional behaviours" (p.531).

There are also many studies that examined the knowledge, skills and auditors' experiences. For example, Arthur, Endrawes, and Ho (2017) found that the audit quality increases after the auditor rotation when a new auditor has an industry specialisation. Further, Cameran, Ditillo, and Pettinicchio (2017) revealed that the audit team member attributes such as the common educational background after auditor rotation could influence audit quality. These input factors focussing on the personal attributes of auditors are excluded from the proposed study.

2.2.2 Process factors

The framework for audit quality also stipulates that "quality audits involve auditors applying a rigorous audit process and quality control procedures that comply with laws, regulations and applicable standards" (IAASB, 2014b, p. 12). As such, senior audit team members, who have more experiences, should consistently perform the quality control on audit procedures to maintain the quality. Further, their audit firms' quality control procedures must also be in compliance with IAASB's ISQC1 for continuous development of the audit methodology.

There are very few studies that investigate audit processes. A study by Sutton (1993) investigates "a set of key factors influencing the quality of the audit process and a corresponding set of measures for evaluating audit quality" (p.88). However, Kitiwong (2014) claims that "real audit fieldwork is not allowed to be observed or investigated. Therefore, researchers have generally used ex-post data on audits to evaluate the process of auditing instead of accessing the process of an audit as it is being conducted" (p.74). For this reason, this study excludes the process factors.

2.2.3 Output factors

According to the framework for audit quality, IAASB identifies that "quality audits result in outputs that are useful and timely. Outputs are described in relation to the full reporting supply chain and they include outputs from: the auditor, the audit firm, and the entity and audit regulators" (IAASB, 2014, p. 4). Also, IAASB explains that "the primary output of an audit is an auditor's opinion that provides users with confidence as to the reliability of the audited financial statements" (IAASB, 2014, p.15). The auditor's report is a signal to convey company's facts to stakeholders. The value and timeliness of the auditor's report, the transparency of the audit and annual reports increase the audit quality if they contain useful information for financial statements' users.

Many studies use different output factors as proxies for studying audit quality. For example, some studies use audited financial statements (Cameran, Francis, Marra, & Pettinicchio, 2015; Carey & Simnett, 2006; Shafie, Hussin, Yusof, & Hussain, 2009). Others use auditor's opinion (Geiger & Raghunandan, 2002; Lee, 2015; Ruiz-Barbadillo, Go´mez-Aguilar, &

Carrera, 2009), while several other studies use audit fees (Cameran et al., 2015; Kwon, Lim, & Simnett, 2014; Stewart, Kent, & Routledge, 2016), and audit hours (Cameran et al., 2015; Kwon et al., 2014). In addition, audit tenure (Carey & Simnett, 2006; Geiger & Raghunandan, 2002; Myers et al., 2003) and audit adjustment transactions (Lennox, Wu, & Zhang, 2014) have been used as proxies when investigating audit quality.

Some studies measured audit quality via the quality of audited financial statements, proxied by level/change in discretionary accruals (Cameran et al., 2015; Chen et al., 2008; Kwon et al., 2014; Lee, 2015; Lennox et al., 2014; Myers et al., 2003; Ryken, Radich, & Fargher, 2007). This output is claimed to likely represent the audit quality in terms of the financial information's quality to investors and stakeholders in their decision making processes. Other outputs such as audit fees, audit hours, and audit adjustments are excluded from this study because they are unobservable.

2.2.4 Key Interactions within the Financial Reporting Supply Chain

According to the framework for audit quality, "quality audits involve auditors interacting properly with the stakeholders in the financial reporting supply chain. The interactions between the following key stakeholders are described as amongst: the auditor, management, those charged with governance, users, and regulators. These interactions, including both formal and informal communication, are influenced by the context in which the audit is performed, and allow a dynamic relationship to exist between inputs and outputs" (IAASB, 2014, p. 5). The communications among participants encourages audit quality by sharing and interacting different aspects of the auditing processes and their expectations on companies' performance reports.

Many factors may have influenced the interactions between the auditor and the stakeholders in different ways, including the practice of auditor rotation. Previous studies also use various interactions factors to examine audit quality such as the users' opinions (Jennings et al., 2006) and audit partners' opinions (Daugherty, Dickins, Hatfield, & Higgs, 2012) on the audit quality after auditor rotation. Imhoff (2003) focuses on the relationship between regulators, the management, and the auditor through auditor rotation. Hossain, Monroe, Wilson, and Jubb (2016) study on the interaction between audit committee, audit partner, and

audit quality. Based on the framework and previous studies, this study concentrates on the interactions of these key stakeholders on the mandatory auditor rotation in Thailand.

2.2.5 Contextual factors

Also according to the audit quality framework, "quality audits involve auditors who respond properly to contextual factors. Contextual factors are described as having the potential to impact the nature and quality of financial reporting and, either directly or indirectly, audit quality" (IAASB, 2014, p. 4). Also, IAASB states that "The contextual factors represent the environment of financial reporting and auditing" (IAASB, 2014, p.26). Contextual factors vary from country to country in terms of business practices and commercial laws, applicable financial reporting frameworks, corporate governances, and information systems leading to different level of audit quality. Research suggests countries' contextual factors can be researched/explained through their economic and accounting environment that influence the audit quality (IAASB, 2014). For example, common law countries, such as the U.S. and the U.K., are generally perceived as strong economic environments that encourage the higher-quality of financial reporting as compared to code law countries such as France and Italy (Ball et al., 2003; Barth, Landsman, & Lang, 2008).

Many studies investigate the IAASB audit quality framework in relation to audit quality in countries that have big audit and financial markets to evaluate the effectiveness of auditor rotation requirement, for example, the U.S. (Jennings et al., 2006; Myers et al., 2003), Australia (Ryken et al., 2007; Stewart et al., 2016), South Korea (Kwon et al., 2014), and China (Lennox et al., 2014). There is a small number of studies conducted in small and unique developing countries, especially Thailand, that motivates this study to use this framework.

2.3 Conceptual Framework

This proposed study focuses only on relevant contextual factors of the IAASB framework for audit quality in examining the impact of the mandatory auditor rotation on audit quality. These factors to be studied are categorised into three elements: contextual factors, key interactions, and effects. Adapted from IAASB (2014) audit quality framework, Figure 2 depicts the conceptual framework of the proposed study.

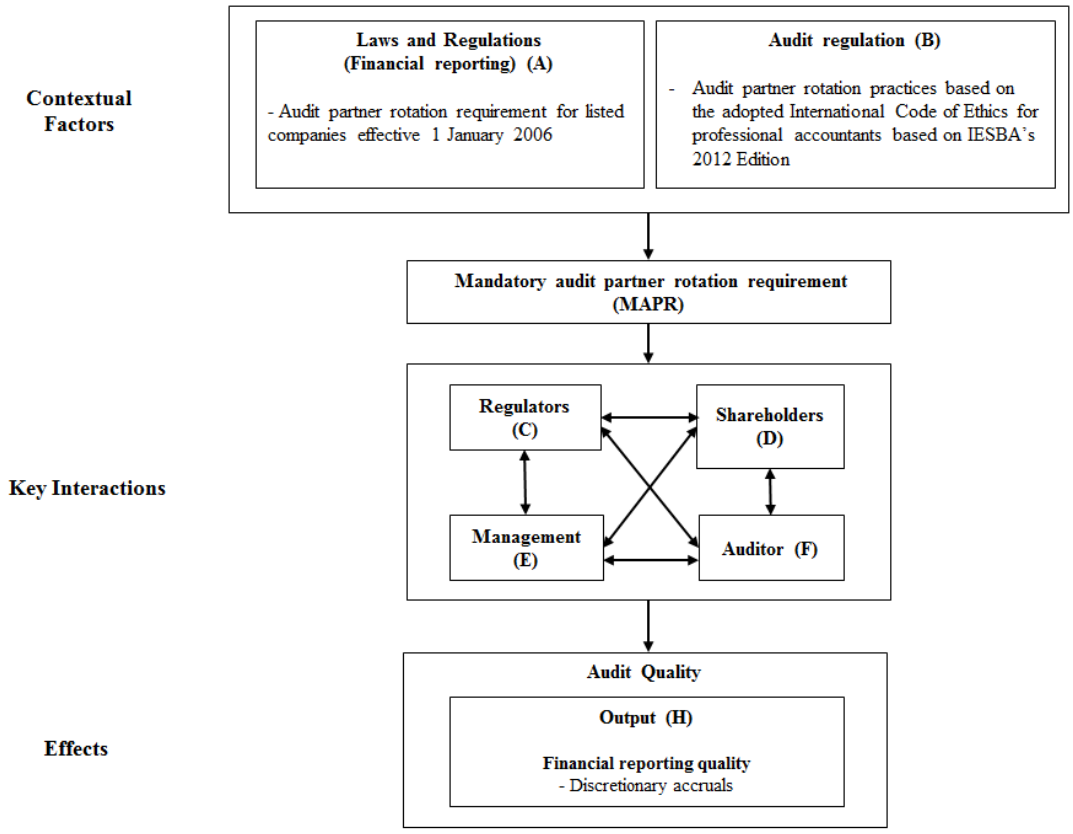

Figure 2: Conceptual framework for this study adapted from IAASB 2014's framework for audit quality

2.3.1 Contextual factors

The two significant contextual factors which influence mandatory auditor rotation in Thailand are the financial reporting's laws and regulations, and audit regulation. The mandatory audit partner rotation is required by the Securities and Exchange Committee of Thailand (SECT) which regulates financial reporting of the SET (SECT, 2015b) (path A → MAPR → Key interactions). SECT requires five years of auditor appointment limitation for listed companies and two years of cooling period through KorJor.39/2548 (Notification of the SECT on governing securities issuance and issuer's duty) which is in effect since 1 January 2006 (Kitiwong, 2014; Phadungdet, 2014; Thapayom, 2012). As mentioned previously, the Thai professional accounting body, FAP has adopted the International Code of Ethics for professional accountants based on IESBA's 2012 (the Code). This requires the rotation of the key engagement audit partner in order to promote high quality auditing (FAP, 2013b) (path B → MAPR → Key interactions) in Thailand's listed companies (Phadungdet, 2014; Pinijorachai, 2007; Thapayom, 2012).

2.3.2 Key interactions

As per the framework on audit quality, IAASB states that "the interactions among the key stakeholders are influenced by the context in which the audit is performed" (IAASB, 2014, p. 5). In this study, mandatory auditor rotation is assumed to have an influence on the context and the dynamic relationship between the inputs (laws and regulations) and output (audit quality). In Thailand, a lead audit partner is required to rotate by both regulators, FAP and SECT. As such, the key elements of contextual factors are regulators (C), financial statement users (D), management (E), and auditor (F). They form the key interaction chains supporting the high-quality financial reporting and audit quality (IAASB, 2014).

In Thailand, SECT and FAP responsible for overseeing and inspecting auditors for audit quality purposes (path C → F), establishing and enforcing the financial reporting frameworks for audit quality improvements (path C → E). Publicly reported Thailand regulators' activities provide "an impression of audit quality" especially to the financial statement users (IAASB, 2014, p. 24) (path C → D). Financial statement users, the management, and the auditor assist regulators by effectively giving feedback (path F → C, E→ C, D→ C).

The interaction between shareholders and management can enhance shareholders' understanding of the financial statements through the issuance of press releases (path E → D). The shareholders could demand higher quality financial reporting from the management in annual general meetings, expecting them to align their interests as their agents (path D → E). The shareholders interact with the auditor in the general meetings by asking questions and clarifications, appointing or reappointing an entity's auditor (path D → F). An auditor has to provide independent opinion on the truth and fairness of the entity's financial position to the shareholders (path F → D). As an auditor is expected to be independent while performing the auditing (DeAngelo, 1981b), mandatory auditor partner rotation is expected to improve his independence by minimising threats to independence and thus, improves the audit quality (IAASB, 2014; FAP, 2013a).

The management is responsible for the preparation of the financial statements and provision of other relating information to the auditor (path E → F). The auditor is also required to give recommendation and possible improvements to the entity's financial reporting practices and internal controls (path F → E). However, if the auditor over-familiarity with the client due to auditing the same client for a long period of time, this would create familiarity threats in addition to self-interest threat through the continuity of the audit fees payments (IAASB, 2014, p.40). These threats to independence can be reduced by having the mandatory audit partner rotation in Thailand (Phadungdet, 2014; Pinijorachai, 2007; Thapayom, 2012). Thus, the rotation is an important/critical factor for audit quality.

2.3.3 Effect

In this study, the audit quality is referred to as the output/consequential factor of mandatory audit partner rotation. IESBA (2012) and previous studies have claimed that the mandatory auditor rotation can improve the audit quality and enhance the financial reporting (Kitiwong, 2014) and earnings' qualities (Chen et al., 2008; Myers et al., 2003) (path MAPR → Key interactions →H).

Prior studies have employed various "ex-post data of audits" (Kitiwong, 2014, p. 74) as the proxy of output to evaluate audit quality following auditor rotation. As mentioned earlier, auditor's opinion (Firth et al., 2012; Geiger & Raghunandan, 2002; Monroe & Hossain,

2013) and earnings/financial reporting quality (Chen et al., 2008; Chi, Huang, Liao, & Xie, 2009; Kwon et al., 2014; Thapayom, 2012) have been used as determinants of audit quality. Therefore, this study will use the financial reporting quality as a proxy of the audit quality measured by discretionary accruals following prior studies (Chen et al., 2008; Chi & Huang, 2005; Chi et al., 2016; Kitiwong, 2014; Myers et al., 2003).

In conclusion, consistent with the agency theory, the mandatory audit partner rotation along with other relevant factors could influence audit quality as proposed by the IAASB's framework for audit quality. Using the conceptual framework, the results of this study will provide additional evidence on the impact of mandatory audit partner rotation on audit quality in Thailand.

3. Literature Review and institutional setting in Thailand

This part provides the background information of the institutional setting in Thailand for the auditor rotation as well as the literature review on the determinants of audit quality and auditor rotation including those studies previously conducted in Thailand and various other countries.

3.1 Background information and mandatory auditor rotation in Thailand

Thailand has been chosen for this study because of the uniqueness of its economic and accounting environments. Not only it has a smart economic policy (World Bank Group, 2016) and continuing economic growth (OECD, 2016), its financial system has not been influenced by European countries. Further, Thai's economic and accounting regimes have been aligned with international accounting standards and other international accounting regulations (International Financial Reporting Standards (IFRS), 2016) make it interesting to be studied.

3.1.1 Colonization, legal systems and business practices of Thailand

Between the 18th century and the 19th century, almost all countries in the Southeast Asia were colonized by European countries such as Great Britain, France as well as Japan. Great Britain and France had a significant domination in the region. They influenced and formed the legal environments in the countries they colonized. The only country that escaped colonisation and control by foreign powers was Thailand (Angus-Leppan, 1997; Chayasombat, 2010; Ma, 1997). In Southeast Asia, colonization resulted in two primary legal systems, the British Common Law and the French Code Law systems. Even though Thailand was never colonised, its legal system is influenced by both the French Code Law and the British Common Law systems used in the neighboring countries (The Central Intelligence Agency, 2015). They also influenced the countries' economic and accounting regimes.

In Thailand, it is the government rather than the individual investors, who plays an important role in developing the capital market regulatory environment and financial resources (Ball et al., 2003; Chayasombat, 2010). Further, institutional investors such as the governmental agencies and commercial banks tend to be major investors and financial resource funders as compared to the individual investors (Ball et al., 2003). Thus, the Thai financial system is likely to be bank-oriented with the bank as the major funder of business financial funds (Ali & Hwang, 2000; Chayasombat, 2010). As a result, Thailand has weaker investor protection in comparison to the more developed markets. Thus, it is likely to have higher rates of earnings management (Leuz, Nanda, & Wysocki, 2003). In terms of business practices, Ma (1997) reports that the major shareholders of the financial institutions in Thailand are Chinese. That is, since Chinese immigration over a hundred years ago, Chinese business practices have played a major role in the Thai trading system. As a result, family businesses and personal relationships are quite dominant in Thai business practices (Ball et al., 2003; Chayasombat, 2010; Ma, 1997). For instance, personal communication with the shareholders is preferred, hence financial reporting disclosure requirements are less emphasised (Ball et al., 2003).

In terms of tax regimes of the country, there is a link between financial reporting income and tax-based income. Based on Thai tax Law, corporate businesses are required to conform to financial reporting and tax reporting hence, most companies prepare financial reporting aligned with tax accounting for the convenience of tax assessments such as depreciation

policies (Ball et al., 2003; Chayasombat, 2010; Ma, 1997)These exclusive accounting and business environments make Thailand an interesting setting for studying the change of audit quality after the introduction of the International Code of Ethics for the accountants.

3.1.2 Accounting regulatory bodies and listed companies' auditor in Thailand

The Thai accounting regulator, FAP was enacted in 2004 (FAP, 2013a). The FAP is derived from the Accountant Association of Thailand, which was founded in 1948, and the Institute of Certified Accountants and Auditors of Thailand (ICAAT) in 1975 (FAP, 2013a). It is a self-regulatory body and a member of the ASEAN Federation of Accounting (AFA) and IFAC since 1977.

The FAP attempts to enhance the quality of accounting and auditing regimes in Thailand by conforming to international standards, regulations, and requirements including international ethical requirements. The FAP continues to translate the International Financial Reporting Standards (IFRS), International Standards on Auditing (ISA) and IESBA's 2012 Edition (FAP, 2013b) into the Thai language. These standards and requirements have been adopted into the Thai accounting regime. In 2012, the FAP with the endorsement of the Oversight Committee on Accounting Professions under the Ministry of Commerce, promulgated IFRS-based Thai Financial Reporting Standards (TFRS) for the preparation of financial statements by Thai listed companies. Under this regulation, an auditor who performs auditing in listed companies has to be accredited by the SECT (SECT, 2015).

In order to be a listed company's auditor, an audit firm and an individual auditor have to fulfill certain SECT requirements. That is, an audit firm has to have at least five full-time Certified Public Accountants (CPA) and assistant auditors (SECT, 2015). An audit firm is also required to have an audit quality control system which is in compliance with the Thai Standard on Quality Control 1 (TSQC1) (equivalent to IFAC's International Standard on Quality Control 1 (ISQC1)). This requirement has been enforced since 1st January 2014. It aims to enhance the existing audit quality (FAP, 2013a).

An individual auditor of a listed company has to be a CPA licensed by the FAP. He/she has to be a leader or a partner or someone in an equivalent position in an approved audit firm. He/she also has to be attached to only one approved audit firm, has a ten-year experience as an auditor and should not have any prohibited characteristics as prescribed by the SECT. In addition, an experienced auditor is usually an auditor who should have been a signing audit partner for at least three years within the last five years, and has been an engagement quality control reviewer (EQCR) for at least four years before filing an application. An approved auditor of the SECT has to have work experience in a reasonable sized company and have dealt with complicated and diversified clients (SECT, 2015). Also, all individual auditors have to comply with the Accounting Professions Act 2547 B.E. (2004), imposed by the FAP in 2004. The Act sets up the accounting standards, the auditing standards, and the code of ethical requirements (World Bank Group, 2008).

In order to enhance the auditors' ethics and the audit quality, the FAP translated and adopted the Code of Ethics for professional accountants based on the IFAC's 2012 Edition (the Code) (FAP, 2013b). The FAP also monitors and assesses audit quality of individual auditors through reviewing of working papers, while the SECT Accounting Supervision Department monitors the audit firms of listed companies. The SECT Accounting Supervision Department is created by the SECT and is a member of the International Forum of Independent Audit Regulators (IFIAR) (Kitiwong, 2014).

3.1.3 Mandatory auditor rotation in Thailand

There are two main regulatory bodies associated with mandatory auditor rotation in Thailand: the SECT and the FAP. The SECT imposes the auditor rotation requirement through the KorJor. 39/2548 Rules, Criteria and Procedures for Disclosure of Financial Status and Operating Results of Securities Issuing Companies (Item No. 20) (SECT, 2005). This requirement aims to reform financial reporting and disclosure practices of Thai listed companies; it also conforms with the global standards. The requirement limits five consecutive accounting years for engagement audit partner in servicing the listed companies. The cooling-off period is two years on rotation. This requirement became effective from 1st January 2006. Listed companies which could not comply with this requirement had to negotiate with the SECT on a case by case basis. Since 2008, however, all listed companies have to comply with this requirement which was made mandatory.

The FAP has been instrumental in the introduction of auditor rotation practices through the Auditors Act, B.E. 2505 (1962) since 1962. Initially in 2004, the regulator imposed Accounting Professions Act 2547 B.E. 2004 (the Act) and repealed the prior Act to legislate accounting standards and auditing standards including the ethical requirements (Kitiwong, 2014; Phadungdet, 2014). However, this Act did not explicitly require auditors to be rotated. In 2013, when the FAP adopted the Code (FAP, 2013b), periodic audit partner rotation was required to mitigate familiarity and self-interest threats between the management and the auditor. The auditor rotation is also aimed to promote greater auditor independence and enhance audit quality (FAP, 2013b). However, the audit partner rotation is only mandated for companies listed on the Thai stock market (SECT, 2005). By investigating the effects of mandatory auditor rotation on audit quality in Thailand, this study aims to add to the debate around the issue of auditor rotation.

3.2 The determinants of audit quality and auditor rotation

Audit quality

Audit quality is the core of auditing. Both practitioners and academics state that the determinants of audit quality are complex and multifaceted (Francis, 2011; Kitiwong, 2014; Löfving & Widenius, 2016). Since 1981, many studies such as those by Watt and Zimmerman (1986) and Francis (2011), have attempted to conceptualize, observe, and measure audit quality's dimensions (Wooten, 2003).

In accordance with other previous studies (Chayasombat, 2010; Chi et al., 2009; Löfving & Widenius, 2016; Stakebrand, 2016), this proposed study uses the definition of audit quality developed by DeAngelo (1981b). DeAngelo (1981b) established that quality of audit could be defined by (a) finding out the breach in corporate financial statements and (b) disclosing that breach. This audit quality definition can be referred to in components as auditor competency and auditor independence, respectively. The focus of the proposed study is on auditor independence that can be promoted by mandatory auditor rotation in order to improve audit quality.

According to the IESBA, auditor independence is the key factor in audit quality (Brook, 2011; IESBA, 2012; Kitiwong, 2014). Auditors should be independent by being free from self-interests (Lee, 1993; Mautz & Sharaf, 1961). IESBA requires auditors to be both, independence in mind and independence in appearance (IESBA, 2016). IESBA (2012) describes independence in mind as "the state of mind that permits the expression of a conclusion without being affected by influences that compromise professional judgment thereby allowing an individual to act with integrity and exercise objectivity and professional scepticism" (p. 46). In term of independence in appearance, IESBA (2012) definition is "the avoidance of facts and circumstances that are so significant that a reasonable and informed third party would be likely to conclude, weighing all the specific facts and circumstances, that a firm's, or a member of the audit team's, integrity, objectivity or professional scepticism has been compromised" (p. 46). That is, an auditor who lacks independence may have the tendency not to reveal material misstatements in financial reporting thus potentially impair audit quality.

Many factors, including familiarity and self-interest threats, can affect auditor independence, and therefore, audit quality (IESBA, 2012). The familiarity threat occurs when there is a close and long relationship between the management and the auditor through a long period of auditor tenure. This long length of auditor tenure may develop a personal rather than a professional relationship which can impair the auditor's professional scepticism (Brooks, Cheng, Jonhnston, & Reichelt, 2017), threatens the auditor's independence (Carey & Simnett, 2006; Chayasombat, 2010; Chen et al., 2008; Tepalagul & Lin, 2015), and consequentially deteriorates audit quality (Firth et al., 2012; Lennox et al., 2014). The long period with the same audit partner may also create self-interest threat, and increase audit fees dependency. Following compromised independence, an auditor tends to allow the management to create favourable financial statements through manipulation of accounting policies and transactions to prolong the relationship with the client (DeAngelo, 1981a; Dopuch, King, & Schwartz, 2001), as well as to ensure auditor's incentives, such as continuation of audit fees (Chi & Huang, 2005; Stakebrand, 2016). In addition, an auditor may be pressured by the management to issue an audit report that favours the management (Dopuch et al., 2001). Ultimately, a long auditor-client relationship has adverse effects on audit quality.

In order to minimise familiarity and self-interest threats, accounting professional bodies in many countries have mandated auditor rotation with the intention of audit quality improvement. That is, auditor rotation is established as a safeguard in order to "mitigate the associated threats and to reduce them to an acceptable level" (IESBA, 2012, p.71).

Auditor rotation

Mandatory auditor rotation is not new to the accounting profession. It first emerged as an idea in the 1930s as initiated by the practitioners. In the 1970s, mandatory auditor rotation was merely encouraged as the accounting practice profession as the means of auditor independence improvement. For example, in 1976, Ralph Nader and other members of Corporate Accountability Research Group proposed that listed corporate auditors should be rotated periodically every five years to enhance auditor independence (Hoyle, 1978; Ng, 2003). However, this suggestion was a guideline, not a regulation. In the same year, the Senate Committee also supported mandatory audit firm rotation through the Metcalf Report. This report suggested that the long period of audit-client relationship causes impairment of auditor independence.

After the collapse of Arthur Anderson in 2002, mandatory auditor rotation gained prominence again. The Arthur Anderson case illustrated the failure of auditing. In this case, there was wide public outcry about the firm's misreporting which decreased investors' confidences. Auditor independence also faced substantial criticism by stakeholders after the Arthur Anderson collapse. The public concerns led to the U.S regulator imposing mandatory auditor rotation requirement through the Sarbanes-Oxley Act of 2002 (the SOX). The SOX section 203 requires audit partner rotation every five years in the U.S. in order to increase the accuracy and reliability of a company's financial disclosures. As this legislation limits a long auditor-client relationship, mandatory auditor rotation was thought to minimise threats to auditor independence and encourage audit quality (General Accounting Officer, 2003; IESBA, 2016; Tepalagul & Lin, 2015). It also encourages a fresh view in the auditing process and influences competition among audit firms. By doing so, audit quality is expected to increase (Healey & Kim, 2003; Ng, 2003).

On the other hand, there are a number of studies that argue against mandatory auditor rotation. For example some studies point out that the loss of client-specific knowledge and experiences are likely, as a consequence of mandatory auditor rotation, to cause audit failure after auditor rotation (Chen et al., 2008; Chi et al., 2009; Daniels & Booker, 2011; Geiger & Raghunandan, 2002; Ryken et al., 2007) while some other studies suggest that there are also additional audit costs to a client (Ng, 2003). According to the auditor independence definitions previously mentioned, the General Accounting Office (GAO) also noticed that while mandatory auditor rotation can increase auditor independence in mind, there is no clear evidence on clear improvements in auditor independence in appearance (GAO, 2003). Thus, the GAO calls for further studies to provide more evidence on the impact of mandatory auditor rotation (Kaplan & Mauldin, 2008). A number of studies have been conducted to investigate the impact of auditor rotation on audit quality such as in the U.K., Italy, Australia, China and Malaysia, this topic is under-researched in Thailand. Thus, this proposed study intends to bridge the gap and provides additional recent evidence from Thai capital market.

3.3 Previous studies on auditor rotation and audit quality

There is a long-standing debate on the merits of auditor rotation requirement. Many studies have been carried out to investigate changes in audit quality as a consequence of auditor rotation. These have produced inconclusive results. This section provides the evidence from previous studies on the impact of auditor rotation on audit quality. Prior studies are categorised into two main groups; global studies and Thai studies.

3.3.1 Global studies on auditor rotation and audit quality

Positive impacts of mandatory auditor rotation

Many studies support the use of mandatory auditor rotation and the benefits of the fresh insight of a new auditor in the auditing process (Healey & Kim, 2003). For example, study by Lennox et al. (2014) has found evidence that supports mandatory auditor rotation. The authors investigate audit initiated adjustments to transactions before and after auditor rotation and use those as a proxy of audit quality in China. The researchers found that whereas an

outgoing audit partner is likely to clean up financial reporting through posting audit adjustment transactions on termination period, a new auditor, with a new perspective, is also more likely to require adjustments to transactions in the first year as an incumbent auditor. These results shown audit quality increased. This could imply that audit quality is possibly improved in the last year of a departing lead audit partner and the first year of a new incoming lead audit partner. However, the study by Lennox et al. (2014) observes mainly Chinese urban stock markets therefore the results might not be easily generalised to other contexts.

Many studies appear to confirm that auditor rotation increases auditor independence through limiting the long length of auditor-client relationship, thereby improving audit quality. A study by Chi and Huang (2005), for example, examines the relationship between earnings quality and audit tenure in Taiwan. The researchers assume that the excessive-familiarity from a long period of audit services can decrease audit quality. Their study uses discretionary accruals as an audit quality proxy and the number of years that the auditor has provided audit services to the same client which were employed as an independence factor. The results confirmed that the lower earnings quality was related to a long length of auditor-client relationship.

Similarly, Carey and Simnett (2006) investigate the association between audit partner tenure and audit quality in Australia. They use audit tenure and the probability of bankruptcy of a financially distressed company as independent factors that indicate presence or lack of audit quality. Audit quality is measured by auditors using a going-concern, modified audit opinion with such distressed firms. It is assumed that "the auditor has to objectively evaluate a company's performance and withstand client pressures to issue a clean opinion" (Carey & Simnett, 2006, p. 660). The results revealed that there was a lower propensity to issue a going-concern, modified opinion with longer audit partner tenure. This implies that audit quality is impaired with long audit services period. Therefore, the authors supported auditor rotation to limit the familiarity threat arising from a long auditor-client relationship.

In the same way, Firth et al. (2012) investigate audit quality as a consequence of mandatory auditor rotation in China. They use a modified audit opinion as a variable of audit quality and employ mandatory auditor rotation as an independent factor. They found an association between mandatory auditor rotation and a modified audit opinion of companies located in regions with weak legislation. Firth et al. (2012) concluded that mandatory auditor rotation could improve audit quality. In addition, a study by Shafie, Yusof, and Hussain (2004) also found that the companies that had financial problems and did not have auditor rotation were likely to receive a clean opinion. This evidence implies that auditor independence is impaired by the long audit tenure.

Stakeholders appear to believe that there is an increased auditor independence after an auditor rotation. A study by Daugherty et al. (2012), for instance, found greater auditor independence following auditor rotation based on partner opinions. Auditor independence in mind was also improved; this lead to the increased self-esteem of auditors. Similarly, Jennings et al. (2006) studies the judges' independence perceptions of audit independence in appearance as a consequence of the mandatory rotation. This study's results found the interaction between the strong corporate governance, mandatory auditor rotation, and strong board of directors that all improve audit quality.

In conclusion, mandatory auditor rotation can improve audit quality in many ways, including bringing the fresh audit perspective, and by promoting auditor independence. The studies discussed above show evidence that support the mandatory auditor rotation.

Negative impacts of mandatory auditor rotation

By contrast, there are several studies of auditor rotation from various countries that have shown adverse results of mandatory auditor rotation. These studies show that although a new auditor may provide a fresh viewpoint on audit services, the loss of client-specific knowledge is inevitable (Chen et al., 2008; Chi et al., 2009). Many studies have found that the long period of audit services increases the auditor's specific knowledge of a client (Geiger & Raghunandan, 2002). That is, the requirement of mandatory auditor rotation causes the loss of client-specific knowledge, potentially impacting audit quality.

This claim is confirmed by Geiger and Raghunandan (2002) study. The authors observe the effect of auditor rotation on audit quality in the U.S. The study employs audit reporting failures on issuing modified audit opinion for going-concern issues for bankrupt companies as a proxy of audit quality. Audit tenure is used as an independent variable. The results revealed a lack of success in the audit opinion in the initial year following auditor rotation. That is, a short tenure of the auditor was associated with audit reporting failures. The results of this study show that auditor rotation did not promote greater audit quality because the new auditor had a lack of knowledge and a lack of learning curve in the early engagement years.

Similarly, Myers et al. (2003) also investigate earnings quality after auditor rotation. As earnings quality can be inferred from audit quality, researchers focus on the discretionary accruals (DA) as a proxy of earnings quality. The authors assume that more dispersion of DA presents lower audit quality. This study, however, found less dispersion of DA in the long period audit tenure. The evidence suggested that a long audit tenure can limit the "extreme management decisions in the reporting of financial performance" (Myers et al., 2003, p. 779). This implies that the long auditor-client relationship length has not impaired audit quality. In the same way, Cameran et al. (2015) observe abnormal working accruals to measure audit quality in Italy. They assume that audit quality can limit abnormal working accruals. They found that audit quality decreased in the first three years after auditor rotation. That is, mandatory auditor rotation does not increase audit quality, according to this study.

Several other studies have employed different proxies to evaluate audit quality. Some studies have used audit fees to measure audit quality. A study by Stewart et al. (2016), for example, observe an association between audit partner rotation and audit fees. They found that professional services charges increase in the first year of rotation following both mandatory and voluntary audit partner rotations. In addition, Stewart et al. (2016) also found that the more effort an audit partner puts on getting client-specific knowledge in the first year as an incumbent auditor, the higher the audit fees are. This suggested that auditor rotation can increase fees for a client.

Some studies used stakeholders' opinions to evaluate audit quality. For example, Daugherty et al. (2012) study audit partners' perceptions of the audit quality related to the mandatory auditor rotation. They found impairment of client-specific knowledge after auditor rotation and consequently auditors had to take a few years to become knowledgeable about their clients' business. This implies that in the first few years of a new engagement, a new auditor may not have adequate client-specific knowledge, which may negatively affect audit quality. Their finding was similar to that of Chi et al. (2016), which also shown a new auditor knowledge and experience cannot compensate for an outgoing auditor client-specific knowledge. These results strongly support the idea that a long tenure creates client-specific knowledge that increases earnings quality, thereby also audit quality.

As the concept of auditor rotation has spread extensively, emerging markets have also embraced auditor rotation in order to improve financial information quality, increase audit quality, and appeal to international investors. However, many studies in such markets have found contradicting evidence. A study by Chen et al. (2008), for example, found auditor rotation, for both audit partner and audit firm rotation, could not enhance earnings quality in Taiwan. Similarly, Chi et al. (2009) also found insignificant improvements in audit quality after the mandatory audit partner rotation in the same country. Their study also confirmed that investors in that setting perceived no greater audit quality after mandatory audit partner rotation.

Similarly, in South Korea, Kwon, Lim, and Simnett (2010) and Kwon et al. (2014) also studied the effect of audit firm rotation on audit quality, audit fees and audit hours. They found no significant differences between pre- and post- voluntary audit firm rotation. In other words, audit firm rotation had not encouraged audit quality in those countries. Further, Siregar, Amarullah, Wibowo, and Anggraita (2012) and Suprapto and Suwardi (2013) study the relationship of auditor rotation and audit quality by investigating the length of audit partner engagement and audit fees in Indonesia. The results of that study confirmed that there was no significant effect of mandatory auditor rotation on audit quality in Indonesia.

In conclusion, several studies have found lower audit quality following auditor rotation in various countries. That is, there is inconclusive evidence on the impact of auditor rotation on audit quality, especially in developing countries. Thus, the topic of mandatory auditor rotation is a subject of continuing debate.

3.3.2 Thai studies on auditor rotation and audit quality

The research in Thailand is very limited. A few studies have been conducted after the mandatory audit partner rotation was imposed in Thailand in 2006. These studies also show mixed results and therefore, more research on this topic in Thailand is needed.

Positive impacts of mandatory auditor rotation

By using earnings management as a proxy of audit quality, Phadungdet (2014) points out that mandatory audit partner rotation can limit earnings management of listed companies in Thailand. This study uses discretionary accruals to investigate earnings management. The researcher found that the companies without audit partner rotation have higher earnings management than the companies with audit partner rotation. However, this study includes only the top 100 listed companies during the period of 2009-2013 on the Thai stock exchange market. This limited evidence cannot provide conclusive evidence regarding the effects of mandatory audit partner rotation on audit quality of all companies in the country. For this reason, the current study uses larger financial statements of the Thai listed companies' to further investigate this issue.

Negative impacts of mandatory auditor rotation

Although Thai regulators expect higher quality of both financial reporting and auditing after mandatory audit partner rotation, some studies have found opposite effects. A study by Thapayom (2012) investigates the relationship between auditor tenure, audit partner rotation and earnings quality of the top 100 listed companies on Thailand Stock Exchange during 2006-2010. The authors based their study on a study by Chi and Huang (2005), examines the link between earnings quality and audit quality. The study used discretionary accruals to evaluate earnings quality. Evidence from the study revealed that there was no relationship

between audit tenure and earnings quality. The findings implied that audit tenure was not associated with audit quality.

Some other studies also assumed that mandatory audit partner rotation can improve auditor independence and audit quality by minimising earnings management. For example, Pinijorachai (2007) uses discretionary accruals as a factor of earnings management to measure audit quality after the auditor rotation. This study found that there was no significant change in earnings distortion after the adoption of audit partner rotation requirement.

In conclusion, many countries require the use of mandatory auditor rotation as a means of improving audit quality. Most studies have been done in developed countries but only a small number of studies have been done in developing countries, especially Thailand. The results of these studies have been inconclusive. This study aims to provide further evidence of the impact of auditor rotation on audit quality in a developing country.

4. Hypotheses development and methodology

This section discusses the research questions as well as the hypotheses development of this study. It also explains the methodology in terms of the measurement of audit quality, the model, and sample selection for testing this study's hypotheses.

4.1 Research questions and hypotheses development

4.1.1 Research questions

As previously discussed, the main aim of this study is to investigate the change in audit quality as a consequence of auditor rotation in Thailand. Auditor rotation is one requirement that the regulators in Thailand use to encourage audit quality. According to the agency theory and prior studies in various settings, auditor rotation can minimise threats to auditor

independence, and consequently, improve audit quality (Carey & Simnett, 2006; Chi & Huang, 2005; Firth et al., 2012; Lennox et al., 2014).

Several previous studies have found many factors such as the length of the auditor's term and the non-audit fees as significant factors that can impair auditor independence and consequently audit quality (Chen et al., 2008; Chi et al., 2009; Geiger & Raghunandan, 2002; Myers et al., 2003). These factors also include a country's economic and accounting environment.

In Thailand, the regulators have required audit partner rotation for the listed companies in the Thai capital market aiming to improve audit and earnings quality since 2006. However, the Thai capital market characteristics, as discussed in previous sections, such as weak investor protection and the bank oriented financial system, lead to the low requirement for corporate financial reporting disclosures (Ball et al., 2003; Chayasombat, 2010). That is, these characteristics have a negative influence on the earnings quality requirement (Ball et al., 2003; Chayasombat, 2010). In such capital markets as the Thai market, the question is how does audit quality improve, if at all, after the mandatory audit partner rotation is imposed. Therefore, the first research question for this study is:

> Research question 1: What is the impact of mandatory audit partner rotation on the audit quality of listed companies in Thailand?

The audit firm size is also a crucial factor influencing audit quality (DeAngelo, 1981b). Many prior studies have claimed that Big 4 audit firms provide better audit quality than non-Big 4 audit firms because Big 4 audit firms have better audit methodologies, more knowledge within firms, have international networks on their disposal for technical accounting issues and generally have higher industry specialisation than non-Big 4 audit firms (Chayasombat, 2010; Chi & Huang, 2005; DeAngelo, 1981b; Francis, 2004; Hamilton, Ruddock, Stokes, & Taylor, 2005; Kitiwong, 2014).

On the SET, the audit supply by audit firms as a percentage of listed companies as their clients in the period 2001–2015 is Big 4 audit firms' market share of 52% and non-Big 4 audit firms market share of 48%. The small gap in the audit supply between Big 4 and non-Big 4 firms for listed Thai companies shows that Big 4 audit firms play a similar role to non-Big 4 audit firms as audit services suppliers. It is possible that audit quality between Big 4 audit firms and non-Big 4 audit firms is, therefore, not significantly different. Hence, this assumption leads to the second research question:

> Research question 2: Is there no difference in earnings quality following mandatory audit partner rotation between Big 4 auditors and non-Big 4 auditors in Thailand?

This study's results will provide further evidence on the impact of mandatory auditor rotation on the audit quality and will provide more understanding of the role of Big 4 audit firms and non-Big 4 audit firms in the Thai setting.

4.1.2 Hypotheses development

This study's hypotheses are developed based on the above research questions, the agency theory, and the review of the literature on auditor rotation and audit quality across different countries. In the following sub-sections, there are two main hypotheses to be tested, to do with auditor rotation and audit quality, and audit firm size and audit quality.

4.1.2.1 Auditor rotation and audit quality

The effect of auditor rotation can be explained by using the agency theory and reference to results of prior studies. The agency theory explains the role of the auditor in relation to financial statements quality based on the principal-agent relationship. It also explains the need for audit quality and auditor independence that influence the idea of auditor rotation.

Previous studies, by observing financial reporting quality and audit quality, provided evidence of audit quality improvement after the mandatory auditor rotation in various jurisdictions. The results of previous studies claimed that auditor rotation brings fresh insight of a new lead audit partner to an engagement team, thereby enhancing financial reporting quality (Hamilton et al., 2005). Auditor rotation also promotes auditor independence by limiting the long and close relationship between the management and the auditor (Carey & Simnett, 2006; Chi & Huang, 2005). This is because the long auditor-client relationship creates threats to auditor independence. That is, the long association with the client can lead to the threat of familiarity and can impair audit quality. For example, the same auditor who works with the same client for many years is likely to use static audit programmes and checklists based on previously used risk assessments rather than creating new and appropriate methodologies fitted to the current circumstances (Monroe & Hossain, 2013). Therefore, auditor rotation is expected to mitigate the familiarity threat by enhancing auditor independence and improving audit quality (Firth et al., 2012; Healey & Kim, 2003; Lennox et al., 2014).

On the other hand, many studies argue that auditor rotation causes a loss of client-specific knowledge, which potentially impacts on audit quality. Some studies have claimed that the new auditor has a lack of knowledge and that they have a steep learning curve in the early years of their auditing service. The unfamiliarity regarding the new client and the steep learning curve, combined with audit fee pressures can lead to auditors not detecting material misstatements in the financial statements, all resulting in lower audit quality (Agunda, 2014; Chi et al., 2016; Geiger & Raghunandan, 2002; Myers et al., 2003). Results from such studies thus have found that the longer tenure by an auditor did not impair audit quality (Cameran et al., 2015; Myers et al., 2003).

In Thailand, the regulators adopted the concept of mandatory audit partner rotation aiming to conform to global ethical standards and boost audit quality in the country. Also, many previous studies in different countries confirmed that auditor rotation is thought to initiate the enhancement of audit quality. Thus, this study then assumes that mandatory audit partner rotation will increase audit quality. It argues that having a new incoming lead audit partner will lead to greater auditor independence by limiting the over-familiarity between the auditor

and the client's management. A new auditor is expected to have a new insight, better audit procedures and greater auditor independence. These can improve the chances of detecting material misstatements, thus leading to more accurate financial statements and financial reporting quality as a result of increased audit quality. Since the audit quality is difficult to measure directly, researchers generally observe the improvements in financial reporting as indicators of changes in audit quality.

Following this proposition, the first hypothesis is as follows:

> H1: There is an improvement in audit quality measured by improvement/change in the quality of financial statements as a consequence of mandatory audit partner rotation.

4.1.2.2 Audit firm size, audit rotation and audit quality

Audit firm size plays an important role in influencing audit quality, as confirmed by prior studies (Chayasombat, 2010; DeAngelo, 1981b; Hamilton et al., 2005). The results point out that large audit firms[1] provide greater audit quality to their clients as compared to the medium and small audit firms, due to the benefits of their size and networks (Chayasombat, 2010; DeAngelo, 1981b; Francis, 2004; Francis & Yu, 2009).

Several studies have highlighted Big 4 audit firms for having more skilful auditing and industry in–house specialists than non–Big 4 audit firms (Chi & Huang, 2005; Francis & Yu, 2009). In this case, the new auditor from Big 4 audit firms could gain client-specific knowledge within a shorter time of audit fieldwork after auditor rotation due to audit firm specialisation and expertise. In addition, the large audit firms have greater accumulated knowledge and experience and are more likely to have generally better audit methodologies. They are also able to facilitate better quality audit planning, and audit performance, as well as

[1] In this study, the large audit firms refer to the international audit firms with the international networks, the greater firm's reputations, the greater accumulated in-house knowledge and experience, the firms with the industry specialist and the large client numbers (Chayasombat, 2010; Francis & Yu, 2009).

have better technical resources and reporting compared to smaller audit firms. In this sense, it can be argued that audit firm size affects audit quality.

The Big 4 audit firms in Thailand consist of Deloitte & Touche, Ernst & Young, KPMG and PricewaterhouseCoopers. In the Thai capital market, there is no significant difference in audit market segmentation between the Big 4 audit firms and non–Big 4 audit firms in terms of the number of clients. The Big 4 audit firms provide auditing service to the 52% of listed companies and non–Big 4 audit firm conduct the auditing to 48% of listed companies on the Thai Stock Exchange (data since 2001–2015). This means that the Big 4 audit firms are not the major audit service suppliers in Thailand's audit market. Given the small gap in the supply chain between the Big 4 and non-Big 4 firms on the Thai audit market, and given the previous discussion, therefore, the second hypothesis in this study is:

> H2: There is a higher improvement in financial statements quality as a consequence of the mandatory audit rotation for clients of Big 4 audit firms compared to clients of non-Big 4 audit firms.

4.2 Measurement of audit quality, model, and sample selection

4.2.1 Measurement of audit quality

As explained in previous sections, auditor rotation can improve the quality of financial statements and earnings quality by minimising the threat of familiarity between the auditor and the management, thereby promoting auditor independence and facilitating higher chance of improving auditor detecting and reporting of material misstatements in the financial statements. That is, a new auditor with a fresh view and greater auditor independence can better discover material misstatements in financial reporting. This will improve the earnings quality as well as audit quality (Harris, 2012; Myers et al., 2003). Several prior studies have used financial statements/earnings quality to investigate and measure the change in audit quality as a consequence of auditor rotation (Chen et al., 2008; Chi et al., 2009; Kitiwong, 2014; J. S. Lee, 2015; Stakebrand, 2016). In order to evaluate earnings/audit quality after

auditor rotation, many studies have also employed discretionary accruals as proxies for earnings/audit quality (Chen et al., 2008; Chi et al., 2009; Kitiwong, 2014; Kwon et al., 2014; Myers et al., 2003; Stakebrand, 2016).

According to the agency theory, management generally attempts to respond to shareholders' demands through the company's earnings. When the company's performance does not maintain the shareholders' expected earnings level, the management may engage in financial statements/earnings manipulation through the use of discretionary accruals (Chen et al., 2008; Dechow, Sloan, & Sweeney, 1995; Harris, 2012; Jones, 1991; Myers et al., 2003). Previous studies on discretionary accruals have found that the higher discretionary accruals levels are related to qualified audit opinions (Bartov, Gul, & Tsui, 2000) and audit failure (Geiger & Raghunandan, 2002). In other words, high audit quality can mitigate the management's opportunity to manage earnings (Chen et al., 2008; Harris, 2012; Johnson, Khurana, & Raynolds, 2002; Myers et al., 2003). Auditor rotation by introducing a new partner and terminating a long association with the client, as previously discussed, is thought to enhance earnings quality by minimising chances of the management to misstate company's financial performance through discretionary accruals.

Chi et al. (2009), for example, investigated the effect of mandatory audit partner rotation on the audit quality through observing absolute and signed performance-matched abnormal accruals developed by Kothari, Leone, and Wasley (2005) as audit quality proxies in Taiwan. In the Taiwanese capital markets, an audit report has to be certified by two audit partners from the same audit firm. The authors hypothesised that companies subject to audit partner rotation would show high audit quality and lower discretionary accruals. Their study focuses on performance-matched abnormal accruals similar to those used by Kothari et al. (2005) to measure discretionary accruals of listed companies as proxies of audit quality in order to test their hypotheses.

In order to measure discretionary accruals, prior studies have used the Jones model and the modified-Jones model (DeFond & Subramanyam, 1998; Johnson et al., 2002; Myers et al., 2003). The Jones model estimates that the normal accruals (nondiscretionary accruals) would be constant in the event year through controlling companies' economic circumstances such as

the change in revenue and the level of property, plant and equipment (PPE). However, some researchers argue that the Jones model cannot detect discretionary accruals when a company commits earnings manipulation through revenue (Dechow et al., 1995; Myers et al., 2003). Dechow et al. (1995) developed the modified-Jones model to minimise the limitations of the original Jones' model. The modified-Jones model assumes that all credit sales are derived through earnings management; it adjusts the change in revenue with a change in accounts receivables in any event year.

However, the study by Kothari et al. (2005) criticised the modified-Jones model proposed by Dechow et al. (1995). The authors argue that there is a limitation in measuring discretionary accruals when a company has a significant growth in the event year, such as in the year of an initial public offering (IPO). For this reason, Kothari et al. (2005) developed and proposed the cross-sectional modified-Jones model, which matches the company's performance by including the return on assets (ROA) ratio in the modified-Jones model. The Kothari et al. (2005) study results confirm that the performance-matched modified-Jones model improves the reliability of detecting discretionary accruals. The performance-matched discretionary accruals model as used by Kothari et al. (2005) is:

$$TA_{it} = \delta_0 + \delta_1(1/ASSET_{it-1}) + \delta_2\, \Delta SALES_{it} + \delta_3\, PPE_{it} + \delta_4\, ROA_{it\ (or\ it-1)} + \varepsilon_{it}$$

where

TA_{it}	= total accruals in year *t* for the company *i;*
$\Delta SALES_{it}$	= the change in sales which is calculated by ($\Delta SALES_{it}$ - ΔAR_{it}) in year *t* for the company *i;*
PPE_{it}	= property, plant and equipment – net in year *t* for the company *i;*
ROA_{it}	= net income divided by total assets in year *t* for the company *i;*
ROA_{it-1}	= net income divided by total assets in year *t-1* for the company *i*;
ε_{it}	= error term

Many studies in the literature on auditor rotation have used the performance-matched discretionary accruals/abnormal accruals model as developed by Kothari et al. (2005) as proxies to evaluate audit/earnings quality (Bandyopadhyay, Chen, & Yu, 2014; Chen et al., 2008; Chi et al., 2009; Kwon et al., 2010, 2014; Litt, Sharma, Simpson, & Tanyi, 2014). This study will also use the performance-matched discretionary accruals/abnormal accruals model to measure the level of discretionary accruals of Thai listed companies. The model will be used to assess changes in audit quality as a consequence of mandatory auditor rotation in Thailand.

4.2.2 The study's model

As indicated above, several previous studies on the impact of auditor rotation on audit quality, including the study of Chi et al. (2009), used the level of discretionary accruals measured by Kothari et al. (2005) to scale the changes of audit quality to improve the reliability of discretionary accruals as proxies of audit quality (Chen et al., 2008; Johnson et al., 2002; Kwon et al., 2014; Litt et al., 2014). The study by Chi et al. (2009) investigated the effectiveness of mandatory audit partner rotation in improving audit quality of Taiwanese listed companies. They based their study on Myers et al. (2003)'s study that highlighted the relationship between auditor tenure and audit quality. Unlike prior studies, however, Chi et al. (2009) focused on the impact of mandatory audit partner rotation on audit quality. In addition, they used the level of discretionary accruals measured by Kothari et al. (2005) to scale changes in audit quality that can improve the reliability of discretionary accruals detecting as proxies of audit quality. The focus of this study is similar to that of the study by Chi et al. (2009); it adapts and applies the model that was used to investigate the change in audit quality after the mandatory audit partner rotation as per Chi et al. (2009)'s study to test the hypotheses outlined above.

In order to evaluate changes in audit quality, Chi et al. (2009) compared the audit quality of sample companies that had been subjected to mandatory audit partner rotation (MROTA) in 2004 with three benchmark samples (BMK). The BMK consisted of: (1) the companies that were not subjected to mandatory audit partner rotation in 2004 referred to as non-rotation samples (NROTA), (2) the one year earlier of mandatory rotation company itself (one year

before mandatory auditor rotation) (MBEFR) that show financial performance of the same companies in 2003, and (3) the companies with at least one partner within the same firm that voluntarily rotated before the voluntary auditor rotation in 2003 (VROTA). In addition, six variables, based on the Myers et al. (2003) and other prior studies, were included as control variables. These variables were the company age, the company size, the growth rate of the industry, the company cash flow from operating activities, the companies' auditor size and the number of consecutive years that the company retained the audit firm. The authors expected the level of discretionary accruals of companies with mandatory audit partner rotation to be less than the BMK.

This study follows the Chi et al. (2009) study to assess the effectiveness of mandatory audit partner rotation on audit quality in the Thai capital market. The study period covers 2006 to 2016 because a five-year mandatory lead partner rotation has been required since 2006. This investigated period provides at least three periods of mandatory audit partner rotation. The samples include all companies that run their business at least one year as at the investigated year to examine the changes in audit quality.

In order to test the hypotheses, this study compares the discretionary accruals between companies subjected to mandatory audit partner rotation (MAPR) from 2006 to 2016 with three benchmarks (BMK). The BMK consists of; first, a comparison of MAPR with companies that are not subject to audit partner rotation (NAPR) in the same year of MAPR. Second, a comparison of MAPR with the same companies in one year before rotation (BMAPR) and finally, a comparison of MAPR with the voluntary audit partner rotation before the last year of predecessor auditor (VAPR). Thus, for example, companies that had audit partner rotation from 2001 to 2004 are VAPR for comparing the discretionary accruals with MAPR in 2006.

The changes in discretionary accruals level after mandatory audit partner rotation can be referred to as the change in audit quality. It is expected that the level of discretionary accruals in the period after mandatory audit partner rotation is lower than the period before MAPR. That is, MAPR can promote auditor independence which can minimise financial reporting manipulations as well as offering new view to the auditor team, thus potentially improving financial quality and audit quality.

This study also investigates and uses audit firm size as an independent variable which can influence audit quality as shown in the Chi et al. (2009)'s and other studies. Unlike the study by Chi et al. (2009) model, however, this study will include the leverage as a control variable because it is correlated with audit quality. This is based on the study by Defond and Jiambalvo (1994) claimed that high leverage companies are likely to have large discretionary accruals and the manager is likely to misstate financial statements. Kwon et al. (2014) also found the association between leverage and discretionary accruals.

Thus, this study uses the following model to examine the relationship of mandatory audit partner rotation and audit quality of Thai listed companies as expressed by:

$$DA_{it} = \beta_0 + \beta_1 BMK_{it} + \beta_2 BIG4_{it} + \beta_3 AGE_{it} + \beta_4 SIZE_{it} + \beta_5 GROW_{it} + \beta_6 CFO_{it} + \beta_7 LEV_{it} + \delta\ Year_{it} + \varepsilon_{ij}$$

where

DA_{it} = discretionary accruals that are calculated by performance-matched abnormal accruals measures by Kothari et al. (2005) in year *t* for the company *i*;

BMK_{it} = an indicator set to 1 if observations are from one of the BMK samples, and set to 0 otherwise in year *t* for the company *i*;

$BIG4_{it}$ = an indicator set to 1 if the audit firm is one of the Big 4 audit firms, and set to 0 otherwise in year *t* for the company *i*;

AGE_{it} = number of years since the company was listed in the SET in year *t* for the company *i*;

$SIZE_{it}$	= the natural logarithm of total assets of the company in year *t* for the company *i*;
$GROW_{it}$	= $\Sigma Sales_{i,t} / \Sigma Sales_{i,t-1}$ by the SET sectors in year *t* for the company *i*;
CFO_{it}	= the cash flow from operating activities of the company in year *t* for the company *i*;
LEV_{it}	= long-term debts plus current portion of long-term debt divided by total assets in year *t* for the company *i*;
$Year_{it}$	= indicator variables for each year in the sample period;
ε_{it}	= error term
i	= 1,…, i company index; and
t	= 1,…, t year index for which ranges over investigated period.

4.2.2.1 Dependent variable

Discretionary accruals

The dependent variable in this study is discretionary accruals (DA) as measured by performance-matched abnormal accruals measures in the Kothari et al. (2005) study. The variables are calculated from the financial statements of Thai listed companied over the examined period.

The DA, as discussed in section 4.2.1, is widely used as a proxy of audit quality. The signed (positive and negative), and absolute of DA based on prior studies are also be observed in this study. By using discretionary accruals, Myers et al. (2003) stated that "auditors could constrain income-increasing accruals to a greater or lesser extent than income-decreasing accruals, and auditor tenure could have differential effects on this constraint" (p.783). Additionally, the study by Carey and Simnett (2006) also observed signed and absolute amounts of abnormal working capital accruals to evaluate the discretionary level that the management commit to in earnings reporting in the later years of audit partner tenure. Thus, Chi et al. (2009) suggest mandatory auditor rotation affects auditor tenure, and accruals constraint. Chi et al. (2009) also claim that "earnings quality as captured by abnormal accruals is also affected by the audit firm and thus reflects audit quality" (p. 363).

This study uses the signed amounts of DA (the positive DA (DA^+), and negative DA (DA^-)) and the absolute DA (|DA|), to evaluate the change of audit quality in Thai listed companies.

4.2.2.2 Independent variables

Audit partner rotation

Mandatory audit partner rotation is a requirement in many countries. It aims to increase earnings/audit quality by limiting over-familiarity between the auditor and the management. A long auditor tenure and the close auditor-client relationship can impair audit quality (Chi & Huang, 2005). For example, in a long tenure situation, the management may engage in financial statements/earnings manipulation through the use of discretionary accruals in order to achieve earnings targets that favour the shareholders (Chen et al., 2008; Dechow et al., 1995; Harris, 2012; Jones, 1991; Myers et al., 2003). That is, the management may pressure an auditor to issue an audit report favourable to them (Dopuch et al., 2001). Also, an auditor is likely to allow the management to create favourable financial statements through earnings manipulation in order to extend the engagement with the client (DeAngelo, 1981a; Dopuch et al., 2001), as well as to ensure the audit fees are secured (Chi & Huang, 2005; Stakebrand, 2016). This can lead to decreased earnings/audit quality.

Research suggests that mandatory audit partner rotation can promote auditor independence (Francis, 2004; Healey & Kim, 2003; Lennox et al., 2014). A new auditor with a fresh view and greater auditor independence are better able to detect management's manipulation and material misstatements in the company's financial statements. In other words, auditor rotation can potentially minimise financial statement manipulations (measured by DA) and thus improves the earnings/audit quality. Therefore, mandatory audit partner rotation, denoted as MAPR, is expected to be a negative significant relationship with both signed and absolute amounts of DA (Chen et al., 2008; Chi et al., 2009).

In the Thai capital market, the auditor's report of listed companies must be certified by a lead audit partner. The audit partners' name and the audit firm's name must be disclosed. In this study, the change of the audit partners' name indicates an audit partner rotation. In order to measure an audit quality, this study will compare the DA level of listed companies that have been subject to mandatory audit partner rotation (MAPR) since 2006-2016 with the three benchmarks (BMK). The BMK consists of; (1) the listed companies have not been subjected to mandatory audit partner rotation in the same investigated year (NAPR), (2) the one-year earlier of the MAPR (BMAPR), and (3) the voluntary audit partner rotation before the last year of predecessor auditor (VAPR). The BMK is equal to one if observations are from one of the BMK samples, and set to 0 otherwise. Thus, this study uses the change of a lead audit partner as a proxy of audit partner rotation to test H_1.

Audit firm size

Audit firm size, is denoted as the BIG4 in this study and 0 otherwise. Audit firm size plays a major role in influencing audit quality (Chayasombat, 2010; DeAngelo, 1981b; Hamilton et al., 2005). As discussed in section 4.1.2.2, large audit firms have greater accumulated in-house knowledge and experience and better audit methodology as well as they are industry specialists that can provide higher audit quality than small and medium audit firms (Chi & Huang, 2005; Francis & Yu, 2009). The large audit firms are generally referred to as the Big 4 audit firms are: Deloitte & Touche, Ernst & Young, KPMG and PricewaterhouseCoopers. Many prior studies suggest that the Big 4 audit firms provide greater audit quality, and minimised management opportunity to create material misstatements in financial reporting (Chi & Huang, 2005; Francis & Yu, 2009; Kitiwong, 2014).

In the Thai stock market, there are 27 audit firms (in 2017) including the Big 4 audit firms and SECT-certified local audit firms (non-Big 4 audit firms). Also, the Big 4 audit firms are not the major audit service suppliers in the Thai audit market as discussed in 4.1.2.2. The small gap in the number of clients between the Big 4 and non-Big 4 audit firms in the Thai capital market leads to doubts on the earnings quality of listed companies, thereby affecting audit quality. Therefore, using DA as proxies of audit quality, and audit firm size is expected to have a negative significant relationship with both signed and absolute amounts of DA.

Audit firm size is indicated by the audit firm's name disclosed in the auditor's report of listed companies. Audit firm size is equal to one if the audit firm is one of the Big 4 audit firms or 0 otherwise (Chen et al., 2008; Chi et al., 2009; Myers et al., 2003). This study uses the audit firm's name as a proxy of audit firm size to test H_2.

4.2.2.3 Control variables

Previous studies in the literature of auditor rotation and audit quality have provided evidence that other factors also have significant influences on audit quality. These factors, based on the Chi et al. (2009) model and other studies are discussed below.

Company age

The company age, denoted as AGE, has a significant effect on DA. Previous studies have found that there are different levels of accruals based on a company's life cycle (Chi et al., 2009; Matthews, 2012; Myers et al., 2003). Chi et al. (2009), for example, stated that there are less DA when the company's age increases. In other words, newer companies are more likely to be financially distressed. In this study, the company age is calculated by the number of years since the company was listed on the SET. The company age is expected to have a negative relationship with DA.

Company size

The company size, denoted as SIZE, is a control variable of this study. As in other studies previously discussed, the company size in this study is measured by the natural logarithm of the total assets of the company. Several studies have found evidence that larger companies are likely to have higher accruals (Becker, DeFond, Jiambalvo, & Subramanyam, 1998; Kwon et al., 2014; Watt & Zimmerman, 1986). Thus, a positive relationship between SIZE and DA is expected.

Industry growth

The company's industry growth is denoted as GROW. In this study, it is a controlled variable. The industry growth is calculated by summarising sales of all companies in the industry categorised by the Thai Stock Exchange in the current year ($\Sigma Sales_{i,t}$) divided by the summarised sales of all companies in the industry categorised by SET in the last year ($\Sigma Sales_{i,t-1}$). Previous studies have found a positive association between a company's growth and discretionary accruals (Kwon et al., 2014; Myers et al., 2003). Thus, GROW should be positively correlated with DA (Chi et al., 2009; Myers et al., 2003) in this study.

Cash flow of the company

The cash flow from the operating activities of the company is denoted as CFO in this study. This control variable is directly observed from the Cash Flow Statement. Prior studies have found that the companies with higher cash flows from operating activities have better performances (Myers et al., 2003). In addition, they also found a negative association between DA and CFO (Dechow et al., 1995; Myers et al., 2003). Thus, this study expects CFO to be negatively related to DA.

Leverage

The leverage, denoted as LEV, is also included in the model. Previous studies have found that highly leveraged companies have strong incentives to manage earnings to avoid violating debt covenants (Carey & Simnett, 2006; Defond & Jiambalvo, 1994). The leverage is measured through long-term debts plus the current portion of long-term debt divided by total assets. Prior study claimed that the high leveraged companies are likely to manage earnings to avoid violating debt covenants and also, report larger DA. Thus, LEV is expected to be positively correlated with DA (Defond & Jiambalvo, 1994; Matthews, 2012).

Year

The study includes the year ($Year_{it}$) fixed-effects to control for the variation in DA during the examined period.

Table 1 presents the expected sign of this study's variables based on the prior studies as previously discussed.

Table 1: the expected sign of variables

Variables	Expectation
Intercept	+/-
Independent variables	
BMK	+/-
Audit firm size (BIG4)	+
Control variables	
Company age (AGE)	-
Company size (SIZE)	+
Industry growth (GROW)	+
Cash flow of the company (CFO)	-
Leverage (LEV)	+

4.2.3 Sample selection

This study focuses on the audit quality of listed companies on the SET after the mandatory audit partner rotation, which became effective from 1st January 2006. In order to investigate the changes in audit quality, this study examines the mandatory audit partner rotation in the period from 2006 to 2016. According to the requirement that limits five consecutive years of appointment for a lead audit partner, this study provides at least three periods of mandatory audit partner rotation namely 2006, 2011, and 2016.

The data are retrieved from the Datastream of Thomson Reuters as per Table 2. As shown in Table 1, information about a number of listed companies over the period 2006 – 2014 are used. The financial information for the 2015 – 2016 period are being collected and will be added to the sample at a later date.

In Table 2, there are 9,947 firm-year observations from 638 listed companies from August 2016. The 340 firm-year observations for 20 companies from those observations are deleted as they were to do with delisted companies and amalgamated companies from the SET. The

892 firm-year observations of 11 companies are further omitted because there was no sufficient financial information for those companies. Consistent with prior studies (Chi et al., 2009; Kwon et al., 2014), 867 firm-year observations (51 companies) of financial sectors, 680 firm-year observations (40 companies) of non-equity instrument investment entities, and 1,037 firm-year observations (61 companies) of property fund and real estate investment trusts (REITs) have been eliminated from the sample of this study due to special regulation requirements and different accounting treatments used by such entities. The financial information of observed companies in the period 2001–2005 (1,775 firm-year observations) are also excluded because mandatory audit partner rotation was not required over that period. The 72 firm-year observations of 8 companies that postponed a lead audit partner rotation during 2006-2007 periods to a further year are excluded because these companies have requested a special exception from the SECT. Finally, new companies that were listed during the 2015–2016 period will be included as samples later. The final sample for this study consists of 3,468 firm-year observations at this stage (423 listed companies over 2006-2014).

Table 2: The study (partial) sample data of Thai listed companies (2006-2014)

Descriptions	Companies	Firm-year observations
Number of companies listed on the SET (main board)	638	9,947
Less Delisted companies (delisting of common stock and amalgamation)	(20)	(340)
Companies missing financial data	(11)	(892)
Companies in financial entities segment	(51)	(867)
Companies in non-equity investment instrument entities segment	(40)	(680)
Companies in property fund & REITs segment	(61)	(1,037)
Companies with financial statements in 2001-2005 (before mandatory audit partner rotation)	0	(1,775)
Companies should rotate a lead audit partner but postpone to a further year	(8)	(72)
New companies listed in 2015–2016	(24)	(816)
The partial sample data	**423**	**3,468**

5. Descriptive statistics

Table 3 presents data on auditor rotation over the period 2006 to 2014. This data is categorised by auditor rotation types and audit firm size.

Panel A of Table 3 presents data classified by types of auditor rotation over the period 2006 to 2014. The number of observations increased slightly in later periods of this study as a result of newly registered companies in the Thai capital market. These observations are divided into three groups namely companies that had been subjected to mandatory audit partner rotation (group 1), companies which carried out voluntary audit partner rotation (group 2), and companies which have not at all been subjected to mandatory audit partner rotation (group 3).

Group 1 represents the number of companies subjected to mandatory audit partner rotation. These are the companies that used the same audit partner for five consecutive accounting years since 2001 and had to rotate to a new audit partner when the mandatory auditor partner rotation was introduced in 2006. In total, there are 317 of these companies (9 percent of the total population used in this study) rotated a lead audit partner during the 2006 to 2014 period. On average, about 1 percent of the total population used in this study rotated a lead audit partner. A maximum of 79 companies in this group (2 percent of the total population used in this study) rotated a lead audit partner in 2006, the first period of auditor rotation requirement. These include the top 10 companies on the Thai Stock Exchange with the highest total assets, such as Advanced Information Service PLC, Charoen Pokphand Foods PLC, and TPI Polene PLC.

In the second group, 805 companies (23 percent of the total population used in this study) voluntarily rotated their auditors over the investigated period. The maximum number of voluntarily rotated company is 105 companies (3 percent of the total population used in this study) in 2014. The largest company (based on total assets) in 2014 is Thai Rung Union Car PCL in the automotive industry.

The last group, with the majority of listed companies over the observed period have not rotated their auditor because they had changed an audit partner before the five–year requirement. This group has a total of 2,346 companies (68 percent of the total population used in this study). The years, 2012 and 2014 had the largest number of companies (289 companies; 8 percent of the total population used in this study) without audit partner rotation.

Panel B of Table 3 presents sample data classified by audit firm size. Overall, the number of clients audited between the Big 4 audit firms and non–Big 4 audit firms is not significantly different in the Thai audit market over the period 2006–2014. The Big 4 audit firms provided auditing service to 52% of listed companies and non–Big 4 audit firms conducted auditing of 48% of companies listed on SET. Thus, the Big 4 audit firms are not a major audit service supplier in Thailand's audit market.

Table 3: The sample data of Thai listed companies classified by rotation and audit firm size in 2006-2014

Panel A: The sample data classified by the rotation

Year	Mandatory auditor rotation		Voluntary auditor rotation		Non-Rotation		Total	
	Firms	%	Firms	%	Firms	%	Firms	%
Before the mandatory audit partner rotation								
2001			61	4%	198	13%	259	17%
2002			68	5%	204	14%	272	18%
2003			86	6%	204	14%	290	19%
2004			62	4%	259	17%	321	22%
2005			81	5%	266	18%	347	23%
Total			358	24%	1,131	76%	1,489	100%
After the mandatory audit partner rotation								
2006	79	2%	86	2%	191	6%	356	10%
2007	22	1%	77	2%	265	8%	364	10%
2008	23	1%	100	3%	250	7%	373	11%
2009	18	1%	91	3%	270	8%	379	11%
2010	24	1%	95	3%	264	8%	383	11%
2011	52	1%	79	2%	256	7%	387	11%
2012	29	1%	76	2%	289	8%	394	11%
2013	41	1%	96	3%	272	8%	409	12%
2014	29	1%	105	3%	289	8%	423	12%
Total	317	9%	805	23%	2,346	68%	3,468	100%

Panel B: The sample data classified by audit firm size

Year	Big 4 audit firms		Non-Big 4 audit firms		Total (a)	
	Firms	%	Firms	%	Firms	%
2006	193	54%	163	46%	356	100%
2007	188	52%	176	48%	364	100%
2008	183	49%	190	51%	373	100%
2009	184	49%	195	51%	379	100%
2010	187	49%	196	51%	383	100%
2011	196	51%	191	49%	387	100%
2012	213	54%	181	46%	394	100%
2013	223	55%	186	45%	409	100%
2014	246	58%	177	42%	423	100%
Total	1,813	52%	1,655	48%	3,468	100%

Table 4 presents the descriptive statistics for key financial data in United States Dollar (USD) of 423 listed companies (3,468 firm-year observations) for the companies listed on the SET for the period 2006 to 2014.

This study uses the Thai Revenue Law in Chapter 3 Part 3: Corporate income tax, Section 65 Bis (5) in order to convert from Thai Bath to USD. According to the Law, a company that has the balance of assets or liabilities in foreign currency has to convert these into Thai currency using commercial banks rate calculated by the Bank of Thailand (BOT), the central Bank of Thailand. The assets use the average buying rate while the liabilities use the average selling rate for the conversion. Other elements of financial statements such as revenue and expenses use the market rate on the day that transactions occur.

Thus, according to the Thai Revenue Law, the balances of property, plant and equipment (PPE) and total assets in this study are converted to USD using the annual buying transfer rate, while an annual selling rate is used for the conversion of the total liabilities' balance. A mid-rate instead of the market rate at the time of transaction is used to convert other financial information because there is a lack of transactions date data for using the exact market rate. Accordingly, the annual mid-rate (average between buying and selling rate) is used to convert other financial information such as the net revenue, net income available to common stocks, and the net cash flow from operating activities. There are no significant differences between these three exchange rates (Appendix 1). That is, the key financial data of this study population using these three different exchange rates (Appendix 2), present similar values to the key financial information that are converted by the mid-rate of exchange proposed by BOT for the year 2014 (Appendix 3). Therefore, this study uses three different exchange rates suggested by the Thai Revenue Law. The amounts are presented in units of million USD as shown in Table 4.

Most of the key financial data, as well as the number of listed companies, increased during observed period (Appendix 2). Some of the highest amounts of key financial data (i.e. property, plant and equipment (PPE), total assets, total liabilities, and net revenue) are in 2013 because the Thai economy expanded through the government's stimulus in the first half of the year.

As shown in Table 4, the average size (based on total assets) of listed companies in this study is 560.78 million USD. This is smaller than the study by Phadungdet (2014) which had the average size of 704.82 million USD. This is because Phadungdet (2014) study included only large size companies (top 100 listed companies (SET100) in the SET) in 2014 as the sample while this study uses Thai listed companies of various sizes over several years (2006 to 2014). The sample of this study includes more average sized companies (based on total assets) than the study of Chayasombat (2010) (85 million USD) and Pinijorachai (2007) (approximately 248 million USD). Whereas, Chayasombat (2010) used small firms (non-listed companies) in their samples, and the study of Pinijorachai (2007) used financial data of all listed companies during 1999 – 2005, this study comprises of all listed companies with higher growth of financial performance in the Thai capital market in recent years.

Table 4: The overall key financial information of the Thai listed companies (2006-2014)

(Unit: Million USD)

Year	N	Mean	Median	Std. Dev.	Minimum	Maximum
Property, Plant and Equipment (PPE)	3,468	248.94	27.89	1,183.10	0	25,365.61
Total assets	3,468	560.78	94.35	2,509.90	0.69	58,433.90
Total liabilities	3,468	295.76	40.52	1,365.83	0	31,238.57
Net revenue	3,468	583.64	79.57	3,754.58	0	92,517.35
Net income available to common stocks	3,468	32.17	3.99	173.74	-641.77	3,453.28
Net cash flow from operating activities	3,468	51.33	5.55	307.53	-1,881.97	7,021.04

In Table 4, the amount of PPE varies from 0 to 25,365.61 million USD; the mean (median) is 248.94 (27.89) million USD over the 2006 – 2014 period. The minimum amount is zero balance in year 2014, the first year of Amata B. Grimm Power Plant Infrastructure Fund. The PTT PCL (PTT), in the resources segment, has the maximum balance (25,365.61 million USD) in the year 2013. It also has the highest PPE every year over the investigated periods.

The total assets over the nine observation years vary from 0.69 to 58,433.90 million USD and the mean (median) is 560.78 (94.35) million USD. The standard deviation of the total assets is 2,509.90 million USD. The minimum amount refers to Big Camera PCL, at 0.69 million

USD, a company that operates in the services segment in 2013. The PTT has the largest total assets with the maximum amount of 58,433.90 million USD in the same year. The total assets of PTT are more than double the total assets of PTT Exploration and Production PCL, the second largest company with total assets of 22,762 million USD. PTT also has the biggest amount of total assets over 2006 to 2014.

The mean (median) of the total liabilities is 295.76 (40.52) million USD. The lowest value of liabilities is a zero balance in 2012 reported for Global Connection PCL in the industrial segment. In 2013, PTT had the maximum amount of total liabilities (31,238.57 million USD).

The mean (median) of the net revenue is 583.64 (79.57) million USD. The standard deviation of the net revenue is 3,754.58 million USD. The minimum amount is zero balance in every year except 2007 (Appendix 2) and the maximum amount of net revenue (92,517.35 million USD) was recorded in 2013. The biggest net income for a company used in this study over these nine years is the income of PTT. The net income of PPT is five times larger than the second largest company in all of the examined periods.

The mean (median) of the net income available to common stocks is 32.17 (3.99) million USD. The minimum amount of net loss available to common stocks, for Thai Airways International, was negative 641.77 million USD in 2008. The maximum amount of net income available to common stocks in 2011 was for PTT, the amount of 3,453.28 million USD. These two companies are Thai state-owned companies. The Ministry of Finance is the major shareholder; it holds over 51 percent of companies' common stocks.

The mean (median) of net cash flow from operating activities is 51.33 (5.55) million USD. The minimum amount was negative at 1,881.97 million USD for the first year of Digital Telecommunications Infrastructure Fund in 2013. The maximum amount of net income available to common stocks in 2014 (7,021.04 million USD) was PTT.

6. Limitations

This study has two limitations. Firstly, the sample size is small, consisting of a number of listed companies in Thailand. Data are obtained from only 423 companies over the study period. The results may not be easily generalizable to other settings with significantly different environments such as larger markets or more developed capital markets. In other words, findings of this study may only be specific to the Thai market or similar, small capital market, in a developing country with similar characteristics.

Finally, the inference about the effectiveness of mandatory audit partner rotation on the audit quality of this study depends on the ability of the accrual-based proxies to capture audit quality (Chi et al., 2009; Matthews, 2012). The study of Chi et al. (2009) for example, claimed that the discretionary accruals are noisy. Further, Matthews (2012) suggests that abnormal accruals may have measurement errors. Thus, the accuracy of inferences from this study on the impact of mandatory auditor rotation on the audit quality may be limited by these limitations.

7. Duration of study

The study is expected to be completed by 1 March 2020. Table 5 presents the work that has been done since 1 March 2016 as well as plans for the time period 2017-2020.

Table 5: Study timetable

Descriptions	Time period
Literature search of previous studies on auditor rotation and audit quality	March – April 2016
Initial draft of the literature review and theoretical framework	May – June 2016
Hand collected financial information on the Thai listed companies from 2001–2015 including audit partners' name, audit firms, and auditor's opinion in the audit reports	July – September 2016
Initial draft of the descriptive statistics of preliminary financial data	October 2016
Writing hypotheses, research design and methodology sections	November 2016 – February 2017
Collecting key contacts information such as: Audit oversight board/body, Thai Regulators, Audit partners (Big4 audit firms and non-Big4 audit firms) in Thailand	December 2016 – January 2017
Proposal preparation	February – August 2017
Proposal presentation	September 2017
Data collection continues	October 2017 – January 2018
Data Analysis	February-July 2018
Discussion and write-up of analysis	August – December 2018
Updating relevant studies, rewriting/updating literature review, and thesis completion	January – May 2019
Final draft completion	June 2019
Tentative viva voce (an oral exam)	November 2019
Thesis completion	March 2020

Appendix 1: The rates of exchange of commercial banks in Bangkok Metropolis by the Bank of Thailand

(Unit : Baht / 1 Unit of Foreign Currency)

Description	2006	2007	2008	2009	2010	2011	2012	2013	2014
USA : DOLLAR (USD)									
Buying transfer	37.8322	34.4486	33.2394	34.1970	31.5857	30.3518	30.9430	30.5874	32.3388
Selling	38.0287	34.6854	33.4853	34.4728	31.8674	30.6316	31.2232	30.8645	32.6208
Mid-rate	37.8820	34.5182	33.3133	34.2858	31.6898	30.4917	31.0831	30.7260	32.4798

Appendix 2: Descriptive statistics for key financial data of Thai listed companies categorised by financial year during 2006 to 2014 by using the three different exchange rates

(Unit: Million USD)

Panel A: Property, Plant and Equipment - net						
Year	**N**	**Mean**	**Median**	**Std. Deviation**	**Minimum**	**Maximum**
2006	356	165.94	24.44	655.33	0.03	8,911.24
2007	364	182.03	25.90	709.11	0.17	9,179.68
2008	373	201.89	26.12	813.85	0.01	11,304.51
2009	379	207.41	25.90	958.69	0.00	14,872.47
2010	383	232.11	29.29	1,105.24	0.13	17,713.55
2011	387	285.77	28.08	1,362.86	0.10	21,171.80
2012	394	304.79	29.65	1,429.69	0.07	22,246.44
2013	409	325.97	31.27	1,595.68	0	25,365.61
2014	423	310.08	33.04	1,449.69	0	23,278.62
Panel B: Total assets						
2006	356	324.81	62.02	1,249.73	2.66	19,829.72
2007	364	383.89	72.32	1,575.59	2.61	25,872.81
2008	373	411.29	79.50	1,626.16	1.79	26,584.54
2009	379	426.40	75.49	1,875.47	1.69	31,977.25
2010	383	511.12	88.81	2,276.62	4.66	39,065.59
2011	387	637.48	103.81	2,719.33	4.86	45,568.75
2012	394	709.64	117.39	3,117.22	2.80	52,251.52
2013	409	792.64	129.29	3,452.45	0.69	58,433.90
2014	423	775.73	131.69	3,249.44	3.10	54,706.27
Panel C: Total liabilities						
2006	356	168.70	27.30	683.41	0.29	10,410.03
2007	364	193.34	30.91	880.80	0.14	14,202.81
2008	373	208.07	35.87	873.77	0.15	13,531.85
2009	379	216.18	33.34	1,036.10	0.09	17,272.60
2010	383	262.73	38.40	1,232.73	0.17	20,792.44
2011	387	341.60	48.16	1,470.92	0.19	24,130.15
2012	394	382.06	55.06	1,704.08	0	28,349.26
2013	409	431.57	52.86	1,898.13	0.20	31,238.57
2014	423	415.70	55.21	1,735.46	0.11	27,644.72

(Unit: Million USD)

Panel D: Net revenue						
Year	**N**	**Mean**	**Median**	**Std. Deviation**	**Minimum**	**Maximum**
2006	356	336.24	59.87	1,841.92	0	32,046.49
2007	364	402.91	63.87	2,412.58	0.20	43,333.84
2008	373	507.13	70.62	3,282.22	0	60,060.58
2009	379	413.80	67.23	2,508.34	0	46,263.29
2010	383	524.38	80.32	3,231.25	0	59,956.36
2011	387	699.59	86.96	4,333.98	0	79,633.63
2012	394	767.58	97.95	4,841.43	0	89,882.70
2013	409	783.51	100.39	4,896.57	0	92,517.35
2014	423	750.04	101.92	4,577.71	0	87,276.77
Panel E: Net income available to common stocks						
2006	356	24.13	3.13	150.62	-128.79	2,514.68
2007	364	27.80	3.15	168.13	-98.42	2,833.37
2008	373	16.76	2.96	124.19	-641.77	1,552.08
2009	379	23.86	3.18	114.91	-250.27	1,736.81
2010	383	36.37	4.45	176.38	-319.16	2,621.92
2011	387	40.54	3.94	216.67	-334.42	3,453.28
2012	394	43.72	5.64	222.77	-511.62	3,367.29
2013	409	41.86	6.42	210.65	-392.09	3,074.33
2014	423	32.14	5.67	135.28	-480.66	1,700.24
Panel F: Net cash flow from operating activities						
2006	356	37.35	4.62	190.30	-69.40	2,947.02
2007	364	40.42	4.85	215.63	-81.43	3,431.78
2008	373	40.74	3.62	258.51	-233.00	3,986.40
2009	379	43.33	6.74	182.19	-120.30	2,576.37
2010	383	51.16	5.07	295.79	-312.92	4,692.27
2011	387	53.39	4.83	346.67	-200.58	5,728.03
2012	394	64.26	6.40	355.39	-272.70	5,482.33
2013	409	58.10	7.82	364.42	-1,881.97	5,328.57
2014	423	68.66	7.06	426.38	-243.62	7,021.04

Appendix 3: Descriptive statistics for key financial data of Thai listed companies categorised by financial year during 2006 to 2014 by the mid-rates of exchange at 2014

(Unit: Million USD)

Panel A: Property, Plant and Equipment – net						
Year	**N**	**Mean**	**Median**	**Std. Deviation**	**Minimum**	**Maximum**
2006	356	193.29	28.47	763.32	0.04	10,379.74
2007	364	193.07	27.47	752.09	0.18	9,736.11
2008	373	206.61	26.73	832.88	0.01	11,568.88
2009	379	218.37	27.27	1,009.38	0.00	15,658.78
2010	383	225.72	28.49	1,074.82	0.13	17,225.94
2011	387	267.05	26.24	1,273.57	0.09	19,784.67
2012	394	290.37	28.25	1,362.04	0.07	21,193.83
2013	409	306.98	29.45	1,502.71	0	23,887.71
2014	423	308.74	32.90	1,443.40	0	23,177.56
Panel B: Total assets						
2006	356	378.33	72.24	1,455.67	3.10	23,097.49
2007	364	407.16	76.70	1,671.10	2.77	27,441.12
2008	373	420.91	81.36	1,664.19	1.83	27,206.26
2009	379	448.95	79.48	1,974.63	1.78	33,667.88
2010	383	497.05	86.36	2,213.95	4.53	37,990.20
2011	387	595.71	97.01	2,541.16	4.54	42,583.20
2012	394	676.06	111.83	2,969.72	2.67	49,779.21
2013	409	746.46	121.75	3,251.29	0.65	55,029.31
2014	423	772.36	131.12	3,235.33	3.09	54,468.78
Panel C: Total liabilities						
2006	356	197.52	31.96	800.17	0.34	12,188.50
2007	364	206.47	33.01	940.62	0.15	15,167.27
2008	373	214.51	36.98	900.82	0.16	13,950.76
2009	379	229.44	35.38	1,099.68	0.09	18,332.47
2010	383	257.78	37.68	1,209.49	0.17	20,400.40
2011	387	322.16	45.42	1,387.22	0.18	22,757.07
2012	394	367.28	52.93	1,638.16	0	27,252.47
2013	409	410.10	50.23	1,803.73	0.19	29,685.00
2014	423	417.51	55.45	1,742.99	0.11	27,764.73

(Unit: Million USD)

Panel D: Net revenue						
Year	**N**	**Mean**	**Median**	**Std. Deviation**	**Minimum**	**Maximum**
2006	356	392.17	69.82	2,148.28	0	37,376.62
2007	364	428.20	67.88	2,563.99	0.22	46,053.42
2008	373	520.14	72.43	3,366.45	0	61,601.86
2009	379	436.81	70.97	2,647.82	0	48,835.71
2010	383	511.62	78.37	3,152.66	0	58,498.05
2011	387	656.77	81.64	4,068.69	0	74,759.23
2012	394	734.57	93.73	4,633.23	0	86,017.56
2013	409	741.20	94.97	4,632.17	0	87,521.72
2014	423	750.04	101.92	4,577.71	0	87,276.77
Panel E: Net income available to common stocks						
2006	356	28.14	3.65	175.67	-150.22	2,932.93
2007	364	29.55	3.35	178.68	-104.60	3,011.19
2008	373	17.19	3.04	127.38	-658.24	1,591.91
2009	379	25.18	3.36	121.30	-264.18	1,833.39
2010	383	35.48	4.34	172.09	-311.39	2,558.14
2011	387	38.06	3.70	203.41	-313.95	3,241.90
2012	394	41.84	5.40	213.20	-489.62	3,222.49
2013	409	39.60	6.07	199.28	-370.92	2,908.32
2014	423	32.14	5.67	135.28	-480.66	1,700.24
Panel F: Net cash flow from operating activities						
2006	356	43.56	5.38	221.95	-80.95	3,437.18
2007	364	42.95	5.15	229.17	-86.54	3,647.16
2008	373	41.78	3.71	265.14	-238.98	4,088.70
2009	379	45.74	7.11	192.32	-126.99	2,719.63
2010	383	49.92	4.94	288.60	-305.31	4,578.14
2011	387	50.12	4.54	325.45	-188.30	5,377.42
2012	394	61.50	6.12	340.11	-260.98	5,246.58
2013	409	54.96	7.39	344.74	-1,780.35	5,040.85
2014	423	68.66	7.06	426.38	-243.62	7,021.04

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