Audit Quality Research Report

A report prepared by the 2013-14 Summer Interns in the Research School of Accounting and Business Information Systems

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1.0 Introduction

This paper explores the topic of audit quality, the definition of which remains contentious in academia. In addition to variations in definitions, there are also various proxies applied by researchers to measure the quality of audit. There is no consensus as to which proxies for audit quality are best suited for any particular research objectives.

In exploring these issues, we first identified key research papers in audit quality and then expanded our findings by tracing references. We then selected 50 research journals in total from sources such as ProQuest, Google Scholar, Wiley Online Library, Taylor and Francis Online Journals, Social Science Research Network, ScienceDirect and Jstor. We also search on Google for relevant articles or papers issued by regulatory bodies including Financial Reporting Council in Australia, Australian Securities and Investments Commission (ASIC), Institutional Auditing and Assurance Standards Board (IAASB), Government Accountability Office in the U.S., Financial Market Authority and Parliamentary Counsel Office in New Zealand.

The remainder of the paper is organised as follows. In the next section we classify the definitions from literatures into groups – direct and indirect, and discuss their implications respectively. In Section Three, we intensively review over 20 audit quality proxies and categorize them according to the relationship between proxy measures and the nature of audit quality. A brief conclusion will be present in the last section, summarising our findings and discussions.

2.0 Audit Quality Definition from Literatures

Audit quality is no longer a new concept under the scope of auditing. However, up till now, there still does not exist a universal definition that people can agree upon unanimously. By reviewing contemporary audit quality research journals and documents issued by regulatory bodies, we classify various defining terms of audit quality into two broad categories - direct definition and indirect definition. Definitions fall into the ‘direct’ category if the authors define audit quality without relying on any proxies such as auditor’s quality, reputation and

etc.; all the rest of the definitions are treated as 'indirect', especially when proxies are used and the theory is built on some research results and findings, or the definition implicitly implied from the contents. We further divide direct definition and indirect definition into 4 categories respectively.

2.1 Direct Definition

The most widely used definition of audit quality is by DeAngelo (1981, p.186), stating that "the quality of audit services is defined to be the market-assessed joint probability that a given auditor will both (a) discover a breach in the client's accounting system, and (b) report the breach", as quite a number of other papers have cited that, or have similar implied definition which would be discussed in the next section. Many researchers then used this double approach to further define audit quality with details in competence and independence, while others adopt it as a foundation to identify other audit quality attributes. For example, Seyyed (2012) provides further explanation that audit quality could be a function of the auditor's ability to detect material misstatements and reporting the errors. Together with other similar definitions, they all emphasize on two of the most important aspects of audit quality, namely auditor ability or auditor effort, and auditor independence. Therefore, this stream of definitions is mainly about the auditors' quality.

Another stream of defining audit quality focuses on the accuracy of the information reported by the auditors. Titman and Trueman (1986, cited in Behn and Choi 2008) suggest that high audit quality would improve the reliability of financial statement information and allows investors to make more precise estimate of the firm's value. Schauer (2002, p.78) also advises that "a higher quality audit increases the probability that the financial statements more accurately reflect the financial position and results of operations of the entity being audited". In other words, audit quality is part of the quality of accounting information disclosed (Clinch 2010).

Besides, another set of definitions concentrates on the degree to which the audit conforms to applicable auditing standards. Government Accountability Office (2003, cited in Bedard et al. 2010) defines a high-quality audit as an audit "in accordance with generally accepted auditing standards to provide reasonable assurance that the audited financial statements and related disclosures are presented in accordance with generally accepted accounting principles and are not materially misstated whether due to errors or fraud". Defond et al. (2010) also raises that

view in his research paper. Furthermore, it is suggested by de las Heras (2012) that audit quality is the probability of detecting audit failure, disciplining auditors and incentivising them to constrain managerial opportunism, which is closely related to auditing standards.

Finally, it is found that most literatures we read have been contented to approximate or even equate audit quality with the quality of auditors. However, there are some exceptions. Manita and Elommal (2010) claim that audit quality should be in terms of audit process quality and the studies on audit process should put emphasis on examining different stages of the audit process. However, they also suggest that the indicators of audit process may not be as obvious as those of auditors.

Table 1 lists all the direct definitions of audit quality we have found.

2.2 Indirect Definition / Implied Definition

2.2.1 Independence and Competence Related Definition

The majority of indirect definition is associated with the independence and competence of auditing, following the basis developed by DeAngelo. As Francis (2009, p. 1523) states, "Higher quality audits are inferred by the auditor’s likelihood of issuing a going-concern audit report and accuracy of the report in predicting client bankruptcy, and the degree to which clients evidence earnings management behaviour". Besides, it is suggested by Mansouri (2009) that audit quality is positively related to audit independence. But he also points out if there is lack of competence, the auditors must rely on management of the client's, and there is no way of independence in existence. Hence audit quality, auditor independence and auditor competence are positively related. Likewise, this opinion is consistent with what is in Jamal (2011), which states that audit quality is always equated with independence. Further, from the perspective of reporting direction and information risk, Chen et al. (2011) have cited from Becker et al. (1998) that “auditing is a form of monitoring that constrains managerial reporting discretion and therefore reduces information risk.” Hence, the quality of auditing is the quality of reporting direction and information risk reduction.

Table 1: Direct definitions of audit quality

Definition	Source
The quality of audit services is defined to be the market-assessed joint probability that a given auditor will both (a) discover a breach in the client's accounting system, and (b) report the breach.	DeAngelo (1981)
Cited by	Kanagaretnam et al. (2011), Hakim and Omri (2010), Watkins et al. (2004), Seyyed et al. (2012), Chi et al. (2009), Becker et al. (1998), Yasina and Nelson (2012), Manita and Elommal (2010), Gold et al. (2012), Breesch and Branson (2009), Memis and Cetenak (2012), Patrick and Henning (2013) and Chen et al. (2013)
Audit quality is a component of the quality of accounting information disclosed and higher disclosure quality leads to lower information asymmetry between traders.	Clinch et al. (2010)
A high-quality audit as an audit that improves the reliability of financial statement information and allows investors to make more precise estimate of the firm's value. A higher quality audit increases the probability that the financial statements more accurately reflect the financial position and results of operations of the entity being audited.	Titman & Trueman (1986); Schauer (2002)
The degree of assurance that the accounting standards are applied in a manner that faithfully represents the client's underlying economic activities.	DeFond & Zhang (2013)
Audit quailty is the probability of detecting audit failure, disciplining auditors and inventivising them to constrain managerial opportunism.	de las Heras et al. (2012)
Audit quality is a function of the auditor’s ability to detect material misstatements (technical capabilities) and reporting the errors (auditor independence)”	Chadegani (2011)
Cited by	Gold et al. (2012) and Memis and Cetenak (2012)
The majority of studies on audit quality were contented to extrapolate the "audit quality" by the "auditor quality". However audit quality should be in terms of audit process quality instead of auditor quality.	Manita and Elommal (2010)
A high-quality audit is one performed “in accordance with generally accepted auditing standards (GAAS) to provide reasonable assurance that the audited financial statements and related disclosures are (1) presented in accordance with generally accepted accounting principles (GAAP) and (2) are not materially misstated whether due to errors or fraud.”	Government Accountability Office (2003)

Another stream of definitions solely focuses on the competence of auditors. Specifically, it is stated that the value of auditing stems from the auditor detecting and correcting material misstatements in the financial information presented and audit quality can be conceptualised as a continuum ranging from very low to very high audit quality; and low audit quality is taken to mean audit failure which would cause negative sanctions based on Sundgren (2011). Balsam (2003, p. 73) defines audit quality as ″The quality of the firm's auditor is one factor that restricts the extent to which managers can manage earnings.″ Besides, according to Liu et al. (2011, p. 621), in the accounting profession, audits play an important role in serving the public interest by increasing the accountability of managers and reinforcing trust and confidence in financial reporting. Therefore, audit quality is the assessment of whether audits have served the public interest through increasing the accountability of managers and reinforcing trust and confidence in financial reporting.

In addition, some other researchers also offer opinions associated with audit independence. For instance, POB (2000, p.109) once argues that independence is fundamental to the reliability of auditor's reports cited in Geiger and Tan (2002). And truly independent auditors are able to provide the public with higher-quality audits due to the lack of ″ties″ with the audited client. This lack of association with the client enables auditors to exercise unfettered professional judgement when planning and conducting the audit, and reporting the results of their findings in their audit report. In terms of impairment of independence, Antle & Nalebuff (1991) points out that, audited financial statements, and hence audit quality, are the joint effort of the auditor; and Gibbins et al. (2001) considers that the client that arise from a process of negotiation between the two, which are cited by Asthana and Boone (2012).

2.2.2 Firm Size and Reputation Related Audit Quality

This type of definitions uses auditor’s characteristics to explain what audit quality is since both size and reputation can reflect auditor’s competence and independence to some degree.

It is commonly suggested that audit quality is positively related to firm size and specialization. DeAngelo (1981) once states that “larger auditors, as captured by membership among the Big N, tend to provide higher quality audits. In later theoretical and empirical researches, it is confirmed that firm size is closely associated with audit quality. Further, Li et al. (2009) suggest that "large and/or specialized auditors are seen as being likely to have

greater insurance coverage in the event of financial statement fraud and/or other forms of proven audit failure”.

Firm reputation/brand is another key firm characteristics that improves audit value. Audit is usually regarded as high quality when conducted by those Big N firms, because of higher level of available resources and greater degree of personnel training and expertise. On the other hand, higher reputation costs will provide the incentives to convey higher audit quality firms (Dopuch and Simunic 1980, DeAngelo 1981, Klein and Leffler 1981). According to Hennes et al. (2011 ctied in Skinner and Srinivasan 2012), "Firms with a reputation for credible financial reporting are likely to change auditors when their audit quality is questioned to avoid the capital market consequences of potentially unreliable financial reporting". In such sense, a firm with good reputation is more likely motivated to maintain skilled auditors to further maintain reputation. Ultimately “auditors develop a brand name reputation for providing higher quality assurance, with a resulting increase in the quality of audited financial statements" (Li et al. 2009).

2.2.3 Earnings Quality Related Definition

Audit quality can also be inferred from earnings quality, as high quality of audit alleviates the degree of earnings management and enhances the informativeness of financial reports. According to Balsam et al.(2003), audit quality has a positive relationship with the quality of financial reporting, which can be proxied by earnings quality. If the quality of earnings is high, the informativeness and usefulness of earnings would be correspondingly high, hence the accuracy of the information. Therefore, recent stream of literature argues that audit quality is the quality of the audited earnings (Francis et al. 2011). As a result, many research papers have used earnings quality as a substitute definition for audit quality (Chen et al. 2008; Asthana & Boone 2012; Koh et al. 2013), and this kind of definition conforms to the statement made by Titman and Trueman (1986).

2.2.4 Regulations and Inspection Programs Related Definition

According to Financial Reporting Council, audit quality is correlated to auditing legal frameworks such as the company auditor registration system, the auditor independence regime in the Corporations Act 2001 and the accounting and auditing standards. Although those frameworks have not exactly defined what audit quality is, they convey a clear idea to

people that high audit quality implies that the relevant standards are met where certain standards should be applicable to both auditors and clients. This set of indirect definitions confirms to GAO (2003).

Institutional Auditing and Assurance Standards Board (IAASB) suggests that "auditing is a discipline that relies on competent individuals using their experience and applying integrity, objectivity, and scepticism to enable them to make appropriate judgments that are supported by the facts and circumstances of the engagement", which implies that high audit quality should be of satisfied independence and competence of auditors in order to ensure the reports are qualified. IAASB also indicates that a high level of audit quality is best supported and sustained if preparers, audit committees, auditors, standard-setters, professional bodies, and regulators collectively work together towards achieving this common goal. Meanwhile auditing standards are quite significant as following the requirement indicates satisfied audit quality:

Corporation Act 2001 s307 sets requirement for both auditors and clients regarding the responsibility of both parties. For example, auditors should give a true and fair view of the financial position and performance of the entity while clients must keep financial records sufficient to enable a financial report to be prepared and audited. Section 307A also requires an auditor to follow the auditing standards issued by the Auditing and Assurance Standards Board. Then it is the inspection program that raises the standard of audit quality.

Taking PCAOB as an example, the inspections mainly involve: (1) evaluating the quality of the audit work performed on a specific audit engagement; and (2) reviewing the auditor's quality control system (Gunny and Zhang 2012). Upon the release of inspection reports, report users would have an idea with respect to the performance of audit work and hence audit quality.

To sum up, DeAngelo's (1981) explanation of audit quality in terms of competence and independence has penetrated in a wide range of audit research literature and its impact is long-lasting. However, variations in stakeholder perspectives make it difficult to reach an agreement on a single and universal definition of audit quality, which indicates that no single element should be assumed as having the dominant influence on audit quality (IAASB). As can be seen from prior research and literature, people define audit quality by multiple criteria such as competence and independence, the reliability of audited output of financial reports,

compliance with regulatory standards or occasionally the quality of audit process, forming 3 major and 1 special streams. Furthermore, examining the indirect definitions closely, we note that they all have their theoretical underpinnings extracted from those direct definitions.

3.0 Audit Quality Proxies from Literatures

3.1 General Review of Proxy Types

Measuring audit quality has also been a controversial issue in academics for quite a long time. As the definition of audit quality is not uniform, people view audit quality differently and sometimes they only focus on one or a bit more of the quite many attributes. Hence, a variety of audit quality proxies mushroomed during the last 20 to 30 years to help people assess the level of quality. Meanwhile, we have found that looking at single indicator alone would not provide a full image of audit quality. Therefore, people tend to allocate different proxies into various categories in distinct ways. The purpose is to "address the problem resulting from looking at a complex construct from a limited perspective" (Bedard et al. 2010, p.14), which could further contribute to our understanding of the connection as well as the difference among a large collection of indicators.

IAASB (2011) introduce a commonly used classification: audit quality can be viewed as a triangular system with inputs, outputs and context factors at the three angles. The main idea is that audit quality can be affected by the resources an audit team put in such as auditor skill and experience, ethical values and adopted audit process; audit quality can also be reflected by the production of audit process, which is the auditor's report; further, a strict legal environment and sound corporate governance may have positive relationship with audit quality,

Bedard et al. (2010) develop another set of proxy types with input indicators and output indicators. However, their classification is not limited to this stage and the accuracy of audit opinion, and firm-level indicators like audit firm size and peer review results.

A final classification method from the literatures we have read is to divide proxies into direct measure groups and indirect measure groups (Chadegani 2011, cited in Memis and Cetenak 2012). Direct Measures mean that people could have an idea of the level of quality at the glance of the proxies, including financial reporting compliance with GAAP, quality control

review, bankruptcy desk review and SEC performance. Indirect Measures contains proxies which could not inform people of the level until they figure out the underlying logics between those proxies and the nature of audit quality, such as audit company size, auditor tenure, industry expertise, audit fees, economic dependence, reputation and cost of capital.

We have identified around 20 proxies, most of which would fill in the category of indirect measures. The indicators can also be classified into input and output variables as well as engagement level and firm level ones. However, we define proxy types by ourselves according to the relationship between those proxies and the nature of audit quality. We set five main categories: earnings quality proxies (related to reliability of information), Auditor Characteristics (related to competence), Independence related proxies, market perceptions related proxies, and other proxies. Details will be discussed in the next section regarding underlying logics to audit quality as well as typical measurement models.

Table 2 reports the proxies of audit quality we have identified.

3,2 Earnings Quality

3.2.1 Meet or beat earnings targets

As discussed, audit quality sometimes equates to earnings quality. The main idea is to assure the reliability of information through maintaining high earnings quality. Koh et al. (2013) find previous evidence that there is a reward system for managers depending on whether the earnings meet targets or not. Hence, an obvious intention for earnings management exists. Francis and Yu (2009) claim that firms are managing earnings to meet or beat earnings target as there are an abnormally high proportion of firms that just ‘‘meet or beat’’ benchmarks and an abnormally low proportion of firms just below benchmark targets. This kind of behaviours is also evidenced by the intention of the firm not to report the loss. On the other hand, earnings quality would be assumed high if there is no earnings management. In this way, auditors would be more likely to detect probable problems and thus the audited financial statement would be more reliable. Take to a further step, if the client does not systematically conduct earnings management, the earnings of that client would be less likely to meet the targets (Francis and Yu 2009). Therefore, logically meeting or beating earnings target would be a proper way to measure earnings quality as well as audit quality.

Table 2: Types of Audit Quality Proxies

Proxy Type	Variables	Source
Earning Quality	Discretionary acrruals	Balsam et al. (2003) Carey and Simnett (2006) Hoitash et al. (2007) Chen et al. (2008) Jackson et al. (2008) Chi et al. (2009) Francis and Yu (2009) Choi et al. (2010) Francis et al. (2011) Lawrence et al. (2011) Asthana and Boone (2012) de las Heras et al. (2012) Gold et al. (2012) Gunny and Zhang (2012) Minutti-Meza (2013) Koh et al. (2013) Patrick and Penning (2013) Svanstrom (2013) Lee et al. (2013)
	Meet or beat earnings target	Francis (2004) Carey and Simnett (2006) Francis and Yu (2009) Asthana and Boone (2012) Koh et al. (2013) Minutti-Meza (2013)
	Earnings response coefficient	Balsam et al. (2003) Chi et al. (2009) Burnett et al. (2013) Lee et al. (2013) Koh et al. (2013)
	Likelihood of retatement	Gunny and Zhang (2012)
	Likelihood of reporting a profit	Francis et al. (2011)
	Timely loss recognition	Francis et al. (2011)
	Standard deviation of residuals (current accruals to cash flows)	Hoitash et al. (2007)
Auditor Characteristics	Auditor size	DeAngelo (1981) Francis (2004) Behn et al. (2008) Clinch et al.(2010) Kanagaretnam et al.(2011) Chen et al. (2011) Memis and Cetenak (2012)
	Auditor type	Becker et al. (1998) Clarkson (2000) Watkins et al. (2004) Hakim and Omri (2010) Clinch et al. (2010) Kanagaretnam et al. (2011) Chu et al. (2013)

Table 2 continued

Proxy Type	Variables	Source
	Auditor skills and expertise	Carcello and Nagy (2004) Francis (2004) Watkins et al. (2004) Behn et al. (2008) Breesch and Branson (2009) Mansouri et al. (2009) Li et al. (2009) Clinch et al. (2010) Hakim and Omri (2010) IAASB (2011) Kanagaretnam et al. (2011) Chen et al. (2013)
	firm characteristics	Skinner and Srinivasan (2012)
Market Perception	Forecast accuracy	Lawrance (2011)
	Cost of capital	Lawrance (2011)
	Bid-ask spread	Schauer (2002)
Independence	Likelihood of issuing going concern report	Geiger and Tan (2002) Carey and Simnett (2006) Jackson et al. (2008) Francis and Yu (2009) DeFond and Lennox (2011) Gunny and Zhang (2012) Minutti-Meza (2013) Burmett et al. (2013)
	Audit fee	DeAngelo (1981) Watkins et al. (2004) Li et al. (2009) Kanagaretnam et al. (2011) Yasina and Nelson (2012)
	Audit opinion	Breesch and Branson (2009) Liu et al. (2011)
	Audit firm tenure	Hakim and Omri (2010)
Other	Audit process	Manita and Elommal (2010) IAASB (2011)
	People's perception	Jamal and Sunder (2011) Svanström (2013)
	Avoidance of reviews and inspections	DeFond and Lennox (2011)
	Disciplinary sanctions	Sundgren and Svanstrom (2011)

Besides, earnings management is also closely related to adjustment to discretionary accruals. In other words, managers would change the level of accruals to adjust profits in order to meet or beat earnings targets, as one of the most commonly used strategies. Hence, meeting or beating earnings targets would be in line with discretionary accruals proxy.

Across various studies, certain proportion of researchers usually test earnings management behaviours to meet two types of targets, which are reporting small positive profits to avoid losses and reporting small positive earnings increase to avoid earnings declines. In the study of Francis and Yu (2009), they investigate the relationship between audit quality and Big 4 firm office sizes. A PROBIT model is used that audit quality is proxied by whether the benchmark earnings target has been meet: PROBIT (BENCHMARK=1). BENCHMARK is used to represent earnings target. That variable is coded as 1 if a firm reports small positive profit or small earnings increase, and 0 otherwise. It is a dependent variable and the coefficient of size would explain how office size would affect earnings quality. Carey and Simnett (2006), Koh et al. (2013), Asthana and Boone (2012) and Minutti-Meza (2013) also adopt this approach, although some of them only focus on one of the targets.

However, Kinney and Libby (2002, cited in Koh et al. 2013) point out, "the benchmark measure categorizes all firms that meet or beat the benchmark as firms with poor-quality earnings, regardless of whether the goal was achieved via earnings management, expectations management, reduction in uncertainty, or improvements in operations. Conversely, a firm that is consistently well below the benchmarks will be categorized as one with high-quality earnings, although the firm might have manipulated the earnings by large amounts".

3.2.2 Discretionary Accruals

The proxy, discretionary accruals, is one of the most common proxies for earnings quality as well as audit quality. Basically, the financial statements are the combined product from a negotiation process between managers and auditors (Becker et al. 1998, cited in de las Heras et al. 2012). Therefore, it is argued that the quality of earnings information in the financial report is able to reflect the audit quality. In other words, earnings quality is implicitly

regarded as a measurement indicator for audit quality itself. Once talking about earnings quality, people would think of discretionary accruals immediately.

Discretionary accruals are the proportion of accruals, which cannot reflect fundamental economic performance. From the point of view of earnings management, this type of accruals is the favourite tool for managers. According to prior studies, discretionary accruals should be positively related earnings management, while audit quality is inversely related to earnings management theoretically (Schipper 1989; Jones 1991; Levitt 2000; DeFond and Park 2001, cited in Geiger and Raghunandan 2002). Discretionary accruals have provided managers opportunities to manipulate earnings and at the same time, auditors are allowed that some of the manipulations do not need to be corrects as they confirm to the standards (Asthana and Boone 2012). With high level of discretionary accruals, implying higher chance of earnings management and consequently lower earnings quality, the quality of earnings information usefulness is quite low and thus auditors may not be able to detect earnings management. Then, ceteris paribus, audit quality is assumed low.

Also, many empirical studies provide sound evidence in support of discretionary accruals as an indicator for audit quality. For example, Menon and Williams (2004, cited in Chi et al. 2009) find that companies which employ former audit partners as director's report larger abnormal accruals, indicating low earnings quality; on the other hand, independence impairment leads to lower audit quality. Besides, there are also many other empirical studies adopting discretionary accruals as a proxy for audit quality to figure out the relationship between audit quality and other variables such as audit firm type.

In one particular stream of literatures, researchers just define or approximate audit quality as earnings quality (Chen et al. 2008; Asthana & Boone 2012; Koh et al. 2013). As is discussed by Balsam et al. (2003), there is a positive relationship between earnings quality with audit quality that audit quality can probably be translated into earnings quality under most circumstance. Therefore, discretionary accruals, as a widely used proxy for earnings quality, are viewed as an indicator for audit quality since two terms are the same under this stream.

It is also argued that discretionary accruals can directly reflect the auditors' effort to enforce accounting standards by detecting earnings management (Lawrence 2011). It confirms to audit quality definition of the degree to which the audit conforms to applicable auditing standards. Besides, Svanstrom (2013) suggests that in order for an auditor to detect

deficiencies or material misstatements, the first step is to look at accounting figures, for example, checking discretionary accruals to uncover earnings management.

Among all the research papers using discretionary accruals as the proxy for audit quality, there are 3 main types of models: Jones (1991) Model, Modified Jones Model, and performance adjustment Model based on Jones and Modified Jones according to Kothari et al. (2005). There are also other models such as specific regressions.

Most studies measure the absolute value of discretionary accruals. According to Menon and Williams (2004, cited in Chi et al. 2009), unsigned value of discretionary accruals would "more completely identifies the discretion afforded managers by their auditors and in this context does not require assumptions about auditor bias with regard to the directional effect of an accounting choice". In other words, the absolute value of discretionary accruals would capture both income-increasing and income-decreasing accruals as both of them would contribute to earnings management (Koh et al. 2013). However, still a proportion of studies focus on signed value of discretionary accruals, including Carey and Simnett (2006) and Gold et al. (2012). For example, in Carey and Simnett (2006), they measure the abnormal working capital accruals and they only consider the reduction of earnings quality.

Jones (1991) Model is a two-step method to measure discretionary accruals and two studies in the database adopt this method (Minutti-Meza 2013; Francis and Yu 2009; de las Heras et al. 2012). The first step is to calculate total accruals for the given year:

$$TAt = \Delta CAt - \Delta Casht - \Delta CLt\, \Delta DCLt - Dept$$ (de las Heras et al. 2012)

Then, after that, discretionary accruals are the residuals of the regression:

$$TAi,t = \alpha + \beta 1Ri,t + \beta 2PPEi,t + \varepsilon i,t$$ (Minutt-Meza 2013)

However, Hoitash et al. (2007) claim that Jones model is of considerable imprecision. For example, Francis et al. (2005, cited in Hoitash et al. 2007) suggest that only two factors (PPE and changes in Revenues) are not enough to identify accruals that are abnormal. They also suggest that caution must be exercised by auditors.

Therefore, several versions of modified Jones model emerge. In order to adjust for this limitation, Dechow et al. (1995) modify Jones Model that they include credit sales to reduce

the power of earnings management on revenues. This model is used by Balsam et al. (2003), Svanstrom (2013) and Lee et al. (2013). In addition, Gold et al. (2012) adopt the cash flow Jones model, Kasznik (1999) model, by including a change in the cash flow. The assumption of this model is that the accruals of a current period are dependent on the cash flows of the previous period. A final modified model in our database is Ball and Shivakumar (2006) Model, which is used by Choi et al. (2010). This model controls for the asymmetric timeliness of accruals in recognizing economic gain and loss.

Furthermore, Kothari et al. (2005, cited in Chi et al. 2009) suggest that the models should be performance adjusted, as after adjustment, performance-matched abnormal accruals capture earnings management better than traditional models. Within the database, Hoitash et al. (2007), Jackson et al. (2008) and Asthana and Boone (2012) use performance adjustment.

However, using discretionary accruals have one major limitation. As noted by Guay et al. (1996, cited in Lawrence 2011, p. 261), "it only partially captures the effectiveness of an audit in constraining earnings management, as discretionary accruals not only reflect management's opportunism, but also management's signaling attempts and random noise". Furthermore, Kinney and Libby (2002, cited in Koh et al. 2013) argue that discretionary accruals might only identify firms, which engage in transactions that involve complex judgments and estimates

3.2.3 Likelihood of restatement

As a client-specific measure of audit quality, propensity to restate is the consequence of extreme earnings management and failure of audit if the auditor is unable to detect noncompliance with GAAP standards (Gunny and Zhang 2012). In Gunny and Zhang (2012), logistic model based on Burns and Kedia (2006) is applied and RESTATE is 1 if there exists a restatement or 0 otherwise.

$$RESTATE_t = \gamma_0 + \gamma_1 Deficient_t + \gamma_2 Seriously\ Deficient_t + \gamma_3 LnMV_{t-1} + \gamma_4 BTM_{t-1} + \gamma_5 LEV_{t-1} + \gamma_6 IND_t + \gamma_7 Deficient_t * Annual + \gamma_8 SeriouslyDeficient_t * Annual + \varepsilon_t$$

However, when using this model, it is suggested that annual rather than quarterly restatements should be considered as the annual audits bear greater extent of legal and

regulatory scrutiny (Gunny and Zhang 2012). Moreover, the type of restatement selected also needs to be cautiously examined to avoid including restatements due to changes in GAAP which can distort the sample (Gunny and Zhang 2012).

3.2.4 Likelihood of reporting a profit

The profitability of auditing firms and their surrounding market structure is essential to the quality of audit outcomes and earnings quality. In this sense, the likelihood of loss avoidance is adopted as one of the proxy in measuring audit quality. It is also related to meeting or beating earnings target. Francis et al. (2011) emphasizes the importance of legal jurisdictions because audit markets are country-specific in nature due to country-level controls over the licensing and regulation of auditors. Even though the big 4 accounting firms operate a global network, each country constitutes a separate legal practice and audit market. According to Francis et al. (2011), the dependent variable PROFIT is coded 1 for firms that report a bottom-time positive net income and 0 for loss firms in the accruals model. The dependent variable is the probability of reporting a profit, which stands for audit quality.

$$\begin{aligned} Prob.(PROFIT\ = 1) \\ &= \beta_0\ + \beta_1 B4SHARE + \beta_2 CONCEN\ + \beta_3 LOG\ SALES + \beta_4 CFO + \beta_5 LEV \\ &+ \beta_6 SALES\ GROWTH + \beta_7 PPE\ GROWTH + \beta_8 LAG\ LOSS + \beta_9 MB \\ &+ \beta_{10} FIN\ DEVEL +\ \beta_{11} RULE\ OF\ LAW + Country\ Fixed\ Effect \\ &+ Year\ Fixed\ Effects\ + Industry\ Fixed\ Effects\ + \varepsilon_t \end{aligned}$$

However, a potential limitation is that larger listed firms of the countries appear to be the majority involved in the measure of audit market structure. It does not necessarily fit in the model appropriately since it is not the primary concern of the model.

3.2.5 Timely Loss Recognition

Based on Francis et al. (2011), there are numbers of reports claim that the concentration of supply in audit markets is harmful because the lack of competition reduces the incentives of Big 4 auditors to conduct high-quality audits, and is consequently detrimental to earnings quality. Further, the model of timely loss recognition is built on the basis of Ball and Shivakumar (2005) and Bushman and Piotroski (2006), cited in Francis (2011), and it can be used to come up with better forecasts for firms with negative cash flows relative to those with positive cash flows.

$$TOT\ ACC = \beta_0 + \beta_1 NEG + \beta_2 CFO + \beta_3 NEG * CFO + \beta_4 B4SHARE + \beta_5 NEG * B4SHARE + \beta_6 CFO * SHARE + \beta_7 NEG * CFO * B4SHARE + \beta_8 CONCEN + \beta_9 NEG * CONCEN + \beta_{10} CFO * CONCEN + \beta_{11} RULE\ OF\ LAW + \beta_{11} NEG * CFO * CONCEN + Firm - Level\ Controls + Country\ Fixed\ Effects + Year\ Fixed\ Effects + Industry\ Fixed\ Effects + \varepsilon_t$$

3.2.6 Standard deviation of residuals

In the study of Hoitash et al. (2007), the residual term relating current accruals to cash flows is used as an estimation of abnormal portion of total fees based on the regression model. The normal fees can be measured using estimation model:

$$LTFEE = a + \beta_1 LNTA + \beta_2 SEG + \beta_3 SUBS + \beta_4 FOREIGN + \beta_5 LOSS + \beta_6 \mathrm{LIQ} + \beta_7 \mathrm{ROA} + \beta_8 \mathrm{MERGER} + \beta_9 \mathrm{INVREC} + \beta_{10} \mathrm{FINANCE} + \beta_{11} \mathrm{INSTITOWN} + \beta_{12} \mathrm{BIG5} + \beta_{13} \mathrm{TENURE} + \varepsilon_t$$

where LTFEE is the natural logarithm of total fees.

The regression model is as follows:

$$FLOSAQ = a + \beta_1 Total\ fees + \beta_2 LNTA + \beta_3 Cycle + \beta_4 PropLoss + \beta_5 StdSales + \beta_6 StdCFO + \varepsilon_t$$

It is worth noting that a scaling limitation may exist as similar scaled fees may be used by both small and large clients. Besides, the study of Hoitash et al. (2007) requires public companies in the sample to report auditor fees by themselves, and hence the reported fees to be used in the model are likely to involve subjective judgment and the accuracy can be questioned.

3.2.7 Earnings Response Coefficient

Quality of financial reporting, auditing and market responses are always correlated. Market's perception of earnings quality generally could reflect investor’s view of actual audit quality. In order to measure audit quality, one of the most common strategies is to understand market’s perception of earnings quality. While earnings quality could be measured by using

the proxy: earnings response coefficient (ERC) (Teoh and Wong 1993; Francis and Ke 2006 and Ghosh and Moon 2005, cited in Chi et al. 2009). Therefore, audit quality could also be measured by ERC.

Following Ghosh and Moon (2005), ERC model was gradually developed, and used by a number of recent studies as measurement of audit quality, in order to study relationships between audit quality and other elements which may interact with each other. For instance, Chi et al. (2009) studies audit quality, market perception and audit partner rotation in Taiwan Region, using a typical ERC model

$$CAR=\alpha+\beta_1 E+\beta_2 \Delta E+\beta_3 BMK+\beta_4 E\times BMK+\beta_5 \Delta E\times BMK+\sum_{j=1}^{9}\beta 6+2(j-1)E\times CVj+\sum_{j=1}^{9}\beta 7+2(j-1)\Delta E\times CVj+\sum_{j=1}^{9}\beta(23+j)CVj+\varepsilon$$

CAR represents cumulative value-weighted market-adjusted abnormal returns over eight months, while E stands for income from continuing operation, and BMK stands for dummy variable 0 or 1 corresponding to benchmark samples.

Likewise, other later studies conducted by Burnett et al. (2013), Lee et al. (2013) and Koh et al. (2013) all used similar approach, by using ERC as proxy to measure audit quality. In these studies, CAR were always measured as cumulative value-weighted market-adjusted returns over a certain period ranging from 3 days to 15 months, calculated by adding income, firm systematic risk variable (Kol et al. 2013), abnormal returns (Kol et al. 2013), earnings persistence (Kol et al. 2013, Lee 2013), earnings surprise (Lee 2013, Burnett et al. 2013) variables and other study-specific control variables.

3.3 Auditor Characteristics

3.3.1 Auditor Reputation

Firm reputation is usually viewed as firm-wide characteristic that is consistent across audit engagement. With expertise and skills, audit has of role of assurance to "develop a brand name reputation for providing higher quality assurance, with a resulting increase in the quality of audited financial statements" (Li et al. 2009). According to Watkin et al. (2004), reputation is the perceived attributes of audit quality and influences how credible stakeholders perceive that information to be.

There are several theoretical justifications for an expected positive correlation between auditor reputation, proxied by audit firm size, and audit monitoring strength. The most frequently mentioned is DeAngelo's (1981) argument that incumbent auditors earn client-specific quasi-rents that are subject to loss from discovery of lower than expected monitoring strength and thus serve as collateral against such opportunistic behavior. Larger auditors having more clients would incur higher opportunity losses from the performance of low quality audits. A related but distinct argument is that audit firms may invest in brand name collateral. Specifically, more prestigious firms and larger audit firms have more reputation capital at stake and are therefore less likely to overlook a material misstatement or to risk litigation than less prestigious and smaller audit firms (Palmrose, 1988; Klein and Leffler, 1981, cited in Sundgren and Svanstrom 2011).

It is also suggested that "Firms with a reputation for credible financial reporting are likely to change auditors when their audit quality is questioned to avoid the capital market consequences of potentially unreliable financial reporting" (Hennes et al. 2011, cited in Skinner and Srinivasan 2012). A recent event study following ChuoAoyama's - a Japanese firm audit failure, has been conducted by Skinner and Srinivasan (2012), to examine whether reputation matters for audit quality and equity valuation in Japan. The study generally based on a sample of 2199 client firms, categorizing into 3 groups, (1)"Aarata": firms moved from ChuoAoyama when Aarata commits to deliver high quality audits, coded 2; (2) "Change": firms switched to other auditors when ChuoAoyama's series problems came to light, coded 1; (3) "Misuzu": clients remain with ChuoAoyama after it rebirthed as "Misuzu", coded 0. Though study finds evidence of reputation relating to audit quality was ambiguous, reputation does matter for audit quality as numerous clients moved when quality of audit is questioned. However, evidence on quantitative analysis of financial loss resulting from audit failure was inconsistent.

3.3.2 Auditor size/type

In DeAngelo's well-known paper published in 1981, he connects the link between auditor size and audit quality through the economic theory of quasi-rents. There are two conflicting forces that affect auditor's behaviour. On the one hand, client-specific quasi-rent raises auditor's dependence on the client; on the other hand, the quasi-rent specific to the rest of the clients also discourages the auditor to misbehave (DeAngelo 1981). He argues that the

greater the size of an audit firm, the higher the perceived audit quality (DeAngelo 1981) due to the large amount of collateral.

In DeAngelo (1981)'s paper, the number of clients reflects the auditor size and the size measure is appropriate when the quasi-rent remains identical across clients of a give auditor. In that case, quasi-rents resulting from considerable start-up expenses will be lost if auditors act opportunistically and delivers lower quality of audit than expected (DeAngelo 1981). However, if the quasi-rents vary across clients, the proportion of a specific client's quasi-rent relative to the total quasi-rent matters (DeAngelo 1981).

In addition, some research research also points out that the large Big N firms have greater incentive to protect their well-established brand names and reputations by providing higher audit quality. (Simunic and Stein, 1987; Francis and Wilson, 1988 cited in Francis 2004). Dye (1993 cited in Clinch et al. 2010) is also in favour of this idea because large auditors will place their wealth at risk given litigation. Resource availability also bolsters the relationship between large size audit firms and high audit quality (Dopuch and Simunic 1982 cited in Watkins et al. 2004).

Empirical evidence is generally in line with the size/type theory. For example, Behn et al. (2008) denote 1 for a Big 5 auditor and 0 otherwise to testify the positive relationship between audit quality and size. In this paper, forecast accuracy and dispersion of analysts' forecast are used to approximate the quality of earnings (Behn et al. 2008). Similar dichotomous variable method can also be found in Clarkson (2000), Clinch et al. (2010), Hakim and Omri (2010), Kanagaretnam et al. (2011), Chen et al. (2011), Memis and Cetenak (2012), and Chu et al. (2013).

Nevertheless, alternative arguments can be as simple as claiming that 'good' firms have higher probability to choose auditors from Big N and are generally less likely to manipulate earnings (Francis 2004). Therefore, it is infeasible to deduce high audit quality from satisfied earnings outcome because auditor choice is 'endogenous' (Francis 2004).

Lawrence et al. (2011) try to tackle the issue by investigating whether disparities between audit quality proxies among large and small firms are actually affected by the audited firms' characteristics. By applying proxies including discretionary accruals, ex ante cost-of-equity capital and analyst forecast accuracy and controlling differences in client characteristics, they

find out that Big 4 audit quality is not considerably higher than that of non-Big 4 auditors (Lawrence et al. 2011). Hence, it is suggested that it is the client size rather than the auditor size/type that matters the quality of audits.

To conclude, although the overall empirical evidence tends to agree with the idea that the larger the size (Big N) of an auditor, the higher the audit quality, concerns such as client characteristics may also add noise to the sample data and thereby distort research findings.

3.3.3 Auditor Skills and Expertise

Previous researches provide solid evidence in support of using industry specialisation to proxy audit quality (Francis 2004; Watkins et al. 2004; Breesch and Branson 2009; Clinch et al. 2010; IAASB 2011). It is expected that specialists would provide high quality services.

Industry specialisation has always been an indicator of industry expertise (Francis et al. 1999, cited in Li et al. 2009). Generally, industry expertise allows auditors to differentiate themselves from others. The clients of such auditors therefore can earn higher rates of return on investment than those whose auditors are not specialists by using higher quality audit reports (Craswell et al. 1995; Ferguson and Stokes 2002, cited in Clinch et al. 2010). Moreover, it is suggested that auditors with skills and expertise are associated with less earnings management (Krishnan 2003, cited in Li et al. 2009). Hence information risk is lower, and as a result, cost of equity would be lower. For instance, auditors who are specialists in the banking industry can better assess the adequacy of the loan loss allowance than non-specialist auditors, which can enhance financial reporting quality and mitigates fraudulent financial reporting (Kanagaretnam et al. 2011).

To measure audit quality, the first step is to find a way of measuring specialisation or auditor's skills and expertise. Based on the paper we studied, there are generally two categories of proxies that could approximately measure the degree of an audit firm's industry specialisation: market share and human capital related elements.

Auditor specialisation measured by auditor market share is used to proxy audit quality (Carcello and Nagy 2004; Li et al. 2009; Hakim and Omri 2010). Comparing industry leaders (e.g., Big 5) with those others (e.g., non-Big 5), it is usually found that industry leaders have greater expertise, resources, and market-based incentives (e.g., maintaining auditor's

reputation capital) (Kanagaretnam et al. 2011). Hence, an audit firm's market share generally reflects its level of expertise within the industry.

According to prior researches, level of expertise is usually used as a control variable in audit quality related researches. Usually, a model includes a dummy variable 1if auditors is designated as an industry specialist or Big 4, and 0 otherwise (Carcello and Nagy 2004; Li et al. 2009; Clinch et al. 2010; Hakim and Omri 2010; Kanagaretnam et al. 2011). More specifically, a value equal to 1 is assigned if a firm is audited by an industry specialist. For instance, an audit firm that possesses the largest market share in a given industry is assigned as 1, and 0 otherwise (Li et al. 2009). Sometimes, industry specialisation is also recognised if an auditor firm maintains at least a 10 percent market share for the industry (Hakim and Omri 2010). In the study of Carcello and Nagy (2004), market share calculation is based on total client sales audited within each industry, based on two-digit SIC code. It is also measured on the percentage of client assets audited within an industry.

On the other hand, auditors' human capital such as hard skills have been argued as highly associated with audit quality (Mansouri et al. 2009; Chen at al. 2013). Auditor expertise is gradually developed through training and practical experience from auditing in a particular industry. Specialists should have better industry-specific knowledge that allow them to better detect financial statements' misstatements (Taylor 2000; Dunn and Mayhew 2004; Hammersley 2006, cited in Hakin and Omri 2010). They usually have better ability to recognise various risks within a particular industry, and gain a deeper understanding of the accounting rules and reporting requirements for that industry (Kwon, 1996, ctied in Clinch et al. 2010). Hence higher quality of audits could be delivered.

In Chen et al. (2013)'s study, the variables used to proxy audit quality were extracted from four human capital factors: including auditor's educational level (Lee et al., 1999; Liu, 1997), work experience (Aldhizer et al., 1995; FRC, 2006), professionalism (Aldhizer et al., 1995), and continuing professional education (Meinhardt et al., 1987; FRC, 2006).

3.4 Independence

3.4.1 Likelihood of issuing going concern report and Audit Opinion

Although the motivations and the purposes of the research may vary, quite a large volume of papers adopt the propensity of issuing going concern report or expressing unclean audit opinions to proxy audit quality. Regarding going-concern report, the responsibility of assessing going-concern falls on the shoulder of clients, while auditors need to make sure that the company's report has provided a true and fair view towards the performance. If the auditor finds a going-concern problem during the auditing process, an independent auditor would report it. With respect to audit opinion, if the opinion is "unclean", it means that auditors have found and reported the problem.

Audited financial statements are considered as the joint products of the auditors and the clients which arise from a process of negotiation between the two (Gibbins et al. 2001, cited in Asthana and Bone 2012). Kida (1980, cited in Geiger and Tan 2002) suggest that the negotiation of reports is particular sensitive, as some clients may receive a going-concern report but they only require an unmodified one. DeFond et al. (2002, cited in Carey and Simnett 2006) argue that auditors must objectively evaluate the client's performance and withstand client pressure to issue a clean opinion. Hence, independence is playing an important role to maintain audit quality. Just as DeAngelo's (1981) double approach definition mentioned, auditor quality concerns partially on the probability of an auditors to report the breach if problems are found. Therefore, if a going concern report is issued or any unclean audit opinion is provided, audit quality is assumed high as there is no independent impairment.

Other studies provides some alternative explanations: if the auditors have more expertise, they should be better capable of identifying going-concern problems and issuing more timely going-concern reports (Francis and Yu 2009). The auditors with more expertise are usually from larger office or Big N firms, which is also in line with the proxy of auditor size and type and the definition stream of competence of audit quality.

The models to proxy audit quality by propensity are quite similar across various studies. Most researches study external factors' effect on audit quality such as the regime of mandatory firms or big 4 firms sizes. Thus, regression models would be run with the variable audit quality on the left hand side and other influential variables stay on the right hand side. Then people would use the variables (1) the propensity of issuing going concern report or (2) audit opinion type to represent audit quality.

For example, Liu et al. (2011) examine the effect of state ownership and management affiliations and their joint effect on audit quality in China. They set a dummy variable OPINION to proxy audit quality. If the opinion is unclean (qualified, disclaimed, and adverse opinions, and unqualified opinions with explanatory notes), OPINION is 1 and 0 otherwise. The following regression coefficient would explain how affiliation and state ownership would affect audit quality.

$$OPINION = a_0 + a_1 Affiliation + a_2 State + a_3 State * Affiliation + a_4 Size + a_5 CR + a_6 ROA + a_7 Cash + a_8 Dual + a_9 Afirm + \varepsilon$$

With respect to going concern report, Francisa and Yu (2009) uses the likelihood of issuing going concern as a proxy of audit quality to determine whether big 4 audit quality uniform across small and large practice offices. PROBIT[GCREPORT = 1]is used to represent audit quality. The variable for going concern report GCREPORT is coded as 1 if the auditor gave a going-concern opinion to the client in the fiscal year and 0 otherwise. Some other studies also adopt such expression method (Geiger and Tan 2002; Carey and Simnett 2006; Jackson et al. 2008; DeFond and Lennox 2011; Gunny and Zhang 2012; Minutti-Meza 2013; Burmett et al. 2013).

However, according to DeFond and Lennox (2011), there is a limitation of using propensity of issuing going concern report to proxy audit quality that the auditor's decision to issue a going concern opinion may be associated with shocks to company performance. Furthermore, DeFond and Lennox (2011) argue that going concern opinions may be driven by PCAOB inspection programs to some degree. Researchers should make better control over variables.

3.4.2 Audit Fee

Researchers choose to concentrate on the different aspects of nexus between audit quality and audit fees, and thus adopt dissimilar proxies in the process. In general, audit fees are more likely to reflect auditor effort because the audit market is closely regulated and opportunities to earn rents are limited (Srinidhi and Gul 2007, cited in Kanagaretnam et al. 2011). It is generally perceived that larger audit firms are able to charge higher audit fees due to monopolistic power or greater audit monitoring effort. Therefore, high audit fee is assumed to be more efforts in audit process and higher audit quality. The model used in Kanagaretnam et al. (2011) is to divide sample banks into two groups based on whether their audit fees

(nonaudit fees) are above or below the annual median fee, and to use the methodology by Fields et al. (2004) to regress the natural logarithm of audit fees (nonaudit fees) on the determinants of normal fees to obtain abnormal fees (cited in Kanagaretnam et al. 2011). The variable FEE would be 1 if audit fee or nonaudit fee is above median for a given year and zero otherwise.

Besides, Yasina & Nelson (2012) has adopted external audit fee to proxy audit quality. They point out that, a higher amount of audit fees indicates that auditors provide more efficient audit services to the firm compared to lower audit fees. According to O'Sullivan (2000, cited in Yasina and Nelson 2012), more audit hours and more specialized audit staff are required for a more thorough investigation, which will lead to the higher audit fees. Hence, it is expected that higher audit fees indicate a higher quality audit, as more audit work is required to ensure that the financial statements are free from material misstatement (Deis and Giroux 1996, cited in Yasina and Nelson 2012).

Alternatively, another stream of research considers that large fees to auditors provide them with fewer incentives to detect errors and frauds from their clients since they are economically dependent on the clients, which can be a threat to audit independence. More specifically, the study conducted by Hoitash et al. (2007) demonstrate a statistically negative correlation between audit quality and the amount of audit fees, in particular for non-audit services. Further, Li et al. (2009) has fully discussed how the unexpected audit fees can be regarded as the proxy for audit quality. The main point is that, higher than expected audit fee would be considered as the fact that the auditors have made much more efforts. Similarly, earnings quality would also be higher when there is more audit efforts, with lower information risks to investors.

3.4.3 Audit Firm Tenure

It has been recently found that audit firm tenure can be differentiated by the market perception of audit quality. The research study of Hakim and Omri (2010) has also adopted audit firm tenure as one of the three observable measures to assess audit quality. It mainly examines whether the length of relationships between auditors and clients could impair auditor independence. That is the major argument to call for auditor rotation on a regular basis.

In fact, two competing views have been presented in Hakim and Omri (2010) regarding the relations between audit quality and firm tenure. One group suggests that it is highly likely for the auditor independence and objectivity to be compromised as the audit firm tenure lengthened. However, it is argued by some other researchers that audit quality improves with tenure because auditors can be easily detect errors and frauds of the company based on familiarity of its business operations and reporting issues.

According to Hakim and Omri (2010), the regression model is used for estimation:

$$SPREADit = \alpha_{it} + \beta_1 BIGit + \beta_2 SPECit + \beta_3 TENURE_{it} + \beta_4 \cdot SIZEit + \beta_5 VOLUMEit + \beta_6 RET_{it} + \beta_7 VOLAT_{it} + \varepsilon$$

3.5 Market Perception

3.5.1 Forecast Accuracy

It has been found recently that a higher quality audit is positively associated with analysts' earnings forecast accuracy (Behn. et al. 2008). Following this study, Lawrence et al. (2011) used earnings forecast accuracy as one of the variables used to measure audit quality. The study was to examine that whether Big 4 versus non-Big 4 differences in analyst forecast accuracy can be attributed to client characteristics.

Lawrence et al. (2011) employed the model structured by Behn et al. (2008) and implemented several study specific modifications,

$$ACCY_{i,t} = \beta_0 + \beta_1 BIG4_{i,t} + \beta_2 LOG_MKT_{i,t} + \beta_3 SURPRISE_{i,t} + \beta_4 NETLOSS_{i,t} + \beta_5 ZMIJ_{i,t} + \beta_6 HORIZON_{i,t} + \beta_7 STDROE_{i,t} + \beta_8 NANA_{i,t} + \beta_9 EL_{i,t} + Industry_FE + Year_FE + \varepsilon_{i,t}$$

(for firm i and fiscal year n)

Here ACCY represents the magnitude of the difference between analysts' earnings forecast of EPS and actual EPS scaled by end-year stock price.

3.5.2 Cost of Capital

The quality of audit can be reflected on the cost of capital, related to credibility of financial information stream. Generally, investors perceive earnings audited by Big 4 auditors more

assured than non-Big 4 ones and as a consequence, Lawrence et al. (2011) claims that 'ceteris paribus, the Big 4 clients should receive a break in their cost-of-equity capital'.

In the model, RPEG represents ex ante cost of capital estimated based on the approach Based on Khurana and Raman (2004 cited in Lawrence et al. 2011), Lawrence uses the following model to examine the relation between auditor type and the ex ante cost of capital, adopted from Easton (2004 cited in Lawrence et al. 2011).

$$RPEG_{i,t} = \beta_0 + \beta_1 BIG4_{i,t} + \beta_2 BETA_{i,t} + \beta_3 LOG_LEV_{i,t} + \beta_4 VAR_{i,t} + \beta_5 LOG_MKT_{i,t} + \beta_6 LOG_{BTM_{i,t}} + \beta_7 GRWTH_{i,t} + IndustryFE + YearFE + \varepsilon_{i,t}$$

Interestingly, their research findings suggest that it is the clients' characteristics rather than the auditors' that contribute to the effect on the ex ante cost-of-equity capital.

3.5.3 Bid-ask Spread

It is claimed by Schauer (2002) that proxies used by most prior audit quality research are indirect. For example, clients usually pay higher audit fees for high quality audits. Similarly, greater ERC provide evidence of market's perception of higher quality of audits. However, in many cases the public has little knowledge of the actual quality of audits (Schauer 2002).

The role of an audit is the reduction of information risk (Boynton and Kell 1996, p36, cited in Schauer 2002), higher quality auditors mitigate information (Firth and Liau-Tan 1998, cited in Schauer 2002). It is therefore argued that bid-ask spread is a more direct measure of audit quality. Market participates always stand ready at any time to trade. If they encounter a trading which cannot be explained by the information available on market, they increase their bid-ask spread in order to counteract the information asymmetry. Moreover, according to Stoll (1989), the bid-ask spread is positively associated with the extent of information asymmetry about the firm (cited in Schauer 2002). In such case, it is argued that bid-ask spread could reflect the quality of information disclosed, which subsequently reflect the level of audit quality.

Using bid-ask spreads as a proxy for audit quality, Schauer (2002) examines differences in audit quality resulting from difference in the level of the auditor's industry specialisation, with the following regression model,

$$Spread = \beta_0 + \beta_1 Specialist + \beta_2 Variance + \beta_3 Volume + \beta_4 Price + \beta_5 Turnover + \beta_6 NOANAL + \beta_7 Insider + \beta_8 MARvalue + \beta_9 NYSE + \beta_{10} AMER + \varepsilon$$

In this model, the dependent variable spread is the percentage bid-ask spread calculated as the difference between daily high and low bid, divided by the average. Results of the study show that industry specialisation and auditors experiences are positively correlated with audit quality.

3.6 Other Category

3.6.1 Disciplinary sanctions

It is suggested that audit failure would be more common among auditors who provide low audit quality, indicating a negative relationship between audit failure and quality of the service (Palmrose 1988, cited in Sundgren and Svanstrom 2011).

If there is an audit failure, definitely a sanction would be imposed. However, audit failure seems to be a point in the line of audit quality. Among some disciplinary cases, litigation or inspections are able to identify audit failure, while others do not. Hence, we have no borderline to determine how significant of one deficiency would be regarded as audit failure and we cannot use audit failure to directly reflect audit quality in the line. Therefore, the likelihood of disciplinary sanctions would be useful to estimate the level of audit quality. If an auditor is more likely to be subject to sanctions, audit quality would be assumed lower when comparing to others (Palmrose 1988, cited in Sundgren and Svanstrom 2011). In other words, sanctions would be a concept translation of compliance. As the degree of conforming increases, corresponding probability of being charged with sanctions decreases. Higher degree of complying with standards means higher quality. Thus, lower probability of disciplinary sanctions presents higher quality.

On the other hand, the proxy can also be explained from the incentive of the auditors. Disciplinary sanctions would impose pressure on auditors that their compensations would be reduced with some other possible punishment or impairment of reputation. Therefore, usually higher quality auditors with high reputation would have intention to maintain quality levels to avoid audit failures and at the same time enhance or preserve the reputation (Sundgren and

Svanstrom 2011). It also indicates that auditors with less likelihood of sanctions would imply higher audit quality.

The model to proxy audit quality using likelihood of disciplinary sanctions is similar to issuing going concern report. The variable used is SANCTIONS and audit quality is represented by a PROBIT expression: Ln[(SANCTION=m) / (SANCTION=1)] Where m=1 for auditors with no disciplinary sanctions, m=2 for reprimands, m=3 for warnings and m=4 for exclusions from the profession. Auditors with no sanctions are in the base-category (Sundgren and Svanstrom 2011).

3.6.2 Audit Process

A new stream of research has also started to focus on the audit process as an important indicator of audit quality. As IAASB (2011, p. 4) mentions in the audit quality report, 'The audit process concerns such matters as the soundness of the audit methodology, the effectiveness of the audit tools used, and the availability of adequate technical support, all geared toward supporting execution of a quality audit'. Manita and Elommal (2010) construct measurement scales to direct stakeholders' attention towards audit process quality instead of solely on auditor quality. Five stages adopted from a Churchill's approach (1979 cited in Manita and Elommal 2010) are established to evaluate the quality of audit and are summarised as follows:

- The qualitative study with the audit committee members
- Drafting and preliminary testing of the questionnaire
- Data collection
- Refinement of the measurement instrument
- Reliability and validity of the measurement instrument

However, there are still various limitations to this approach including sample size, practical relevance of the measurement and sample selection.

3.6.3 People's Perception

Using people's perception to approximate audit quality is a new concept of audit research. For example, recently a field experiment on baseball cards conducted by Jamal and Sunder (2011) finds out that stakeholders value greatly on professional assurance and test subjects

which are less independent with diversified services tend to provider higher quality of service. Thus, the research findings suggest that high level of independence does not necessarily lead to high quality of audit (Jamal and Sunder 2011).

Another example can be found in Svanström's (2013) paper, where the author measures audit quality via the management's perception, which captures the extent to which reporting quality is raised by the audit process. Managers are in the best position to witness audit quality improvement because they are heavily involved in communicating with auditors and producing annual reports (Svanström 2013). In the paper, Svanström refines Jones model by adding respondents' perceptions of quality (PERCQUAL) and the scale ranges from 1 (strongly disagree) to 7 (strongly agree). However, the relative constraint is that the management's perception might only represents service quality instead of actual audit quality and the result may be biased (Svanström 2013).

3.6.4 Avoidance of AICPA peer reviews and PCAOB inspections

The avoidance of AICPA peer reviews and PCAOB inspections means that some firms do not receive AICPA reviews or fail to register with the PCAOB. According to previous literatures, unfavourable reviews and inspection reports are related to poor audit quality (Hilary and Lennox, 2005; Casterella et al., 2009; Gunny and Zhang, 2009, cited in DeFond and Lennox 2011). Hence, if there is an auditor with lower audit quality, the probability of receiving an inspection report with many identified deficiencies is higher. As a consequence, the reputation decreases and there would be a significant loss of clients, finally forcing the firm to exit the market at extreme case (DeFond and Lennox 2011).

According to DeFond and Lennox (2011), PCAOB enforcement would put higher costs on low quality auditors: relating back to sanctions, if significant deficiencies have been identified, heavy sanctions would be imposed. Lower quality auditors are subject to harsher penalties from the outcomes of inspections. Moreover, PCAOB inspection can also notify relevant authorities with report of breaching criminal regulations, making the penalties much heavier. In order to avoid the punishment as well as to maintain the reputation, lower quality auditors are not willing to accept peer reviews or inspections, consequently with little weakness discovered to the public. Therefore, lower quality auditors would find it better to avoid either review or inspections, and they would find it much cost beneficial to exit the market.

DeFond and Lennox (2011) run a regression to investigate whether exit companies are of lower quality. EXIT is the variable to present whether a firm exits or not, while REVIEWED and INSPECTED are the two variables to proxy audit quality. Both proxies are coded as 1 if the firm is reviewed or inspected and 0 otherwise.

However, there is a limitation for peer review. DeFond and Lennox (2011) also figure out that as reviews are required just once every three years, if the firm's existence has not reached that length, even high audit quality firms would not be reviewed, which could be regarded as passive avoidance. Therefore, researchers should carefully categorize their samples to rule this issue out.

To sum up, audit quality measurements vary and all proxies all proxies have theoretical underpinning to different definition. Some proxies are commonly used while others are not to present audit quality. With respect to models, there are different methods to measure audit quality using the same proxy. Further, the same proxies may be measured in different ways. In addition, some studies adopt various proxies to investigate one specific research problem. However, the results are inconsistent. It indicates that one proxy can reflect certain aspects of audit quality and certain indicators have some limitations. When all proxies are combined, people would find an overall picture of audit quality.

4.0 Conclusion

In this report, we have examined what audit quality is and how various proxies are related to different streams of audit quality definition as well as the models. In the definition section, we first summarize the direct definitions into four major streams: detecting and reporting, credibility of information, the degree to which the audit conforms to applicable auditing standards, and the audit process respectively. Then we put indirect and implied definitions into different categories which can also be related back to direct ones. We find that it is difficult to reach an agreement on a single and universal definition of audit quality as there are variations in stakeholder perspective, which indicates that no single element should be assumed as having the dominant influence on audit quality. In the proxy section, we examined around 20 different indicators. We first discuss the classification of different proxies. As audit quality is not in a uniform form, specific proxy would only focus on one

perspective of audit quality. Thus, people tend to allocate different proxies into various categories in distinct ways to “address the problem resulting from looking at a complex construct from a limited perspective”, which could further contribute to our understanding of the connection as well as the difference among a large collection of indicators. Then, we discuss the proxies in details regarding two major questions: why this proxy can be used to represent audit quality and how this proxy represents audit quality. A final conclusion is reached that one proxy can reflect certain aspects of audit quality and certain indicators have some limitations. When all proxies are combined, people would find an overall picture of audit quality.

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