ผลกระทบของผู้มีหน้าที่กำกับดูแลและการนำมาตรฐานการสอบบัญชีไทยฉบับปรับปรุง 2555 มาใช้ ต่อคุณภาพของงานสอบบัญชี

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THE EFFECT OF THOSE CHARGED WITH GOVERNANCE AND THE ADOPTION OF THE REVISED THAI STANDARDS ON AUDITING (B.E. 2555) ON AUDIT QUALITY

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งานวิจัยฉบับนี้ได้ทำการศึกษาผลกระทบของลักษณะของผู้มีหน้าที่กำกับดูแลต่อคุณภาพของงานสอบบัญชีในช่วงที่มีการนำมาตรฐานการสอบบัญชีไทยฉบับปรับปรุง (พ.ศ.2555) มาใช้ มาตรฐานการสอบบัญชีฉบับนี้มีจุดประสงค์เพื่อพัฒนางานตรวจสอบบัญชี และเพื่อเน้นถึงบทบาทอันสำคัญของผู้มีหน้าที่กำกับดูแลในการให้ความร่วมมือกับผู้ตรวจสอบบัญชีเพื่อที่จะพัฒนาคุณภาพของงานสอบบัญชี วรรณกรรมที่ผ่านมาได้ศึกษาเกี่ยวกับคุณภาพของงานสอบบัญชีอย่างกว้างขวาง โดยเฉพาะอย่างยิ่ง การศึกษาเกี่ยวกับปัจจัยทางด้านอุปทาน อาทิเช่น ลักษณะของผู้สอบบัญชีและสำนักงานสอบบัญชี เพื่อเป็นการเติมเต็มช่องว่างของวรรณกรรมในอดีต งานวิจัยฉบับนี้จึงได้ศึกษาปัจจัยทางด้านอุปสงค์ของคุณภาพของงานสอบบัญชีจำนวนสี่ด้าน คือ ความเสี่ยงในการตบแต่งตัวเลขทางการเงินของผู้บริหาร การถือหุ้นในลักษณะครอบครัวของผู้บริหาร การหมุนเวียนคณะกรรมการตรวจสอบ และความเชี่ยวชาญทางด้านบัญชีของคณะกรรมการตรวจสอบ

จากกลุ่มตัวอย่างของบริษัทจดทะเบียนในตลาดหลักทรัพย์แห่งประเทศไทย ในช่วงระยะเวลา พ.ศ. 2552 ถึง พ.ศ.2557 ผลของงานวิจัยแสดงให้เห็นว่าผู้บริหารที่มีความเสี่ยงในการตบแต่งตัวเลขทางการเงินสูงมีแนวโน้มที่จะมีความเกี่ยวข้องกับระดับของคุณภาพของงานสอบบัญชีที่ต่ำ ความสัมพันธ์นี้เด่นชัดมากขึ้นในช่วงหลังจากที่มีการนำมาตรฐานการสอบบัญชีไทยฉบับปรับปรุงมาใช้ ภายใต้ทฤษฎีแนวร่วม ผู้บริหารที่ถือหุ้นในลักษณะครอบครัวในปริมาณมากมีแนวโน้มที่จะสนับสนุนให้ระดับของคุณภาพของงานสอบบัญชีดีขึ้น โดยเฉพาะอย่างยิ่งในช่วงหลังจากที่มีการนำมาตรฐานการสอบบัญชีไทยฉบับปรับปรุงมาใช้ อย่างไรก็ตาม ไม่พบหลักฐานว่ามีความสัมพันธ์ระหว่างลักษณะของคณะกรรมการตรวจสอบและคุณภาพของงานสอบบัญชี ผลของงานวิจัยนี้ยังคงเหมือนเดิมเมื่อทดสอบเพิ่มเติมหลายด้านโดยการควบคุมลักษณะของผู้สอบบัญชี และผลกระทบซ้ำซ้อนจากการเปลี่ยนแปลงมาตรฐานการบัญชี

โดยรวมแล้ว งานวิจัยฉบับนี้นำเสนอความเข้าใจเกี่ยวกับบทบาทของผู้มีหน้าที่กำกับดูแลต่อคุณภาพของงานสอบบัญชี นำเสนอหลักฐานในขั้นต้นจากการนำมาตรฐานการสอบบัญชีไทยฉบับปรับปรุงมาใช้ และสนับสนุนการทำงานอย่างเป็นอันหนึ่งอันเดียวกันของผู้มีหน้าที่กำกับดูแล ผู้ตรวจสอบบัญชี และคณะกรรมการควบคุมและกำหนดมาตรฐานการสอบบัญชี เพื่อพัฒนาคุณภาพงานสอบบัญชีให้ดียิ่งขึ้น

ภาควิชา การบัญชี ลายมือชื่อนิสิต .....

สาขาวิชา การบัญชี ลายมือชื่อ อ.ที่ปรึกษาหลัก .....

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TANIKAN VIRIYACHINKARN: THE EFFECT OF THOSE CHARGED WITH GOVERNANCE AND THE ADOPTION OF THE REVISED THAI STANDARDS ON AUDITING (B.E. 2555) ON AUDIT QUALITY. ADVISOR: NOPMANEE TEPALAGUL, D.B.A., 117 pp.

This study investigates the effect of those charged with governance (TCWG) characteristics on audit quality during the mandatory adoption of the revised Thai Standards on Auditing (B.E.2555). The revised Thai Standards on Auditing (henceforth, "the revised TSAs") aim to improve audit tasks and emphasize important roles of TCWG to collaborate with auditors to enhance audit quality. Previous studies have extensively explored audit quality especially in term of supply-side factors such as auditors' and audit firms' characteristics. Filling the gap in the existing literature, this paper examines four demand factors of audit quality which are management's risk of manipulation, management's family ownership, audit committee rotation, and audit committee's accounting expertise.

Based on the samples of listed companies in the Stock Exchange of Thailand in the period of 2009 to 2014, the results show that high potential manipulators are more likely to involve in lower level of audit quality. This association is more pronounced in the period after the revised TSAs adoption. Supporting the alignment effect, management with higher family ownership tend to support greater level of audit quality, especially after the revised TSAs adoption. However, there is no evidence of the association between audit committee's traits and audit quality. These findings are robust to multiple additional approaches after controlling for auditor's traits and confounding effect from accounting standards changes.

Overall, this paper offers insight into the roles of TCWG on audit quality, provides early evidence of the revised TSAs adoption, and encourages harmonious cooperation among audit clients, auditors, and regulators to improve audit quality.

Department:	Accountancy	Student's Signature	.....
Field of Study:	Accountancy	Advisor's Signature	.....
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ABBREVIATIONS

AICPA	American Institute of Certified Public Accountants
AS	Auditing Standards
FAP	Federal of Accounting Professions
GAAP	General Accepted Accounting Principles
GAAS	General Accepted Auditing Standards
IAASB	International Auditing and Assurance Standards Board
ICAAT	Institute of Certified Accountants and Auditors of Thailand
IFAC	International Federation of Accountants
IFRS	International Financial Reporting Standards
ISAs	International Standards on Auditing
JDM	Judgement and Decision Making
PCAOB	Public Company Accounting Oversight Board
SEC	Securities and Exchange Commission
SET	Stock Exchange of Thailand
SETSMART	SET Market Analysis and Reporting Tools
SOX	Sarbanes-Oxley Act of 2002
TAS	Thai Accounting Standards
TCWG	Those Charged With Governance
TFRS	Thai Financial reporting Standards
TSAs	Thai Standards on Auditing

1. INTRODUCTION

This study examines the association between those charged with governance (TCWG) characteristics and audit quality during the revised Thai Standards on Auditing (B.E. 2555) adoption in Thailand. Following the global trends, Thailand has adopted International Standards on Auditing (ISAs) since January 1, 2012. There are ten new standards and each of the standards is considered as a significantly, moderately, or slightly changed standard as compared to the old standards. Specifically, the revised TSAs firstly define TCWG in the auditing standards (TSA260; TSA265), implying that roles of TCWG are increasingly more important under the new auditing standards regime. One of the major goals of auditing standards improvement is to increase audit quality.

Audit quality has been studied by researchers and regulators for decades. The evidence from academic review papers (Knechel et al. 2012; DeFond and Zhang 2014) show a gap in audit quality literature which encourages researchers to study about new drivers of audit quality such as client demands instead of the overwhelmed research related to supplies of audit quality, namely the auditors' and audit firm's characteristics. In practice, the International Auditing and Assurance Standards Board (IAASB) releases the publication, *A Framework for Audit Quality*[1], in 2014 to raise awareness of the importance of audit quality among auditors, audit firms, and other stakeholders.

[1] On February 18th, 2014, The IAASB released its new publication, *A Framework for Audit Quality: Key Elements that Create an Environment for Audit Quality*. Through this Framework, the IAASB aims to raise awareness of the key elements of audit quality, encourage key stakeholders to challenge themselves to do more to increase audit quality in their particular environments, and facilitate greater dialogue between key stakeholders on audit quality (IAASB 2014).

Likewise, the Securities and Exchange Commission of Thailand (SEC) has launched the initiatives of audit quality oversight in Thailand since 2010 to promote the audit quality and to be in line with the international practice. It is, therefore, interesting to examine whether the increasing roles of newly defined TCWG and the significant improvement of auditing standards have any impact on audit quality in Thailand.

First, this research explores the effect of four characteristics of TCWG on audit quality. The first two characteristics are management's manipulation risk and family ownership. The other two characteristics are rotation and accounting expertise of audit committees. This paper emphasizes on the management and audit committee as representatives of TCWG because these people closely monitor the business, prepare the financial reports for both internal and external users, and directly cooperate and communicate with external auditors. Moreover, regulations about audit committee rotation and accounting-only expertise are controversial issues. To date, there is no regulation related audit committee rotation in Thailand which leads to concerns about independence of audit committee under bonding effect or familiarity between audit committees and the entity. Besides, the SEC regulation allows audit committees to have either financial or accounting expertise, and some companies choose not to have any accounting expert on audit committee. Thus, it is interesting to investigate the effect of audit committee rotation and accounting-only expertise on audit quality under the revised TSAs.

With regards to the first two management characteristics, the result suggests that risk of manipulation is negatively associated with audit quality, revealing that high potential manipulators tend to involve with lower level of audit quality. For the family ownership, degree of audit quality is higher for the firms with greater percentage of

family ownership concentration, indicating that family business tends to support auditors to improve audit quality. However, there is no evidence of the association between the two audit committee's characteristics and audit quality.

Second, this research examines the effect of TCWG characteristics on audit quality after the revised TSAs adoption. The results report that the negative association between management's manipulation risk and audit quality still holds after the revised TSAs adoption period, suggesting that the revised TSAs do not effectively impose management with high risk of manipulation to cooperate with external auditor in improving audit quality. On the contrary, family managers increasingly collaborate with the auditor to promote high level of audit quality after the revised TSAs adoption. Despite the greater emphasis on role of TCWG after the revised TSAs implementation, there is no evidence that audit committee rotation and accounting expertise are associated with auditor quality. The results support the prior evidence from survey in Thailand that audit committees emphasize more on internal control rather than the association with external auditors and quality of financial statements (Tengamnuay and Stapleton 2009). However, the additional test shows that accounting expertise of audit committee is more important in improving audit quality in the revised TSAs regime only when the companies are audited by non-Big4 auditors. To minimize the threat of confounding effect from the recent implementation of accounting standards, the additional tests are performed to mitigate the effect of the three accounting standards changes around the sample period (2009-2014). The three accounting standards are TAS40 *Investment Property*, TAS12 *Income Taxes*, and TAS19 *Employee Benefits*. After eliminating these contemporaneous events, the results remains unchanged.

The findings of this study provides the following contributions. First, this paper offers an understanding of the impact of TCWG characteristics on audit quality and helps regulators and standard setters for determining policy related to the qualification of TCWG in the future. This paper uses Beneish (1999) model to divide high and low potential manipulators. Thus, this model is an effective tool for investors and regulators to identify the companies with high risk of manipulation. Further, the results support the notion that family business in Thailand are in line with an alignment effect, meaning that family managers are willing to create long lasting consequences and to pass the business down to their next generation. However, this results do not support the regulation about audit committee rotation because the percentage of the rotated audit committee is not associated with audit quality. The regression results do not support the issue about audit committee's accounting qualification because having only accounting expertise on audit committee are not related with improving audit quality. Second, this paper fills in the gap in the previous audit quality literature. DeFond and Zhang (2014) states that the consequence of the auditing regulatory intervention on audit quality has rarely gained attention from researchers, as compared to other regulations such as International Financial Reporting Standards (IFRS) and the Sarbanes-Oxley Act (SOX) of 2002. Moreover, prior research mostly focus on supply-side factors of audit quality such as auditors and audit firms characteristics. This paper focuses on the client-demand factors[2] of audit quality. In this paper, the demand factors of audit quality are captured by the four characteristics of management and audit committee (Knechel et al. 2012).

[2] DeFond and Zhang (2014) define demand for audit quality as a function of client competencies which are captured by mechanisms such as audit committee characteristics. The supply of audit quality is a function of the auditor's independence and competencies (DeAngelo 1981).

Third, this paper provides archival evidence by analyzing final outputs of listed companies' operation and audit works disclosed on financial statements and annual reports while prior research related to the regulators' concern on audit quality uses primary data, questionnaires and interview, to understand stakeholders' perception about the changing standards. Forth, the findings suggest that the recent change of auditing standards has no significant effect on the association between TCWG and audit quality. Thus, regulators and standard setters should increasingly focus on audit client inspection along with the SEC's auditor inspection in order to actively enforce the revised TSAs to all related stakeholders. Finally, this research is motivated by academic and practical point of view in order to encourage the coordination among regulators, auditors, and audit clients to harmoniously improve audit quality.

Section 2 discusses institutional background of Thai Standards on Auditing and roles of the Stock Exchange of Thailand on audit quality. Section 3 provides theoretical background and literature review for hypothesis development. Section 4 describes methodology and research design, including sample data, measurement of variables, and research model. Section 5 details empirical results and robustness checks. And, section 6 discusses the conclusion of this paper.

2. INSTITUTIONAL BACKGROUND

The Federation of Accounting Professions (FAP) and the Securities and Exchange Commission, Thailand (SEC) are the collaborative organizations overseeing quality of accounting and auditing in Thailand. The FAP is responsible for setting the Thai accounting and auditing standards which affect all accountants and auditors of either listed or non-listed companies in Thailand. The SEC regulates and inspects specifically only the auditors of listed companies. The evolution of Thai Standards on Auditing and the involvement of the FAP are discussed in section 2.1 and the importance of the SEC is mentioned in section 2.2.

2.1 Thai Standards on Auditing

Thai Standards on Auditing (TSAs) have evolved for years. In 1948, "Accountant Association of Thailand" was first successfully founded by a group of accountants. The first draft of "Accounting Act" was written in 1953 and enacted as "Public Accountant Act B.E. 2505", effective on November 2, 1962. Later in 1975, the association was renamed as "Institute of Certified Accountants and Auditors of Thailand (ICAAT)". ICAAT acted as a national accounting organization responsible for setting auditing standards and raising concerns on accounting professions among its members. Since 1978, ICAAT has become a member of International Federation of Accountants (IFAC)[3], a worldwide accounting professional body.

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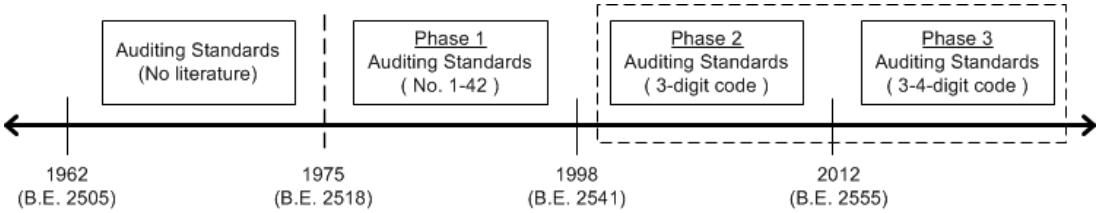
[3] International Auditing and Assurance Standards Board (IAASB) of the IFAC issues International Standards on Auditing (ISAs). As of November 17, 2015, there are 111 countries implementing or committing to implement ISAs either by law and regulation or as national standards (IAASB 2015). Thailand has adopted ISAs as local standards and there may be national modifications which are stated to be in line with the spirit of IAASB modification policy.

On October 23, 2004, "Accounting Profession Act B.E. 2547" was first enacted in an effort to institutionalize accounting professions and to put every accounting profession under the regulation. On January 29, 2005, ICAAT members unanimously voted to register the cassation of its operation and transferred all ICAAT's duties and responsibilities to the FAP (Narongdej 2008). There are six accounting professions under the FAP; accounting, financial report auditing, managerial accounting, accounting system designing, tax accounting, and accounting knowledge and technology. The FAP is operated and monitored by accounting professionals themselves and becomes the first officially recognized representative of the national accounting professional body in Thailand. In accordance with Accounting Professions Act B.E. 2547 section 7, roles of the FAP are divided into three functions. First, supportive function includes (i) to support learning, research development of accounting professions, and unity, and (ii) to establish accounting standards, auditing standards, and other standards relating to accounting professions. Second, monitoring function includes (i) to establish accounting profession's ethic, and (ii) to certify accounting certificate, knowledge, proficiency, and accounting CPD course[4] to assure membership's qualification. Third, assisting function includes (i) to give consultation, advice and accounting knowledge to the general public and the government, and (ii) to operate the accounting profession in accordance with Accounting Professions Act B.E. 2547.

[4] CPD course stands for “Continuing Professional Development” course. In 2015, all certified public accountants have to accomplish CPD course no less than 18 hours. All accountants and tax auditors have to complete CPD course no less than 12 hours.

Figure 1 Timeline of Thai Auditing Standards



The timeline of auditing standards in Thailand is presented in Figure 1 (Henchokchaichana 2011). The accounting profession framework in auditing has been developed from the unwritten auditing standards B.E. 2505-2517 (1962-1974) to the general accepted auditing standards (GAAS). There have been three phases of GAAS. The first phase is the code 1-42 auditing standards, effective from 1975 to 1997 (B.E. 2518-2540). ICAAT announced this set of auditing standards following the U.S. auditing standards, issued by American Institute of Certified Public Accountants (AICPA). The second phase is the 3-digit code auditing standards, effective from 1998 to 2011 (B.E. 2541-2554). This second set of auditing standards is translated from International Auditing Standards (ISAs), issued by the IFAC, and has been reviewed during the changes from ICAAT to FAP in 2005. The third phase is the current 3-4-digit code auditing standards or "the revised TSAs (B.E. 2555)", effective from January 1, 2012 to the present (B.E. 2555-present). The revised TSAs consist of five parts: Standards on Quality Control, Auditing (code: 200-800), Reviews (code: 2000-2999), Assurance Engagement (code: 3000-3999), and Related Services (code: 4000-4999). The current revised TSAs are translated from "International Quality Control, Auditing, Review, Other assurance, and Related Services Pronouncements 2010 edition". The significant changes of TSAs from 3-digit code to the revised standards include 10 new auditing standards and many highly-changed standards. The audit quality are expected to be improved due to these new and significantly changed auditing standards.

The scope of this research is limited to the changes from the second phase of the 3-digit code auditing standards to the third phase of the 3-4-digit code auditing standards (henceforth called "the revised TSAs"). The revised TSAs aim to increase audit quality by performing better risk assessments through a more detailed understanding of the entity and its environment, including its internal control assessment and improved design and performance of audit procedures to respond to assess those risks of material misstatements. Table 1 compares the second phase TSAs with those in the third phase and summarizes the level of changes.

Table 1 Summary of Thai Standards on Auditing: 3-digit and 3-4 digit code

10 New Standards	Change level	3-4-digit code	3-digit code	Topics
	Low		120	Framework for Assurance Engagements
		200-299		**GENERAL PRINCIPLES AND RESPONSIBILITIES**
	Low	200	200	Overall Objectives of the Independent Auditor and the Conduct of an Audit in Accordance with International Standards on Auditing
	Medium	210	210	Agreeing the Terms of Audit Engagements
	Low	220	220	Quality Control for an Audit of Financial Statements
	High	230	230	Audit Documentation
	High	240	240	The Auditor's Responsibilities Relating to Fraud in an Audit of Financial Statements
	Low	250	250	Consideration of Laws and Regulations in an Audit of Financial Statements
New	Medium	260		Communication with Those Charged with Governance
New	Medium	265		Communicating Deficiencies in Internal Control to Those Charged with Governance and Management
		300–499		**RISK ASSESSMENT AND RESPONSE TO ASSESSED RISKS**
	Low	300	300	Planning an Audit of Financial Statements
			310	Knowledge of Business
New	**High**	315		Identifying and Assessing the Risks of Material Misstatement through Understanding the Entity and Its Environment
	Medium	320	320	Materiality in Planning and Performing an Audit
New	**High**	330		The Auditor's Responses to Assessed Risks
			400	Risk Assessment and Internal Control
			401	Auditing in a Computer Information Systems Environment

10 New Standards	Change level	3-4-digit code	3-digit code	Topics
	Medium	402	402	Audit Considerations Relating to an Entity Using a Service Organization
New	Medium	450		Evaluation of Misstatements Identified during the Audit
		500-599		**AUDIT EVIDENCE**
	Medium	500	500	Audit Evidence
	Medium	501	501	Audit Evidence-Specific Considerations for Selected Items
New	Medium	505		External Confirmations
	Low	510	510	Initial Audit Engagements-Opening Balances
	Low	520	520	Analytical Procedures
	Low	530	530	Audit Sampling
	High	540	540	Auditing Accounting Estimates, Including Fair Value Accounting Estimates, and Related Disclosures
	High	550	550	Related Parties
	Medium	560	560	Subsequent Events
	Low	570	570	Going Concern
	Medium	580	580	Written Representations
		600-699		**USING THE WORK OF OTHERS**
	High	600	600	Special Considerations-Audits of Group Financial Statements (Including the Work of Component Auditors)
	Low	610	610	Using the Work of Internal Auditors
	Medium	620	620	Using the Work of an Auditor's Expert
		700-799		**AUDIT CONCLUSIONS AND REPORTING**
	High	700	700	Forming an Opinion and Reporting on Financial Statements
New	Medium	705		Modifications to the Opinion in the Independent Auditor's Report
New	Medium	706		Emphasis of Matter Paragraphs and Other Matter Paragraphs in the Independent Auditor's Report
	Medium	710	710	Comparative Information-Corresponding Figures and Comparative Financial Statements
	Low	720	720	The Auditor's Responsibilities Relating to Other Information in Documents Containing Audited Financial Statements
		800-899		**SPECIALIZED AREAS**
	Low	800	800	Special Considerations-Audits of Financial Statements Prepared in Accordance with Special Purpose Frameworks
New	Low	805		Special Considerations-Audits of Single Financial Statements and Specific Elements, Accounts or Items of a Financial Statement
New	Low	810		Engagements to Report on Summary Financial Statements

Note: In 2012, new auditing standards are TSA260, TSA265, TSA315, TSA330, TSA450, TSA505, TSA705, TSA706, TSA805, and TSA810. These standards are new in term of "numbers" but the second Column shows the level of change in "context" of the standards.

From Table 1, the first Column marks the 10 new standards in 3-4-digit code version which are mostly related to communication with those charged with governance (TSA 260; TSA 265), identifying and assessing risk of material misstatement (TSA 315; TSA 330; TSA450), audit evidence (TSA 505), auditor's report (TSA 705; TSA 706), and specialized areas (TSA 805; TSA 810). The second Column shows the level of changes in the current 3-4-digit code standards from the 3-digit code standards. The highly changed standards in the second Column are related to auditor's responsibility to fraud (TSA 230; TSA 240), risk assessment (TSA 315; TSA 330), auditing accounting estimates and fair values (TSA 540), related party transactions (TSA 550), group audit (TSA 600), and forming the audit opinion (TSA 700). There are three 3-digit code standards missing from the prior version of TSAs which are TSA 310, TSA 400, and TSA 401. These standards are replaced by TSA 200, TSA 315, TSA 330, and TSA 500. The reasons that the standards are considered to be highly, moderately, or slight changed standards are because of the level of changes in objective, definition, and requirements. For example, TSA540 is considered to be a highly-changed standard because the audit tasks related to auditing accounting estimate have to be in line with TFRS 13 "*Fair Value Measurement*". The structure of the revised TSAs comprises of five sections: introduction, objective, definitions, requirements, and application and other explanatory material. Introductory part includes the purpose, scope, and subject matter of the TSAs. The objective part contains a clear statement of the objective of the auditors and related parties. The definition part defines a greater understanding of the applicable terms used in the TSAs. The requirement part expresses the phrase "the auditor shall" to support the objective. Lastly, the application and other explanatory

material explains more precisely about what the requirement means and includes examples of the process that may be appropriate under certain circumstances.

2.2 The Securities and Exchange Commission, Thailand

The Securities and Exchange Commission, Thailand (SEC), established on May 16, 1992, is an independent state agency under the Securities and Exchange Act B.E. 2535 (1992). The missions of SEC are to develop and supervise the Thai capital market to ensure efficiency, fairness, transparency, and integrity. The Stock Exchange of Thailand (SET) is a secondary market where efficient trading systems and clearing settlement systems must be put in place. The SEC supervises duty performance of the SET and trading centers to ensure that investors receive adequate protection. In addition, the SEC regulates auditors who audit and express opinions on financial statements of listed companies in the capital market. The audit work shall be in accordance with the code of professional ethics, the provisions of law relating to auditors, the SEC regulations, and standards on quality control issued by IFAC. The SEC is, therefore, charged with conducting inspections to ensure that registered auditors and audit firms have qualifications according to those regulators (SEC 2012).

Since 2010, the SEC has initially performed the independent audit inspection of audit firms and their auditors in order to enhance audit quality, to avoid audit deficiencies, and to comply with Thai Standards on Quality Control 1 (TSQC1) "*Quality Control for Firms that Perform Audits and Reviews of Financial Statements, and Other Assurance and Related Services Engagements*" which became effective in Thailand on January 1st, 2014. TSQC1 is based on the International Standards on Quality Control 1 (ISQC1) which was published by IFAC in 2005. In Thailand, TSQC1 was firstly drafted in 2010 and proclaimed extensively in the beginning of 2011 among

audit firms which audit listed companies. TSQC1 raises awareness of six issues that audit firms have to comply with; (1) leadership responsibilities for quality within the firm, (2) relevant ethical requirement, (3) acceptance and continuance of client relationship, (4) human resources, (5) engagement performance, and (6) monitoring. These quality control standards help to enhance audit quality, increase public trusts, and reduce risks of audit failure.

So far, three Independent Audit Inspection Activities Reports[5] have been prepared and published in 2012, 2013, and 2014 respectively. The first inspection cycle is from October 10, 2010 to December 31, 2012. During the first cycle, deficiencies at engagement level were found in most audit firms partially as a result of the newly-adopted auditing standards. The second audit quality inspection cycle is from January 1, 2013 to December 31, 2013. The independent audit inspection activities report in 2013 states that the SEC aims to determine the root causes of the deficiencies found in the first cycle and employ measures that enhance audit quality and avoid the repetition of those deficiencies. Recently, the third inspection cycle is from January 1, 2014 to December 31, 2014. Although there are fewer deficiencies detected in sampling and analytical procedures, other areas require further improvement. These areas include audit planning and risk assessment, audit procedures in response to fraud risk, audits of revenue recognition, and assessments of the appropriateness of management's use of going concern assumption. The 2014 report also discovers root causes of the deficiencies which are shortage of human resource within profession, improper job

[5] The SEC from the Stock Exchange of Thailand conducts its inspection on audit quality based on the auditing standards, code of professional ethics, and Standard on Quality Control 1. For more detail, please see *Independent Audit Inspection Activities Reports* available on www.sec.or.th.

assignment, and mislead audit planning that failed to respond to engagement risks and ineffective participation from those charged with governance. Thus, the SEC plays a crucial role in uplifting the quality of audit work and financial reports by closely cooperating with all related stakeholders, including auditors, accountants, audit committees, listed companies management as well as related accounting and audit regulatory bodies (SEC 2015).

3. THEORETICAL BACKGROUND, LITERATURE REVIEW, AND HYPOTHESIS DEVELOPMENT

3.1 Audit quality

The meaning of audit quality is not conclusive either in academic or in practice. Different stakeholders are likely to have different aspects about the definition of audit quality. Audit quality is a complex and multi-faceted concept (IAASB 2011). In practice, Figure 2 illustrates importance of audit quality defined by IAASB. IAASB views audit quality in three fundamental aspects: inputs, outputs, and context factors. Inputs are auditing standards, auditor's personal attributes, audit methodology, effectiveness of audit tools, and the availability of technical support. Outputs are the auditor's report and the communications to TCWG. The context factors are corporate governance within the entity as well as law and regulations that create dialogues for auditors and related stakeholders to conduct effective audit works and financial reporting. Overall, the attitude of TCWG, regulators, standard setters, and the importance they place on constructive and truthful communication with auditors can facilitate improvement of audit quality.

In academic, the most commonly-used definition of audit quality in academic literature is defined by DeAngelo (1981) as "the market-assessed joint probability that a given auditor will both discover a breach in the client's accounting system, and report the breach". Therefore, the common concept of audit quality in 1980's is a combination of two auditor's characteristics; (1) competency to detect the material misstatements, and (2) independence to report the misstatements. Knechel et al. (2012) provide a comprehensive review of academic research on audit quality. They consider that the

most important matters for improving audit quality are the attributes of the audit itself. However, Knechel et al. (2012) encourage researchers to find out new drivers of audit quality such as firms, clients, regulators, or other sources. In recent research, DeFond and Zhang (2014) define audit quality as a function of client demands (management, internal auditor, and audit committee) and auditor supply (competencies, independence, and auditors' incentives) under regulatory intervention. Therefore, audit quality can be improved by the harmonized coordination among audit clients, auditors, and regulators as shown in Figure 3.

Figure 2 Important influence on audit quality (IAASB 2011)

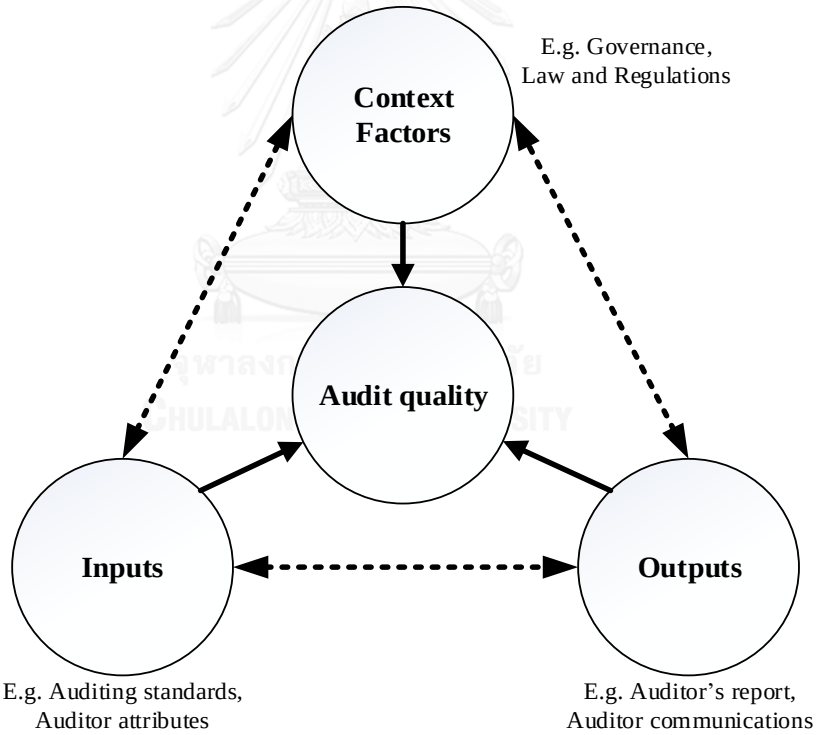
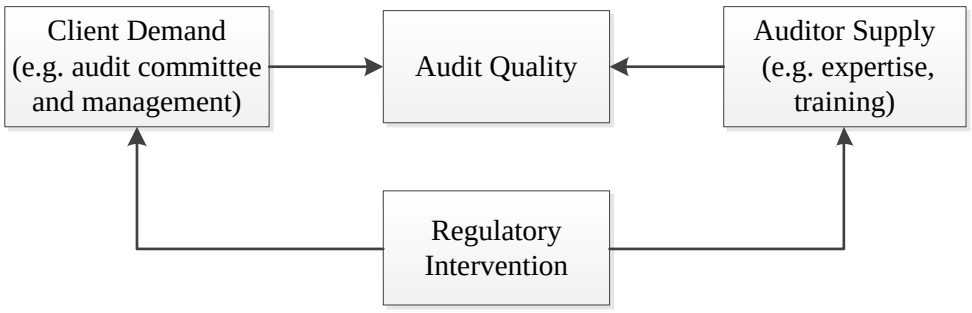


Figure 3 Audit quality framework (DeFond and Zhang 2014)



The presentations of audit quality framework in Figure 2 (practical view) and Figure 3 (academic view) look different but the contexts are similar. Auditor supplies in Figure 3 are similar to input factors in Figure 2. Client demands in academic view (Figure 3) are similar to context factors (Figure 2). However, the output of audit quality in Figure 2 is missing from Figure 3 because the audit quality is unobservable or unmeasurable in academic point of view. Therefore, many researchers use accounting quality as an output measure for audit quality. The distinct definitions of audit quality and accounting quality are controversial. Recently,Gros and Worret (2014) explain that audit quality (i.e. the quality of the audit by the statutory auditor) and accounting quality (i.e. financial reporting quality) are interrelated because higher audit quality leads to higher accounting quality and vice versa. This paper explores audit quality rather than accounting quality due to many reasons. First, previous literature heavily focus on the effect of auditor supply factors which are both auditors and audit firms' characteristics on audit quality. On the other hand, this paper fills in the gap in literature by investigating supply factors of audit quality which are audit client's characteristics. Second, the revised TSAs inherently regulate roles of TCWG in the auditing standards which infer that TCWG personnel, together with the auditor, have an effect on level of audit quality. Moreover, the change in the auditing standards directly affects the

auditors' performance in their audit work. In conclusion, this paper defines audit quality as the degree to which auditors perform their audit work that meets auditing standard requirement and assure the reliability and the fair presentation of financial statements, monitored by those charged with governance.

All accounting and auditing issues always involve decision-making (Koonce and Mercer 2005). In auditing, judgment and decision-making (JDM) aims to *describe* how auditors make judgment and decision and to *suggest* how to improve their judgment and decision (Ashton and Ashton 1995). Koonce and Mercer (2005) encourage archival researchers to apply JDM theory because the theory explicitly compares people's actual decisions to readily observable economics-based information. Auditors need to make judgment whether there are material misstatements in the financial statements while the standards setters regulate work of accountants and auditors and decide appropriate presentation of financial information. Theoretically, the change in audit task and audit client characteristics partly influence auditors' judgment and decision when they perform audits, leading to an expected increase in audit quality. Thus, the Bonner (1999)'s JDM framework is applied to explain the effect of TCWG and the auditing standards improvement on audit quality.

Figure 4 presents an analysis of applying JDM theory to study the impact of TCWG and the auditing standards' revision on audit quality. For the first and second questions of the framework, JDM performance of auditors, of course, needs improvement because auditors could not detect frauds or errors, leading to many business collapses and world scandals. Therefore, auditing standards needs improvement such that standard setters continuously revise auditing standards to be in line with current economic environment and moving forward to the globally accepted

standards. Third, the sources of deficiencies in auditing standards are from related stakeholders (audit firms, auditors, and audit clients), the complicated and optional tasks, and the emerging and high competitive market. For the fourth question, deficiencies of audit work can be corrected in three ways; change persons (auditors, audit clients), change tasks, and/or change environment. The environment related to auditors' judgment and decision making is uncontrollable. Extant studies have examined the degree of audit quality as a result of audit firm's characteristics (Chi and Chin 2011; Techamontrikul 2006) and auditor's traits, such as tenure (Carey and Simnett 2006), industry expertise (Chi and Chin 2011), education background, Big N, and political background (Gul et al. 2013). Changing audit firms and auditors obviously has an impact on judgment and decision making of audit work. However, this study adds to the literature of JDM theory in auditing by focusing on audit clients or TCWG and the change of audit task, rather than the auditors and audit firms.

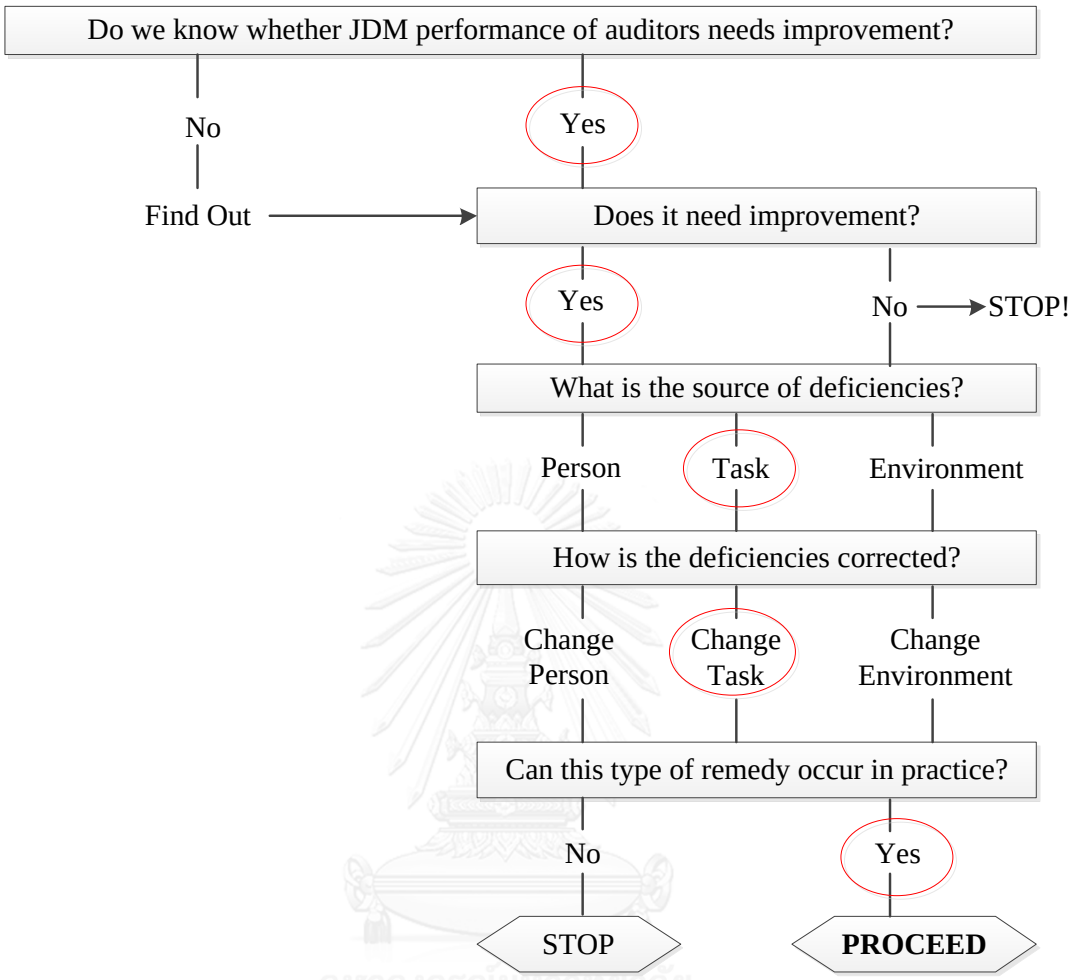
3.2 The effect of TCWG on audit quality

TSA 260 defines "those charged with governances" (TCWG) as the person(s) with responsibility for overseeing the strategic direction of the entity and obligations related to the accountability of the entity. In large entities, TCWG can be a board of directors, an audit committee, a committee of management, and management personnel (TSA260.10; TSA260.A2). In small entities, one person, such as the owner-manager, may be charged with governance. In this paper, TCWG are specifically defined as management and audit committees because they are the key persons who closely monitor the entity, prepare public financial reports, and communicate directly with the auditor during audit fieldwork.

Theoretically, TCWG should act as an agent to maximize the best interest of a principal or an entity. However, both TCWG and the principal, in practice, act in their self-interests to maximize their own benefits, leading to agency problem and agency costs. In order to mitigate the agency problem and reducing agency costs, the revised auditing standards emphasize roles of TCWG by altering form of auditor's report and encouraging effective two-way communication[6] between the auditor and audit client. Moreover, the auditor's report under the revised TSAs presents a single paragraph of management responsibility to prepare the financial statements that are fairly presented in accordance with the general accepted accounting principles (GAAP) and free of material misstatement, either due to fraud or error (TSA 700). Thus, the effective TCWG as a good governance mechanism thirst for a demand of high audit quality as a mean of avoiding financial misstatement and ensuring business's compliance with rules and regulations. In this paper, TCWG characteristics are measured in four dimensions: management's manipulation risk, management's family ownership, audit committee's rotation, and audit committee's accounting expertise.

[6] The revised TSA 260.4 discusses effective two-way communication in assisting the auditor and TCWG to understand related matters and to develop a constructive working relationship. The auditor shall obtain relevant information from TCWG and TCWG may assist the auditor in understanding the entity and its environment. TCWG shall fulfill their responsibility to oversee the financial reporting process, thereby reducing the risks of material misstatement in financial statements.

Figure 4 Bonner (1999)'s framework for JDM research

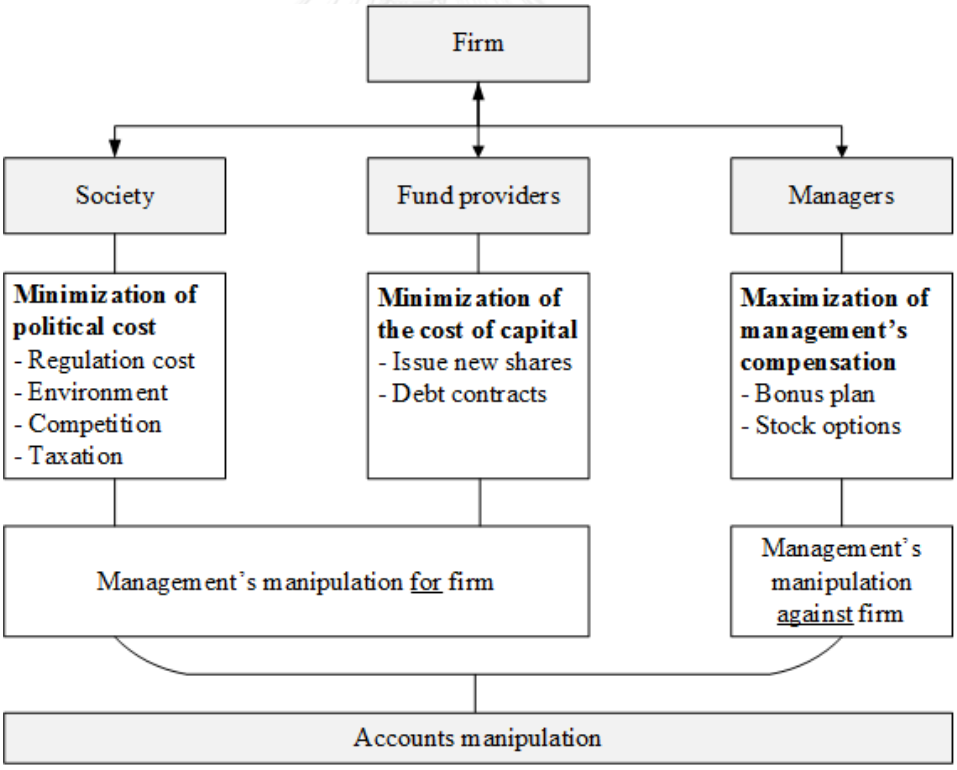


3.2.1 Management's risk of earnings manipulation

TSA 220 defines management as the person(s) with executive responsibility to monitor the entity's operations. TSA 315 APPENDIX 1 discusses management's philosophy and operating style that management attitudes and actions toward financial reporting may be manifested through conservative or aggressive selection from available alternative accounting principles. Stolowy and Breton (2004) summarize literature and propose conceptual framework related to accounts manipulation. Manipulation risk arises from the use of management's accounting choice to manage accounting transactions which possibly affect wealth transfer among stakeholders.

Figure 5 illustrates sources of management's account manipulation which are from three stakeholders; society, fund providers, and managers themselves. According to this framework, management manipulates accounting either for firms or against firms. Similar to Dechow et al. (1996), the source of earnings manipulation are the desire to attract external financial at low cost (for firm), the attention to decrease cost of capital (for firm), and the weaknesses of management to oversight the firm (against firm). Beneish (1999) also defines earnings manipulation as "an instance in which the company's managers violate generally accepted principles to favorably represent the company's financial performance" (for firm).

Figure 5 Principles of accounts manipulation (Stolowy and Breton 2004)



This paper identifies accounts manipulation risk as an undesirable characteristic of management no matter that the manipulation is for firm or against firm. Management's manipulation risk is a constraining factor of audit quality. It increases

the possibility of undetected financial misstatement by external auditors. The examples of common accounts manipulation are income smoothing, big bath accounting, overstatement of revenue, delayed recognition of loss, overstatement of inventories, and understatement of provision for loan loss reserve. These misbehaved acts of management absolutely decrease audit quality.

A number of studies have examined the detection of earnings management to favor the users in stock markets (Li et al. 2008) but relatively little work has examined the association between propensity of earning manipulation by management and audit quality. Bedard and Johnstone (2004) use case study to investigate the association between management's manipulation risk and auditor's planning and pricing decision. They find that auditors increase their effort and billing rates for clients with high manipulation risk during the planning session of audit process. Huang and Hsiao (2011) finds that firms with manipulation crossing the zero earnings thresholds seeks for low audit quality auditors to gain more earnings manipulation and the low quality auditors cannot resist the client's earnings maneuver.

To extend existing literature and to fulfill the lack of empirical evidence, this paper explores the association between management's risk of earnings manipulation and audit quality. This study hypothesizes that audit quality is lower when financial reports are prepared by management with high risk of manipulation.

H1a: Management's risk of manipulation is negatively associated with audit quality.

3.2.2 Management's family ownership

In 2003, the Stock Exchange of Thailand raises concern about shareholders' practices by publishing "Best Practice for Shareholders" to encourage good corporate

governance mechanism of listed companies. The guidance stated that the controlling shareholders with management position should manage the company in the best interests of the firm and should not make decision for their own advantages. The SEC needs to evaluate ownership structure when assessing companies under listing process before launching the initial public offerings in the stock market. If the ownership structure is unclear, unfair, or has a potential conflict of interest, the company's listing process may be delayed. Obviously, the regulators are concerned about controlling shareholders and ownership structure as important inputs of corporate governance.

From previous literature, the definition of a family firm is not conclusive. One definition of a family business is a business where members are from the founding family and continue to hold position in top management or on the board of the companies (Chen et al. 2008; Chen et al. 2013; Boonlert-U-Thai and Kuntisook 2009). In this paper, a family firm is a firm where a family exerts control over the organization through ownership, top management, or board position (Lau 2010; Chu 2011; Suehiro and Wailerdsak 2004). The meaning of family firm does not emphasize on the founding family because there are mergers, takeovers, and business combination in the stock market where one family may take over the business from the founding family. For such case, the company may not be counted as a family firm even though it has a non-founding family that possesses concentrated ownership.

The most dominant theory adopted in empirical studies of listed family controlled firms is agency theory. Family firms usually encounter into Type II agency problem[7] where there are conflicts of interest between controlling shareholders, or the

[7] The classic Type I agency problem described by Jensen and Meckling (1976) explain the conflicts of interest between managers and shareholders only in non-family firms.

managers who own equity of the firm, and minority shareholders. According to Type II agency problem, controlling shareholders have opportunities to pursue their own interests at other shareholders' expense, leading to greater agency costs. The conflicts of interest between controlling and minority shareholders generate two competing effects: the entrenchment effect and the alignment effect.

Under the entrenchment effect, controlling shareholders (family managers) may increase their managerial ownership through the pursuit of objectives that are not profit-maximizing for all shareholders but for their personal benefits. Fan and Wong (2002) study ownership structure in seven East Asian countries, including Thailand. They find that controlling shareholders report accounting information for self-interested purposes, causing low earnings informativeness and low creditability of financial reports. O'sullivan (2000) finds percentage of equity owned by executive directors has a negative effect on audit quality, as measured by audit fee, indicating that auditors are concerned about managerial ownership structure. Recently, Phattaranawig (2012) studies the association between the ultimate ownership structure of family firms and real earnings management in Thailand. She finds that firms with ultimate family shareholders are more likely to engage in real earnings management. Thus, the entrenchment effect predicts that the family controlling owners are more likely to manage earnings for their own benefits rather than fairly present earnings as a reflection of the firm's true underlying economic transactions.

Under the alignment effect, the interest of controlling and minority shareholders are aligned because the family owners tend to pass their business down to their generations so they are willing to build a reputation by not expropriating minority shareholders (Gomes 2000) and create long-lasting economic consequences. Using data

from Taiwan, Chu (2011) finds positive association between family owners serving as CEOs, top management, or directors of the firms, and firm performance, as measured by return on assets. In Thailand, Boonlert-U-Thai and Kuntisook (2009) finds that family ownership is positively associated with accounting conservatism as a proxy for earnings quality. Recently, Issarawornrawanich and Jaikengkit (2012) finds that firms with higher family ownership concentration in Thailand tend to have higher accrual quality and lower stock investment risk, as compared to firms with lower family ownership. Thus, the alignment effect predicts that the family controlling owners are less likely to manage earnings because they would like to protect reputation and continue their business in the long run.

This study expects management with higher family ownership concentration to be more effective in collaborating with auditor than those with lower family ownership. Supporting by the alignment effect, listed companies in Thailand are founded by Thai-Chinese family who migrated to Thailand and mostly still maintain their controls over their businesses (Suehiro and Wailerdsak 2004). Former evidences in Thailand also provide positive evidence that family ownership are positively related with accounting and accrual quality (Boonlert-U-Thai and Kuntisook 2009; Issarawornrawanich and Jaikengkit 2012). Thus, this paper hypothesizes that audit quality is higher when financial reports are prepared by management with greater family ownership concentration.

H1b: Management's family ownership is positively associated with audit quality.

Audit committee

Notification of Stock Exchange of Thailand number Bor.Jor./Ror. 01-04[8] reports that the qualifications of a company's audit committee must be in accordance with the rules prescribed under the Notification of the Capital Market Supervisory Board, Bor.Jor/Ror. 25-00, "Best Practice Guidance for Audit Committee". The guidance defines an audit committee as "a sub-committee of the board of directors who assists the board in handling the issue which might be overlooked and in ensuring a good monitoring system within the business". The aim of audit committee's establishment is to increase the reliability and creditability of financial reports. Under Bor.Jor/Ror. 25-00, the composition and qualification of audit committee members are listed below. The audit committees:

- must consist of at least three directors, with at least one member having financial or accounting knowledge,
- must be appointed by the board of directors and shareholders,
- must not be a non-executive director, an executive officer, an employee or an advisor who receives a regular salary from the company,
- must be free of any financial or other interest in the company's management and business, and
- must not hold shares exceeding five percent (including shares held by persons related to audit committee members) of the paid-up capital.

[8] Regulation of the Stock Exchange of Thailand number Bor.Jor./Ror.01-04, "Qualifications and Scope of Work of the Audit Committee, 2008" has come into force on July 1, 2008.

Financial reporting is the result of actions which involve the interaction among management, internal auditors, external auditors, and audit committees. There is little theory to explain why the board and audit committee exists (DeFond and Zhang 2014). The importance of audit committee under agency theory is that the committee can reduce the agency costs by monitoring financial reporting quality. Abbott et al. (2007) define effective audit committees as the committees who simultaneously exhibit the characteristics of independence, diligence (as measured by frequency of meeting), and financial expertise. Kalbers and Fogarty (1993) define audit committee effectiveness as the competency to play a role of duties to oversee and ensure high quality of the firm's financial and other information. Prior studies extensively examine the effect of audit committee characteristics on multiple measures of earnings quality such as accruals quality (Rainsbury et al. 2009; Krishnan et al. 2011; Krishnan and Visvanathan 2008; Dhaliwal et al. 2010) and restatements (Carcello et al. 2011). This paper examines two characteristics of audit committee: rotation and accounting expertise.

3.2.3 Audit committee's rotation

According to Notification of Stock Exchange of Thailand number Bor.Jor/Ror. 25-00, independent audit committee opinion refers to the giving of opinions or making of report in a free and unrestricted manner and free from influence of any person(s), namely directors and management. Without specific rule about the re-appointment of audit committee in Bor.Jor/Ror 25-00, the SEC publishes "*Audit Committee Handbook*" in December 2010 and recommends that the audit committees who had expired from the terms of office period, usually 2 - 5 years to ensure continuity of audit committee

work performance, should not be re-selected because the familiarity[9] between the audit committees and the firm may decrease independence of audit committees. Since the SEC has not yet enforced this re-election rule to audit committee, this study examines the frequency of audit committee's rotation as a proxy for their independence. This study provides the first step to feedback the effect of rotation policy, recommended by the SEC, on audit quality.

Prior research reports various evidence about the effect of audit committee independence, measured by numbers of outside director in committee boards, on multiple measures of accounting quality. Some studies report positive effects of audit committee independence. Beasley (1996) finds that audit committee independence significantly reduces the likelihood of financial statement fraud. Carcello and Neal (2000) show that the greater percentage of independent boards in audit committee, the lower probability that the auditor will issue going-concern audit reports. Krishnan (2005) finds that independent audit committees are less likely to be associated with the incidence of internal control problem. Marra et al. (2011) report that independence of board and the existence of audit committee play important and effective roles in reducing earnings management after the adoption of IFRS in Italy. On the other hand, some studies report no effect of audit committee independence. Rainsbury et al. (2009) find no relationship between independence of audit committee on financial reporting quality, measured by discretionary accrual and audit fee. In Thailand, Tengamnuay and Stapleton (2009) use survey to understand the monitoring mechanism of audit

[9] Familiarity can be described using "bonding effect" between audit committee and management, leading to lower audit quality. On the contrary, "learning effect" may explain that audit committees, who work at the entity for a long time, may share their in-depth knowledge and thus support the auditor to perform better audit work.

committees and finds that audit committees place greater emphasis on internal controls rather than roles associated with external auditors and quality of financial statements. This paper extends the prior research by examining audit committee independence under bonding effect, rather than a number of outside directors in the committee in order to primarily examine whether audit committee rotation has an effect on audit quality.

This study expects that audit committee rotation is an effective trait of good governance of the entity that mitigate bonding effect as recommended by the SEC. The auditor who audits the firm that rotates audit committees regularly is expected to provide higher quality audit than those firms with no audit committee rotation.

H1c: Audit committee's rotation is positively associated with audit quality**.**

3.2.4 Audit committee's accounting expertise

Notification of Stock Exchange of Thailand number Bor.Jor/Ror 25-00 states that at least one committee member must have knowledge, understanding or experience in accounting *or* finance because the main duty of audit committees is to review the financial reporting process to ensure the best quality of financial reports. However, the expertise of audit committee is controversial because the guidance allows audit committee to have accounting-only, financial-only, or joint accounting-financial expertise.

Researchers have investigated the inconclusive definition of audit committee expertise in many ways and the results are mixed. Some studies find positive effects of audit committee expertise. Krishnan (2005) finds that independent and financially-specialized audit committees are less likely to be associated with the incidence of

internal control problem. DeFond et al. (2005) find positive market reaction around the appointment of accounting financial experts on audit committees. Krishnan and Visvanathan (2008) report that an audit committee's accounting financial expertise is positively associated with conservatism which is the fundamental property of financial statements. Dhaliwal et al. (2010) document that the agency role of audit committee's accounting and finance expertise has a positive impact on their monitoring of accruals quality. Using data from 1,000 largest companies in the U.S. stock market, Krishnan et al. (2011) find that about 65 percent and 75 percent of audit committees in 2003 and 2005 samples, respectively, have at least one accounting-only expert. They find that accounting-only expertise, compared to accounting-and-financial expertise, of audit committee increases accounting quality, as measured by either absolute discretionary accruals or Dechow and Dichev (2002) accrual. However, some studies find no effect of audit committee expertise. Rainsbury et al. (2009) finds no association between accounting expertise and financial report quality, measured by discretionary accruals and audit fees. Recently, Bryan et al. (2013) find no difference in earnings quality, measured by (1) informativeness, (2) timely loss recognition, (3) earnings persistence, and (4) accrual quality, between firms employing a financial expert with those without accounting expertise. In Thailand, Thoopsamut and Jaikengkit (2009) use data from the Stock Exchange of Thailand in 2005-2006 and find that accounting or financial expertise is not related to quarterly earnings management.

Accounting expertise of audit committee is defined as a skill or experience in maintaining financial reports which is assumed to be presented in the audit committee who graduates in accounting or has work experience in accounting or auditing field. This paper studies whether the accounting-only expertise of audit committee enhances

effectiveness and efficiency of communication between auditor and the committee, thus leading to an increase in the quality of audit.

H1d: Audit committee's accounting expertise is positively associated with audit quality

3.3 The effect of TCWG on audit quality after the TSAs adoption

The use of auditing standards is one way to improve audit quality by constraining auditors to perform audit tasks under the standards' requirement in order to assure audit quality. Auditing standards imply that audit quality is achieved by the issuance of the appropriate auditor's report on the client's compliance with generally accepted accounting principles (Francis 2011). DeFond and Zhang (2014) summarize archival auditing research and introduce a future research area on regulators' concern about audit quality which is rare as compared to research on IFRS and SOX regulation. Therefore, this paper fills the gap by investigating how the change in audit tasks under the revised TSAs influence audit quality.

The revised TSAs aim to raise audit quality in convergence with global auditing practice. Approximately half of the TSAs are substantially revised to be in line with the revised ISAs. Therefore, the revised TSAs are extensively different from the older version of 3-digit code TSAs. Eight standards, TSA 230, TSA 240, TSA315, TSA330, TSA540, TSA 550, TSA600, and TSA 700, are recognized as the highly-changed standards. TSA 230 emphasizes on the audit documentation that shall be prepared on timely basis (TSA230.A1) and exhaustive enough for an experience auditor with no previous involvement in the audit to understand (TSA 230.8). TSA 240 clearly identifies risk of fraud, risk assessment, and how to respond to fraud during the audit.

TSA 315 considerably focuses on understanding the entity and its environment when performing risk assessment. TSA330 assists auditors to design and implement overall responses at financial statement level and to carry out audit procedures corresponding those assessed risks at assertion level by substantive procedures or test of controls (TSA330.5; TSA330.6). TSA 540 places more emphasis on indicators of management bias when auditing accounting estimates. TSA 550 challenges the auditor to answer why the company enters into the related party transactions and why these transactions are necessary to the company. TSA 600 revises nature of group audit from bottoms-up approach, where subsidiary audits are collected and consolidated, to top-down approach, when the principal auditor takes charge and tell component auditors about the scope and timing of their work (TSA 600.8; TSA600.11). TSA 700 makes structural changes to the auditor's report (TSA 700.Appendix). As a result of substantive changes in the auditing standards, regulators certainly expect the positive impact on the audit quality.

Although the revised auditing standards have been implemented worldwide, a few studies examine the effect of these standards. Eglund and Gidlund (2012) uses qualitative method to examine the effect of the implementation of the clarified International Standards on Auditing (ISAs) on audit process in Sweden. She finds that the implementation of the revised ISAs have meant an increased costs of audit while audit quality remains unchanged. Using empirical data in the USA, Wang and Zhou (2012) investigate the impact of PCAOB Auditing Standards No. 5 *An Audit of Internal Control* on audit fee and audit quality. They find that AS5 reduces audit fee but has no effect on audit quality. Recently, Sulaiman et al. (2013) use survey to examine how audit quality has been seen in practice. They document that cooperation of management

and participation of audit committee, together with various change to the audit regulatory regimes, significantly contribute to the perception of an increase in level of audit quality. The survey reports that auditors and audit firms acknowledged the increasing quality of communication between them and audit clients after the regulatory change. Thus, quality of executive management and audit committee could enhance the effectiveness of audit.

Since Thailand has adopt the revised TSAs in 2012 and there are significant changes in auditing standards especially the increasing roles of TCWG, this paper predicts that introduction of the revised TSAs will increase TCWG effectiveness in constraining earnings management and therefore promoting high audit quality. For the period after the revised TSAs adoption (2012-2014), the auditor shall increase level of communication with TCWG and the roles of TCWG are increasingly emphasized in the standards which imply more positive association between TCWG and audit quality. Thus, this paper hypothesizes that the association between the TCWG characteristics and audit quality remains positively significant for the period after the revised TSAs implementation, except that management's manipulation risk is expected to be less negatively related with audit quality after the post-adoption period because the revised TSAs are expected to reduce the management's ability to manipulate financial statements.

H2a: Management's manipulation risk is less negatively associated with audit quality after the revised TSAs adoption.

H2b: Management's family ownership is more positively associated with audit quality after the revised TSAs adoption, as compared to the post-adoption period.

H2c: Audit committee's rotation is more positively associated with audit quality after the revised TSAs adoption, as compared to the post-adoption period.

H2d: Audit committee's accounting expertise is more positively associated with audit quality after the revised TSAs adoption, as compared to the post-adoption period.

4. RESEARCH DESIGN

4.1 Sample data

Table 2 presents the final sample of this study which includes 352 companies or 2,112 firm-year observations. The samples consist of all survival listed companies in the Stock Exchange of Thailand during 2008-2014 as some variables need lagged data in 2008 for analysis. The six-year period (2009-2014) is used for analysis because one of the objectives of this study is to examine audit quality in the periods before (2009-2011) and after (2012-2014) the revised TSAs adoption**.** TCWG characteristics data are hand-collected from annual registration form (Form 56-1) and listed companies' websites. Financial accounting data are obtained from SET Market Analysis and Reporting Tool (SETSMART) database and the Stock Exchange of Thailand's website (www.set.or.th). The sample data in this study exclude:

1) companies in financial service, insurance industries, and leasehold property funds because their total asset base and financial structure are not comparable to those of the other companies;
2) companies under rehabilitation because they are subject to different financial reporting requirement and business condition;
3) companies whose fiscal year-ends are not on the 31st of December to ensure that the samples are subject to similar market condition;
4) companies that have not been listed during our sample period 2008-2014 because some variables required one-year lagged information, and
5) companies with incomplete data for analysis.

Table 2 Sample data

	Numbers of firms	Firm-year observations
Total listed companies in SET during 2008-2014	463	2,778
Less Companies in financial and insurance industries	(66)	
Less Companies under rehabilitation	(13)	
Less Non-December fiscal year-ended companies	(22)	
Less Companies with incomplete data	(10)	
Final sample	**352**	**2,112**

4.2 Measurement of dependent variable - *AQ*

Audit quality can be measured precisely by using firms that are forced to accounting restatement (Chin and Chi 2009). However, from 2009 to 2014, there are only 32 restatements from 17 listed companies in the Stock Exchange of Thailand. Thus, this paper does not use accounting restatement as a proxy of audit quality due to the inadequacy of data for regression analysis. Instead, this paper uses performance-adjusted discretionary accruals (Kothari et al. 2005) as a proxy of audit quality. This measure is the most common proxy of audit quality (Hope et al. 2013; K. Johl et al. 2013; Dou et al. 2013) because it considers the overall quality of financial reporting or earnings quality by measuring the deviation of accruals from a certain norm. (Behn et al. 2008; Francis and Yu 2009; Knechel et al. 2012). It is also called the Kothari et al. (2005) version of the modified Jones model controlling for current year's firm performance (ROA). Intuitively, TSA315 states that the auditor shall identify and assess risk of material misstatement through understanding the entity and its environment, thereby implementing responses to those risks. Thus, the discretionary accruals remaining in the residual of the Kothari et al. (2005) model is an appropriate measure

of audit quality defined in this paper because it is a proxy for the auditor's inability to detect misstatements or the auditor's failure to comply with the revised TSAs.

In academic, DeFond and Zhang (2014) summarize audit quality proxies and discuss the advantages of using discretionary accruals, as an output measure, that it is tightly linked to the concept of audit quality (DeAngelo 1981) by capturing and signaling the undetected misstatement within-GAAP manipulation for a large number of firms. Gros and Worret (2014) use data from German listed companies from 2009-2010 to conduct a Spearman's rank correlation analysis of fifteen different audit quality measures[10]. The results show that different audit quality measures are not always consistent with regard to each other, only the ranks of the performance-adjusted Jones-Model are positively correlated with the ranks of all other 14 measures at the 1% level. Regarding the consistency and the strength of the performance-adjusted modified Jones model, the following Kothari et al. (2005)'s model is used to extract undetected misstatements from each industry-year observation to measure audit quality in this paper. Following Kothari et al. (2005), a constant is included in the model estimation because it provides additional control, allows better power of test, and mitigates problem from omitted variables. Following Dechow et al. (1995) and Kothari et al. (2005), revenues are assumed not to be managed, but the change in account receivables

[10]The fifteen audit quality measures in Gros and Worret (2014)'s paper are derived from six accrual earnings management models: (1) Jones-Model, (2) Modified Jones-Model, (3) Performance-Adjusted-Jones-Model, (4) Forward-looking Jones Model, (5) Dechow-Dichev-Model, and (6) Dechow-Dichev-McNichol-Model; three real earnings management models: (7) sales manipulation, (8) overproduction, (9) discretionary expenses: and six other measures: (10) enforcement error findings in a specific year, (11) enforcement error findings overall, (12) big four dummy, (13) audit lag, (14) logarithm of audit fee, and (15) share of audit fee divided by total assets.

represents the earnings management. Thus, the modified variable $\Delta REV_{i,t}$ - $\Delta REC_{i,t}$ represents non-discretionary accruals.

$$Accr_{i,t} = \alpha_0 + \alpha_1 (1 / TA_{i,t-1}) + \alpha_2(\Delta REV_{i,t} - \Delta REC_{i,t}) + \alpha_3 PPE_{i,t} + \alpha_4 ROA_{i,t} + \varepsilon_{i,t}$$

Where:

$Accr_{i,t}$ = total accruals, measured as income before extraordinary items minus operating cash flows, scaled by lagged total assets for firm i in year t;

$TA_{i,t-1}$ = lagged total asset for firm i in year t;

$\Delta REV_{i,t}$ = annual change in revenues scaled by lagged total assets for firm i year t;

$\Delta REC_{i,t}$ = annual change in receivables scaled by lagged total assets for firm i year t;

$PPE_{i,t}$ = property, plant, and equipment for firm i in year t scaled by lagged total assets;

$ROA_{i,t}$ = net income for firm i year t scaled by total assets.

The residuals from the industry-year regression model are used as a proxy for discretionary accruals. This test uses the absolute value of discretionary accruals to proxy audit quality because either upward or downward earnings manipulation represents auditor's inability to detect and report the accounting distortion. Audit quality (*AQ*) is measured by multiplying minus one (-1) to absolute discretionary accruals from the model above. Thus, the higher value of the *AQ* variable indicates higher audit quality.

4.3 Measurement of independent variables

Independent variables represent the characteristics of those charged with governance. Two characteristics to describe management are manipulation risk (*MANIPULATE*) and family ownership (*FAMILY*) of management. Two characteristics to describe audit committee are rotation (*AC_ROT*) and accounting expertise (*AC_ACC*).

4.3.1 Management's manipulation risk - *MANIPULATE*

The variable *MANIPULATE* is a binary variable, equals to one if the firm is a high potential manipulator and zero otherwise. To separate our sample into high-potential and low-potential manipulators, M-score from Beneish (1999)'s model is used to estimate the weighted value of management manipulation. Beneish's M-score is a probabilistic model that can be used to detect companies with a tendency to commit fraud (Beneish et al. 2013; Cassell et al. 2016). M-score is employed in this paper because it is accepted by many researchers that Beneish M-score is considered to be simple and effective tool to detect earnings manipulators (Warshavsky 2012; Omar et al. 2014; Herawati 2015). The model is constructed from eight financial ratios from the companies' financial statements to describe the degree of earnings manipulation.

*M-score = -4.84 + 0.92*DSRI + 0.528*GMI + 0.404*AQI + 0.892*SGI +*

*0.115*DEPI – 0.172*SGAI – 0.327*LVGI+ 4.679*TATA*

where

(1) $DSRI =$ Day's sale in receivables index $= \dfrac{\text{Receivables}_t/\text{Sales}_t}{\text{Receivables}_{t-1}/\text{Sales}_{t-1}}$

(2) $GMI =$ Gross margin index $= \dfrac{(\text{Sales}_{t-1} - \text{Cost of goods sold}_{t-1})/\text{Sales}_{t-1}}{(\text{Sales}_t - \text{Cost of goods sold}_t)/\text{Sales}_t}$

(3) $AQI =$ Asset quality index $= \dfrac{(1 - \text{Current assets}_t + \text{PP\&}E_t)/\text{Total assets}_t}{(1 - \text{Current assets}_{t-1} + \text{PP\&}E_{t-1})/\text{Total assets}_{t-1}}$

(4) $SGI =$ Sale growth index $= \dfrac{\text{Sales}_t}{\text{Sales}_{t-1}}$

(5) $DEPI =$ Depreciation index $= \dfrac{\text{Depreciation}_{t-1}/(\text{Depreciation}_{t-1} + \text{PP\&}E_{t-1})}{\text{Depreciation}_t/(\text{Depreciation}_t + \text{PP\&}E_t)}$

(6) $SGAI =$ Selling and administration(S&A) $expense$ index $= \dfrac{\text{S\&}A\ expense_t/\text{Sales}_t}{\text{S\&}A\ expense_{t-1}/\text{Sales}_{t-1}}$

(7) $LVGI =$ Leverage index $= \dfrac{(\text{Long tern debt}_t + \text{Current liabilities}_t)/\text{Total assets}_t}{(\text{Long tern debt}_{t-1} + \text{Current liabilities}_{t-1})/\text{Total assets}_{t-1}}$

(8) $TATA =$ Total accruals to total asset ratio $= \frac{\text{Total accruals}_t}{\text{Total assets}_t}$

Beneish and Nichols (2007) describe that the *DSRI, AQI, DEPI,* and *TATA* ratios capture the financial statement distortion that result from earnings manipulation while the *GMI, SGI, SGAI,* and *LVGI* ratios indicate a predisposition to engage in earnings manipulation. *DSRI* indicates revenue inflation. *AQI* and *DEPI* represent unusual expense capitalization and decline in depreciation, causing expense deflation. *GMI* and *SGAI* capture distorted gross margin and increasing administration costs. The positive weighted SGI indicates that growth firms have incentive to manipulate earnings to raise capital in order to increase reliance on debt financing (*LVGI*).

Beneish et al. (2013) classify their observations with the predicted M-score values greater than -1.78 as potential manipulators. Thus, this paper applies this cut off point as a rule of thumb to flag the samples as high or low risk of management manipulation. The dummy variable *MANIPULATE* equals to one if the predicted M-score of the high potential manipulator is greater than -1.78 and equals to zero if the M-score is equal to or lower than -1.78.

4.3.2 Management's family ownership - *FAMILY*

Definitions of family business in accounting research have been an ongoing debate in the existing literature. Lau (2010) reviews literature related to family firms and defines a family firm as "a firm where the family dominates the management control structure, has an intention to maintain family control, and has a significant ownership". Some studies measure family ownership as a binary variable equal to one if the percentage of ownership is greater than cut off points at 10%, 20%, 50%, and etc. (Chin and Chi 2009; Sraer and Thesmar 2007; Cascino et al. 2010). Some papers

measure the family ownership on a continuous scale. (Ali et al. 2007; Anderson and Reeb 2003; Chen et al. 2013; Wang 2006; Issarawornrawanich and Jaikengkit 2012). However, Astrachan et al. (2002) reveal that a continuous measure of family business using percentage of ownership presents a more appropriate measure of characteristic of a family business than a dichotomous scale does.

In this paper, family management is defined as a single shareholder or members of his or her family related by blood or marriage either individually or as a group. The percentage of equity is counted if the single family shareholder or his or her family member(s) hold a position in the board of director or in the top management. In summary, family ownership (*FAMILY*) is measured by a numeric percentage of equity owned by family members.

4.3.3 Rotation of audit committee - *AC_ROT*

Prior literature heavily examine independence of audit committee by a proportion of independent directors (Krishnan 2005; DeFond et al. 2005; Rainsbury et al. 2009; Krishnan et al. 2011). However, according to the Notification of the Stock Exchange of Thailand, dependent boards are not allowed to hold a position in audit committee. The committees must be free of company's financial interest and free from any position with a regular salary. Adding to the literature, audit committee rotation is considered as an appropriate characteristic of independent audit committee. This paper aims to examine the necessity of audit committee rotation policy which is a current issue in the SET. Thus, audit committee's rotation (*AC_ROT*) is measured by the percentage of rotated or new audit committee of each year. Rotation of audit committee is defined as the appointment of new audit committee in the company's annual meeting which indicates that the company allows rotation policy and the new committees are

expected to encourage more transparency and decrease familiarity according to the bonding effect between management and audit committee boards. Therefore, the appointment of new audit committee considerately increases audit committee's independence.

4.3.4 Accounting expertise of audit committee - *AC_ACC*

AC_ACC is measured by percentage of accounting expert on audit committees (Krishnan 2005; Krishnan and Visvanathan 2008; Thoopsamut and Jaikengkit 2009; Dhaliwal et al. 2010). Accounting expertise on audit committee must have either a minimum of Bachelor's degree in accounting or work experience in accounting or auditing field. This measure is useful for future policy about audit committee qualification.

4.4 Measurement of moderating variables - *POST*

POST is a dummy variable, equals to one if the financial statements are audited under the revised TSAs (2012-2014), and zero if the financial statements are audited under the old version of TSAs (2009-2011)**.**

4.5 Model test

4.5.1 Model test for H1

The following model is used to test H1a to H1d:

$$AQ_{i,t} = \beta_0 + \beta_1 MANIPULATE_{i,t} + \beta_2 FAMILY_{i,t} + \beta_3 AC\_ROT_{i,t} + \beta_4 AC\_ACC_{i,t} + \beta_5 Log\_Asset_{i,t} + \beta_6 OCF_{i,t} + \beta_7 LEVERAGE_{i,t} + \beta_8 MB_{i,t} + \beta_9 ROA_{i,t} + \beta_{10} BIG4_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

For H1a to H1d, the research objective is to examine the association between TCWG characteristics and audit quality. From the model, the dependent variable, *AQ*, represents audit quality as discussed in Section 4.2. Independent variables are

characteristics of TCWG. Firstly, management's manipulation risk (*MANIPULATE*) is measured a binary variables with a value of one if the management are classified as high potential manipulator and zero otherwise. According to H1a, the coefficient of this variable (β_1) is expected to be significantly negative because the high potential manipulators weaken auditor's ability to detect material misstatement in financial reports. Secondly, management's family ownership (*FAMILY*) is measured by percentage of equity shares owned by family management. H1b expects the coefficient of β_2 to be positive and in line with alignment effect because the firms with higher family ownership concentration are supposed to help auditors increase audit quality in order to present their faithful accounting numbers and maintain their reputation in long-run. For H1c, audit committee rotation (*AC_ROT*) is measured by percentage of new audit committee to total committees. The coefficient is expected to be positive because the new audit committee better supports auditors to perform high quality audits with less bonding influence between the audit committees and the entity. The last predictor is audit committee's accounting expertise which equals to percentage of accounting experts to total audit committees. H1d expects a positive estimate of β_4 because audit committees with accounting knowledge monitor high quality financial reporting which enhances high quality audit.

Following prior studies on audit quality (Francis and Yu 2009; Chi and Chin 2011; Hope et al. 2013; Gros and Worret 2014), Model 1 includes the extensive sets of firm characteristics used in prior research to control for potential determinants driving audit quality proxy. The first one is firm size measured by the natural log of total assets (*Log_Asset*). Larger firms are more likely to have higher earnings quality (Becker et al. 1998; Techamontrikul 2006; Francis and Yu 2009; Hope et al. 2013; Barnes 2013) so

this paper expects firm size to be be positively associated with audit quality. The second control variable is net operating cash flow scaled by total assets (*OCF*). Dechow (1994) show that a well-specified accrual model should control for cash from operation because they find that the low (high) cash from operation firms experience an increase (a decrease) in total accruals, holding earnings constant. In the other word, accruals are the difference between earnings and net cash flow so the association between accruals and net cash flow is negative. This paper expects that the operating cash flow is negatively associated with absolute discretionary accruals (Francis and Yu 2009; Marra et al. 2011; Chi and Chin 2011; Frankel et al. 2002; Gul et al. 2009; Brooks et al. 2013; Barnes 2013) and thus positively associated with audit quality. The third one is leverage ratio (*LEVERAGE*) which is a ratio of total liabilities to total assets. This ratio is a proxy for financial distress of the firms because the companies engaged in high degree of debt covenant violation have high possibility to manage earnings (Johnson et al. 2002; Techamontrikul 2006; Hope et al. 2013). The coefficient of *LEVERAGE* is expected to be negative because higher financial distress firms tend to distort accounting numbers and lower quality of audited financial statements. The fourth variable is market-to-book ratio (*MB*) to control for growth opportunity. Growth firms may have greater incentives to manage earnings to meet market expectations (Francis and Yu 2009; Barnes 2013) so the coefficient is expected to have the negative association between market-to-book ratio and audit quality measure. The fifth control variable is return on asset ratio (*ROA*) which controls for firm performance. Prior literature find that profitable firms are less likely to manage earnings (Johnson et al. 2002; Hope et al. 2013; Adibah Wan Ismail et al. 2013) so its coefficient is expected to be positive. Finally, a dummy variable, *BIG4*, is included. *BIG4* equals to one if the company is audited by one of the Big 4

audit firms[11], and zero otherwise. Prior studies find that financial reports audited by the Big N auditors are associated with smaller discretionary accruals or less management earnings manipulation (Becker et al. 1998; Francis et al. 1999; Francis et al. 2013; Techamontrikul 2006). Jureerojna and Srijunpetch (2012) use questionnaires to examine the effects of ISQC1 on Thai auditors' perception and find that Big 4 auditors perceive that they are not as much influenced by ISQC1 as the non-Big 4 firms because the Big 4 audit firms have gradually maintain this standards while the non-Big 4 firms need to increase the costs of audit and training to be ready for the ISQC1 enforcement in 2015. Thus, the association between *Big 4* and audit quality is expected to be positive.

4.5.2 Model test for H2

The following model is used to test H2a to H2d:

$$AQ_{i,t} = \beta_0 + \beta_1 POST_{i,t} + \beta_2 \boldsymbol{MANIPULATE}_{i,t} + \beta_3 (POST_{i,t} * \boldsymbol{MANIPULATE}_{i,t}) + \beta_4 Log\_Asset_{i,t} + \beta_5 OCF_{i,t} + \beta_6 LEVERAGE_{i,t} + \beta_7 MB_{i,t} + \beta_8 ROA_{i,t} + \beta_9 BIG4_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \quad (2a)$$

$$AQ_{i,t} = \beta_0 + \beta_1 POST_{i,t} + \beta_2 \boldsymbol{FAMILY}_{i,t} + \beta_3 (POST_{i,t} * \boldsymbol{FAMILY}_{i,t}) + \beta_4 Log\_Asset_{i,t} + \beta_5 OCF_{i,t} + \beta_6 LEVERAGE_{i,t} + \beta_7 MB_{i,t} + \beta_8 ROA_{i,t} + \beta_9 BIG4_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \quad (2b)$$

$$AQ_{i,t} = \beta_0 + \beta_1 POST_{i,t} + \beta_2 \boldsymbol{AC\_ROT}_{i,t} + \beta_3 (POST_{i,t} * \boldsymbol{AC\_ROT}_{i,t}) + \beta_4 Log\_Asset_{i,t} + \beta_5 OCF_{i,t} + \beta_6 LEVERAGE_{i,t} + \beta_7 MB_{i,t} + \beta_8 ROA_{i,t} + \beta_9 BIG4_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \quad (2c)$$

$$AQ_{i,t} = \beta_0 + \beta_1 POST_{i,t} + \beta_2 \boldsymbol{AC\_ACC}_{i,t} + \beta_3 (POST_{i,t} * \boldsymbol{AC\_ACC}_{i,t}) + \beta_4 Log\_Asset_{i,t} + \beta_5 OCF_{i,t} + \beta_6 LEVERAGE_{i,t} + \beta_7 MB_{i,t} + \beta_8 ROA_{i,t} + \beta_9 BIG4_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \quad (2d)$$

[11] Big4 audit firms are (1) PricewaterhouseCoopers ABAS Ltd., (2) Deloitte Touche Tohmatsu Jaiyos Co., Ltd., (3) KPMG Phoomchai Holdings Co., Ltd., and (4) Ernst and Young Thailand Ltd.

The dependent variable, *AQ*, and control variables are the same as identified in Section 4.5.1. The test variables for H2 are *POST* and TCWG characteristics variables. The variable *POST* represents a binary variable equal to one if the financial statements is audited under the revised TSAs adoption (2012-2014) and zero otherwise. From Model 2a, *MANIPULATE* equals to one if the management is considered to be a high potential manipulator and zero if the management is a low potential manipulator. According to H2a, the interaction term β_3 of Model 2a is expected to be negative and the joint test coefficient of $\beta_2 + \beta_3$ should be significantly less negative (not significant) than (compared to) the coefficient β_2, indicating that high potential manipulators corroborate with the auditor to contribute to higher audit quality after the revised TSAs adoption as compared to the pre-adoption period. From Model 2b, *FAMILY* equals to percentage of equity owned by family management. H2b predicts that the association between family ownership and audit quality is more positive in the post-adoption period as compared to the period before the revised TSAs adoption. The estimated β_3 is expected to be positive and the joint test coefficient of $\beta_2 + \beta_3$ should be significantly more positive than the coefficient β_2. The third characteristic is audit committee's rotation. From Model 2c, *AC_ROT* equals to percentage of new audit committee to all committees. H2c expects positive coefficient β_3 and expects that the joint test of $\beta_2 + \beta_3$ should be significantly more positive than the coefficient β_2. The fourth TCWG trait is audit committee's accounting expertise. From Model 2d, *AC_ACC* equals to percentage of accounting experts to all audit committees. H2c and H2d expect positive coefficient for β_3 and β_3 respectively. The joint test of $\beta_2 + \beta_3$ should be significantly more positive than the coefficient β_2. The joint test of $\beta_2 + \beta_3$ should be significantly more positive than the coefficient β_2. H2c and H2d expect that the effective audit committees who rotate

regularly and have accounting knowledge help auditors perform high quality audit of financial statements.

5. EMPIRICAL RESULTS AND DISCUSSION

5.1 Descriptive statistics

Table 3 presents descriptive statistics, which consists of mean, standard deviation, minimum, median, and maximum, for all variables used in this study. The mean (median) of audit quality (*AQ*) is -0.0768 (-0.0567). Regarding to TCWG characteristics, the mean (median) of management's manipulation risk, *MANIPULATE,* is 0.1714 (0.0000), indicating that the sample are mostly considered as low potential manipulators. The mean (median) of family ownership of management is 0.3638 (0.3839), indicating that the average percentage of family ownership is about 35 to 40%. The mean (median) of audit committee's rotation is 0.0914 (0.000), showing that there are not many audit committee rotation during the sample period. The mean (median) of audit committee's accounting expertise is 0.2707 (0.3333), implying that, on average, most of the sample firms has at least one accounting expert in audit committees.

The total samples are 2,112 firm-year observations. 1,056 Observations are from the financial statements audited under the revised TSAs while the other half portions are audited under the prior version of the TSAs. With respect to control variables, the mean (median) value of total assets are 20.7480 (3.4518) million baht. The higher mean indicates that the firm size distribution is left-skewed. Thus, the natural logarithm of total assets will be used in regression analysis to reduce the degree of non-normality (Hair et al. 2006). The mean and median of total assets in logarithm form are 15.2830 and 15.0544 respectively. Slightly over half of the sample firms are auditing by Big4 auditors.

Table 3 Descriptive statistics

Variables	*Obs.*	*Mean*	*Std. Dev.*	*Min*	*Median*	*Max*
Audit quality						
AQ	2,112	-0.0768	0.0743	-0.8447	-0.0567	0.0000
TCWG characteristics						
MANIPULATE	2,112	0.1714	0.3769	0.0000	0.0000	1.0000
FAMILY	2,112	0.3638	0.2507	0.0000	0.3839	0.9788
AC_ROT	2,112	0.0914	0.2057	0.0000	0.0000	1.0000
AC_ACC	2,112	0.2707	0.2428	0.0000	0.3333	1.0000
The revised TSAs adoption						
POST	2,112	0.5000	0.5000	0.0000	0.5000	1.0000
Controls						
Assets (million baht)	2,112	20.7480	93.7510	0.0577	3.4518	1,801.7216
OCF	2,112	0.1010	0.1067	-0.8435	0.0846	0.9681
LEVERAGE	2,112	0.4503	0.2952	0.0019	0.4476	6.0333
MB	2,112	2.1854	4.2761	-7.0900	1.3500	127.5300
ROA	2,112	0.0774	0.1098	-1.6970	0.0597	1.5323
BIG4	2,112	0.5374	0.4987	0.0000	1.0000	1.0000

Note: **Audit quality**: *AQ* = Absolute discretionary accruals from performance-adjusted modified Jones model from Kothari et al. (2005) multiple by minus one. **TCWG Characteristics**: *MANIPULATE* = 1 if the M_SCORE from Beneish (1999) Model is higher than -1.78 (Beniesh et al. 2013) and 0 otherwise. *FAMILY* = percentage of equity owned by family management. *AC_ROT* = percentage of independent audit committee or newly appointed audit committee to total audit committees. *AC_ACC* = percentage of committee who has accounting knowledge to total audit committees. **The revised TSAs adoption:** *POST* = 1 if the financial statements are audited under the revised TSAs (2012-2014), and 0 otherwise. **Control variables:** *Asset*s = total assets in million(s) baht. *OCF* = net operating cash flow scaled by total assets. *LEVERAGE* = ratio of total liabilities to total assets. *MB* = ratio of market value to book value of equity. *ROA* = Ratio of net income to total assets. *Big4* = 1 if the firm's auditor is from Big 4 audit firms and 0 otherwise.

Additionally, Table 4 shows audit quality statistics by year, by industry, and by auditor types. Audit quality by year shows that the mean level of audit quality is highest in 2011 at -0.0679 while audit quality in 2009 and 2014 are lowest at the mean value of -0.0891 and -0.0856 respectively. In term of industry, the 22% of total samples (456 observations) is from Service industry following by Property & Construction industry which accounts for 21% of total samples (450 observations). Audit quality of Consumer Product and Agro & Food industries are the highest at the mean value of -0.0579 and -0.0636 respectively. The lowest mean of audit quality is -0.0879 for the Technology industries. The other industries' audit quality level is almost the same. For auditor type,

audit quality of financial statements audited by Big4 and non-Big4 auditors are very similar. The mean value of audit quality of financial statement audited by Big4 (non-Big4) auditors is -0.0764 (-0.0773). Thoroughly, audit quality classified by auditor types and years illustrate small differences. The mean difference of audit quality audited by Big4 between the post- and the pre-adoption period is 0.0003 (-0.0763-(-0.0766)) and the mean difference is -0.0012 (-0.0779-(-0.0767)) for non-Big4 sample.

Table 4 Audit quality statistics

Variable - AQ	*Obs.*	*Mean*	*Std. Dev.*	*Min*	*Max*
Full samples	**2,112**	**(0.0768)**	**0.0743**	**(0.8447)**	**(0.0000)**
By year					
2014	352	(0.0856)	0.0939	(0.8447)	(0.0003)
2013	352	(0.0732)	0.0765	(0.5911)	(0.0008)
2012	352	(0.0722)	0.0659	(0.4701)	(0.0004)
2011	352	(0.0679)	0.0650	(0.5453)	(0.0000)
2010	352	(0.0730)	0.0620	(0.3515)	(0.0006)
2009	352	(0.0891)	0.0761	(0.5084)	(0.0002)
By industry					
Agro & Food Industry (AGRO)	240(11%)	(0.0636)	0.0486	(0.2738)	(0.0002)
Consumer Products (CONSUMP)	204(10%)	(0.0579)	0.0553	(0.3851)	(0.0000)
Industrials (INDUS)	390(18%)	(0.0849)	0.0843	(0.5453)	(0.0004)
Property & Construction (PROPCON)	450(21%)	(0.0780)	0.0817	(0.8447)	(0.0006)
Resources (RESOURC)	168(8%)	(0.0822)	0.0664	(0.3894)	(0.0002)
Services (SERVICE)	456(22%)	(0.0771)	0.0755	(0.5911)	(0.0003)
Technology (TECH)	204(10%)	(0.0879)	0.0774	(0.4587)	(0.0004)
By auditor type					
Big4	1,135	(0.0764)	0.0685	(0.5084)	(0.0002)
Non-Big4	977	(0.0773)	0.0806	(0.8447)	(0.0000)
By auditor type and years					
Big4 (2009-2011)	552	(0.0766)	0.0650	(0.5084)	(0.0002)
Big4 (2012-2014)	583	(0.0763)	0.0718	(0.4587)	(0.0003)
Non-Big4 (2009-2011)	504	(0.0767)	0.0723	(0.5453)	(0.0000)
Non-Big4 (2012-2014)	473	(0.0779)	0.0887	(0.8447)	(0.0004)

Note: Four-digit values shown in parentheses present negative value of absolute discretionary accruals from performance-adjusted modified Jones Model, representing audit quality.

Table 5 reports the correlations among the variables in regression. Notably, *AQ* is negatively correlated (-0.0571 Spearman/-0.0774 Pearson) with *MANIPULATE*,

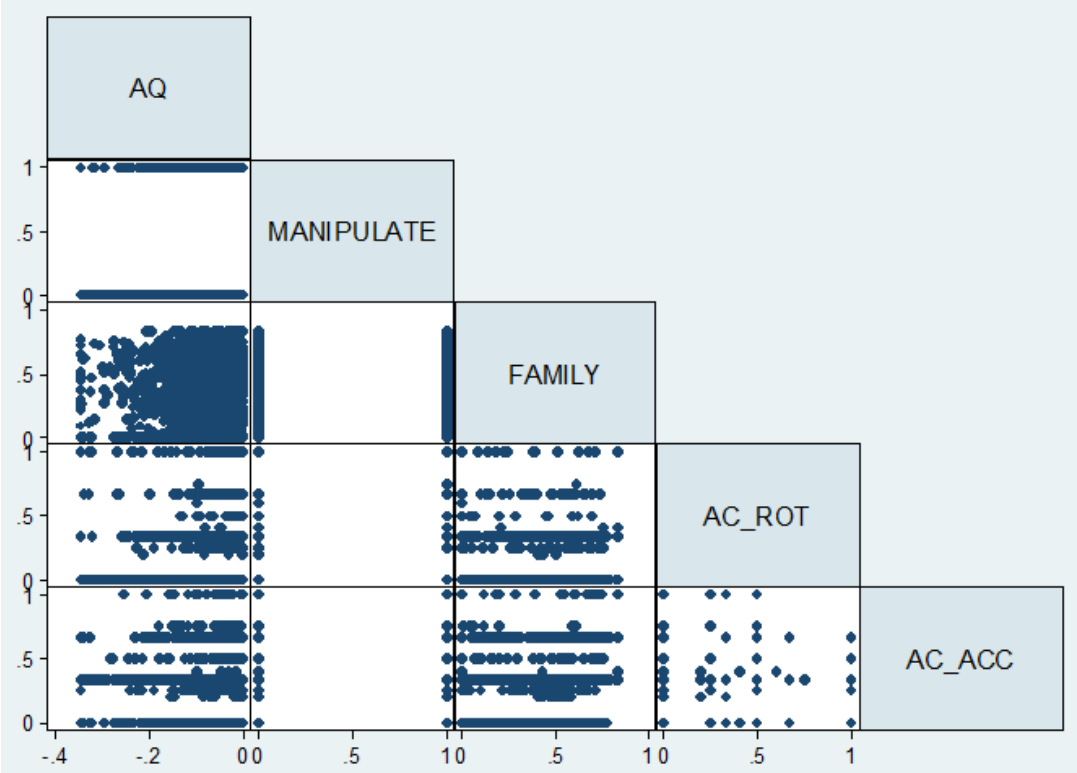
indicating that the higher management's manipulation risk is related with lower audit quality, consistent with H1a. *AQ* is also positively correlated (0.0594 Spearman/0.0498 Pearson) with *FAMILY*, suggesting that the higher family ownership concentration is associated with higher audit quality, consistent with H1b. However, the correlation matrix does not show any significant association between audit quality and characteristics of audit committee. Audit quality is also negatively correlated with *OCF*, *MB*, and *ROA* for both Spearman and Pearson correlation coefficients. Figure 6 illustrates a series of scatterplots for the main variables using graph matrix. The scatter plots do not clearly show the association between audit quality and the main variables of TCWG. In later regression analysis, the multicollinearity between audit quality and other variables is not a problem because the mean variance inflation factors (VIF) for Model 1 and Model 2 are both less than 10. These correlation coefficients do not account for the joint effect of other variables so the multiple regression analysis should be performed to test the hypotheses. Assumption tests of linear regression are done in Appendix 2.

Table 5 Correlation matrix

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
AQ	[1]	1	**-0.0571**	**0.0594**	-0.019	0.0137	0.0288	0.0105	**-0.3767**	-0.0418	**-0.1824**	**-0.1198**	-0.0283
MANIPULATE	[2]	**-0.0774**	1	**-0.0731**	0.0375	-0.0307	0.0477	0.0098	**-0.1879**	0.0359	**0.0576**	**0.0611**	-0.0291
FAMILY	[3]	**0.0498**	**-0.0715**	1	**-0.1408**	0.0484	0.0024	-0.1401	0.0086	**-0.0678**	0.004	-0.046	**-0.0849**
AC_ROT	[4]	-0.0292	**0.0609**	**-0.1632**	1	-0.0425	0.0309	0.0076	-0.0201	-0.0112	0.0347	0.016	-0.0502
AC_ACC	[5]	0.0235	-0.0229	**0.0498**	**-0.0541**	1	-0.0011	**-0.0849**	-0.0344	-0.0064	0.0066	0.0013	0.0227
POST	[6]	-0.0022	**0.0477**	0.0029	0.0322	-0.0087	1	**0.0915**	**-0.0797**	0.0021	**0.2194**	**-0.0566**	0.0294
Log_Asset	[7]	0.0292	-0.0055	**-0.1646**	0.0376	**-0.1075**	**0.0891**	1	0.0092	**0.3358**	**0.1695**	-0.0220	**0.4208**
OCF	[8]	**-0.3475**	**-0.1625**	0.0112	-0.0347	-0.0129	**-0.0865**	0.0139	1	**-0.0911**	**0.2717**	**0.4265**	**0.1008**
LEVERAGE	[9]	-0.001	**0.0446**	**-0.0806**	-0.0116	-0.0035	0.0197	**0.2122**	**-0.0806**	1	**0.1512**	**-0.1509**	**0.1197**
MB	[10]	**-0.1146**	-0.0027	-0.0285	**0.0429**	-0.0348	**0.0875**	0.0259	**0.1261**	**0.1234**	1	**0.3756**	**0.2121**
ROA	[11]	**-0.0876**	**0.1633**	-0.038	-0.0091	-0.0074	**-0.0679**	**-0.0532**	**0.3655**	**-0.0555**	**0.0943**	1	**0.0595**
BIG4	[12]	0.0055	-0.0291	**-0.0814**	**-0.0633**	0.0178	0.0294	**0.3930**	**0.0673**	0.0394	0.0248	-0.0204	1

Note: - The upper half reports Spearman correlation matrix and the below half reports Pearson correlation matrix.
- All variable definitions are defined in Table 3, except *Log_Asset* which is the log of total assets.
- All coefficients in bold are significant at 5% level

Figure 6 Graph matrix by presenting a series of scatterplots for the main variables



5.2 Main empirical results

5.2.1 Main empirical results for H1

Table 6 presents the main results for H1a to H1d. Column 5 illustrates regression results for Model 1. Additionally, separate regressions for each hypothesis are reported in Column 1 to Column 4 for H1a to H1d respectively. As shown in the table, F-statistics are statistically significant at 1% level, indicating that an overall significance test of Model 1 is valid. All continuous variables are winsorized at 1st and 99th percentile to mitigate influence of outliers[12]. All defined explanatory variables are

[12] Using R-student residuals to detect outliers, there are 82 outliers (4%) from 2,112 observations. In untabulated results after dropping these outliers, Model 1 provides higher R-squared at 31.73% and higher F-statistic at 44.44. However, the significance and sign of coefficients among all independent variables are similar. Thus, Table 6 shows full sample regression with winsorization method to reduce the effect of outliers.

able to explain audit quality variable by 26.72% as presented by R-squared value. The other separate models in Column 1 to Column 4 also report 25% of R-square in average. The mean variance inflation factor (VIF) of Model 1 is 1.61, which are fairly small and well below 10 (Myers 1990), indicating no multicollinearity among independent variables. For independence assumption, Dubin-Watson statistic shows that d-statistic is 1.91, indicating that autocorrelation problem of Model 1 does not exist. Linear regression assumption tests are performed in Appendix 2. Most of control variables are significantly associated with audit quality in the expected directions.

To explain the results, the main Model 1 in Column 5 will be referred as the main analysis of H1a to H1d and the separate tests in Column 1 to Column 4 are additional support to the main test. For the first H1a hypothesis, the coefficient of management's manipulation risk (β_1) is negative and significant at 1% level both in the full model (coefficient = -0.0289 in Column 5) and for the separate model (coefficient = -0.0293 in Column 1) which supports H1a. The result indicates that high potential manipulators influence lower audit quality. Secondly, the coefficient of management's family ownership (β_2) is positive and significant at 10% and 5% level for the full model (Column 5) and the separate model (Column 2) respectively. Consistent with H1b expectation, the higher family ownership concentration affects the higher audit quality performed by the auditor. In Column 5, the coefficient of family ownership (β_2) is 0.0108, revealing that increasing percentage of family ownership by 1% boosts audit quality by 1.08%. This finding is consistent with alignment effect and previous evidences in Thailand (Boonlert-U-Thai and Kuntisook 2009; Issarawornrawanich and Jaikengkit 2012). For audit committee's characteristics, the coefficients of audit committee's rotation and accounting expertise are not significant which indicates the

failure to support H1c and H1d. Rotation of audit committees is not associated with audit quality, consistent with the qualitative research by Tengamnuay and Stapleton (2009) who describe that audit committees in Thailand prioritizes their roles with internal control rather than with external auditors and financial reporting quality. For H1d, accounting expertise of audit committee has no effect on audit quality. This finding is consistent with prior research which find no relation between accounting financial expertise of audit committees and accounting quality (Rainsbury et al. 2009; Bryan et al. 2013; Thoopsamut and Jaikengkit 2009). Because the Notification of the SET assigns qualification of audit committees to have at least one of three committee to have either financial or accounting knowledge, a committee with financial-only background may be able to help the auditor to perform audit work effectively so that the accounting expertise has no effect on audit quality. In sum, the results support H1a and H1b. The management's manipulation risk (family ownership) is negatively (positively) associated with audit quality. However, the findings fail to support H1c and H1d, implying that audit committee's rotation and accounting expertise have no effect on audit quality.

Besides, the effects of most control variables in Model 1 (Column 5) are significant in the predicted directions. The coefficient of total assets (*Log_Asset*), 0.0034, is statistically significant and positive at 1% level, suggesting that larger firm size in term of asset value is related with higher audit quality. The coefficient of operating cash flow (*OCF*) and return-on-asset ratio (*ROA*) are positively significant at 1% level, proving that audit quality is higher for firms with higher operating cash flow or lower accruals and profitable firms that efficiently manage their assets to generate income (Johnson et al. 2002; Hope et al. 2013; Adibah Wan Ismail et al. 2013). As

expected, the coefficient of market-to-book ratio (*MB*) is negatively significant at 1% level, suggesting that audit quality is lower for growth firms due to management incentives (Francis and Yu 2009; Barnes 2013). However, the coefficients of leverage (*LEV*) and Big4 auditors (*BIG4*) are not significant, indicating that firm's financial distress and auditor type are not related with audit quality as measured by performance-adjusted discretionary accruals.

5.2.2 Main empirical results for H2

Table 7 compares the means of the variables used in regression analysis for the pre- (*POST=0*) and the post (*POST=1*)-revised TSAs adoption period. As presented in the table, audit quality in the period before and after the revised TSAs adoption is not significantly different. Moreover, there is no significant difference in percentage of family ownership (*FAMILY*), percentage of audit committee rotation (*AC_ROT*), and percentage of accounting experts in audit committee (*AC_ACC*) between the pre- and post-period. However, after the adoption of the revised TSAs in 2012, management's manipulation risk increase significantly at 5% level. Statistically significant at 1% level, size of firm (*Log_Asset*) and market-to-book value (*MB*) is larger while cash flow from operation (*OCF*) and return-on-asset ratio (*ROA*) are smaller after the adoption period. The univariate analysis provides preliminary evidence about the change in audit quality, TCWG characteristics, and control variables upon the implementation of the revised auditing standards. At this early stage, there is no significant change in audit quality in the period prior to and the period after the revised TSAs adoption.

Table 6 Main results for H1: The effect of TCWG characteristics on audit quality

$$AQ_{i,t} = \beta_0 + \beta_1 MANIPULATE_{i,t} + \beta_2 FAMILY_{i,t} + \beta_3 AC\_ROT_{i,t} + \beta_4 AC\_ACC_{i,t} + \beta_5 Log\_Asset_{i,t} + \beta_6 OCF_{i,t} + \beta_7 LEVERAGE_{i,t} + \beta_8 MB_{i,t} + \beta_9 ROA_{i,t} + \beta_{10} BIG4_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Dependent var.		**Exp. Sign**	**(1) (H1a)** *AQ*	**(2) (H1b)** *AQ*	**(3) (H1c)** *AQ*	**(4) (H1d)** *AQ*	**(5) (H1)** *AQ*
Constant			-0.0714***	-0.0871***	-0.0773***	-0.0796***	-0.0803***
			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
TCWG Characteristics variables							
MANIPULATE	H1a	-	**-0.0293*** **				**-0.0289*** **
			(0.0000)				**(0.0000)**
FAMILY	H1b	+		**0.0129** **			**0.0108***
				(0.0300)			**(0.0590)**
AC_ROT	H1c	+			**-0.0092**		**-0.0046**
					(0.2520)		**(0.5690)**
AC_ACC	H1d	+				**0.0032**	**0.0021**
						(0.5460)	**(0.6940)**
Control variables							
Log_Asset		+	0.0032***	0.0036***	0.0035***	0.0035***	0.0034***
			(0.0020)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
OCF		+	0.3792***	0.3476***	0.3473***	0.3462***	0.3802***
			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
LEVERAGE		-	-0.011	-0.0103	-0.0108	-0.0105	-0.0112
			(0.1080)	(0.1340)	(0.1160)	(0.1260)	(0.1010)
MB		-	-0.0039***	-0.0041***	-0.0039***	-0.0040***	-0.0039***
			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
ROA		+	0.1055***	0.0725***	0.0685***	0.0683***	0.1088***
			(0.0000)	(0.0020)	(0.0030)	(0.0040)	(0.0000)
BIG4		+	0.0019	0.0024	0.0016	0.0018	0.0020
			(0.5210)	(0.4160)	(0.5800)	(0.5360)	(0.4890)
Industry fixed effect included			Yes	Yes	Yes	Yes	Yes
Year fixed effect included			Yes	Yes	Yes	Yes	Yes
N			2,112	2,112	2,112	2,112	2,112
R-sq			0.2655	0.2450	0.2438	0.2432	0.2672
F-statistics			22.27	20.72	20.69	20.69	19.06
Prob>F			0.0000	0.0000	0.0000	0.0000	0.0000
Mean VIF (VIF<10)			1.67	1.68	1.65	1.65	1.61
d-statistics (0<DW<4)			1.90	1.89	1.89	1.89	1.91

Note: - All variable definitions are defined in Table 3, except *Log_Asset* which is the log of total assets.
- Continuous variables are winsorized at 1st and 99th percentile.
- P-values in parentheses are robust to heteroscedasticity.
- ***, **, * indicate significant level at 1%, 5%, and 10%, respectively (two-tailed test)

Table 7 Univariate statistics

Variables	*(a)* ***POST*=0** N=1,056	*(b)* ***POST*=1** N=1,056	*(b)-(a)* **Difference**	t-stat	P-value	Sig. Level
AQ	-0.0767	-0.0770	-0.0003	-0.1004	0.9201	
MANIPULATE	0.1534	0.1894	0.0360	2.1956	0.0282	**
FAMILY	0.3631	0.3645	0.0014	0.1316	0.8953	
AC_ROT	0.0848	0.0980	0.0132	1.4799	0.1391	
AC_ACC	0.2728	0.2686	-0.0042	-0.3988	0.6901	
Log_Asset	15.1474	15.4185	0.2711	4.1072	0.0000	***
OCF	0.1103	0.0918	-0.0185	-3.9882	0.0001	***
LEVERAGE	0.4445	0.4561	0.0116	0.9044	0.3659	
MB	1.8113	2.5595	0.7482	4.0353	0.0001	***
ROA	0.0848	0.0699	-0.0149	-3.1254	0.0018	***
BIG4	0.5227	0.5521	0.0294	1.3528	0.1763	

Note: - All variable definitions are defined in Table 3, except *Log_Asset* which is the log of total assets.
- ***, **, * indicate significant level at 1%, 5%, and 10%, respectively

Table 8 presents regression results for the audit quality and TCWG characteristics after the revised TSAs adoption. Consistent with univariate analysis in Table 8, Column 1 shows that the coefficient of *POST* is not significant, suggesting that audit quality in overall does not change after the revised TSAs adoption. Column 2 illustrates the result for H2a. The coefficient on the interaction of *POST* and *MANIPULATE* is significantly negative (β_3= -0.0301) at 1% level, suggesting that the relationship between the management's manipulation risk and audit quality becomes more negative after the revised TSAs adoption period which is opposite to the H2a prediction. The effects of management's manipulation risk on audit quality after the revised TSAs adoption relative to the pre-adoption period are captured by the joint test (β_2+ β_3). The coefficient of joint test is -0.0432 (the sum of -0.0131 and -0.0301), indicating that management with high risk of manipulation lowers audit quality than management with low risk of manipulation does by 4.32% for the post-TSAs period, while the effect is -1.31% (β_2) for the pre-TSAs period. Contrary with the expectation in H2a, management with high risk of manipulation continues to obstruct auditors in

performing high audit quality either before or after the revised TSAs adoption. With regard to H2b, Column 3 shows that the coefficient of interaction between *POST* and *FAMILY* is positively significant (β_3 = 0.0209) at 10% level, indicating that management with higher family ownership concentration becomes more effective in enhancing auditor quality after the revised TSAs adoption period. Consistent with the expectation of H2b, the sum of the two coefficients (β_2+ β_3) as shown in the joint test is positively significant at 1% level, capturing the effect of management's percentage of family ownership on audit quality under the new auditing standards regime (*POST*=1). Specifically, increasing percentage of management's family ownership by 1% raises level of audit quality up by 2.33% (the sum of 0.0024 and 0.0209) in the post-adoption period, while the effect is only 0.24% (β_2) and not significant in the pre-adoption period (*POST*=0). Nonetheless, the results reported in Column 4 and Column 5 show that H2c and H2d are not supported. Both rotation and accounting expertise of audit committees are not related with audit quality either before or after the revised TSAs implementation. The evidence is in line with the results of H1c and H1d in Table 6 that the two audit committee's characteristics does not tie with audit quality.

5.2.3 Summary of the main results

The first set of hypotheses H1a to H1d examines the effect of TCWG characteristics on audit quality. The main results in Section 5.2.1 confirms that management's risk of manipulation and family ownership concentration influence level of audit quality. Supporting H1a and H1b, high potential manipulators are associated with lower level of audit quality while family managers tend to cooperate in enhancing audit quality. However, the results do not support H1c and H1d. Both rotation and accounting expertise of audit committee do not associate with degree of audit quality.

These findings are possibly because audit committees in Thailand concentrate more on internal control mechanism than external auditors and financial reporting quality as presented in previous survey research by Tengamnuay and Stapleton (2009). The main results in Section 5.2.2 suggests that there is no evidence that audit quality improves after the implementation of the new auditing standards. Although the revised TSAs put greater emphasis on roles of TCWG, companies monitored by high potential manipulators still involve with low level of audit quality. The relationship between management's risk of manipulation and audit quality in the post-adoption period is more negative than it is in the pre-adoption period which is opposite from the expectation. Supporting H2b, the results show that family managers progressively coordinate with the auditor to improve audit quality after the auditing standards were launched. With regards to H2c and H2d, there is no evidence of the association between audit committee's attributes and audit quality either before or after the revised TSAs adoption.

Table 8 Main results for H2: The effect of TCWG characteristics on audit quality after the revised TSAs adoption

Model **Dependent var.** **TCWG var.**	**Test**	**Exp. Sign**	*AQ*	**(H2a) Model 2a** *AQ* *MANIPULATE*	**(H2b) Model 2b** *AQ* *FAMILY*	**(H2c) Model 2c** *AQ* *AC_ROT*	**(H2d) Model 2d** *AQ* *AC_ACC*
Constant			-0.0778***	-0.0732***	-0.0831***	-0.0775***	-0.0776***
			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
The revised TSAs adoption variable							
POST		+	-0.0070	-0.0010	-0.0146**	-0.0066	-0.0114*
			(0.1710)	(0.8320)	(0.0220)	(0.2150)	(0.0530)
TCWG characteristics variables							
TCWG		-,+,+,+		-0.0131**	0.0024	-0.0063	-0.0044
				(0.0140)	(0.7390)	(0.4970)	(0.5120)
*POST*TCWG*	H2	-,+,+,+		**-0.0301*** **	**0.0209***	**-0.0055**	**0.0165**
				(0.0000)	**(0.0530)**	**(0.7200)**	**(0.1320)**
Control variables							
Log_Asset		+	0.0034***	0.0033***	0.0036***	0.0034***	0.0035***
			(0.0010)	(0.0010)	0.0000	(0.0010)	(0.0010)
OCF		+	0.3792***	0.3476***	0.3473***	0.3462***	0.3802***
			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
LEVERAGE		-	(0.0104)	-0.0128*	(0.0110)	(0.0108)	(0.0106)
			(0.1310)	(0.0600)	(0.1080)	(0.1140)	(0.1230)
MB		-	-0.0040***	-0.0038***	-0.0040***	-0.0039***	-0.0040***
			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
ROA		+	0.0682***	0.1029***	0.0710***	0.0686***	0.0673***
			(0.0040)	(0.0000)	(0.0030)	(0.0030)	(0.0040)
BIG4		+	0.0020	0.0015	0.0024	0.0017	0.0018
			(0.5090)	(0.5950)	(0.4210)	(0.5740)	(0.5380)
Joint tests							
TCWG	H2	-,+,+,+		**-0.0432*** **	**0.0233*** **	**-0.0117**	**0.0121**
*+(POST*TCWG)*				**(0.0000)**	**(0.0084)**	**(0.3471)**	**(0.1579)**
Industry fixed effect included				Yes	Yes	Yes	Yes	Yes
Year fixed effect included				Yes	Yes	Yes	Yes	Yes
N				2,112	2,112	2,112	2,112	2,112
R-sq				0.2431	0.2720	0.2464	0.2439	0.2440
F-statistics				21.84	21.81	19.91	19.63	19.97
Prob>F				0.0000	0.0000	0.0000	0.0000	0.0000
Mean VIF (VIF<10)				1.78	1.87	2.07	1.84	1.93
d-statistics (0<DW<4)				1.89	1.92	1.89	1.89	1.89

Note: - All variable definitions are defined in Table 3, except *Log_Asset* which is the log of total assets.
- Continuous variables are winsorized at 1st and 99th percentile.
- P-values in parentheses are robust to heteroscedasticity.
- ***, **, * indicate significant level at 1%, 5%, and 10%, respectively (two-tailed test).
- TCWG variables represent *MANIPULATE* for H2a, *FAMILY* for H2b, *AC_ROT* for H2c, and *AC_ACC* for H2d.

5.3 Additional tests

In this section, additional tests are performed to ensure robustness of the main results. For H1, Section 5.3.1 performs multiple regression by using (A) alternative measures of TCWG characteristics, (B) 2-interaction term (*BIG4*TCWG*) and separate sub-samples of Big4 and non-Big4 firms, and (C) potential influential observations. Section 5.3.2 provides additional tests for H2 by (A) eliminating confounding effects of new accounting standards implementation, (B) performing 3-interaction term (*POST*BIG4*TCWG*) and separate regression on Big4 and non-Big4 sub-samples, (C) restricting samples to event period (2011-2012), (D) restricting samples by excluding event period (2009-2010 vs. 2013-2014), and (E) using alternative measures of TCWG characteristics.

5.3.1 Additional test for H1

(A) Alternative measures of TCWG characteristics

This section firstly performs the additional test for H1 using alternative measures of TCWG characteristics. For management's risk of manipulation, it is possible that the cut-off point at -1.78 may not be appropriate with the sample data in Thailand in 2009-2014 because this paper does not replicate the original studies which Beneish (1999) and Beneish et al. (2013) use sample data in the U.S. in the period 1982-1992 and 1993-2010 respectively. Thus, this section applies three alternative measures which are (1) M-score using upper and lower quartiles to classify high and low potential manipulators, (2) M-score using industry median cut off point, and (3) lagged M-score. First, *MANIPULATE_Q* equals to one if M-score is in the upper quartiles (528 firm-year observations with highest M-score) and equals to zero if M-score is in the lower quartiles (528 firm-year observations with lowest M-score). This measure classifies

high and low potential manipulators across two extreme portfolios. Table 9 presents four portfolios of M-score using quartile ranking to wipe out the grey area (2^{nd} and 3^{rd} quartile) of manipulation risk classification. The 1^{st} quartile observations represent low potential manipulators (*MANIPULATE_Q* = 0) whose M-score is lower than -2.78. The 4^{th} quartile observations are proxies for high potential manipulators (*MANIPULATE_Q* = 1) whose M-score is greater than -1.94.

Table 9 Quartile M-score

Quartile	Mean	Max.	Median	Min.	Obs.	*MANIPULATE_Q*
1st Quartile	-3.8278	-2.7819	-3.2019	-27.8364	528	0
2nd Quartile	-2.5796	-2.3852	-2.5804	-2.4074	528	-
3rd Quartile	-2.1974	-1.9440	-2.2149	-2.3842	528	-
4th Quartile	4.2484	970.1126	-1.4201	-1.9440	528	1
Total	-1.0891	970.1126	-2.3847	-27.8364	2,112	

Second, *MANIPULATE_M* equals to one if M-score is greater than industry median value (1,056 firm-year observation above median), and zero otherwise. The median split is more industry-specified for the data set used in this paper. Table 10 shows median M-score of all seven industries. The median M-score of each industry is quite similar in the small range between -2.33 and -2.47. Because the cut-off point to divide high and low risk of manipulation is classified by median value, the number of high and low potential manipulators are 1,056 equally while the main test using -1.78 cut-off points shows 362 high potential manipulators and 1,750 low potential manipulators. Third, *MANIPULATE_L* equals to one if the lagged M-score is greater than -1.78 and zero otherwise. The reason of using lagged M-score as an alternative measure is because this paper identifies management's manipulation risk as the possibility that management have potential to manage earnings throughout the

accounting period. However, the pre-audited financial data are not publicly available to predict manipulation risk during the accounting period. Therefore, this paper alternatively uses M-score calculated from weighted model of last year financial ratios to classify high and low potential manipulators. The available data used for this measure is limited to data from 2010 to 2013 because some ratios used to derive lagged M-score must be two-year lagged data. Table 11 presents descriptive statistics for lagged M-score. Using lagged M-score classification, there are 299 high potential manipulators whose lagged M-score is greater than -1.78 and 1,109 low potential manipulators whose lagged M-score is lower than or equal to -1.78.

Table 10 Median M-score by industry

Industry	Median M-score (for Table 15)	Beneish et al. (2013) (for Table 6)
Agro & Food Industry (AGRO)	-2.38	-1.78
Consumer Products (CONSUMP)	-2.46	-1.78
Industrials (INDUS)	-2.45	-1.78
Property & Construction (PROPCON)	-2.33	-1.78
Resources (RESOURC)	-2.35	-1.78
Services (SERVICE)	-2.40	-1.78
Technology (TECH)	-2.47	-1.78
Numbers of high risk of manipulators	1,056 (*MANIPULATE_M* = 1)	362 (*MANIPULATE* = 1)
Numbers of low risk of manipulators	1,056 (*MANIPULATE_M* = 0)	1,750 (*MANIPULATE* = 0)

Table 11 Lagged M-score

Variable	**Obs.**	**Mean**	**Max.**	**Median**	**Min.**
MANIPULATE_L =1	299	5.1614	970.1126	-1.2010	-1.7747
MANIPULATE_L =0	1,109	-2.7512	-1.7871	-2.5032	-19.2065
Total (2010-2013)	1,408	-1.0709	970.1126	-2.3329	-19.2065

In term of management's family ownership, prior research widely use 20% cut-off point to define family business (Fogel 2006; Sraer and Thesmar 2007; Faccio and Lang 2002; Boonlert-U-Thai and Kuntisook 2009; Lau 2010). Thus, the alternative

measure of *FAMILY_D* is a dummy variable equals to one if percentage of family ownership is greater than 20%, and zero otherwise. There are 1,387 firm-year observations (65.67%) whose family ownership is greater than 20% and the other 725 firm-year observations (34.33%) have family ownership concentration lower than or equal to 20%.

For audit committee characteristics, binary variable is used to replace continuous variables used in the main test. Alternative measure of audit committee rotation (*AC_ROT_D*) equals to one if there is audit committee rotation during the fiscal period and zero otherwise. Audit committee's accounting expertise (*AC_ACC_D*) equals to one if there is accounting expert in committee boards and zero otherwise.

Model 3 is used to test alternative measure of manipulation risk using quartile M-score. Model 4 and 5 are used to investigate alternative measures of manipulation risk using median M-score by industry and lagged M-score respectively.

$$AQ_{i,t} = \beta_0 + \beta_1 \mathbf{MANIPULATE\_Q}_{i,t} + \beta_2 \mathbf{FAMILY\_D}_{i,t} + \beta_3 \mathbf{AC\_ROT\_D}_{i,t} + \beta_4 \mathbf{AC\_ACC\_D}_{i,t} + \beta_5 Log\_Asset_{i,t} + \beta_6 OCF_{i,t} + \beta_7 LEVERAGE_{i,t} + \beta_8 MB_{i,t} + \beta_9 ROA_{i,t} + \beta_{10} BIG4_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \quad (3)$$

$$AQ_{i,t} = \beta_0 + \beta_1 \mathbf{MANIPULATE\_M}_{i,t} + \beta_2 \mathbf{FAMILY\_D}_{i\,i,t} + \beta_3 \mathbf{AC\_ROT\_D}_{i,t} + \beta_4 \mathbf{AC\_ACC\_D}_{i,t} + \beta_5 Log\_Asset_{i,t} + \beta_6 OCF_{i,t} + \beta_7 LEVERAGE_{i,t} + \beta_8 MB_{i,t} + \beta_9 ROA_{i,t} + \beta_{10} BIG4_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \quad (4)$$

$$AQ_{i,t} = \beta_0 + \beta_1 \mathbf{MANIPULATE\_L}_{i,t} + \beta_2 \mathbf{FAMILY\_D}_{i\,i,t} + \beta_3 \mathbf{AC\_ROT\_D}_{i,t} + \beta_4 \mathbf{AC\_ACC\_D}_{i,t} + \beta_5 Log\_Asset_{i,t} + \beta_6 OCF_{i,t} + \beta_7 LEVERAGE_{i,t} + \beta_8 MB_{i,t} + \beta_9 ROA_{i,t} + \beta_{10} BIG4_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \quad (5)$$

Using quartile rank to separate high and low potential manipulators, Table 12 shows significant negative association that the upper quartile high potential

manipulators tend to collaborate lower audit quality. Using quartile cut-off point instead of Beneish (1999)'s cut-off point (-1.78) increases numbers of high manipulator from 362 to 528 firm-year observations. Total firm-year observations also drop from 2,112 to 1,056 observations because the 2nd and 3rd quartile observations are cut out from the samples. The main finding for H1a remains robust using alternative quartile ranking M-score, indicating that the quartile cut off point is another effective tools to detect firms with high risk of manipulation. For the alternative measure of family ownership, the additional analyses in Table 12 show similar results with the main test for H1b. Management with concentrated family ownership greater than 20% are more likely to engage in higher level of audit quality which support alignment effect among family business in Thailand. However, the coefficients of *AC_ROT_D* and *AC_ACC_D* are not significant in any regression, confirming that audit committee's rotation and accounting expertise do not cause auditors to significantly improve audit quality.

Using median cut-off point and lagged M-score to classify high and low manipulators, Table 13 shows no significant association between both alternative measures of manipulation risk and audit quality. Using industry median cut-off point instead of Beneish (1999)'s cut-off point (-1.78) increases numbers of high manipulator from 362 to 1,056 firm-year observations. The increasing numbers of observations weaken the test results to be insignificant. Moreover, the lagged M-score may not reflect the most current incentives to drive management's intention to perform earnings manipulation in the later year. Thus, the original Beneish (1999)'s cut-off point at -1.78 can be applied in the financial market of Thailand to distinguish high and low potential manipulators when determining its effect on audit quality.

Table 12 Additional test for H1: Alternative measures of TCWG characteristics (Quartile M-score)

$$AQ_{i,t} = \beta_0 + \beta_1 \boldsymbol{MANIPULATE\_Q}_{i,t} + \beta_2 \boldsymbol{FAMILY\_D}_{i,t} + \beta_3 \boldsymbol{AC\_ROT\_D}_{i,t} + \beta_4 \boldsymbol{AC\_ACC\_D}_{i,t} + \beta_5 Log\_Asset_{i,t} + \beta_6 OCF_{i,t} + \beta_7 LEVERAGE_{i,t} + \beta_8 MB_{i,t} + \beta_9 ROA_{i,t} + \beta_{10} BIG4_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \quad (3)$$

	Test	**Exp. Sign**	**(H1a)** *AQ*	**(H1b)** *AQ*	**(H1c)** *AQ*	**(H1d)** *AQ*	**(H1)** *AQ*
Constant			-0.0543**	-0.0817***	-0.0767***	-0.0765***	-0.0547*
			(0.0459)	(0.0000)	(0.0000)	(0.0000)	(0.0529)
MANIPULATE_Q	H1a	-	**-0.0149*** **				**-0.0150*** **
			(0.0018)				**(0.0018)**
FAMILY_D	H1b	+		**0.0051***			**-0.0030**
				(0.0791)			**(0.6005)**
AC_ROT_D	H1c	+			**-0.0021**		**0.0027**
					(0.5311)		**(0.6586)**
AC_ACC_D	H1d	+				**-0.0002**	**-0.0004**
						(0.9323)	**(0.9428)**
Log_Asset		+	0.0009	0.0033***	0.0034***	0.0033***	0.0009
			(0.6020)	(0.0011)	(0.0011)	(0.0013)	(0.6071)
OCF		+	0.3560***	0.3481***	0.3468***	0.3464***	0.3560***
			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
LEVERAGE		-	0.0119	-0.0096	-0.0099	-0.0097	0.0120
			(0.3190)	(0.1614)	(0.1501)	(0.1556)	(0.3126)
MB		-	-0.0049***	-0.0041***	-0.0040***	-0.0040***	-0.0049***
			(0.0043)	(0.0001)	(0.0001)	(0.0001)	(0.0043)
ROA		+	0.0387	0.0721***	0.0689***	0.0688***	0.0396
			(0.1511)	(0.0033)	(0.0046)	(0.0047)	(0.1462)
BIG4		+	0.0095*	0.0024	0.0018	0.002	0.0098*
			(0.0713)	(0.4264)	(0.5431)	(0.5104)	(0.0682)
Industry fixed effect included			Yes	Yes	Yes	Yes	Yes
Year fixed effect included			Yes	Yes	Yes	Yes	Yes
N			1,056	2,112	2,112	2,112	1,056
R-sq			0.2466	0.2442	0.2432	0.243	0.2469
F-statistics			12.29	20.78	20.71	20.68	10.58
Prob>F			0.0000	0.0000	0.0000	0.0000	0.0000

Note: Variables are defined in Table 3, except *Log_Asset* which is the log of total assets, and except **TCWG characteristic** variables. *MANIPULATE_Q* = 1 if the M-score from Beneish (1999) Model is in highest upper 4th quartile and 0 if M-score is in smallest lower 1st quartile. *FAMILY_D* = 1 if the percentage of equity owned by family management is greater than 20% and 0 otherwise. *AC_ROT_D* = 1 if there is at least one audit committee or newly appointed audit committee in the fiscal year. *AC_ACC* = 1 if there is at least one committee who has accounting knowledge to total audit committees. Continuous variables are winsorized at 1st and 99th percentile. P-values in parentheses are robust to heteroscedasticity. ***, **, * indicate significant level at 1%, 5%, and 10%, respectively.

Table 13 Additional test for H1: Median M-score and Lagged M-score

$$AQ_{i,t} = \beta_0 + \beta_1 \boldsymbol{MANIPULATE\_M}_{i,t} + \beta_2 \boldsymbol{FAMILY\_D}_{i\,i,t} + \beta_3 \boldsymbol{AC\_ROT\_D}_{i,t} + \beta_4 \boldsymbol{AC\_ACC\_D}_{i,t} + \beta_5 Log\_Asset_{i,t} + \beta_6 OCF_{i,t} + \beta_7 LEVERAGE_{i,t} + \beta_8 MB_{i,t} + \beta_9 ROA_{i,t} + \beta_{10} BIG4_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \quad (4)$$

$$AQ_{i,t} = \beta_0 + \beta_1 \boldsymbol{MANIPULATE\_L}_{i,t} + \beta_2 \boldsymbol{FAMILY\_D}_{i\,i,t} + \beta_3 \boldsymbol{AC\_ROT\_D}_{i,t} + \beta_4 \boldsymbol{AC\_ACC\_D}_{i,t} + \beta_5 Log\_Asset_{i,t} + \beta_6 OCF_{i,t} + \beta_7 LEVERAGE_{i,t} + \beta_8 MB_{i,t} + \beta_9 ROA_{i,t} + \beta_{10} BIG4_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \quad (5)$$

Model ***Dependent var.***	**Test**	**Exp. Sign**	**(H1a)** *AQ*	**(H1) Model 4** *AQ*	**(H1a)** *AQ*	**(H1) Model 5** *AQ*
Constant			-0.0765***	-0.0812***	-0.0406**	-0.0514***
			(0.0000)	(0.0000)	(0.0202)	(0.0053)
MANIPULATE_M	H1a	-	**-0.0020**	**-0.0023**		
			(0.4490)	**(0.3936)**		
MANIPULATE_L	H1a				**-0.0002**	**-0.0002**
					(0.9435)	**(0.8640)**
FAMILY_D	H1b	+		**0.0051***		**0.0131****
				(0.0807)		**(0.0277)**
AC_ROT_D	H1c	+		**-0.0015**		**0.0046**
				(0.6578)		**(0.6159)**
AC_ACC_D	H1d	+		**-0.0003**		**0.0014**
				(0.9143)		**(0.8055)**
Log_Asset		+	0.0034***	0.0034***	0.0020*	0.0022*
			(0.0010)	(0.0010)	(0.0765)	(0.0585)
OCF		+	0.3498***	0.3521***	0.4350***	0.4340***
			(0.0000)	(0.0000)	(0.0000)	(0.0000)
LEVERAGE		-	-0.0100	-0.0099	-0.0153**	-0.0151**
			(0.1473)	(0.1497)	(0.0280)	(0.0305)
MB		-	-0.0040***	-0.0040***	-0.0013	-0.0015
			(0.0001)	(0.0001)	(0.2079)	(0.1550)
ROA		+	0.0706***	0.0743***	0.0432*	0.0485**
			(0.0041)	(0.0028)	(0.0591)	(0.0384)
BIG4		+	0.0019	0.0022	0.0033	0.0040
			(0.5319)	(0.4617)	(0.2902)	(0.2138)
Industry fixed effect included			Yes	Yes	Yes	Yes
Year fixed effect included			Yes	Yes	Yes	Yes
N			2,112	2,112	1,408	1,408
R-sq			0.2432	0.2445	0.3422	0.3446
F-statistics			20.74	17.89	21.25	18.26
Prob>F			0.0000	0.0000	0.0000	0.0000

Note: Variables are defined in Table 3, except *Log_Asset* which is the log of total assets, and except **TCWG characteristic** variables. *MANIPULATE_M* = 1 if the M-score from Beneish (1999) Model is higher than industry median score and 0 otherwise. *MANIPULATE_L* equals to one if the lagged M-score is greater than -1.78 and zero otherwise. *FAMILY_D* = 1 if the percentage of equity owned by family management is greater than 20% and 0 otherwise. *AC_ROT_D* = 1 if there is at least one audit committee or newly appointed audit committee in the fiscal year. *AC_ACC_D* = 1 if there is at least one committee who has accounting knowledge to total audit committees. Continuous variables are winsorized at 1st and 99th percentile. P-values in parentheses are robust to heteroscedasticity. ***, **, * indicate significant level at 1%, 5%, and 10%, respectively.

(B) Big 4 vs. non-Big 4 samples

The second sensitivity analysis for H1 is to determine the effect of auditor type (*BIG4*) by (1) interacting *BIG4* with TCWG characteristics and (2) regressing Big4 and non-Big4 samples separately. Although the main research questions of this paper focus on client-demand factors of audit quality (DeFond and Zhang 2014), the auditor types (Big4 vs. non-Big4) are added to ensure that the regression results in the main test are hold after incorporating the effect of the auditor-supply factor. Prior research extensively find that auditor and audit firm types significantly influence level of audit quality (Chi and Chin 2011; Carey and Simnett 2006; Gul et al. 2013). Since auditors' characteristics are unobservable, indirect measures such as audit tenure (Stephens 2011; Carey and Simnett 2006) and auditor industry specialization (Balsam et al. 2003) are used by many researchers to find the relationship with audit quality. Lots of research also provide evidence that Big4 vs. non-Big4 auditors are associated with accounting and audit quality (Krishnan 2003; Francis 2004; Francis and Yu 2009). Thus, the main results may be distorted by auditor characteristics instead of TCWG characteristics. Adding interaction term and regressing separate model for Big4 and non-Big4 help to confirm that the main results hold for both types of auditor. The following models are used to test two-way interaction term of *BIG4* and TCWG characteristics.

$$AQ_{i,t} = \beta_0 + \beta_1 BIG4_{i,t} + \beta_2 \mathbf{MANIPULATE}_{i,t} + \beta_3 (BIG4_{i,t} * \mathbf{MANIPULATE}_{i,t}) + \beta_4 \mathbf{FAMILY}_{i,t} + \beta_5 (BIG4_{i,t} * \mathbf{FAMILY}_{i,t}) + \beta_6 \mathbf{AC\_ROT}_{i,t} + \beta_7 (BIG4_{i,t} * \mathbf{AC\_ROT}_{i,t}) + \beta_8 \mathbf{AC\_ACC}_{i,t} + \beta_9 (BIG4_{i,t} * \mathbf{AC\_ACC}_{i,t}) + \beta_{10} Log\_Asset_{i,t} + \beta_{11} OCF_{i,t} + \beta_{12} LEVERAGE_{i,t} + \beta_{13} MB_{i,t} + \beta_{14} ROA_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \quad (6)$$

To add, Model 7 is used to regress Big4 and non-Big 4 samples separately. It is similar to Model 1 except there is no *BIG4* variable in the model.

$$AQ_{i,t} = \beta_0 + \beta_1 \boldsymbol{MANIPULATE}_{i,t} + \beta_2 \boldsymbol{FAMILY}_{i,t} + \beta_3 \boldsymbol{AC\_ROT}_{i,t} + \beta_4 \boldsymbol{AC\_ACC}_{i,t} + \beta_5 Log\_Asset_{i,t} + \beta_6 OCF_{i,t} + \beta_7 LEVERAGE_{i,t} + \beta_8 MB_{i,t} + \beta_9 ROA_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \quad (7)$$

First, Table 14 presents regression analysis of the effect of auditor type and TCWG characteristics on audit quality by integrating all Big4 and non-Big4 samples (N=2,112 firm-year observations). The last Column of Table 14 presents full sample regression results of Model 6. It shows the significant negative coefficient of *MANIPULATE* (β_2 = -0.0329) which is in line with the main results in Table 6 while the coefficient of interaction term *MANIPULATE*BIG4* is positive (β_3 = 0.0073) but it is not significant. It implies that Big 4 auditors do not influence level of audit quality for the companies monitored by higher manipulators, family managers, rotated audit committees, and accounting expertise committee. The main result of H1a is still hold that the management's risk of manipulation has a negative effect on audit quality. However, the results do not show any effect of management's family ownership and audit committee's traits on audit quality.

Table 14 Additional test for H1: Two-way interaction with auditor type

$$AQ_{i,t} = \beta_0 + \beta_1 BIG4_{i,t} + \beta_2 \boldsymbol{MANIPULATE}_{i,t} + \beta_3 (BIG4_{i,t} * \boldsymbol{MANIPULATE}_{i,t}) + \beta_4 \boldsymbol{FAMILY}_{i,t} + \beta_5 (BIG4_{i,t} * \boldsymbol{FAMILY}_{i,t}) + \beta_6 \boldsymbol{AC\_ROT}_{i,t} + \beta_7 (BIG4_{i,t} * \boldsymbol{AC\_ROT}_{i,t}) + \beta_8 \boldsymbol{AC\_ACC}_{i,t} + \beta_9 (BIG4_{i,t} * \boldsymbol{AC\_ACC}_{i,t}) + \beta_{10} Log\_Asset_{i,t} + \beta_{11} OCF_{i,t} + \beta_{12} LEVERAGE_{i,t} + \beta_{13} MB_{i,t} + \beta_{14} ROA_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \ldots\ldots\ldots\ldots\ldots\ldots (6)$$

	Test	**Exp. Sign**	**(H1a)** *AQ*	**(H1b)** *AQ*	**(H1c)** *AQ*	**(H1d)** *AQ*	**(H1)** *AQ*
Constant			-0.0705***	-0.0868***	-0.0774***	-0.0813***	-0.0804***
			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
BIG4			0.0005	0.0015	0.0018	0.0066	0.0029
			(0.8660)	(0.7750)	(0.5970)	(0.1210)	(0.6200)
MANIPULATE	H1a	-	**-0.0335*** **				**-0.0329*** **
			(0.0000)				**(0.0000)**
*MANIPULATE*BIG4*			0.0080				0.0073
			(0.3820)				(0.4170)
FAMILY	H1b	+		**0.0114**			**0.0061**
				(0.1950)			**(0.4530)**
*FAMILY*BIG4*				0.0027			0.00798
				(0.8090)			(0.4530)
AC_ROT	H1c	+			**-0.0087**		**-0.0020**
					(0.4670)		**(0.8660)**
*AC_ROT*BIG4*					-0.0013		-0.0062
					(0.9390)		(0.7060)
AC_ACC	H1d	+				**0.0122**	**0.0107**
						(0.1150)	**(0.1550)**
*AC_ACC*BIG4*						-0.0176	-0.0168
						(0.1030)	(0.1150)
Log_Asset		+	0.0032***	0.0036***	0.0035***	0.0035***	0.0034***
			(0.0020)	(0.0000)	(0.0010)	(0.0010)	(0.0010)
OCF		+	0.3800***	0.3470***	0.3470***	0.3460***	0.3800***
			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
LEVERAGE		-	-0.0108	-0.0104	-0.0108	-0.0108	-0.0117*
			(0.1120)	(0.1330)	(0.1170)	(0.1170)	(0.0880)
MB		-	-0.0039***	-0.0041***	-0.0039***	-0.0040***	-0.0040***
			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
ROA		+	0.1070***	0.0723***	0.0685***	0.0679***	0.1090***
			(0.0000)	(0.0020)	(0.0030)	(0.0040)	(0.0000)
Industry fixed effect included			Yes	Yes	Yes	Yes	Yes
Year fixed effect included			Yes	Yes	Yes	Yes	Yes
N			2,112	2,112	2,112	2,112	2,112
R-sq			0.2659	0.2450	0.2438	0.2441	0.2686
F-statistics			21.19	19.68	19.61	19.72	16.14
Prob>F			0.0000	0.0000	0.0000	0.0000	0.0000

Note: - All variable definitions are defined in Table 3, except *Log_Asset* which is the log of total assets.
- Continuous variables are winsorized at 1st and 99th percentile.
- P-values in parentheses are robust to heteroscedasticity.
- ***, **, * indicate significant level at 1%, 5%, and 10%, respectively (two-tailed test).
- TCWG variables are *MANIPULATE* for H1a, *FAMILY* for H1b, *AC_ROT* for H1c, and *AC_ACC* for H1d.

Second, using Model 7, Table 15 and Table 16 present separate regression results using data from financial reports audited by Big-4 and Non-Big4 auditors respectively. Supporting H1a, both Big4 auditors (Table 15; β_1 = -0.0256) and Non-Big4 auditors (Table 16; β_1 = -0.0341) yield significantly lower audit quality when auditing financial reports prepared by management with high risk of manipulation. Interestingly, the results for H1b is positively significant only for Big4 auditors. The coefficient of *FAMILY* in Table 15 (β_2 = 0.0137) is significantly positive at 10% level while it is not significant in Table 16 (β_2 = 0.0089), indicating that the increasing level of audit quality can be achieved by the cooperation among family management and Big4 auditors. The result in Column 5 of Table 15 (H1b) convinces that increasing 1% of family ownership concentration in companies audited by Big4 auditors boosts level of audit quality by 1.37%. Thus, the positive significant result for H1b in the main test is driven by family firms audited by Big4 auditors.

Consistent with the main results for H1c and H1d in Table 6, audit committee characteristics are not associated with audit quality, and neither Big4 nor Non-Big4 auditors ties the association.

Table 15 Additional test for H1: Big 4 auditors

$$AQ_{i,t} = \beta_0 + \beta_1 \boldsymbol{MANIPULATE}_{i,t} + \beta_2 \boldsymbol{FAMILY}_{i,t} + \beta_3 \boldsymbol{AC\_ROT}_{i,t} + \beta_4 \boldsymbol{AC\_ACC}_{i,t} + \beta_5 Log\_Asset_{i,t} + \beta_6 OCF_{i,t} + \beta_7 LEVERAGE_{i,t} + \beta_8 MB_{i,t} + \beta_9 ROA_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \quad (7)$$

	Test	**Exp. Sign**	**(H1a)** *AQ*	**(H1b)** *AQ*	**(H1c)** *AQ*	**(H1d)** *AQ*	**(H1)** *AQ*
Constant			-0.0708***	-0.0888***	-0.0770***	-0.0720***	-0.0759***
			(0.0010)	(0.0000)	(0.0000)	-0.001	(0.0010)
MANIPULATE	H1a	-	**-0.0255*** **				**-0.0256*** **
			(0.0000)				**(0.0000)**
FAMILY	H1b	+		**0.0138***			**0.0137***
				(0.0650)			**(0.0660)**
AC_ROT	H1c	+			**-0.0089**		**-0.0066**
					(0.3470)		**(0.4870)**
AC_ACC	H1d	+				**-0.0086**	**-0.0096**
						(0.2410)	**(0.1890)**
Log_Asset		+	0.0026**	0.0032**	0.0030**	0.0027**	0.0028**
			(0.0460)	(0.0160)	(0.0270)	(0.0400)	(0.0350)
OCF		+	0.3820***	0.3510***	0.3540***	0.3530***	0.3810***
			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
LEVERAGE		-	0.0010	-0.0011	-0.0004	0.0010	-0.0014
			(0.9260)	(0.9110)	(0.9720)	(0.9200)	(0.8930)
MB		-	-0.0043***	-0.0047***	-0.0043***	-0.0044***	-0.0045***
			(0.0020)	(0.0010)	(0.0020)	(0.0010)	(0.0010)
ROA		+	0.2130***	0.1840***	0.1780***	0.1790***	0.2130***
			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Industry fixed effect included			Yes	Yes	Yes	Yes	Yes
Year fixed effect included			Yes	Yes	Yes	Yes	Yes
N			1,135	1,135	1,135	1,135	1,135
R-sq			0.2595	0.2432	0.2413	0.2417	0.2635
F-statistics			14.49	13.42	13.29	13.32	12.50
Prob>F			0.0000	0.0000	0.0000	0.0000	0.0000

Note: - All variable definitions are defined in Table 3, except *Log_Asset* which is the log of total assets.
- Continuous variables are winsorized at 1st and 99th percentile.
- P-values in parentheses are robust to heteroscedasticity.
- ***, **, * indicate significant level at 1%, 5%, and 10%, respectively (two-tailed test).

Table 16 Additional test for H1: Non-Big4 auditors

$$AQ_{i,t} = \beta_0 + \beta_1 \boldsymbol{MANIPULATE}_{i,t} + \beta_2 \boldsymbol{FAMILY}_{i,t} + \beta_3 \boldsymbol{AC\_ROT}_{i,t} + \beta_4 \boldsymbol{AC\_ACC}_{i,t} + \beta_5 Log\_Asset_{i,t} + \beta_6 OCF_{i,t} + \beta_7 LEVERAGE_{i,t} + \beta_8 MB_{i,t} + \beta_9 ROA_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \quad (7)$$

	Test	**Exp. Sign**	**(H1a)** AQ	**(H1b)** AQ	**(H1c)** AQ	**(H1d)** AQ	**(H1)** AQ
Constant			-0.0760***	-0.0934***	-0.0842***	-0.0897***	-0.0868***
			(0.0030)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
MANIPULATE	H1a	-	**-0.0348*** **				**-0.0341*** **
			(0.0000)				**(0.0000)**
FAMILY	H1b	+		**0.0137**			**0.0089**
				(0.1400)			**(0.3000)**
AC_ROT	H1c	+			**-0.0072**		**0.0003**
					(0.5810)		**(0.9840)**
AC_ACC	H1d	+				**0.0130**	**0.0114**
						(0.1070)	**(0.1470)**
Log_Asset		+	0.0034**	0.0037**	0.0036**	0.0038**	0.0037**
			(0.0490)	(0.0320)	(0.0390)	(0.0310)	(0.0370)
OCF		+	0.4040***	0.3680***	0.3650***	0.3630***	0.4050***
			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
LEVERAGE		-	-0.0094	-0.0072	-0.0081	-0.0088	-0.0096
			(0.3200)	(0.4550)	(0.3950)	(0.3570)	(0.3150)
MB		-	-0.0038***	-0.0038***	-0.0038***	-0.0038***	-0.0038***
			(0.0020)	(0.0030)	(0.0030)	(0.0030)	(0.0030)
ROA		+	0.0653**	0.0259	0.0230	0.0224	0.0666**
			(0.0200)	(0.3250)	(0.3800)	(0.3940)	(0.0180)
Industry fixed effect included			Yes	Yes	Yes	Yes	Yes
Year fixed effect included			Yes	Yes	Yes	Yes	Yes
N			977	977	977	977	977
R-sq			0.2956	0.27	0.2687	0.2701	0.2977
F-statistics			13.35	12.15	12.06	12.32	11.41
Prob>F			0.0000	0.0000	0.0000	0.0000	0.0000

Note: - All variable definitions are defined in Table 3, except *Log_Asset* which is the log of total assets.
- Continuous variables are winsorized at 1st and 99th percentile.
- P-values in parentheses are robust to heteroscedasticity.
- ***, **, * indicate significant level at 1%, 5%, and 10%, respectively (two-tailed test).

(C) Potential influential observations

The additional results in Table 15 and 16 raise argument that Big4 auditors may drive the association between audit quality and management's family ownership. The small portion of each TCWG groups may be the possible influential observations of the whole samples, leading to possible errors in regression analyses.

Table 17 Alternative TCWG measures vs. Big4 observations

	no. of firm-year observations			
	BIG4=1	*BIG4*=0	Difference	Total
MANIPULATE_Q = 1	273	255	18 (3.4%)	528
MANIPULATE_Q = 0	267	261	6 (1.1%)	528
MANIPULATE_M = 1	556	500	56 (5.3%)	1,056
MANIPULATE_M = 0	579	477	102 (9.7%)	1,056
MANIPULATE_L = 1	160	139	21 (7.02%)	299
MANIPULATE_L = 0	600	509	91 (8.2%)	1,109
FAMILY=1	701	686	15 (1.1%)	1,387
FAMILY=0	434	291	143 (19.7%)	725
AC_ROT=1	215	221	-6 (-1.4%)	436
AC_ROT=0	920	756	164 (9.8%)	1,676
AC_ACC=1	738	620	118 (8.7%)	1,358
AC_ACC=0	397	357	40 (5.3%)	754

Note: *MANIPULATE_Q* = 1 if the Beneish (1999) M-score is in upper quartile (4st quartile with highest M-score) and 0 if the M-score is in lower quartile (1st quartile with lowest M-score). *MANIPULATE_M* = 1 if the Beneish (1999) M-score is higher than industry median score and 0 otherwise. *MANIPULATE_L* = 1 if lagged M-score is higher than -1.78 and 0 otherwise. *FAMILY* = 1 if the percentage of equity owned by family management is greater than 20% and 0 otherwise. *AC_ROT* = 1 if there is at least one audit committee or newly appointed audit committee in the fiscal year. *AC_ACC* = 1 if there is at least one committee who has accounting knowledge to total audit committees. *BIG4* = 1 if the firm is audited by Big4 auditors.

Table 17 shows numbers of observations by alternative TCWG characteristics versus Big4 auditor type. The descriptive numbers present slightly differences between firms using Big4 and non-Big4 auditors (overall less than 10% differences). However, the non-family firms (*FAMILY* = 0) choose Big4 auditors more than non-Big4 auditors for 20% (143/725) which is in line with the correlation matrix in Table 5. The correlation between *FAMILY* and *BIG4* is significantly negative at 5% level. However,

the regression results remain valid because the variance inflation factors (VIF) is lower than 10, indicating no multicollinearity problem.

Originally, Table 10 Column 2 presents M-score form the main test (*MANIPULATE*), there are 362 high potential manipulators and 1,750 low potential manipulators. Thus, the potential influential observation for *MANIPULATE* group is the high potential manipulators. From Table 17, using alternative dummy variables, there are 1,387 family firms and 725 non-family firms; 436 firms rotating audit committee and 1,676 firms not rotating; and 1,358 firm with accounting experts on audit committee and 754 firms which have no accounting expert.

Replicating Model 1, Table 18 presents regression results using only major samples of each TCWG. Column 1 shows that the regression results from the sample set of low potential manipulators. The results support H1b and show insignificant association between audit committee's characteristics and audit quality which is in line with the main findings in Table 6. Using only non-family firms, Column 2 presents that H1a is supported while H1c and H1d remain insignificant. Column 3 uses samples which has no audit committee rotation. Column 4 uses samples which has at least one accounting expert on audit committee. Both Column 3 and 4 show the negative association between management's manipulation risk and audit quality and present no evidence to support H1c and H1d. This additional test of major samples confirm that the main results is valid and robusted after eliminating possible outliers. In conclusion, this analysis confirms that the main results are primarily driven by TCWG characteristics, not because of the auditor type.

Table 18 Additional test for H1: Potential influential observations

$$AQ_{i,t} = \beta_0 + \beta_1 \boldsymbol{MANIPULATE}_{i,t} + \beta_2 \boldsymbol{FAMILY}_{i,t} + \beta_3 \boldsymbol{AC\_ROT}_{i,t} + \beta_4 \boldsymbol{AC\_ACC}_{i,t}$$
$$+ \beta_5 Log\_Asset_{i,t} + \beta_6 OCF_{i,t} + \beta_7 LEVERAGE_{i,t} + \beta_8 MB_{i,t} + \beta_9 ROA_{i,t}$$
$$+ \beta_{10} BIG4_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Samples Dependent variable	**Test**	**Exp. Sign**	**H1** ***MANIPULATE*=0** *AQ*	**H1** ***FAMILY*=1** *AQ*	**H1** ***AC_ROT*=0** *AQ*	**H1** ***AC_ACC*=1** *AQ*
Constant			-0.0857***	-0.0594***	-0.0571***	-0.0625***
			0.0000	(0.0044)	(0.0021)	(0.0029)
MANIPULATE	H1a	-		**-0.0118*** **	**-0.00996** **	**-0.00766***
				(0.0077)	**(0.0143)**	**(0.0722)**
FAMILY	H1b	+	**0.0102***		**0.00177**	**0.00251**
			(0.0573)		**(0.6089)**	**(0.5077)**
AC_ROT	H1c	+	**-0.0108**	**0.0010**		**-0.00566**
			(0.1405)	**(0.8063)**		**(0.1719)**
AC_ACC	H1d	+	**0.0012**	**0.0007**	**0.0019**	
			(0.8166)	**(0.8402)**	**(0.5438)**	
Log_Asset		+	0.0041***	0.0025*	0.0025**	0.0027**
			0.0000	(0.0659)	(0.0404)	(0.0483)
OCF		+	-0.511***	0.381***	0.398***	0.364***
			0.0000	0.0000	0.0000	0.0000
LEVERAGE		-	-0.0148**	-0.0181**	-0.0152*	-0.0139*
			(0.0337)	(0.0446)	(0.0566)	(0.0818)
MB		-	-0.00273***	-0.00425***	-0.00408***	-0.00418***
			(0.0025)	(0.0020)	(0.0013)	(0.0004)
ROA		+	0.2380***	0.1050***	0.0971***	0.08660***
			0.0000	(0.0052)	(0.0006)	(0.0029)
BIG4		+	0.0000	0.0045	0.0054	0.0012
			(0.9980)	(0.2256)	(0.1194)	(0.7471)
Industry fixed effect included			Yes	Yes	Yes	Yes
Year fixed effect included			Yes	Yes	Yes	Yes
N			1,750	1,387	1,676	1,358
R-sq			0.4050	0.2532	0.2659	0.2704
F-statistics			30.07	14.07	16.36	14.38
Prob>F			0.0000	0.0000	0.0000	0.0000

Note: All variable definitions are defined in Table 3, except *Log_Asset* which is the log of total assets and except **TCWG variables**. *MANIPULATE* = 1 if the M-score from Beneish (1999) Model is higher than -1.78 and 0 otherwise. *FAMILY* = 1 if the percentage of equity owned by family management is greater than 20% and 0 otherwise. *AC_ROT* = 1 if there is at least one audit committee or newly appointed audit committee in the fiscal year. *AC_ACC* = 1 if there is at least one committee who has accounting knowledge to total audit committees.Continuous variables are winsorized at 1st and 99th percentile. P-values in parentheses are robust to heteroscedasticity. ***, **, * indicate significant level at 1%, 5%, and 10%, respectively (two-tailed test)

5.3.2 Additional test for H2

For the additional test of H2, there are several possible arguments about this hypothesis because it is an archival study for a specific event period of new auditing standards transformation. First of all, there may be a confounding effect from the change in other accounting standards during the event period. Not only auditing standards that may cause change in level of audit quality, the accounting standards may also influence audit quality. Second, audit quality in the period before and after the TSAs implementation may be influenced by both auditors and TCWG (3-interaction term). In order to maintain their standards to be conformed with the other Big4 firms globally, the Big4 auditors in Thailand have been trained and working under the revised international auditing standards (ISAs) since 2009 when the ISAs is firstly implemented worldwide. Third, the analysis of two-year time period during the transition year (2011 vs. 2012) is performed to compare audit quality during the transition years. Fourth, excluding the transition year, Model 2 is replicated using the samples from the pre-adoption period in 2009-2010 and the post adoption period (2013-2014). Finally, alternative measures of TCWG characteristics are used to regress Model 2a to 2d.

(A) Confounding effects from change in accounting standards

It is possible that other changes occur during the same timeframe as the revised TSAs adoption regime. To my knowledge, there are three major changes in the accounting standards during the sample period 2009-2014. TAS40, *Investment Property*, has been revised in 2009 (B.E. 2552) and 2014 (B.E. 2557). TAS12, *Income Taxes*, has been revised in 2009 (B.E. 2552) and 2012 (B.E. 2555). This standard requires an entity to recognize a deferred tax asset or a deferred tax liability in the statements of financial position. TAS19, *Employee Benefits*, has been revised in 2009

(B.E. 2552) and 2012 (B.E. 2555). TAS21[13], *The Effect of Changes in Foreign Currency Rate*, has been revised in 2011 and effective in 2014. To mitigate the confounding effect, the following model is used to extract the effect of the three accounting standards changes, except for TAS21, from discretionary accruals and group them as parts of non-discretionary accruals. Thus, the portion of non-discretionary accruals includes net change in revenues, property plant and equipment, investment property, deferred tax assets, deferred tax liability, and accrued employee benefits. The negated absolute residual from the following regression model is used as a proxy for audit quality in this additional test.

$$Accr_{i,t} = \alpha_0 + \alpha_1 (1 / TA_{i,t-1}) + \alpha_2(\Delta REV_{i,t} - \Delta REC_{i,t}) + \alpha_3 PPE_{i,t} + \alpha_4 ROA_{i,t} + \alpha_5 IP_{i,t} + \alpha_6 DTA_{i,t} + \alpha_7 DTL_{i,t} + \alpha_8 EB_{i,t} + \varepsilon_{i,t}$$

Where:

Variables are the same as defined in Section 4.2, except

$IP_{i,t}$ = net investment property for firm i year t scaled by total asset (TAS40)

$DTA_{i,t}$ = deferred tax assets for firm i year t scaled by total asset (TAS12)

$DTL_{i,t}$ = deferred tax liabilities for firm i year t scaled by total asset (TAS12)

$EB_{i,t}$ = accrued employee benefit for firm i year t scaled by total asset (TAS19)

[13] TAS21 "*The Effects of Changes in Foreign Currency Rate*" has been revised and become effective on January 1st, 2014. The difference between reporting currency and functional currency is recorded in other comprehensive income which has an effect on net operating cash flow used in Kothari et al. (2005)'s model. However, there are only a few listed companies applied TAS21 such as PTT Exploration and Production Public Company Limited, Precious Shipping Public Company Limited, Regional Container Lines Plc., and Jutha Maritime Public Company Limited. Thus, this paper waives to include the effect of TAS21 when examining confounding effects from accounting standards changes.

Table 19 presents the results from replicating Model 2a to 2d using the alternative measure of audit quality. The results are generally consistent with the main test in Section 5.2.2. Similar results for H2a in Table 8, the joint test shows that management with high risk of manipulation lower degree of audit quality by 3.06% after the revised TSAs adoption which is higher than the effect during the pre-adoption period (1.92%). Supporting H2b, the joint test presents significantly positive coefficient at 5% level, suggesting that audit quality improves greater for firms monitored by higher family ownership concentration after the revised TSAs adoption, as compared to the pre-adoption period. However, the association of audit quality and audit committees' characteristics remain insignificant which is also consistent with the main findings.

(B) Big4 and non-Big4 samples

The notion behind this additional test for H2 is the same as described in Section 5.3.1 (A) for H1. Firstly, the 3-interaction terms (*POST*BIG4*TCWG*) are performed to analyze the effect of TCWG characteristics and auditor types on audit quality in the post-TSAs adoption period. The following models; 8a, 8b, 8c, and 8d, are used to perform 3-way interaction terms for H2a, H2b, H2c, and H2d respectively.

$$AQ_{i,t} = \beta_0 + \beta_1 POST_i + \beta_2 BIG4_{i,t} + \beta_3 \boldsymbol{MANIPULATE}_{i,t} + \beta_4 (POST_{i,t} * BIG4_{i,t}) + \beta_5 (POST_{i,t} * \boldsymbol{MANIPULATE}_{i,t}) + \beta_6 (BIG4_{i,t} * \boldsymbol{MANIPULATE}_{,i,t}) + \beta_7 (POST_i * BIG4_{i,t} * \boldsymbol{MANIPULATE}_{i,t}) + \beta_8 Log\_Asset_{i,t} + \beta_9 OCF_{i,t} + \beta_{10} LEVERAGE_{i,t} + \beta_{11} MB_{i,t} + \beta_{12} ROA_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \quad (8a)$$

$$AQ_{i,t} = \beta_0 + \beta_1 POST_i + \beta_2 BIG4_{i,t} + \beta_3 \boldsymbol{FAMILY}_{i,t} + \beta_4 (POST_{i,t} * BIG4_{i,t}) + \beta_5 (POST_{i,t} * \boldsymbol{FAMILY}_{i,t}) + \beta_6 (BIG4_{i,t} * \boldsymbol{FAMILY}_{i,t}) + \beta_7 (POST_i * BIG4_{i,t} * \boldsymbol{FAMILY}_{i,t}) + \beta_8 Log\_Asset_{i,t} + \beta_9 OCF_{i,t} + \beta_{10} LEVERAGE_{i,t} + \beta_{11} MB_{i,t} + \beta_{12} ROA_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \quad (8b)$$

Table 19 Additional test for H2: Confounding effects – Accounting standards change

Model ***Dependent var.*** ***TCWG var.***	**Test**	**Exp. Sign**	*AQ*	**(H2a)** **Model 2a** *AQ* *MANIPULATE*	**(H2b)** **Model 2b** *AQ* *FAMILY*	**(H2c)** **Model 2c** *AQ* *AC_ROT*	**(H2d)** **Model 2d** *AQ* *AC_ACC*
Constant			-0.0751***	-0.0703***	-0.0777***	-0.0751***	-0.0748***
			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Change audit task variable							
POST		+	-0.0227***	-0.0197***	-0.0286***	-0.0218***	-0.0248***
			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
TCWG characteristics variables							
TCWG		-,+,+,+		-0.0192***	-0.0003	-0.0003	-0.0025
				(0.0000)	(0.9640)	(0.9630)	(0.6280)
*POST*TCWG*	H2	-,+,+,+		**-0.0114***	**0.0161****	**-0.0109**	**0.0077**
				(0.0860)	**(0.0480)**	**(0.3020)**	**(0.3710)**
Control variables							
Log_Asset		+	0.0036***	0.0034***	0.0037***	0.0036***	0.0036***
			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
OCF		+	0.1086***	0.1385***	0.1094***	0.1100***	0.1085***
			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
LEVERAGE		-	-0.0041	-0.0053	-0.0046	-0.0044	-0.0042
			(0.4450)	(0.3150)	(0.3900)	(0.4120)	(0.4350)
MB		-	-0.0026***	-0.0025***	-0.0026***	-0.0025***	-0.0026***
			(0.0020)	(0.0030)	(0.0020)	(0.0020)	(0.0020)
ROA		+	-0.0013	0.0300	0.0001	-0.0009	-0.0017
			(0.9450)	(0.1080)	(0.9940)	(0.9630)	(0.9270)
BIG4		-	0.0007	0.0005	0.0009	0.0005	0.0006
			(0.7750)	(0.8380)	(0.6910)	(0.8250)	(0.7910)
Joint tests							
TCWG	H2	-,+,+,+		**-0.0306*****	**0.0158****	**-0.0112**	**0.0052**
+(POST*TCWG)				**(0.0000)**	**(0.0168)**	**(0.1869)**	**(0.4470)**
Industry fixed effect included			Yes	Yes	Yes	Yes	Yes
Year fixed effect included			Yes	Yes	Yes	Yes	Yes
N			2,112	2,112	2,112	2,112	2,112
R-sq			0.1056	0.1393	0.1085	0.1067	0.1060
F-statistics			10.70	11.57	9.67	9.62	9.62
Prob>F			0.0000	0.0000	0.0000	0.0000	0.0000

Note: - Variable definitions are defined in Table 3, except *Log_Asset* which is the log of total assets, and except that audit quality is estimated from minus one multiple with the residuals from the following model

$Accr_{i,t} = \alpha_0 + \alpha_1 (1 / TA_{i,t-1}) + \alpha_2(\Delta REV_{i,t} - \Delta REC_{i,t}) + \alpha_3 PPE_{i,t} + \alpha_4 ROA_{i,t} + \alpha_5 IP_{i,t} + \alpha_6 DTA_{i,t} + \alpha_7 DTL_{i,t} + \alpha_8 EB_{i,t} + \varepsilon_{i,t}$

- Continuous variables are winsorized at 1st and 99th percentile.
- P-values in parentheses are robust to heteroscedasticity.
- ***, **, * indicate significant level at 1%, 5%, and 10%, respectively (two-tailed test).
- TCWG variables represent *MANIPULATE* for H2a, *FAMILY* for H2b, *AC_ROT* for H2c, and *AC_ACC* for H2d.

$$AQ_{i,t} = \beta_0 + \beta_1 POST_i + \beta_2 BIG4_{i,t} + \beta_3 \mathbf{AC\_ROT}_{i,t} + \beta_4 (POST_{i,t} * BIG4_{i,t})$$
$$+ \beta_5 (POST_{i,t} * \mathbf{AC\_ROT}_{i,t}) + \beta_6 (BIG4_{i,t} * \mathbf{AC\_ROT}_{i,t}) + \beta_7 (POST_i * BIG4_{i,t} * \mathbf{AC\_ROT}_{i,t})$$
$$+ \beta_8 Log\_Asset_{i,t} + \beta_9 OCF_{i,t} + \beta_{10} LEVERAGE_{i,t} + \beta_{11} MB_{i,t} + \beta_{12} ROA_{i,t}$$
$$+ \text{Industry indicators} + \text{Firm year indicators} + \varepsilon_{i,t} \ldots\ldots (8c)$$

$$AQ_{i,t} = \beta_0 + \beta_1 POST_i + \beta_2 BIG4_{i,t} + \beta_3 \mathbf{AC\_ACC}_{i,t} + \beta_4 (POST_{i,t} * BIG4_{i,t})$$
$$+ \beta_5 (POST_{i,t} * \mathbf{AC\_ACC}_{i,t}) + \beta_6 (BIG4_{i,t} * \mathbf{AC\_ACC}_{i,t}) + \beta_7 (POST_i * BIG4_{i,t} * \mathbf{AC\_ACC}_{i,t})$$
$$+ \beta_8 Log\_Asset_{i,t} + \beta_9 OCF_{i,t} + \beta_{10} LEVERAGE_{i,t} + \beta_{11} MB_{i,t} + \beta_{12} ROA_{i,t}$$
$$+ \text{Industry indicators} + \text{Firm year indicators} + \varepsilon_{i,t} \ldots\ldots (8d)$$

Table 20 presents results for the three-way interaction terms. The three-interaction terms are not significant for H2a, H2c, and H2d. Only the three interaction terms for family ownership (*POST*BIG4*FAMILY*) has a slightly negative significance at 10% level. However, the results of two-way interaction terms between *POST* and *TCWG* (β_5) remain unchanged after controlling the effect of auditor type. In addition, there is a positive significance association between audit committee's accounting expertise and audit quality when performing three-way interaction ($\beta_5 = 0.0323$).

Using Model 9a to 9d, the separate regression analyses between Big4 samples in Table 21 and non-Big4 samples in Table 22 are performed to apparently explain this additional association.

$$AQ_{i,t} = \beta_0 + \beta_1 POST_{i,t} + \beta_2 \mathbf{MANIPULATE}_{i,t} + \beta_3 (POST_{i,t} * \mathbf{MANIPULATE}_{i,t})$$
$$+ \beta_4 Log\_Asset_{i,t} + \beta_5 OCF_{i,t} + \beta_6 LEVERAGE_{i,t} + \beta_7 MB_{i,t} + \beta_8 ROA_{i,t}$$
$$+ \text{Industry indicators} + \text{Firm year indicators} + \varepsilon_{i,t} \ldots\ldots (9a)$$

$$AQ_{i,t} = \beta_0 + \beta_1 POST_{i,t} + \beta_2 \mathbf{FAMILY}_{i,t} + \beta_3 (POST_{i,t} * \mathbf{FAMILY}_{i,t})$$
$$+ \beta_4 Log\_Asset_{i,t} + \beta_5 OCF_{i,t} + \beta_6 LEVERAGE_{i,t} + \beta_7 MB_{i,t} + \beta_8 ROA_{i,t}$$
$$+ \text{Industry indicators} + \text{Firm year indicators} + \varepsilon_{i,t} \ldots\ldots (9b)$$

$$AQ_{i,t} = \beta_0 + \beta_1 POST_{i,t} + \beta_2 \mathbf{AC\_ROT}_{i,t} + \beta_3 (POST_{i,t} * \mathbf{AC\_ROT}_{i,t}) + \beta_4 Log\_Asset_{i,t} + \beta_5 OCF_{i,t} + \beta_6 LEVERAGE_{i,t} + \beta_7 MB_{i,t} + \beta_8 ROA_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \quad (9c)$$

$$AQ_{i,t} = \beta_0 + \beta_1 POST_{i,t} + \beta_2 \mathbf{AC\_ACC}_{i,t} + \beta_3 (POST_{i,t} * \mathbf{AC\_ACC}_{i,t}) + \beta_4 Log\_Asset_{i,t} + \beta_5 OCF_{i,t} + \beta_6 LEVERAGE_{i,t} + \beta_7 MB_{i,t} + \beta_8 ROA_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \quad (9d)$$

The results, presented in Table 21 and Table 22, are not much different from prior analyses, except that the last Column of Table 22. It shows that coefficient of the interaction term of Model 2d between *POST* and *AC_ACC* (β_2 = 0.0344) and the joint test of *AC_ACC+(POST*AC_ACC)* ($\beta_2 + \beta_3$ = 0.0324) are positively significant at 5% level. This outcome reveals that, when the company is audited by non-Big4 auditors, audit committee with accounting expertise plays an important role in increasing level of audit quality. In conclusion, the findings from non-Big4 samples in Table 22 supports H2a, H2b, and H2d. The results from Big4 samples in Table 21 only support H2a, revealing that the revised TSAs adoption has a greater impact on non-Big4 auditors. It is possible that Big4 auditors have adopted the revised ISAs since 2009 when ISAs have initially launched internationally.

Table 20 Additional test for H2: Three-way interaction terms

Model ***Dependent var.*** ***TCWG var.***	**Test**	**Exp. Sign**	*AQ*	**(H2a) Model 8a** *AQ* *MANIPULATE*	**(H2b) Model 8b** *AQ* *FAMILY*	**(H2c) Model 8c** *AQ* *AC_ROT*	**(H2d) Model 8d** *AQ* *AC_ACC*
Constant			-0.0768***	-0.0719***	-0.0776***	-0.0766***	-0.0764***
			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Change audit task variable							
POST		+	-0.0094	-0.0020	-0.0271***	-0.0081	-0.0179**
			(0.1120)	(0.7400)	(0.0030)	(0.1990)	(0.0180)
Auditor Type							
BIG4		+	-0.0002	-0.0005	-0.0088	0.0007	0.0014
			(0.9500)	(0.9020)	(0.1530)	(0.8620)	(0.7870)
*POST*BIG4*			0.0044	0.0017	0.0207**	0.0023	0.0114
			(0.4110)	(0.7500)	(0.0380)	(0.6950)	(0.1600)
TCWG characteristics variables							
TCWG	H1	-,+,+,+		-0.0161**	-0.011	-0.0014	-0.0018
				(0.0500)	(0.2860)	(0.9070)	(0.8540)
*POST*TCWG*	H2	-,+,+,+		**-0.0310****	**0.0455*****	**-0.0139**	**0.0323***
				(0.0110)	**(0.0080)**	**(0.5460)**	**(0.0510)**
*BIG4*TCWG*		None		0.0054	0.0233*	-0.0145	-0.0059
				(0.6120)	(0.0900)	(0.4630)	(0.6540)
*POST*BIG4*TCWG*		-,+,+,+		0.0025	-0.0423*	0.0238	-0.0274
				(0.8830)	(0.0610)	(0.4570)	(0.2160)
Control variables							
Log_Asset		+	0.0034***	0.0033***	0.0037***	0.0034***	0.0035***
			(0.0010)	(0.0010)	0.0000	(0.0010)	(0.0010)
OCF		+	0.3468***	0.3836***	0.3490***	0.3484***	0.3463***
			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
LEVERAGE		-	-0.0105	-0.0127*	-0.0116*	-0.0109	-0.0111
			(0.1280)	(0.0610)	(0.0910)	(0.1090)	(0.1040)
MB		-	-0.0040***	-0.0038***	-0.0039***	-0.0039***	-0.0040***
			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
ROA		+	0.0682***	0.1044***	0.0693***	0.0685***	0.0659***
			(0.0040)	(0.0000)	(0.0040)	(0.0030)	(0.0050)
Industry fixed effect included			Yes	Yes	Yes	Yes	Yes
Year fixed effect included			Yes	Yes	Yes	Yes	Yes
N			2,112	2,112	2,112	2,112	2,112
R-sq			0.2434	0.2724	0.2482	0.2444	0.2458
F-statistics			20.77	19.06	17.47	17.11	17.46
Prob>F			0.0000	0.0000	0.0000	0.0000	0.0000

Note: - Variable definitions are defined in Table 3, except *Log_Asset* which is the log of total assets.
- Continuous variables are winsorized at 1st and 99th percentile.
- P-values in parentheses are robust to heteroscedasticity.
- ***, **, * indicate significant level at 1%, 5%, and 10%, respectively (two-tailed test).
- TCWG variables represent *MANIPULATE* for H2a, *FAMILY* for H2b, *AC_ROT* for H2c, and *AC_ACC* for H2d.

Table 21 Additional test for H2: Big 4 auditors

Model **Dependent var.** **TCWG var.**	**Test**	**Exp. Sign**	*AQ*	**(H2a) Model 9a** *AQ* *MANIPULATE*	**(H2b) Model 9b** *AQ* *FAMILY*	**(H2c) Model 9c** *AQ* *AC_ROT*	**(H2d) Model 9d** *AQ* *AC_ACC*
Constant			-0.0774***	-0.0727***	-0.0878***	-0.0764***	-0.0709***
			(0.0000)	(0.0010)	(0.0000)	(0.0000)	(0.0010)
Change audit task variable							
POST		+	-0.0054	-0.0002	-0.0067	-0.0061	-0.0078
			(0.4370)	(0.9690)	(0.4170)	(0.3810)	(0.3280)
TCWG characteristics variables							
TCWG		-,+,+,+		-0.0124*	0.0113	-0.0132	-0.0125
				(0.0710)	(0.2340)	(0.3310)	(0.1930)
*POST*TCWG*	H2	-,+,+,+		**-0.0252****	**0.0050**	**0.0086**	**0.0082**
				(0.0310)	**(0.7160)**	**(0.6590)**	**(0.5740)**
Control variables							
Log_Asset		+	0.0029**	0.0027**	0.0032**	0.0029**	0.0027**
			(0.0300)	(0.0410)	(0.0160)	(0.0280)	(0.0400)
OCF		+	0.3530***	0.3850***	0.3510***	0.3540***	0.3530***
			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
LEVERAGE		-	0.0007	-0.0006	-0.0013	-0.0005	0.0012
			(0.9430)	(0.9560)	(0.9000)	(0.9610)	(0.9110)
MB		-	-0.0044***	-0.0043***	-0.0047***	-0.0043***	-0.0044***
			(0.0010)	(0.0020)	(0.0010)	(0.0000)	(0.0020)
ROA		+	0.1800***	0.2110***	0.1830***	0.1770***	0.1790***
			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Joint tests							
TCWG	H2	-,+,+,+		**-0.0376*****	**0.0163**	**-0.0046**	**-0.0043**
*+(POST*TCWG)*				**(0.0000)**	**(0.1295)**	**(0.7302)**	**(0.6979)**
Industry fixed effect included			Yes	Yes	Yes	Yes	Yes
Year fixed effect included			Yes	Yes	Yes	Yes	Yes
N			1,135	1,135	1,135	1,135	1,135
R-sq			0.2407	0.2644	0.2432	0.2415	0.2419
F-statistics			14.10	13.83	12.70	12.56	12.71
Prob>F			0.0000	0.0000	0.0000	0.0000	0.0000

Note: - Variable definitions are defined in Table 3, except *Log_Asset* which is the log of total assets.
- Continuous variables are winsorized at 1st and 99th percentile.
- P-values in parentheses are robust to heteroscedasticity.
- ***, **, * indicate significant level at 1%, 5%, and 10%, respectively (two-tailed test).
- TCWG variables represent *MANIPULATE* for H2a, *FAMILY* for H2b, *AC_ROT* for H2c, and *AC_ACC* for H2d.

Table 22 Additional test for H2: Non-Big 4 auditors

Model **Dependent Var.** **TCWG Var.**	**Test**	**Exp. Sign**	*AQ*	**(H2a) Model 9a** *AQ* *MANIPULATE*	**(H2b) Model 9b** *AQ* *FAMILY*	**(H2c) Model 9c** *AQ* *AC_ROT*	**(H2d) Model 9d** *AQ* *AC_ACC*
Constant			-0.0843***	-0.0777***	-0.0872***	-0.0842***	-0.0851***
			(0.0010)	(0.0020)	(0.0010)	(0.0010)	(0.0010)
Change audit task variable							
POST		+	-0.0087	-0.0014	-0.0286***	-0.0075	-0.0179*
			(0.2820)	(0.8570)	(0.0050)	(0.3740)	(0.0550)
TCWG characteristics variables							
TCWG		-,+,+,+		-0.0150*	-0.0104	-0.0004	-0.0020
				(0.0820)	(0.3170)	(0.9730)	(0.8300)
*POST*TCWG*	H2	-,+,+,+		**-0.0351*** **	**0.0489*** **	**-0.0132**	**0.0344** **
				(0.0060)	**(0.0060)**	**(0.5890)**	**(0.0430)**
Control variables							
Log_Asset		+	0.0035**	0.0033**	0.0040**	0.0036**	0.0038**
			(0.0390)	(0.0470)	(0.0220)	(0.0400)	(0.0300)
OCF		+	0.3640***	0.4070***	0.3710***	0.3660***	0.3640***
			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
LEVERAGE		-	-0.0080	-0.0115	-0.0088	-0.0082	-0.0092
			(0.4030)	(0.2200)	(0.3560)	(0.3860)	(0.3310)
MB		-	-0.0038***	-0.0037***	-0.0035***	-0.0037***	-0.0038***
			(0.0030)	(0.0030)	(0.0060)	(0.0030)	(0.0030)
ROA		+	0.0225	0.0608**	0.0219	0.0232	0.0198
			(0.3900)	(0.0300)	(0.4070)	(0.3730)	(0.4510)
Joint tests							
TCWG	H2	-,+,+,+		**-0.0501*** **	**0.0385*** **	**-0.0136**	**0.0324** **
*+(POST*TCWG)*				**(0.0000)**	**(0.0099)**	**(0.5276)**	**(0.0208)**
Industry fixed effect included				Yes	Yes	Yes	Yes
Year fixed effect included				Yes	Yes	Yes	Yes
N				977	977	977	977
R-sq				0.2683	0.3037	0.2763	0.2691	0.2730
F-statistics				12.84	13.33	11.88	11.38	11.89
Prob>F				0.0000	0.0000	0.0000	0.0000	0.0000

Note: - Variable definitions are defined in Table 3, except *Log_Asset* which is the log of total assets.
- Continuous variables are winsorized at 1st and 99th percentile.
- P-values in parentheses are robust to heteroscedasticity.
- ***, **, * indicate significant level at 1%, 5%, and 10%, respectively (two-tailed test).
- TCWG variables represent *MANIPULATE* for H2a, *FAMILY* for H2b, *AC_ROT* for H2c, and *AC_ACC* for H2d.

(C) Event period (2011 vs. 2012)

In this section, the sample includes only observations during the event period transformation from 2011 to 2012 in order to present specific point of adoption time period. The results from Model 2a to 2d, presented in Table 23, show insignificant association for H2a, H2c, and H2d. However, the result for H2b is consistent with the main result, indicating that family managers are associated in increasing level of audit quality after the revised TSAs adoption period.

(D) Excluding event period (2009-2010 vs. 2013-2014)

Since the effect of TCWG characteristics during the event period is not highly pronounced, this section shifts the period of interest to the years around the event period using Model 2a to 2d. The results, reported in Table 24, inform that the management's risk of manipulation significantly and marginally decreases audit quality in the period before and after the revised TSAs adoption. From Table 23 and Table 24, it can be concluded that the effect of significant negative association of management's manipulation risk on audit quality (H2a) is strongly supported during non-event period interval (2009-2010 vs. 2013-2014). Besides, the significant positive association between management's family ownership and audit quality exists during the event period (2011-2012).

Table 23 Additional test for H2: Event period (2011 vs. 2012)

Model **Dependent Var.** **TCWG Var.**	**Test**	**Exp. Sign**	*AQ*	**(H2a) Model 2a** *AQ* *MANIPULATE*	**(H2b) Model 2b** *AQ* *FAMILY*	**(H2c) Model 2c** *AQ* *AC_ROT*	**(H2d) Model 2d** *AQ* *AC_ACC*
Constant			-0.0256	-0.0233	-0.0296	-0.0266	-0.0294
			(0.2740)	(0.3240)	(0.2040)	(0.2550)	(0.2190)
Change audit task variable							
POST		+	-0.0015	-0.0024	-0.0105*	0.0002	-0.0039
			(0.6800)	(0.5520)	(0.0780)	(0.9520)	(0.5030)
TCWG characteristics variables							
TCWG		-,+,+,+		-0.0080	-0.0004	0.0078	0.0044
				(0.2990)	(0.9730)	(0.5520)	(0.6930)
*POST*TCWG*	H2	-,+,+,+		**0.0052**	**0.0247***	**-0.0195**	**0.0085**
				(0.5890)	**(0.0870)**	**(0.3150)**	**(0.5820)**
Control variables							
Log_Asset		+	0.0009	0.0009	0.0011	0.001	0.0011
			(0.5290)	(0.5560)	(0.4740)	(0.5170)	(0.4550)
OCF		+	0.4515***	0.4578***	0.4514***	0.4526***	0.4508***
			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
LEVERAGE		-	-0.0191**	-0.0193**	-0.0193**	-0.0187**	-0.0196**
			(0.0350)	(0.0350)	(0.0340)	(0.0390)	(0.0320)
MB		-	-0.0016	-0.0016	-0.0017	-0.0016	-0.0016
			(0.2080)	(0.2140)	(0.1860)	(0.2060)	(0.2090)
ROA		+	0.0359	0.0434	0.0401	0.0371	0.0359
			(0.2390)	(0.1650)	(0.1990)	(0.2200)	(0.2430)
BIG4		-	0.0046	0.0048	0.0053	0.0045	0.0042
			(0.2740)	(0.2580)	(0.2150)	(0.2940)	(0.3210)
Joint tests							
TCWG	H2	-,+,+,+		**-0.0028**	**0.0243****	**-0.0117**	**0.0129**
*+(POST*TCWG)*				**(0.6590)**	**(0.0173)**	**(0.3811)**	**(0.2158)**
Industry fixed effect included			Yes	Yes	Yes	Yes	Yes
N			704	704	704	704	704
R-sq			0.3833	0.3846	0.3878	0.3842	0.3847
F-statistics			16.15	14.10	14.97	14.03	14.01
Prob>F			0.0000	0.0000	0.0000	0.0000	0.0000

Note: - Variable definitions are defined in Table 3, except *Log_Asset* which is the log of total assets.
- Continuous variables are winsorized at 1st and 99th percentile.
- P-values in parentheses are robust to heteroscedasticity.
- ***, **, * indicate significant level at 1%, 5%, and 10%, respectively (two-tailed test).
- TCWG variables represent *MANIPULATE* for H2a, *FAMILY* for H2b, *AC_ROT* for H2c, and *AC_ACC* for H2d.

Table 24 Additional test for H2: Excluding event period (2009-2010 vs. 2013-2014)

Model **Dependent Var.** **TCWG Var.**	**Test**	**Exp. Sign**	*AQ*	**(H2a) Model 2a** *AQ* *MANIPULATE*	**(H2b) Model 2b** *AQ* *FAMILY*	**(H2c) Model 2c** *AQ* *AC_ROT*	**(H2d) Model 2d** *AQ* *AC_ACC*
Constant			-0.0938***	-0.0908***	-0.0994***	-0.0924***	-0.0920***
			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Change audit task variable							
POST		+	-0.0034	0.0068	-0.0096	-0.0038	-0.0085
			(0.5110)	(0.1730)	(0.1860)	(0.4840)	(0.1870)
TCWG characteristics variables							
TCWG		-,+,+,+		-0.0165**	0.0037	-0.0154	-0.0081
				(0.0240)	(0.6990)	(0.2210)	(0.3500)
*POST*TCWG*	H2	-,+,+,+		**-0.0543*** **	**0.0170**	**0.0050**	**0.0193**
				(0.0000)	**(0.2430)**	**(0.8110)**	**(0.1970)**
Control variables							
Log_Asset		+	0.0044***	0.0044***	0.0046***	0.0044***	0.0044***
			(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
OCF		+	0.3070***	0.3580***	0.3090***	0.3080***	0.3080***
			(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
LEVERAGE		-	-0.0063	-0.0090	-0.0070	-0.0066	-0.0065
			(0.4930)	(0.3200)	(0.4460)	(0.4720)	(0.4820)
MB		-	-0.0050***	-0.0045***	-0.0050***	-0.0049***	-0.0050***
			(0.0000)	(0.0010)	(0.0000)	(0.0000)	(0.0000)
ROA		+	0.0935***	0.1360***	0.0945***	0.0943***	0.0923***
			(0.0040)	(0.0000)	(0.0040)	(0.0040)	(0.0050)
BIG4		-	0.0001	-0.0012	0.0004	-0.0004	0.0001
			(0.9870)	(0.7530)	(0.9210)	(0.9190)	(0.9850)
Joint tests							
TCWG *+(POST*TCWG)*	H2	-,+,+,+		**-0.0708*** ** **(0.0000)**	**0.0207*** **(0.0860)**	**-0.0104** **(0.5379)**	**0.0112** **(0.3515)**
Industry fixed effect included			Yes	Yes	Yes	Yes	Yes
Year fixed effect included			Yes	Yes	Yes	Yes	Yes
N			1408	1408	1408	1408	1408
R-sq			0.1955	0.2584	0.1979	0.1968	0.1964
F-statistics			13.23	15.10	11.90	11.80	11.93
Prob>F			0.0000	0.0000	0.0000	0.0000	0.0000

Note: - Variable definitions are defined in Table 3, except *Log_Asset* which is the log of total assets.
- Continuous variables are winsorized at 1st and 99th percentile.
- P-values in parentheses are robust to heteroscedasticity.
- ***, **, * indicate significant level at 1%, 5%, and 10%, respectively (two-tailed test).
- TCWG variables represent *MANIPULATE* for H2a, *FAMILY* for H2b, *AC_ROT* for H2c, and *AC_ACC* for H2d.

(E) Alternative measures of TCWG

This additional tests use alternative measures of TCWG characteristics. The measurement of TCWG characteristics in this section is defined in Section 5.3.1 (B) or in Table 15. To perform robustness for H2a, the three alternative measures of management's manipulation risk are quartile M-score (Model 10a), median M-score (Model 10b) and lagged M-score (Model 10c). Column 1, 2 and 3 of Table 25 present regression results for Model 10a, 10b and 10c respectively.

$$AQ_{i,t} = \beta_0 + \beta_1 POST_{i,t} + \beta_2 \boldsymbol{MANIPULATE\_Q}_{i,t} + \beta_3 (POST_{i,t} * \boldsymbol{MANIPULATE\_Q}_{i,t}) + \beta_4 Log\_Asset_{i,t} + \beta_5 OCF_{i,t} + \beta_6 LEVERAGE_{i,t} + \beta_7 MB_{i,t} + \beta_8 ROA_{i,t} + \beta_9 BIG4_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \quad \text{(10a)}$$

$$AQ_{i,t} = \beta_0 + \beta_1 POST_{i,t} + \beta_2 \boldsymbol{MANIPULATE\_M}_{i,t} + \beta_3 (POST_{i,t} * \boldsymbol{MANIPULATE\_M}_{i,t}) + \beta_4 Log\_Asset_{i,t} + \beta_5 OCF_{i,t} + \beta_6 LEVERAGE_{i,t} + \beta_7 MB_{i,t} + \beta_8 ROA_{i,t} + \beta_9 BIG4_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \quad \text{(10b)}$$

$$AQ_{i,t} = \beta_0 + \beta_1 POST_{i,t} + \beta_2 \boldsymbol{MANIPULATE\_L}_{i,t} + \beta_3 (POST_{i,t} * \boldsymbol{MANIPULATE\_L}_{i,t}) + \beta_4 Log\_Asset_{i,t} + \beta_5 OCF_{i,t} + \beta_6 LEVERAGE_{i,t} + \beta_7 MB_{i,t} + \beta_8 ROA_{i,t} + \beta_9 BIG4_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \quad \text{(10c)}$$

The results in Table 25 show that the main finding for H2a is hold using quartile M-score and median M-score but there is no significant association between lagged M-score and audit quality after the revised TSAs adoption. These findings ensure that quartile M-score is another effective measure of management's manipulation risk. Table 26 presents that the results for H2b, H2c, H2c using alternative binary variables are consistent with the main findings in Table 8.

Table 25 Additional test for H2: Alternative measures of TCWG characteristics (H2a)

Model **Dependent Var.** **TCWG Var.**	**Test**	**Exp. Sign**	**(H2a)** **Model 10a** *AQ* *MANIPULATE_Q*	**(H2a)** **Model 10b** *AQ* *MANIPULATE_M*	**(H2a)** **Model 10c** *AQ* *MANIPULATE_L*
Constant			-0.0594** (0.0272)	-0.0789*** (0.0000)	-0.0414** (0.0179)
Change audit task variable					
POST		+	-0.0241** (0.0102)	-0.0004 (0.9364)	0.0051 (0.2346)
TCWG characteristics variables					
TCWG		-	0.0010 (0.8577)	0.0057 (0.1179)	0.0058 (0.2848)
*POST*TCWG*	H2	-	**-0.0329***** **(0.0005)**	**-0.0159***** **(0.0056)**	**-0.0094** **(0.2007)**
Control variables					
Log_Asset		+	0.000848 (0.6255)	0.0033*** (0.0011)	0.0020* (0.0753)
OCF		+	0.3630*** (0.0000)	0.3538*** (0.0000)	0.4340*** 0.0000
LEVERAGE		-	0.0100 (0.3986)	-0.0104 (0.1282)	-0.0156** (0.0254)
MB		-	-0.0049*** (0.0042)	-0.0039*** (0.0001)	-0.0013 (0.2102)
ROA		+	0.0445* (0.0997)	0.0735*** (0.0029)	0.0432* (0.0597)
BIG4		-	0.00958* (0.0689)	0.002 (0.5065)	0.0033 (0.2960)
Joint tests					
*TCWG +(POST*TCWG)*	H2	-	**-0.0319***** **(0.0000)**	**-0.0102**** **(0.0145)**	**-0.0036** **(0.4608)**
Industry fixed effect included			Yes	Yes	Yes
Year fixed effect included			Yes	Yes	Yes
N			1,056	2,112	1,408
R-sq			0.2546	0.2465	0.3431
F-statistics			12.24	19.91	20.37
Prob>F			0.0000	0.0000	0.0000

Note: Variables are defined in Table 3, except *Log_Asset* which is the log of total assets, and except **TCWG characteristic** variables. *MANIPULATE_Q* = 1 if the M-score from Beneish (1999) Model is in highest upper 4th quartile and 0 if M-score is in smallest lower 1st quartile. *MANIPULATE_M* = 1 if the M-score from Beneish (1999) Model is higher than industry median score and 0 otherwise. *MANIPULATE_L* = 1 if the lagged M-score is greater than -1.78 and 0 otherwise. Continuous variables are winsorized at 1st and 99th percentile. P-values in parentheses are robust to heteroscedasticity. ***, **, * indicate significant level at 1%, 5%, and 10%, respectively.

Table 26 Additional test for H2: Alternative measures of TCWG characteristicss (H2b, H2c, H2d)

Model **Dependent Var.** **TCWG Var.**	**Test**	**Exp. Sign**	**(H2b)** **Model 2b** *AQ* *FAMILY_D*	**(H2c)** **Model 2c** *AQ* *AC_ROT_D*	**(H2d)** **Model 2d** *AQ* *AC_ACC_D*
Constant			-0.0789***	-0.0765***	-0.0740***
			(0.0000)	(0.0000)	(0.0000)
Change audit task variable					
POST		+	-0.0131**	-0.0079	-0.0121*
			(0.0289)	(0.1403)	(0.0522)
TCWG characteristics variables					
TCWG		+,+,+	0.0001	-0.0040	-0.0040
			(0.9690)	(0.3364)	(0.2274)
*POST*TCWG*	H2	+,+,+	**0.0100***	**0.0036**	**0.0076**
			(0.0622)	**(0.5780)**	**(0.1676)**
Control variables					
Log_Asset		+	0.0034***	0.0034***	0.0033***
			(0.0010)	(0.0011)	(0.0013)
OCF		+	0.3477***	0.3464***	0.3466***
			(0.0000)	(0.0000)	(0.0000)
LEVERAGE		-	-0.0103	-0.0099	-0.0098
			(0.1308)	(0.1497)	(0.1520)
MB		-	-0.0040***	-0.0040***	-0.0040***
			(0.0001)	(0.0001)	(0.0001)
ROA		+	0.0701***	0.0689***	0.0678***
			(0.0044)	(0.0046)	(0.0055)
BIG4		-	0.0023	0.0018	0.0020
			(0.4483)	(0.5472)	(0.5039)
Joint tests					
*TCWG + (POST*TCWG)*	H2	+,+,+	**0.0101****	**-0.0004**	**0.0072**
			(0.0230)	**(0.9486)**	**(0.4175)**
Industry fixed effect included			Yes	Yes	Yes
Year fixed effect included			Yes	Yes	Yes
N			2,112	2,112	2,112
R-sq			0.2455	0.2433	0.2437
F-statistics			20.12	19.64	19.84
Prob>F			0.0000	0.0000	0.0000

Note: Variables are defined in Table 3, except *Log_Asset* which is the log of total assets, and except **TCWG characteristic** variables. *FAMILY_D* = 1 if the percentage of equity owned by family management is greater than 20% and 0 otherwise. *AC_ROT_D* = 1 if there is at least one audit committee or newly appointed audit committee in the fiscal year. *AC_ACC_D* = 1 if there is at least one committee who has accounting knowledge to total audit committees. Continuous variables are winsorized at 1st and 99th percentile. P-values in parentheses are robust to heteroscedasticity. ***, **, * indicate significant level at 1%, 5%, and 10%, respectively.

5.3.3 Summary of additional test results

Overall, the additional results are consistent with the main results for both hypotheses. For the first hypothesis in Section 5.3.1, the robustness tests are performed by controlling effect of auditor type and by using alternative measures of TCWG characteristics. The results show that management's manipulation risk influences lower level of audit quality no matter the company is audited by either Big4 or non-Big4 auditors. For H1b, management's family ownership is positively associated with audit quality only for the firms audited by Big4 auditors, indicating that the significant result in the main test rises from both management's family holdings and Big4 auditors. Anyhow, the insignificant association between audit committee's characteristics and audit quality holds for all robustness checks.

The second hypotheses examine the relationship between TCWG characteristics and audit quality after the revised TSAs adoption. Six additional tests are performed to confirm the robustness of the main results. From all additional tests, the main result of H2a is unanimously supported by all additional tests, except the test for the event period, suggesting that management's risk of manipulation is more negatively associated with audit quality after the revised TSAs adoption. It is possible that the new standards are not suitably effective to enforce earnings manipulators in cooperating high level of audit quality since the strongly negative association remains until the new auditing standards regime. For H2b, the additional tests confirm that the main result holds. Family ownership is positively related with audit quality after the revised TSAs adoption. This association is driven by non-Big4 samples, revealing that, together with non-Big4 auditors, family managers tend to corporate in high level of audit quality under the alignment effect after the revised standards implementation. Likewise, audit

committee's traits for H2c and H2d remains unsupported by the additional tests. Remarkably, accounting expertise of audit committee is positively associated with audit quality after the new standards adoption only for non-Big4 samples, meaning that the revised TSAs encourages the cooperation among non-Big4 auditors and the accounting expertise committee to enhance audit quality.

6. CONCLUSION

To improve audit quality, the recent changes of the Thai Standards on Auditing in 2012 modify many audit tasks and highlight roles of those charged with governance to cooperate with the auditor in complying with the regulations. This paper addresses two research questions of whether the characteristics of TCWG have an effect on audit quality and whether the introduction of the revised TSAs increases effectiveness of TCWG in constraining earnings management and therefore promoting high audit quality afterward. This paper investigates four characteristics of TCWG which are management's manipulation risk, management's family ownership, audit committee rotation, and audit committee accounting expertise.

From the analysis of TCWG characteristics and audit quality, the findings reveals that management's manipulation risk, measured by Beneish (1999) model, has a significant negative impact on audit quality. Thus, this model is considered to be useful for investors and regulators to identify high manipulation risk firms to beware of. Moreover, the results also support prior studies (Boonlert-U-Thai and Kuntisook 2009; Chu 2011; Issarawornrawanich and Jaikengkit 2012) that family firms in Thailand tends to have higher level of audit quality which is in line with alignment effect under agency theory. However, this paper does not find evidence on the association between independence and accounting expertise of audit committees and audit quality. It can be explained by a survey study that audit committees in Thailand contribute themselves to internal control system rather than the cooperation with the external auditors and financial reporting quality (Tengamnuay and Stapleton 2009). The additional analyses reveal that when either Big4 or non-Big4 auditors audit firms

managed by high potential manipulators, level of audit quality decrease. However, only when non-Big4 auditors audit firms with high family ownership concentration, audit quality increases. It is possible that the effect of the revised TSAs has an impact on non-Big4 auditors more than it does on Big4 auditors because Big4 auditors have performed audit work under the revised ISAs since 2009 when it was firstly adopted worldwide.

Additionally, the results provide an insight into roles of TCWG and audit quality through which the adoption of the revised TSAs influence the association. The empirical results do not provide evidence to support that the new auditing standards are suitably effective to impose the revised TSAs on management with high risk of manipulation. The degree of audit quality is dramatically lower for the firms managed by high potential manipulators after the revised TSAs adoption. This result possibly assumes ineffective enforcement of the revised TSAs among TCWG. To recommend, this paper suggests that the SEC should further perform TCWG inspection in addition to auditor inspection in order to enforce the revised TSAs efficiently and effectively. With regard to management's family ownership, the family managers tends to cooperate more with the auditors in increasing audit quality after the introduction of the new auditing standards. This stronger association between family ownership and audit quality during the post-adoption period is driven by non-Big4 samples. Besides, the results show that accounting expertise of audit committee is associated with higher audit quality after the revised TSAs adoption only for firms audited by non-Big4 auditors. These findings imply that the revised TSAs have a greater impact on non-Big4 auditors to improve audit quality when auditing firms with higher family ownership concentration and firms monitored by audit committee with accounting expertise.

Although this paper contributes to the very beginning point about the revised TSAs adoption in the audit literature in Thailand, there are several limitations to be noted. First, as this study is an event study in a specific period of time, the confounding effect from other events may distort the results. The additional test in Section 5.3.2 (A) presents regression analysis by controlling for the changes of three accounting standards during 2009-2014. The results in Table 19 prove that the main findings are confirmed. Second, Big 4 auditors have adopted the revised TSAs since 2009 to be complied with the clarified ISAs. The supplementary analyses are performed by using interaction terms (*TCWG*BIG4*) and the models are re-run on Big 4 and non-Big4 subsamples. The results of this supplementary analysis certifies the main results and raises remarkable explanation about the greater effect of the revised TSAs on non-Big4 auditors. The third limitation is that the family ownership data are collected from the entity's annual report (Form 56-1) which does not cover the ultimate ownership concentration due to data availability and research timing constraint. Forth, this paper defines management's manipulation risk as the potential that management manipulate earnings during the accounting period. However, the pre-audited financial data is not publicly available to predict manipulation risk during the period. Therefore, this paper uses M-score model which apply audited financial data to classify high and low potential manipulator. Moreover, the additional tests also employ lagged M-score to ensure the validity and robustness of the main results. Fifth, the cut-off point of M-score at -1.78 may not be appropriate in the research setting in Thailand and this paper does not replicate the work of Beneish (1999) and (Beneish et al. 2013) because the numbers of restatement in Thailand is not enough to replicate Beneish's papers. Thus, the additional tests are performed by applying industry median and the extreme upper

and lower quartile of M-score to cut off high and low potential manipulator instead of -1.78. However, the results is stronger for -1.78 cut-off point, suggesting that the -1.78 cut off point of M-score is an appropriate tool to detect firms with high risk of manipulation. In addition to all the foregoing, the measurement of audit quality is limited to accruals manipulation point of view which derives from the GAAP violation or from the possible selective accounting choices. Future research on audit quality measurement in term of cash flow manipulation or real earnings management would be interesting.

Future research could analyze other characteristics of TCWG on audit quality such as TCWG individual background, size, duality, tenure, and etc. in order to devote to not only investors and regulators but also for the entity's human resource management. Moreover, the three-way interaction terms among auditor supply, client demand, and regulatory intervention (DeFond and Zhang 2014) could be interesting for future research in order to understand the relationship among all stakeholders of audit quality. One of the most noticeable future research to be continued is audit committee rotation. In auditing and accounting literature, there are plenty of studies related to auditor tenure (Carey and Simnett 2006; Cassell et al. 2016), audit firm tenure (Carcello and Nagy 2004; Brooks et al. 2013), and auditor rotation (Pomsanam 2011; Barnes 2013). However, none of research focuses on audit committee rotation. Thailand is moving forward to regulate the audit committee's rotation policy among listed companies. Thus, it is a great opportunity of researchers to assist regulators by investigating advantageous research questions that contribute to both academic and practical requirements.

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APPENDICES

Appendix 1 Variables and expected coefficient signs for Model 1 and Model 2

$$AQ_{i,t} = \beta_0 + \beta_1 \boldsymbol{MANIPULATE}_{i,t} + \beta_2 \boldsymbol{FAMILY}_{i,t} + \beta_3 \boldsymbol{AC\_ROT}_{i,t} + \beta_4 \boldsymbol{AC\_ACC}_{i,t} + \beta_5 Log\_Asset_{i,t} + \beta_6 OCF_{i,t} + \beta_7 LEVERAGE_{i,t} + \beta_8 MB_{i,t} + \beta_9 ROA_{i,t} + \beta_{10} BIG4_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \quad (1)$$

$$AQ_{i,t} = \beta_0 + \beta_1 POST_{i,t} + \beta_2 \boldsymbol{MANIPULATE}_{i,t} + \beta_3 (POST_{i,t} * \boldsymbol{MANIPULATE}_{i,t}) + \beta_4 Log\_Asset_{i,t} + \beta_5 OCF_{i,t} + \beta_6 LEVERAGE_{i,t} + \beta_7 MB_{i,t} + \beta_8 ROA_{i,t} + \beta_9 BIG4_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \quad (2a)$$

$$AQ_{i,t} = \beta_0 + \beta_1 POST_{i,t} + \beta_2 \boldsymbol{FAMILY}_{i,t} + \beta_3 (POST_{i,t} * \boldsymbol{FAMILY}_{i,t}) + \beta_4 Log\_Asset_{i,t} + \beta_5 OCF_{i,t} + \beta_6 LEVERAGE_{i,t} + \beta_7 MB_{i,t} + \beta_8 ROA_{i,t} + \beta_9 BIG4_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \quad (2b)$$

$$AQ_{i,t} = \beta_0 + \beta_1 POST_{i,t} + \beta_2 \boldsymbol{AC\_ROT}_{i,t} + \beta_3 (POST_{i,t} * \boldsymbol{AC\_ROT}_{i,t}) + \beta_4 Log\_Asset_{i,t} + \beta_5 OCF_{i,t} + \beta_6 LEVERAGE_{i,t} + \beta_7 MB_{i,t} + \beta_8 ROA_{i,t} + \beta_9 BIG4_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \quad (2c)$$

$$AQ_{i,t} = \beta_0 + \beta_1 POST_{i,t} + \beta_2 \boldsymbol{AC\_ACC}_{i,t} + \beta_3 (POST_{i,t} * \boldsymbol{AC\_ACC}_{i,t}) + \beta_4 Log\_Asset_{i,t} + \beta_5 OCF_{i,t} + \beta_6 LEVERAGE_{i,t} + \beta_7 MB_{i,t} + \beta_8 ROA_{i,t} + \beta_9 BIG4_{i,t} + Industry\ indicators + Firm\ year\ indicators + \varepsilon_{i,t} \quad (2d)$$

Variables		Definition	Expected Sign
Dependent variable - Audit quality			
AQ		Negate absolute residual from the performance-adjusted discretionary accrual model (Kothari et al. 2005)	
Independent variables for H1 - Characteristics of TCWG			
MANIPULATE	H1a	1 if the predicted M-score of a potential manipulator is higher than -1.78 (Beneish 1999; Beneish et al. 2013), and 0 otherwise	Negative
FAMILY	H1b	Percentage of equity owned by family management	Positive
AC_ROT	H1c	Percentage of rotated audit committee to total audit committees	Positive
AC_ACC	H1d	Percentage of accounting experts in audit committees	Positive

Variables		Definition	Expected Sign
Independent variables for H2 - Characteristics of TCWG and The revised TSAs adoption			
POST		1 if the financial statements are audited under the revised TSAs (2012-2014), and 0 otherwise	Positive
*POST*MANIPULATE*	H2a	Interaction term	Negative
*POST*FAMILY*	H2b	Interaction term	Positive
*POST*AC_ROT*	H2c	Interaction term	Positive
*POST*AC_ACC*	H2d	Interaction term	Positive
Control variables			
Log_Asset		natural log of total assets	Positive
OCF		net operating cash flow scaled by total assets	Positive
LEVERAGE		ratio of total liabilities to total assets	Negative
MB		ratio of market value to book value of equity	Negative
ROA		Ratio of net income to total assets	Positive
BIG4		1 if the firm's auditor is from Big 4 audit firms	Positive
Industry		Industry fixed-effect	
Year		Year fixed-effect (2009-2014)	
i and t		Company and year indicators	

Appendix 2 Linear regression assumptions

This paper uses ordinary least squares (OLS) or linear regression to test hypotheses. For interval scales, Model 1 has 23 independent variables including industry and year-fixed effects, thus the minimum sample size requires at least 690 cases (23 x 30 cases per independent variable). Model 2 has 22 predictor variables including industry and year-fixed effect, thus the minimum sample size requires at least 660 cases (22 x 30 cases per independent variable). The sample of this study includes 2,112 firm-year observations. Therefore, both models have enough samples and degree of freedom to perform multiple regression analysis. The F-test ANOVA presented in all regression results are significant at 1% level, confirming the validity of the models. The results may be biased if the data do not meet the assumptions underlying OLS regression. The following assumption tests are performed when regressing Model 1 for H1a-H1d and Model 2a-2d for H2a-H2d.

1. Linearity

For outliers of linear regression analysis, all continuous variables used in Model 1 and Model 2 are winsorized at 1st and 99th percentile to mitigate influence of outliers. To test linearity assumption, Figure 7 illustrates scatter plots of standardized residuals from Model 1 against each of the main independent variables in the regression model. Figure 8 presents scatter plots of standardized residuals from Model 2 against each of the main independent variables in the regression model. The four residuals versus each variable plots do not show a clear departure from linearity. Thus, there is no problem of non-linearity for the regression results of H1a to H1d and H2a to H2d.

2. Multicollinearity

Multicollinearity occurs when two or more independent variables are closely correlated to one another in multiple regression. Multicollinearity causes unstable estimated coefficients and inflated standard errors. Table 6 shows that the Variance Inflation Factor (VIF) value of Model 1 regression result for H1a to H1d equals to 1.61 Table 8 presents VIF values of Model 2 for H2a to H2d which are range from 1.78 to 2.07. VIF values for both models are well below 10, indicating that there is no multicollinearity problems in the regression analyses.

3. Independence

This assumption requires linear regression analysis to have no autocorrelation in the data. Autocorrelation occurs when the residuals are not independent from each other. This assumption is very important because if the errors are not independent, the estimators are biased. This study uses Durbin-Watson's d test to detect autocorrelation problem. Table 6 Colum 5 shows that d-statistic equals to 1.91 for Model 1. Table 8 illustrates that d-statistics for Model 2 is range from 1.89 to 1.92. Thus, Durbin-Watson's statistics from Model 1 and Model 2 regression results are between 0 and 4, indicating no autocorrelation problem.

Figure 7 Scatter plots of residual from Model 1 on independent variables

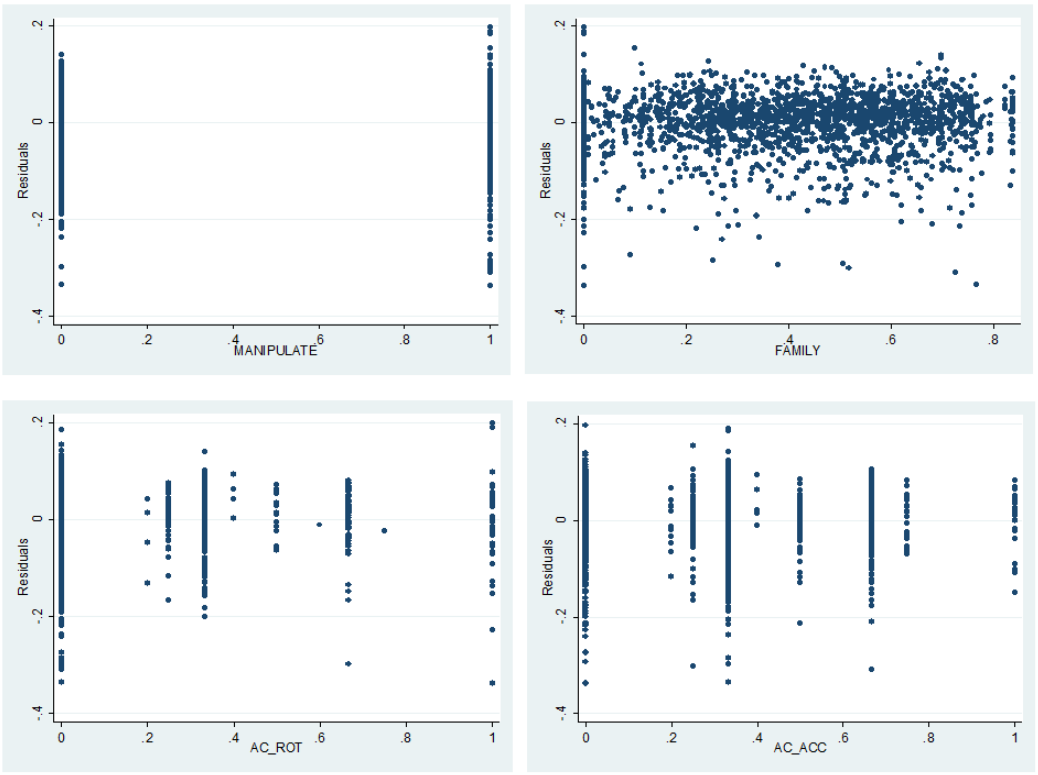
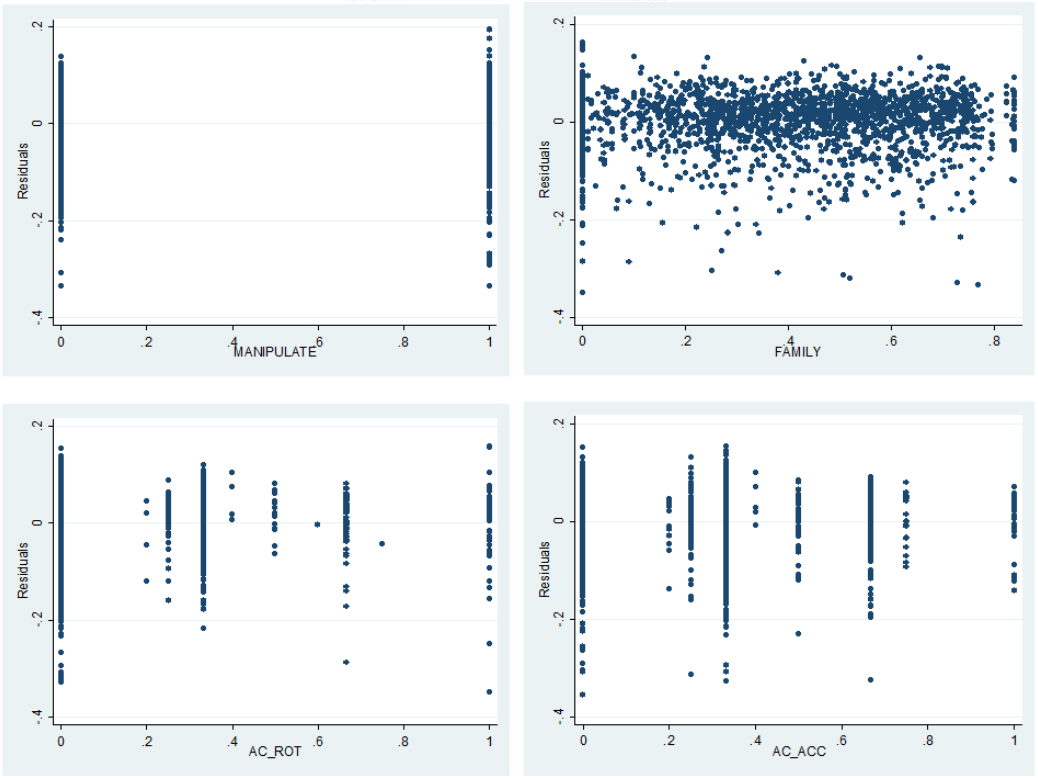


Figure 8 Scatter plots of residual from Model 2 on independent variables



4. Homoscedasticity

This assumption assumes that the variance in residuals has to be homoscedastic or constant. If the model is well-fitted, the residuals plotted on the fitted values should be no pattern. Heteroscedasticity occurs when the variance of residuals is not constant, leading to distortion of findings and weaken the regression analysis (unreliable P-value). Figure 9 and Figure 10 shows scatter plots of residual from Model 1 and Model 2 on fitted value of winzorized audit quality (*AQ*). The scatter plots from both figures show that residuals are not evenly scattered around the zero line, implying heteroscedasticity problem. In addition, Table 27 presents results from Breusch-Pagan test and the null hypothesis of constant variance is rejected for both Model 1 and Model 2. The graphical and the Breusch-Pagan tests suggest the presence of heteroscedasticity in the models. This problem may cause wrong estimates of standard errors of the coefficients. Therefore, all regression analyses in this paper use robusted standard errors to mitigate the non-constant variance assumption. In STATA program, all regression models are adjusted for heteroscedasticity by using the option robust in the regress command.

5. Normality

Normality of residuals assures that the p-values for t-test and F-test are valid for hypothesis testing. This paper uses kernel density estimate (STATA command: kdensity) and a standardized normal probability (P-P) plots (STATA command: pnorm) to illustrate indications of non-normality. Figure 11 and Figure 12 shows Kernel Density Estimate and Standardized Normal P-P plots for Model 1 and Model 2 respectively. The graphs show deviation from normality. Table 28 shows results of Shapiro-Wilk W test for normality. The P-value is based on the assumption that the

distribution is normal. The P-values are significant, suggesting that residuals are not normally distributed. However, normality is not required in order to obtain unbiased estimated coefficients. Therefore, the coefficient estimates in this paper remain unbiased.

Figure 9 Scatter plot of residual from Model 1 on fitted value of *AQ*

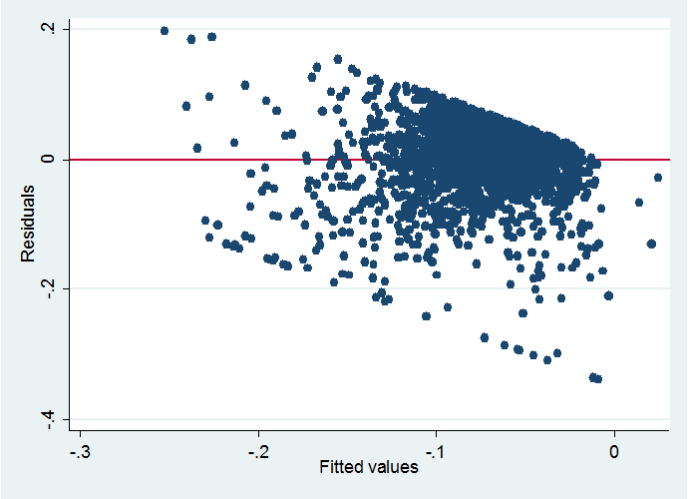


Figure 10 Scatter plots of residual from Model 2 on fitted value of AQ

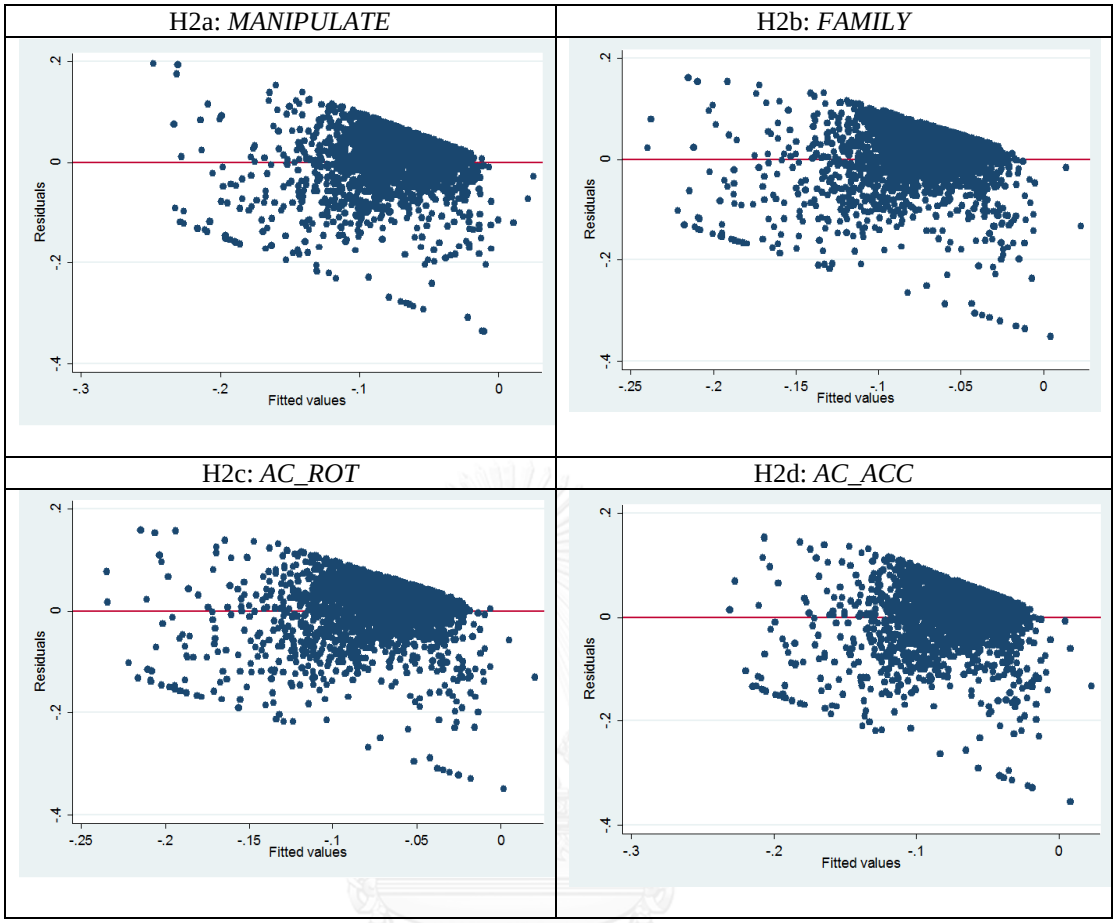


Table 27 Breusch-Pagan tests for heteroscedasticity

	Model 1	Model 2			
	H1a-H1d	H2a	H2b	H2c	H2d
Chi-square(χ^2)	152.94	173.03	68.10	70.52	70.62
Prob>Chi-square(χ^2)	0.0000	0.0000	0.0000	0.0000	0.0000

Note: Null hypothesis is constant variance of residual on fitted value of *AQ*

Figure 11 Normality test for Model 1

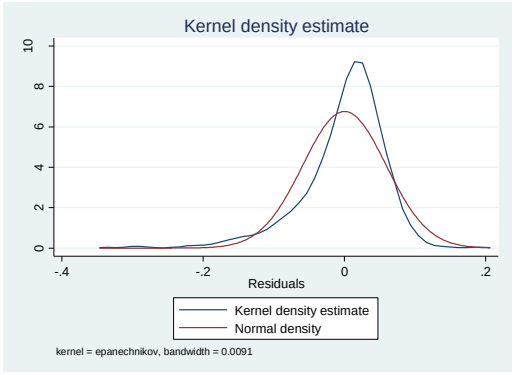
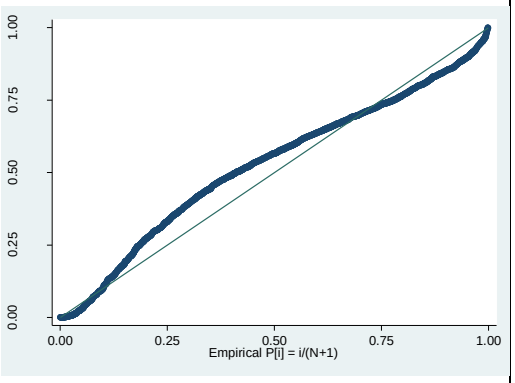
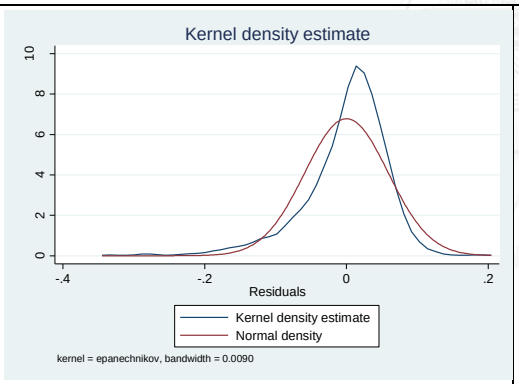
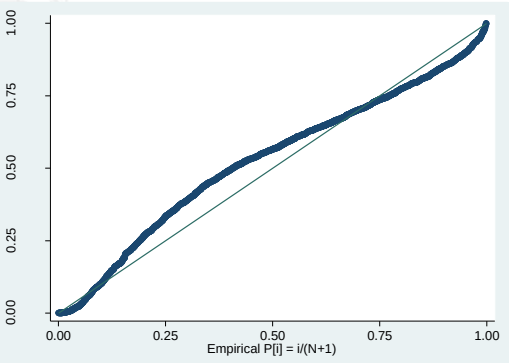
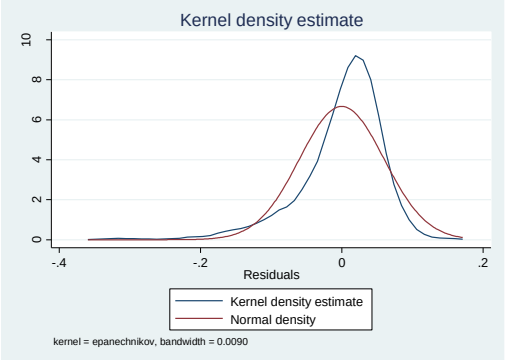
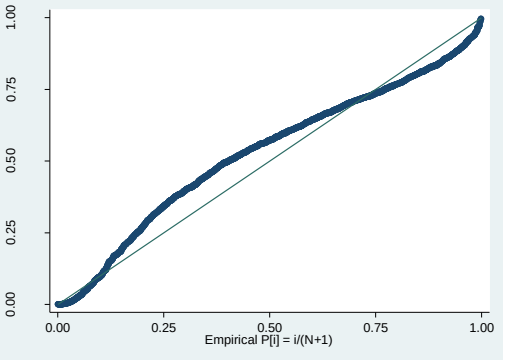
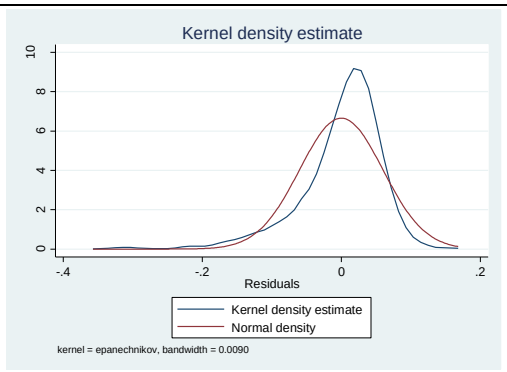
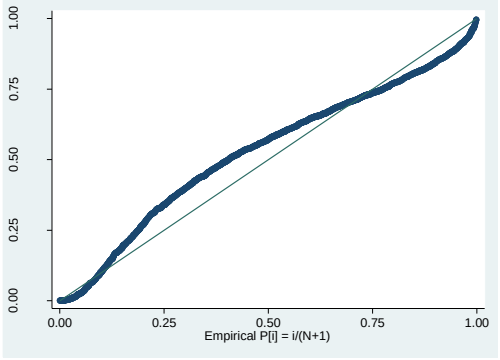
Kernel Density Estimate	Standardized Normal P-P Plots
	

Figure 12 Normality tests for Model 2

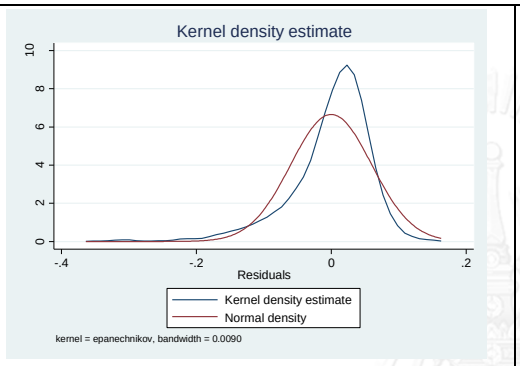
Kernel Density Estimate	Standardized Normal P-P Plots
H2a: *MANIPULATE*	
	
H2b: *FAMILY*	
	

H2c: *AC_ROT*





H2d: *AC_ACC*



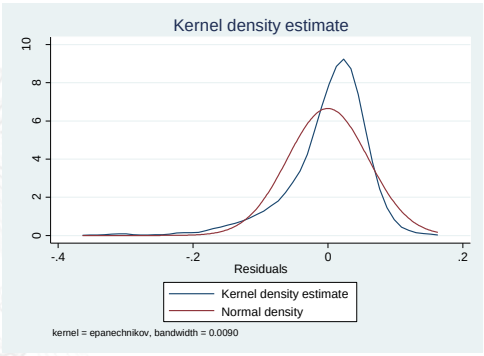


Table 28 Shapiro-Wilk W tests for normality

Shapiro-Wilk W						
Test for normal residuals distribution						
Model	Hypothesis	Obs	W	V	z	Prob>z
Model 1	H1a-H1d	2,112	0.92084	98.6540	11.7030	0.0000
Model 2a	H2a	2,112	0.92423	94.4270	11.5920	0.0000
Model 2b	H2b	2,112	0.90934	112.9780	12.0490	0.0000
Model 2c	H2c	2,112	0.90994	112.2300	12.0320	0.0000
Model 2d	H2d	2,112	0.91050	111.5350	12.0160	0.0000

Note: Null hypothesis is normal distribution of residuals

Appendix 3 Jurisdictions Using the Clarified ISAs or Committed to Using Them in the Near Future (111) as of November 17, 2015

Albania	FYR Macedonia	Malta	Slovenia
Argentina	Georgia	Mauritius	South Africa
Armenia	Ghana	Mexico	South Korea
Australia	Guatemala	Moldova	Spain
Austria	Greece	Mongolia	Sri Lanka
Bahamas	Guyana	Montenegro	Swaziland
Bahrain	Hong Kong	Namibia	Sweden
Bangladesh	Hungary	Nepal	Switzerland
Barbados	Iceland	Nicaragua	Tanzania
Belgium	India	Netherlands	**Thailand**
Benin	Indonesia	New Zealand	Togo
Bosnia and Herzegovina	Ireland	Nigeria	Trinidad and Tobago
Botswana	Italy	Norway	Tunisia
Brazil	Jamaica	Pakistan	Turkey
Bulgaria	Japan	Palestine	Uganda
Canada	Jordan	Panama	Ukraine
Cayman Islands	Kazakhstan	Papua New Guinea	United Arab Emirates*
Chile	Kenya	Philippines	United Kingdom
China	Kosovo	Poland	United States**
Colombia	Kuwait	Portugal	Uruguay
Costa Rica	Kyrgyz Republic	Puerto Rico**	Uzbekistan
Croatia	Latvia	Romania	Vietnam
Cyprus	Lebanon	Russian Federation	Zambia
Czech Republic	Lesotho	Rwanda	Zimbabwe
Denmark	Lithuania	Senegal	
El Salvador	Luxembourg	Serbia	
Estonia	Malawi	Sierra Leone	
Finland	Malaysia	Singapore	
France (CSOEC)	Mali	Slovakia	

** Private Companies

* Abu Dhabi and Dubai

Source: IAASB (2015)

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