



**IAF Quality and Earnings Management Influenced by  
Big Data Analytics Powered by Artificial Intelligence  
and Other Moderators**

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## **Dedication**

*To*

*All*

*Poor*

*People*

*In*

*All*

*Universes*

*Always, I will work—work—work for you!*

*To the last second of my life.*

## Acknowledgment

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## **Abstract**

This study examined several country-level and corporate-level factors that could moderate the effects of internal audit function (IAF) quality on earnings management. The country-level factors include (a) shareholder protection environment, (b) a country's legal system and (c) economic status (developed and developing markets). Factors at the corporate-level include (i) assistance between internal and external auditors and (ii) outsourcing big data analytics.

Following the quantitative approach, the research data was retrieved from the Institute of Internal Auditors' Global Internal Audit Common Body of Knowledge (CBOK) 2015 database, where responses from 150 chief audit executives (CAEs) were extracted for investigation. This thesis implemented ordinary least square (OLS) regressions in two separate empirical studies to address its objectives in studying the moderating factors at both country and corporate levels. Separating the two levels empirically enabled reduced potential noise of interaction variables, leading to more robust statistical results. This multi-level study is intended to deepen understanding of the complex set of moderating variables that affect the association between IAF quality and earnings management.

At the country-level, the results showed that the effects of IAF quality on reducing earnings management are higher for firms in countries with a lower shareholder protection environment or developing economy than their counterparts with a higher shareholder protection environment or developed economy. Further, this thesis found no significant evidence on whether the country's legal system can moderate the relationship between IAF quality and earnings management. These findings indicate that the effectiveness of high IAF quality on deterring earnings management is not similar across nations. As a result, country-level factors should be considered by regulators, investors, and researchers in understanding the environmental work of the corporate governance that includes IAFs.

Furthermore, at the corporate-level, this study found the following. First, the effects of IAF quality on reducing earnings management are more significant for firms that spend a lower amount of time on assisting external auditors provided by internal auditors than firms that spend a higher amount of time on such assistance. This result is consistent with the notion that more direct assistance lowers the time IAFs can spend on higher-risk areas (e.g., detecting earnings management). Second, this study showed evidence that high IAF quality reduces earnings management, and this relationship is more pronounced for firms that outsource big data analytics for IAFs purposes than those that do not outsource. This study concluded that companies should consider the potential costs and benefits from outsourcing big data analytics and the extent of time spent to support the external audit.

**Keywords:** *IAF quality; earnings management; shareholder protection environment; a country's legal system; economic status; developed markets; developing markets; outsourcing big data analytics; assistance between internal and external auditors; CBOK 2015.*

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## List of abbreviations

IAF	Internal Audit Function
IIA	Institute of Internal Auditors
OLS	Ordinary Least Squares
CEO	Chief Executive Officer
CAE	Chief Audit Executive
CBOK	Database from The Institute of Internal Auditors' Global Internal Audit Common Body of Knowledge
SAS	Statement on Auditing Standard

# **Chapter 1. Introduction**

## **1.1 Overview**

This thesis examines the extent to which country-level and corporate-level factors could moderate the effects of internal audit function (IAF) quality on earnings management. First, the research examines the effects of country-level factors, including shareholder protection environment, the country's legal system, and economic status (i.e., developed and developing markets). Second, it examines corporate-level factors regarding assistance between internal and external auditors and outsourcing big data analytics.

The effective IAF, along with the audit committee, management and external auditor, is one of four cornerstones of corporate governance (IIA, 2003). In this analysis, higher IAF quality was described, following previous literature, as "a greater assurance that the financial statements represent the company's underlying economy, based on its financial reporting system and innate features" (DeFond and Zhang, 2014, p. 276). Earnings management refers to "the modification in the economic results of companies announced by controlling owners or managers to trick or manipulate other stakeholders' contractual outcomes" (Leuz et al., 2003, p. 506).

## **1.2 Research Motivations**

Recent evidence indicates that high IAF quality reduces firms' likelihood of earnings management (e.g., Prawitt et al., 2009; Johl et al., 2013; Al-Rassas and Kamardin, 2015; Abbott et al., 2016; Gros et al., 2017). Although the abovementioned studies, among others, contributed to a better understanding of the effects of IAF quality on earnings management, their findings are limited. This study is motivated by two gaps in the previous literature. Previous research has been conducted in single countries (e.g., the US, Germany, and Malaysia). Such design allowed researchers to control for country-level effects; however, it limited their ability to capture and examine specific country-level characteristics that could contribute to explaining the relationship

between IAF quality and earnings management. By neglecting country-level characteristics, previous research limited the scope of our understanding of the external factors that might influence the effectiveness of IAF quality as a deterrent to earnings management.

Further, previous research has analyzed a limited number of corporate-level moderators (e.g., audit committee independence, investment in IAFs, competence, and independence of IAFs). In this vein, I argue that there are still critical corporate-level factors that previous researchers should have considered. Next, I elaborate more on those country-level and corporate-level factors that deserve further attention.

By adopting a single country design, the previous literature could not investigate the effects of country-level factors (e.g., shareholder protection environment, a country's legal system, and economic status) on this relationship. Substantial empirical evidence suggests that countries with a high shareholder protection environment are essential factors explaining the effects of companies engaging less in earnings management than those with a low shareholder protection environment (Wright et al., 2006). DeFond et al. (2004) showed that earnings management is affected by a shareholder protection environment, which differs from one country to another. Shleifer and Vishny (1997) explained how the laws organize the shareholder protection environment and how in some countries, such as the United States (US), Japan, and Germany, courts impose the law to protect shareholders. In other parts of the world, shareholder protection is less common, and the legal functions are less powerful, increasing earnings management. As a result, shareholder protection alone will not be enough, and accounting information (e.g., net income) does not represent "real" economic performance.

Moreover, numerous studies have established that an audit committee plays an influential role in monitoring earnings management. DeFond and Jiambalvo (1991) found that earnings management is lower among US companies with an audit committee. Dechow et al. (1996) concluded that

companies with an audit committee are less able to manipulate earnings. Wild (1996) showed a significant increase in the market's response to earnings reports following an audit committee's formation. Benkel et al. (2006) and Saleh et al. (2007) found that the audit committee reduces the level of discretionary accruals. Likewise, Piot and Janin (2007) reported that an audit committee's presence decreases earnings management among French companies, and Baxter and Cotter (2009) acknowledged that the formation of an audit committee diminishes deliberate earnings management among Australian firms. This evidence motivates this study to explore the extent to which the shareholder protection environment moderates the relationship between IAF quality and earnings management.

On the other hand, prior studies examining a country's legal system found that firms in stronger legal environments are engaged in fewer earnings management (e.g., Li et al., 2011). This literature is significant as they demonstrated that the institutional factors are significant accounting factors manipulations and impact financial statements' transparency. Most of the previous studies focused on the accruals manipulations leading to an incomplete understanding of other factors affecting earnings management (i.e., a country's legal system). In other words, the previous studies focused on the activity-based strategies that manipulate earnings management (e.g., Gunny, 2010). Empirical work investigating the relationship between the legal system in a particular country and earnings management is scarce (see, for example, Leuz et al., 2003; Haw et al., 2004). The evidence from those studies shows a negative relation between the strength of the legal environment and insiders' propensity to manage accruals. This is because countries with more vital legal protection provided for minority shareholders make it difficult for managers to achieve enormous private benefits. Thus, the country's legal system's effectiveness reduces the insiders' incentives to manipulate earnings to hide their control benefits. This study is motivated by the current gaps in how such institutional factors (a country's legal system) would moderate the effects of IAF quality on earnings management.

Similarly, as any country's economic status plays a role in shaping how efficient corporate governance for listed companies is, it is expected and found that developed markets have higher corporate governance than developing markets (Vasilescu, 2008; IMF, 2019). Confidence and trust are the main elements of a competitive market economy and restoring investor confidence through sound corporate governance and more open corporate structures and market intermediaries are necessary to foster economic growth. Corporate alignment, increased market control, and enhanced transparency through better disclosure are universal principles for sound macroeconomic development. In the light that the IAF is a corporate governance element to prevent managers from manipulating earnings (e.g., Prawitt et al., 2009; Johl et al., 2013; Al-Rassas and Kamardin, 2015; Abbott et al., 2016; Gros et al., 2017), this study investigates whether IAF quality has different effects in reducing earnings management between developed and developing markets.

Given the above, earnings management is more widespread in developing markets than in developed markets like the US and Europe (Zweig, 2019). The studies focusing on earnings management in developing and developed markets are scarce. Ghaleb et al. (2020) summarized the need for such studies in three points. First, earnings management is pervasive in the developing market. Second, most developing markets require listed companies to establish IAF to protect the company's assets and shareholders' investments. Third, firms in developing markets are required to disclose information on IAF. Commonly, the leading market listing requirements mandate that companies disclose their IAF sourcing, whether in-house or out-sourced. Also, companies are commonly required to disclose the IAF costs incurred in the financial year.

At the corporate-level, this study first examines the moderating effect of outsourcing the data analysis activities used for the IAFs (namely, big data analytics) on the relationship between IAF quality and earnings management. In this context, previous literature indicates that outsourcing some or all IAFs to a third party reduces earnings management (e.g., Prawitt et al., 2012; Abbott et al., 2016). This study differentiates itself from previous literature by focusing on the moderating

effect of outsourcing big data analytics that serves the internal auditors in their duties. There are several challenges to adopting big data analytics that might prevent auditors from using big data analytics, such as lack of technical skills, limited cognitive resources, biased audit judgment, information overload and limited resources on software and hardware analytics. These challenges may result in the selection and analysis of irrelevant information (Ahmad, 2019). Thus, outsourcing big data analytics might be a better option than internal adoption in such circumstances.

Clearly, throughout the audit process, the analytics could be used as a part of IAF. However, as audit analytics by IAF is below expectations (Li et al., 2018), this shows the need to better utilize big data analysis by setting clear plans for this purpose (Tang et al., 2017). Although data analysis offers advantages to external and internal auditors, it provides deep insight, practical foresight, and continuous monitoring information (Schneider et al., 2015; Verver, 2015). Verver (2015, p. 20) noted that “as the IAF offers access from all parts of the company to processes and records, the data analysis also allows internal auditors to provide insights into issues of risk, control, and efficiency which no other role can provide.” That evidence stresses the need for exploring the moderating effect of outsourcing big data analytics and its impact on the IAF.

Next, on the corporate-level, previous literature finds that assistance between internal and external auditors results in economic saving (e.g., reduction in external audit fees) (e.g., Prawitt et al., 2011; Abbott et al., 2012a), and shorter audit delay (e.g., Abbott et al., 2012b; Oussii and Taktak, 2018). Besides, external auditors can perceive such concerns (if found) on the independence and objectivity of internal auditors in their duties (Regoliosi and Martin, 2019) through the practice of such assistance and coordination. Back to the literature, several studies have shown the need for coordination between internal and external auditors. It is found that external auditors often assess internal auditors' independence as the most important criterion in evaluating the objectivity of IAFs (Messier and Schendair, 1988). External auditors usually evaluate the primary role of the IAF and

structure, which influences the internal auditors' objectivity. Accordingly, the practice and cooperation between the internal and external auditors are common and organized in most firms. This is why no previous studies, to the best of my knowledge, have studied the moderating role and influence of such cooperation on the relationship between IAF and earnings management. This study is distinctive in realizing the need for investigating this relationship and going beyond the influence of the relationship between internal and external auditors on IAF quality and earnings management. There is, however, little evidence to date as to whether or not such assistance has a moderating effect on IAF quality and earnings management. Therefore, this study examines the moderating effect of this assistance on the relationship between IAF quality and earnings management.

### **1.3 The aims and objectives of the study**

Building on prior research and theories that identify IAF quality as a key factor in reducing earnings management, my study investigates whether the effectiveness of IAF quality to deter earnings management is influenced by country-level and corporate-level factors, which, despite their relevance, were not addressed before in previous literature for various possible reasons such as difficulty in data collection, lack of interest and the absence of theoretical Foundation. This study represents a direct response to recent calls in the literature requesting a broader understanding of the potential factors that influence the relationship between IAF quality and earnings quality (e.g., Johl et al., 2013; Al-Rassas and Kamardin, 2015). A theoretical perspective on the relationship between IAF quality and earnings management is provided in this thesis.



## **1.4 Research hypotheses**

From the defined aims and objectives, the main research hypotheses this study sets out to investigate are:

Hypothesis 1: The effects of IAF quality on reducing earnings management are higher for firms in countries with a lower shareholder protection environment than their counterparts with a higher shareholder protection environment.

Hypothesis 2: High IAF quality reduces earnings management for firms in civil law countries more than common law countries.

Hypothesis 3: High IAF quality reduces earnings management for firms in developing economies more than developed economies.

Hypothesis 4: The effect of IAF quality on reducing earnings management is larger for firms that spend a lower amount of time on internal auditors assisting external auditors than firms that spend a higher amount of time on such assistance.

Hypothesis 5: High IAF quality reduces earnings management, and this relationship is more pronounced for firms that outsource big data analytics for IAF purposes than those that do not outsource.

## **1.5 Research contributions**

### *Contribution to literature*

This study has included several contributions to IAF literature (e.g., Prawitt et al., 2009, 2012; Johl et al., 2013; Al-Rassas and Kamardin, 2015; Abbott et al., 2012a, 2016; Gros et al., 2017). It will extend this literature by investigating how various country-level and corporate-level moderating factors could affect the relationship between IAF quality and earnings management.

First, this study accounts for country-level factors, thereby expanding the literature on corporate-level factors. My study will contribute to the current debate on whether high IAF quality is sufficient to decrease earnings management to protect shareholders across countries with different shareholder protection environments, a country's legal system, and economic status. Hence, this study will provide further information on whether national characteristics could explain the effectiveness of IAFs.

Further, this study contributes to understanding the potential effects of (i) outsourcing big data analytics and (ii) assisting external auditors on the relationship between IAF quality and earnings management. The findings contribute to data analytics usage regulation and improve the relationship between internal and external auditors. Besides, previous literature has been conducted on a single country-level (e.g., US, Germany) to explain the effect of IAF quality on earnings management, and this has not provided a broader explanation. This thesis utilizes a dataset across countries for the year 2014.

Additionally, the current study is expected to develop an existing theoretical foundation concerning the moderating factors influencing the relationship between IAF quality and earnings management. Three theoretical frameworks are conducted in this study. Further details will be provided in Chapter 3 (The theoretical perspective of IAF quality and earnings management).

By using a data set from 2014, this research updates findings on the relationship between IAF quality and earnings management by bringing further evidence because most of the previous studies on IAF and earnings management used data from the year(s) 2000-2005 (e.g., Prawitt et al., 2009), 2008-2009 (e.g., Abbott et al., 2016) and 2012 (e.g., Al-Rassas and Kamardin, 2015; Gros et al., 2017). To the best of my knowledge, this study is the first that examines the relationship between IAF quality and earnings management across countries with an up-to-date dataset on internal auditing.

In general, corporate governance includes IAF, audit committee, executive management and external auditor (Prawitt et al., 2009). Further, corporate governance is defined as what "the board of a company does and how it sets the company's values and is to be distinguished from the day-to-day operational management of the company by full-time executives (Chartered IIA UK and Ireland, 2018)." Considering the IAF is the cornerstone of corporate governance to stop managers from manipulating earnings, this study is motivated to investigate the extent of IAF quality to scale back earnings management across (1) shareholder protection environments, (2) a country's legal system and (3) economic status (developed and developing markets), (4) assistance between internal and external auditors and (5) outsourcing big data analytics. As IAF quality reduces earnings management, shareholders will be more protected. Further, the external auditors will rely more on IAF quality.

### ***Contribution to theory***

The current literature on the effects of corporate-level and country-level factors on the IAF quality and earnings management is limited. Most of the available literature focuses on the relationship between financial performance and IAF quality (e.g., Chen et al., 2013; Ching et al., 2015). Only a few studies examine the effects of IAF quality on earnings management. The empirical evidence available (see, e.g., Garcia et al., 2012; Alzoubi, 2019) focuses on the antecedents of IAF quality without considering the moderating factors. Incorporating additional moderating factors to

understand the effectiveness of IAF quality contributes to the prior literature and provides a wider view of quality, and goes beyond measuring and understanding the IAF quality in the context of corporate-level factors (big data analytics and assistance between internal and external auditors) and country-level factors (shareholder protection environment, a country's legal system and economic status).

For the current study, the theoretical perspective has been built upon the institutional theory for country-level factors and the agency theory and resource dependence theory for corporate-level factors, as illustrated in the theoretical perspective chapter (Chapter 3). Empirically, this study is considered the first attempt to understand the influence of specific moderating factors at the country and corporate levels on the relationship between IAF quality and earnings management. The further investigation of such relationships across countries is another significant contribution of this study. In addition to this, the introduction of shareholder protection environment, a country's legal system and economic status are highly relevant to the national corporate governance culture and business environment, coupled with the investigation of their contributions to IAF quality and earnings management significant contribution to theory. In investigating their moderating effects, this thesis can add to the scant body of knowledge on the concept while also responding to the call for testing that was suggested by previous literature (e.g., Gramling et al., 2013; DeSimone and Abdolmohammadi, 2016; Yasin et al., 2016; Eulerich and Westhausen, 2018) to better understanding of IAF quality across different economies, countries and cultures. Additionally, this thesis aims to understand better the potential implications of (1) outsourcing big data analytics and (2) assistance between internal and external auditors on the relationship between IAF quality and earnings management, which is likely to contribute to the theories. Investigating the effects of such corporate-level factors responded to the literature call (e.g., Bame-Aldred et al., 2012; Prawitt et al., 2012; Yasin et al., 2016; Behrend and Eulerich, 2019).

### *Contribution to practice*

The current study contributes to the internal audit process by providing a greater understanding of the IAF and its factors. The effectiveness of IAF is of interest to organizations and the users of financial statements (e.g., investors, external auditors, stakeholders). The study provides empirical evidence on how to enhance the effectiveness of IAF is relevant, given the importance of IAF knowledge, for users' decision-making. Understanding the factors many IAF users consider to impact IAF quality offers valuable insights into how organizations can enhance IAF quality. Considering the efficiency of IAF, it is necessary to decide where to guide efforts to strengthen and focus them on; low-quality IAFs may require adjustments, such as restructuring, refocusing or modifying the supply arrangements or exploration of ways to enhance the service in general.

Additionally, the external auditor is one of the important factors that affect the standard of internal auditing. In the case of contracting companies with the Big Four, it applies strict standards to regulate the internal audit process, which successively contributes to improving the internal audit process. Understanding the effects of moderating factors of this study is likely to help external auditors in assessing the quality of IAFs.

### **1.6 Research methodology overview**

This study uses quantitative research methods to investigate the research hypothesis based on corporate-level data collected from multiple secondary publicly available databases. First, it relies on data from the CBOK 2015 database<sup>1</sup> for the year 2014. This database is available from the Institute of Internal Auditors (IIA). The database from IIA is based on a survey sent to its members

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<sup>1</sup> CBOK refers to the common knowledge body operated by IIA. According to the IIA (2018b), "the CBOK is the world's largest ongoing study of the internal audit field, composed of two phases: the Practitioners' Survey and the Stakeholder Survey. The IAF is the first phase (practitioner) in which systematic surveys of practitioners at every level will be carried out and funded by the IIA institute and chapters around the world." Practitioners include both current and retired internal auditors from all over the world, including colleagues and employees from service companies and researchers who teach or study subjects. In 166 separate nations, there were 14,518 available survey responses.

from 166 countries. This survey captures information on several topics, including education level, organization details, internal audit department, corporate governance, value and performance measures, audit committee, and financial measures. Second, this study extracts data from the Worldscope database<sup>2</sup> to gather individual corporate-level data not obtained in the CBOK 2015 survey to complete the testing models presented in the methodology chapter of this thesis.

It should be noted that this thesis's sample (n = 150) is small because the sample has been collected based on specific questions provided in the CBOK 2015 questionnaire. These particular questions are essential to set up the model for IAF quality. Further, these questions are limited to the head of the internal audit department [Chief Audit Executive (CAE)]. In other words, the respondents do not include general managers, lower organizational positions, senior and junior auditors. Although the CBOK presents data for 14,518 respondents, only 150 CAEs were included in this study (further details are provided in the methodology chapter, see Chapter 5). Therefore, the sample has not been collected based on the archival data (14,518 participants). Table 5 Precisely shows the derivation of the sample from 14,518 participants to 150 CAEs.

To measure the firms' earnings management (dependent variable), I follow prior audit literature, and I utilize absolute abnormal accruals (*AbsoluteAbnAccr*) as a proxy for financial reporting quality (e.g., Prawitt et al., 2009; Francis, 2011; Juhl et al., 2013; Badolato et al., 2014; Al-Rassas and Kamardin, 2015; Cho and Chun, 2016; Abbott et al., 2016; Persakis et al., 2016; Gros et al., 2017). Accruals represent the difference between accruals earnings and cash earnings (Richardson et al., 2005). To measure abnormal accruals (*AbsoluteAbnAccr*), I use the performance-adjusted cross-sectional variation of the modified Jones model (Dechow et al., 1996) as reported by Kothari et al. (2005). Worldscope provides data to calculate abnormal accruals.

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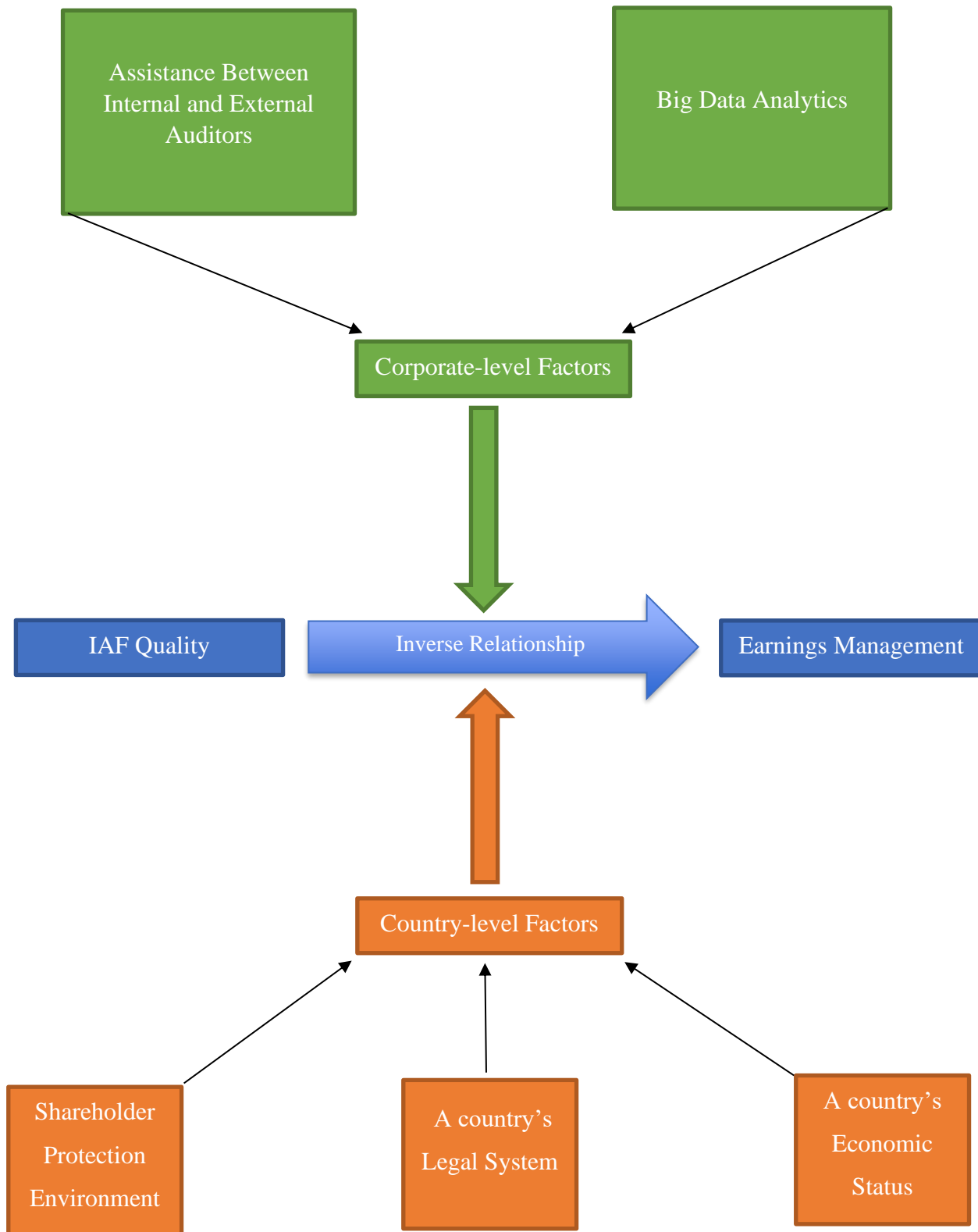
<sup>2</sup> The Worldscope Database is the leading source of comprehensive financial statements and information on accounts of public entities based that include most of the countries (Thomson Reuters, 2013).

On the other hand, I follow Prawitt et al. (2009) to derive a composite measure of IAF quality. My composite measure of IAF quality is based on six individual characteristics – (1) experience, (2) certification, (3) training, (4) financial audit, (5) IAF functioning reporting, and (6) IAF funding. This data is extracted from CBOK 2015.

### **1.7 Structure of the thesis**

This thesis consists of eight chapters, commencing with the introductory chapter. Chapter 2 provides background on IAF quality and earnings management. Chapter 3 focuses on the theoretical perspective of IAF quality and earnings management. Chapter 4 describes the literature review and research hypotheses development. In Chapter 5, the sample and methodology are described. Descriptive statistics, correlation matrix, empirical tests, and results are presented in Chapter 6. Chapter 7 discusses the results. Chapter 8 provides a conclusion, implications, limitations, and recommendations for future research. The theoretical model underpinning this thesis is shown in Figure 1.

**Figure 1: Moderating effects of country-level and corporate-level factors on the relationship between IAF quality and earnings management**





## **Chapter 2. Background on IAF quality and earnings management**

### **2.1 Introduction**

Since the enactment of the Sarbanes – Oxley Act 2002 in the US, which brought about major changes in the responsibilities of firms’ directors, the interest in IAF has considerably increased. Recently, IAF has received noticeable attention due to the diversity of the tasks it performs within any organization. Its tasks are no longer limited to examining financial and accounting operations only but incorporate various other organizational tasks contributing to risk management and providing effective oversight at a reasonable cost. Besides, it helps assess and motivate employees' performance, adapt departments and workers to achieve the enterprise strategy, and increase governance effectiveness (Behrend et al., 2019). IAF has expanded to become one of the important administrative tools upon which the Board of Directors and the Audit Committee depend on obtaining documented information on the effectiveness of an organization’s internal control system (Johl et al., 2013).

IAF plays an essential role in organizations supporting the performance of other governing bodies. “It plays an important role in assisting management to improve internal oversight and adjustments” (Karagiorgos et al., 2010, p. 16). The IAF assists in documenting the external auditors' internal information to build their judgment on the transparency and accuracy of organization disclosures. Therefore, the IAF plays a distinct role in establishing and supporting the governance parties and thus increases corporate governance effectiveness. This reflects the IAF's contribution to corporate governance and that it must be characterized by an appropriate level of quality in the performance of its role. Independence, adequate protection and commitment to professional performance are essential requirements that allow internal auditors to perform tasks under their responsibility with the required efficiency and quality (Christ et al., 2015).

It is based on mutual trust between the professional and related parties and the increased dependence of users of the financial statements on the audited financial statements. It is an appropriate source of information for stakeholders to make different decisions since it increases the auditor's responsibility to meet the quality of the audit work. This provides a high degree of efficiency, speed, and economy, which serves society's general goals and adds more confidence, credibility, and dependence on the internal auditor's work (Saputra and Yusuf, 2019).

Biddle et al. (2009) define financial reporting quality as the precision to which financial reporting reflects information about the firm's operations informing investors. The financial reporting quality is measured in prior studies by concentrating on financial restatements, earnings management and fraud (Xie et al., 2003). Many definitions of earnings management can be found in the previous literature. Earnings management in the process of external financial reporting is the aimed intervention, with intending to obtain some special gain. Healy and Wahlen (1999) argued that "earning management takes place if managers judge the structure process of transactions in financial reporting to change financial reports either to impact contractual results based on reported accounting numbers or to misguide some stakeholders about the company's internal economic performance" (p. 368).

Earnings management is defined by Ronen and Yaari (2008) as "the managerial decisions collection which does not cause to report earnings as recognized by management for being short-termed, value-maximized" (p. 27). It is noticed that earnings management might be neutral or used to hide short- to long-term worth despite that it might be appropriate if used to capture long-term worth, similar to using it to indicate the company's precision short-term performance.

Bushman and Smith (2003) explain that the role of corporate governance is guaranteeing the compliance of financial accounting with the system in financial reporting, besides maintaining financial statement credibility. Becker et al. (1998) point out that auditing is used as a monitoring mechanism to reduce information asymmetry between shareholders and managers, hence making assurance of financial reports more trustworthy. Jensen and Meckling (1976) considered auditing a valued technique to monitor companies attempting to reduce agency costs.

In a bid to complement their internal corporate governance, companies voluntarily set an IAF. IAF provides companies with consulting services and assertion, which could increase the efficiency of internal monitoring, corporate governance procedures and risk management (IIA, 1999). Furthermore, IAF improves audit committee operations' efficiency and makes their work simple since its function suites the audit committee's financial reporting for monitoring accountabilities (Abbott et al., 2012a).

While investigating US companies, Prawitt et al. (2009) identified dimensions of IAF quality and found that IAF quality is negatively associated with earnings management. Moreover, García et al. (2012) indicated that IAF presence is negatively associated with earnings management among Spanish firms. Gras-Gil et al. (2012) found that collaboration amongst internal and external auditors results in high financial reporting quality in the Spanish banking sector. In summary, previous research indicated that financial reporting quality is enhanced when the internal auditors have greater participation in the process of financial reporting.

- **IAF definition and background**

Increasing attention to IAF, its increasing roles, its establishment in a growing number of business institutions, and the development of this function's size have become apparent in the last years. Professionals and researchers have been working to emphasize the necessity of the

IAF and its contribution toward the quality of corporate governance. The importance of IAF is associated with its oversight role, its contribution to the improvement of the control and monitoring environment and its impact on reducing the risks and fraud within the organizations (Soh and Martinov-Bennie, 2011). The definitions below highlight such importance:

- Petraşcu (2010, 240) defined IAF as "an independent and objective activity, an organization that gives assurance as to the degree of control by the operations, a guide to improve operations and contribute to an adding value, where it helps to achieve its objectives by evaluating a systematic and methodical approach to its risk management processes, control and management of the entity and making proposals to strengthen their effectiveness."
- According to COSO (1992), IAF is defined as a "process launched by an entity's board of directors, management, and other personnel, designed to provide reasonable assurance regarding the achievement of objectives in the following three categories: effectiveness and efficiency of operations, reliability of financial reports and compliance with applicable laws and regulations" (Qaid and Alhamidi, 2020, 975).
- The Institute of Internal Auditors Australia defined IAF as "an independent, objective assurance and consulting activity designed to add value and improve an organization's operations. It helps an organization accomplish its objectives by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control, and governance processes" (Office of Internal Audit UNC-Chapel Hill, 2020).
- The Institute of Internal Auditors – IIA (2018a) defined IAF as a "department, division, team of consultants, or other practitioners (s) that provides an independent, objective assurance and consulting services designed to add value and improve an organization's operations. The internal audit activity helps an organization accomplish its objectives

by bringing a systematic, disciplined approach to evaluating and improving governance, risk management, and control processes."

- **Roles and responsibilities of internal auditors**

Auditing is a science that has grown in importance since the 1990<sup>th</sup> period (KPMG, 1999), as businesses and potential investors have recognized the need for disclosure and the reliability of published information. The functions and roles of the internal auditors are as follows (Johl et al., 2013):

- submit internal audit reports to senior management on various activities, and follow up on the implementation of recommendations,
- assess the risks that the organization may face periodically,
- measure the efficiency of the methods and procedures used, and the extent of their contribution to achieving the goals of the organization,
- assess compliance with established laws, regulations, policies and procedures,
- report on the general performance of the organization and its divisions and the extent of their implementation of the plans drawn,
- verify the accuracy and correctness of financial transactions and transactions by examining accounting documents,
- evaluate internal control,
- support the achievement of organizational objectives,
- provide advice (no right to make decisions) for decision making.

- **IAF: audits of working papers vs. audit of consolidation of accounts among different subsidiaries**

This section aims to distinguish between audit working papers and audit of consolidation of accounts among different subsidiaries. Generally, auditors should arrange and organize their working papers to provide an adequate audit service. The auditor should prevent producing or accumulating unneeded working documents and, as a result, should resist making large copies of the client's accounting documents (Association of Chartered Certified Accountants, 2021).

Based on the Financial Reporting Council (2009), as illustrated by the Association of Chartered Certified Accountants (2021) and The Institute of Chartered Accountants in England and Wales (2020), the audit working papers have the following key goals.

- (a) Presenting evidence of the auditor's rationale for reaching a judgment concerning the attainment of the auditor's overall goals,
- (b) Assisting the auditors in planning and carrying out the audit,
- (c) Keeping a record of issues that will be relevant to future audits,
- (d) Making external inspections possible in line with any legal, regulatory, or other requirements.

On the other hand, International Auditing and Assurance Standards Board issued an international standard on auditing (ISA) 600. It works as special considerations for auditing group financial statements (known as consolidation of accounts among different subsidiaries that belong to one parent company) (International Federation of Accountants, 2009). Among the audit techniques that might be done during such consolidation auditing are (as simplified by Association of Chartered Certified Accountants (2021)):

1. Verifying that the figures used in the consolidation were correctly derived from the component's financial statements,

2. Assessing the group's component classifications, such as whether the elements have been appropriately recognized and treated as subsidiaries, associates, or joint ventures,
3. Examining the disclosures required in the group financial statements, such as linked party transactions and minority stakes,
4. Examining the handling of any elements that have a various financial year-end than the remainder of the company,
5. Obtaining facts relevant to the precise consolidation modifications mandated by financial reporting standards.

## **2.2 Quality of the IAF**

IAF has emerged due to the expansion of economic activities, the large institutions, and the increased tasks and branches. It provides its services to the higher management, including the institution's board of directors and helps them make decisions through the controls it performs.

IAF has four elements to maintain its quality (Gurama and Mansor, 2018):

- **Inputs:**

Where this element involves internal audit activities.

- **Resources:**

This represents the resources needed to accomplish internal audit tasks and the human components (e.g., skills and personal experiences).

- **Operation or method of performing internal audit activities:**

Where the focus in this element is on efficiency and effectiveness of performance.

- **Outputs:**

This element includes internal audit reports, opinions, and recommendations.

### **2.3 The concept of quality of the IAF**

The concepts of quality of the IAF are multiple according to the diversity of the parties involved in the audit environment. For instance, financial statement users consider the quality of IAF in terms of "satisfaction level they get from the service to meet their needs, while internal auditors refer to the quality of the audit in terms of the level of work they do following professional standards" (Kordloi and Yarahmadi, 2013). Some other definitions for the concept of quality of the IAF are presented below:

- De Angelo (1981) defines it as the auditors' likelihood of discovering errors and gaps in the customers' accounting system and recording those in their report (Flayyih et al., 2020).
- Palmrose (1988) defines it as the degree of confidence that the auditor provides to the financial statements' users; that indicates the actual audit quality (Nwanyanwu, 2017).
- Christ et al. (2015) define it as the ability to discover and report significant financial statement errors, reduce information asymmetry between management and shareholders, and protect shareholders' interests.
- Ali (2016) defines it as an independent, objective and consultative oversight activity that would provide the necessary assurances and make recommendations that add value and increase the facility's effectiveness and lead to improving its performance.
- Archambeault et al. (2008) argue that the quality of IAF can be seen as the provision of objective and relevant assurance. Additionally, they consider other dimensions for assessing the quality of the IAF. Those dimensions include its ability to add value to the efficiency and effectiveness of corporate governance and risk management and internal control.



To that end, it can be concluded that the quality of the IAF is represented in good audit services that are performed in accordance with the standards and guidelines of the audit as well as in accordance with the rules of conduct and professional custom and that the quality of the performance of the audit means performing the work at the specified level according to the different professional rules and standards, audit guidelines, and rules and procedures issued by the organizations concerned with the profession of auditing and maintaining the integrity and independence of the auditor, in a manner that ensures achieving the common objectives of the related parties (Johl et al., 2013).

### **2.3.1 Quality dimensions of the IAF**

According to Christ et al. (2015), the concept of quality of IAF should include several dimensions as the following:

- good planning for the audit process,
- scientific and practical qualification of references,
- quality of fieldwork implementation,
- commitment to accounting and auditing standards issued by professional organizations concerned with the profession,
- achievement of audit objectives at specified times and to the required level,
- Adequate disclosure in the report with reasonable assurance that significant errors and irregularities have been discovered.

### **2.3.2 The importance of the quality of the IAF**

The internal audit is considered an important economic and social profession, and its importance stems from that as it contributes to the process of economic development and social

welfare. This could be achieved by raising attention to the weaknesses of companies to carry out an early correction. The audit results are important for all parties related to the audit process, whether directly or indirectly (Sahdan et al., 2019).

The importance of the IAF derives from the quality of services it provides to these parties interested in the financial disclosures. IAF provides a systematic, scientific and thoughtful review process based on criteria and works guides prepared and approved in advance. Audit increases firms' credibility (Abbott et al., 2016), where high-quality IAF helps managers identify weaknesses and quickly respond to them, preventing and correcting potential failures. Therefore, the internal audit process is done at the highest quality level (Abbott et al., 2016).

The audit work results are trusted by all involved parties as long as those parties trust the internal audit standards and evidence set by specialized, experienced, and reputable technical bodies in the field of auditing. The auditor's commitment during the audit process's performance to standards and evidence ensures that the auditing process is carried out properly and that the auditor's findings in his report can be trusted and relied upon by those parties in making various decisions (Dzikrullah et al., 2020). The trust term in this section refers to trustworthiness, as Rodgers (2010) explained.

Trustworthiness was discussed broadly in the study of Rodgers (2010). Rodgers (2010) shows that trust pathways are becoming increasingly crucial in achieving strategic advantage for effective, ethical considerations rules in all sectors, business and non-business. According to

Rodgers (2010), trust pathways can be classified into three categories that are (1) trust as a rational choice<sup>3</sup>, (2) category-based trust<sup>4</sup>, and (3) rule-based trust<sup>5</sup>.

Rodgers (2010) suggests ways of handling trust, no trust, and distrust based on these pathways. In detail, trust (high, low), no trust, and distrust (low, high) are connected with values (coefficients) ranging from +1 (the highest trust) to -1 (the highest distrust) (Rodgers, 2010). He suggests that any coefficient with an absolute value greater than or equal to 0.5 is supportive of a high trust effect. He added that any coefficient with an absolute value less than 0.5 denotes a low level of trust in the variables associated with that path.

According to Lewicki et al. (1998), trust demonstrates assured favorable perceptions about another person's behavior, whereas distrust reflects confident negative views about another person's behavior. Therefore, trust is determined by the direct connection between two enterprises instead of their indirect ties via third parties. The conditions under which solid indirect links improve trust overturn their effect to establish distrust (Rodgers, 2010). Hence, it is expected that IAF with quality should gain trust from beneficiaries of its reports (e.g., audit committee, management, etc.).

In addition to internal users, shareholders and investors are also interested in completing internal audit processes at the highest quality level. This ensures that the firm's funds are protected from loss, theft, tampering, and forgery. Thus, high quality internal audit enables the investors to make informed investment decisions (Christ et al., 2015), while a low-quality internal audit harms the investors and organizational interests (Christ et al., 2015).

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<sup>3</sup> Trust as a rational choice defined as “the shortest pathway, that is to say, the quickest way to achieve a goal that individuals perceive and decide on” (Rodgers, 2010, p.86)

<sup>4</sup> The need for accurate and appropriate information to direct trust relationships is acknowledged by category-based trust (Rodgers, 2010).

<sup>5</sup> According to Lewicki et al. (1998), rule-based trust stems from the idea that you trust somebody for a firmly legally binding normative rule or law system. Regulations, practices, and mechanisms are highly improbable to shift unexpectedly or randomly; instead, they are mentally expressed as internalized awareness.

Lenders and creditors are very interested in the process of reviewing financial statements with a high level of quality. This guarantees their loans and signals the possibility of continuing loans or rescheduling. Additionally, a high-quality internal audit provides a true picture of the company's financial position and predicts whether there are indications that the company has failed or is expected to fail (Ibiam, 2019).

Finally, it is in the government's interest that companies complete the process of reviewing the financial statements at a high level of quality. This is because the success of any institution and continuity contribute to increasing the government's treasury revenues and contribute to supporting the economy. Institutions' failures weaken the government treasury and contribute to the collapse and weakening of the economy (Saidin, 2014).

### **2.3.3 Measuring the quality of the IAF**

The quality of the IAF can be assessed by capturing the quality of input using the following measures:

- **Input Quality:**

It is measured by the level of employee experience within the internal audit department, scientific qualification, training, organizational culture, professional qualification and professional certificates, and internal audit role in the control system (Al-Twajry et al., 2004).

- **Quality of Operation:**

It is measured by the internal auditors' actions to detect fraud, level of examination and control of personal commitment, specialization and ethical standards (Savčuk, 2007).

- **The Fraud Triangle**

Fraud hurts organizations through financial losses. Fraud can be defined as the intent of obtaining a personal benefit by exploiting others through stealing by trickery (Houqe and

Monem, 2016). According to Cressy's (1953) fraud triangle, each of three conditions must exist for fraud to occur: (i) perceived pressure, (2) perceived opportunity and (3) rationalization. The motive or incentive for the crime is created by perceived pressure from a non-shareable financial difficulty. Perceived opportunity is the belief that (1) a power limitation exists and (2) the likelihood of being stopped is isolated. Rationalization is an effort to reduce a person's dilemma. By allowing for the conditions under which an action may be determined right or wrong, ethics deals with rationalization and, to a lesser extent, the pressure and opportunity associated with the fraud.

Rodgers et al. (2014) investigate whether it is possible to detain fraudulent cases and improve corporate social responsibility (CSR) in organizations if specific internal control mechanisms and policies support varied ethical stances using an Ethical Process Throughput Model<sup>6</sup>. A well-established ethical behavior control system offers unmatched security, improved convenience, increased accountability, improved fraud prevention, and is highly effective in fraud depression (Rodgers et al., 2014). Their study reveals several insights as follows.

- Ethical roles can improve behavior by treating conflicts of interest, illegal or other unfair payment, additional work, accepting contractors' gifts, etc.
- Annual reviews can address whether all employees acknowledge understanding of the ethical positions to be implemented in their daily tasks.
- These ethical approaches can assist the management in preventing harm to a firm's reputation. If a code of conduct does not present, it is possible to transmit ethical positions orally during staff meetings, at an interface between individuals, or by the example of everyday tasks.

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<sup>6</sup> The Throughput Modelling approach to ethics offers a mechanism to handle accounting information processed by decision-makers in different ways (Rodgers, 2009).

- Areas where the manager is banned explicitly from ultimate controls can be documented and communicated.
- Deviations from the ethical positions stated can be examined and acknowledged.

#### **2.3.4 Internal audit standards, according to the Institute of Internal Auditors:**

Internal audit is a profession governed by laws and rules, and it depends on standards that represent guidelines to help auditors perform their work (Tsai et al., 2017). Since the early fifties, the standards have been issued by the American Chartered Accountants Association, and they obtained general acceptance and were applied to companies in Canada and the US. In this context, it is important to distinguish between auditing standards and auditing procedures. The auditing standards represent the objectives that must be achieved through the audit process. In contrast, the auditing procedures are related to the actions that should be carried out according to the audit plan. These standards are occasionally updated and could be reached through the institution's website.<sup>7</sup>

The auditing standards have received general acceptance as being integrated guidelines that help define the principles of what the internal audit practices should be and ensure the implementation of the audit activities effectively by providing a framework to accomplish and evaluate its performance (IIA, 2017).

According to the IIA (2016), internal audit standards comprise two main categories: attribute and performance standards. IAA's Attribute standards are made up of the 1000 series. The following are examples of the attribute standards.

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<sup>7</sup> Available at: <https://na.theiia.org/Pages/IIAHome.aspx>.

### 2.3.5 Attribute standards

The attribute standards represent or refer to a formal document that defines the internal audit activity's purpose, authority, and responsibility.

Table 1 depicts the standards provided in the formal document.

**Table 1: Attribute standards**

**1000 Purpose, authority and responsibility**

The Internal Audit Charter is an official document that specifies the internal audit activity's purpose, authority, and responsibility. The internal audit charter also specifies the functional location of the internal audit activity within the organization, including the nature of the dependency relationship that links the chief audit executive with the Board of Directors. It specifies the right to access and view records, access to employees, and physical assets related to performance.

**1010 Recognizing Mandatory Guidance in the Internal Audit Charter**

The fundamental principles of the professional practice of internal auditing, principles of professional ethics, standards, and auditing definition must be recognized.

**1100 Independence and objectivity**

Independence is "the freedom from conditions that threaten the ability of the internal audit activity to carry out internal audit responsibilities in an unbiased manner."

Objectivity is an unbiased mental attitude that allows internal auditors to perform engagements to believe in their work product and that no quality compromises are made.

**1110 Organizational independence**

The CEO of internal auditing must depend on an organizational level to ensure that the internal audit activity performs its responsibilities as required.

**1111 Direct interaction with the board**

The chief audit executive must communicate directly with the board of directors.

**1112 Chief Audit Executive Roles Beyond Internal Auditing**

When the CEO of an internal audit has any roles or responsibilities that fall outside the internal audit framework, precautions must be taken to limit the extent of their negative impact on independence and objectivity.

### **1120 Individual objectivity**

The internal auditors should be impartial and avoid any conflicts of interest.

### **1130 Impediments to independence or objectivity**

When something impedes independence or objectivity, details must be disclosed to the appropriate parties, whether in reality or manifestly.

### **1200 Proficiency and Due Professional Care**

Internal audit tasks must be accomplished with skill and with appropriate professional care.

#### **1210 Proficiency**

The internal auditors must have the knowledge, skills and other competencies necessary to implement the individual responsibilities entrusted to each of them.

#### **1220 Due Professional care**

The internal auditors must exert the level of care and skill expected to be any internal auditor with a reasonable level of foresight

### **1300 Quality Assurance and Improvement Program**

The chief audit executive must maintain a quality assurance and improvement program to maintain all related internal audit activity aspects.

#### **1310 – Requirements of the Quality Assurance and Improvement Program**

The audit process must include quality and assurance improvement.

#### **1312 Internal Assessments**

The assessment should include ongoing performance monitoring and periodic self-assessment

#### **1320 Reporting on the Quality Assurance and Improvement Program**

The CEO of Internal Audit must inform the senior management and the Board of Directors of the Quality Assurance and Improvement Program results.

Source: IIA (2016)



### 2.3.6 Performance standards

Performance Standards refer to a set of standards that help to regulate the performance of IAF. They are numbered in the 2000s range. Table 2 presents examples of the Performance Standards.

**Table 2: Performance standards**

**2000 Managing the Internal Audit Activity**

The chief audit executive must effectively manage the internal audit activity to ensure that it adds value to the organization.

**2010 Planning**

The CEO must audit a risk-based plan to prioritize the internal audit activity in line with objectives.

**2020 Communication and Approval**

The CEO of Internal Audit must inform the internal audit activity plans and the resources they require, including any interim changes.

**2030 Resource Management**

The chief audit officer must ensure that the internal audit resources are adequate and adequate and are effectively employed to complete a plan.

**2040 Policies and Procedures**

The CEO of an internal audit should establish the policies and procedures to guide the internal audit activity.

**2050 Policies and Procedures**

The CEO of Internal Audit should share information and coordinate activities with other external and internal parties that provide

**2060 Reporting to Senior Management and the Board**

The chief audit executive must periodically inform the senior management and board of directors of an activity's purpose, authority, responsibility, and performance. Internal auditing, according to the plan laid down for it and on the compliance of this activity with the principles of professional ethics and standards. This must include:

**2100 Nature of work**

The internal audit activity should evaluate the governance, risk management and control processes and contribute to their improvement by adopting a method.

#### **2110 Governance**

The internal audit activity should evaluate the organization's corporate governance processes and propose appropriate recommendations to improve corporate governance practices.

#### **2120 Risk Management**

The internal audit activity should assess the effectiveness of risk management processes and contribute to their improvement.

#### **2130 Control**

The internal audit activity should help the organization maintain effective control controls by assessing its effectiveness and efficiency and pushing for improvement.

#### **2200 Internal Audit Mission Planning**

The internal auditors should develop and document a work plan for each audit task, including the mission objectives, scope, timing, and resources.

#### **2220 Engagement Scope**

The scope of the audit mission should be sufficient to achieve the mission objectives.

#### **2400 Communicating Results**

The internal auditors must report the results of the audit tasks.

#### **2420 Quality of Communication**

Communications must be true, objective, clear, concise, constructive, complete and timely.

Source: IIA (2016)

### **2.3.7 Indicators of IAF quality**

Despite the large literature on internal auditing, there is still no commonly accepted definition of internal audit quality. The quality of IAF consider assessing and improving risk management, control, and corporate governance practices, i.e., company size, industry type, regulated services vs. nonregulated services. This benefits the various stakeholders, as the institute of internal auditors (IIA) emphasized (IIA, 2016).

### **2.3.8 IAF and risk assessment (the audit risk model)**

Audit risk assessment is a vital audit development (Castanheira et al., 2010). However, the auditing should not reveal all severe misrepresentations about the financial statement. The audit is restricted by sample, and it is exceedingly difficult to discover misconceptions and well-hidden fraud. Therefore, even if the auditor has met with generally accepted audit standards, there is still a risk that this audit will not identify significant errors (Arens and Loebbecke, 1997).

The audit risk model, discussed in Statement on Auditing Standards (SAS) No. 47 (American Institute of Certified Public Accountants [AICPA], 1983), is stated as follows:

Audit Risk = Inherent Risk \* Control Risk \* Detection Risk

The three components (Inherent Risk, Control Risk and Detection Risk) are defined as follows. Inherent risk is the susceptibility to misunderstandings of an account balance or type of transaction, either separately or in combination with misinterpretations in other credits or classifications, provided the corresponding internal controls are not available (Hayes et al., 2005). Control risk is a measure of the auditor's judgment that the client's internal controls do not avoid or discover errors in exceeding an acceptable level within a division (Corporate Finance Institute, 2021). Detection risk is the risk of audit findings failing to identify severe misstatements for any given audit statement (Corporate Finance Institute, 2021). Hogan and Wilkins (2008) reveal that auditors must minimize the detection risk to keep their overall audit risk to a tolerable level, with a good level of inherent risk and control risk. They emphasized that detection risk is reduced by increasing substantive testing/auditing.

### **2.3.9 IAF and risk assessment (Scepticism)**

Professional Skepticism is traditionally defined as "an attitude that includes a questioning mind and a critical assessment of audit evidence" (Rodgers et al., 2017, p.566). Considering new evidence, Bamber et al. (1997) characterize auditing skepticism to update audit views. One of the factors which require professional Skepticism in auditing is the effectiveness of the

accounting job (Glover and Prawitt, 2014). Professional skepticisms play an essential role in auditors' decisions (Rodgers et al., 2017). Moreover, after an adequate investigation of an audit setting, the proper amount of Skepticism must meet each specific case (Glover and Prawitt, 2014). The auditor's willingness to conduct numerous tests is one frequent metric of Skepticism, which can be shown by the hours projected for audit work (Hurt et al., 2008).

It has been found that professional Skepticism is strongly associated related with auditing quality (Noviyanti and Winata, 2015). Further, Rodgers et al. (2017) found that audit knowledge transfers significantly impact auditor judgments' reliability in developing professional audit skepticism. Christina and Tjaraka (2018) illustrated that expertise, audit situation, and ethics positively affect auditors' Professional Skepticism. On the other hand, the study of Rohman and Chariri (2018) revealed that Auditors' performance and competence were not mediated by professional Skepticism. Interestingly, Shaub and Lawrence's (2002) study suggests that the least experienced auditors are the most active skeptics, whereas the most reserved auditors are the most experienced. This finding is related to knowledge studies that demonstrate the preference of more experienced and expert auditors to focus on non-error justifications for potential mistakes.

## **2.4 Earnings management**

The business environment in recent years is witnessing radical transformations characterized by the appearance of many complex financial and commercial transactions (Omarova, 2012). This encouraged decision-makers to use advanced accounting and control systems to retrieve information. Such information includes financial details, interpretations, multiple alternatives, and methods that help decision-makers manipulate financial performance reports. This also enables the organization to show the best image through what has become known as creative accounting practices, through which several methods can be used to show the results of the

economic unit and its financial position in a way contrary to the economic situation, and thus conceal or modify activities to suit the objectives of the management.

The concept of earnings management has emerged in response to conflicts of interests between management and owners and the rest of the company's stakeholders according to the principle of rational choice, whereby each party tries to maximize their benefits (Mohapatra, 2011).

Earnings management is practiced through the protocols carried out by the management resulting from its selection of the accounting policies of a company affected by its own goals. It is recognized that earnings management is used to mislead shareholders and the rest of the users of financial statements to maximize management benefits and achieve some of the gains regardless of their legitimacy and that by exploiting or departing from flexibility in accounting principles and standards, this is where the IAF comes to curb these practices (Chung et al., 2009).

#### **2.4.1 The concept of earnings management**

Earnings management can be defined as a deliberate intervention in the process of preparing financial reports to achieve some impressive gains, which is a behavior that the management performs and affects the income that the financial statements show. Earnings management does not always achieve real economic benefits and may lead to long-term damage. Earnings management is achieved when managers use personal judgment in preparing financial reports and restructuring operations to amend financial reports, either to mislead shareholders about the company's economic performance or to conclude contracts based on accounting numbers (Needles et al., 2018).

Previous researchers addressed many definitions of earnings management based on multiple perspectives. The most important of these definitions are the following:

- Siekelova et al. (2019) defined it as managers' choice of accounting policies that achieve their specific goal, and this is what is known as management opportunism, meaning that management is a set of administrative decisions that lead to a real lack of reporting in the short term, to maximize the value of profits as known to management.
- Kordloi and Yarahmadi (2013) defined it as managers have flexible options in choosing between alternative methods of accounting operations and choosing between operations through the same accounting treatment, allowing managers to adapt to economic conditions, visualize economic outcomes, and visualize the correct economic results of operations and impact.

Furthermore, earnings management could be defined according to three directions, as follows:

➤ White earnings management:

It is defined as tapping into flexibility in choosing accounting treatment to refer to the manager's information about future cash flows (Lopes, 2018).

➤ Gray earnings management:

It is defined as choosing accounting treatments motivated by opportunism or administrative efficiency purposes (Johnson et al., 2011).

➤ Black barning management:

It is defined as practicing and using tricks to distort or reduce the transparency of financial reports (Lopes, 2018).

## **2.4.2 Motives of earnings management**

Earnings management occurs when managers have certain motives to achieve advanced goals. There are several arguments about the drivers related to this phenomenon. El-Diri (2018) stated that earnings management are based on the following justifications:

- It is based on justifications for violating the legal rules, whether they are general or commercial activities.
- It is based on the justifications for violating the accepted accounting principles.
- They are based on justifications that violate the scope of their powers.

According to Nikoomaram et al. (2012), earnings management has two motivations. The first is the achievement of self-benefits for management, at which the motivation is an opportunist. The second is the effect on the user of accounting information by showing the enterprise's income to balance the return and the degree of risk. This ensures the survival and continuity of the enterprise in the competitive market.

Management motives in earnings management behavior can be summarized in three main points that may include opportunistic motives or efficiency motives or the two motives together as follows (Hamid et al., 2012):

- Contractual motives: When the contract between the company and other parties is based on the accounting results, this generates the incentive for managers to manage profits.
- Market incentives: When managers realize that because there is a relationship between declared profits and the company's market value, the incentive for earnings management does seem to affect the market.
- Organizational motives: When it is believed that declared profits impact the productivity of legislators or government officials.

Some of the additional motivations for earnings management can be reviewed below:

As compensation plans are seen as one of the most fundamental drivers of earnings management, and the plans of the firm are in managers' incentives contracts, managers are more likely to manage profits by transferring part of the profits for future periods to current periods to maximize their rewards in the current period. Managers can achieve this by choosing from the accounting policies that entail transferring part of the profits for future periods to the current period. Management incentives and rewards contracts depend on the accounting numbers, such as the declared profits or the market value of the company's shares, which are also affected by the company's profits. This affects managers' behavior when preparing external financial reports, as this represents an incentive for the management to adjust profits in line with its objectives by managing profits. Thus, they influence their bonuses in the current and future periods (Gao and Shrieves, 2002).

Agrawal and Chatterjee (2015) argue that the biggest use of accounting information by investors and financial analysts to assist in valuing stocks can generate an incentive for managers to manipulate profits to influence the stock price performance in the short term. Previous studies related to earnings management have shown that profits are used to match investors' and analysts' expectations (i.e., Louis, 2004; Wei, 2004). Thus, these analysts' expectations create an incentive for managers to manage profits and manage forecasts. The relationship between managers and shareholders can be described through the agency theory, where management cannot show clear indicators for the company's performance for the stakeholders. Shareholders rely on reports as the main source of information regarding the enterprise's economic performance. Hence, investors and financial analysts mostly rely on accounting information provided in financial reports for evaluation purposes, and by extension, it will motivate managers to manipulate profits to affect the performance of stock prices (Etengu et al., 2019).



A contractual motive could also be mentioned in this regard. It generates an incentive for managers to manage profits. For example, debt contracts include some legal terms that the borrower must adhere to during the contract period, and if these legal terms are violated, the company will bear a high cost represented in the penalties from exposure to judicial accountability. The directors are expected to choose the accounting policies that increase the profit values disclosed for the current year to reduce the possibilities of contractual terms for debts based on accounting numbers, especially for companies in a position close to violating the contractual terms of debt. Accordingly, it is expected that the managers will manage the earnings to transfer earnings from future periods to current periods (Rani et al., 2013).

Some studies have explored the effects of two forms of organizational motivations on earnings management: industry regulation and anti-monopoly regulation. According to the positive accounting theory, when a firm is exposed to high political costs, it is likely that its managers will reduce the value of the profits disclosed for the current year. This is because large companies can attract the media or politicians' attention and that when these companies disclose huge profits as a result of increasing prices on consumers. This leads to the regulatory authorities trading to face the monopoly, which results in managers choosing the policies and the accounting methods that would transfer the profits from the current period to future periods (Othman and Zeghal, 2006).

According to Minanari and Rahayu (2020), self-motivated management<sup>8</sup> uses earnings management techniques as follows:

- afflicting a negative impact on stock prices and then acquiring them,

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<sup>8</sup> Self-motivated management is defined as management that focus on tasks in order to achieve the set goals, and usually this type of management is repaid according to the performance and achievement of goals (Walker, 2013).

- Preserving the reputation of the organization's managers to enhance their position in maintaining their job positions. If the management performance evaluation is based on a target profit number or last year's profit number or the basis of the rate of growth in profits, the management will have a motive to manipulate the profit number to agree with the scale used,
- providing large incentives for management: as management seek to manage the profits to exhibit larger amounts of profit to increase the incentives provided to them,
- manipulating the earnings of the company to provide sufficient justifications to stakeholders when seeking to enlist the shares of the company in the market,
- practicing good management, as the new management resorts to getting rid of all bad accounting matters by uploading them to the year in which the change occurred. By doing so, the new management appears better when evaluating its performance in the coming years, and it has brought about an improvement in the organization's performance.

### **2.4.3 Earnings management measurement**

According to Marai and Pavlović (2014), accounting literature does provide a variety of methods for measuring earnings management; However, their capability is still open to question, with all methods having advantages and disadvantages in comparison to others which academics must consider when identifying earnings management. In reality, the advantages and disadvantages of all methods eventually rely on determining the level and instruments for modifying the reported earnings. (For a comprehensive literature review on all these methods, see Marai and Pavlović (2014).

The accruals basis is considered one of the most used methods to measure earnings management carried out by companies' management, which is based on the principle of matching revenue and expenses that pertain to the current period. It could be affected by selection, estimation, and personal judgment. Management exploits this opportunity to practice earnings management and influence the realized profit. Profits consist of cash in hand and accruals (Chen et al., 2015).

#### **2.4.4 Results of earnings management**

Earnings management could benefit the organization in the short term; however, it leads to serious problems in the long term (Weerathunga et al., 2020). First, it could deteriorate the value of the firm. Also, it increases optional expenses such as maintenance, production incentives and training and development expenses, resulting in lost productivity. Second, it can conceal operational management problems where earnings management is not limited to only senior management. Third, it could lead to economic sanctions and the restoration of financial statements.

#### **2.4.5 Warning signs of earnings management**

There are two kinds of earnings management: efficacious earnings management (to develop earnings credibility in sharing private information) and opportunistic earnings management (i.e., managers report earnings opportunistically to maximize their utility) (Scott, 2000). Internal auditors should carefully research any warning signs that indicate the existence of earnings management. Examples of these are (Shahzad, 2016):

- Cash flow is not tied to earnings.
- Client accounts that are not linked to revenue.
- Provision for doubtful debts that are not related to client accounts.

- Reserves that are not related to the balance sheet items.
- Profits that accurately and consistently meet the expectations of financial analysts.

#### **2.4.6 Committee of Sponsoring Organizations (COSO) framework and earnings management**

The COSO Board prepares advisory publications to help firms identify the risks, internal controls and detect fraud (Snook, 2019). According to COSO (2013, p.3), "internal control is a process, effected by an entity's board of directors, management, and other personnel, designed to provide reasonable assurance regarding achieving objectives relating to operations, reporting, and compliance." The COSO framework divides internal control objectives into three categories that are operations (e.g., performance goals), reporting (e.g., internal and external financial reporting), and compliance (e.g., adhering to laws and regulations) (COSO, 2013). In other words, the COSO framework specifies enterprise risk management (ERM) practice through several attainments of internal control targets (COSO, 2004).

Companies with more consistent and accurate financial statements and audit standards compliance that results in more significant internal control and financial reporting quality are assumed to have high-quality ERM systems (Wang et al., 2018). Further, Wang et al.'s (2018) study has demonstrated the positive association of weaker ERM performance in earnings management, suggesting that inadequate ERM performance will likely allow managers to manage the earnings. Ultimately, one of ERM's goals through various mechanisms (e.g., IAF quality) is to reduce overall business risk by having higher financial reporting quality (e.g., lower earnings management).

#### **2.4.7 Earnings management – pros and cons**

Based on the above discussion in section 2.4, earnings management's implications have several crucial pros and cons on companies, as illustrated in Table 3.

**Table 3: Pros and cons of earnings management**

Pros	Cons
<ul style="list-style-type: none"> <li>- Earnings management enables employees to seek a salary raise because of the high financial performance</li> <li>- Shareholders also want extra dividends if the management engages in upward earnings management</li> <li>- The stock market prices the discretionary accruals (earnings management) into the share price (Subramanyam, 1996)</li> <li>- In their final work years, earnings management may motivate CEOs to lower expenditures on research and development and may improve reported profits (Dechow and Sloan, 1991)</li> <li>- Higher earning management leads to higher corporate value (Jiraporn et al., 2008)</li> <li>- As earnings management is likely to increase financial returns and long-</li> </ul>	<ul style="list-style-type: none"> <li>- Earnings management does not enable investors to receive accurate decision-making information</li> <li>- Stakeholders are mistaken about the company by getting inaccurate information because of earnings manipulation</li> <li>- Earnings management may generate many inaccurate transactions in the financial accounts</li> <li>- Earnings manipulation motivates managers to ignore recording costs in the appropriate time</li> <li>- In case the firm collapses due to a scandal that is related to such earnings manipulation, many people will lose their jobs</li> <li>- Abnormal accruals (earnings management) may be recognized before initial public offers, which leads to overvalued stocks' prices</li> </ul>

<p>term shareholders' value, managers will face more powerful pressure in the working environment (Matsumoto, 2002)</p>	<p>- Companies with higher earning management suffer from more agency costs (Jiraporn et al., 2008)</p>
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#### **2.4.8 The relationship between IAF quality and earnings management**

Demand for high-quality IAF appears due to the need to improve the relationship between parties involved in the business, such as owners, creditors, public authorities, workers, and customers (Weerathunga et al., 2020). The IAF aims to reduce information asymmetry between these parties thanks to the high quality of IAF related to a low information asymmetry level. It adds credibility to the prepared financial statements (Weerathunga et al., 2020).

Previous studies (e.g., Johl et al., 2013; Christ et al., 2015; Abbott et al., 2016) have confirmed the negative relationship between the quality of IAF and earnings management, as it is concluded that the quality of IAF leads to a limitation of management practices in earnings management.

The quality of the IAF lies not only in the importance of the information provided by the financial statements of the parties participating in the business but also in the conflict of interests between these parties, methods and practices for managing profits in a manner that achieves interests for one party have emerged at the expense of the others.

As a result of these practices and the importance of ensuring the clarity of this accounting information, various organizations and agencies have considered enacting legislation and publishing recommendations that ensure a reduced risk of information asymmetry between the parties.

## **2.5 Review of previous studies on the relationship between IAF quality and earnings management**

There have been many studies that dealt with the relationship between IAF quality and earnings management. For instance, Ghaleb et al. (2020) tested the IAF's control role upon real earnings management (REM)<sup>9</sup>. The study investigated the impact of the sourcing arrangement of IAF on earnings management and investing in IAF. This research sample consisted of 1,056 observations from a new market in Malaysia from 2013 until 2016. The study's findings show that the relationship between earnings management and the IAF is negative. The managers' ability to manipulate earnings is reduced by the IAF high quality, thus impairing managing earnings in their interests. The results help in reporting the significant role of IAF to the managers, regulators, other investors, researchers, and shareholders.

Other researchers have also examined factors that could better explain the effectiveness of IAF in mitigating earnings management. Hashim et al. (2019) investigated the effects of in-house or outsourced IAF on companies' earning quality.

Azzali and Mazza (2018) examined the association between the IAF, earnings management and combined assurance. They choose combined assurance variables according to the prior literature review and as long as improving IA quality is assured through regulations and standards as an effective coordination strategy. These variables are used to verify when they adopt effective coordination strategies and improve shared knowledge based on Relational Coordination theories and Tacit Coordination Mechanisms. The scholars predict the importance of combined assurance in improving earnings and IA quality through preventing gaps in monitoring and risk coverage and duplication of efforts.

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<sup>9</sup> Janin (2000) states that REM involves real business activities that have a direct impact on operating cash-flows. Also, Ewert and Wagenhofer (2005 p. 1102) describe REM as “changes the timing or structuring of real business transactions to alter earnings”.

The findings reveal that remediation, reporting, education and meeting as combined assurance components importantly and positively are related to the quality of internal audit. However, earning management importantly and negatively is related to combined remediation and reporting. Based on common ground and shared knowledge, the results show the effective means of implementing coordination strategies.

The current thesis examines a different environment from previous studies. It is distinguished from previous studies in its main objective, which seeks to identify how moderating factors at the country and corporate levels affect the relationship between the quality of the IAF and earnings management.



## **Chapter 3. The theoretical perspective of IAF quality and earnings management**

### **3.1 Introduction**

Internal auditing can be understood as a mechanism in the corporate governance setting. Consequently, theories and frameworks explaining the development of corporate governance could be applied to IAF. Most corporate governance theories and frameworks have been derived mainly from other disciplines such as economics, finance, accounting and law (Mallin, 2016). There are some drivers behind the development of corporate governance theories (i.e., agency theory, resource dependency theory, and stakeholder theory): the country's culture, institutional factors, and political and legal systems (Goergen, 2012). Hence, some of these theories may be more relevant to some contexts than others (Mallin, 2016). Identifying and understanding the theories explaining the factors influencing the IAF quality and earnings management help businesses' leaders to set a proper measure to improve the IAF quality and reduce earnings management. This chapter addresses three main theories associated with this research: institutional theory, resource dependence theory and agency theory.

### **3.2 Theoretical perspective for the country-level factors (institutional theory)**

The institutional theory can explain the country level factors influencing the relationship between IAF and earnings management. To illustrate, institutional theory has a central tenet that institutions will take on similar institutions' characteristics by what is known as isomorphism<sup>10</sup>. Institutions will acquire similar structures, values, and norms based on other institutions in their field. This is done for several reasons. Though it may seem counter-intuitive

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<sup>10</sup> Isomorphism is the similarity of one organization's processes or structure to those of another, whether the outcome of imitation or independent development under comparable limitations. Institutional isomorphism is classified into three types: normative, coercive, and mimetic.

to innovation and efficiency, there are logical reasons that drive the process. An institution has a primary motive to be viewed as legitimate. This maintains its credibility in the eye of the public and its stakeholders. Legitimization is required to satisfy its stakeholders and justify their courses of action. According to DiMaggio and Powell (1983), this legitimacy is gained through (i) external coercive pressures, (ii) by simulating similar organizations, or (iii) through pressures to meet professional expectations. These three forces combine to generate isomorphism as a means to attain legitimacy.

First, coercive pressures are pressures exerted by external forces, usually by government regulations, to enforce organizations to comply with several legal requirements and standards. Scott (1987) noted that "... an institutional perspective gives special emphasis to authority relations: the ability of organizations, especially public organizations, to rely on legitimate coercion" (p.502). This maintains legitimacy and a pragmatic approach to staying in business.

Second, mimetic forces are driven by the belief that what works for other organizations will work in any organization. In doing so, it contributes to isomorphism. It allows an organization to create structure and strategy without evolving through the initial growth phases. It may be done for convenience or cost savings (Kossek et al., 2010). It can also result in the copying of unwanted characteristics such as fads, styles and trends for which there is no logical support (Abrahamson, 1996). The institutional theory pushes for that, along with the tried and true methods being copied. There are also the phenomena of 'monkey see, monkey do' where most internal auditors work without understanding what they do exactly (O'Fallon and Butterfield, 2011).

Third, the normative forces are defined as the professional and community standards that influence an organization and its effect (Martinez and Dacin, 1999). Organizations are expected to adopt guidelines and principles based on existing professional organizations. DiMaggio and

Powell (1983, p.148) described the profession as one of the "...great rationalizers of the second half of the twentieth century". Normative forces guide an organization and shape it from its inception through its long-term evolution.

Generally, the institutional theory argues that organizations strive for continuity, survival, sustainability, and stability. It promotes the legitimacy of the organization and, in doing so, creates an isomorphic institution. It is naturally resistant to change and frames its members' beliefs, norms, and actions to previously held notions of success. The institutional theory would tend to create organizations that were likely to adopt late and slow to innovate. They would resist taking the risk and strive to satisfy all their clients and stakeholders within their policies (Lammers and Garcia, 2017). The external environment would greatly influence the firm, and the individuals in the organization would also assume that role, striving for continuity, survival, sustainability, and stability.

Additionally, the institutional theory argues that organizations aim at maintaining legitimacy in the institutional environment to guarantee their survival. Institutions include the rules, routines, and norms that organizations put into practice in their operations (Glover et al., 2014); however, the definition is not limited to these factors. Organizations choose the institutions within which to operate based on legal, internal, and external influence. For example, companies have to implement legal rules that affect them in their operations. Another example is that organizations may choose rules and behavior that have led to the success of others in the industry. Finally, companies prefer institutions favorable to the internal environment, for example, rules that motivate employees to work hard (Orlitzky and Swanson, 2008).

All in all, the discussion above indicates that organizations desire institutions that are acceptable to stakeholders such as employees, the government, and shareholders. A lack of conformity, for example, to legal institutions may ruin the company's image to the public

(Idowu and Louche, 2011). This is because the public supports companies that follow the institutional frameworks that the government sets. Organizations also have to implement rules and norms favorable to employees; the failure to execute such rules leads to negative attitudes from workers and high employee turnover. This enhances the public, corporate image and credibility of the organization's activities to society. Institutional theory (North, 1990) also provides an appropriate theoretical framework for managerial behavior. Institutions in society provide the game rules that monitor the interplay between organizations, the game players, who attempt to exploit the institutions' opportunities to increase their welfare (Li, 2004).

Protecting shareholders is intended to regulate four cornerstones related directly to management, internal audit, external audit and audit committees (Prawitt et al., 2009). This means that IAFs effectively develop shareholder protection structures and evaluate internal control effectiveness significantly. The corporate governance reforms in several countries pay more attention than before to IAF to enhance the quality and transparency of the financial reports. For instance, the SOX (2000) in the US requires that all companies' management report on the internal control structures<sup>11</sup> (Section 404, SOX, 2002). In 2004, the New York Stock Exchange (NYSE) mandated all companies to maintain their internal audit practices. It launched additional regulations to assess if the companies comply with recent regulations and identify the IAF role to measure audit practices' nature, time, and the extent and ensure that shareholders' rights received adequate protection and avoid fraud. Besides, there is evidence that IAF practices are associated with improving the control environment reflected in improved shareholder protecting, mainly in improving the financial reporting quality (Holt and DeZoort, 2009).

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<sup>11</sup> Internal control structure includes a "company's plan of organization and all the procedures and actions it takes to protect its assets against theft and waste, ensure compliance with company policies and federal law and evaluate the performance of all personnel to promote efficient operations (Turedi and Celayir, 2018, 2)."

### **3.2.1 Institutional-based theory and the institutional economics perspective**

Theoretical foundations for institutional theory are extensive for investigating a wide range of topics concerning multinational firm administration at various levels of analysis (Meyer and Peng, 2016). However, institutional theory can be classified into three sub-theories: (i) institutional economics, (ii) organizational institutionalism, and (iii) comparative institutionalism. First, the institutional economics theory was developed by North (1990). Second, organizational institutionalism theory that initiated by several scholars (DiMaggio and Powell, 1983; Scott, 2008). Third, comparative institutionalism theory that developed by Hall and Soskice (2001) and Whitley (1999). The key difference among these sub-theories is the impact of institutions on organizations (Greenwood et al., 2008).

North (1990) defines institutional economics as an objective that underlines the institutional quality and creditworthiness of a particular country and that distinguishes the significance and role of formal and informal institutions. The main objective is institutionalization, namely, the establishment of specific methods of social life that are lawful and commonly practiced and the impact on the organizations of these institutionalized arrangements (Scott, 2008). A system or a holistic approach, comparative Institutionalism suggests typologies of national institutions such as a free-market economy or a coordinating market economy as defined by Hall and Soskice (2001).

This thesis argues that institutional economics is the most appropriate perspective to the research's objectives. First, institutional economics describes the behavior of companies via conceptions of economic rationality and effectiveness under the institutional context's limits (Kostova and Marano, 2019). Second, institutional economics considers organizations to be humanly designed limits that minimize uncertainty between all economic characters involved and affect production costs (North, 1990). This thesis addresses the IAF quality that cannot be

accomplished without considerations for the levels of rationality, effectiveness and availability of resources described in institutional economics.

### **3.3 Theoretical perspectives for corporate-level factors (resource dependence theory and agency theory)**

Resource dependence and agency theories can explain the corporate-level factors influencing the relationship between IAF quality and earnings management.

#### ***Resource dependence theory***

The theory of resource dependency is power and control derived from resource dependence and external constraints. It is also impossible for a single company to have all the resources necessary to sustain a competitive advantage. The resource dependence theory focuses on the fact that even efficient companies can fail if they cannot access the scarce resources that may be critical to their survival. This theory is based on the assumption that successful organizations possess internal structures that match environmental demands. Coping effectively with uncertainty is essential, and the directors serve to link the organization with the external environment to reduce uncertainty. This link is essential as firms need to maintain a good relationship with external stakeholders, and even non-contractual stakeholders are linked to the firm. However, the firm's benefit depends on how the directors can access resources and information (Clarke, 2004).

Through establishing partnerships and joint ventures, a company may have successful access to the expertise and skills of its business partners. In other words, companies with a shortage of unique resources can obtain these resources by maintaining external connections. The resource dependency theory proposes that companies become dependent on each other to generate such complementary properties. Researchers found that there has been a strong trend toward the development of core capabilities through knowledge exchange, investments in

relation-specific assets, and complementary capabilities. Outsourcing big data analytics could be one of the knowledge exchanges that firms may need to adopt.

Further, the resource dependence theory observes independent external auditors as 'boundary spanners' who extract experiences from several business situations (Haislip et al., 2013). It expects that more resource-rich independent external auditors would facilitate to bring invaluable experiences for better organizational performance. This claim has obtained certain empirical evidence. For instance, Carpenter and Westphal (2001) stated that external auditors contribute to the strategic decision-making procedure of an organization. Furthermore, independent external auditors can facilitate organizational information attainment, i.e., access to big data and contracting professional big data analytics. Accordingly, the resource dependence theory can illustrate the practical framework of coordination and assistance between internal and external auditors and the advantages of having access to big data analytics (Regoliosi and Martino, 2019). It should be noted that both auditors (internal and external) and big data are categorized as resources in any company (Regoliosi and Martino, 2019).

Therefore, by drawing upon the relevant theoretical and empirical literature, it can be stated that the resource dependency theory can illustrate the assistance and cooperation between both types of auditors and outsourcing big data analytics for IAFs purposes.

### ***Resource dependence theory; intangible assets, and cooperation approach***

According to Barney and Arikan (2001, p 138), resources are defined as "tangible and intangible assets that firms use to conceive and implement their strategies". The intangible asset is a physically recognizable non-monetary asset (e.g., computer software, licenses, trademarks, patents, films, copyrights, and import quotas) (IFRS, 2021). As big data has no physical existence, it is a part of firms' intangible assets.

On the other hand, intangible resources are often more likely to match the criterion for strategic resources (i.e., valuable, scarce, hard to imitate, and unique) than tangible resources (Edwards et al., 2014). Firms seeking long-term competitiveness should consequently prioritize efforts to maintain and grow their intangible resources (Edwards et al., 2014; Kamasak, 2017). Brynjolfsson et al. (2002) show that these intangible assets would offer actual rewards in increased output. Thus, after accounting for conventional inputs (such as capital, labor, and materials), a production function model should indicate that businesses that implemented more of these intangibles experienced higher yield in the following years (Brynjolfsson et al., 2002). Further, Ocaik and Fındık (2019) argue that intangible assets (including big data) significantly impact long-term growth rates and company value.

Firms need to get resources from the outside world to survive. Big data analytics can be obtained through an outsourcing scheme if the in-house approach is not available due to scarcity of resources or lacking skills. In other words, external stakeholders must be approached for resources that cannot be provided internally (Scott and Davis, 2015). Additionally, big data analytics can be outsourced through the phenomenon of cooperation that can be explained by resource dependence theory (Ozcan and Eisenhardt, 2009).

Cooperation competition results from two significant influences: the tension of competition and the drive for collaboration (Bengtsson and Kock, 2000). Broadly, according to the literature, cooperation happens when two or more businesses adopt both competitive and cooperative initiatives simultaneously (Lado et al., 1997). These approaches are based on two different interaction rationales: competing and mutual desires (Bengtsson and Kock, 2000). Cooperation can be considered a chance to expand the market size by collaborating with competitors rather than competing for a substantial individual business market share (Zacharia et al., 2019). The desire for innovation, the sophistication and significant level of technological advancement of commodities, and the diversity and distinctiveness of resources all influence cooperative



relations (Zakrzewska-Bielawska, 2013). Czakon (2009) argues that coopetition is a framework of players interacting with each other based on a degree of objective and business compatibility. Also, his study claimed that coopetition focuses on the mechanisms of creating value and realizing the rewards that result from them, rather than just the relationships between partners. In other words, by implementing coopetition, firms attempt to get access to scarce resources, which can only be obtained by partnering with their competitors (Zacharia et al., 2019).

The resource-related factors promote coopetition due to the firm's resource-based perspective (Dagnino and Rocco, 2009). Thus, the unique and complementary structure of the resources involved in coopetitive relationships is a foundation of relationship competitive advantage (Dyer et al., 2001). As the demand for such resources grows over time, firms that demand and provide such services grow more real worth on each other (Madhok, 1997). Coopetition allows individuals to reap the benefits of cooperation while also competing, resource sharing, or constructing common resources, sustaining competitive relationships between the parties, and protecting their unique, usually unusual resources (Zakrzewska-Bielawska, 2013).

Coopetitive relationships are developed to restrict particular resources for other competitors, which boosts the coopetitors' competitive advantage over their remaining competitors (Das and Teng, 2000). Coopetitive raises the possibility of resource leakage. However, "coopetitors ought both to protect their shared resources against undesired leakage and use by competitors from outside the relationship and to protect their own key resources which are not the subject of competitive cooperation" (Zakrzewska-Bielawska, 2013, p.52). As it explains the motivations for cooperation, resource dependence theory underlines the necessity of resource interdependence.

## *Agency theory*

Based on the agency theory, a firm is contained in a chain of contracts between the owners of economic resources (the principals) and managers (the agents) who are in charge of utilizing and controlling these resources (Jensen and Meckling, 1976). Agency theory sets that agents have more information than principals and that this information asymmetry negatively affects the capability of principals to check whether or not their interests are adequately represented and served by agents. Additionally, it is assumed that principals and agents behave rationally and use the contract to increase their capital and wealth.

Since the principals do not have access to all the information available when the agent makes a decision, they cannot decide if the agent's decisions are in the company's best interest. Nevertheless, internal auditors can access this kind of information at the right time to ensure that the agents' decisions are in the best interest of the company. Additionally, it is claimed that the more information asymmetry the company has, the greater the need for internal auditors. As a result, investing more in the internal audit department means that the IAFs get better productivity in terms of monitoring the company's operations that have information asymmetry.

Agency theory defines agency costs as the principal's (equity owners) costs due to the agent's existence (management) when they make corporate decisions that are not in the company's best interest. The agency theory analyses the agency's costs by assessing financial decisions regarding risk, feasibility and trade-off between the parties' interests. It can be understood that profit maximization becomes a zero-sum game where one party becomes worse off as another becomes better off. As stated in agency theory, management implements internal auditing and other internal monitoring processes to signal to shareholders that management effectively discharges its duties to optimize shareholder wealth (Jensen and Meckling, 1976). For instance, the study of McKnight and Weir (2009) that examined the company's merger operations

showed that a vast pool of funds available to managers could be used to maximize the utility's value of management by facilitating the acquisition of other companies. A large body of research (e.g., Rau and Vermaelen, 1998; Kelly, 1999) shows a lack of positive returns for the owners of the acquiring firm and, thus, a high level of acquisition activity may be an indication of a high level of agency costs as it contributes to a decrease of shareholders valuation, resulting in residual losses.

Therefore, this finding indicates that increased management ownership can influence the board of directors to provide a higher quality of IAFs to track managers' performance closely. It is also probable that management with higher equity holding is encouraged to invest in a broader IAF to further track profits and inform the Board of Directors that they are confident that the best use of funds needs to be through their high share of earnings determined regularly.

Also, Adams (1994) concluded that agency theory could help understand the presence and roles of the IAF and could offer a valuable basis for more analytical studies. He also argued that agency theory leads to set up IAFs (internal audit department) that will monitor managers' decisions to protect the interest of the company's parties (e.g., board of directors, the shareholders and the debtholders). Basic economic theory suggests that people tend to increase their own personal benefit or level of happiness. The audit role offers some guarantee that managers and inside shareholders should not pursue this objective to the detriment of external shareholders and debtholders.

Of course, internal auditors play various roles in controlling and monitoring organizational resources. Agency theory suggests that external audit may theoretically lead to better organizational performance (Lary, 2014). It proposes that external auditors, because of their presumed independence, can be capable of better auditing strategy, risks and organizational resources, which might help improve the IAF and its quality. The agency theory highlights the

board as a monitor of management activities to minimize agency costs, with the shareholders' interest in focus. It considers the relationship between the non-managing owners and the non-owning managers. Therefore, this theory rests on the contractual view of the firm (Clarke, 2004). This is based on a contract between the financiers and the managers. Managers raise funds from the financier and put them to effective use, while the financiers need specialized human capital to generate returns on investment. However, keeping the shareholders' interests in mind, the managers work under constraints to reduce funds' misallocation. The agency theory is based on the self-interested utility-maximizing motivation of individualized actors. Hence, the relationship between the shareholders and the management could be in a low trust position. Contracts tend to be incomplete and subject to hazards because of people's nature, including self-interest, bounded rationality, and risk aversion (Lubatkin et al., 2005). Information is distributed asymmetrically in an organization, and agency problems can also occur as agents take actions that favor their interests (Seth, 2016).

Likewise, internal auditors engage in regular meetings, management decision-making, and information reporting, which aid independent directors in fulfilling their roles (Baatwah and Al-Qadasi, 2019). Internal auditors also communicate the organization's goals in developing and executing the organization's strategies. Hence it can reduce earnings management through the provision of accurate financial reports. Internal auditors administer the operations of organizational financial plans and strategies, evaluate the major risks and ensure that the organization is properly controlled and supervised, thereby enhancing its performance (Al-khabash and Al-Thuneibat, 2009). However, some businesses deal with big data that will likely contain business hazard signs and strategic risks. In case that internal auditors lack technological skills, which is most likely existed, then outsourcing big data analytics could help IAFs maintain higher financial reporting quality and reduce agency costs. Some could argue that outsourcing such data is not demanded if internal auditors can learn to analyze big data.

The author of this thesis thinks that third parties specializing in big data analytics would have more resources (e.g., software, technical support, technicians) to analyze big data comparatively to internal auditors even if they were well trained.

Independent external auditors can lead to more effective coordination within organizations. As a result, such effective coordination reduces the divergent interests between shareholders and management, consequently reducing agency costs. It seems that organizations, which are complying to appoint independent external auditors, engage in good corporate governance structures along with practices. Such strong corporate governance structures act as a basis to access the international capital market (Schneider, 2009). However, empirical research studies have found a mixed association between independent external auditors and organizational performance. For instance, Pham et al. (2014) has found that organizations' investment opportunities are strongly related to the effectiveness of external auditors. The study also suggests that external auditors ensure that the activities of organizations are value-adding.

Consequently, based on the above discussion, it can be claimed that assistance between external and internal auditors can promote a decrease in earnings manipulation, and outsourcing big data analytics, the agency theory can demonstrate both.

## **Chapter 4. Literature review and research hypotheses development**

### **4.1 Introduction**

The previous chapter highlighted the theoretical perspective underlining this study. This chapter aims to develop the different research hypotheses addressing the moderating factors of country and corporate levels on the relationship between IAF quality and earnings management (see Figure 1). Addressing the theoretical and empirical literature helps identify the research gap and pave the way for research hypotheses development.

### **4.2 Moderating factors for the quality of IAF and earning management on the country level**

#### **4.2.1 Shareholder protection environment**

One of the basic mechanisms of corporate governance is auditing, and its specialists undertake one of the essential controlling and monitoring roles in the businesses. The auditing function has been tested as a fundamental independent element in corporate governance. Nevertheless, some studies affirm that the auditor's governance role is probably a part of the national corporate governance system (Newman et al., 2005). The enacted regulations and auditing quality are likely to impact the shareholder protection environment. The literature shows there are inconsistent findings on this triangular relationship.

One perspective is that if the quality of the country-level legal environment is weak, external corporate auditing services are highly demanded. Higher demands for a substitute increase when one mechanism is believed to be weak. Shedding light on the relationship between the auditors' external services and the influence of the regulations of shareholders protection, the rationale to fulfill the entire desire of governance level is that more demand for the former results from having less of the latter (Fan and Wong, 2005). It is supposed that a low level of shareholders protection regulations causes the market to be an insider-dominated structure of corporate governance and

intensive ownership (La Porta et al., 2000). Ball et al. (2000) document that in the context of the shareholders' governance system, the entire demand for public accounting information is reduced since the representation of owners on the management team and the board makes them the most influential because they often have a direct source of information. Thus, it reduces the demand for external services of auditors (Coffee, 2006). Similarly, it is supposed that more unstable ownership described as minority ownership and controlled by outsiders is due to the need for a high standard of shareholder protection regulations (La Porta et al., 2000). This leads to generally more demand for auditing and public accounting, particularly auditing and high-quality accounting (Ball et al., 2000).

A contradictory perspective is that in a strong (weak) legal environment, demanding auditor services is high (low). The core of this perspective is that the legal environment sets the foundations of some market essential characteristics. It is supposed that a low level of shareholders protection regulations causes the market to be an insider-dominated structure of corporate governance and intensive ownership (La Porta et al., 2000). Ball et al. (2000) document that in the context of the shareholders' governance system, the entire demand for public accounting information is reduced since the representation of owners on the management team and the board makes them the most influential because they often have a direct source of information. Thus, it reduces the demand for external services of auditors (Coffee, 2006). Similarly, it is supposed that more unstable ownership described as minority ownership and controlled by outsiders is due to the requirement for a high standard of shareholder protection regulations (La Porta et al., 2000). This leads to generally more demand on auditing and public accounting, particularly auditing and high-quality accounting (Ball et al., 2000).

The insufficiency of consensus on this relationship is confirmed by examining some of these contributions in the literature. For example, the demand for high audit quality (e.g., measured as Big-5 market share) is lower in countries with a weak legal environment than in countries with

solid legal environments (Francis et al., 2003). While considering the effect of the legal environment, the impact of governance on the company's level, represented by Big-4 auditors and non-Big-4 auditors, influences the choice of auditors. The governance scores for the company-level are positively related to the probable selection of the company to a Big-5 auditor. In countries with a weak legal environment, this relation becomes more powerful (Hossain et al., 2010). In general, previous studies indicate a positive relationship between auditing demand and legal environment strength. Srinidhi et al. (2009) conclude that countries with a more vital legal environment impose a higher average audit fee, confirming a positive relationship between the legal environment and IAF. They showed that these countries have a lower premium of specialist fees than countries with a weak legal environment. Choi and Wong (2007) study the relationship between the choice of the Big 5 auditor and national legal settings. They find that there is a positive relationship between these variables.

Nevertheless, the increase in the strength of the legal environment negatively affects this relationship. The study showed that demanding auditing services become lesser in more robust legal environments. These studies illustrate some evidence that found a negative relationship between auditing demand and the legal environment's strength.

According to agency theory, as an economic model of behavior, expects that, as long as the objectives of the principal and agent are aligned, the agent will attempt to maximize the goals of the principal; however, when their objectives are conflicted, the view of agency theory is that the agent will attempt to maximize their self-interest over the principal's interests. Accordingly, the motivation for manipulating earnings begins when alignment is conflicted. According to institutional theory, earnings management incentives may be affected by formal or informal pressure, and an organization may create change to model itself on other organizations. Kury (2007) argues that institutional theory provides the best perspective for examining earnings management. He offers the institutional argument for explaining earnings management, which



helps complete the view of agency theory and suggests that insights for earnings management comprise the blending of agency and institutional theory perspectives to obtain a complete understanding of the behavior and the positing of a continuum of earnings management.

Concerning the legal environment, La Porta et al. (2000) revealed that different protection levels for the creditor and shareholder are found in different legal origin- countries. These protections are drawn from the countries' regulatory framework (La Porta et al., 2000). The researchers argue that using shareholder protection levels as a basis for countries' discrimination indicates the law's enforcement and strength. La Porta et al. (2000) show that shareholder protections' strongest regulations can be found in countries with common law system fundamentals like the US and the United Kingdom. On the other hand, the weakest shareholder protection regulations can be found in countries with French civil law foundations. Also, medium shareholder protection environments are located in countries with legal systems originating either from Scandinavian civil law or German civil law. The researchers of this study argue that national markets are affected by these discriminations in that: the ownership of outside (minority) higher levels, less concentrated ownership, more developed financial markets, as the number of listed initial public offerings and firms show, are traits of the regulations of stronger shareholder protections.

Nonetheless, several researchers argued that it is not clear that the historical roots of the national legal environment greatly affect the current markets (Armour et al., 2009). Moreover, the reason for connecting regulations of shareholder protections and legal origins has been doubted too. The study reveals that shareholder protection regulations evolve, and consequently, their relative power differs among countries (Martynova and Renneboog, 2011). According to Huang et al. (2013), investors prefer to invest in countries with a strong shareholder protection environment. Su et al. (2008) found a principle-principle conflict in Chinese public companies, resulting in a less protective environment for shareholders.

To summarize, this study argues that the positive effect of IAF quality on reducing earnings management varies according to changes in the shareholder protection environment. The shareholder protection environment significantly impacts managers' behavior in manipulating earnings. A high shareholder protection environment's practical dominating advantages are likely to force firms to focus on improving the quality of their internal control mechanisms (e.g., IAF quality). In such an environment, financial markets may perceive firms' investments in IAF quality in general as appropriate or desirable, and consequently, value the companies. In fact, financial markets may reward the companies that heavily practice high IAF quality concerning shareholder protection environment changes. Therefore, this study proposes such a moderating effect from the shareholder protection environment on the relationship between IAF quality and earnings management.

Previous research provides evidence that a low level of shareholder protection regulations causes the market to be an insider-dominated corporate governance structure and intensive ownership (La Porta et al., 2000). This leads to more demand for auditing and public accounting, particularly auditing and high-quality accounting (Ball et al., 2000). This thesis, therefore, predicts the first research hypothesis:

**Hypothesis 1: The effects of IAF quality on reducing earnings management are higher for firms in countries with a lower shareholder protection environment than their counterparts with a higher shareholder protection environment.**

#### **4.2.2 The country's legal system**

This thesis defines the country's legal system as which type of judicial system a country follows. There are two main judicial systems: the common law system and the civil law system. The audit literature is scarce on how the country's legal system would affect IAF quality and earnings management. The study of Haw et al. (2004) might be, to the best of this thesis's author's

knowledge, the only study that explicitly examined the effect of a country's legal system (civil vs. common laws) on earnings management. They argue that effective tax enforcement has more impacts on reducing earnings management than the type of a country's legal system (civil vs. common laws) and the efficiency of the judicial system. On the other hand, it seems that no previous studies were able to examine the effect of a country's legal system on IAF quality due to limited data across countries in the area of internal auditing.

Nowadays, organizations face massive challenges through regulatory requirements. For instance, an organization may need to reassess its skill sets, resource requirements and re-evaluate the organizational legislation's thorough impact on regulation needs. Investigating the legislation impact on an organization requires the assimilation of its concept, which refers to its structure in the first place, how to deal with stimuli and take actions to guarantee survival. Changes in organizations trigger more risks, so their survival is crucial to how they cope with the risks and their ability to manage and eliminate such risks.

The discussion so far confirms that it is important to highlight how regulatory changes create unexpected conditions that result in organizational changes and various risks. The relevance of such questions is addressed in several studies. For instance, Merton (1936) concludes that sweeping regulatory changes create unintended consequences. Organizations evaluate risks and reconsider their governance structures after systemic events<sup>12</sup> take place.

The influence of the adaptive organizational capabilities must be sufficient to ensure organizations' survival by altering internal and external control mechanisms (including corporate governance) since they confront environmental changes. Regulation changes are an example of environmental changes. It is a kind of cost that can threaten the organization's existence by consuming its

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<sup>12</sup> Systematic events refer to events of major collapsed businesses that affect a major industry or the entire economy (e.g., collapse of Lehman brothers, Enron, Worldcom, ect.)

resources and affecting its business plans and objectives (Cook et al., 1983). Therefore, the scope and nature of regulation may influence the organization significantly.

Haveman et al. (2001) indicate that some country legislations critically impact organizations and institutions' environment, affecting their structures, strategies, and activities. One instance of the extent of legislation impact on organizational structure, strategies and activities in the US mandate breakup of ATandT. MacAvoy and Robinson (1985) point that though state legislation continued to impose restrictions on the leverage of ATandT, it was still doing well after the divestiture. Other acts reflect how legislation changes organizations and institutions' internal and external environments.

In short, intermittent change extends to all industries, and these upheavals are often provoked by the regulatory regime's shifts (Haveman et al., 2001). Therefore, responses to legislation impact can adjust the ongoing organization's strategies, structure, and activities.<sup>13</sup>

Academic literature generally acknowledges that the country's legal system is critical to the businesses and shareholder protection environment (e.g., Kray and Tawara, 2010). Çule and Fulton (2013) found that a country's legal system has a significant effect on the business environment because it is anticipated that a company that is highly concerned about law enforcement, an adequate level of bureaucracy and efficient corruption control will provide the required framework to secure shareholder performance and enhance the business environment. Other relevant studies also have supported this idea of a close connection between different aspects of the legal system, shareholder protection and economic performance (Price et al., 2011; Rodrik, 2004). The conclusion that could be made in this regard is that the country's legal system's quality is likely to affect businesses' environment.

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<sup>13</sup> This point is further illustrated in the theoretical perspective chapter.

To recap, the real influence of IAF quality (as a part of corporate governance) on reducing earnings management differs across countries depending on the quality of a country's legal system. Through several such regulations and country-level standards, companies will be required to concentrate on improving the efficiency of their internal monitoring mechanisms (e.g., IAF quality). However, according to research, "the practice of earnings management is present in almost all countries, but countries with very weak legal institutions experience this practice at its highest level " (Capkun et al., 2008, p.1). Additionally, this thesis proposes that high IAF quality will complement these ineffective and weak legal mechanisms in civil law countries. As a result, this study suggests that the country's legal system has a moderating impact on the relationship between IAF quality and earnings management.

Following the current discussion, the second hypothesis has been formulated.

**Hypothesis 2: High IAF quality reduces earnings management for firms in civil law countries more than common law countries.**

#### **4.2.3 The country's economic status**

This thesis defines a country's economic status as to whether the country's economy is a developed or developing market. Developing countries have historically lacked an effective and stable rule of law, resulting in a "poor governance" environment (Dharwadkar et al., 2000; Mitton, 2002). Moreover, according to Vasilescu (2008) and IMF (2019), any country's economic status plays a role in shaping how efficient corporate governance for listed companies is. Thus, firms in developed markets have better corporate governance than firms in developing markets.

The quality of audits requires technical competence and auditors' judgment (for an early framework, see Libby and Luft (1993) and for a recent review as well as Lennox and Wu (2018). Various audit deficiencies, which auditors in their inspections determine, are because of the insufficient exercise of professional skepticism according to The Public Company Accounting

Oversight Board (PCAOB) in the US and other regulators all over the globe (e.g., the Financial Reporting Council [FRC] in the UK). Many studies focus on auditor skepticism by identifying the characteristics and degree reflected in auditors' actions and decisions by revealing their influential factors (Nelson, 2009; Nolder and Kadous, 2018).

Since the environment identifies the auditor's receiving exposure type, it can passively imprint (e.g., Arieftiara, 2013). In contrast, when an environment appreciates an auditor's value, it might actively establish a specific human capital type (e.g., Dessein and Santos 2017). It is well established that greater uncertainty is one of the economic downturns' features. It makes it more complicated to evaluate outsiders' financial performance (e.g., Loh and Stulz, 2018). Moreover, Hawkins (2009) yields that corporate earnings are affected negatively by economic downturns, and during these periods, executives are under stress to embellish their financial performance. PCAOB (2017) highlights that auditors' role expands to have logical assurance about whether a material misstatement is found in the financial statements. When uncertainty is intensified during economic downturns, internal auditors should be more skeptical. Accordingly, Moussalli et al. (2016) show that internal auditors focus more on fraud detection during economic downturns. It is assumed that in economic downturns, auditors at the early career stage would show skepticism as a critical audit professionals' attribute. They also would positively adopt a skeptical mindset and carry their initial environment imprint throughout their profession.

Therefore, given the above discussion, this study extends the previous limited studies by investigating the moderating effect of a country's economic status on the relationship between IAF quality and earnings management. In this vein, the literature made the presumption that the economic status may strengthen or weaken corporate governance toward achieving better financial reporting quality (lower earnings management). For example, it is expected and found that developed markets have higher national corporate governance than developing markets (e.g., La Porta et al., 1998; Djankov and Murrell, 2002). Hence, IAF quality, as an internal control

mechanism and a key component of corporate governance, is likely to have different effects on reducing earnings management between developed and developing markets.

In short, studies have found that developing countries have historically lacked an effective and stable rule of law, resulting in a "poor governance" environment (Dharwadkar et al., 2000; Mitton, 2002). Also, La Porta et al. (1998) and Djankov and Murrell (2002) find that developed markets have higher national corporate governance than developing markets, while Moussalli et al. (2016) show that internal auditors focus more on fraud detection during economic downturns. In connection, the author of this thesis argues that IAF quality is likely, at least partially, to compensate for a weak national corporate governance in developing economies. Stated in the alternative form, the third hypothesis follows:

**Hypothesis 3: High IAF quality reduces earnings management for firms in developing economies more than developed economies.**

#### **4.3 Moderating factors for the quality of IAF and earnings management at the corporate level**

##### **4.3.1 Assistance between internal and external auditors**

To the best of my knowledge, the study of Abbott et al. (2012b) is the only study that examined the relationship between the assistance among internal and external auditors and earnings management. Abbott et al. (2012b) found an inverse but not significant relationship between the relative extent of internal audit assistance provided to the external audit and earnings management. Another study carried by Gras-Gil et al. (2012) found that greater coordination and cooperation between internal and external audits improve the quality of financial reporting. Also, Dumitrescu and Bobițan (2016) argued that if the internal auditors work together with the external auditors, the results will increase the quality and the effectiveness of the organization's systems and activities.

On the other hand, previous studies found that internal and external auditors complement each other in their auditing duties. For instance, Mautz (1984) found that the internal auditors considered that the least appealing aspect of their jobs is the external auditors' relationship. Peacock and Pelfrey (1989) carried out a survey and used two separate questionnaires to study the relationship between internal auditing directors and staff members directly in touch with external auditors. Participants were asked to assess the relationship's nature with the organization's external auditors and their entire performance. The study concluded that the internal audit directors felt that the relationship between external and internal auditors is good, and the external auditors rely on internal auditors to accomplish some of their auditing tasks. Al-Twajry et al. (2004) found low cooperation between internal and external auditors in Saudi Arabia and argued that external auditors felt limited access to internal auditors. These studies show that, in certain contexts, the relationship between internal and external auditors and the coordination and cooperation in their work is insufficient.

US was the home of most of the previous studies, which were carried out on certain factors as the studies focused on the “Statement on Auditing Standard (SAS)” No. 9, *Effect of an IAF on the Scope of the Independent Auditor's Examination* (Edge and Farley, 1991). SAS No. 9, in specific, requires assessing internal auditors' objectivity, work performance, and competence by external auditors when deciding reliance. Generally, such studies concentrated on determining the relative significance of objectivity, work performance and competence.

Brown (1983) conducted an early study to evaluate external auditors' assessment of the strength of IAF. A group of 101 external auditors was mailed explanatory packages at four "Big Eight" accounting companies in different areas across the US. The study focused on the impact of the three elements (objectivity, work performance and competence), noted in the SAS No. 9, on assessing IAF's reliability by the external auditors. The findings proved that the primary elements that affected auditors' judgment were objectivity and work performance. Most of the judgments of



IAF's reliability by the external auditors varied to extract the following attributes: (1) the internal auditors' work during the prior audit; and (2) the degree to which the independence operation is ensured by the internal audit departments' reports at the level of organization.

Using explanatory study, Abdel-khalik et al. (1983) examined the impact of three Electronic Data Processing (EDP) techniques (Test Data, Generalized Audit Software and Integrated Test Facility) and two variables of the organization relative to work performance and independence of internal auditors (mainly, the responsibility level of the internal auditors to review application programs changes and whether the internal audit department report enough). The impact of these factors was investigated on the external auditors' judgments in the process of planning audit programs. The findings showed that the most significant factor in the external auditor's judgments was internal auditors' independence (whether the reports of internal audit staff were received by the corporate audit committee or the controller).

Some studies examined the extent of external auditors' reliance on the IAF and how their assessment of IAF strength and reliance decisions are related. In a similar explanatory study, Schneider (1984) determined descriptive models that represented how the external auditors weighed and combined the three elements mentioned in SAS No. 9 (objectivity, work performance, and competence) to assess the IAF's strength. The findings proved that external auditors thought that the most significant element of assessing IAF was work performance, competence and objectivity in a row. Besides, Schneider (1985) conducted another explanatory study to investigate the consensus degree among 18 supervisors/managers of external auditors in assessing IAF. The finding revealed that performance, competence, and objectivity were the most crucial elements. Building on the previous studies, the researcher examined the extent of external auditors' reliance on the IAF and how their assessment of IAF strength and reliance decisions are related.

Similarly, Haron et al. (2004) applied on the external auditors in Malaysia to test the criteria as the Malaysian Approved Standards on Auditing AI 610 has been specified *Concerning the Work of Internal Auditing*. The criteria investigated were the internal audit's scope of function (work performance), proper professional care, technical competence (competence), and organizational status. This study also aimed at identifying the uniformity of the judgments of the external audits. The researchers conducted a questionnaire to collect the sample's data, which consisted of 64 external audits. The results suggested that the two most important criteria that the external audits consider when relying upon internal audit work are work performance and competence. Moreover, it revealed that the judgment of the audit showed uniformity. These studies showed that the reliance of the external audits on internal audits is highly affected by work performance and competence, and thus they were considered the two main factors.

Interviews and questionnaires were conducted in Al-Twajri et al. (2004) in Saudi Arabia to investigate the coordination and corporation level among the external audits' managers and partners and the internal audit departments' directors. A response rate of 58% involved 78 internal audit department directors, and a response rate of 85% involved 33 external audits who participated in the survey. The information obtained from the two matched questionnaires was reinforced and complemented by the interviews. This research emphasized how the external and internal auditors perceived the external auditors' reliance on the internal audit work and if this caused reducing external auditors' fees. The research findings suggested that the internal audit departments' size, independence, and scope of work caused the concern of external auditors. The study also showed that the reliance on the external auditors on internal auditors' work differed according to the internal audit department's quality. This is due to the difference in the perception of the two parties of the cooperation among them. For instance, the external auditors showed a positive image of the cooperation between internal and external auditors, especially when the internal audit department's quality was high.

In contrast, the internal auditors thought of the cooperation among themselves and the external auditors to be of a limited degree. The external auditors explained that many Saudi Arabia companies had IAFs with insufficient independence and professionalism from the management. Thus, the value of the internal auditors' work was affected and decreased the possibility of the external auditors' reliance on it.

The empirical studies (e.g., Prawitt et al., 2009, 2012; Johl et al., 2013; Al-Rassas and Kamardin, 2015; Abbott et al., 2012a, 2016; Gros et al., 2017) showed that there is an inverse relationship between IAF quality and earnings management, and some variables need to be included as moderators to extend our understanding on such relationship. Thus, assistance between internal and external auditors is used as a moderating variable in this study. Such assistance is likely to bring value to organizations; it provides resources and expertise to enhance and maintain financial reporting quality (lower earnings management). The motivation to bring this assistance as a moderating variable is to investigate whether it affects the relationship between IAF quality and earnings management, which will be a new contribution to the literature.

Recall that in the case of cooperation between internal and external auditors, the assumption is that the more cooperation auditors have, the more likely they have higher financial reporting quality (see Gras-Gil et al., 2012). Also, such cooperation being better at knowledge transfer due to experience will mean that they make different (better) decisions than someone with less knowledge. On the other hand, the survey of Oliverio and Newman (1991) indicates that many internal auditors in the study were unhappy with their assigned position in the external audit assistance/duty. Additionally, internal auditors considered the external auditors' relationship the least attractive aspect of their jobs. Therefore, this thesis proposes that the assistance to external auditors is time-consuming, which results in a lower amount of time IAFs can spend on higher-risk areas, including earnings manipulation. This leads to the fourth hypothesis (stated in alternative form).

**Hypothesis 4: The effect of IAF quality on reducing earnings management is larger for firms that spend a lower amount of time on internal auditors assisting external auditors than firms that spend a higher amount of time on such assistance.**

#### **4.3.2 Outsourcing big data analytics**

The study of Subramaniam et al. (2004) found that outsourcing IAF is being adopted largely in the Australian public sector for non-financial reasons such as lack of technological knowledge and service quality. Further, previous literature indicates that outsourcing some or all IAFs to a third party reduces earnings management (e.g., Prawitt et al. 2012, Abbott et al., 2016). However, to the best of the author's knowledge, no studies examined the effects of outsourcing big data analytics on the relationship between IAF quality and earnings management. Studying such effects has been raised by previous scholars (e.g., Bame-Aldred et al., 2012). Thus, this section will define what big data analytics is. Then it will describe the outsourcing process and its effects, followed by data analytics and audit analytics.

Big Data Analytics was defined by Sun et al. (2018) as the process of collecting, organizing, and analyzing big data to visualize and display knowledge, patterns, intelligence, and other information that is part of big data. However, Tang et al. (2017) show that IAF evaluates and improves organizations' control, risk management, and governance. Accordingly, an operational audit for each unit, division, and the entity is expected to be supported and assisted by big data analytics. Moreover, complete datasets are collected and interrogated instead of taking samples and extrapolating them to increase the IAF's analysis accuracy. The study discusses literature reviews, tools and methodology, explains the focus group outcomes, and finally concludes. Much developing literature studies the effect of Big Data Analytics on internal audits. Moreover, various academic researchers recognize Big Data Analytics opportunities and advantages in forensic accounting internal audit and fraud detection.

“Internal Audit Capabilities and Needs Survey” by Protiviti (2017) studies data analytics and general technical knowledge, audit process knowledge, audit process, 906 participants’ capabilities and skills in various industries, including financial services in U.S., manufacturing, and industries of healthcare in the U.S.

Five main factors of internal audit and data analytics were identified in this survey

- Most of the internal audits departments are still in their analytics infancy.
- More attention is bestowed towards digital and business transformation.
- Internal auditing is growing to be a base for data analytics.
- Mobile tech, cybersecurity, big data and cloud are primary concerns.
- The analytics are expected to provide a higher value along with their sophisticated capabilities.

The causes of the embeddedness of Enterprise Resource Planning (ERP) systems are studied in Alves and Matos (2010). It shows that there are many reasons why systems of ERP are eliminated from companies. These reasons include applications integration, competitive environment, real-time information demand, and information securing to help making decisions.

Technology use increases when it comes to the process of auditing is a finding to Cangemi (2015). This study reveals that they must use big data analytics technologies to have their internal auditors’ internal audit process supported, strengthened, and reinforced.

In Tang et al. (2017), the researchers examined the data analytics use in internal auditing following a case study approach. The sample consisted of six profit companies’ Chief Audit Executives and six profit organizations’ Chief Audit Executives. The study reveals that data analytics demand will continually rise. In the following half-decade, more employees qualified in data analytics technologies will be needed in companies’ internal audit departments. Moreover, the study shows that many programs of universities will be affected by this change.

Companies in numerous fields exploit the huge amount of available data for competitive advantages to achieve more revenues or reduce costs. Provost and Fawcett (2013) indicate that Data-Driven Decisions (DDD) are making essential differences in productivity on Return on Equity (ROE), Return on Assets (ROA), market value and asset utilization. Barton and Court (2012) find that using big data analytics in companies' operations helps record 5% and 6% of productivity and profitability, respectively, by outperforming their competitors. Columbus (2017) points out that 53% of firms have applied big data in 2017, while in 2015, it was only 17%. Similarly, Protiviti (2017) mentions that regulators constantly support the use of analytics by the organization. This confirms the urgent need for conducting big data analytics in organizations. The market forces could influence accountants/auditors to adopt data analytics/big data (Alles, 2015). Schneider et al. (2015) refer to the significance of big data analytics for the accounting profession since data collecting and analytics techniques can probably change the auditing and accounting task processes. Scholars find that big data analytics emergence will tangibly change the assure/predict/infer auditors and accountants (e.g., oversight/foresight insight) tasks. Accounting is increasingly influenced by big data and analytics, which will offer more methods to progress in financial accounting, financial reporting practices and managerial accounting (Warren et al., 2015). Furthermore, big data is suggested to provide the unprecedented potential for diverse, sophisticated analyses and voluminous datasets. Big data can produce central variables in internal and external auditors, such as better prediction estimates, fraud and going concern calculations (Alles, 2015).

Additionally, through the means of big data or data analytics, auditors might foster profitability and influence and limits audit costs. As a part of the audit process, 66% of the internal audits departments recently invested in data analytics (Protiviti, 2017). Serious obstacles still require removal, despite the great promise to improve audit quality in using data analytics.

According to research suggestions, the accounting profession has been slow to adopt revolutionary technologies throughout history (Dai and Vasarhelyi, 2016; Alles, 2015). Otherwise, embracing big data analytics receives the special attention of external auditors, mainly practitioners (Fullerton, 2016), and they are studying the hurdles of analytic data adoption. However, internal auditors' big data adoption and utilization are carried out on little study (Tang et al., 2017) despite the privilege of the IAF (IAF) to use big data compared to the external auditors even though the IAF has adopted analytics in auditing (Verver, 2015; Protiviti 2017). Moreover, Li et al. (2018) state that the research results show that IAF use of audit analytics is below expectations. However, it still exerts the effort to improve big analytics and increase its future usage (Tang et al., 2017). Data analytics offer internal auditors promising platforms, providing continuous oversight (assure), deep insights (infer) and realistic foresight (predict), although it promises an advantage for internal and external auditors (Schneider et al. 2015; Verver, 2015). Data analytics often gives auditors the chance to offer oversights into risks, domains and undertake unique issues not provided in other functions since the internal audit has access to data and processes from the whole organization (Verver, 2015).

Li et al. (2018) determine three elements to utilize data analytics via creating special opportunities for IAF. First, the range of IAF tasks is much wider than the external auditors' range. Thus, internal auditors must perform their tasks effectively and efficiently through more demanding data analytics employment. Second, IAFs can use data analytics to disclose fraud and anomalies because they can easily access the organization's internal data. Finally, IAFs are flexible in finding different data analytics tools because IAFs' work is not organized the same way as the external auditors. Alles and Gray (2016) underscored these three elements for future research opportunities.

In the revision of the section entitled “Proficiency and Due Care” of the Institute of Internal Auditors code (IIA, 2016), the significance of technologies emergence like big data analytics in IAF is explained (Tang et al., 2017). Protiviti (2017) concludes that internal audit departments

with specialized analytics functions experience the value of analytics on its highest level, as do those departments with the champions of designated analytics.

Therefore, the study aims at identifying the challenges that the auditors/accountants face when adopting big data analytics. The effect of these challenges/ barriers will be empirically examined upon IAF's data analytics adoption. Protiviti (2017) suggested that all the organizations showed an increasing demand for data analytics services from the group of internal audits in the last year. The organizations with a committed function and champions of the analytics for their IAF are labeled in particular. This demand will likely increase as long as the internal audit shops adopt analytics and more progress is attained on their use of data.

It is important to examine the reliance on internal auditors on big data analytics and the barriers that face adopting data analytics. This is due to the dominance of big data analytics on the internal auditors' priority list. These lists are subject to such auditors' constant focus to improve data analytics use so that the technology-enabled capabilities of auditing are reinforced. These capabilities include constant monitoring and constant auditing. Therefore, it must have a strategy for the long term and a roadmap application to surmount these barriers. A value for a long term and an important aspect of internal audit services are represented by exquisite pilot programs and explicit directions from organizational leaders and CAEs who can find these data analytics (Protiviti, 2017).

Various researchers (Malaescu and Sutton, 2015) argue that one of the elements that impacted the external auditors' reliance on the IAF in complying with the requirements is investing in the technology and techniques of IT audit (PCAOB, 2007). Appelbaum (2016) suggested that a solution to overcome the barriers of the evidence of the external big data audit could occur at the beginning within the profession of internal auditing. Moreover, experts argue that the greater value the analytics are expected to provide goes along with their more developed analytics capabilities.



Therefore, this study is an answer to recommendations by Alles and Gray (2016), Huerta and Jensen (2017), and Li et al. (2018). The latter studies called for examining the factors relevant to data analytics, including business acumen, technical skills, and cognitive skills.

#### **4.3.2.1 Big data, outsourcing process and its effects, data analytics, and audit analytics**

##### ***Big data***

Big data gives a different meaning that varies in variable fields. However, there is a fundamental misconception between business intelligence characteristics, big data, and data analytics that are slightly different (Vasarhelyi et al., 2015). It is indicated in Cao et al. (2015) that big data consists of too complex and large sets of data that cannot be interrogated or manipulated using standard tools or methods. Big data is considered related to quantities and analysis on a large scale of massive amounts of data to engender knowledge and insights (Verver, 2015). Four Vs. are big data features: Variety, Volume, Veracity, and Velocity. Variety refers to data resource diversity, Volume refers to dataset size, Veracity refers to gaining truthful information from big data and noise elimination, and velocity refers to data generation speed. Occasionally, six Vs. Characterize big data, including Variety, Veracity, Variability, Volume, Value, and Velocity. Sivarajah et al. (2017) argue that seven Vs. Characterize big data: Variability, Variety, Volume, Visualization, Velocity, Veracity, and Value.

##### ***Outsourcing process and its effects***

Technically, big data analytics should be considered in auditing its effect on entire auditing procedures and its role in providing a tool for audit quality enhancement. Previous studies provide evidence of view range on audit quality. Nevertheless, from a functionalist point of view, some studies depict quality as auditors' ability evaluation derived from the market to explore material misstatements and inform relevant stakeholders of their presence (for a summary of this literature, see DeFond and Zhang, 2014). However, among audit scholars, we see an increasing appreciation

(Holm and Zaman, 2012). Besides, the regulatory community states that audit quality has no one agreed-upon definition that can be considered a "standard" facing the assessment of the actual performance. As a socially established phenomenon, this latter point corresponds to an explanative view on the audit quality notions and audit environment.

Therefore, considering that big data analytics is a developing area, scholars can tackle the probable empirical lacuna of how audit quality in a data-driven environment is operationalized and conceptualized. It is crucial since there is relatively little knowledge about the extent of shaping the outcomes and the actual delivery of an audit. For instance, it is not obvious if the major effect is merely by the greater processing power that enables larger samples. However, it utilizes significantly the same proof and investigates the methods. The major effect may be through improving novel techniques and applying novel evidence forms. Here, significant research questions would be tested about the degree to which big data analytics is restructuring the essence of audit evidence by incorporating data. Previously, this data was not taken into the audit's consideration, yet it can be applied diagnostically to notify auditors of the possible problematic fields in financial statements. The researchers here would be able to derive related insights from Power (1997), for example. While the domains were looked at as problematic or unimportant from the point of the audit of view, Power suggests proof in his study of how these domains were made auditable. In the study of William (2013), he explains the way tools like big data analytics would be applied to make objects attention-requiring from regulatory and are risky. These two studies address the nature of the audit spaces, which is considered social constructivist. Moreover, they address the audit evidence in a way that is considered co-produced by the corporation between technology and auditors.

### *Data analytics*

AICPA (2015) defines big data as the science and art of discovering and analyzing patterns, identifying peculiarities and abstracting other benefitable information in data that are related or fundamental to an audit's theme by analyzing, modeling, and visualizing the aim of the audit's performing or planning. Cao et al. (2015) consider big data as the process of cleaning, inspecting, modeling, and transforming big data to find and communicate useful patterns and information, provide decision-making support and suggest conclusions.

### ***Audit analytics***

Audit analytics include data analytics' application in the audit. AICPA (2017) defines data analytics audit as the science and art of discovering and analyzing patterns, identifying peculiarities and abstracting other benefitable information in data related to or fundamental to an audit's theme by analyzing, modeling, and visualizing the aim of the audit's performing or planning. That is to say, audit data analytics are considered as techniques that can be applied to conduct some audit procedures, including details tests, management of risk, and essential analytical procedure to assemble evidence of audit. Advantages of audit data analytics use involve a better understanding of an entity's operations and the risk that is a related risk, such as the growing ability for material misrepresentation detection, fraud risk, and enhanced communications with people responsible for audited entities management.

#### **4.3.2.2 Artificial intelligence via machine learning impact on IAF**

Dalal (1999, p.1) predicted that "With the world's population likely to increase to unimaginable levels and due to the complexity in the nature of transactions, applying audit procedures will be increasingly dependent on software. Artificial intelligence and expert systems are therefore useful and perhaps, inevitable in the conduct of the present-day audit". Artificial intelligence is defined as "the science and engineering of making intelligent machines, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence, but

artificial intelligence does not have to confine itself to biologically observable methods" (McCarthy, 2007, 2). Further, IBM (2021) simply defines artificial intelligence as using technology and computers to simulate the human mind's problem-solving and decision-making abilities.

Machine learning can be understood as a branch of artificial intelligence and a computer approach for identifying correlations and patterns through vast amounts of detailed data (Cho et al., 2020). Cho et al. (2020) argued that individuals could use learning mechanisms to forecast future events. Machine learning adoption can affect all phases of audit procedures, from data cleansing to decision-making, by recognizing insights, trends, and relationships in big data that are not obvious to individuals (CPA Canada, 2020). Machine learning helps auditors obtain fair and more accurate information in the beginning phases of audit work by gathering data utilizing criteria established with machine learning algorithms (Cho et al., 2020).

Brennan et al. (2017) illustrate that the effects of artificial intelligence in auditing are most noticeable in the area of data gathering (i.e., data harvesting, comparing, and validity). It indicates that artificial intelligence-powered technology could find crucial data, separate it from documentation, and give access to professional auditors, allowing them to spend additional time on issues needing relatively high evaluation. In particular, artificial intelligence allows for the complete automation of lengthy processes like monetary transactions assessment and the extraction of every supportive evidence for additional analytical procedures (Brennan et al., 2017). Additionally, auditing has fallen behind businesses in developing technologies for a long time due to the complicated and repetitive audit activities, the various formats of source information and files, and the necessity of expert evaluations (Oldhouser, 2016).

On the other hand, Tiberius and Hirth (2019) investigated changes in auditing procedures anticipated by German auditing professionals. It was discovered that German auditing

professionals think that new technology would relieve and help auditors rather than replace them. Ultimately, artificial intelligence has limitations, as discussed by the study of Hammond (2016). Hammond (2016) observes a lack of objectivity and warns that when intelligent technologies are employed, they appear to display the people's biases who design or engage with them. Data-driven bias is an example of bias linked with systems producing biased results due to errors or deviation in the original data.

Studies project that artificial intelligence will perform 30% of business audits by 2025 (World Economic Forum, 2015). Therefore, tensions are arising between various stakeholders (i.e., auditors, audit firms, clients, client investors, the audit profession, regulators, and society) due to the increasing use of artificial intelligence (Munoko et al., 2020). This tension originates from a clash of stakeholder rights, accountability gaps, expectation gaps, and the uncommon conflict of ethical standards.

#### **4.3.2.3 Big data analytics through machine learning and deep learning**

In order to analyze data in real-time with high speed and accuracy, big data analytics demands the development of new and complex algorithms based on machine and deep learning techniques. Integrating machine learning and big data enables individuals and companies to examine data and discover representations that might not be achievable with conventional methods (Belmonte et al., 2020). Deep learning is a notion that involves mining through massive amounts of data to programmatically derive insights and retrieve features from complex unstructured data even without the assistance of a person, making it a powerful tool for big data research (Bengio et al., 2013).

The analysis and interpretation of huge volumes of unstructured data is a fundamental feature of deep learning, making it an effective tool for big data analytics when original data is typically unclassified and not categorized (Najafabadi et al., 2015). Additionally, Najafabadi et al. (2015)

point out that deep learning methods automatically derive sophisticated interpretations from massive amounts of unstructured input. These methods are primarily driven by the area of artificial intelligence, which aims to simulate the human mind's ability to observe, evaluate, learn, and make choices, particularly for challenging situations (Najafabadi et al., 2015).

Based on a systematic literature review approach, Hordri et al. (2017) identified five features of deep learning that are (1) hierarchical layer, (2) high-level abstraction, (3) process a high volume of data, (4) universal model, and (5) does not overfit the training data. They define and elaborate on these features as follows. First, learning several levels is characterized as a hierarchical layer. Second, deep learning is a subsection of machine learning that employs a collection of algorithms to model super high abstractions in data utilizing model structures with complicated designs or perhaps consisting of many non-linear operations. Third, deep learning algorithms could generate relational and meaningful data representations from vast amounts of unstructured original data at high-level layers. Fourth, universal models are machine learning models that understand the universal phenomena inductively or use mathematical equations or expressions to define the universal phenomena, universal machine learning models, universal mathematical analysis, and universal object models. Fifth, as evidenced by their test results, deep learning algorithms would not lead to biased estimates of the training data. To conclude, these five features of deep learning need to be considered to enhance big data analytics (Hordri et al., 2017).

Since 2015, the big 4 accounting firms have made significant investments in artificial intelligence and research and innovation (Kokina and Davenport, 2017; Chawla, 2020). As a result, artificial intelligence-powered technology could locate critical data, split it from documentary evidence, and make it available to professional auditors, enabling them to invest more time on matters involving relatively high examination (Brennan et al., 2017). Auditing through artificial intelligence makes extensive use of technological tools, identifies the weaknesses of traditional audit approaches, and improves audit efficiency, audit quality, and audit ability (Chen, 2020).

Therefore, the consequences of artificial intelligence are supposed to be most visible in audit works that were traditionally performed manually but are now assisted by certain sophisticated technology (Agnew, 2016). Section 4.3.2.6 discusses broadly how artificial intelligence (e.g., big data analytics, machine learning and deep learning) enhances IAF quality.

#### **4.3.2.4 Big data analytics (in-house approach)**

Firms outsource big data analytics and purchase software to handle it, driven by machine learning and deep learning features. Implementing big data analytics offers several strategic benefits for a corporation that include (1) identifying growth opportunities, (2) developing a product design and innovation, (3) shaping the customer experience, (4) generating operational efficiencies, and (5) enhancing risk management (Beresford, 2021).

According to McKinsey and Company (2016, p.2), Ash Gupta, chief risk officer at American Express, illustrated how they handle significant data analytics in-house as follows; "the first change we had to make was to make our data of higher quality. We have many data, and sometimes we just were not using that data, and we were not paying as much attention to its quality as we now need to. That was one, to make sure that the data has the right lineage and has the right permissible purpose of serving the customers. This, in my mind, is a journey. We made good progress and we expect to continue to make this progress across our system". Additionally, ATandT, the giant US telecommunications company, utilizes big data tools to evaluate all the possible variations to enhance that experience to address or improve a specific problem (McKinsey and Company, 2016). They take the complexity and reduce it to something clear and practical.

Many large and multinational firms use in house big data analytics in their competitive advantages that include, but are not limited to, Amazon, American Express, BDO, Capital One, General Electric, Miniclip, Netflix, Next Big Sound, Starbucks, T-Mobile, Alibaba, Google, Apple, Baidu,

Facebook, IBM, JD.com, Microsoft, Tencent, Banjo, HiSilicon, Intel, Nvidia, OpenAI, Qualcomm, SenseTime and Twitter (O'Neill, 2016; Botha, 2019; Marr, 2019). In addition, the 16 best data science and machine learning platforms for 2021, as reported by Solutions Review (2021), are Altair, Alteryx, Anaconda, Databricks, Dataiku, DataRobot, Domino Data Lab, Google Cloud AI Platform, H2O Driverless AI, IBM, KNIME, MathWorks, Azure Machine Learning, RapidMiner Studio, SAS and TIBCO Data Science.

#### **4.3.2.5 Artificial intelligence powering big data analytics**

The application of big data analytics, driven by artificial intelligence, assists businesses in enhancing data processing skills (Srinivasan and Swink, 2018). Companies experience difficulties in big data management that can be addressed by using big data analytics techniques, including descriptive analytics, predictive modeling, and prescriptive analytics (Sivarajah et al., 2017). Artificial intelligence enables the outsourcing of challenging pattern classification, learning, and other activities to computer-based systems in circumstances involving enormous amounts of data (O'Leary, 2013). It enables them to evaluate and incorporate large pieces of information derived from various sources, with management employing this consolidated knowledge to decrease uncertainty about demand, capacity, and supply availability (Dubey et al., 2019, 2020).

Findings through big data analytics and artificial intelligence enable organizations to restructure their resources in a manner that effectively responds to changing situations and builds stronger relationships with their partners (Duan et al., 2019). Selz (2020) rightfully points out that information gained from extensive data analysis paired with artificial intelligence would become the future control mechanism in businesses. O'Leary (2013) illustrates that researchers in artificial intelligence have studied to develop programs that analyze complex data and categorize or organize that data in some way so that the information obtained may be utilized directly to analyze a processor to communicate with other applications.



Artificial intelligence and machine learning have several advantages, including reduced costs, improved quality, and faster response time (Kim, 2019; Lee and Shin, 2020). Wu et al. (2008) identified the top 10 data mining algorithms through artificial intelligence. These ten algorithms cover classification, clustering, statistical learning, association analysis, and link mining (Wu et al., 2008). Artificial intelligence has become increasingly powerful due to big data and high computer power (Duan et al., 2019). Overall, the ramifications of using big data analytics and artificial intelligence can potentially result in improved operational effectiveness (Dubey et al., 2020). Numerous industries (for example, healthcare, agriculture, food, etc.) gain from using artificial intelligence to power big data analytics (see Abidi and Abidi, 2019; Misra et al., 2020).

#### **4.3.2.6 Artificial intelligence enhancing IAF quality**

Conventional audit methods have numerous flaws, including increased tool constraints, low sampling accuracy, lengthy work, resource sharing, or low efficiency, among others (Chen, 2020). Artificial intelligence technologies assist audits and assure compliance by tracking documents in conformity with regulations and laws and detecting business concerns. Machine learning algorithms can swiftly scan through massive volumes of data to uncover possible fraud or suspicious behavior problems that people may have overlooked and highlight them for further assessment (Madina, 2021). Therefore, artificial intelligence audit creates full use of technological tools, addresses the shortcomings of conventional audit techniques, and enhances audit efficiency, audit quality, and audit ability (Chen, 2020).

The automation of labor-intensive jobs targets artificial intelligence abilities in auditing (Rapoport, 2016). These are organized and regular actions that must be completed during the audit. Machine learning and knowledge projection technologies may be used to (1) manage audit knowledge and risk criteria, (2) create an audit body of knowledge system, (3) an intelligent risk control model

with active and real-time reaction, (4) substitute auditors' human processing and analysis, and (5) reduce the burden of a shortage of audit skills and knowledge resource (Zhou, 2021). Thus, the implications of artificial intelligence are expected to be most noticeable in audit activities that were previously conducted manually but are now supported by some advanced technologies (Agnew, 2016).

Currently, the influence of artificial intelligence on audits is most noticeable in data gathering (extraction, comparison, and validation of data) (Brennan et al., 2017). As more data flows through that and is analyzed, artificial intelligence examines it and discovers connections based on dozens of various factors (Madina, 2021). It implies that artificial intelligence tools can find important information and harvest it from papers. They usually make it worthwhile for individual auditors, allowing them to dedicate more time to appropriate higher-level judgment. In addition, it dramatically decreases the audit's workload (Madina, 2021). Obtaining financial data records for analysis entails minimum work, and the analysis may begin (Madina, 2021). Consequently, artificial intelligence systems can detect data errors such as an unanticipated spike in orders in a specific location, abnormally high spending items recorded by an individual, or extraordinarily desirable equipment leasing terms for a vendor (Brennan et al., 2017). Therefore, the auditors' time may be dedicated to a more comprehensive analysis of the facts, allowing them to construct a far more complete financial landscape than they can previously ever think of (Madina, 2021).

However, it should be noted that Hammond's (2016) study highlights the lack of impartiality and warns that when intelligent robots are implemented, they tend to represent the personal biases of the workers who design or interact with them. The first bias is data-driven, linked with systems that provide skewed results due to faults or deviation in the original data. Another type of bias is bias via interaction, which happens when robots replicate the biases of those who develop them. Additionally, there may be other concerns with the use of artificial intelligence-based solutions.

These include, but are not limited to, (1) the threat of competitors gaining access to the tools (Abdolmohammadi and Usoff, 2001) and (2) extended decision-making processes as a result of considering more options (Mackay et al., 1992).

To sum it up, this research suggests that outsourcing big data analytics could change the impact of IAF quality on earnings management. Internal auditors' ability to detect earnings management is considerably affected by such outsourcing. As a result, this study posits that outsourcing big data analytics has a moderating effect on the relationship between IAF quality and earnings management.

It is clear that big data analytics offer internal auditors promising platforms, providing continuous assurance, deep insights and realistic predictions (see Schneider et al., 2015; Verver, 2015). Also, it gives auditors the chance to offer oversights into risks, domains and undertake unique issues that are not provided in other functions since the internal audit has access to data and processes from the whole organization (Verver, 2015). However, most IAFs are still in their early stages of analytics (Protiviti, 2017). In other words, internal auditors lack technological knowledge in analyzing big data analytics. Therefore, this thesis proposes that the external specialist that works with big data has technological knowledge on big data analytics that internal auditors lack. This leads to the fifth hypothesis (stated in alternative form).

**Hypothesis 5: High IAF quality reduces earnings management, and this relationship is more pronounced for firms that outsource big data analytics for IAF purposes than those that do not outsource.**

## **Chapter 5. Methodology**

### **5.1 Introduction**

Chapter 4 (Literature Review and Research hypotheses Development) identified gaps in the literature that examines the relationship between IAF quality and earnings management. As it has been found in previous research, a higher IAF quality helps to limit earnings management. This implication finally leads the author to question which factors moderate this relationship.

This chapter outlines the quantitative methods used in this thesis to address the research hypotheses, as shown in section 1.4. This chapter consists of five sections, commencing with the introductory section. Section 5.2, source of data, shows how the data was collected. Sections 5.3 and 5.4 describe how this study measured IAF quality and earnings management, respectively. Finally, section 5.5 outlines the regression design used for exploring the moderating factors on the association between IAF quality and earnings management.

### **5.2 Data and matching process**

The data for this thesis has been collected from multiple secondary sources, as shown in Table 4. First, the study relied on data from the CBOK 2015 database for the year 2015. This database is available from the Institute of Internal Auditors (IIA). The database from IIA is based on a survey that was sent to its members from 166 countries. The IIA survey captured information on several variables, including education level, organization details, internal audit department, corporate governance, value and performance measures, audit committee and financial measures. As described below (see Table 4), several of the variables used in this thesis were obtained from CBOK 2015.

**Table 4: Description of variables**

<b>Variable</b>		<b>Description</b>	<b>Source</b>
IAF Quality	=	A single composite value measured the quality of the IAF. The variable can range from zero to six, with zero representing the lowest quality and six representing the highest quality.	CBOK 2015
Experience	=	The number of years of professional experience in the internal auditing profession.	CBOK 2015
Certification	=	The number of professional certifications and qualifications related to the internal auditing (CIA (Certified Internal Auditor), CMIIA (Chartered Member of The IIA–the United Kingdom and Ireland), PIIA (Practitioner of The IIA–the United Kingdom and Ireland), CGAP (Certified Government Auditing Professional), CCSA (Certification in Control Self-Assessment), CFSA (Certified Financial Services Auditor), CRMA (Certification in Risk Management Assurance) and other national internal audit certification).	CBOK 2015
Training	=	The number of hours of formal training related to the internal audit profession (e.g., but not limited to seminars, conferences, workshops, online, or web-based training).	CBOK 2015
IASize	=	An indicator variable that equals “1” if IAFs have completely sufficient funding, “0.5” if IAFs have somewhat sufficient funding and “0” if IAFs have not at all sufficient funding.	CBOK 2015
TimeFin	=	Percentage of time spent performing a financial audit.	CBOK 2015
CAEAC	=	A dummy variable equals “1” if the IAF functionally reports to the audit committee or a higher level, and “0” otherwise.	CBOK 2015
Assistance	=	How many work weeks does the internal audit department spend every year on activities that support the external audit. This study formed Assistance as a dummy variable equals “1” if the company has workweeks above or equals the sample's median, “0” otherwise.	CBOK 2015
OutsourcingBigDataAnalytics	=	Whether the internal audit department outsources the data analysis activities for the IAFs to a third party (yes = 1, no = 0).	CBOK 2015

**(Continued on the next page)**

**Table 4: Description of variables**

<b>Variable</b>		<b>Description</b>	<b>Source</b>
ACEffectiveness	=	A dichotomous variable indicates whether the audit committee presence or absence equals 1 if the audit committee exists and 0 otherwise.	CBOK 2015
IAFsThirdParty	=	Whether the firm outsources some or all IAFs to a third party (yes = 1, no = 0).	CBOK 2015
MTG	=	A dichotomous variable indicates whether the IAF is used as an MTG. MTG is coded “1” when the IAF is part of a management training rotation and “0” otherwise.	CBOK 2015
IndustryDummies	=	Dichotomous variables used to represent different industries.	CBOK 2015
CountryLegalsystem	=	A dichotomous variable indicates whether the firm is in a common law country (yes = 1, no = 0).	La Porta et al. (1998)
DevelopedEconomies	=	A dichotomous variable indicates whether the firm is in a developed market country (yes = 1, no = 0). Consistent with Jiang et al. (2018), I adopted MSCI indices in classifying my countries into two regions; (1) developed market and (2) developing market. MSCI indexes are available at <a href="https://www.msci.com/market-cap-weighted-indexes">https://www.msci.com/market-cap-weighted-indexes</a> .	MSCI index
ShareholderPro	=	A dummy variable equals “1” if the firm is located in a country that has a minority shareholder protections index above or equals the median of the sample and “0” otherwise.	World Bank
GDPperCapita	=	National GDP is divided by the population.	World Bank
ControlofCorrupt	=	Control of Corruption relates to "how public power is perceived as being used for private gain. The variable embodies the full continuum of corruption, from petty forms, to more great examples, to the exercise of power by elites and other private interests to manipulate the state (World Bank, 2020)."	World Bank
GovernmentEffec	=	The index of Government Effectiveness captures "perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies (World Bank, 2020)."	World Bank

**(Continued on the next page)**

**Table 4: Description of variables**

<b>Variable</b>		<b>Description</b>	<b>Source</b>
PoliticalStabi	=	Political Stability and Absence of Violence/Terrorism relate to "how political instability or violence and terrorism are perceived as being likely to be present (World Bank, 2020)."	World Bank
RegulatoryQuality	=	Regulatory Quality concerns the extent to which "the government is considered capable of formulating and implementing robust policies and regulatory frameworks that foster and support the development of the private sector (World Bank, 2020)."	World Bank
RuleofLaw	=	Rule of Law concerns the extent to which "confidence in society's rules and their power to encourage conformance to those rules is seen to exist. Specifically, the enforcement of contracts, property rights, police and court decisions are the focus and the tendency for crime and violence to occur (World Bank, 2020)."	World Bank
AbnAccr	=	Abnormal accruals are the error term ( $\epsilon_{it}$ ) as measured using the equation (absolute value is used in testing): $TA_{it} / A_{it-1} = \beta_0 + \beta_1 (1/A_{it-1}) + \beta_2 (\Delta REV_{it} - \Delta AR_{it} / A_{it-1}) + \beta_3 (PPE_{it} / A_{it-1}) + \beta_4 (NI_{it} / A_{it-1}) + \epsilon_{it}$	Worldscope
$TA_{it}$	=	Total accruals for firm $i$ for year $t$ . Literature defines $TA_{it}$ as income before extraordinary items minus operating cash flows.	Worldscope
$A_{it-1}$	=	Average total assets for firm $i$ for year $t-1$ .	Worldscope
$\Delta REV_{it}$	=	Change in net revenue for firm $i$ for year $t$ .	Worldscope
$\Delta AR_{it}$	=	Change in accounts receivable for firm $i$ for year $t$ .	Worldscope
$PPE_{it}$	=	Property, plant and equipment for firm $i$ for year $t$ .	Worldscope
$NI_{it}$	=	Net income for firm $i$ for year $t$ .	Worldscope
CFO	=	A company's cash flows from operations.	Worldscope

(Continued on the next page)

**Table 4: Description of variables**

<b>Variable</b>		<b>Description</b>	<b>Source</b>
SalesGrowth	=	A company's one-year sales growth.	Worldscope
Age	=	How many years when Worldscope started to list the company.	Worldscope
AuditorSpecialist	=	A dichotomous variable indicates whether the external auditor is a Big 4 auditor, equal to 1 if firm i is audited by a Big 4 audit firm and 0 otherwise.	Worldscope
Complexity	=	The number of business segments that the company has.	Worldscope
Assets	=	Total assets of a company (natural log used in testing).	Worldscope
Stability	=	The standard deviation of the company's CFO for the previous five years.	Worldscope
Leverage	=	The sum of long-term debt and current liabilities of a company	Worldscope
Loss	=	A dichotomous variable indicates whether the company experienced a loss in the previous year (yes = 1, no = 0).	Worldscope
MB	=	A company's market-to-book ratio.	Worldscope
ROA	=	Return on assets that are calculated as net income divided by total assets.	Worldscope



The CBOK is the world's most extensive ongoing study of the internal audit profession (IIA, 2018b). There are 14,518 usable survey responses from 166 different countries. CBOK 2015 is approximately 50 pages long and covers a wide range of institutions (e.g., 1. non-listed firm; 2. listed firm; 3. public sector organization; and 4. not-for-profit organization) and various areas of internal audit practice. Its primary purpose is to provide benchmarking data for internal auditing. Hence, it provides a rich overview of how the profession is currently being practiced and changes that may be on the horizon. A copy of the most recent survey can be found by searching for "CBOK 2015" on the IIA's website (<http://www.theiia.org>).

The IIA conducted several procedures to ensure the reliability of the CBOK 2015 dataset. These procedures are known as "Data Cleansing Note" in the excel file that contains the CBOK survey's complete responses. These cleansings include:

- The IIA eliminated all non-auditing practitioners after choosing "I teach internal auditing at an institution of higher learning" For Q8. These "academic" respondents completed section 12 "critical Thinking," and the survey ended.
- Completion of Q23, which meant that the respondent had completed all demographic questions available to all respondents who were internal audit practitioners. There were 13,054 in this category that was eliminated from the usable sample.
- If the input variables for a particular case "topic" had multiple illogical answers or followed a confusing pattern (such as all 6's), that case was invalidated.
- Some respondents input the same number of years of IIA membership and for age question. For example, both fields contained "50." In these cases, IIA invalidated the years of membership and kept the Age.
- Responses must have three digits or less for hours of training per year to be valid.
- Values such as 0 (no answer) and 6 (not applicable) were coded as missing values in the SPSS format of the CBOK 2015 survey.

Next, my sample is consistent with prior internal audit research (e.g., Pelfrey and Peacock, 1995; Scarbrough et al., 1998; Raghunandan et al., 2001; Carcello et al., 2005; Prawitt et al., 2009; Abbott et al., 2010; Abbott et al., 2012a; Abbott et al., 2016; Jiang et al., 2018; Alzeban, 2020) and targeted chief internal auditors (CIAs) or chief audit executives (CAEs) only.<sup>14</sup> Also, as CBOOK 2015 did not include the names of the participated firms in the survey, I performed a match of several self-reported fields in the CBOOK 2015 survey with similar fields in the Worldscope database as consistent with Prawitt et al. (2009), Lin et al. (2011) and Prawitt et al. (2012). This matching allowed the identification of individual firms in CBOOK 2015.

More specifically, to match the CBOOK 2015 data with data in Worldscope, I matched self-reported fields of (1) total assets, (2) total revenues, (3) operating industry and (4) the country of the company (geographical place of work) in the CBOOK database with similar fields in the Worldscope database. The successful matchings were 150 firms. Table 5 shows how I derived these 150 firms. After identifying the matched firms and extracting the necessary data from Worldscope, I obtained sufficient data to estimate earnings management (the dependent variable) and the rest of the explanatory and control variables.

This sample size (n=150) is consistent with previous studies on internal auditing. For instance, Alzeban (2020) collected 151 firms from CBOOK 2015. In a similar study, Abbott et al. (2016) collected their data from the questionnaire and obtained 189 firms for their analysis.

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<sup>14</sup> CIA or CAE refer to the head of the internal audit department.

**Table 5: Derivation of sample**

<b>Description</b>	<b>The sample size for analysis</b>
All participants in the internal auditing database (CBOK 2015)	14,518
Less participants who are not chief executive audit (CEAs)	11,551
Less CEAs that work in the public sector or non-profit organizations	1,083
Less CEAs that work in privately held firms	594
Less CEAs that work in publicly traded firms in countries not covered in Worldscope	17
Less CEAs that did not provide figures on (i) total assets or (ii) total revenues, or (iii) industry name	570
Less CEAs that did not identify their based or primary work country	18
Usable sample for matching	685
Less observations with no reported data in Worldscope	480
Less observations where IAF reported values are missed in CBOK 2015*	25
Less observations that have missed data to calculate abnormal accruals and model variables	30
Firms available for the final sample	150

Table 5 shows how I derived my sample after matching CBOK 2015 and Worldscope. \* Those observations were dropped from the sample to ensure that the IAF quality model is reasonable and reliable.

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### 5.3 Measurement of IAF quality

To investigate the research hypotheses that presented in section 1.4, I first considered the IAF quality measurements. Hence, I implemented Prawitt et al.'s (2009) methodology to measure IAF quality, which built an IAF quality model based on internal audit standards that represent guidelines to help internal auditors to perform their work (Tsai et al., 2017). See section 2.3.4 for the internal audit standards.

Generally, the Prawitt et al. (2009) model is the original and most refereed model to measure IAF quality. Since it was first published, the model has been slightly changed (see Lin et al., 2011; Ege, 2015; Mina et al., 2015; Abbott et al., 2016). Appendix 1 presents several models that aim to assess IAF quality as adopted by previous studies.

I derived a composite measure of IAF quality based on Prawitt et al. (2009) and extracted the necessary variables from the CBOK 2015 database. The composite measure of *IAF Quality* consists of six individual characteristics:

$$IAF\ Quality = Experience + Certification + Training + TimeFin + CAEAC + IASize$$

See Table 4 for data sources and variables description.

*IAF Quality* is a single composite value measuring the quality of the IAF. The variable can range from zero to six, with zero representing the lowest quality and six representing the highest quality. The underlining assumption is that more competent internal auditors reflect into better IAFs at the firm level to discover and report any significant errors in the financial statements to protect shareholders' interests (Christ et al., 2015).

Typically, these six variables, as shown in the above equation, represent various aspects of internal auditing standards. According to the internal audit standards, internal auditors should have a sufficient level of (1) competence, (2) auditing scope, (3) objectivity and (4) financial resources to

perform their work effectively. First, internal auditors' competence consists of specific factors, including (i) professional experience, (ii) professional certifications and (iii) training (AICPA, 2007). Accordingly, three variables were used to proxy for these factors are *Experience*, *Certification* and *Training*. *Experience* represents the total number of years of working in internal auditing roles. *Certification* refers to the number of professional certifications and qualifications related to the internal auditing that internal auditors acquired (e.g., CIA, CPA).<sup>15</sup> *Training* is the number of hours of training<sup>16</sup> the internal auditors completed during the year.

Second, for the auditing scope standards, I set *TimeFin* variable to capture the degree of IAFs focus on financial work. More specifically, *TimeFin* represents the percentage of internal audit time spent performing financial audits. It is assumed that the more time internal auditors spend on financial auditing, the higher chance of detecting earnings management in the financial statements.

Third, the objectivity of IAF represents who is the receiver of the internal audit findings (see AICPA, 2007; Prawitt et al., 2009; Lin et al., 2011; Ege, 2015; Mina et al., 2015; Abbott et al., 2016). To proxy for objectivity, I used *CAEAC* as a dummy variable that indicates whether the head of the IAFs reports to the audit committee (*CAEAC* = 1) or management (*CAEAC* = 0). The assumption is that reporting to the audit committee allows internal auditors to perform engagements so that the executive management makes no quality compromises.

Fourth, *IASize* is an overall measure of the firm's investment in the IAFs. In reality, the head of IAFs (CAE) must ensure that the internal audit resources are adequate and are effectively employed to complete auditing plans. *IASize* is obtained from the CBOK 2015 survey question

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<sup>15</sup> Certified Internal Auditor (CIA) is a globally recognised qualification that provides a firm foundation for a career in internal auditing (Chartered IIA UK and Ireland, 2020). The Certified Public Accountant (CPA) "designation distinguishes licensed accounting professionals committed to protecting the public interest. These professionals offer financial statement audits and other attestation services to help inform investors about the financial health of organizations. They provide individuals and families with valuable knowledge and advice on taxes and financial planning (Association of International Certified Professional Accountants, 2020)."

<sup>16</sup> According to CBOK 2015, this training includes seminars, conferences, workshops, online, or web-based training.

number 4, where the CAEs were asked if IAFs funding relative to the extent of its audit responsibilities is: a (not at all sufficient), b (somewhat sufficient), or c (entirely sufficient). The data source and a summary description of all the six variables in the IAF quality model can be found in Table 4.

Consistent with previous studies (e.g., Prawitt et al., 2009; Lin et al., 2011; Ege, 2015; Mina et al., 2015; Abbott et al., 2016), I created an overall composite measure of *IAF Quality* by dichotomizing each of *Experience*, *Certification*, *Training*, *TimeFin* and *CAEAC* variables by assigning a value of “1” to the firm if it is above or equals the median of the sample for that variable and “0” otherwise. On the other hand, the *IASize* variable is measured by the IAFs’ allocated funding relative to the extent of its audit responsibilities, by using a scale ranging from 0 to 1, and on which “0” indicates not at all sufficient, “0.5” indicates somewhat sufficient, while “1” which indicates completely sufficient.

Subsequently, scores of the individual quality components (*Experience*, *Certification*, *Training*, *TimeFin*, *CAEAC* and *IASize*) were added to create *IAF Quality*. Table 7 represents descriptive statistics relating to *IAF Quality* and the individual quality components used to create IAF quality. A keynote in Table 7 is the significant variation in *IAF Quality* and each of the individual components combined to provide an overall measure of IAF quality. The *IAF Quality* variable ranges from one to six, with first and third quartile scores of 3 and 5, respectively. This descriptive data suggest that IAFs representing a reasonable degree of variation in quality responded to the CBOK 2015 survey.

**Table 6: List of variables used in this study**

Dependent variable	Moderating variables	Control variables
AbsoluteAbnAccr	IAF Quality  ShareholderPro  DevelopedEconomies  CountryLegalsystem  Assistance  OutsourcingBigDataAnalytics	ACEffectiveness CFO SalesGrowth Complexity MB Age Assets MTG Leverage Loss AuditorSpecialist ROA Stability IAFsThirdParty GDPperCapita ControlofCorrupt GovernmentEffec PoliticalStabi RegulatoryQuality RuleofLaw

**Table 7: Descriptive statistics of internal audit characteristics**

<b>Variable</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Percentile 25</b>	<b>Median</b>	<b>Percentile 75</b>	<b>Max</b>
IAF Quality (0 to 6 points)	4.01	1.26	1.5	3	4	5	6
Experience (number of years)	11.51	8.58	0	5	9.5	18	39
Certification (number of certifications)	1.26	0.56	1	1	1	1	4
Training (number of hours per year)	43.15	27.05	0	24.25	40	50	160
IASize (0 to 1)	0.64	0.31	0	0.5	0.5	1	1
TimeFin (0% - 100%)	0.64	0.86	0	0	0.2	0.1	0.4
CAEAC (0 or 1)	0.72	0.45	0	0	1	1	1

*IAF Quality* is potentially ranging from zero to six. Larger IAF Quality scores indicate IAFs that are of higher quality. The data source and a summary description of all the IAF quality model variables can be found in Table 4.



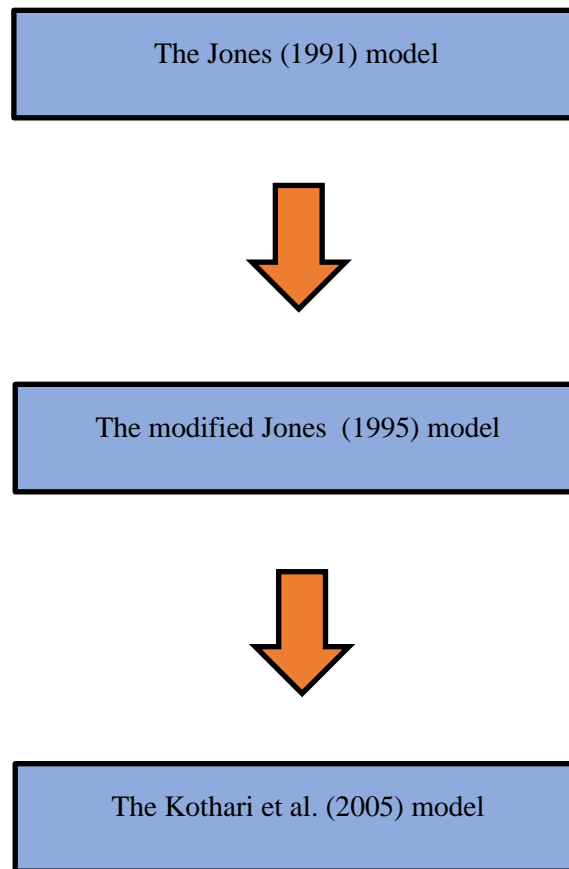
## 5.4 Earnings management measurement

A stream of literature on earnings management has focused on manipulating earnings through accruals-based measures<sup>17</sup> (e.g., Prawitt et al., 2009; Abbott et al., 2016; Campa, 2019; Dewinta and Mita, 2020, Gandía and Huguet, 2020; Zhang et al., 2020). Therefore, this study applied the accruals-based model in measuring earnings management. In the next three sections, this study discusses and evaluates three accruals-based models, which are (i) the Jones (1991) model, (ii) the modified Jones (1995) model, and (iii) the Kothari et al. (2005) model. This study used the Kothari et al. (2005) model in the main analysis, while the other models were used in the robustness check analysis. See Figure 2.

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<sup>17</sup> Accruals are accumulated revenues or expenses that impact a company's net profit on the income statement despite the fact that the cash associated in the transaction has still not been received

**Figure 2: Development of accruals-based models in measuring earnings management**



### 5.4.1 The Jones (1991) model

Earnings management can be achieved in various ways, such as the use of accruals, changes in accounting methods, and changes in the capital structure (Jones, 1991). Jones (1991)'s study focused on total accruals as the source of earnings management, which Jones defined as the change in non-cash working capital. Furthermore, Jones (1991) used the ordinary least square (OLS) regression with the longest time-series data (1961-85) for the variables included in the regression.

$$[TA_{it}/A_{it-1}] = \beta_0 + \beta_1 [I/A_{it-1}] + \beta_2 [\Delta REV_{it}/A_{it-1}] + \beta_3 [PPE_{it}/A_{it-1}] + \varepsilon_{it}$$

The Jones (1991) model

Where:

$TA_{it}$  = Total accruals for firm  $i$  for year  $t$  defined as income before extraordinary items minus operating cash flows.

$A_{it-1}$  = Average total assets for firm  $i$  for year  $t-1$ .

$\Delta REV_{it}$  = change in net revenue for firm  $i$  for year  $t$ .

$PPE_{it}$  = Property, plant and equipment for firm  $i$  for year  $t$ .

$\varepsilon_{it}$  = Error term, the measure of abnormal accruals<sup>18</sup>.

Previous researchers have discussed the weaknesses of the Jones (1991) model. For instance, Dechow et al. (1995) discussed how the Jones (1991) model could not catch the effect of sales-based manipulation because variations in sales are supposed to give rise to non-discretionary accruals, causing the estimate of earnings management to be biased toward zero. Dechow et al. (1995) found that in the Jones (1991) model, the change in revenues is not adjusted for the

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<sup>18</sup> The higher absolute abnormal accruals, the higher earnings management.

change in receivables in the estimation period. Hence, Dechow et al. (1995) proposed a modified version of the Jones (1991) model.

#### **5.4.2 The Modified Jones (1995) model**

Dechow et al. (1995) considered a modification to the Jones (1991) model to eliminate its tendency to inaccurately measure discretionary accruals with error due to an inability to capture the impact of sales-based manipulation during the estimation period for each firm in the sample. The modified Jones (1995) model is identical to the original, except that the receivables' change is subtracted from the change in revenue in the estimation period.

$$[TA_{it}/A_{it-1}] = \beta_0 + \beta_1 [I/A_{it-1}] + \beta_2 [(\Delta REV_{it} - \Delta AR_{it})/A_{it-1}] + \beta_3 [PPE_{it}/A_{it-1}] + \varepsilon_{it}$$

The modified Jones (1995) model

Where:

$\Delta AR_{it}$  = Change in accounts receivable for firm  $i$  for year  $t$ .

The remaining variables in the above model have been previously defined.

This modified Jones (1995) model explicitly assumes that a change in credit sales in the estimation period may be affected by earnings management. Earnings management is most likely to occur when revenues are overstated by inflating sales at the end of the year involving overstatement of accounts receivable.

In fact, in a test to evaluate alternative models' ability to detect earnings management, Dechow et al. (1995) found that the modified Jones (1995) model provides the most powerful earnings management test. Thus, the modified Jones (1995) model is recognized as superior

compared to the Jones (1991) Model because it accounts for accounts receivable, which results in a higher accurate measurement for abnormal accruals (see Doukakis, 2014).

#### **5.4.3 The Kothari et al. (2005) model**

Later studies on earnings management (e.g., Campa, 2019; Dewinta and Mita, 2020) used another variation of the modified Jones model (1995), as reported by Kothari et al. (2005). Kothari et al. (2005) adjusted the modified Jones (1995) model by considering the factor of return on assets (ROA) (= net income divided by total assets) in their model. ROA adjusts for a performance-matched firm's discretionary accruals.

Equally important, DeFond and Jiambalvo (1994) proposed a cross-sectional version of the Jones (1991) model to minimize the effects of survivorship bias.<sup>19</sup> This cross-sectional version of the Jones (1991) model reduces survivorship bias problems, as only two consecutive years' data are required. This model version also estimates coefficients in a given year, thus avoiding the assumption of coefficients being stable across years.

Consequently, the Kothari et al. (2005) model is identical to the cross-sectional analysis that uses OLS regression and the cross-sectional data. Further, as discussed earlier, Kothari et al. (2005) added ROA in their model, which leads to a superior enhancement in measuring abnormal accruals compared to the Jones (1991) and the modified Jones (1995) models.

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<sup>19</sup> Survivorship bias can occur when businesses which no longer exist – either it due to acquisition, bankruptcy, or any other reason – are also not taken into account when calculating earnings management.

$$[TA_{it}/A_{it-1}] = \beta_0 + \beta_1 [I/A_{it-1}] + \beta_2 [(\Delta REV_{it} - \Delta AR_{it})/A_{it-1}] + \beta_3 [PPE_{it}/A_{it-1}] \\ + \beta_4 [NI_{it}/A_{it-1}] + \varepsilon_{it}$$

The Kothari et al. (2005) model

Where:

$NI_{it}$  = Net income for firm  $i$  for year  $t$ ,

The term  $[NI_{it}/A_{it-1}]$  represents ROA.

The remaining variables in the above model have been previously defined.

## 5.5 Regression design

To investigate the moderating effects of the country and corporate levels factors on the relationship between IAF quality and earnings management, this thesis performed the analysis using both country-level and corporate-level regression models. The models are specified as follows.

### Country-level model:

$$\begin{aligned} \text{AbsoluteAbnAccr} = & \beta_0 \\ & + \beta_1 \text{ IAF Quality} \\ & + \beta_2 \text{ ShareholderPro} \\ & + \beta_3 \text{ DevelopedEconomies} \\ & + \beta_4 \text{ CountryLegalsystem} \\ & + \beta_5 \text{ IAF Quality*ShareholderPro} \\ & + \beta_6 \text{ IAF Quality*DevelopedEconomies} \\ & + \beta_7 \text{ IAF Quality*CountryLegalsystem} \\ & + \beta_8 \text{ ACEffectiveness} \\ & + \beta_9 \text{ CFO} \\ & + \beta_{10} \text{ SalesGrowth} \\ & + \beta_{11} \text{ Complexity} \\ & + \beta_{12} \text{ MB} \\ & + \beta_{13} \text{ Age} \\ & + \beta_{14} \text{ Assets} \\ & + \beta_{15} \text{ MTG} \\ & + \beta_{16} \text{ Leverage} \\ & + \beta_{17} \text{ Loss} \\ & + \beta_{18} \text{ AuditorSpecialist} \\ & + \beta_{19} \text{ ROA} \\ & + \beta_{20} \text{ Stability} \\ & + \beta_{21} \text{ GDPperCapita} \\ & + \beta_{22} \text{ ControlofCorrupt} \\ & + \beta_{23} \text{ GovernmentEffec} \\ & + \beta_{24} \text{ PoliticalStabi} \\ & + \beta_{25} \text{ RegulatoryQuality} \\ & + \beta_{26} \text{ RuleofLaw} \\ & + \beta_{(27-31)} \text{ IndustryDummies} \\ & + \varepsilon \end{aligned}$$

### Corporate-level model:

$$\begin{aligned} \text{AbsoluteAbnAccr} = & \beta_0 \\ & + \beta_1 \text{ IAF Quality} \\ & + \beta_2 \text{ Assistance} \\ & + \beta_3 \text{ OutsourcingBigDataAnalytics} \\ & + \beta_4 \text{ IAF Quality*Assistance} \\ & + \beta_5 \text{ IAF Quality*OutsourcingBigDataAnalytics} \\ & + \beta_6 \text{ IAFsThirdParty} \\ & + \beta_7 \text{ ACEffectiveness} \\ & + \beta_8 \text{ CFO} \\ & + \beta_9 \text{ SalesGrowth} \\ & + \beta_{10} \text{ Complexity} \\ & + \beta_{11} \text{ MB} \\ & + \beta_{12} \text{ Age} \\ & + \beta_{13} \text{ Assets} \\ & + \beta_{14} \text{ MTG} \\ & + \beta_{15} \text{ Leverage} \\ & + \beta_{16} \text{ Loss} \\ & + \beta_{17} \text{ AuditorSpecialist} \\ & + \beta_{18} \text{ ROA} \\ & + \beta_{19} \text{ Stability} \\ & + \beta_{20} \text{ GDPperCapita} \\ & + \beta_{21} \text{ ControlofCorrupt} \\ & + \beta_{22} \text{ GovernmentEffec} \\ & + \beta_{23} \text{ PoliticalStabi} \\ & + \beta_{24} \text{ RegulatoryQuality} \\ & + \beta_{25} \text{ RuleofLaw} \\ & + \beta_{(26-30)} \text{ IndustryDummies} \\ & + \varepsilon \end{aligned}$$



This thesis implemented two ordinary least square (OLS) regressions to achieve its objectives in studying the moderating factors at both country and corporate levels separately (see Figure 1). Separating the two levels empirically reduces the noise of moderating variables, leading to a better explanation for the statistical results. In detail, if the researcher combines the corporate and country data in one regression, the statistical results obtained from the OLS test are problematic and misleading (Garrett, 2003; Dongand and Stettler, 2011). Moreover, Garrett (2003) suggested that a corporate-level regression, in which the dependent variable and control variables are measured for each firm, is likely to provide a better-specified model for the analysis than an aggregated regression for both country and corporate levels.

Further, as the sample of this thesis included firms that are not homogenous due to different business atmospheres, including countries, industries, corporate governance and legal environments, accounting environments and economic circumstances, the multilevel analysis is an appropriate method to include moderating variables at the country and corporate levels separately (see Jaggi and Low, 2000; Hox, 2002; Dong and Stettler, 2011; Braam and Peeters, 2018). The multilevel analysis approach used in this thesis should enhance our understanding of the complex set of moderating factors on the relationship between IAF quality and earnings management. In short, the multilevel analysis can provide a clearer interpretation of the difference in moderating levels viewed across countries and firms (Garrett, 2003; DeFon et al., 2007; Dongand and Stettler, 2011). Nevertheless, this thesis included the same control variables in both regressions because the dependent variable remained unchanged.<sup>20</sup> See Table 6 that lists dependent, explanatory and control variables.

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<sup>20</sup> There is one additional control variable (*IAFsThirdParty*) in the corporate-level model to ensure that the moderating variable *OutsourcingBigDataAnalytics* captures the moderating effect of outsourcing big data analytics only without interferences from other aspects of outsourcing (e.g., recruitments, IT services, auditing financial transactions, etc.).

### 5.5.1 Measurement of the dependent variable (earnings management)

Following prior audit literature (Becker et al., 1998; Warfield et al., 1995; Jiambalvo et al., 2002; Prawitt et al., 2009; Abbott et al., 2016; Yung and Root, 2019; Dewinta and Mita, 2020; Gandía and Huguet, 2020; Zhang et al., 2020), this study utilized absolute value of abnormal accruals (*AbsoluteAbnAccr*) as a proxy for earnings management (the dependent variable). As discussed in section 5.4.3, the Kothari et al. (2005) model is superior in measuring earnings management compared to the Jones (1991) and the modified Jones (1995) models in cross-sectional data. Therefore, as this study has cross-sectional data, the Kothari et al. (2005) model measures abnormal accruals. The data source and description of the dependent variable (*AbsoluteAbnAccr*) can be found in Table 4.

Consistent with prior literature (e.g., Prawitt et al., 2009; Abbott et al., 2016; Dang et al., 2017; Campa, 2019; Dewinta and Mita, 2020), this study used the Kothari et al. (2005) model to separately estimate abnormal accruals by the industry for all firms in Worldscope database. I classified Worldscope's firms based on each firm's primary industry using the Standard Industrial Classification (SIC)<sup>21</sup> (at two-digit SIC code) reported by Worldscope. Then, I required ten firms minimum per industry<sup>22</sup> in the Worldscope database to compute the abnormal accruals measure, as illustrated by Prawitt et al. (2009), Cohen and Zarowin (2010), Kotari et al. (2012) and Abbott et al. (2016).

As seen in Table 8, *AbnAccr* (before taking the absolute value; *AbsoluteAbnAccr*) ranges from -0.14 to 0.18 with a mean (standard deviation) value of -0.02 (0.06). Kothari et al. (2005)

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<sup>21</sup> Standard Industrial Classification (SIC) codes are "four-digit numerical codes assigned by the U.S. government to business establishments to identify the primary business of the establishment. The classification was developed to facilitate the collection, presentation and analysis of data; and to promote uniformity and comparability in the presentation of statistical data collected by various agencies of the federal government, state agencies and private organizations. The classification covers all economic activities (SICCODE, 2020)."

<sup>22</sup> It assumes that all firms in an industry have the same operating technology, which leads to the same normal accruals for a given level of performance, as well as that all firms are at the same stage of the operating cycle.

reported a similar mean of -0.02 for all firms in the Compustat database with sufficient data to estimate abnormal accruals from 1963 to 1999. However, the minimum (-0.14) and maximum (0.18) of what was found in this thesis fall within the first (-7.45) and third (7.43) quartiles that were reported by Kothari et al. (2005). This suggests that my sample is comparable to the whole Compustat population in terms of mean abnormal accruals, although not reflecting as much variation in abnormal accruals as the Compustat population.

### **5.5.2 Measurements of the moderating variables**

To investigate the research hypotheses as shown in section 1.4, this thesis included six explanatory variables in the regression models, which are (1) *IAF Quality*, (2) *ShareholderPro*, (3) *DevelopedEconomies*, (4) *CountryLegalsystem*, (5) *Assistance* and (6) *OutsourcingBigDataAnalytics*. The data sources and descriptions for these explanatory variables can be found in Table 4.

Hence;

- *IAF Quality*: It is the metric proxy for the overall quality of the IAFs. Clikeman (2003) indicated that internal auditors should be strongly involved in defining earning management and take an effective approach in educating directors and managers about the risks of pursuing it. Church et al. (2001) revealed that IAF is sensitive to elements that may lead to fraud in financial reporting.
- *ShareholderPro*: It is a dummy variable that measures minority shareholder protections against directors' misappropriation of corporate assets for personal benefit, as well as safe governance lines and corporate disclosure standards that reduce the risk of managerial misconduct by executives (World Bank, 2020). The minority shareholder protections index, as reported by the World Bank, includes six sub-indices that are the (1) extent of disclosure index, (2) extent of director liability index, (3) ease of shareholder suits index,

(4) extent of shareholder rights index, (5) extent of ownership and control index and (6) extent of corporate transparency index. This study dichotomized each sub-index by assigning a value of one to the country if it is above or equals the sample's median for that index and zero if it is below the sample's median. Subsequently, the individual sub-index scores were added to create the minority shareholder protections index that ranges from 0 to 6 points.<sup>23</sup> Finally, *ShareholderPro* is coded “1” if the firm is located in a country that has a minority shareholder protections index above or equals the median of the sample and “0” otherwise.

- *DevelopedEconomies*: The sample countries are classified into two different economic blocks based on the MSCI index: (1) developed market and (2) developing market. *DevelopedEconomies* is coded “1” if the firm is located in a developed market, “0” otherwise.
- *CountryLegalsystem*: A dummy variable equals “1” if the firm is located in a common law country, “0” otherwise.
- *Assistance*: Assistance between internal and external auditors in this study is expressed by how many workweeks does the internal audit department spends every year on activities that support the external audit. This study formed *Assistance* as a dummy variable equals “1” if the company has workweeks above or equals the sample's median, “0” otherwise.
- *OutsourcingBigDataAnalytics*: It is a dummy variable equal to “1” if the firm outsources big data analytics of the IAFs to a third party, “0” otherwise.

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<sup>23</sup> Larger the minority shareholder protections index scores indicate the strength of minority shareholder protections that are of higher protection.

### 5.5.3 Measurements of the control variables

This thesis included several control variables that may impact the level of abnormal accruals. The list of these control variables can be found in Table 6, and their descriptions and data sources can be found in Table 4. Because IAF is a component of corporate governance<sup>24</sup>, this study included two control variables, *ACEffectiveness* and *AuditorSpecialist*, to control the contribution of corporate governance in reducing earnings management and maintaining financial reporting quality (La Porta et al., 1998; Blue Ribbon Committee (BRC), 1999; Whitley, 2005; Rose et al., 2013; Eller, 2014; Christ et al., 2015; Abbott et al., 2016; IIA, 2018c; Chartered IIA UK and Ireland, 2018). The inclusion of a measure for each component of corporate governance increases the likelihood that the *IAF Quality* coefficient represents the incremental contribution of the IAF toward the reduction in earnings management.

To control for the effect of the audit committee on abnormal accruals, I included *ACEffectiveness*. Previous research demonstrated that the audit committee's existence decreases earnings management and improves financial reporting quality (see Alves, 2013; Alzoubi, 2019; Agyei-Mensah, and Yeboah, 2019). Therefore, I formed *ACEffectiveness* as a dummy variable equals "1" if the audit committee exists, "0" otherwise. I expect to find a negative relation between *ACEffectiveness* and *AbsoluteAbnAccr*.

Additionally, previous research suggested that Big external auditing firms tend to be more conservative in their auditing approach than smaller firms (Becker et al., 1998; Francis et al., 1999; Francis and Krishnan, 1999; Krishnan, 2003; Francis and Wang, 2008; Francis and Yu, 2009; Prawitt et al., 2009; Cai et al., 2020; Lara et al., 2020). Therefore, earnings management is likely to be lower for audited companies by a Big external auditor. Thus, I set

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<sup>24</sup> Corporate governance includes IAF, audit committee, executive management and external auditor. Further, corporate governance is defined as "what the board of a company does and how it sets the values of the company and is to be distinguished from the day to day operational management of the company by full-time executives (Chartered IIA UK and Ireland, 2018)."

*AuditorSpecialist* as a dummy variable equals “1” if a firm is audited by a Big 4 audit firm and “0” otherwise. Also, I expect to observe a negative coefficient on *AuditorSpecialist*.

Next, management training ground (MTG) represents rotating internal auditors into management positions (or cycling current employees into the audit department for a short period before promoting them into management positions). Abbott et al. (2016) found that using IAF as an MTG increases earnings management. Also, Messier et al. (2011) showed that external auditors would assess internal auditors' objectivity to be lower if the IAF is used as an MTG than if it is not used as an MTG. In this study, *MTG* is coded “1” when the IAF is part of an MTG and “0” otherwise. A positive sign of the *MTG* coefficient is expected.

Additional control variables (*Assets*, *Age*, *Leverage*, *Complexity*, *CFO*, *SalesGrowth*, *MB*, *Stability*, *ROA* and *Loss*) are included to control other factors that may impact a company's abnormal accruals. Previous studies (e.g., Dechow and Dichev, 2002; Hoang and Phung 2019; Owusu et al., 2020) found that larger firms have higher accruals; hence, I controlled for firm size by including the natural log of total assets (*Assets*). Also, I included *Age* because firms may experience different accruals patterns as they age (Anthony and Ramesh, 1992; Prawitt et al., 2009; Dickinson, 2011; Abbott et al., 2016; Liu et al., 2018).

This study expects *Leverage* (=total debt/total assets) to be associated with more abnormal accruals to allow non-violation of debt covenants (Press and Weintrop, 1990; Ater and Hansen, 2020) to meet debt-covenant restrictions. Further, *Leverage* is expected to be associated with lower abnormal accruals (DeAngelo et al., 1994) to reduce earnings for contractual renegotiations. Therefore, this study expects to have a mixture of negative and positive signs on coefficient *Leverage* as demonstrated in prior research (Frankel et al., 2002; Ater and Hansen, 2020; Cai et al., 2020; Lara et al., 2020).

Moreover, I included a *Complexity* variable (Prawitt et al., 2009; Abbott et al., 2016) that proxies for firms' complexity using the number of operating segments a firm discloses in Worldscope. Firms with greater complexity may have more financial reporting manipulation due to the inherent complexity of their operations. Managers of companies with more complex operations may invest in higher IAF quality and have a greater ability to hide earnings management efforts.

Additionally, *CFO* (operating cash flows) (Dechow et al., 1995; Prawitt et al., 2009; Abbott et al., 2016; Owusu et al., 2020), *SalesGrowth* (sales growth from the prior year) (Menon and Williams, 2004; Hoang and Phung, 2019), and *MB* (market to book value) (Matsumoto, 2002; Lara et al., 2020) are included to control for business growth. Also, *Stability* (operating cash flow volatility) is included because it may impact the accrual calculation (Dechow and Dichev, 2002; Ujah and Brusa, 2014).

On top of that, low financial performance provides an incentive for earnings manipulation, so consistent with prior literature (e.g., Prawitt et al., 2009; Abbott et al., 2016; Alhadab and Clacher, 2018; Owusu et al., 2020; Kjærland et al., 2020), I included *ROA* (return on assets ( $ROA = \text{net income} / \text{total assets}$ ) and *Loss* (coded "1" if the firm experienced a loss in the preceding year, "0" otherwise). Prior literature revealed that increases in *ROA* might impact the calculation of abnormal accruals. Further, firms with a net loss have an increased incentive to manage earnings. Therefore, I expect a negative (positive) relationship between *ROA* (*Loss*) and abnormal accruals.

Further, I included *IndustryDummies* to control for differing levels of abnormal accruals by industry. As CBOK 2015 contains data on 20 different industries, and the sample in the thesis is relatively small ( $n=150$ ), my regressions will have lower degrees of freedom. As degrees of freedom decrease, the t-distribution does not approach normality. Hence, this study

implemented the Fama and French five industry conversion method<sup>25</sup> to reduce the 20 industries to five based on the four-digit SIC code as illustrated by their methodology.<sup>26</sup> It will help overcome the statistical challenge of a small sample size.

As previous studies (e.g., La Porta et al. 1998, 2000, Leuz 2010) found that countries' financial market development, security laws and national corporate governance have a relevant influence on firms' corporate governance structures and financial reporting quality, I included six additional control variables that were used by other researchers (e.g., Abdioglu et al., 2013; Nnadi and Soobaroyen 2015; Villiers and Marques, 2016; Lemma et al., 2019; Alzeban, 2020, Isidro et al., 2020). These variables are (1) *GDPperCapita* (GDP per capita in USD), (2) *ControlofCorrupt* (control of corruption), (3) *GovernmentEffec* (government effectiveness), (4) *PoliticalStabi* (political stability), (5) *RegulatoryQuality* (regulatory quality) and (6) *RuleofLaw* (rule of law). These country-level control variables, except *GDPperCapita*, were standardized in this thesis, where higher values represent better national governance outcomes. This thesis applied the natural log in measuring *GDPperCapita*<sup>27</sup>.

Finally, I included *IAFsThirdParty* in my corporate-level model as a control variable because Prawitt et al. (2012) found that outsourcing some or all IAFs to a third party (*IAFsThirdParty*) reduces earnings management. This model investigates whether outsourcing big data analytics for the IAFs (*OutsourcingBigDataAnalytics*) moderates the relationship between IAF quality

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<sup>25</sup> Fama and French methodology in reducing any number of industries to five industries are available at [http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data\\_Library/det\\_5\\_ind\\_port.html](http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/det_5_ind_port.html). By implementing this methodology, researchers can reduce any given number of industries to five industries that are (1) consumer, (2) manufacturing, (3) Hi technology, (4) healthcare, and (5) other.

<sup>26</sup> Eugene Fama and Kenneth French are specialised in predicting stock returns since 1992. In 2013, Fama won the Nobel Memorial Prize in Economic Sciences.

<sup>27</sup> Estimate of national corporate governance variables, which are *ControlofCorrupt*, *GovernmentEffec*, *PoliticalStabi*, *RegulatoryQuality* and *RuleofLaw*, ranges from -2.5 (weak) to 2.5 (strong). Thus, in consistent with Alzeban (2020), standardizing their values was the most suitable procedure to assure that their residuals are normally distributed. On the other hand, *GDPperCapita* variable ranges from USD 4,909 to USD 65,354. Therefore, such measuring method through natural log was applied to this variable in consistent with previous studies on testing GDP per capita (e.g., Durkin and Krygier, 2000; Ifa and Guetat, 2018).



and earnings management. Hence, the inclusion of *IAFsThirdParty* increases the likelihood that the coefficient on *OutsourcingBigDataAnalytics* (a moderating variable discussed in section 5.5.2) represents the Moderating contribution of outsourcing big data analytics toward the relationship between IAF quality and earnings management.

**Table 8: Descriptive statistics of variables included in the models**

<u>Variable</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Min</u>	<u>Max</u>
AbnAccr	-0.02	0.06	-0.14	0.18
AbsoluteAbnAccr	0.05	0.05	0.00	0.24
IAF Quality	4.01	1.26	1.50	6.00
ShareholderPro	0.77	0.42	0.00	1.00
DevelopedEconomies	0.61	0.49	0.00	1.00
CountryLegalsystem	0.41	0.49	0.00	1.00
Assistance	0.69	0.47	0.00	1.00
OutsourcingBigDataAnalytics	0.19	0.40	0.00	1.00
IAFsThirdParty	0.47	0.50	0.00	1.00
ACEffectiveness	0.82	0.39	0.00	1.00
CFO in USD	484,000,000	991,000,000	- 69,600,000	4,610,000,000
SalesGrowth	0.02	0.17	-0.29	0.60
Complexity	3.78	2.20	1.00	9.00
MB	2.29	1.99	0.19	9.70
Age	21.72	13.93	0.00	42.00
Assets in USD	7,220,000,000	16,200,000,000	28,800,000	83,300,000,000
MTG	0.33	0.47	0.00	1.00
Leverage	0.25	0.18	0.00	0.68
Loss	0.12	0.33	0.00	1.00
AuditorSpecialist	0.84	0.37	0.00	1.00
ROA	0.05	0.05	-0.07	0.17
Stability in USD	348,556	698,207	958.84	3,261,877
GDPperCapita in USD	36,019	15,903	4,909	65,354
ControlofCorrupt	0.00	1.00	-2.28	1.61
GovernmentEffec	0.00	1.00	-2.46	1.25
PoliticalStabi	0.00	1.00	-3.18	1.38
RegulatoryQuality	0.00	1.00	-2.50	1.48
RuleofLaw	0.00	1.00	-2.46	1.18

## Chapter 6. Data analysis and results

### 6.1 Descriptive statistics and correlation matrix

Table 7 presents descriptive statistics relating to my composite measure of IAF quality components, and Table 8 presents descriptive statistics for the variables included in the models using abnormal accruals (*AbsoluteAbnAccr*) as the dependent variable. Table 9 presents the correlations matrix for the variables included in the tested models.

From Table 7, the average experience (*Experience*) in internal auditing roles for internal auditors included in the sample is 11.51 years. The average number of professional certifications (*Certification*) (e.g., CIA or CPA) that internal auditors have is 1.26 certifications. Of the CAEs in the sample, 72 percent report directly to the audit committee (*CAEAC*). Internal auditors in the sample spend, on average, 64 percent of their time performing work related to financial reporting (*TimeFin*) and 43.15 hours per year for training (*Training*). Finally, of the *IASize* in the sample, 64 percent of CEAs believe that funding for their IAF is sufficient.<sup>28</sup>

Table 8 shows descriptive statistics for variables in the models. Sample firms are located in countries that have a 0.77 average shareholder protection environment (*ShareholderPro*). On top of that, 41 percent and 61 percent of sample firms are located in common law and developed countries, respectively. From the corporate-level perspective, 69 percent of the firms spend workweeks every year on activities that support the external auditor (*Assistance*). Further, 19 percent of the companies reported that their internal audit departments outsource big data

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<sup>28</sup> The descriptive statistics in Table 7 provides further evidence that I captured a broad range of *IAF Quality*, as each individual characteristic varies significantly. This provides some assurance that my results may generalise to a larger population of firms.

analytics to a third party (*OutsourcingBigDataAnalytics*). Similarly, around half of the sample outsources such IAFs to a third party.

Eighty-two percent of the firms have an audit committee (*ACEffectiveness*) in the sample, and 84 percent have external auditors from the big 4 (*AuditorSpecialist*). The firms' size ranges from small to quite medium, as might be expected, with a mean asset size of \$7.220 billion and their mean age (*Age*) is 21.72 years. Their leverage is fairly low (mean of 25%), and most have been public companies for at least 21.72 years (many for much longer). The firms have, on average, 3.78 operating segments (*Complexity*), operating cash flow (*CFO*) is \$0.484 billion (mean) and \$0.991 million (standard deviation), while mean cash flow volatility (*Stability*) is \$0.348 million.

Notably, mean sales growth (*SalesGrowth*) was 2%, and mean return on assets (*ROA*) was 5%, reflecting the 2014 economic environment. The mean market-to-book ratio (*MB*) was 2.29, reflecting the expansion of the financial markets during the examined period, and the incidence of a prior year loss (*Loss*) is 12%. All these measures are higher than those reported in Abbott et al. (2016)<sup>29</sup>, again likely reflective of the updated economic environment in my study.

A third of the companies in the sample have an *MTG* program. Table 8 also shows that the mean of *AbnAccr* is -0.02, and the standard deviation is 0.06. Additionally, the mean of *IAF Quality* is 4.01. The average GDP per capita (*GDPperCapita*) is \$ 36,019, and the mean for the national corporate governance indicators (*ControlofCorrupt*, *GovernmentEffec*, *PoliticalStabi*, *RegulatoryQuality* and *RuleofLaw*) is 0.00 due to standardization.

The correlation matrix in Table 9 demonstrates that all correlations between the moderating variables (explanatory variables) with *IAF Quality* and earnings management

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<sup>29</sup> Abbott et al. (2016) utilised a primary data through survey that covers the period from 2008 to 2009.

(*AbsoluteAbnAccr*) are below 0.50. As shown in Table 9, of the four correlations pairs among the three corporate governance variables (*IAF Quality*, *ACEffectiveness* and *AuditorSpecialist*), one is significant (*IAF Quality* and *ACEffectiveness*). *IAF Quality* is significantly correlated, but only modestly at 5%, with *ACEffectiveness*. However, the correlation between the control variables for the country-level effects (*GDPperCapita*, *ControlofCorrupt*, *GovernmentEffec*, *PoliticalStabi*, *RegulatoryQuality* and *RuleofLaw*) is more than 0.67. This strong correlation can reflect that these variables are correlated by nature.<sup>30</sup>

According to Frost (2020), not all multicollinearity is severe enough to cause problems (Frost, 2020).<sup>31</sup> One way to solve multicollinearity is by standardizing all the correlated variables. I standardized all of these variables except *GDPperCapita*, where I took its natural log. It is noted that initial data analysis on STATA software did not drop variables due to "possible collinearity." Nevertheless, to assure the results are robust in this study, I replaced these control variables with alternative variables for the country-level effect. I followed Jiang et al. (2018) in the robustness test section to assure that my results are consistent and robust. Also, Frost (2020) suggests that one potential solution to deal with multicollinearity is by linearly combining the independent variables (*ControlofCorrupt*, *GovernmentEffec*, *PoliticalStabi*, *RegulatoryQuality* and *RuleofLaw*)<sup>32</sup> by adding them together in one variable. This study also applied such a method as an additional robustness test. Further, in this thesis, I applied the

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<sup>30</sup> There are several variables that are correlated by nature (e.g., size of the firm has high correlation with the audit fees) and were included in empirical studies of IAF quality area (see Prawitt et al., 2009; Abbott et al., 2016; Gros et al., 2017).

<sup>31</sup> Frost (2020) argues that Only the correlated independent variables are affected by multicollinearity. As a result, if multicollinearity does not exist for the independent variables that the researcher is particularly interested in, he may not need to resolve it. Frost (2020) added that if the statistical model contains the explanatory variables of interest and some control variables has high multicollinearity exists for the control variables but not the explanatory variables, then the researcher can interpret the explanatory variables without problems. Jim Forest is an author for three statistical textbooks; (i) Introduction to Statistics, (ii) Hypothesis Testing and (iii) Regression Analysis. Refer to [www.statisticsbyjim.com](http://www.statisticsbyjim.com) for more information.

<sup>32</sup> As these variables measure the national corporate governance only, I will not include *GDPperCapita* in the new variable, as suggested by Frost (2020).

principal components analysis (CPA) test to solve this multicollinearity as an additional robustness test to assure that my initial results hold.

**Table 9: Correlation between variables**

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	AbnAccr	1													
2	AbsoluteAbnAccr	-0.003	1												
3	IAF Quality	-0.022	0.054	1											
4	ShareholderPro	-0.014	0.107	0.450***	1										
5	DevelopedEconomies	-0.092	0.041	-0.034	-0.276***	1									
6	CountryLegalsystem	-0.070	0.241**	0.466***	0.463***	0.416***	1								
7	Assistance	-0.056	0.045	0.118	0.273***	0.054	0.334***	1							
8	OutsourcingBigDataAnalytics	0.049	0.139	0.085	0.150	-0.0966	0.138	0.003	1						
9	IAFsThirdParty	0.026	0.098	0.289***	0.105	0.331***	0.463***	0.085	0.050	1					
10	ACEffectiveness	-0.052	0.037	0.204*	0.070	0.341***	0.393***	0.170*	0.010	0.403***	1				
11	CFO	-0.147	0.066	0.031	-0.068	0.183*	0.120	-0.018	-0.059	0.157	0.189*	1			
12	SalesGrowth	0.020	0.227**	0.300***	0.182*	0.067	0.313***	0.267***	0.039	0.106	0.127	-0.046	1		
13	Complexity	0.074	-0.090	0.093	0.002	0.058	-0.058	0.004	-0.059	0.075	0.016	0.229**	-0.062	1	
14	MB	-0.111	0.215**	0.240**	0.201*	0.026	0.176*	-0.090	0.013	0.158	0.185*	0.062	0.100	-0.075	1
15	Age	-0.123	0.065	0.023	-0.266**	0.466***	0.252**	0.063	0.016	0.074	0.099	0.241**	0.055	0.254**	-0.052
16	Assets	-0.036	-0.092	-0.071	-0.107	0.211**	-0.029	-0.279***	-0.119	0.026	0.024	0.401***	-0.142	0.207*	0.086
17	MTG	-0.009	0.017	0.070	0.183*	-0.031	0.108	0.072	0.055	0.061	0.030	0.179*	0.130	0.134	0.127
18	Leverage	0.101	0.036	0.203*	0.244**	0.125	0.366***	0.225**	0.039	0.231**	0.239**	0.092	0.179*	0.138	0.026
19	Loss	0.130	-0.138	-0.051	0.010	0.083	0.065	0.161*	-0.077	0.107	0.120	-0.133	-0.019	-0.038	-0.249**
20	AuditorSpecialist	-0.239**	0.059	-0.078	0.060	0.064	-0.040	-0.060	0.030	-0.102	-0.063	0.187*	-0.027	0.064	-0.012
21	ROA	-0.088	0.241**	0.124	0.055	-0.154	-0.062	-0.109	0.077	-0.121	-0.120	-0.009	0.089	-0.068	0.462***
22	Stability	-0.130	0.078	0.033	-0.066	0.181*	0.124	-0.014	-0.056	0.163*	0.191*	0.37*	-0.048	0.238**	0.063
23	GDPperCapita	-0.154	-0.016	0.030	-0.082	0.820***	0.375***	0.059	-0.058	0.213**	0.221**	0.205*	0.078	0.070	-0.039
24	ControlofCorrupt	-0.064	-0.056	-0.163*	-0.270***	0.784***	0.119	0.016	-0.129	0.119	0.081	0.097	-0.021	0.090	-0.125
25	GovernmentEffec	-0.086	-0.012	-0.098	-0.103	0.739***	0.245**	0.094	-0.070	0.088	0.039	0.049	0.004	0.034	-0.086
26	PoliticalStabi	-0.076	-0.099	-0.304***	-0.246**	0.486***	-0.121	-0.036	-0.109	-0.131	-0.185*	-0.003	-0.079	0.059	-0.207*
27	RegulatoryQuality	-0.099	-0.026	-0.052	0.024	0.632***	0.217**	0.099	-0.092	0.098	-0.004	0.054	0.021	0.054	-0.086
28	RuleofLaw	-0.087	0.015	-0.039	-0.052	0.763***	0.318***	0.089	-0.090	0.158	0.067	0.093	0.050	0.058	-0.057

(Continued on the next page)

**Table 9: Correlation between Variables (continued)**

	Variable	15	16	17	18	19	20	21	22	23	24	25	26	27	28
15	Age	1													
16	Assets	0.190*	1												
17	MTG	0.055	0.146	1											
18	Leverage	0.043	0.082	0.103	1										
19	Loss	-0.019	-0.007	0.005	0.172*	1									
20	AuditorSpecialist	-0.060	0.181*	0.110	-0.041	-0.007	1								
21	ROA	-0.046	-0.047	0.106	-0.363***	-0.488***	0.170*	1							
22	Stability	0.241**	0.400***	0.181*	0.099	-0.132	0.180*	-0.012	1						
23	GDPperCapita	0.313***	0.142	0.032	0.093	0.112	0.197*	-0.100	0.196*	1					
24	ControlofCorrupt	0.306***	0.121	-0.046	0.007	0.089	0.179*	-0.110	0.090	0.814***	1				
25	GovernmentEffec	0.287***	0.056	-0.002	0.007	0.072	0.167*	-0.073	0.042	0.826***	0.951***	1			
26	PoliticalStabi	0.148	0.015	-0.015	-0.176*	0.077	0.254**	-0.018	-0.014	0.678***	0.846***	0.862***	1		
27	RegulatoryQuality	0.179*	0.010	0.046	0.009	0.081	0.241**	-0.054	0.045	0.782***	0.917***	0.956***	0.867***	1	
28	RuleofLaw	0.288***	0.074	0.049	0.045	0.066	0.184*	-0.060	0.087	0.853***	0.945***	0.975***	0.819***	0.966***	1

This table presents the Pearson correlations between the variables used in the regressions. Continuous variables are winsorized at both the top and bottom 2% levels. All variable definitions are summarised in Table 4. Reporting significance: \* p<0.05, \*\* p<0.01, and \*\*\* p<0.001.



## 6.2 Multivariate Results

### 6.2.1 Multivariate results (country-level)

Table 10 summarizes the results from regressing absolute abnormal accruals (*AbsoluteAbnAccr*) on IAF related variables and controls variables at the country level. It can be observed that *IAF Quality*, *ShareholderPro* and *DevelopedEconomies* (*CountryLegalsystem*) are negatively (positively) related to earnings management (*AbsoluteAbnAccr*). These signs indicate that (1) higher IAF quality (*IAF Quality*) is associated with lower levels of earnings management and (2) firms that located in countries that have (i) higher shareholder protection environment (*ShareholderPro*) or (ii) developed markets (*DevelopedEconomies*) or (iii) civil legal system (*CountryLegalsystem*) are associated with lower levels of earnings management as well. The coefficients on *IAF Quality* (t-stat. = -2.68), and *DevelopedEconomies* (t-stat. = -2.07) are significant, while the coefficient on *ShareholderPro* (t-stat. = -1.61) is marginally insignificant. Also, the coefficient on *CountryLegalsystem* (t-stat. = 1.28) is not significant.

In Table 10, the predicted signs for my interaction variables are positive (negative) for *IAF Quality\*ShareholderPro* and *IAF Quality\*DevelopedEconomies* (*IAF Quality\*CountryLegalsystem*). With respect to the interactive term between *IAF Quality* and *ShareholderPro* (coefficient = 0.018, t-stat. = 1.86), the results suggest that the effects of IAF quality on reducing earnings management are higher for firms in countries with a lower shareholder protection environment than their counterparts with a higher shareholder protection environment (*support Hypothesis 1*). In other words, the impact of the IAF on financial reporting quality is dependent on the level of shareholder protection environment. The reduction in abnormal accruals for a certain level of IAF quality is conditional upon the shareholder protection environment level.

On the other hand, as I do not find a significant interaction effect between *IAF Quality* and *CountryLegalsystem* (coefficient = -0.013, t-stat = -0.98), the results suggest that the country's legal system has no significant moderating effect on the relationship between IAF quality and earnings management (*reject Hypothesis 2*).

However, the significantly positive coefficient (coefficient = 0.022, t-stat = 2.14) for the interactive term between *IAF Quality* and *DevelopedEconomies* suggests that the abnormal accrual reduction effect of *IAF Quality* is greater for firms located in developing markets. Particularly, high IAF quality yields greater reductions in earnings management (i.e., increase in financial reporting quality) in developing economies rather than developed economies (*support Hypothesis 3*). Further insights on these results that checked hypotheses 1, 2 and 3 will be discussed broadly in Chapter 7.

Several of the control variables are significant. *Stability (CFO)* and *SalesGrowth* are significant with positive (negative) coefficients and move in the predicted direction. These results are consistent with some previous studies that showed *Stability (CFO)* and *SalesGrowth* are associated with higher (lower) earnings management (*AbsoluteAbnAccr*) (e.g., Ujah and Brusa, 2014; Abbott et al., 2016; Astami et al., 2017).

The remaining control variables (*ACEffectiveness*, *Assets*, *Age*, *AuditorSpecialist*, *Complexity*, *Leverage*, *Loss*, *MB*, *ROA*, *MTG*, *GDPperCapita*, *ControlofCorrupt*, *GovernmentEffec*, *PoliticalStabi*, *Regulatory* and *QualityRuleofLaw*) are not significant at the p-value 0.10 level.

The reported adjusted R<sup>2</sup> is 17%, as shown in Table 10. Critical studies on IAF quality and earnings management (e.g., Prawitt et al., 2009; Johl et al., 2013; Al-Rassas and Kamardin, 2015; Abbott et al., 2016<sup>33</sup>; Gros et al., 2017) that have sample size (number of firms) varying

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<sup>33</sup> Abbott et al. (2016) reported two regressions. Frist (second) regression has a sample size of 81 (108) firms and an adjusted R<sup>2</sup> of 24% (20%). To simplify it, I took their average on both sample size and the adjusted R<sup>2</sup>.

from 40 to 2032 firms, reported adjusted  $R^2$  of 6% to 45%. Hence, my adjusted  $R^2$  lies within the previous studies' range for the adjusted  $R^2$ . Additionally, it is known that the adjusted  $R^2$  explaining observed variation in a dataset and low the adjusted  $R^2$  does not mean the model is not good (Fonticella, 2010). Furthermore, this thesis's regression aims to report an association between an independent and dependent variable. In other words, even when a model has a low  $R^2$ , it can still be used because there could be a significant correlation between the independent variables and the dependent variable that is still meaningful (Theroux, 1981). As a result, the reported adjusted  $R^2$  (=17%) should not be problematic in interpreting the association between the moderators and the dependent variable.

**Table 10: How country-level variables could moderate the relationship between IAF quality and earnings management (Dependent variable is AbsoluteAbnAccr)**

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.030	0.011	-2.68***
ShareholderPro	?	-0.066	0.041	-1.61
DevelopedEconomies	?	-0.082	0.040	-2.07**
CountryLegalsystem	?	0.073	0.057	1.28
IAF Quality*ShareholderPro	?	0.018	0.010	1.86*
IAF Quality*DevelopedEconomies	?	0.022	0.010	2.14**
IAF Quality*CountryLegalsystem	?	-0.013	0.013	-0.98
ACEffectiveness	-	-0.014	0.013	-1.05
CFO	-	-0.000	0.000	-2.45**
SalesGrowth	+	0.061	0.034	1.80*
Complexity	+	-0.003	0.002	-1.57
MB	-	0.003	0.003	0.82
Age	-	0.000	0.000	0.43
Assets	+	-0.001	0.001	-1.11
MTG	+	-0.004	0.009	-0.49
Leverage	+	-0.001	0.029	-0.03
Loss	+	0.005	0.013	0.35
AuditorSpecialist	-	0.014	0.009	1.60
ROA	-	0.205	0.146	1.41
Stability	+	0.000	0.000	1.73*
GDPperCapita	?	0.003	0.015	0.17
ControlofCorrupt	?	0.007	0.021	0.33
GovernmentEffec	?	0.012	0.017	0.68
PoliticalStabi	?	-0.006	0.011	-0.54
RegulatoryQuality	?	0.014	0.022	0.63
RuleofLaw	?	-0.032	0.030	-1.06
Intercept	?	0.128	0.151	0.85
n	150			
Adj. R <sup>2</sup> (from OLS regression)	0.17			

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10, 0.05,$  and  $0.01$  levels, respectively. Industry effect is repressed for presentational ease. I reported ‘‘Robust Std. Err.’’ because this thesis’s data has heteroscedasticity. I used the Breusch and Pagan test to check the presence of such heteroscedasticity. See Table 4 for variables descriptions.

### 6.2.2 Multivariate results (corporate-level)

Table 11 summarizes the results from regressing absolute abnormal accruals (*AbsoluteAbnAccr*) on the IAF related variables and controls variables at the corporate level. It is shown that *IAF Quality* and *Assistance* (*OutsourcingBigDataAnalytics*) are negatively (positively) related to earnings management (*AbsoluteAbnAccr*). These signs indicate that (1) higher IAF quality (*IAF Quality*) is associated with lower levels of earnings management, (2) assistance between internal and external auditors (*Assistance*) is associated with lower levels of earnings management as well, while (3) outsourcing big data analytics (*OutsourcingBigDataAnalytics*) helps managers to manipulate earnings more. The coefficients on *IAF Quality* (t-stat. = -2.01), *Assistance* (t-stat. = -2.18) and *OutsourcingBigDataAnalytics* (t-stat. = 2.04) are significant.

In Table 11, the predicted sign for the interactive variable is positive (negative) for *IAF Quality\*Assistance* (*IAF Quality\*OutsourcingBigDataAnalytics*). With respect to the interactive term between *IAF Quality* and *Assistance* (coefficient = 0.013, t-stat. = 1.93), my results suggest that the effect of IAF quality on reducing earnings management is larger for firms in which internal auditors spend less time on assisting external auditors than firms that spend a higher amount of time on such assistance (*support Hypothesis 4*).

The significantly negative coefficient (coefficient = -0.020, t-stat = -1.79) for the interaction term between *IAF Quality* and *OutsourcingBigDataAnalytics* suggests that high IAF quality reduces earnings management, and this relationship is more pronounced for firms that outsource big data analytics for IAFs purposes than those that do not outsource (*support Hypothesis 5*). Further insights on these results that checked hypotheses 4 and 5 will be discussed extensively in Chapter 7.

Several control variables (*SalesGrowth*, *CFO*, *Stability*, *Complexity* and *AuditorSpecialist*) gain significance in Table 11. The coefficients' signs on *SalesGrowth* (+), *CFO* (-) and *Stability* (+)

move as predicted, while the coefficients' signs on *Complexity* (-) and *AuditorSpecialist* (+) move oppositely. The results on *SalesGrowth* (+), *Stability* (+) and *CFO* (-) are consistent with previous studies, as shown in section 6.2.1.

On the other hand, *Complexity* (-) results are not consistent with previous studies (e.g., Abbott et al., 2016). The negative relationship between *Complexity* and earnings management (*AbsoluteAbnAccr*) could be explained in two different ways. First, the firm size in my sample ranges from small to medium-sized compared to Abbott et al. (2016) that targeted big-sized firms, which could be engaged more in earnings management if they have more product segments (*Complexity*). Refer to Appendix 2 that compares the firms' size between my sample and some previous studies. Second, Abbott et al. (2016) utilized primary data through a survey covering 2008 to 2009, where most firms suffered from the financial crisis. Their sample firms were probably under pressure to manage earnings more to meet analysts' expectations. At the same time, this study targeted firms in 2014, where no financial crisis existed that year.

Further, it can be noted that the coefficient of *AuditorSpecialist* is positive in Table 11. Simultaneously, it is not reasonable concerning the external auditors' role (*AuditorSpecialist*) in reducing earnings management. Prawitt et al. (2009, p.1269) found that "external auditors have a positive relationship with negative abnormal accruals," and most of my sample firms have negative abnormal accruals before taking the absolute value. Further, the results in Table 11 showed that the audit committee's effect (*ACEffectiveness*) in reducing earnings management is not significant (coefficient = -0.009, t-stat = -0.72) to mitigate earnings management. Taken as a whole, these results suggest that in my sample, IAF quality (*IAF Quality*) plays a more significant role in mitigating earnings management than the other aspects of corporate governance, including audit committee (*ACEffectiveness*) and external auditors (*AuditorSpecialist*).

Finally, the rest of the control variables (*Assets*, *Age*, *Leverage*, *Loss*, *MB*, *ROA*, *MTG*, *GDPperCapita*, *ControlofCorrupt*, *GovernmentEffec*, *PoliticalStabi*, *Regulatory* and *QualityRuleofLaw*) are not significant at the p-value 0.10 level.

**Table 11: How corporate-level variables could moderate the relationship between IAF quality and earnings management** (Dependent variable is AbsoluteAbnAccr)

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.010	0.005	-2.01**
Assistance	?	-0.059	0.027	-2.18**
OutsourcingBigDataAnalytics	?	0.091	0.045	2.04**
IAF Quality*Assistance	?	0.013	0.007	1.93*
IAF Quality*OutsourcingBigDataAnalytics	?	-0.020	0.011	-1.79*
IAFsThirdParty	-	0.010	0.008	1.23
ACEffectiveness	-	-0.009	0.012	-0.72
CFO	-	-0.000	0.000	-2.10**
SalesGrowth	+	0.074	0.033	2.24**
Complexity	+	-0.003	0.002	-1.69*
MB	-	0.002	0.003	0.68
Age	-	0.000	0.000	0.79
Assets	+	-0.001	0.001	-0.98
MTG	+	-0.013	0.008	-1.50
Leverage	+	0.008	0.028	0.29
Loss	+	0.009	0.014	0.64
AuditorSpecialist	-	0.017	0.009	1.83*
ROA	-	0.207	0.143	1.45
Stability	+	0.000	0.000	1.80*
GDPperCapita	?	0.007	0.015	0.45
ControlofCorrupt	?	-0.017	0.013	-1.26
GovernmentEffec	?	0.025	0.018	1.37
PoliticalStabi	?	-0.013	0.010	-1.31
RegulatoryQuality	?	0.010	0.020	0.50
RuleofLaw	?	-0.011	0.024	-0.47
Intercept	?	0.010	0.157	0.06
n			150	
Adj. R <sup>2</sup> (from OLS regression)			0.21	

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ , 0.05, and 0.01 levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for variables descriptions.



### 6.3 Robustness tests

This section further investigates the results obtained in the primary analysis in section 6.2. The purpose of additional analyses is to provide reasonable assurance that the main findings are robust to various models' specifications. The tests include the following.

1	Using alternative variables to control for the country-level effect
2	Additional control variables for the country-level effect
3	Multicollinearity checks
4	Excluding countries that have one firm only
5	Excluding firms from Taiwan, Japan and the US
6	Using alternative proxies to measure earnings management and IAF quality
7	Using an alternative proxy to measure economic status / using an alternative variable for the control variable <i>GDPperCapita</i> <sup>34</sup> (GDP per capita)

#### 6.3.1 Robustness tests (country-level regression for hypotheses 1, 2 and 3)

This section presents twelve robustness tests to assure that my original findings on the relationship between IAF quality and earnings management at the country-level (hypotheses 1, 2 and 3) are robust.

##### 6.3.1.1 Using alternative variables to control for the country-level effect

In this robustness test, I replaced the original control variables for the country-level effects (*ControlofCorrupt*, *GovernmentEffec*, *PoliticalStabi*, *RegulatoryQuality*, *RuleofLaw* and *GDPperCapita*) with two alternative variables that reported by Jiang et al. (2018). I included (1) countries' financial market development (*FINDEV*) (Jiang et al., 2018) and (2) overall quality of

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<sup>34</sup> The robustness test (using an alternative proxy to measure economic status) will be used for the country level regression, while (using an alternative variable for the GDP per capita (*GDPperCapita*) will be used at the corporate level regression.

security laws (*SECLAW*) (Jiang et al., 2018) as two alternative control variables for the country-level effects.<sup>35</sup> The correlation between these two variables is 0.21 and significant at the p-value of 0.05.

The results are consistent with my original findings, as shown in Table 10, therefore providing certainty to the conclusions drawn about hypotheses 1, 2 and 3. Appendix 3 shows the robustness results.

### **6.3.1.2 Additional control variables for the country-level effect**

In addition to the control variables included in the main model for the country-level effect (*ControlofCorrupt*, *GovernmentEffec*, *PoliticalStabi*, *RegulatoryQuality*, *RuleofLaw* and *GDPperCapita*), this robustness test included Jiang et al. (2018)'s control variables (*FINDEV* and *SECLAW*) for the country-level effect as they argue that these two variables capture the country-level effect in the analysis across countries. The present study tested whether the inclusion of these variables would affect the primary results.

The results of this robustness test, as presented in Appendix 6, showed that the original findings reported in Table 10 for hypotheses 1, 2 and 3 hold, even with the inclusion of these two additional control variables.

### **6.3.1.3 Multicollinearity checks**

#### **Approach A: Linearly combining**

As this study's control variables for the country-level effect (*ControlofCorrupt*, *GovernmentEffec*, *PoliticalStabi*, *RegulatoryQuality* and *RuleofLaw*) that proxy for the national corporate

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<sup>35</sup> *SECLAW* is calculated as the mean of the standardised values of three indices developed in La Porta et al. (2006) and used in Leuz (2010): disclosure quality index, liability standard index, and public enforcement index. See Appendix 4 for *SECLAW* calculation. *FINDEV* is calculated as the standardised mean rank of two variables: the ratio of domestic listed companies to the total population from 2011 to 2013 and the market capitalisation to total GDP from 2011 to 2013. See Appendix 5 for *FINDEV* calculation.

governance (NCG)<sup>36</sup> have high multicollinearity, Frost (2020) suggests that one potential solution to deal with is by linearly combining them in one variable, which this robustness test applied. Therefore, this robustness test created (*NCG\_indicators*) variable that equals the sum of these variables for each country. The statistical descriptive of these variables is presented in Table 8.

Interestingly enough, as presented in Appendix 7, my results remain unchanged in this additional analysis with my original results for hypotheses 1, 2 and 3. This is consistent with Frost (2020), who argues that if high multicollinearity exists for the control variables but not the explanatory variables, the researcher can interpret the explanatory variables without problems.

### **Approach B: Principal components analysis**

One very common solution to solve this high multicollinearity is by reducing the dimensionality of the data into fewer independent variables that take the interdependence of variables into account, for example, by a principal component analysis (PCA) (Björklund, 2019). By adopting the PCA test for these highly correlated variables, a new variable (*NCG-PrincipleComponentsAnalysis*) is created. It represents the overall direction and effect of the highly correlated variables (*ControlofCorrupt*, *GovernmentEffec*, *PoliticalStabi*, *RegulatoryQuality* and *RuleofLaw*).

In this robustness test, I replaced these highly correlated variables with *NCG-PrincipleComponentsAnalysis* variable. As presented in Appendix 8, my results remain unchanged in this additional analysis with my original results for hypotheses 1, 2 and 3.

### **Approach C: Combining the new variable from the multicollinearity checks with additional control variables for the country-level effect**

This additional test combined Jiang et al. (2018)'s variables (*FINDEV* and *SECLAW*) with (*NCG\_indicators*) variable to control for the country-level effect. The original results reported in

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<sup>36</sup> Higher values of each variable representing better national governance outcomes.

Table 10 for hypotheses 1, 2 and 3 hold, even with the inclusion of these three variables as alternative variables to control the country-level effect. See Appendix 9 for the robustness results.

#### **6.3.1.4 Excluding countries that have one firm only**

Certain countries have one observation only in the sample. Because of the possibility that the results are affected by firms that operate in these countries, this test re-estimated the regressions and excluded countries with one observation. Again, the results in Appendix 10 remain unchanged from my original results for hypotheses 1, 2 and 3.

#### **6.3.1.5 Excluding firms from Taiwan, Japan and the US**

Because my data included many US firms (32 percent of the total sample), one concern is that the US firms may affect the results. Similarly, Taiwanese and Japanese firms also represent a relatively large portion of the sample. To address the potential bias introduced by firms from these three countries, I control for Taiwanese, Japanese and US firms in additional analysis, as shown in Appendices 11, 12 and 13, respectively. I re-estimated the regressions without US, Taiwan, or Japan firms. My results in these additional analyses are consistent with my original results for hypotheses 1, 2 and 3.

Reducing the sample size in this robustness test by removing such firms from the US, Taiwan, and Japan affected the significance degree slightly for the interactive term *IAF Quality\*ShareholderPro* after removing Taiwanese firms (t-stat = 1.64), but the sign remains unchanged. Previous studies that examined the relationship of IAF quality with other investigated variables (e.g., earnings management) have sample sizes range from 150 to 528 (See, e.g., Alzeban, 2020; Jiang et al., 2018; Abbott et al.; 2016; Prawitt et al., 2012, 2009), which indicates that reducing the sample to fewer than 150 firms is likely to affect the significant degree of the model's variables. At the same time, I controlled for the influence of the US, Taiwan, and Japan firms and various countries' firms in my primary and robustness analyses by including thirteen different

control variables (*ControlofCorrupt*, *GovernmentEffec*, *PoliticalStabi*, *RegulatoryQuality*, *RuleofLaw*, *GDPperCapita*, *FINDEV*, *SECLAW*, *ShareholderPro*, *DevelopedEconomies*, *CountryLegalsystem*, *NCG\_indicators* and *NCG-PrincipleComponentsAnalysis*) to capture all country-level effects in my regressions.

Even my sample has large portions of US, Taiwanese and Japanese firms, studies across countries are likely to have large portions from these three countries for several reasons. First, the US economy is the largest globally and accounting for almost 22 percent of global output and over a third of the stock market capitalization. Second, Japan is the third-largest economy globally by nominal GDP and the fourth-largest by purchasing power parity. Also, Japan has the third-largest stock exchange in the world by aggregate market capitalization of its listed companies and the largest in Asia. Third, the Taiwanese economy and stock market capitalization ranked in the top 21, 20 worldwide, respectively. Hence, studies that target publicly traded companies across countries are likely to have large portions from these three nations. For instance, the study of Jiang et al. (2018), which utilized the dataset CBOK 2010, has many US, Taiwanese and Japanese firms.

#### **6.3.1.6 Using alternative proxies to measure earnings management and IAF quality**

##### **Alternative A: Using an alternative proxy to measure IAF quality by Ege (2015) model**

In my primary analysis, I derived the composite measure of IAF quality based on the previous model created by Prawitt et al. (2009), which consists of six individual characteristics as

$$IAF\ Quality = Experience + Certification + Training + TimeFin + CAEAC + IASize.$$

Ege (2015) created another model for IAF quality similar to Prawitt et al. 2009 model, except that he added the *MTG* variable<sup>37</sup>.

$$IAF\ Quality = Experience + Certification + Training + + TimeFin + CAEAC + IASize + MTG$$

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<sup>37</sup> For more details on MTG, refer to section 5.5.3.

Therefore, this robustness test replaced Prawitt et al. (2009) model for the IAF quality by Ege (2015) model. The results of this robustness test, as presented in Appendix 14, remain unchanged from my original results for hypotheses 1, 2 and 3.

### **Alternative B: Using an alternative proxy (the modified Jones (1995) model) to measure earnings management**

In addition to adopting the Kothari et al. (2005) model for estimating earnings management, this study also applied the modified Jones (1995) model as an alternative proxy of earnings management. Refer to Figure 2 that shows the most widespread models in measuring earnings management. Appendix 15 shows the OLS regression on how such country-level factors could moderate the relationship between IAF quality and earnings management (proxied by the modified Jones (1995) model). The adjusted R<sup>2</sup> obtained in this regression is comparable to my primary regression in Table 10. As shown in Appendix 15, the results are consistent and qualitatively remain unchanged<sup>38</sup> with the main test for Hypotheses 1, 2 and 3. However, the interactive term *IAF Quality\*ShareholderPro* is marginally insignificant (t-stat = 1.57). This can be justified by noting that the constant is positive and highly significant<sup>39</sup> at p<0.05. The significance of the constant could indicate that there are such important variables not yet captured in the model. The modified Jones (1995) model does not capture the effect of return on asset (equals net income divided by total assets) in measuring earnings management, while the Kothari et al. (2005) model does capture this effect.

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<sup>38</sup> The term *qualitatively remain unchanged* in this study means that the signs of the explanatory variables remain unchanged in the robustness test compared with the primary analysis.

<sup>39</sup> All my primary tests have insignificant constants, which indicates that these tests captured and controlled for all possible effects in the environment of my study at both country and corporate levels.

### **Alternative C: Using an alternative proxy (the Jones (1991) model) to measure earnings management**

This robustness test applied the Jones (1991) model as an alternative proxy of earnings management. The results of this additional analysis, as shown in Appendix 16, qualitatively remain unchanged from my original results for Hypotheses 1, 2 and 3. However, the interactive term *IAF Quality\*ShareholderPro* [*IAF Quality\*DevelopedEconomies*] is not significant [marginally<sup>40</sup> insignificant (t-stat = 1.50)]. One of the justifications for this non-significant result is that as the constant is positive and significant at  $p < 0.1$ , the Jones (1991) model does not capture the effect of return on asset and the change in accounts receivable while the Kothari et al. (2005) model does capture these two effects. Refer to section 5.4 that presents the technical differences between the Jones (1991) model, the modified Jones model (1995), and the Kothari et al. (2005) model.

### **Alternative D: Combining Ege (2015) model to measure IAF quality and the modified Jones (1995) model to measure earnings management**

This additional analysis combined Ege's (2015) model to measure IAF quality and the modified Jones model (1995) to measure earnings management instead of the Prawitt et al. (2009) model and the Kothari et al. (2005) model, respectively. As shown in Appendix 17, the results remain unchanged in this additional analysis with my original results for hypotheses 1, 2 and 3. However, the interactive term *IAF Quality\*ShareholderPro* is not significant. The constant is positive and highly significant at  $p < 0.05$ , which could explain why the interactive term is not significant due to the absence of the effect of return on the asset in measuring earnings management.

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<sup>40</sup> As the American Statistical Association has recently acknowledged, the choice of model may influence the p-value results (Wasserstein and Lazar, 2016). Scientific findings and corporate or policy decisions should not have been made solely based on whether a p-value falls below a certain level (e.g., 0.1, 0.05, etc.) (Wasserstein and Lazar, 2016). Further, reliance on tests of significance will lead to erroneous conclusions about the relevance of predictor variables (Wasserstein and Lazar 2016). For instance, if a variable selection method depends on p-values to assess statistically significant results, a variable may miss a predetermined cut-off by a tiny margin resulting in a finding that the variable is not likely to be associated and predictive (Bursac et al., 2008).

### **Alternative E: Combining Ege (2015) model to measure IAF quality and the Jones (1991) model to measure earnings management**

This robustness test replaced Prawitt et al. (2009) model and the Kothari et al. (2005) by Ege's (2015) model and the modified Jones model (1995) to measure IAF quality and earnings management, respectively. The results in Appendix 18 qualitatively remain unchanged in this additional analysis with my original results for Hypotheses 1, 2 and 3. However, the interactive term *IAF Quality\*ShareholderPro* is not significant, and the constant is positive and highly significant at  $p < 0.05$ .

#### **6.3.1.7 Using an alternative proxy to measure economic status**

This additional test replaced the *DevelopedEconomies*<sup>41</sup> variable, which measures each country's economic status in my sample by *GDPperCapita-Stnd* as an alternative variable. I set *GDPperCapita-Stnd* as a dummy<sup>42</sup> variable after standardizing GDP per capita in USD, where *GDPperCapita-Stnd* is coded “1” if the firm located in a country that has GDP per capita equals or greater than the median of my sample, “0” otherwise. As shown in Appendix 19, the results remain unchanged in this additional analysis with my original results for Hypotheses 1, 2 and 3.

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<sup>41</sup> In my primary tests, the sample countries are classified into two different economic blocks based on MSCI indexes: (1) developed market and (2) developing market. *DevelopedEconomies* is coded “1” if the firm located in a developed market, “0” otherwise.

<sup>42</sup> Utilising moderating variables as a dummy rather than continuous variable make it easier for statistical interpretation.



### **6.3.2 Robustness tests (corporate-level regression for hypotheses 4 and 5)**

This section replicated the same robustness tests in section 6.3.1 to examine whether the primary findings on Hypotheses 4 and 5 hold to various models' specifications.

#### **6.3.2.1 Using alternative variables to control for the country-level effect**

This robustness test replaced the original control variables for the country-level effect (*ControlofCorrupt*, *GovernmentEffec*, *PoliticalStabi*, *RegulatoryQuality*, *RuleofLaw* and *GDPperCapita*) with two alternative sets of control variables. First, this test included *FINDEV* and *SECLAW* as two alternative control variables for the country-level effects instead of my original control variables, as shown in Table 11. The results of this robustness test, as shown in Appendix 20, are consistent with my original findings on Hypotheses 4 and 5.

Second, this test utilized *ShareholderPro*, *DevelopedEconomies* and *CountryLegalsystem* as three alternative control variables for the country-level effects. Again, the results shown in Appendix 21 are consistent with the original findings on hypotheses 4 and 5.

#### **6.3.2.2 Additional control variables for the country-level effect**

The present study examined whether the inclusion of *FINDEV* and *SECLAW* (*ShareholderPro*, *DevelopedEconomies* and *CountryLegalsystem*) variables as additional control variables for the country-level effects would affect the primary results. The results of this robustness test are presented in Appendix 22 (23). It has been found that my original findings on Hypotheses 4 and 5 hold, even with the inclusion of these two sets of additional control variables.

#### **6.3.2.3 Multicollinearity checks**

##### **Approach A: Linearly combining**

As mentioned earlier, this study's control variables for the country-level effect (*ControlofCorrupt*, *GovernmentEffec*, *PoliticalStabi*, *RegulatoryQuality* and *RuleofLaw*) have high multicollinearity.

One potential solution to this multicollinearity is by linearly combining these variables in one variable (*NCG\_indicators*), as suggested by Frost (2020).

As shown in Appendix 24, the results of this test are similar to the main findings for Hypotheses 4 and 5. Therefore, the multicollinearity existence between such control variables (*ControlofCorrupt*, *GovernmentEffec*, *PoliticalStabi*, *RegulatoryQuality* and *RuleofLaw*) is unlikely to affect the results, as predicted by Frost (2020).

#### **Approach B: Principle components analysis**

After running the CPA test, I replaced the highly correlated variables (*ControlofCorrupt*, *GovernmentEffec*, *PoliticalStabi*, *RegulatoryQuality* and *RuleofLaw*) with *NCG-PrincipleComponentsAnalysis* variable. As shown in Appendix 25, the results remain unchanged in this additional analysis with my original results for Hypotheses 4 and 5.

#### **Approach C: Combining the new variable from the multicollinearity checks with additional control variables for the country-level effect**

This additional test combined separately two sets of variables, *NCG\_indicators* with *FINDEV* and *SECLAW* and *NCG\_indicators* with *ShareholderPro*, *DevelopedEconomies* and *CountryLegalsystem*, to control for the country-level effect. This study found the results reported in Table 11 for Hypotheses 4 and 5 hold, even with the inclusion of these two sets of variables as alternative variables to control the country-level effect. See Appendix 26 (27) for the robustness results.

#### **6.3.2.4 Excluding countries that have one firm only**

This robustness test re-estimated the regression and excluded countries with one observation, and the results as presented in Appendix 28 remain relatively unchanged from my original results.

However, the interactive term *IAF Quality\*OutsourcingBigDataAnalytics* is barely insignificant (P-value = 0.103; t-stat = -1.64).

#### **6.3.2.5 Excluding firms from Taiwan, Japan and the US**

This additional test re-estimated the regression without firms from the US or Taiwan or Japan. The results qualitatively remain unchanged in these additional analyses with my original results for Hypotheses 4 and 5. However, the results as shown in Appendices 29, 30 and 31 showed that the interactive term *IAF Quality\*Assistance* is not significant after removing Japanese firms. Further, the interactive term *IAF Quality\*OutsourcingBigDataAnalytics* is marginally insignificant after excluding Taiwanese firms (t-stat = -1.53) or Japanese firms (t-stat = -1.56). This could be related to reducing the sample size, which is initially small (n=150). Nevertheless, the signs of my explanatory variables remain unchanged.

#### **6.3.2.6 Using alternative proxies to measure earnings management and IAF quality**

##### **Alternative A: Using an alternative proxy to measure IAF quality by Ege (2015) model**

This robustness test replaced the Prawitt et al. (2009) model as a proxy for the IAF quality by Ege (2015) model. The results remain unchanged compared with my original hypotheses 4 and 5. However, the results showed that the interactive term *IAF Quality\*Assistance* is slightly insignificant (t-stat = -1.53), but its sign remains unchanged. See Appendix 32 for the robustness results.

##### **Alternative B: Using an alternative proxy (the modified Jones (1995) model) to measure earnings management**

The results of this robustness test, as shown in Appendix 33, are consistent with the main test for Hypotheses 4 and 5 in Table 11. However, the interactive term *IAF Quality\*Assistance* is not significant.

**Alternative C: Using an alternative proxy (the Jones (1991) model) to measure earnings management**

The results of this additional test, as shown in Appendix 34, are similar to the main test for Hypotheses 4 and 5 in Table 11. However, the interactive term *IAF Quality\*Assistance* is not significant.

**Alternative D: Combining Ege (2015) model to measure IAF quality and the modified Jones (1995) model to measure earnings management**

This robustness test applied alternative proxies by Ege's (2015) model to measure IAF quality and the modified Jones (1995) model to measure earnings management. The results remain unchanged, as shown in Appendix 35. However, the interactive term *IAF Quality\*Assistance* is not significant.

**Alternative E: Combining Ege (2015) model to measure IAF quality and the Jones (1991) model to measure earnings management**

Similar to the previous robustness test, the Prawitt et al. (2009) model and the Kothari et al. (2005) model have been replaced by Ege (2015) model and the modified Jones (1995) model, respectively. The results remain unchanged, as shown in Appendix 36. However, the interactive term *IAF Quality\*Assistance* is not significant. From a statistical perspective, it is worth noting that both the modified Jones (1995) model and the Jones (1991) model do not control for the effects of return on asset and the change in accounts receivable in measuring earnings management, while the Kothari et al. (2005) model does capture these effects. This might justify the insignificant interactive terms in this test and the previous tests (no. 8, 9 and 10).

### **6.3.2.7 Using alternative variables for the control variable *GDPperCapita* (GDP per capita)**

This robustness test replaced the control variable *GDPperCapita* with *GDPperCapita-Stnd* and *DevelopedEconomies*<sup>43</sup> variables, respectively. It has been found that the results of this test, as presented in Appendices 37 and 38, respectively, remain unchanged with my original results for Hypotheses 4 and 5.

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<sup>43</sup> Refer to Table 4 for variables description.

## **Chapter 7. Discussion**

### **7.1 Introduction**

Chapter 6 (Data analysis and results) presents the statistical findings on whether such country-level and corporate-level factors could moderate the relationship between IAF quality and earnings management. By considering the comprehensive literature review in Chapter 4 (Literature review and research hypotheses development), the author decided to break the moderation effect into two areas, country and corporate levels, separately. In this study, country-level moderating factors include (i) shareholder protection environment, (ii) a country's legal system and (iii) economic status (developed and developing markets). On the other hand, corporate-level moderating factors include (a) assistance between internal and external auditors and (b) outsourcing big data analytics.

This chapter discusses the results that answered the hypotheses, as shown in section 1.4. It consists of three sections, commencing with the introductory section. Section 7.2 discusses the results of country-level moderating factors (hypotheses 1, 2 and 3). The results of the corporate-level moderating factors (hypotheses 4 and 5) will be discussed in section 7.3. In general, the results will be justified and discussed from the theoretical perspective of IAF quality and earnings management as presented in Chapter 3 through three theories: institutional theory, resource dependence theory and agency theory. Further, this thesis is the first, to the best of my knowledge, to investigate the effects of these moderating factors on the association between IAF quality and earnings management. Hence, the author will discuss and link the found results with the most relevant literature for each research hypothesis.

## 7.2 Country-level moderating factors

### 7.2.1 Shareholder protection environment

Some companies that go public in certain countries might have low demand and interest from investors because of the low shareholder protection environment. Regarding **hypothesis 1**, the results of this thesis, as shown in section 6.2.1, found that **the effects of IAF quality on reducing earnings management are higher for firms in countries with a lower shareholder protection environment than their counterparts with a higher shareholder protection environment**. This indicates that the role of the country's shareholder protection environment moderates the relationship between IAF quality and earnings management. The obvious justification for this result is that high IAF quality at least partially compensates for a weak shareholder protection environment. It can be argued that the country-level national corporate governance (NCG) mechanisms placed to protect shareholders from earnings manipulation and other misbehavior actions are not sufficient and effective enough to do so. NCG tools and mechanisms include, but are not limited to, (1) control of corruption, (2) government effectiveness, (3) political stability, (4) regulatory quality and (5) the rule of law. See Table 4 for NCG's variables description. The statistical results in Table 10 showed that firms in countries with a strong shareholder protection environment engage less in earnings management than their counterparts in a low shareholder protection environment (*ShareholderPro*; coefficient = -0.066, t-stat. = -1.61). Thus, high IAF quality will complement these ineffective mechanisms and motivate shareholders to invest in countries with lower shareholder protection environments.

There could be several reasons for the lack of effective external and internal governance mechanisms. Depending on a particular country's legal structure and institutional characteristics, the performance outcomes of boards of directors (including the audit committee), ownership concentration, and executive compensation can vary (Filatotchev et al., 2013). Su et al. (2008)

discovered that the principal-principal conflict<sup>44</sup> existing in Chinese public companies results in a lower shareholder protection environment. Furthermore, the principal–principal conflict raises agency costs (Su et al., 2008). When external and internal governance mechanisms are weak, serious principal-principal conflicts emerge (Peng and Sauerwald, 2013). Good governance structures, including high-quality IAFs, combined with a high-quality disclosure environment, contribute to higher firm value, particularly in firms with a severe agency conflict (Renders and Gaeremynck, 2012).

Given the well-known economic advantages of enhancing external governance mechanisms (La Porta et al., 1997), one could wonder why efficacious external governance mechanisms are not implemented in countries with less effective investor protection environments. In many countries that currently have weak external governance mechanisms, controlling shareholders are frequently disinterested in improving investor protection laws, a potential situation defined as economic entrenchment (Morck et al., 2005). These powerful owners, commonly wealthy families, use their position to impact their own private companies and government policy. As a result, if large parts of a country's economic sector are controlled by a small group of corporate owners who want to maintain the current status quo, effective external governance mechanisms may not show up (Morck et al., 2005).

Moreover, though external governance mechanisms such as regulations and laws are important, they do not always work as intended and must frequently be supported by internal mechanisms (Peng and Sauerwald, 2013). In other words, if such external or internal governance mechanisms (e.g., parliament public hearing committee, IAFs) are far more successful and effective than other mechanisms, then some weak governance mechanisms (e.g., audit committee) will be replaced or supplemented intensively by those more successful (Rediker and Seth, 1995; Suhomlinova, 2006).

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<sup>44</sup> Principle-principle conflicts refer to the conflict between major and minor shareholders.



According to institutional theory, the severity of agency conflicts and how corporate governance is ruled likely affect corporations' corporate governance decisions (Renders and Gaeremynck, 2012).

Next, from the same theory perspective, it is argued that organizations strive for continuity, survival, sustainability, and stability. In detail, they have to implement rules, routines and norms favorable to employees and stockholders to enhance and maintain their public reputation, corporate image and the credibility of the organization's activities to society. In addition to that, organizations are forced to comply with safety regulations and other legal requirements. Thus, the board of directors of firms located in countries with low shareholder protection environments should act proactively. The key mechanism to do so is by having a high-quality IAF to prevent managers from manipulating earnings and to detect any other sort of unhealthy behavior (e.g., fraud, bribe).

Additionally, less evolved corporate governance mechanisms in developing economies, with the help of the Institute of Internal Auditors (IIA), may act as an institutional mimetic isomorphism force for change in IAFs and corporate governance, according to the findings of this thesis. In this context, mimetic forces are driven by the belief that what works for other organizations (e.g., a high-quality IAF) will work in any organization. Clearly, coercive pressure from the country-level is weak in developing countries. Consequently, firms would follow either/both simulating similar organizations (through mimetic forces) and professional standards from IIA (through normative forces). It might be possible for companies to set up procedures to facilitate the improvement of IAF quality. Before the legitimization of internal audit, there is a chance that internal audit departments would be structured and functioning in a similar way across industries, based on institutional theory (mimetic isomorphism). Companies that show strong corporate governance are likely to attract more investors. Until the internal audit's legitimacy begins, there would be a

possibility for consistency of the process and function of IAFs with high quality across organizations according to mimetic isomorphism.

The study of Lil et al. (2011) showed that the more active a country's regulatory system is, the less earnings management practices appear. Let us look at the case of China. We can also notice the moderating effect of the country's shareholders protection environment, which can be seen from its effect on the quality and strictness of the financial reporting systems in China, where the Chinese Securities Regulatory Commission could impose the death penalty on those engaged in financial wrongdoing (Mao, 2002). As a result of these strict penalties, Chinese family firms engage in earnings management less than US family firms (Eng et al., 2019). The growth in earnings management in a given setting is the main driver for supporting a strong investor protection environment (Li et al., 2011).

In contrast, US stock exchanges started to delist some Chinese companies (e.g., Luckin Coffee) because of earnings manipulation. The USA regulatory Securities and Exchange Commission (SEC) delisted Luckin Coffee and penalized them \$180 million (The National Law Review, 2020). If discovered within China, any Luckin Coffee managers engaged in earnings manipulation "might" lose their lives. However, it is not expected to find such strict punishments (e.g., capital punishment) in most countries to mitigate earnings management. Hence, this thesis suggests that high-quality IAFs can protect investors from earnings management in countries that suffer from the absence of adequate shareholders protection.

Among the economic goals of most governments around the world is economic growth. With this aim, governments' efforts are directed towards attracting and supporting investments. The variances in investors' legal protections might explain why some firms are financed and owned differently in countries worldwide. Such efforts are focused on providing a suitable shareholder protection environment to regulate the four cornerstones of any investment, i.e., management,

internal audit, external audit and audit committees (Prawitt et al., 2009). As the results of this thesis showed that the effects of IAF quality on reducing earnings management are higher in countries with lower shareholder protection, it can be stated that better IAF quality leads to fewer earnings management, which is better for investors. Consequently, attracting more investors, customers, suppliers, contributors, or donors is better for the country.

Huang et al. (2013) also showed that investors prefer to invest in countries with a strong shareholders protection environment. Additionally, investors might consider the quality of IAF in the company or the country overall before their investments begin. Investing in such an economy becomes a series of unilateral decisions that people make, and these have various opportunities for investment in many countries. Therefore, a suitable climate for investment becomes an important aspect (Huang et al., 2013). This thesis recognizes the understandable fear of investing in countries with low shareholders protection environments by claiming that IAFs with high quality could mitigate, at least partially, earnings management.

### **7.2.2 The country's legal system**

In response to **hypothesis 2**, this thesis **found no significant evidence on whether the country's legal system (civil vs. common laws) can moderate the relationship between IAF quality and earnings management**. Refer to section 6.2.1 for the results. In addition, as presented in section 6.3.1, twelve robustness tests provided further assurance that the main finding on hypothesis 2 holds and gets robust to various models' specifications.

The key justification for this unexpected finding can be drawn from the institutional theory perspective. This thesis argues that other mechanisms at the country level (e.g., tax compliance, the judicial system's efficiency) could play more dominant roles in macroeconomic issues and corporate policies than the country's legal system. Haw et al. (2004) discovered that a high rate of tax compliance eventually has a greater impact on mitigating earnings management than the type

of a country's legal system (civil vs. common laws) and the efficiency of the judicial system, where they argue that effective tax enforcement is like a public mechanism that can reduce earnings management.

My result for **hypothesis 2**, as shown in Table 10, revealed further that the country's legal system (*CountryLegalsystem*) does not have a significant direct effect in mitigating earnings management (*CountryLegalsystem*; coefficient = 0.073, t-stat. = 1.28). This surprising result is confirmed by twelve additional robustness tests as presented in appendices 3, 6-19. My data covered 2014, while Haw et al. (2004) collected their data from 1996-1999. Hence, this thesis confirms their finding on the legal system and argues that the country's legal system has no significant direct effect on reducing earnings management. Further, the country's legal system has no significant moderating effect on the relationship between IAF quality and earnings management.

On the other hand, Daily et al. (2003) argued that institutional theory and agency theory complement each other. Thus, the results of this thesis can also be interpreted in the light of agency theory in which it suggests that ownership control and the various attributes of the board of directors and external and internal auditors are important factors in aligning management goals with the corporate owners (Kalbers, 2009) and protecting owners from managers' opportunistic behavior. However, institutional theory indicates that an organization emphasizes institutional governance (in other words, similar to cultural, political and social forces) to increase its legitimacy and prospects for survival (Meyer and Rowan, 1977). Accordingly, this thesis claims that IAFs with high quality can be one of these institutional forces through mimetic isomorphism for change, as discussed earlier in Chapter 3 (The theoretical perspective of IAF quality and earnings management). Additionally, as shown in Table 10, in the absence of the country's legal system's direct and moderating effects, high IAF quality reduces earnings management significantly at p-value < 0.001 (*IAF Quality*; coefficient = -0.030, t-stat. = 2.68). Hence, if an external governance mechanism (e.g., the country's legal system) is not working significantly to

mitigate earnings management, it can be supplemented by an internal mechanism through higher IAF quality.

### 7.2.3 The country's economic status

In response to **hypothesis 3**, as shown in section 6.2.1, this study found that **high IAF quality reduces earnings management for firms in developing economies more than developed economies**. This finding suggests that the economic status (developed and developing markets) moderates the relationship between IAF quality and earnings management. My explanation for this result is that the country-level NCG tools and mechanisms do not significantly mitigate earnings management in developing markets compared to developed markets. In fact, the statistical results in Table 10 indicate that firms in developed markets have lower earnings management than their counterparts in developing markets (*DevelopedEconomies*; coefficient = -0.082, t-stat. = -2.07). Hence, high IAF quality, as a tool of corporate governance, will play a significant role in decreasing earnings management for firms located in developing markets that lack effective NCG.

The author of this thesis thinks there is merit in using institutional theory to describe inequalities in organizations' effectiveness. The institutional theory assumes that the laws and regulations organizations that characterize the organizational environment must adhere to maintain legitimacy and support (Scott and Meyer, 1983). The largest listed companies in a developing economy may have endorsed the appearance of organizational structures from developed economies. Still, these mechanisms rarely work and their equivalents in developed economies (Young et al., 2008). To justify the results on **hypothesis 3** from the institutional theory perspective, I argue that firms located in developing markets must implement rules, routines, norms and take actions to reduce earnings manipulation and maintain their public reputation, corporate image and the credibility of the organization's activities to society. The firms in my sample are publicly traded, where shareholders and managers are assumed to take care of their public image to attract more

stakeholders, including employees, suppliers, customers, banks and other lenders, regulators, the environment, and the community. Effective IAFs with high quality must be one of these mechanisms to be adopted at the corporate level to substitute NCG's weakness in developing markets. Some could argue that NCG's weakness can be eliminated as well. However, the author of this thesis argues that solving NCG's weakness takes time, and there is no guarantee of its effectiveness compared to strengthening the quality of IAF simultaneously.

Of course, organizations in developing economies that influence certain organizational behavior are unstable. Moreover, the formalized institutions which do take place in developing economies very often do not facilitate mutually rewarding impersonal trade between market players (North, 1990, 1994). Consequently, informal institutions direct organizations in developing economies to a greater degree (Peng and Heath, 1996). Researchers usually mistakenly suggest that the institutional environments are seen in developed economies still exist in developing economies. Obviously, this may not be the situation in developing economies, and as a matter of fact, organizational practices in developing economies can vary significantly from those in developed economies (Wright et al., 2005).

Besides, in the case of corporate governance, developing countries have historically lacked an effective and stable rule of law, resulting in a "poor governance" environment (Dharwadkar et al., 2000; Mitton, 2002). This is not to suggest that developing economies lack corporate governance legislation. Most developing economies have tried to implement developed-economy legal rules and frameworks, especially those of the Anglo-American system, whether due to domestic reforms (e.g., China, Russia) or external demands requirements (e.g., South Korea, Thailand). Formal institutions, such as laws and regulations that govern accounting standards, disclosure practices, and stock trading, as well as their compliance, are either incomplete, obsolete or do not work as intended. As a result, standard corporate governance systems receive limited institutional assistance in developing economies (Peng et al., 2003; Peng, 2004). This leads to those informal

institutions, including alliances, business groups, family connections, and government relationships, playing a much bigger role in influencing corporate governance (Peng and Heath, 1996; Yeung, 2006).

Thus, firms in developing economies with far less developed corporate governance mechanisms, with the help of the IIA, possibly act as a mimetic isomorphism motivating force in IAFs and corporate governance, according to this thesis's views. In other words, country-level coercive pressure is likely to be ineffective in developing countries. As a result, businesses will adopt similar organizations' practices (through mimetic forces) or adhere to IIA professional standards (through normative forces). Afterward, companies may be able to establish processes to aid in the improvement of IAF quality. Based on institutional theory, internal audit departments may have been organized and functioned similarly across sectors before the official recognition of internal audit.

Moreover, according to Vasilescu (2008) and IMF (2019), any country's economic status plays a role in shaping how efficient corporate governance for listed companies is. Thus, firms in developed markets have better corporate governance, and it is expected and found that developed markets have higher NCG than developing markets. Looking at my study from another perspective, the study of Saidin (2014) argued that there is a positive relationship between a corporation with high-quality financial statements and the economy, and this can be related to my result in terms of firms in developed markets engaging less in earnings management compared to developing markets. Vasilescu (2008) argued that the key issue of corporations in developing economies is the conflict of interests between managers and shareholders, which creates misconceptions among them and between shareholders and business partners of the entity. This could deteriorate long-term financial performance and even lead to their bankruptcy. Consequently, based on institutional theory, an IAF with high quality is likely to protect the interest of both shareholders and stakeholders in developing economies.

On the other hand, some would argue that there are similar conflicts of interest between managers and shareholders, business partners and shareholders in all countries. This thesis says that the strength of the NCG should be considered in this argument. Legal and regulatory institutions are less advanced in developing than developed economies (Young et al., 2008). Because of the institutional atmosphere, trust between unfamiliar corporate parties is much less likely to happen in developing economies (Skaperdas, 1992; Bardhan, 2001). Also, previous studies (e.g., La Porta et al., 1998; Djankov and Murrell, 2002) showed that governing top managers is less efficient in developing nations because product markets, labor markets, takeover markets, and other external market forces are manipulated or corrupted or inefficient in these nations. Thus, the conflict of interest between parties in developing markets is expected to be higher than in developed markets. For instance, principal–principal conflicts of interest have been recognized as a main corporate governance issue in developing countries. Any conflict of interest between business parties would not promote strategies in the best interests of organizational performance. Due to inefficient corporate governance in developing markets, more focus is brought on internal control mechanisms (Peng and Heath, 1996). Fixing these conflicts in developing countries has the potential to improve the life quality of thousands of people (e.g., customers, stakeholders) in these nations (e.g., Brazil and India) (Morck et al., 2005). Improving the quality of IAFs is one of the innovative solutions (internal control mechanisms) to compensate for NCG weaknesses.

Finally, previous research examines the effect of IAF quality on a specific country but has not compared countries. Therefore, and to the best of my knowledge, this study is the first to compare the influence of IAF quality between developed and developing countries. For instance, studies of Ghaleb et al. (2020), Al-Rassas and Kamardin (2015) and Johl et al. (2013) found that high IAF quality mitigates earnings management in Malaysia (a developing country). Abbott et al. (2016) and Prawitt et al. (2009) showed an inverse relationship between IAF quality and earnings management in the US (a developed country). Gros et al. (2017) revealed that IAF quality reduces



earnings management in Germany (a developed country). This thesis confirmed this inverse relationship across both developed and developing countries.

Further, this thesis could argue that the effect of IAF quality on reducing earnings management is larger in developing countries (e.g., Malaysia) than in developed countries (the US and Germany). At the same time, previous studies could not conclude this argument. Hence, this thesis claims that countries' economic status (developed vs. developing) moderates the inverse relationship between IAF quality and earnings management.

### **7.3 Corporate-level moderating factors**

#### **7.3.1 Assistance between internal and external auditors**

In response to **hypothesis 4**, this thesis revealed that **the effect of IAF quality on reducing earnings management is larger for firms that spend a lower amount of time on internal auditors assisting external auditors than firms that spend a higher amount of time on such assistance**. Refer to section 6.2.2 for the results. *Assistance* in my study refers to the number of workweeks the internal audit department spends every year on activities that support the external auditor. One justification for my result on **hypothesis 4** is that the moderating effect of the assistance to external auditors is time-consuming, which results in a lower amount of time IAFs can spend on higher-risk areas, including earnings manipulation. Surprisingly, according to the Chartered Institute of Internal Auditors (2021), the external auditor may be banned from receiving direct assistance from internal auditors due to a legal or regulatory requirement. For example, in the United Kingdom, the Financial Reporting Council prohibits external auditors from using internal auditors as "direct assistance" participants of the audit team to strengthen the principle of auditors' independence. "While the international standard does allow the internal audit to assist the external auditor directly, the UK standard specifically prohibits this. We believe that it should continue to remain prohibited here in the UK, as it helps to eliminate potential conflicts of interest

and maintains the independence and objectivity of both internal and external audit" (the Chartered Institute of Internal Auditors, 2021, p.2).

Indeed, the assistance between both types of auditors could be explained by the resource dependence theory and agency theory. My results in section 6.2.2 show that the direct effect of *Assistance* reduces earnings management (coefficient = -0.059, t-stat = -2.18). From the agency theory perspective, effective assistance between internal and external auditors reduces the divergent interests between shareholders and management, consequently reducing agency monitoring costs. For instance, if companies engage heavily in earnings management and the public noticed that their market valuation would be affected negatively. Thus, such *Assistance* will reduce the monitoring agency cost by maintaining the shareholders' valuation and avoiding residual losses. Also, the resource dependence theory observes external auditors as 'boundary spanners' who extract experiences from several business situations, and they are expected to have rich resources. Thus, internal auditors with high IAF quality can access these experiences and resources through assistance with external auditors.

However, the author of this thesis thinks there is an optimal level of assistance, but if internal auditors spend more workweeks beyond this optimal level, such assistance will reduce the amount of time IAFs can spend on higher-risk areas, including earnings management. In my sample, 69 percent of the firms spend one to five workweeks every year on activities that support the external auditor. See Table 12 for the workweeks' descriptive statistics in my sample. Figuring out what is the optimal number of workweeks that internal auditors should spend to support external auditors and to maintain their IAF quality simultaneously is future research suggested by this study.

Moreover, from the agency theory's perspective, most firms' departments (e.g., IT, human resources, internal audit department) are often told to reduce their expenditure. Reducing the amount of time that can be saved efficiently from less assistance is one possible area that could

contribute to the cost reduction. The costs are generated from the overtime paid hourly for which internal auditors will be eligible to finish their uncompleted duties. It is important to note that there is likely to be a minimum amount of time required to complete corporate-level internal audit assignments, regardless of the amount of assistance that IAFs provide to the external audits.

Equally important, in a study of the role of US companies' internal auditors in the annual statutory audit, Oliverio and Newman (1991, p. 67) revealed that "... there is considerable participation in external audits by internal auditors ... but that approximately a third of the respondents hoped for a different relationship". Unfortunately, the authors did not understand why internal auditors engage in the external audits in particular entities or why many of them in the study were unhappy with their assigned position in the external audit assistance/duty.

Meanwhile, from the agency theory perspective, Adams' study (1994) could provide an answer to what Oliverio and Newman (1991) were not able to understand and grant a robust explanation to my finding on **hypothesis 4**. Through the agency theory lenses, Adams (1994, p.11) argued that "agency theorists could interpret the employment of internal auditors on the statutory audit as a ploy by managers to reduce the monitoring cost of the statutory audit. However, at the same time, they send a signal to owners that the coverage of the audit is not reduced. Also, the executive decision to involve internal auditors in the external audit may be driven by self-interest motives. For instance, managers may wish to draw internal auditors away from operational assignments if there is a likelihood that evidence of managerial inefficiency and incompetence will be uncovered. In turn, internal auditors may dislike the switch in assignments, and become dissatisfied with their subordinated role in the statutory audit". Adams' argument (1994) can be related to my finding on **hypothesis 4** by indicating that internal auditors are being diverted from operating duties (including detecting earnings management) if they provide more assistance to external auditors.

Until now, few studies shed light on the relationship between internal and external auditors. Even these studies focused on the direct effect, not moderating effects, of this relationship on the businesses aspects (e.g., earnings management, quality of financial reporting, organization`s systems and activities, organizational efficiency, investment prospects and audit fees), I aim to link their findings with my **hypothesis 4**'s results. It is known that internal and external auditors who are concerned with the cost and quality of audits may try to coordinate their activities throughout the year. Both internal and external auditing standards encourage the two audit groups to coordinate their assessment to complete an audit of financial statements.

**Table 12: Assistance between internal and external auditors**

Number of workweeks does the internal audit department spend on activities that support external audit	Percentage in this study sample
5	22%
4	21%
3	13%
2	28%
1	15%

Consequently, Abbott et al. (2012b) found an inverse but not significant relationship (the p-value < 0.12) between the relative extent of internal audit assistance provided to the external audit and earnings management. The Abbott et al. (2012b) study sample included 134 firms from the big 1000 US firms (in terms of total assets). Their sample (number of firms = 134) covered the period from 2005 to 2006, just two years before the global financial crisis in 2008. My study confirmed their finding with a higher significant level (the p-value < 0.05). However, my study contributes further to the practice and literature of internal audit by investigating the moderating effect of the time spent for assisting external audit on the impact of IAF quality in reducing earnings management.

Additionally, my study has three key differences from the Abbott et al. (2012b) study. First, my sample contains firms across countries with various corporate governance characteristics, legal systems, economic status and shareholders protection environment. Second, the size of my sample firms ranges from small to medium. Third, my sample (number of firms = 150) covered 2014, when the global economy was doing well. Thus, I argue that this thesis's findings can be generalized more than those of Abbott et al. (2012b), with further insight on the moderating effect of the time spent assisting external audit on the relationship between IAF quality and earnings management.

Another study carried out by Gras-Gil et al. (2012) found that greater coordination and cooperation between internal and external audits improve financial reporting quality. The level of deficiencies in financial reporting was used as a proxy for the financial reporting quality in their study. As a direct effect of IAF quality on financial reporting quality (e.g., earnings management), my study shows a consistent result with their finding. However, the Gras-Gil et al. (2012) study has several limitations. First, their sample size is 72 firms, which is roughly half my study sample. Second, their analysis is limited to the Spanish banking industry, whereas my sample included firms across countries and industries. Third, their regression model included three control variables only, while my model contained 14 control variables (excluding control variables for the country-level effect).

Few other studies have found several insights into the interactive correlations between external and internal auditors on businesses. Pham et al. (2014) found that investment prospects of companies are closely linked to the efficacy of external auditors. The study also recommended that external auditors ensure that companies' operations are value-adding. Dumitrescu and Bobițan (2016) argued that if the internal auditors work together with the external auditors, the results will increase the quality and the effectiveness of the organization's systems and activities. Mat Zain et al. (2015) found that a higher-quality IAF motivates greater external auditor reliance on internal auditors' work, resulting in lower external audit fees. However, the study of Silva et al. (2019)

does not support the claim of Mat Zain et al. (2015). My study provides another example of the positive effect of the relative extent of internal audit assistance provided to the external audit that enhances financial reporting quality (e.g., less earnings management). Nevertheless, this study differentiates itself from all previous studies by investigating the moderating effect of such assistance and revealing that more time spent on assisting external auditors negatively affects the quality of an IAF. Hence, the author argues that a considerable cost should be managed in the assistance provided to external auditors.

### **7.3.2 Outsourcing big data analytics**

Regarding **hypothesis 5**, as revealed in section 6.2.2, this study found evidence that **high IAF quality reduces earnings management, and this relationship is more pronounced for firms that outsource big data analytics for IAF purposes than those that do not outsource**. The justification for the result of **hypothesis 5** is that internal auditors lack technological knowledge in analyzing big data analytics. According to Cao et al. (2015), big data consists of complex and large data sets that cannot be interrogated or manipulated using standard tools or methods. Also, Verver (2015) pointed out that big data relates to quantities and analysis on a large scale of massive amounts of data to engender knowledge and insights. From the resource dependence theory perspective, it is agreed that even efficient companies can fail if they cannot access the scarce resources (e.g., big data analytics) that may be critical to their survival.

Further, the benefit of outsourcing big data analytics depends on the extent to which the internal auditors have access to resources and information after outsourcing big data analytics. In my study, 72 percent of the participants stated that their internal audit departments (IAFs) are independent of the management, which indicates that they have full access to resources and information from outsourcing big data analytics. In other words, the management cannot prevent IAFs from accessing any information, including big data analytics reports from the third party.

Additionally, outsourcing big data analytics for the IAFs eliminates data conflicts, especially when dealing with data coming from multiple sources and formats. This, indirectly, increases control over earnings management and reduces it significantly. Besides, the principle of resource dependence theory may clarify how the outsourcing of big data analytics for IAF purposes can be explained by internal auditors' dependence on third parties specializing in big data analytics. In line with that, cooperation with partners is the backbone of firms' ability to overcome organizational challenges, including a lack of technical expertise to tackle big data analytics. Hence, it is reasonable for IAFs to outsource big data analytics to envision the complementary role of their operations and resources. Alternatively, the agency theory's principles argue that the IAF role offers some guarantee that managers and inside shareholders should not pursue their objective of increasing their benefit or level of happiness to the detriment of external shareholders and debtholders. Hence, outsourcing big data analytics for IAF purposes is likely to support internal auditors in reducing the agency's costs by maintaining higher financial reporting quality.

Using big data analytics in reporting enables companies to choose the appropriate techniques that IAFs can use to monitor managers and, thus, decrease earnings management. This thesis does not say that an external specialist that works with big data knows more about the company than internal auditors. However, I believe that the external specialist has technological knowledge on big data analytics that internal auditors lack. On the other hand, the internal audit department should also deal with big data and analysis methods to decide the appropriate outsourcing practice. The higher the internal auditors' ability to utilize the big data and outsource analytics services, the lower the earnings management as the internal auditors would have more control over the reporting process. Using audit data analytics provides a better understanding of the business operations and the potential risks such as a growing ability for data misrepresentation, fraud risk, and enhanced communications with people responsible for audited entities management. Those risks, if controlled, will certainly reduce earnings management.

Lastly, Subramaniam et al. (2004), studied in public sector entities in Queensland (State in Australia), suggested that outsourcing internal audit services be extensive. Their results indicate that internal audit outsourcing is being adopted largely for non-financial reasons such as lack of technological knowledge and service quality and not for financial reasons. Their findings are consistent with my justification for **hypothesis 5**'s result, where internal auditors probably lack technological knowledge to deal with big data analytics.



## Chapter 8. Conclusion

### 8.1 Overview

An effective IAF, together with the audit committee, management and the external auditor, is one of the four pillars of corporate governance. This study defines higher IAF quality as discovering and reporting significant financial statement errors. Earnings management refers to the adjustment in the companies' financial results that have been made public by controlling owners or managers to deceive or manipulate the contractual results of other stakeholders.

This study looked at the various factors at the country and corporate levels, which could moderate the effect of IAF on earnings management. Factors at the country level include:

- (a) the shareholder protection environment,
- (b) the country's legal system, and
- (c) the economic situation (developed and developing markets).

Corporate level factors include:

- (1) assistance between internal and external auditors, and
- (2) outsourcing big data analytics.

Following the quantitative approach, research data was retrieved from the 2015 IIA's Common Body of Knowledge of Internal Auditing (CBOK) database, with responses from 150 Chief Audit Executive (CAEs) extracted for investigation. This thesis implemented the ordinary least square (OLS) in two separate experimental studies to deal with its objectives in studying the effects of the country and corporate levels' moderating factors.

Accordingly, the separation of the two levels was experimentally enabled to scale back the interaction variables' potential noise, resulting in more robust statistical results. This multi-level study aims to deepen understanding of the complex set of moderating variables that influence the association between IAF quality and earnings management.

## **8.2 Summary of research motivations and objectives**

By adopting a one-country design at the country level, the previous literature was not ready to investigate the consequences of country-level factors (e.g., shareholder protection environment, a country's legal system and economic status) on the relationship between IAF quality and earnings management. Substantial empirical evidence suggests that a high shareholder protection environment is crucial to elucidate the consequences of companies engaging less in earnings management (Wright et al., 2006). DeFond et al. (2004) showed that earnings management suffers from a shareholder protection environment, which differs from one country to another. Shleifer and Vishny (1997) explained how the laws organize the shareholder protection environment and how courts impose the law to protect shareholders in some countries, such as the United States (US), Japan, and Germany. In other parts of the planet, shareholder protection is less common and therefore, the regulatory system functions are less powerful, allowing making violations within the earnings management. As a result, shareholder protection alone will not be enough, and accounting details, like net income, do not represent "real" economic performance, and these accounting details are major components of earnings management.

Likewise, numerous studies have established that the audit committee effectively monitors earnings management activities. DeFond and Jiambalvo (1991) found that earnings management is lower among US companies with audit committees. Dechow et al. (1996) concluded that companies with an audit committee are less likely to manipulate earnings. Further, Baxter and Cotter (2009) acknowledged that an audit committee's formation diminishes deliberate earnings management among Australian firms. This evidence motivated this study to explore whether the shareholder protection environment moderates the relationship between IAF quality and earnings management.

Similarly, evidence from previous studies shows that countries with stronger legal protections offered to minority shareholders make it difficult to exploit significant private benefits by managers. Thus, the efficiency of the country's legal system reduces insiders' incentives to control earnings to mask their control advantages. This study is driven by current gaps in how these institutional factors (e.g., the country's legal system) moderate the impacts of IAF quality on earnings management.

In light of the IAF being the cornerstone of corporate governance to stop managers from manipulating earnings, this study is motivated to understand the extent of IAF quality to scale back earnings management between developed and developing markets. Earnings management is more prevalent in developing markets than in developed markets like the US and Europe (Zweig, 2019). Studies that specialize in earnings management between developing and developed markets are rare. Most developing markets require publicly traded firms in stock markets to have an IAF to protect company assets and shareholder investments.

This study first examines the moderating effect of outsourcing big data analytics on the association between IAF quality and earnings management at the corporate level. This study differentiates itself from previous literature by specializing mainly in the moderating effect of outsourcing big data analytics that serves internal auditors in their duties. There are many challenges to adopting big data analytics, preventing auditors from using big data analytics, like lack of technical skills, limited knowledge resources, biased audit judgment, information overload, and limited software and hardware analytics resources.

Moreover, at the corporate level, previous literature has found that assistance between internal and external auditors results in economic savings such as reducing audit fees. Returning to the literature, many studies have shown the necessity for coordination between internal and external auditors because it was found that external auditors usually evaluate the independence of internal

auditors because their independence is the most vital criterion in evaluating the objectivity of IAFs (Messier and Schendeir, 1988). This study is distinctive regarding the necessity of researching this relationship between internal and external auditors on IAF quality and earnings management. However, there is little evidence so far on whether this assistance features a moderating effect on IAF quality and earnings management. Therefore, this study examines this assistance's moderating effect on the relationship between IAF quality and earnings management.

Overall, building on previous research and theories identifying IAF quality as a key corporate governance tool in reducing earnings management, my study examines whether the effectiveness of IAF quality to discourage earnings management is influenced by several factors at the country and corporate levels. This study represents an immediate response to recent calls within the literature (e.g., Bame-Aldred et al., 2012; Prawitt et al., 2012; Gramling et al., 2013; DeSimone and Abdolmohammadi, 2016; Yasin et al., 2016; Eulerich and Westhausen, 2018; Behrend and Eulerich, 2019) that need a broader understanding of the potential factors affecting the relationship between IAF quality and earnings management.

### **8.3 Summary of the findings**

This section reports the study's key research findings. Also, it summarizes the key insights from the data used in this study. First, this study found the following results:

1. High IAF quality has more effect on reducing earnings management in countries with a lower shareholder protection environment than a high shareholder protection environment.
2. There is no significant evidence that a country's legal system does moderate the inverse relationship between IAF quality and earnings management.
3. High IAF quality reduces earnings management for firms in developing economies more than in developed economies.

4. The effect of IAF quality on reducing earnings management is larger for firms that spend a lower amount of time on assisting external auditors provided by internal audit than firms that spend a higher amount of time on such assistance.
5. High IAF quality reduces earnings management, and this relationship is more pronounced for firms that outsource big data analytics for IAF purposes than those that do not outsource.

Second, on the data level, this study revealed several insights. The average experience (*Experience*) in internal audit roles for internal auditors included within the sample is 11.51 years. Internal auditors in my sample spend a mean of 64 percent of their time performing work directly associated with financial reporting (*TimeFin*) and 43.15 hours per annum for training (*Training*). Further, 64 percent of CAEs in the sample believe that their IAF funding (*IASize*) is adequate.

My sample's firms are located in countries with a shareholder protection environment's (*ShareholderPro*) average of 77 percent. On top of that, 41 percent and 61 percent of the firms are in common law (*CountryLegalsystem*) and developed countries (*DevelopedEconomies*), respectively.

From a corporate-level perspective, 69 percent of the firms spend working weeks annually on activities that support the external auditor (*Assistance*). Moreover, 19 percent of the firms reported that their internal audit departments outsource big data analytics to third parties (*OutsourcingBigDataAnalytics*). Likewise, nearly half my sample is outsourcing such IAFs to a third party (*IAFsThirdParty*).

In my sample, 82 percent of firms have an audit committee (*ACEffectiveness*), and 84 percent of them have an outsized Big 4 external auditor (*specialist auditor*). My sample's firms are medium and small and "not old", needless to say, with a mean asset size of \$ 7.220 billion and a mean lifespan of 21.72 years. Their leverage (*Leverage*) is fairly low (average 25 percent), and most of

them were listed in stock markets for a minimum of 21.72 years. My sample firms have, on average, 3.78 business segments (*complexity*). Cash flows from operations (*CFO*) in my sample is \$ 0.484 billion (average), while the average volatility for the cash flows from operations (*Stability*) is \$ 0.348 billion.

Notably, the typical sales growth (*SalesGrowth*) was 2 percent, and therefore the average return on assets (*ROA*) was 5 percent, reflecting the 2014 economic environment. The typical market-to-book ratio (*MB*) was 2.29, reflecting the expansion in financial markets. During my sample period, the previous year's loss (*Loss*) incidence rate was 12 percent.

#### **8.4 Contributions of the study**

The current study contributes to the internal audit process by providing a greater understanding of the IAF mechanism and its factors. This study contains several contributions to IAF literature (e.g., Prawitt et al., 2009, 2012; Johl et al., 2013; Al-Rassas and Kamardin, 2015; Abbott et al., 2012a, 2016; Gros et al., 2017). It extended this literature by investigating how certain country-level and corporate-level moderating factors affect the relationship between IAF quality and earnings management.

First, this study dealt with moderating factors at the country level that expanded the abovementioned literature, which focused mainly on corporate level factors. My study contributed to the present call (e.g., Gramling et al., 2013; DeSimone and Abdolmohammadi, 2016; Yasin et al., 2016; Eulerich and Westhausen, 2018) to a better understanding of IAF quality across different economies, countries and cultures. In other words, it aims to investigate whether high IAF quality is adequate and appropriate to scale back earnings management across countries with different (i) shareholder protection environments, (ii) legal systems, and (iii) economic status. Hence, this study will provide more information on whether a country's characteristics could explain the effectiveness of IAFs.

Second, this study contributed to a better understanding of the potential implications of (1) outsourcing big data analytics and (2) assistance between internal and external auditors on the association between IAF quality and earnings management. Investigating the effects of these factors was a response to the literature call (e.g., Bame-Aldred et al., 2012; Prawitt et al., 2012; Yasin et al., 2016; Behrend and Eulerich, 2019).

Consequently, the results help streamline the utilization of big data analytics and improve the connection between internal and external auditors. Besides, the previous literature was conducted at the extent of one country (e.g., the US, Germany) to elucidate the impact of IAF quality on earnings management, and this did not provide a broader explanation. Also, to the best of my knowledge, this study is the first that examined the relationship between IAF quality and earnings management across countries, with up-to-date data focusing on internal audits.

Ultimately, this study developed an existing theoretical basis (e.g., Jensen and Meckling, 1976; DiMaggio and Powell, 1983; Scott, 1987; Adams; 1994, Martinez and Dacin, 1999; Carpenter and Westphal, 2001; Clarke, 2004; Glover et al., 2014) regarding the moderating factors that affect the relationship between IAF quality and earnings management. To construct a conceptual model that is characterized by certain theories, this study incorporates paradigms from agency theory, resource dependency theory, and institutional theory. Integration of such hypotheses facilitates awareness of how the country- and corporate-level variables influence IAF quality and earnings management.

### **8.5 Implications of the study**

The effectiveness of the IAF is of interest to the organizations and users of financial statements (e.g., investors, stakeholders, etc.). Studies providing empirical evidence on how to enhance the effectiveness of IAFs are relevant, given the importance of IAF knowledge, for users' decision-

making. Therefore, understanding the factors that many IAF users concede to impact IAF quality provides valuable insights into how organizations enhance IAF quality.

Considering the competence of the IAFs, it is essential to work out where efforts to strengthen them should be directed and focused on; a low-quality IAF may require adjustments, like restructuring, refocusing, modification of supply arrangements, or exploration of the way to enhance service overall. Additionally, the external auditor is one of the important factors that affect the standard of internal auditing. In the case of contracting companies with the Big Four, it applies strict standards to regulate the internal audit process, which successively contributes to improving the internal audit process.

Ultimately, investors should invest more in IAF quality in firms in countries with lower shareholder protection environments or developing markets. Further, through the audit committee, the board of directors should pay more attention to the extent that internal auditors should support the external auditor in terms of yearly allocated workweeks. Besides, the audit committee should select the most professional third party in outsourcing big data analytics for IAF purposes to ensure that internal auditors receive the efficient, timely and functioning insights from big data analytics to assist them in monitoring the management comprehensively.

## **8.6 Research limitations and suggestions for future research**

Recent evidence suggests that high IAF quality reduces the likelihood that firms will engage in earnings management (e.g., Prawitt et al., 2009; Johl et al., 2013; Al-Rassas and Kamardin, 2015; Abbott et al., 2016; Gros et al. al., 2017). Although the studies mentioned above contributed to a far better understanding of the consequences of IAF quality on earnings management, their results are limited. Two gaps within the previous literature drove this study. First, previous research was conducted in individual countries (e.g., the US, Germany and Malaysia). This design allowed researchers to regulate effects at the country level. However, it limited their ability to capture and



examine specific characteristics at the country level to explain the association between IAF quality and earnings management. By neglecting country-level characteristics, previous research has limited our understanding of external factors which will affect the effectiveness of IAF quality as a deterrent to earnings management. Second, previous research has analyzed a limited number of brokers at the corporate level (e.g., audit committee independence, investment in IAFs, competence, and independence of IAFs). From the above discussion, this thesis addressed these limitations. Nevertheless, my study has several limitations, as follows.

- This thesis's results are limited to cross-sectional data for 2014, while analyzing long-time data series would have more robust and deep results.
- The firms' size ranges from small to medium, while other studies (e.g., Prawitt et al., 2009; Abbott et al., 2016) have medium and large firms.
- As the data of this thesis covered the year 2014, post covid-19 managerial behavior is not considered in the analysis.
- The data targeted publicly traded firms. Thus, my results cannot be generalized to privately held firms. In this respect, the generalization of findings to privately held firms should be considered with caution.
- The analysis of this thesis is limited to secondary data. Hence, combining primary and secondary data will likely provide more insights into the tested relationship between IAF quality and earnings management.
- Accruals earnings management is used to proxy the quality of reported earnings in this thesis. Using real earnings management might have different conclusions on this research.

- This thesis's data "CBOK" was collected in 2015 while Big 4 accounting firms have invested heavily in artificial intelligence and innovation (Agnew, 2016; Melendez, 2016; M2 Presswire, 2016; Kokina and Davenport, 2017; Chawla, 2020) since 2015, thereby changing the auditing function existed since then.

From a future research perspective, this thesis suggests various avenues of further research.

- ✓ The findings of this research can open new areas for analysis, such as observing the moderating role of the country and corporate levels factors with real earnings management, rather than accrual-based earnings management. In addition, analyzing the moderating role of incorporating corporate social responsibility is also worth studying to reveal the power of social services in preventing managerial opportunism and further enhancing the accuracy of the financial statements.
- ✓ Other future research could perform similar testing by splitting the empirical model into geographical areas (countries) to explore the variations and similarities between countries. For instance, performing a comparative analysis between a developed country (e.g., US) and another well-developed country (e.g., UK) might also add value to distinguish which corporate level factors are more effective in moderating the relationship between IAF quality and earnings management within the two different markets.
- ✓ The author of this thesis recommends future studies to replicate this thesis's model by increasing the sample size.

- ✓ Outsourcing of IAF work to the external auditor is associated with a reduced risk of misleading or fraudulent financial reporting (Prawitt et al., 2012). Prawitt et al. (2012) noted that few companies currently achieve a high level of coordination between internal and external auditors. Thus, an interesting avenue for future research is to examine whether firms can achieve similar reductions in accounting risk through increased assistance, coordination and knowledge sharing between the IAF and the external auditors if the IAF is not outsourced entirely. Improving coordination and knowledge sharing may facilitate improving the quality of financial reporting within the current regulatory environment's boundaries. I encourage future researchers to study this issue.
- ✓ I suggest that future studies aim to determine the optimal level of workweeks that internal auditors can spend to support external auditors and maintain their IAF quality simultaneously.

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## Appendices

### Appendix 1: Different models for IAF quality

	Variable	Variable's Description	Prawitt et al. (2009)	Lin et al. (2011)	Ege (2015)	Mina et al. (2015)
1	Experience	Years of professional experience in the internal auditing profession.	yes	yes	yes	yes
2	Certification	Professional certifications and qualifications related to internal auditing (e.g., CIA (Certified Internal Auditor), CFSA (Certified Financial Services Auditor), etc.	yes	yes	yes	yes
3	Training	The number of hours of formal training related to the internal audit profession (e.g., but not limited to seminars, conferences, workshops, online, or web-based training).	yes	yes	yes	yes
4	CAEAC	Administrative reporting refers to supervising day-to-day matters, including budgeting, human resource administration, communication, internal policies and procedures.	yes	yes	yes	yes

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**Appendix 1: Different models for IAF quality**

	<b>Variable</b>	<b>Variable's Description</b>	<b>Prawitt et al. (2009)</b>	<b>Lin et al. (2011)</b>	<b>Ege (2015)</b>	<b>Mina et al. (2015)</b>
5	TimeFin	Time spent performing financial audits.	yes	yes		yes
6	IASize	IASize is measurable in the CBOK 2015 survey question no.4, where the CEAs will answer if IAF funding relative to the extent of its audit responsibilities is A: (Not at all sufficient), B: (Somewhat sufficient), C: (Completely sufficient).	yes	yes	yes	yes
7	Quality assurance (QA) techniques	QA includes practices of (i) direct supervision, (ii) independent working paper review, (iii) audit client feedback, (iiii) peer review by fellow staff members and (iiii) the use of a working paper checklist.		yes		yes
8	Follow-up of previously identified control problems	Follow-up procedure to test the implementation of corrective action to audit observation in the last year/period.		yes		

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**Appendix 1: Different models for IAF quality**

	<b>Variable</b>	<b>Variable's Description</b>	<b>Prawitt et al. (2009)</b>	<b>Lin et al. (2011)</b>	<b>Ege (2015)</b>	<b>Mina et al. (2015)</b>
9	Coordination with external auditors	Coordination with external auditors.		yes		yes
10	MTG	The firm hires new employees into the internal audit department and then rotates them into management positions in the same firm. In other words, it is a rotation process.			yes	
11	Education	Average of the number of years of undergraduate and graduate education of the audit staff, based on the highest degree achieved. Associate, Bachelor, Master, and PhD degrees are assumed to take 2, 4, 6, and eight years of study, respectively.		yes		yes
12	The inclusion of grades or summary opinions on control effectiveness in audit reports	The final internal audit report includes a grade or score as determined by the audit mission's results.		yes		

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**Appendix 1: Different models for IAF quality**

	<b>Variable</b>	<b>Variable's Description</b>	<b>Prawitt et al. (2009)</b>	<b>Lin et al. (2011)</b>	<b>Ege (2015)</b>	<b>Mina et al. (2015)</b>
13	Time spent to assist external audit	Assistance provided by internal auditors to external auditors.				yes
14	Independent Work	An indicator variable equals 1 if IAF performs complete or partial audits of specific locations, products, or functions in coordinating services with the external auditor, and 0 otherwise.				yes

**Appendix 2: Comparison of US firms' size by total Assets (in \$ million) between this study and previous studies**

	This study sample	All US firms in CBOK 2015	Abbott et al. (2016)	Prawitt et al. (2009)
Mean	7,220	10,213	19,602	21,425
Std. Dev.	16,200	20,929	Not reported	36,478
Min	28,800	1	Not reported	162
P25	361	900	2,613	3,589
Median	2,030	2,600	5,318	11,274
P75	5,120	6,500	12,828	26,056
Max	83,300	123,000	Not reported	370,782

Comparison of US firms' size by total assets (in \$ million) between this study and previous studies. I have included all US firms in CBOK 2015 to assure that my matching between CBOK 2015 and Worldscope is consistent with the firms' size reported in CBOK 2015.

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**Appendix 3: Results of robustness test at the country-level by using alternative variables (FINDEV and SECLAW) to control for the country-level effect (Dependent variable is AbsoluteAbnAccr)**

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.028	0.010	-2.72***
ShareholderPro	?	-0.066	0.036	-1.80*
DevelopedEconomies	?	-0.084	0.039	-2.12**
CountryLegalsystem	?	0.065	0.054	1.19
IAF Quality*ShareholderPro	?	0.017	0.009	1.94*
IAF Quality*DevelopedEconomies	?	0.020	0.010	2.01**
IAF Quality*CountryLegalsystem	?	-0.014	0.013	-1.10
ACEffectiveness	-	-0.010	0.012	-0.80
CFO	-	-0.000	0.000	-2.78***
SalesGrowth	+	0.055	0.033	1.68*
Complexity	+	-0.003	0.002	-1.68*
MB	-	0.003	0.003	0.99
Age	-	0.000	0.000	0.59
Assets	+	-0.002	0.001	-1.21
MTG	+	-0.007	0.009	-0.78
Leverage	+	0.003	0.028	0.11
Loss	+	0.007	0.013	0.54
AuditorSpecialist	-	0.015	0.009	1.67*
ROA	-	0.203	0.141	1.44
Stability	+	0.000	0.000	3.14***
FINDEV	?	-0.005	0.007	-0.70
SECLAW	?	0.008	0.006	1.23
Intercept	?	0.154	0.057	2.69***
n	150			
Adj. R <sup>2</sup> (from OLS regression)	0.19			

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ , 0.05, and 0.01 levels, respectively. Industry effect is repressed for presentational ease. I included (1) countries' financial market development (FINDEV) (Jiang et al., 2018) and (2) overall quality of security laws (SECLAW) (Jiang et al., 2018) as two additional control variables. SECLAW is calculated as the mean of the standardized values of three indices developed in La Porta et al. (2006) and used in Leuz (2010): disclosure quality index, liability standard index, and public enforcement index. See Appendix 4 for SECLAW calculation. FINDEV is calculated as the standardized mean rank of two variables: the ratio of domestic listed companies to the total population from 2011 to 2013 and the market capitalization to total GDP from 2011 to 2013. See Appendix 5 for FINDEV calculation. See Table 4 for variables descriptions.

**Appendix 4: Quality of securities regulation of the country (SECLAW)**

	1	2	3	4	5	6	7
Country	Disclosure quality index	standardized values of disclosure quality index	Liability standard index	standardized values of Liability standard index	Public enforcement index	standardized values of Liability standard index	The mean of the standardized values of three indices developed
Argentina	0.5	-0.41	0.22	-1.02	0.58	0.28	-0.38
Australia	0.75	0.65	0.66	0.72	0.9	1.75	1.04
Austria	0.25	-1.47	0.11	-1.46	0.17	-1.61	-1.51
Belgium	0.42	-0.75	0.44	-0.15	0.15	-1.7	-0.87
Brazil	0.25	-1.47	0.33	-0.58	0.58	0.28	-0.59
Canada	0.92	1.37	1	2.07	0.8	1.29	1.58
Chile	0.58	-0.07	0.33	-0.58	0.6	0.37	-0.1
Colombia	0.42	-0.75	0.11	-1.46	0.58	0.28	-0.64
Denmark	0.58	-0.07	0.55	0.29	0.37	-0.69	-0.16
Egypt	0.5	-0.41	0.22	-1.02	0.3	-1.01	-0.81
Ecuador	0	-2.53	0.11	-1.46	0.55	0.14	-1.28
Finland	0.5	-0.41	0.66	0.72	0.32	-0.92	-0.2
France	0.75	0.65	0.22	-1.02	0.77	1.15	0.26
Germany	0.42	-0.75	0	-1.89	0.22	-1.38	-1.34
Greece	0.33	-1.13	0.5	0.09	0.32	-0.92	-0.65
Hong Kong	0.92	1.37	0.66	0.72	0.87	1.61	1.23
India	0.92	1.37	0.66	0.72	0.67	0.69	0.93
Indonesia	0.5	-0.41	0.66	0.72	0.62	0.46	0.26

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**Appendix 4: Quality of securities regulation of the country (SECLAW)**

Country	1	2	3	4	5	6	7
	Disclosure quality index	standardized values of disclosure quality index	Liability standard index	standardized values of Liability standard index	Public enforcement index	standardized values of Liability standard index	The mean of the standardized values of three indices developed
Ireland	0.67	0.31	0.44	-0.15	0.37	-0.69	-0.18
Israel	0.67	0.31	0.66	0.72	0.63	0.51	0.51
Italy	0.67	0.31	0.67	0.76	0.48	-0.18	0.30
Japan	0.75	0.65	0.66	0.72	0.00	-2.39	-0.34
Jordan	0.67	0.31	0.22	-1.02	0.60	0.37	-0.11
Korea (South)	0.75	0.65	0.66	0.72	0.25	-1.24	0.04
Kenya	0.50	-0.41	0.44	-0.15	0.70	0.83	0.09
Malaysia	0.92	1.37	0.66	0.72	0.77	1.15	1.08
Mexico	0.58	-0.07	0.11	-1.46	0.35	-0.78	-0.77
Netherlands	0.50	-0.41	0.89	1.64	0.47	-0.23	0.33
New Zealand	0.67	0.31	0.44	-0.15	0.33	-0.87	-0.24
Norway	0.58	-0.07	0.39	-0.35	0.32	-0.92	-0.45
Nigeria	0.67	0.31	0.39	-0.35	0.33	-0.87	-0.30
Pakistan	0.58	-0.07	0.39	-0.35	0.58	0.28	-0.05
Peru	0.33	-1.13	0.66	0.72	0.78	1.20	0.26
Philippines	0.83	0.99	1.00	2.07	0.83	1.43	1.50
Portugal	0.42	-0.75	0.66	0.72	0.58	0.28	0.08
Singapore	1.00	1.70	0.66	0.72	0.87	1.61	1.35

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#### Appendix 4: Quality of securities regulation of the country (SECLAW)

Country	1	2	3	4	5	6	7
	Disclosure quality index	standardized values of disclosure quality index	Liability standard index	standardized values of Liability standard index	Public enforcement index	standardized values of Liability standard index	The mean of the standardized values of three indices developed
South Africa	0.83	0.99	0.66	0.72	0.25	-1.24	0.16
Spain	0.50	-0.41	0.66	0.72	0.33	-0.87	-0.19
Sri Lanka	0.75	0.65	0.39	-0.35	0.43	-0.41	-0.04
Sweden	0.58	-0.07	0.28	-0.78	0.50	-0.09	-0.31
Switzerland	0.67	0.31	0.44	-0.15	0.33	-0.87	-0.24
Taiwan	0.75	0.65	0.66	0.72	0.52	0.00	0.46
Thailand	0.92	1.37	0.22	-1.02	0.72	0.92	0.42
Turkey	0.50	-0.41	0.22	-1.02	0.63	0.51	-0.31
United Kingdom	0.83	0.99	0.66	0.72	0.68	0.74	0.82
United States	1.00	1.70	1.00	2.07	0.90	1.75	1.84
Uruguay	0.00	-2.53	0.11	-1.46	0.57	0.23	-1.25
Venezuela	0.17	-1.81	0.22	-1.02	0.55	0.14	-0.90
Zimbabwe	0.50	-0.41	0.44	-0.15	0.42	-0.46	-0.34
<u>Mean</u>	<u>0.60</u>		<u>0.48</u>		<u>0.52</u>		
<u>SD</u>	<u>0.24</u>		<u>0.25</u>		<u>0.22</u>		

Consistent with Jiang et al. (2018), quality of securities regulation of a country, calculated as the mean of the standardized values of three indices developed in La Porta et al. (2006) and used in Leuz (2010): disclosure quality index, liability standard index, and public enforcement index. Standardization formula:  $x^* = (x-m)/sd$ , where  $x^*$  is the standardized value of  $x$ ,  $m$  is the mean of  $x$ , and  $sd$  is the standard deviation of  $x$ . The data source in columns 1, 2, and 3 is La Porta et al. (2006, p.15). The first variable is the level of disclosure requirements in securities offerings. The liability standard equals the arithmetic mean of the liability standards for issuers, directors, distributors, and accountants. Public enforcement is a summary index of several sub-indices on public enforcement of securities regulation (supervisor characteristics index, rule-making power index, investigative powers index, orders index, and criminal index) (La Porta et al., 2006). However, as La Porta et al. (2006) did not include China, Saudi Arabia, United Arab Emirates, Macedonia, Mauritius and Poland in their 49 countries sample; I will assign 50% of the average securities regulation index of the closed five neighbor countries around China, Saudi Arabia and the United Arab Emirates to each country separately and 50 % of the average of the developing countries' securities regulation index, excluding the closed five neighbor countries, if applicable, as those three countries have developing markets. The average of the developing countries' securities regulation index is -0.2 in the China case, -0.15 in both Saudi Arabia and United Arab Emirates cases and 0.37 in Poland case. In China's case, its closed five neighbor countries are Japan (-0.19), South Korea (0.04), Taiwan (0.46), India (0.93) and Hong Kong (1.23). Their average securities regulation index = 0.55. Thus, securities regulation index of China =  $50\% * 0.55 + 50\% * -0.2 = 0.18$ . While In both Saudi Arabia

and United Arab Emirates cases, their closed five neighbor countries are: Egypt (-0.81), India (0.93), Jordan (-0.11), Pakistan (-0.05) and Sri Lanka (-0.04). Their average securities regulation index = -0.02. Thus, securities regulation index of both Saudi Arabia and United Arab Emirates =  $50\% * 0 - 0.02 + 50\% * -0.15 = 0.10$  for each country. In Poland's case, its closed five neighbor countries are Germany (-0.26), Sweden (0.28), Switzerland (0.33), Italy (0.62) and Denmark (0.38). Their average securities regulation index = 0.27. Thus, securities regulation index of Poland =  $50\% * 0.27 + 50\% * -0.13 = 0.07$ . In the Macedonia case, its closed five neighbor countries are Austria (-1.51), Greece (-0.65), Italy (0.3), Turkey (-0.31) and Switzerland (-0.24). Their average securities regulation index = -0.49. Thus, securities regulation index of Macedonia =  $50\% * -0.49 + 50\% * -0.1 = -0.29$ . In the Mauritius case, its closed five neighbor countries are Kenya (0.09), Nigeria (-0.3), South Africa (0.16), Sri Lanka (-0.037) and Zimbabwe (-0.34). Their average securities regulation index = -0.087. Thus, securities regulation index of Macedonia =  $50\% * -0.087 + 50\% * -0.13 = -0.11$ .

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### Appendix 5: Financial market development of a country (FINDEV) (1/5)

Country Name	Total number of Listed domestic companies			Population		
	2011	2012	2013	2011	2012	2013
United Arab Emirates	108	107	117	8,946,778	9,141,598	9,197,908
Argentina	99	101	97	41,320,497	41,755,188	42,196,034
Spain	3241	3167	3213	47,084,242	47,063,059	46,930,554
France	586	562	500	63,222,229	63,564,224	63,893,521
Italy	311	303	285	59,589,070	59,879,469	60,166,828
Norway	194	184	173	4,948,335	5,013,716	5,079,460
New Zealand	144	141	143	4,418,674	4,468,462	4,518,519
Philippines	251	252	254	95,570,049	97,212,639	98,871,558
Poland	757	844	869	38,286,824	38,227,033	38,158,043
Germany	670	665	639	80,855,629	80,972,629	81,174,373
Saudi Arabia	150	158	163	28,267,591	29,154,906	30,052,058
Brazil	366	353	352	197,514,541	199,287,292	201,035,904
Canada	3980	4030	3810	34,539,156	34,922,031	35,296,535
Chile	229	225	227	17,233,584	17,400,359	17,571,511
India	5112	5191	5294	1,250,287,939	1,265,780,243	1,280,842,119
Malaysia	932	911	900	28,650,962	29,068,189	29,468,923
South Africa	347	338	322	52,003,759	52,832,659	53,687,125
Indonesia	440	459	483	245,115,988	248,451,714	251,805,314
Switzerland	246	238	236	7,906,988	8,008,006	8,108,876
Sweden	259	258	256	9,466,705	9,542,817	9,618,016
China	2342	2494	2489	1,376,497,633	1,384,206,408	1,391,883,335
Japan	2280	2294	3408	128,498,966	128,423,571	128,314,189
United States	4171	4102	4180	311,584,051	314,043,885	316,400,539
Taiwan	790	809	838	23,268,760	23,346,898	23,421,582
Macedonia	32	32	32	2,072,484	2,074,275	2,076,065



### Appendix 5: Financial market development of a country (2/5)

Country Name	The ratio of (total number of listed domestic companies) to the (total population)				
	2011	2012	2013	Mean of ratio from 2011 to 2013	Standardized mean
United Arab Emirates	0.0000121	0.0000117	0.0000127	0.0000122	-0.39
Argentina	0.0000024	0.0000024	0.0000023	0.0000024	-0.78
Spain	0.0000688	0.0000673	0.0000685	0.0000682	1.86
France	0.0000093	0.0000088	0.0000078	0.0000086	-0.53
Italy	0.0000052	0.0000051	0.0000047	0.0000050	-0.67
Norway	0.0000392	0.0000367	0.0000341	0.0000367	0.60
New Zealand	0.0000326	0.0000316	0.0000316	0.0000319	0.41
Philippines	0.0000026	0.0000026	0.0000026	0.0000026	-0.77
Poland	0.0000198	0.0000221	0.0000228	0.0000215	-0.01
Germany	0.0000083	0.0000082	0.0000079	0.0000081	-0.55
Saudi Arabia	0.0000053	0.0000054	0.0000054	0.0000054	-0.66
Brazil	0.0000019	0.0000018	0.0000018	0.0000018	-0.80
Canada	0.0001152	0.0001154	0.0001079	0.0001129	3.65
Chile	0.0000133	0.0000129	0.0000129	0.0000130	-0.35
India	0.0000041	0.0000041	0.0000041	0.0000041	-0.71
Malaysia	0.0000325	0.0000313	0.0000305	0.0000315	0.39
South Africa	0.0000067	0.0000064	0.0000060	0.0000064	-0.62
Indonesia	0.0000018	0.0000018	0.0000019	0.0000019	-0.80
Switzerland	0.0000311	0.0000297	0.0000291	0.0000300	0.33
Sweden	0.0000274	0.0000270	0.0000266	0.0000270	0.21
China	0.0000017	0.0000018	0.0000018	0.0000018	-0.80
Japan	0.0000177	0.0000179	0.0000266	0.0000207	-0.04
United States	0.0000134	0.0000131	0.0000132	0.0000132	-0.34
Taiwan	0.0000340	0.0000347	0.0000358	0.0000348	0.52
Macedonia	0.0000154	0.0000154	0.0000154	0.0000154	-0.25

### Appendix 5: Financial market development of a country (3/5)

Country Name	The ratio of Market capitalization of listed domestic companies (% of GDP)				
	2011	2012	2013	Mean of ratio from 2011 to 2013	Standardized mean
United Arab Emirates	0.27	0.27	0.50	0.35	-0.77
Argentina	0.08	0.06	0.10	0.08	-1.26
Spain	0.70	0.75	0.82	0.76	-0.01
France	0.54	0.67	0.82	0.68	-0.16
Italy	0.19	0.23	0.29	0.24	-0.97
Norway	0.44	0.48	0.51	0.48	-0.53
New Zealand	0.26	0.30	0.35	0.30	-0.85
Philippines	0.74	0.92	0.80	0.82	0.10
Poland	0.26	0.35	0.39	0.34	-0.79
Germany	0.32	0.42	0.52	0.42	-0.63
Saudi Arabia	0.50	0.51	0.63	0.55	-0.40
Brazil	0.47	0.50	0.41	0.46	-0.56
Canada	1.07	1.13	1.15	1.12	0.65
Chile	1.07	1.17	0.95	1.07	0.56
India	0.55	0.69	0.61	0.62	-0.27
Malaysia	1.33	1.48	1.55	1.45	1.27
South Africa	1.89	2.29	2.57	2.25	2.74
Indonesia	0.44	0.47	0.38	0.43	-0.62
Switzerland	1.56	1.85	2.24	1.88	2.06
Sweden	0.94	1.05	1.27	1.09	0.59
China	0.45	0.43	0.41	0.43	-0.61
Japan	0.54	0.56	0.88	0.66	-0.19
United States	1.01	1.15	1.43	1.20	0.80
Taiwan	1.35	1.46	1.61	1.47	1.30
Macedonia	0.06	0.06	0.06	0.06	-1.30

### Appendix 5: Financial market development of a country (4/5)

Country Name	Standardized mean		Mean
	The ratio of (total number of listed domestic companies) to the (total population)	The ratio of Market capitalization of listed domestic companies (% of GDP)	
United Arab Emirates	-0.39	-0.77	-0.58
Argentina	-0.78	-1.26	-1.02
Spain	1.86	-0.01	0.92
France	-0.53	-0.16	-0.34
Italy	-0.67	-0.97	-0.82
Norway	0.60	-0.53	0.03
New Zealand	0.41	-0.85	-0.22
Philippines	-0.77	0.10	-0.33
Poland	-0.01	-0.79	-0.40
Germany	-0.55	-0.63	-0.59
Saudi Arabia	-0.66	-0.40	-0.53
Brazil	-0.80	-0.56	-0.68
Canada	3.65	0.65	2.15
Chile	-0.35	0.56	0.10
India	-0.71	-0.27	-0.49
Malaysia	0.39	1.27	0.83
South Africa	-0.62	2.74	1.06
Indonesia	-0.80	-0.62	-0.71
Switzerland	0.33	2.06	1.19
Sweden	0.21	0.59	0.40
China	-0.80	-0.61	-0.71
Japan	-0.04	-0.19	-0.12
United States	-0.34	0.80	0.23
Taiwan	0.52	1.30	0.91
Mauritius	1.11	-0.15	0.48
Macedonia	-0.25	-1.30	-0.78

## Appendix 5: Financial market development of a country (5/5)

**The financial market development of a country** is calculated as the standardized mean rank of two variables: the ratio of (domestic listed companies) to the (total population) from 2011 to 2013 and the (market capitalization) to (total GDP) from 2011 to 2013.

### Data Source:

#### Total number of listed domestic companies:

<https://data.worldbank.org/indicator/CM.MKT.LDOM.NO>

(For Taiwan) <https://www.ceicdata.com/en/taiwan/taiwan-stock-exchange-twse-number-of-listed-companies-and-securities/twse-number-of-listed-companies> as extracted from Taiwan Stock Exchange Corporation.

(For Sweden) <https://www.ceicdata.com/en/sweden/omx-stockholm-stock-exchange-share-trading/share-trading-omx-stockholm-no-of-listed-company>

(For Macedonia) <https://tradingeconomics.com/macedonia/listed-domestic-companies-total-wb-data.html>

**Population:** United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Prospects, 2019, Online Edition. Rev. 1. Available at: <https://population.un.org/wpp/Download/Standard/Population/>

#### The market capitalization of listed domestic companies (% of GDP):

<https://data.worldbank.org/indicator/CM.MKT.LCAP.GD.ZS>,

(For Italy) [https://datahub.io/world-bank/cm.mkt.lcap.gd.zs#resource-cm\\_mkt\\_lcap\\_gd\\_zs\\_zip](https://datahub.io/world-bank/cm.mkt.lcap.gd.zs#resource-cm_mkt_lcap_gd_zs_zip)

(For Sweden) <https://www.ceicdata.com/en/indicator/sweden/market-capitalization--nominal-gdp>

(For Taiwan) <https://www.ceicdata.com/en/indicator/taiwan/market-capitalization--nominal-gdp>

(For Macedonia) <https://tradingeconomics.com/macedonia/market-capitalization-of-listed-companies-percent-of-gdp-wb-data.html>.

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**Appendix 6: Results of robustness test at the country-level by using additional control variables (FINDEV and SECLAW) for the country-level effect (Dependent variable is AbsoluteAbnAccr)**

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.029	0.011	-2.61***
ShareholderPro	?	-0.071	0.042	-1.70*
DevelopedEconomies	?	-0.084	0.043	-1.94*
CountryLegalsystem	?	0.061	0.055	1.11
IAF Quality*ShareholderPro	?	0.019	0.010	1.90*
IAF Quality*DevelopedEconomies	?	0.020	0.010	1.88*
IAF Quality*CountryLegalsystem	?	-0.012	0.013	-0.98
ACEffectiveness	-	-0.013	0.013	-0.95
CFO	-	-0.000	0.000	-3.09***
SalesGrowth	+	0.053	0.034	1.55
Complexity	+	-0.003	0.002	-1.67*
MB	-	0.003	0.003	0.96
Age	-	0.000	0.000	0.58
Assets	+	-0.001	0.001	-1.09
MTG	+	-0.005	0.009	-0.5
Leverage	+	0.002	0.029	0.07
Loss	+	0.007	0.014	0.50
AuditorSpecialist	-	0.012	0.010	1.22
ROA	-	0.223	0.149	1.50
Stability	+	0.000	0.000	1.71*
GDPperCapita	?	-0.004	0.016	-0.23
ControlofCorrupt	?	0.029	0.038	0.74
GovernmentEffec	?	0.000	0.029	0.00
PoliticalStabi	?	0.001	0.013	0.09
RegulatoryQuality	?	0.015	0.022	0.71
RuleofLaw	?	-0.044	0.033	-1.33
FINDEV	?	-0.005	0.015	-0.35
SECLAW	?	0.018	0.014	1.27
Intercept	?	0.189	0.156	1.21
n		150		
Adj. R <sup>2</sup> (from OLS regression)		0.16		

\* \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ , 0.05, and 0.01 levels, respectively. Industry effect is repressed for presentational ease. I include (1) countries' financial market development (FINDEV) (Jiang et al., 2018) and (2) overall quality of security laws (SECLAW) (Jiang et al., 2018) as two additional control variables. SECLAW is calculated as the mean of the standardized values of three indices developed in La Porta et al. (2006) and used in Leuz (2010): disclosure quality index, liability standard index, and public enforcement index. See Appendix 4 for SECLAW calculation. FINDEV is calculated as the standardized mean rank of two variables: the ratio of domestic listed companies to the total population from 2011 to 2013 and the market capitalization to total GDP from 2011 to 2013. See Appendix 5 for FINDEV calculation. See Table 4 for variables descriptions.

**Appendix 7: Results of robustness test at the country-level by using multicollinearity checks (Approach A: Linearly combining)** (Dependent variable is AbsoluteAbnAccr)

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.029	0.010	-2.72***
ShareholderPro	?	-0.061	0.036	-1.67*
DevelopedEconomies	?	-0.078	0.040	-1.94*
CountryLegalsystem	?	0.071	0.055	1.29
IAF Quality*ShareholderPro	?	0.017	0.009	1.92*
IAF Quality*DevelopedEconomies	?	0.021	0.010	2.09**
IAF Quality*CountryLegalsystem	?	-0.013	0.013	-1.04
ACEffectiveness	-	-0.011	0.012	-0.91
CFO	-	-0.000	0.000	-1.05
SalesGrowth	+	0.058	0.033	1.77*
Complexity	+	-0.003	0.002	-1.61
MB	-	0.003	0.003	0.85
Age	-	0.000	0.000	0.47
Assets	+	-0.002	0.001	-1.26
MTG	+	-0.006	0.009	-0.74
Leverage	+	0.002	0.028	0.06
Loss	+	0.005	0.013	0.39
AuditorSpecialist	-	0.015	0.009	1.71*
ROA	-	0.195	0.140	1.39
Stability	+	0.000	0.000	2.95***
GDPperCapita	?	-0.004	0.014	-0.26
NCG_indicators	?	-0.001	0.001	-0.4
Intercept	?	0.189	0.143	1.32
n			150	
Adj. R <sup>2</sup> (from OLS regression)			0.19	

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ ,  $0.05$ , and  $0.01$  levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for variables descriptions.

**Appendix 8: Results of robustness test at the country-level by using multicollinearity checks (Approach B: Principle components analysis) (Dependent variable is AbsoluteAbnAccr)**

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.028	0.010	-2.71***
ShareholderPro	?	-0.061	0.036	-1.67*
DevelopedEconomies	?	-0.078	0.040	-1.94*
CountryLegalsystem	?	0.071	0.055	1.29
IAF Quality*ShareholderPro	?	0.017	0.009	1.92*
IAF Quality*DevelopedEconomies	?	0.021	0.010	2.08**
IAF Quality*CountryLegalsystem	?	-0.013	0.013	-1.04
ACEffectiveness	-	-0.011	0.012	-0.9
CFO	-	-0.000	0.000	-2.91***
SalesGrowth	+	0.058	0.033	1.77*
Complexity	+	-0.003	0.002	-1.61
MB	-	0.003	0.003	0.85
Age	-	0.000	0.000	0.47
Assets	+	-0.002	0.001	-1.25
MTG	+	-0.006	0.009	-0.74
Leverage	+	0.002	0.028	0.06
Loss	+	0.005	0.013	0.39
AuditorSpecialist	-	0.015	0.009	1.71*
ROA	-	0.195	0.140	1.39
Stability	+	0.000	0.000	1.75*
GDPperCapita	?	-0.004	0.014	-0.27
NCG-PrincipleComponentsAnalysis	?	-0.003	0.007	-0.37
Intercept	?	0.190	0.144	1.32
n		150		
Adj. R <sup>2</sup> (from OLS regression)		0.19		

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10, 0.05,$  and  $0.01$  levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for variables descriptions.

**Appendix 9: Results of robustness test at the country-level by using multicollinearity checks (Approach C: Combining the new variable from the multicollinearity checks with additional control variables for the country-level effect) (Dependent variable is AbsoluteAbnAccr)**

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.028	0.010	-2.66***
ShareholderPro	?	-0.066	0.036	-1.82*
DevelopedEconomies	?	-0.081	0.041	-1.97*
CountryLegalsystem	?	0.066	0.054	1.21
IAF Quality*ShareholderPro	?	0.017	0.009	1.96*
IAF Quality*DevelopedEconomies	?	0.020	0.010	2.01**
IAF Quality*CountryLegalsystem	?	-0.014	0.013	-1.13
ACEffectiveness	-	-0.009	0.012	-0.78
CFO	-	-0.000	0.000	-2.02**
SalesGrowth	+	0.055	0.033	1.64
Complexity	+	-0.003	0.002	-1.59
MB	-	0.003	0.003	0.89
Age	-	0.000	0.000	0.54
Assets	+	-0.002	0.001	-1.22
MTG	+	-0.007	0.009	-0.78
Leverage	+	0.004	0.028	0.12
Loss	+	0.008	0.014	0.58
AuditorSpecialist	-	0.015	0.009	1.71*
ROA	-	0.208	0.142	1.46
Stability	+	0.000	0.000	2.95***
GDPperCapita	?	-0.008	0.014	-0.59
NCG_indicators	?	0.001	0.002	0.29
FINDEV	?	-0.006	0.011	-0.55
SECLAW	?	0.009	0.006	1.44
Intercept	?	0.236	0.143	1.65
n		150		
Adj. R <sup>2</sup> (from OLS regression)		0.18		

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ , 0.05, and 0.01 levels, respectively. Industry effect is repressed for presentational ease. I include (1) countries' financial market development (FINDEV) (Jiang et al., 2018) and (2) overall quality of security laws (SECLAW) (Jiang et al., 2018) as two additional control variables. SECLAW is calculated as the mean of the standardized values of three indices developed in La Porta et al. (2006) and used in Leuz (2010): disclosure quality index, liability standard index, and public enforcement index. See Appendix 4 for SECLAW calculation. FINDEV is calculated as the standardized mean rank of two variables: the ratio of domestic listed companies to the total population from 2011 to 2013 and the market capitalization to total GDP from 2011 to 2013. See Appendix 5 for FINDEV calculation. See Table 4 for variables descriptions.



**Appendix 10: Results of robustness test at the country-level by excluding countries that have one firm only** (Dependent variable is AbsoluteAbnAccr)

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.032	0.012	-2.64***
ShareholderPro	?	-0.086	0.052	-1.63
DevelopedEconomies	?	-0.086	0.045	-1.91*
CountryLegalsystem	?	0.079	0.063	1.25
IAF Quality*ShareholderPro	?	0.022	0.011	1.91*
IAF Quality*DevelopedEconomies	?	0.022	0.011	1.92*
IAF Quality*CountryLegalsystem	?	-0.014	0.014	-0.99
ACEffectiveness	-	-0.015	0.013	-1.09
CFO	-	-0.000	0.000	-3.28***
SalesGrowth	+	0.06	0.037	1.63
Complexity	+	-0.004	0.002	-1.67*
MB	-	0.003	0.003	0.86
Age	-	0.000	0.000	0.26
Assets	+	-0.001	0.001	-1.12
MTG	+	-0.005	0.009	-0.54
Leverage	+	-0.003	0.031	-0.09
Loss	+	0.005	0.015	0.36
AuditorSpecialist	-	0.013	0.01	1.31
ROA	-	0.218	0.149	1.47
Stability	+	0.000	0.000	1.62
GDPperCapita	?	0.008	0.021	0.37
ControlofCorrupt	?	-0.003	0.043	-0.07
GovernmentEffec	?	0.023	0.038	0.6
PoliticalStabi	?	-0.012	0.028	-0.42
RegulatoryQuality	?	0.025	0.036	0.69
RuleofLaw	?	-0.04	0.039	-1.01
Intercept	?	0.095	0.209	0.46
n	139			
Adj. R <sup>2</sup> (from OLS regression)	0.17			

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ ,  $0.05$ , and  $0.01$  levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for variables descriptions.

## Appendix 11: Results of robustness test at the country-level by excluding Taiwan firms

(Dependent variable is AbsoluteAbnAccr)

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.037	0.013	-2.87***
ShareholderPro	?	-0.055	0.040	-1.37
DevelopedEconomies	?	-0.088	0.055	-1.59
CountryLegalsystem	?	0.069	0.057	1.21
IAF Quality*ShareholderPro	?	0.016	0.010	1.64
IAF Quality*DevelopedEconomies	?	0.026	0.013	2.02**
IAF Quality*CountryLegalsystem	?	-0.006	0.012	-0.48
ACEffectiveness	-	-0.001	0.014	-0.07
CFO	-	-0.000	0.000	-2.26***
SalesGrowth	+	0.053	0.036	1.47
Complexity	+	-0.002	0.002	-1.12
MB	-	0.002	0.003	0.55
Age	-	0.000	0.000	0.33
Assets	+	-0.002	0.002	-1.33
MTG	+	0.002	0.011	0.16
Leverage	+	-0.010	0.029	-0.36
Loss	+	0.011	0.015	0.79
AuditorSpecialist	-	0.009	0.011	0.88
ROA	-	0.301	0.157	1.91**
Stability	+	0.000	0.000	1.93**
GDPperCapita	?	0.016	0.018	0.87
ControlofCorrupt	?	0.060	0.040	1.49
GovernmentEffec	?	-0.003	0.020	-0.15
PoliticalStabi	?	-0.023	0.013	-1.79**
RegulatoryQuality	?	0.013	0.022	0.60
RuleofLaw	?	-0.068	0.043	-1.60
Intercept	?	-0.004	0.183	-0.02
n	126			
Adj. R <sup>2</sup> (from OLS regression)	0.19			

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ , 0.05, and 0.01 levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for variables descriptions.

## Appendix 12: Results of robustness test at the country-level by excluding Japan firms

(Dependent variable is AbsoluteAbnAccr)

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.035	0.013	-2.70***
ShareholderPro	?	-0.087	0.055	-1.58
DevelopedEconomies	?	-0.083	0.046	-1.81*
CountryLegalsystem	?	0.076	0.058	1.31
IAF Quality*ShareholderPro	?	0.023	0.013	1.77*
IAF Quality*DevelopedEconomies	?	0.022	0.011	1.93*
IAF Quality*CountryLegalsystem	?	-0.014	0.013	-1.12
ACEffectiveness	-	-0.010	0.016	-0.63
CFO	-	-0.000	0.000	-2.76***
SalesGrowth	+	0.067	0.035	1.91*
Complexity	+	-0.003	0.002	-1.27
MB	-	0.002	0.003	0.68
Age	-	0.001	0.000	1.48
Assets	+	-0.002	0.001	-1.05
MTG	+	-0.008	0.010	-0.75
Leverage	+	0.013	0.031	0.41
Loss	+	-0.002	0.013	-0.17
AuditorSpecialist	-	0.021	0.010	2.12**
ROA	-	0.228	0.162	1.41
Stability	+	0.000	0.000	1.79*
GDPperCapita	?	0.004	0.017	0.25
ControlofCorrupt	?	0.005	0.022	0.22
GovernmentEffec	?	0.016	0.019	0.87
PoliticalStabi	?	-0.006	0.012	-0.52
RegulatoryQuality	?	0.016	0.025	0.63
RuleofLaw	?	-0.038	0.033	-1.15
Intercept	?	0.117	0.172	0.68
n	126			
Adj. R <sup>2</sup> (from OLS regression)	0.19			

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ ,  $0.05$ , and  $0.01$  levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for variables descriptions.

### Appendix 13: Results of robustness test at the country-level by excluding US firms

(Dependent variable is AbsoluteAbnAccr)

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.027	0.011	-2.56**
ShareholderPro	?	-0.058	0.037	-1.58
DevelopedEconomies	?	-0.074	0.037	-2.02**
CountryLegalsystem	?	0.086	0.069	1.25
IAF Quality*ShareholderPro	?	0.015	0.009	1.69*
IAF Quality*DevelopedEconomies	?	0.020	0.010	2.02**
IAF Quality*CountryLegalsystem	?	-0.014	0.016	-0.87
ACEffectiveness	-	-0.018	0.013	-1.36
CFO	-	0.000	0.000	1.51
SalesGrowth	+	0.042	0.030	1.39
Complexity	+	-0.004	0.002	-1.74*
MB	-	0.004	0.003	1.2
Age	-	0.000	0.000	-0.57
Assets	+	0.000	0.001	-0.15
MTG	+	-0.003	0.009	-0.38
Leverage	+	-0.007	0.033	-0.21
Loss	+	0.002	0.015	0.15
AuditorSpecialist	-	0.010	0.010	1.02
ROA	-	0.166	0.150	1.11
Stability	+	0.000	0.000	3.25***
GDPperCapita	?	-0.001	0.014	-0.05
ControlofCorrupt	?	0.009	0.021	0.44
GovernmentEffec	?	0.013	0.017	0.75
PoliticalStabi	?	-0.003	0.012	-0.25
RegulatoryQuality	?	0.012	0.021	0.57
RuleofLaw	?	-0.034	0.029	-1.15
Intercept	?	0.142	0.135	1.05
n	125			
Adj. R <sup>2</sup> (from OLS regression)	0.16			

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ , 0.05, and 0.01 levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for variables descriptions. In regressing my model without US firms, I removed 25 US firms only out of 49 firms because my sample is very small ( $n = 150$ ), and by excluding US firms, my data has 14 firms only that belong to common law, which reduces the statistical variation in the regression. Further, my sample contains 24 Taiwanese and 26 Japanese firms. Thus, I removed 25 US firms consistent with Taiwanese and Japanese firms' quantity. Previous studies investigating the relationship of IAF quality with other explanatory variables have sample sizes ranging from 150 to 528 (See, e.g., Alzeban, 2020; Jiang et al., 2018; Abbott et al., 2016; Prawitt et al., 2012, 2009). Nevertheless, I explicitly control for the influence of US firms and various countries' firms in my primary and robustness analyses by including eleven different control variables (*ControlofCorrupt*, *GovernmentEffec*, *PoliticalStabi*, *RegulatoryQuality*, *RuleofLaw*, *GDPperCapita*, *FINDEV*, *SECLAW*, *ShareholderPro*, *DevelopedEconomies* and *CountryLegalsystem*) to capture all country-level effects on my possible outcomes.

**Appendix 14: Results of robustness test at the country-level by using an alternative proxy to measure IAF quality by Ege (2015) (Dependent variable is AbsoluteAbnAccr)**

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.029	0.012	-2.49**
ShareholderPro	?	-0.086	0.046	-1.88*
DevelopedEconomies	?	-0.074	0.045	-1.64
CountryLegalsystem	?	0.094	0.062	1.50
IAF Quality*ShareholderPro	?	0.024	0.012	2.03**
IAF Quality*DevelopedEconomies	?	0.020	0.011	1.78*
IAF Quality*CountryLegalsystem	?	-0.018	0.015	-1.20
ACEffectiveness	-	-0.010	0.013	-0.82
CFO	-	-0.000	0.000	-2.87***
SalesGrowth	+	0.064	0.035	1.84*
Complexity	+	-0.003	0.002	-1.73*
MB	-	0.002	0.003	0.77
Age	-	0.000	0.000	0.41
Assets	+	-0.001	0.001	-1.06
MTG	+	0.000	0.009	-0.01
Leverage	+	0.012	0.032	0.38
Loss	+	0.005	0.013	0.38
AuditorSpecialist	-	0.013	0.009	1.5
ROA	-	0.221	0.147	1.51
Stability	+	0.000	0.000	2.05**
GDPperCapita	?	-0.002	0.016	-0.13
ControlofCorrupt	?	0.009	0.023	0.40
GovernmentEffec	?	-0.003	0.019	-0.14
PoliticalStabi	?	0.001	0.011	0.09
RegulatoryQuality	?	0.011	0.020	0.52
RuleofLaw	?	-0.020	0.030	-0.65
Intercept	?	0.162	0.158	1.02
n	150			
Adj. R <sup>2</sup> (from OLS regression)	0.16			

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ ,  $0.05$ , and  $0.01$  levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for variables descriptions.

**Appendix 15: Results of robustness test at the country-level by using an alternative proxy (The modified Jones model (1995)) to measure earnings management (Dependent variable is AbsoluteAbnAccr)**

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.035	0.011	-3.12***
ShareholderPro	?	-0.050	0.040	-1.25
DevelopedEconomies	?	-0.140	0.039	-3.56***
CountryLegalsystem	?	0.064	0.040	1.59
IAF Quality*ShareholderPro	?	0.015	0.010	1.57
IAF Quality*DevelopedEconomies	?	0.032	0.010	3.11***
IAF Quality*CountryLegalsystem	?	-0.015	0.010	-1.52
ACEffectiveness	-	0.005	0.013	0.36
CFO	-	0.000	0.000	2.49**
SalesGrowth	+	0.055	0.030	1.84*
Complexity	+	-0.002	0.002	-1.14
MB	-	0.002	0.002	0.79
Age	-	-0.001	0.000	-1.12
Assets	+	-0.001	0.002	-0.32
MTG	+	-0.001	0.012	-0.06
Leverage	+	-0.011	0.029	-0.39
Loss	+	0.006	0.011	0.54
AuditorSpecialist	-	-0.010	0.015	-0.66
ROA	-	-0.232	0.119	-1.95*
Stability	+	0.000	0.000	2.57**
GDPperCapita	?	-0.011	0.016	-0.70
ControlofCorrupt	?	-0.006	0.021	-0.29
GovernmentEffec	?	0.001	0.018	0.07
PoliticalStabi	?	-0.002	0.011	-0.14
RegulatoryQuality	?	-0.027	0.031	-0.88
RuleofLaw	?	0.039	0.034	1.17
Intercept	?	0.325	0.164	1.99**
n	150			
Adj. R <sup>2</sup> (from OLS regression)	0.18			

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ ,  $0.05$ , and  $0.01$  levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for variables descriptions.

**Appendix 16: Results of robustness test at the country-level by using an alternative proxy (the Jones (1991) model) to measure earnings management (Dependent variable is AbsoluteAbnAccr)**

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.018	0.011	-1.70*
ShareholderPro	?	-0.045	0.039	-1.15
DevelopedEconomies	?	-0.053	0.039	-1.35
CountryLegalsystem	?	0.059	0.044	1.35
IAF Quality*ShareholderPro	?	0.008	0.009	0.84
IAF Quality*DevelopedEconomies	?	0.015	0.010	1.50
IAF Quality*CountryLegalsystem	?	-0.013	0.011	-1.22
ACEffectiveness	-	0.005	0.013	0.38
CFO	-	-0.000	0.000	-1.53
SalesGrowth	+	0.033	0.022	1.48
Complexity	+	-0.001	0.002	-0.94
MB	-	0.001	0.002	0.51
Age	-	0.000	0.000	-1.09
Assets	+	-0.002	0.001	-1.42
MTG	+	0.000	0.009	0.04
Leverage	+	-0.019	0.026	-0.74
Loss	+	0.005	0.013	0.4
AuditorSpecialist	-	0.010	0.010	1.05
ROA	-	0.060	0.113	0.53
Stability	+	0.000	0.000	1.97*
GDPperCapita	?	-0.014	0.016	-0.89
ControlofCorrupt	?	-0.014	0.017	-0.83
GovernmentEffec	?	0.015	0.016	0.93
PoliticalStabi	?	-0.007	0.011	-0.62
RegulatoryQuality	?	-0.017	0.022	-0.75
RuleofLaw	?	0.018	0.028	0.66
Intercept	?	0.299	0.158	1.89*
n	150			
Adj. R <sup>2</sup> (from OLS regression)	0.12			

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10, 0.05,$  and  $0.01$  levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for variables descriptions.

**Appendix 17: Results of robustness test at the country-level by combining Ege (2015) to measure IAF Quality and the modified Jones model (1995) to measure earnings management (Dependent variable is AbsoluteAbnAccr)**

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.029	0.011	-2.58*
ShareholderPro	?	-0.050	0.047	-1.07
DevelopedEconomies	?	-0.133	0.049	-2.74***
CountryLegalsystem	?	0.124	0.065	1.92*
IAF Quality*ShareholderPro	?	0.015	0.011	1.27
IAF Quality*DevelopedEconomies	?	0.032	0.013	2.51**
IAF Quality*CountryLegalsystem	?	-0.030	0.016	-1.90*
ACEffectiveness	-	0.008	0.013	0.66
CFO	-	-0.000	0.000	-2.49**
SalesGrowth	+	0.056	0.030	1.83
Complexity	+	-0.002	0.002	-1.44
MB	-	0.002	0.002	0.75
Age	-	0.000	0.000	-0.92
Assets	+	0.000	0.002	-0.23
MTG	+	0.007	0.011	0.59
Leverage	+	0.006	0.032	0.17
Loss	+	0.008	0.011	0.71
AuditorSpecialist	-	-0.010	0.014	-0.7
ROA	-	-0.212	0.120	-1.76*
Stability	+	0.000	0.000	2.02**
GDPperCapita	?	-0.023	0.016	-1.49
ControlofCorrupt	?	-0.008	0.022	-0.38
GovernmentEffec	?	-0.016	0.018	-0.91
PoliticalStabi	?	0.007	0.011	0.66
RegulatoryQuality	?	-0.044	0.031	-1.41
RuleofLaw	?	0.074	0.033	2.24**
Intercept	?	0.414	0.170	2.43**
n		150		
Adj. R <sup>2</sup> (from OLS regression)		0.18		

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ , 0.05, and 0.01 levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for variables descriptions.



**Appendix 18: Results of robustness test at the country-level by combining Ege (2015) to measure IAF Quality and the Jones (1991) model to measure earnings management (Dependent variable is AbsoluteAbnAccr)**

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.020	0.009	-2.10**
ShareholderPro	?	-0.065	0.037	-1.78*
DevelopedEconomies	?	-0.057	0.038	-1.49
CountryLegalsystem	?	0.073	0.046	1.61
IAF Quality*ShareholderPro	?	0.013	0.009	1.43
IAF Quality*DevelopedEconomies	?	0.017	0.010	1.71*
IAF Quality*CountryLegalsystem	?	-0.017	0.012	-1.45
ACEffectiveness	-	0.007	0.012	0.58
CFO	-	-0.000	0.000	-1.7*
SalesGrowth	+	0.030	0.022	1.35
Complexity	+	-0.002	0.002	-1.12
MB	-	0.001	0.002	0.32
Age	-	0.000	0.000	-1.18
Assets	+	-0.002	0.001	-1.36
MTG	+	0.006	0.009	0.67
Leverage	+	-0.009	0.027	-0.31
Loss	+	0.005	0.012	0.39
AuditorSpecialist	-	0.009	0.010	0.96
ROA	-	0.065	0.112	0.58
Stability	+	0.000	0.000	1.88*
GDPperCapita	?	-0.019	0.016	-1.21
ControlofCorrupt	?	-0.012	0.017	-0.71
GovernmentEffec	?	0.003	0.017	0.17
PoliticalStabi	?	-0.001	0.011	-0.10
RegulatoryQuality	?	-0.021	0.023	-0.91
RuleofLaw	?	0.030	0.028	1.05
Intercept	?	0.350	0.162	2.15**
n	150			
Adj. R <sup>2</sup> (from OLS regression)	0.11			

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ ,  $0.05$ , and  $0.01$  levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for variables descriptions.

**Appendix 19: Results of robustness test at the country-level by using an alternative proxy (GDPperCapita- Stnd) to measure economic status (Dependent variable is AbsoluteAbnAccr)**

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.027	0.011	-2.36**
ShareholderPro	?	-0.063	0.042	-1.51
GDPperCapita- Stnd	?	-0.068	0.049	-1.38
CountryLegalsystem	?	0.071	0.059	1.2
IAF Quality*ShareholderPro	?	0.018	0.010	1.76*
IAF Quality * GDPperCapita- Stnd	?	0.019	0.011	1.73*
IAF Quality*CountryLegalsystem	?	-0.012	0.013	-0.93
ACEffectiveness	-	-0.016	0.013	-1.22
CFO	-	-0.000	0.000	-3.07***
SalesGrowth	+	0.059	0.033	1.75*
Complexity	+	-0.003	0.002	-1.75*
MB	-	0.003	0.003	0.98
Age	-	0.000	0.000	0.38
Assets	+	-0.001	0.001	-1.04
MTG	+	-0.005	0.009	-0.6
Leverage	+	0.001	0.029	0.02
Loss	+	0.003	0.013	0.21
AuditorSpecialist	-	0.014	0.009	1.58
ROA	-	0.224	0.144	1.56
Stability	+	0.000	0.000	3.1***
ControlofCorrupt	?	0.008	0.022	0.36
GovernmentEffec	?	0.016	0.018	0.89
PoliticalStabi	?	-0.008	0.010	-0.76
RegulatoryQuality	?	0.016	0.025	0.63
RuleofLaw	?	-0.037	0.031	-1.18
Intercept	?	0.143	0.060	2.4**
n	150			
Adj. R <sup>2</sup> (from OLS regression)	0.17			

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ ,  $0.05$ , and  $0.01$  levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for variables descriptions.

**Appendix 20: Results of robustness test at the corporate-level by using alternative variables (FINDEV and SECLAW) to control for the country-level effect (Dependent variable is AbsoluteAbnAccr)**

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.010	0.005	-2.11**
Assistance	?	-0.057	0.027	-2.15**
OutsourcingBigDataAnalytics	?	0.090	0.043	2.08**
IAF Quality*Assistance	?	0.013	0.007	1.91*
IAF Quality*OutsourcingBigDataAnalytics	?	-0.019	0.011	-1.79*
IAFsThirdParty	-	0.007	0.008	0.87
ACEffectiveness	-	-0.010	0.011	-0.89
CFO	+	-0.001	0.001	-1.18
SalesGrowth	+	0.062	0.033	1.89*
Complexity	-	0.000	0.000	0.66
MB	-	0.014	0.009	1.57
Age	+	-0.003	0.002	-1.86*
Assets	-	0.000	0.000	-3.14***
MTG	+	0.000	0.000	3.19***
Leverage	+	0.007	0.027	0.28
Loss	+	0.010	0.013	0.75
AuditorSpecialist	-	0.003	0.003	0.86
ROA	-	0.209	0.137	1.52
Stability	+	-0.013	0.008	-1.8*
FINDEV	?	-0.005	0.006	-0.77
SECLAW	?	0.011	0.004	2.59
Intercept	?	0.081	0.039	2.1**
n	150			
Adj. R <sup>2</sup> (from OLS regression)	0.25			

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ , 0.05, and 0.01 levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for the description of the variable.

**Appendix 21: Results of robustness test at the corporate-level by using alternative variables (ShareholderPro, DevelopedEconomies and CountryLegalsystem) to control for the country-level effect (Dependent variable is AbsoluteAbnAccr)**

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.009	0.005	-2.04***
Assistance	?	-0.056	0.027	-2.11**
OutsourcingBigDataAnalytics	?	0.089	0.044	2.02**
IAF Quality*Assistance	?	0.012	0.007	1.86*
IAF Quality*OutsourcingBigDataAnalytics	?	-0.019	0.011	-1.75*
IAFsThirdParty	-	0.008	0.009	0.88
ACEffectiveness	-	-0.009	0.012	-0.8
CFO	-	-0.000	0.000	-2.94***
SalesGrowth	+	0.068	0.033	2.06**
Complexity	+	-0.003	0.002	-1.83*
MB	-	0.002	0.003	0.81
Age	-	0.000	0.000	0.61
Assets	+	-0.001	0.001	-1.03
MTG	+	-0.013	0.008	-1.62
Leverage	+	0.006	0.028	0.21
Loss	+	0.007	0.013	0.55
AuditorSpecialist	-	0.014	0.009	1.53
ROA	-	0.195	0.140	1.39
Stability	+	0.000	0.000	3.09***
ShareholderPro	?	0.010	0.011	0.88
DevelopedEconomies	?	0.001	0.010	0.08
CountryLegalsystem	?	0.013	0.014	0.9
Intercept	?	0.071	0.039	1.84*
n	150			
Adj. R <sup>2</sup> (from OLS regression)	0.23			

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ ,  $0.05$ , and  $0.01$  levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for the description of the variable.

**Appendix 22: Results of robustness test at the corporate-level by using additional control variables (FINDEV and SECLAW) for the country-level effect (Dependent variable is AbsoluteAbnAccr)**

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.009	0.005	-1.92*
Assistance	?	-0.057	0.027	-2.09**
OutsourcingBigDataAnalytics	?	0.089	0.044	2.04**
IAF Quality*Assistance	?	0.012	0.007	1.73*
IAF Quality*OutsourcingBigDataAnalytics	?	-0.019	0.011	-1.77*
IAFsThirdParty	-	0.008	0.008	0.91
ACEffectiveness	-	-0.010	0.012	-0.85
CFO	-	0.000	0.000	3.03***
SalesGrowth	+	0.065	0.035	1.85*
Complexity	+	-0.003	0.002	-1.74*
MB	-	0.002	0.003	0.75
Age	-	0.000	0.000	0.74
Assets	+	-0.001	0.001	-1.07
MTG	+	-0.011	0.009	-1.33
Leverage	+	0.008	0.029	0.29
Loss	+	0.012	0.014	0.85
AuditorSpecialist	-	0.014	0.010	1.46
ROA	-	0.231	0.147	1.57
Stability	+	0.000	0.000	3.15***
GDPperCapita	?	-0.006	0.016	-0.37
ControlofCorrupt	?	0.011	0.028	0.41
GovernmentEffec	?	0.011	0.023	0.49
PoliticalStabi	?	0.000	0.011	0.03
RegulatoryQuality	?	0.013	0.020	0.66
RuleofLaw	?	-0.034	0.028	-1.21
FINDEV	?	-0.007	0.010	-0.73
SECLAW	?	0.018	0.010	1.72*
Intercept	?	0.134	0.165	0.82
n	150			
Adj. R <sup>2</sup> (from OLS regression)	0.22			

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ , 0.05, and 0.01 levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for the description of the variable.

**Appendix 23: Results of robustness test at the corporate-level by using additional control variables (ShareholderPro DevelopedEconomies and CountryLegalsystem) for the country-level effect (Dependent variable is AbsoluteAbnAccr)**

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.010	0.005	-1.99**
Assistance	?	-0.059	0.028	-2.1**
OutsourcingBigDataAnalytics	?	0.090	0.045	2.02**
IAF Quality*Assistance	?	0.012	0.007	1.78*
IAF Quality*OutsourcingBigDataAnalytics	?	-0.020	0.011	-1.78*
IAFsThirdParty	-	0.008	0.009	0.92
ACEffectiveness	-	-0.012	0.012	-0.98
CFO	-	-0.000	0.000	-2.81***
SalesGrowth	+	0.072	0.034	2.11**
Complexity	+	-0.003	0.002	-1.63
MB	-	0.002	0.003	0.62
Age	-	0.000	0.000	0.54
Assets	+	-0.001	0.001	-1.03
MTG	+	-0.012	0.009	-1.31
Leverage	+	0.005	0.030	0.18
Loss	+	0.009	0.014	0.62
AuditorSpecialist	-	0.016	0.009	1.71*
ROA	-	0.213	0.147	1.45
Stability	+	0.000	0.000	2.91***
GDPperCapita	?	0.001	0.017	0.09
ControlofCorrupt	?	-0.004	0.020	-0.22
GovernmentEffec	?	0.019	0.018	1.08
PoliticalStabi	?	-0.006	0.010	-0.57
RegulatoryQuality	?	0.007	0.022	0.33
RuleofLaw	?	-0.022	0.028	-0.8
ShareholderPro	?	0.010	0.012	0.83
DevelopedEconomies	?	0.009	0.020	0.47
CountryLegalsystem		0.011	0.018	0.64
Intercept	?	0.057	0.168	0.34
n		150		
Adj. R <sup>2</sup> (from OLS regression)		0.20		

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ , 0.05, and 0.01 levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for the description of the variable.

**Appendix 24: Results of robustness test at the corporate-level by using multicollinearity checks (Approach A: Linearly combining)** (Dependent variable is AbsoluteAbnAccr)  
(Dependent variable is AbsoluteAbnAccr)

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.008	0.005	-1.63
Assistance	?	-0.057	0.027	-2.11**
OutsourcingBigDataAnalytics	?	0.094	0.046	2.04**
IAF Quality*Assistance	?	0.014	0.007	2.07**
IAF Quality*OutsourcingBigDataAnalytics	?	-0.020	0.011	-1.77*
IAFsThirdParty	-	0.011	0.008	1.29
ACEffectiveness	-	-0.009	0.012	-0.79
CFO	-	-0.000	0.000	-2.70**
SalesGrowth	+	0.068	0.032	2.13**
Complexity	+	-0.004	0.002	-2.27**
MB	-	0.003	0.003	1.02
Age	-	0.000	0.000	0.81
Assets	+	-0.001	0.001	-1.13
MTG	+	-0.011	0.008	-1.52
Leverage	+	0.012	0.028	0.45
Loss	+	0.006	0.013	0.48
AuditorSpecialist	-	0.016	0.009	1.76*
ROA	-	0.184	0.137	1.34
Stability	+	0.000	0.000	3.04***
GDPperCapita	?	0.005	0.014	0.39
NCG_indicators	?	-0.001	0.002	-0.37
Intercept	?	0.016	0.137	0.11
n	150			
Adj. R <sup>2</sup> (from OLS regression)	0.22			

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ , 0.05, and 0.01 levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for the description of the variable.

**Appendix 25: Results of robustness test at the corporate-level by using multicollinearity checks (Approach B: Principle components analysis) (Dependent variable is AbsoluteAbnAccr) (Dependent variable is AbsoluteAbnAccr)**

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.008	0.005	-1.63
Assistance	?	-0.057	0.027	-2.11**
OutsourcingBigDataAnalytics	?	0.094	0.046	2.04**
IAF Quality*Assistance	?	0.014	0.007	2.07**
IAF Quality*OutsourcingBigDataAnalytics	?	-0.020	0.011	-1.78*
IAFsThirdParty	-	0.011	0.008	1.29
ACEffectiveness	-	-0.009	0.012	-0.78
CFO	-	0.000	0.000	2.99***
SalesGrowth	+	0.068	0.032	2.13**
Complexity	+	-0.004	0.002	-2.26**
MB	-	0.003	0.003	1.02
Age	-	0.000	0.000	0.81
Assets	+	-0.001	0.001	-1.14
MTG	+	-0.011	0.008	-1.53
Leverage	+	0.012	0.028	0.45
Loss	+	0.006	0.013	0.48
AuditorSpecialist	-	0.016	0.009	1.76*
ROA	-	0.184	0.137	1.34
Stability	+	0.000	0.000	2.03**
GDPperCapita	?	0.005	0.014	0.37
NCG-PrincipleComponentsAnalysis	?	-0.003	0.007	-0.35
Intercept	?	0.017	0.139	0.12
n	150			
Adj. R <sup>2</sup> (from OLS regression)	0.22			

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ ,  $0.05$ , and  $0.01$  levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for the description of the variable.



**Appendix 26: Results of robustness test at the country-level by using multicollinearity checks (Approach C: Combining the new variable from the multicollinearity checks with additional control variables for the country-level effect) (Dependent variable is AbsoluteAbnAccr)**

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.009	0.005	-2.08**
Assistance	?	-0.057	0.027	-2.11**
OutsourcingBigDataAnalytics	?	0.091	0.044	2.08**
IAF Quality*Assistance	?	0.012	0.007	1.83*
IAF Quality*OutsourcingBigDataAnalytics	?	-0.019	0.011	-1.79*
IAFsThirdParty	-	0.007	0.008	0.89
ACEffectiveness	-	-0.009	0.012	-0.72
CFO	-	-0.000	0.000	-2.84***
SalesGrowth	+	0.062	0.033	1.88*
Complexity	+	-0.003	0.002	-1.73*
MB	-	0.002	0.003	0.78
Age	-	0.000	0.000	0.71
Assets	+	-0.001	0.001	-1.13
MTG	+	-0.013	0.008	-1.65
Leverage	+	0.008	0.027	0.28
Loss	+	0.011	0.014	0.81
AuditorSpecialist	-	0.015	0.009	1.66**
ROA	-	0.212	0.139	1.52
Stability	+	0.000	0.000	2.88***
GDPperCapita	?	-0.008	0.014	-0.6
NCG_indicators	?	0.001	0.002	0.39
FINDEV	?	-0.006	0.008	-0.72
SECLAW	?	0.013	0.005	2.74***
Intercept	?	0.165	0.148	1.11
n			150	
Adj. R <sup>2</sup> (from OLS regression)			0.24	

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ ,  $0.05$ , and  $0.01$  levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for the description of the variable.

**Appendix 27: Results of robustness test at the country-level by using multicollinearity checks (Approach C: Combining the new variable from the multicollinearity checks with additional control variables for the country-level effect) (Dependent variable is AbsoluteAbnAccr)**

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.010	0.005	-2.07**
Assistance	?	-0.058	0.028	-2.11**
OutsourcingBigDataAnalytics	?	0.091	0.044	2.04**
IAF Quality*Assistance	?	0.013	0.007	1.88*
IAF Quality*OutsourcingBigDataAnalytics	?	-0.020	0.011	-1.77*
IAFsThirdParty	-	0.007	0.009	0.82
ACEffectiveness	-	-0.011	0.012	-0.97
CFO	-	-0.000	0.000	-2.50**
SalesGrowth	+	0.067	0.033	2.01**
Complexity	+	-0.003	0.002	-1.68*
MB	-	0.002	0.003	0.74
Age	-	0.000	0.000	0.55
Assets	+	-0.001	0.001	-1.13
MTG	+	-0.012	0.008	-1.54
Leverage	+	0.005	0.028	0.18
Loss	+	0.008	0.014	0.6
AuditorSpecialist	-	0.015	0.009	1.63
ROA	-	0.200	0.141	1.42
Stability	+	0.000	0.000	2.85***
GDPperCapita	?	-0.002	0.016	-0.13
NCG_indicators	?	-0.001	0.001	-0.43
ShareholderPro	?	0.012	0.012	1.07
DevelopedEconomies	?	0.009	0.016	0.58
CountryLegalsystem	?	0.011	0.015	0.78
Intercept	?	0.092	0.159	0.58
n		150		
Adj. R <sup>2</sup> (from OLS regression)		0.22		

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ , 0.05, and 0.01 levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for the description of the variable.

**Appendix 28: Results of robustness test at the corporate-level by excluding countries that have one firm only** (Dependent variable is AbsoluteAbnAccr)

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.011	0.005	-2.03**
Assistance	?	-0.063	0.029	-2.19**
OutsourcingBigDataAnalytics	?	0.085	0.045	1.88*
IAF Quality*Assistance	?	0.013	0.007	1.9*
IAF Quality*OutsourcingBigDataAnalytics	?	-0.019	0.011	-1.64
IAFsThirdParty	-	0.006	0.009	0.65
ACEffectiveness	-	-0.013	0.013	-0.98
CFO	-	-0.000	0.000	-1.55
SalesGrowth	+	0.074	0.037	1.98**
Complexity	+	-0.003	0.002	-1.66*
MB	-	0.002	0.003	0.66
Age	-	0.000	0.000	0.6
Assets	+	-0.002	0.001	-1.25
MTG	+	-0.012	0.009	-1.41
Leverage	+	0.001	0.031	0.02
Loss	+	0.010	0.014	0.68
AuditorSpecialist	-	0.017	0.010	1.63
ROA	-	0.211	0.148	1.43
Stability	+	0.000	0.000	3.13***
GDPperCapita	?	0.012	0.016	0.74
ControlofCorrupt	?	-0.025	0.014	-1.84*
GovernmentEffec	?	0.051	0.025	2.00**
PoliticalStabi	?	-0.022	0.013	-1.65
RegulatoryQuality	?	0.014	0.021	0.66
RuleofLaw	?	-0.026	0.031	-0.83
Intercept	?	-0.020	0.168	-0.12
n			139	
Adj. R <sup>2</sup> (from OLS regression)			0.22	

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ , 0.05, and 0.01 levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for the description of the variable.

**Appendix 29: Results of robustness test at the corporate-level by excluding Taiwan firms** (Dependent variable is AbsoluteAbnAccr)

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.014	0.006	-2.33**
Assistance	?	-0.080	0.031	-2.63***
OutsourcingBigDataAnalytics	?	0.087	0.045	1.92*
IAF Quality*Assistance	?	0.017	0.008	2.23**
IAF Quality*OutsourcingBigDataAnalytics	?	-0.017	0.011	-1.53
IAFsThirdParty	-	0.009	0.009	0.98
ACEffectiveness	-	0.001	0.012	0.13
CFO	-	-0.000	0.000	-2.01**
SalesGrowth	+	0.069	0.035	1.98*
Complexity	+	-0.002	0.002	-1.13
MB	-	0.003	0.003	0.85
Age	-	0.000	0.000	0.62
Assets	+	-0.002	0.002	-1.15
MTG	+	-0.010	0.010	-1.04
Leverage	+	0.000	0.026	-0.02
Loss	+	0.020	0.015	1.28
AuditorSpecialist	-	0.013	0.011	1.19
ROA	-	0.306	0.154	1.99*
Stability	+	0.000	0.000	2.14**
GDPperCapita	?	0.005	0.021	0.21
ControlofCorrupt	?	-0.021	0.024	-0.88
GovernmentEffec	?	0.024	0.021	1.12
PoliticalStabi	?	-0.014	0.014	-1.01
RegulatoryQuality	?	0.012	0.019	0.61
RuleofLaw	?	-0.006	0.027	-0.21
Intercept	?	0.047	0.214	0.22
n			124	
Adj. R <sup>2</sup> (from OLS regression)			0.22	

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ , 0.05, and 0.01 levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for the description of the variable.

### Appendix 30: Results of robustness test at the corporate-level by excluding Japan firms

(Dependent variable is AbsoluteAbnAccr)

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.007	0.007	-1.11
Assistance	?	-0.045	0.036	-1.25
OutsourcingBigDataAnalytics	?	0.095	0.057	1.65
IAF Quality*Assistance	?	0.010	0.008	1.25
IAF Quality*OutsourcingBigDataAnalytics	?	-0.021	0.013	-1.56
IAFsThirdParty	-	0.008	0.010	0.88
ACEffectiveness	-	-0.007	0.016	-0.43
CFO	-	-0.000	0.000	-2.57**
SalesGrowth	+	0.070	0.033	2.11**
Complexity	+	-0.003	0.002	-1.55
MB	-	0.002	0.003	0.54
Age	-	0.001	0.000	1.68*
Assets	+	-0.001	0.001	-0.77
MTG	+	-0.013	0.009	-1.44
Leverage	+	0.018	0.030	0.58
Loss	+	0.001	0.013	0.05
AuditorSpecialist	-	0.025	0.011	2.35**
ROA	-	0.218	0.155	1.41
Stability	+	0.000	0.000	2.80**
GDPperCapita	?	0.006	0.017	0.35
ControlofCorrupt	?	-0.015	0.015	-1.04
GovernmentEffec	?	0.024	0.020	1.19
PoliticalStabi	?	-0.011	0.011	-1.01
RegulatoryQuality	?	0.012	0.026	0.48
RuleofLaw	?	-0.016	0.028	-0.56
Intercept	?	-0.016	0.179	-0.09
n		126		
Adj. R <sup>2</sup> (from OLS regression)		0.21		

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ , 0.05, and 0.01 levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for the description of the variable.

### Appendix 31: Results of robustness test at the corporate-level by excluding US firms

(Dependent variable is AbsoluteAbnAccr)

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.010	0.005	-1.95*
Assistance	?	-0.055	0.026	-2.1**
OutsourcingBigDataAnalytics	?	0.150	0.042	3.59***
IAF Quality*Assistance	?	0.012	0.007	1.71*
IAF Quality*OutsourcingBigDataAnalytics	?	-0.037	0.010	-3.84***
IAFsThirdParty	-	0.013	0.009	1.34
ACEffectiveness	-	-0.010	0.013	-0.77
CFO	-	0.000	0.000	3.15***
SalesGrowth	+	0.082	0.028	2.98***
Complexity	+	-0.004	0.002	-2.06*
MB	-	0.003	0.004	0.71
Age	-	0.000	0.000	0.38
Assets	+	-0.001	0.001	-0.57
MTG	+	-0.011	0.008	-1.33
Leverage	+	-0.010	0.029	-0.33
Loss	+	0.008	0.012	0.62
AuditorSpecialist	-	0.011	0.010	1.14
ROA	-	0.091	0.155	0.59
Stability	+	0.000	0.000	3.19***
GDPperCapita	?	-0.001	0.015	-0.05
ControlofCorrupt	?	-0.011	0.013	-0.88
GovernmentEffec	?	0.025	0.018	1.39
PoliticalStabi	?	-0.010	0.010	-1.06
RegulatoryQuality	?	0.003	0.018	0.18
RuleofLaw	?	-0.011	0.024	-0.48
Intercept	?	0.102	0.159	0.64
n		125		
Adj. R <sup>2</sup> (from OLS regression)		0.21		

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ , 0.05, and 0.01 levels, respectively. Industry effect is repressed for presentational ease. I have removed 25 US firms randomly from this regression. See Table 4 for the description of the variable.

**Appendix 32: Results of robustness test at the corporate-level by using an alternative proxy to measure IAF quality by Ege (2015) (Dependent variable is AbsoluteAbnAccr)**

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.013	0.006	-2.14**
Assistance	?	-0.069	0.030	-2.32**
OutsourcingBigDataAnalytics	?	0.092	0.054	1.71*
IAF Quality*Assistance	?	0.017	0.008	2.18**
IAF Quality*OutsourcingBigDataAnalytics	?	-0.021	0.014	-1.53
IAFsThirdParty	-	0.011	0.008	1.26
ACEffectiveness	-	-0.007	0.012	-0.65
CFO	-	-0.000	0.000	-2.30**
SalesGrowth	+	0.075	0.034	2.22**
Complexity	+	-0.003	0.002	-1.53
MB	-	0.003	0.003	0.92
Age	-	0.000	0.000	1.15
Assets	+	-0.001	0.001	-0.86
MTG	+	-0.009	0.008	-1.1
Leverage	+	0.017	0.028	0.6
Loss	+	0.009	0.014	0.64
AuditorSpecialist	-	0.016	0.009	1.78*
ROA	-	0.211	0.144	1.47
Stability	+	0.000	0.000	2.88***
GDPperCapita	?	0.005	0.017	0.28
ControlofCorrupt	?	-0.017	0.014	-1.26
GovernmentEffec	?	0.027	0.019	1.39
PoliticalStabi	?	-0.009	0.009	-1.01
RegulatoryQuality	?	0.014	0.019	0.74
RuleofLaw	?	-0.018	0.024	-0.74
Intercept	?	0.029	0.168	0.17
n		150		
Adj. R <sup>2</sup> (from OLS regression)		0.22		

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ , 0.05, and 0.01 levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for the description of the variable.

**Appendix 33: Results of robustness test at the corporate-level by using an alternative proxy (The modified Jones model (1995)) to measure earnings management (Dependent variable is AbsoluteAbnAccr)**

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.008	0.005	-1.66*
Assistance	?	-0.047	0.026	-1.81*
OutsourcingBigDataAnalytics	?	0.079	0.045	1.75*
IAF Quality*Assistance	?	0.007	0.006	1.19
IAF Quality*OutsourcingBigDataAnalytics	?	-0.018	0.010	-1.72*
IAFsThirdParty	-	0.005	0.009	0.60
ACEffectiveness	-	0.009	0.013	0.68
CFO	-	0.000	0.000	2.02**
SalesGrowth	+	0.072	0.030	2.44
Complexity	+	-0.002	0.002	-1.21
MB	-	0.001	0.002	0.27
Age	-	-0.001	0.000	-1.38
Assets	+	-0.001	0.002	-0.37
MTG	+	-0.007	0.011	-0.64
Leverage	+	0.009	0.028	0.32
Loss	+	0.012	0.012	1.01
AuditorSpecialist	-	-0.011	0.016	-0.69
ROA	-	-0.173	0.122	-1.42
Stability	+	0.000	0.000	2.24
GDPperCapita	?	-0.014	0.017	-0.81
ControlofCorrupt	?	-0.034	0.015	-2.21**
GovernmentEffec	?	0.011	0.018	0.61
PoliticalStabi	?	-0.004	0.010	-0.42
RegulatoryQuality	?	-0.003	0.027	-0.12
RuleofLaw	?	0.035	0.029	1.22
Intercept	?	0.253	0.191	1.32
n	150			
Adj. R <sup>2</sup> (from OLS regression)	0.21			

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10, 0.05,$  and  $0.01$  levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for the description of the variable.



**Appendix 34: Results of robustness test at the corporate-level by using an alternative proxy (the Jones (1991) model) to measure earnings management** (Dependent variable is AbsoluteAbnAccr)

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.005	0.004	-1.25
Assistance	?	-0.025	0.025	-0.99
OutsourcingBigDataAnalytics	?	0.067	0.032	2.11*
IAF Quality*Assistance	?	0.004	0.006	0.7
IAF Quality*OutsourcingBigDataAnalytics	?	-0.018	0.007	-2.44**
IAFsThirdParty	-	0.009	0.007	1.26
ACEffectiveness	-	0.007	0.012	0.58
CFO	-	-0.000	0.000	-2.06**
SalesGrowth	+	0.042	0.022	1.91*
Complexity	+	-0.002	0.002	-1.46
MB	-	0.000	0.002	-0.15
Age	-	0.000	0.000	-0.88
Assets	+	-0.002	0.001	-1.41
MTG	+	-0.003	0.008	-0.33
Leverage	+	-0.012	0.026	-0.48
Loss	+	0.007	0.013	0.56
AuditorSpecialist	-	0.012	0.009	1.27
ROA	-	0.080	0.119	0.67
Stability	+	0.000	0.000	2.30**
GDPperCapita	?	-0.011	0.014	-0.77
ControlofCorrupt	?	-0.013	0.013	-1.07
GovernmentEffec	?	0.023	0.016	1.43
PoliticalStabi	?	-0.007	0.010	-0.66
RegulatoryQuality	?	-0.025	0.018	-1.35
RuleofLaw	?	0.018	0.022	0.81
Intercept	?	0.212	0.146	1.45
n	150			
Adj. R <sup>2</sup> (from OLS regression)	0.17			

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ ,  $0.05$ , and  $0.01$  levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for the description of the variable.

**Appendix 35: Results of robustness test at the corporate-level by combining Ege (2015) to measure IAF Quality and the modified Jones model (1995) to measure earnings management (Dependent variable is AbsoluteAbnAccr)**

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.008	0.006	-1.42
Assistance	?	-0.037	0.026	-1.42
OutsourcingBigDataAnalytics	?	0.096	0.055	1.75*
IAF Quality*Assistance	?	0.005	0.006	0.78
IAF Quality*OutsourcingBigDataAnalytics	?	-0.023	0.013	-1.75*
IAFsThirdParty	-	0.007	0.009	0.80
ACEffectiveness	-	0.011	0.013	0.84
CFO	-	-0.000	0.000	-2.18**
SalesGrowth	+	0.075	0.030	2.48**
Complexity	+	-0.002	0.002	-1.03
MB	-	0.001	0.002	0.29
Age	-	0.000	0.000	-1.07
Assets	+	0.000	0.002	-0.19
MTG	+	0.000	0.011	-0.01
Leverage	+	0.016	0.028	0.58
Loss	+	0.013	0.012	1.09
AuditorSpecialist	-	-0.011	0.016	-0.69
ROA	-	-0.169	0.118	-1.44
Stability	+	0.000	0.000	1.47
GDPperCapita	?	-0.018	0.018	-1.01
ControlofCorrupt	?	-0.036	0.016	-2.28**
GovernmentEffec	?	0.010	0.020	0.51
PoliticalStabi	?	-0.001	0.010	-0.13
RegulatoryQuality	?	-0.003	0.028	-0.11
RuleofLaw	?	0.037	0.029	1.29
Intercept	?	0.275	0.196	1.4
n	150			
Adj. R <sup>2</sup> (from OLS regression)	0.21			

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ , 0.05, and 0.01 levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for the description of the variable.

**Appendix 36: Results of robustness test at the corporate-level by combining Ege (2015) to measure IAF Quality and the Jones (1991) model to measure earnings management (Dependent variable is AbsoluteAbnAccr)**

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.006	0.005	-1.18
Assistance	?	-0.027	0.026	-1.05
OutsourcingBigDataAnalytics	?	0.061	0.037	1.66*
IAF Quality*Assistance	?	0.005	0.006	0.83
IAF Quality*OutsourcingBigDataAnalytics	?	-0.017	0.009	-1.91*
IAFsThirdParty	-	0.009	0.007	1.19
ACEffectiveness	-	0.008	0.012	0.63
CFO	-	0.000	0.000	1.74*
SalesGrowth	+	0.039	0.022	1.77*
Complexity	+	-0.002	0.002	-1.35
MB	-	0.000	0.002	0.11
Age	-	0.000	0.000	-0.66
Assets	+	-0.002	0.001	-1.32
MTG	+	0.002	0.009	0.19
Leverage	+	-0.007	0.027	-0.28
Loss	+	0.006	0.013	0.49
AuditorSpecialist	-	0.011	0.009	1.23
ROA	-	0.069	0.115	0.6
Stability	+	0.000	0.000	1.99**
GDPperCapita	?	-0.014	0.014	-0.98
ControlofCorrupt	?	-0.013	0.013	-0.99
GovernmentEffec	?	0.021	0.017	1.21
PoliticalStabi	?	-0.002	0.010	-0.25
RegulatoryQuality	?	-0.026	0.018	-1.46
RuleofLaw	?	0.020	0.023	0.87
Intercept	?	0.239	0.150	1.59
n	150			
Adj. R <sup>2</sup> (from OLS regression)	0.15			

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ , 0.05, and 0.01 levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for the description of the variable.

**Appendix 37: Results of robustness test at the corporate-level by using alternative variables for the control variable GDPperCapita (GDP per capita) (Dependent variable is AbsoluteAbnAccr)**

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.010	0.005	-2.02**
Assistance	?	-0.059	0.027	-2.19**
OutsourcingBigDataAnalytics	?	0.090	0.044	2.04**
IAF Quality*Assistance	?	0.013	0.007	1.93*
IAF Quality*OutsourcingBigDataAnalytics	?	-0.020	0.011	-1.79*
IAFsThirdParty	-	0.009	0.008	1.14
ACEffectiveness	-	-0.010	0.012	-0.86
CFO	-	-0.000	0.000	-2.80***
SalesGrowth	+	0.072	0.033	2.16**
Complexity	+	-0.003	0.002	-1.74*
MB	-	0.002	0.003	0.72
Age	-	0.000	0.000	0.74
Assets	+	-0.001	0.001	-1.01
MTG	+	-0.012	0.008	-1.45
Leverage	+	0.009	0.028	0.32
Loss	+	0.008	0.014	0.57
AuditorSpecialist	-	0.017	0.009	1.78*
ROA	-	0.205	0.141	1.45
Stability	+	0.000	0.000	1.76*
GDPperCapita- Stnd	?	0.019	0.017	1.08
ControlofCorrupt	?	-0.023	0.013	-1.73*
GovernmentEffec	?	0.023	0.019	1.24
PoliticalStabi	?	-0.010	0.009	-1.10
RegulatoryQuality	?	0.022	0.024	0.94
RuleofLaw	?	-0.020	0.025	-0.81
Intercept	?	0.071	0.042	1.70*
n	150			
Adj. R <sup>2</sup> (from OLS regression)	0.22			

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ , 0.05, and 0.01 levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for the description of the variable.

**Appendix 38: Results of robustness test at the corporate-level by using alternative variables for the control variable GDPperCapita (GDP per capita) (Dependent variable is AbsoluteAbnAccr)**

Variable	Expected Sign	Coef.	Robust Std. Err.	t-Statistic
IAF Quality	-	-0.009	0.005	-1.968
Assistance	?	-0.060	0.027	-2.19**
OutsourcingBigDataAnalytics	?	0.093	0.045	2.07**
IAF Quality*Assistance	?	0.013	0.007	1.92*
IAF Quality*OutsourcingBigDataAnalytics	?	-0.020	0.011	-1.81*
IAFsThirdParty	-	0.009	0.008	1.12
ACEffectiveness	-	-0.009	0.012	-0.79
CFO	-	0.000	0.000	-2.89***
SalesGrowth	+	0.074	0.033	2.21**
Complexity	+	-0.003	0.002	-1.64
MB	-	0.002	0.003	0.61
Age	-	0.000	0.000	0.61
Assets	+	-0.001	0.001	-1.04
MTG	+	-0.012	0.008	-1.48
Leverage	+	0.009	0.028	0.34
Loss	+	0.009	0.014	0.68
AuditorSpecialist	-	0.017	0.009	1.78*
ROA	-	0.214	0.144	1.49
Stability	+	0.000	0.000	2.53***
DevelopedEconomies	?	0.012	0.018	0.67
ControlofCorrupt	?	-0.021	0.014	-1.46
GovernmentEffec	?	0.024	0.018	1.35
PoliticalStabi	?	-0.010	0.009	-1.13
RegulatoryQuality	?	0.013	0.022	0.58
RuleofLaw	?	-0.012	0.025	-0.48
Intercept	?	0.074	0.042	1.78*
n	150			
Adj. R <sup>2</sup> (from OLS regression)	0.22			

\*, \*\*, \*\*\* indicate statistical significance at the p-value  $\leq 0.10$ , 0.05, and 0.01 levels, respectively. Industry effect is repressed for presentational ease. See Table 4 for the description of the variable.