

An Assessment of the Relationship between Audit Tenure and Audit Quality using a Modified Jones Model

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Citation: Ezekiel K. Duramany-Lakkoh (2022) An Assessment of the Relationship between Audit Tenure and Audit Quality using a Modified Jones Model, *European Journal of Accounting, Auditing and Finance Research*, Vol.10, No. 4, pp.14-35

ABSTRACT: *This study uses the modified Jones Model to investigate the relationship between audit tenure and audit quality with special reference to Sierra Leone. To measure audit quality, discretionary accruals calculated by the Modified Jones model is used as a proxy, while audit tenure data is manually collected. In general, the results are consistent with the hypothesis that Audit quality does not change with the increasing audit firm tenure. On the whole, partner tenure is significantly and positively related to audit quality, indicating that longer audit partner tenure improves audit quality. The audit firm tenure is also positive with audit quality, though the evidence is not significant. Therefore, the results of this research do not support the proposal of audit firm rotation.*

KEYWORDS: audit quality, audit tenure, auditing services

INTRODUCTION

According to Carey and Simnett (2006), the relationship between audit tenure and audit quality has been a key issue of renewed interest both in developed and developing countries. Audit reporting quality is a basic ingredient that can enhance the credibility of financial statements to various stakeholders. Otherwise, maintaining the same audit firm for a long period is considered more economical to the clients due to high start-up cost when the clients rotate the auditors. Simply put, some people think that the longer audit tenure helps the auditors to be more knowledgeable about their clients and perform better and more effectively than new auditors. The contrary opinion is that the long auditor-client relationship will harm auditors' independence (Chen et al, 2008). This debate has been inconclusive given the various strands on the issue. Sierra Leone in the other hand has gone through structural changes, especially after the Ebola outbreak (Duramany-Lakkoh, 2021). The slowdown in business and financial activities in the country affected reporting in financial institutions (Duramany-Lakkoh, 2021), which in turn affected the auditing of some institutions, but have no effect on this study.

To improve audit quality, some developed countries therefore introduced a mandatory rotation policy, which was first adopted in the United States in 2002. This policy requires that the audit partner should be rotated a minimum of once every five years. However, such measures have not gone unchallenged as several researchers are sceptical on whether it is necessary to rotate auditors. Meanwhile, some researchers investigate the connection between audit firm tenure and audit quality instead of partner tenure. Johnson et al. (2002) suggest a positive association

between firm tenure and audit quality while Luo and Huang (2007) found a negative relationship in their studies.

The majority of these previous studies investigated the relation between audit tenure and audit quality using samples before the implementation of the rotation policy. Like in other countries, auditing has also been a usual practice in Sierra Leone for several years. However, little is being known about the relationship between audit tenure and audit quality in Sierra Leone. This study therefore seeks to close the gap by examining the relationship between audit tenure and audit quality in Sierra Leone.

Statement of the Problem

The audit quality issue has been a topical issue to some stakeholders for a long time and Sierra Leone is no exception. In Sierra Leone, some auditing firms have been around for a very long time and have been providing audit service services for a number of organisations. On the other hand, most of these organisations have maintained the same auditing firm for several years. However, little is being known about the connection between audit tenure and audit quality within the case of Sierra Leone. This study therefore seeks to make a contribution in providing a comprehensive and detailed understanding of the relationship between audit tenure and audit quality. It will contribute to the already existing studies on the connection between audit tenure and audit quality.

Research Questions

Majority of prior studies have explored the relationship between audit tenure and audit quality using samples before the implementation of rotation policy, the question here using the case of Sierra Leone are:

Does audit tenure affect audit quality in Sierra Leone?

Is it necessary to rotate audit firms in Sierra Leone?

Research Hypothesis

Whether and how audit tenure affects audit quality has been discussed over decades. Some people think that the longer audit tenure help the auditors to be more knowledgeable about their clients and perform better and more effectively than new auditors. Some hold a contrary view that the long auditor-client relationship will harm the auditor's independence, as they would be very familiar with each other (Chen et al, 2008). Additionally, familiar auditors are more likely to compromise in order to retain the client. The mandatory rotation policy's implementation indicates that the regulators regard the longer audit tenure as being harmful to the audit quality. However, the discussions have not come to an end with the rotation policies. A lot of researchers use the data before the implementation of rotation policy to see whether this policy is worthy; while another group compares the audit quality before and after the year of implementation to check whether audit quality is improved. Nevertheless, most of their research studies use only audit partner tenure or audit firm tenure in order to proxy audit tenure. Therefore, to test the association between audit tenure and audit quality, we develop our hypothesis as follows:

Hypothesis 1: Audit quality does not change with the increasing audit firm tenure.

Motivation of the Study

A study of this nature is critical given the importance of audit tenure and audit quality in low income country like ours. It is therefore necessary to carry out a comprehensive study in order to create better understanding of the relationship between audit tenure and audit quality in Sierra Leone. In addition, results and findings generated from this study would provide a framework in formulating policy recommendations geared towards the issue of audit services in Sierra Leone. It is therefore expected that an examination of the relationship between audit tenure and audit quality in Sierra Leone would also contribute to the existing literature.

LITERATURE REVIEW

Different proxies of audit quality

The audit quality issue has been a hot topic for stakeholders for a long time, especially after the exposure of some severe financial scandals. A number of scholars have started to research audit quality based accruals, earnings response coefficients (ERC) and audit reporting errors. This section reviews different proxies utilized in previous literature.

Discretionary accruals

Auditors are liable for inspecting companies' financial statements and report back to the general public whether or not they are fair and reliable. Audit quality is seemed to be high if the financial statements are transparent with less probability of manipulation (Chen et al., 2008). Therefore, an efficient method to detect audit quality is to use discretionary accruals as a proxy. It has been widely utilized in previous papers like Choi et al., (2010). Similarly, the value of discretionary accruals is used as proxy for audit quality in Chen et al. (2008), to establish the association between audit quality and audit tenure. Choi et al. (2010) investigate the connection between audit quality and abnormal audit fees. Different from the previous three papers, Myers et al. (2003) divide accruals into two categories: discretionary accruals and current accruals, so as to review whether audit firm tenure is related to accruals. The results suggest that longer audit tenure has positive effects on audit quality. Additionally, Lim and Tan (2010) proxy audit quality by accruals and find that industry specialists provide higher audit quality. Discretionary accruals are the most widely used proxy for audit quality as presented in the prior literature; especially its absolute value form. However, there is a limitation to using this proxy. When the financial reporting quality is good, even if the audit quality is poor, the value of discretionary accruals is still low. The previous papers fail to address this issue and, therefore, the results may be affected by this loophole.

Audit failures

An audit report plays a crucial role in communicating between auditors and clients. It conveys professional decisions from auditors to those stakeholders who need this information to take a position . The occurrence of audit failure is of course considered a coffee audit quality. Audit reporting errors is one sort of audit failure, therefore they will be used as a proxy of audit quality, like in Geiger and Rama (2006). In this paper, they classify audit reporting errors into two types. The first is that the businesses receiving a professional auditing opinion do not fail later. The other is that companies issued with an unqualified opinion enter bankruptcy. Then, Geiger and Rama (2006) investigate whether or not there are more audit reporting errors in

non-Big 4 firms, thus better audit quality in Big 4 firms. Another sort of audit failure is financial reporting fraud. For example, in Carcello and Nagy (2004), and Geiger and Raghunandan (2002), they examine the association between audit firm tenure and audit quality surrogate by financial reporting fraud. The results suggest that the audit quality is higher during the short audit tenure by having less possibility of monetary manipulation.

Cost of debt

In Mansi et al. (2004), they find that both audit tenure and quality have effects on the value of debt financing and there is a positive relationship between audit tenure and audit quality. Because auditors' opinions have a great influence on the reliability of companies' financial announcements, investors rely on audited financial reports to make an investment decision. Mansi et al. (2004) report that the cost of debt is lower with increasing audit tenure and, therefore, investors do not think longer audit tenure harms the quality of auditing.

Financial Report Restatement

Financial report restatement is that the main concern for regulators and stakeholders on the audit quality and financial report quality. Therefore, researchers also take it as a proxy for audit quality, like in Myers et al. (2004), to research whether the audit firm tenure is correlated with the occurrence of monetary report restatements, and Myers et al. (2005) to check the relation between financial report restatements and audit partner tenure. In order to offer a more accurate result, their studies chose samples strictly by defining the restatement as 'correlations of monetary statements that are non-GAAP reporting' (Myers et al., 2005).

Earning Response Coefficients (ERC)

Another group of researchers use ERC as a proxy to audit quality like Ghosh and Moon (2003), Chi et al. (2005), Higgs and Skantz (2006) and Ghosh et al. (2009). In Ghosh and Moon (2005), they use ERC as a proxy for audit quality to examine how investors understand the relationship between audit tenure and quality. The results suggest a positive association between the two factors, that is, audit quality improves with longer audit tenure. Likewise, with a proxy ERC for audit quality, Chi et al. (2005) conclude that the implementation of a compulsory rotation policy is useful to audit quality by analyzing Taiwanese companies. Both Higgs and Skantz (2006) and Ghosh et al. (2009) use ERC as a proxy for audit quality to research the connection between audit fees and audit quality. Higgs and Skantz (2006) report a negative relation between audit fees and audit quality, while there is no evidence found in Ghosh et al. (2009) to support the idea that audit fees are correlated with audit quality.

Litigation

The number of litigation activities is used as a proxy of audit quality because it is generally believed that high audit quality auditors have fewer litigation cases. Palmrose (1988) analyzes the relation between audit firm size and audit quality using litigation as the proxy. He uses a sample of 472 legal cases involving both large and small auditing firms and suggests that audit quality is better in larger audit firms.

Different determinants of audit quality

According to prior studies, audit quality is affected by the combination of many factors. For example, audit fees, auditor size, industry expertise and audit tenure. This section reviews the articles about the connection between different determinants and audit quality respectively.

Audit fee and audit quality

Research articles have debated the relationship between audit fees and audit quality. For instance, both Reynolds et al. (2004) and Frankel et al. (2002) find a positive association between audit fees and audit quality. But after considering other factors, like IPO firms in special areas, Reynolds et al. (2004) suggest no relationship between audit quality and fees. Similarly, Larcker and Richardson (2004) report that audit quality improves as audit fees increase at first, and after using latent class models, a negative relationship presents between audit quality and fees rather than a positive one. A negative relation between audit fee and audit quality is found in Higgs and Skantz (2006) and Hoitash et al. (2007), whereas Ghosh et al. (2009) and DeFond et al. (2002) claim that audit fees do not relate to audit quality. It is worth mentioning that an asymmetric and nonlinear relationship between abnormal audit fees and audit quality is found in Choi et al. (2010). In Choi et al. (2010), they use discretionary accruals as a proxy for audit quality and they consist of 9815 samples in total from 2000 to 2003. It is the first study to document evidence that the association between the two is asymmetric and suggest that the future research on this topic needs to consider this fee-quality relationship (Choi et al., 2010).

Audit firm size and audit quality

Some studies point out that the bigger the audit firms are, the more possible for the auditors to perform objectively, i.e. the higher the audit quality is. Subsequently, more and more research has shown evidence that larger audit firms provide higher audit quality (Geiger and Rama, 2006; Francis and Yu, 2009). Palmrose (1988) undertook a study on around 470 litigation cases on both large audit firms and little audit firms (Big 8 and non-Big 8) within the U.S. and concluded that large firms are less likely to be accused, i.e. there is a better audit quality in large firms. Davidson and Neu (1993) demonstrate the positive relation between audit quality and audit firm size by comparing the forecast errors in large and small audit firms. Likewise, Geiger and Rama (2006) report that larger audit firms (Big 4) have a better audit quality because they have less auditing errors. Francis and Yu (2009) find that the larger audit firms have a greater possibility of issuing precise auditing reports than the smaller ones. Moreover, Sundgren and Svanstrom (2013) conclude that audit quality is better in larger audit offices among the non-top six offices in Sweden, but there is no significant evidence.

Industry expertise and audit quality

Industry experts are perceived to be more professional and have more experience than non-experts. Therefore, a wave of research studies emphasize that experts in the auditing industry, such as Big 4, have better audit quality than the non-Big 4 audit firms. Both Balsam et al. (2003) and Krishnan (2003) report that companies audited by industry experts have less discretionary accruals than those audited by non-experts. Likewise, Reichelt and Wang's (2010) research proves that auditors' level of professionalism is crucial to the audit quality. Industry specialists who have a far better understanding of this field provide higher quality in

auditing. However, Mascarenhas et al. (2010) fail to prove that accruals are more informative within the companies audited by specialists.

Audit tenure and audit quality

Audit tenure is also proposed to be another determinant of audit quality. There are a number of studies that have examined whether and how audit quality is affected by the length of audit tenure. This section reviews the prior studies on the relation between audit tenure and audit quality. It is divided into two parts as audit tenure includes both audit firm tenure and audit partner tenure.

Audit partner tenure and audit quality

The literature studying the relationship between audit partner tenure and audit quality is very limited because the audit partner's name is only available in a few countries such as China and Australia (Shen et al., 2008). This section reviews the relative literatures according to different regions.

For instance, there are two studies on the relationship between audit partner tenure and audit quality based on Taiwanese companies (Chi and Huang, 2005; Chen et al. 2008). In Chi and Huang (2005), they describe a U-shape relationship between audit partner tenure and audit quality with a critical point of five years. In this case, audit quality decreases as tenure increases in the beginning 5 years, but then increases afterwards. Whereas Chen et al. (2008) suggest a negative relationship between partner tenure and audit quality.

Carey and Simnett (2006) examined the relation between audit tenure and quality in Australia. The results suggest that the possibility to issue going-concern opinions by auditors diminish over the audit partner's tenure and there are no important findings on audit tenure and abnormal working capital accruals (Carey and Simnett, 2006).

Numerous prior studies have investigated the relation between audit partner tenure and audit quality in China. However, no consensus has been reached so far. A positive relation between partner tenure and audit quality is found in papers such as Shen et al., 2006; Shen et al, 2008; Yu et al, 2008; Zhang and Wu, 2010). Shen et al. (2006) study the effects of a mandatory rotation policy by using abnormal accruals and non-regular profit as proxies of audit quality. Their results suggest that the rotation policy cannot improve the earnings quality. Additionally, Shen et al. (2008) use whether auditors issue going-concern reports for the companies in financial distress and the amount of abnormal working capital as a proxy of audit quality, and suggest that there is no evidence that audit tenure affects audit quality if use going-concern reports as the explained variable. However, abnormal working capital is taken as the explained variable, they find a longer audit partner tenure improves audit quality. Yu et al. (2008) not only find a positive relation between partner tenure and audit quality, but also claim the effect of restraining earnings management is more apparent in a long tenure (≥ 5) than in a short tenure (< 5). Different from the usual methods, game theory is constructed by Zhang and Wu (2010) between shareholders, managers and auditors to analyze each participant's optimal strategy under different changes of auditor in order to examine the impact on audit quality. A negative relation is found in Deng (2004) and Li (2007). Deng (2004) uses unqualified opinions to proxy

audit quality and suggests longer audit partner tenure harms audit quality because the likelihood of issuing unqualified opinions is negatively correlated with audit partner tenure. In contrast, Li (2007) reports that audit partner tenure has a negative impact on audit quality whether control the influence from the audit firm tenure or not. An ambiguous conclusion is claimed by Yu and Li (2003). They analyze the relationship between audit tenure and audit quality theoretically. Generally, they think that audit partner tenure could have both a positive and a negative impact on audit quality. Therefore, whether long audit tenure would increase or decrease audit quality cannot be concluded simply.

Audit firm tenure and audit quality

Audit tenure includes both audit firm tenure and audit partner tenure. Obviously, the studies on audit partner tenure and audit quality do not stand for the relation between audit tenure and audit quality. Therefore, another faction of researchers investigates the association between audit partner tenure and audit quality.

A positive relation is widely documented in prior literature on audit quality (Ghosh and Moon (2005). Myers et al. (2003) suggest that auditors' knowledge about the client extends with increasing audit partner tenure. Hence, the specific experience helps to improve audit quality. While Johnson et al. (2002), Gosh and Moon (2003) and Myers et al. (2003) proxy audit quality with abnormal accruals and find that, as the audit tenure gets longer, the audit quality becomes better. Moreover, Geiger and Raghunandan (2002) analyze insolvent companies and find that the possibility of auditing errors is larger in the early period of auditing. A more complicated piece of research was done by Ghosh and Moon (2005). They studied three different groups of stakeholders and used ERC to proxy audit quality for investors and analysts while the rating-earning relation for rating agencies. Finally, they also reported that audit quality improves with increasing firm tenure (Ghosh and Moon, 2005).

An inverted U-shape relation is suggested in Liu (2006) and Chen and Xia (2006). Both of them use the absolute value of discretionary accruals as a proxy of audit quality to examine the relationship between audit firm tenure and audit quality and they find that audit firm tenure is positively correlated to audit quality in a limited period. After that, they become negatively correlated (Liu, 2006; Chen and Xia, 2006). A similar conclusion is reported in Shi (2008) and he suggests the critical point to be eight years to audit firm tenure.

Meanwhile, a negative relationship between audit firm tenure and audit quality is proved in Luo and Huang (2007) and Zhu (2010). Luo and Huang (2007) investigate how audit quality is correlated with audit firm tenure based on a sample of listed companies. They also proxy audit quality by discretionary accruals and find that the magnitude of earnings management increases when audit firm tenure is more than five years, especially under a stable auditor—client relationship. Zhu (2010) also reports that longer audit tenure decreases auditing activity, thus decreasing the auditing standard and audit quality. Therefore, he considers the rotation policy to be an effective way to increase audit quality.

Nevertheless, no correlation between firm tenure and audit quality is found in (Wang and Liu ,2004). They conclude that increasing audit tenure does not impair auditors' independence.

And the results also suggest that large audit firms can improve audit independence, but in small firms, audit quality is low regardless of the length of audit tenure, i.e. audit quality is affected by audit firm size and there is no effect from audit tenure.

Accruals model

As mentioned in section 2.1.1, discretionary accruals are the most popular proxy to measure audit quality. A study by Chen et al., (2008) took the absolute value of discretionary accruals as the proxy of audit quality. Therefore, this section reviews some models to calculate accruals. Accruals were first defined in Healy (1985) as the difference between profit and operating cash flows, and they are divided into:-discretionary accruals (DA) and non-discretionary accruals (NDA) (Healy, 1985). In his model, Healy regards NDA as the mean of TA and assumes it equals zero (Healy 1985). DeAngelo (1986) thinks that Healy's model can reflect the influences from changing accounting methods. However, if the NDA is big, DA is overestimated. Later on, DeAngelo (1986) considers the change in total accruals and proposes a random walk process of NDA rather than a mean reverting process in Healy's model (Bartov et al., 2001). But this model is regarded as the poorest to measure accruals (Dechow et al., 1995).

Jones model is proposed to mitigate the problems of previous models through controlling changes in NDA (Beneish, 2001). In this model, changes of sales and PPE are included to measure the value of NDA (Jones, 1991). Some prior research of audit quality employs the Jones model to calculate value of discretionary accruals, such as in Chi et. al. (2009) and Myers et al. (2003). However, NDA would be overestimated if revenue is managed (Ibrahim, 2005). To remedy the problems in Jones model, Dechow et al. (1995) put forward the Modified Jones model, which deducts changes in net debtors from changes in revenue. It is regarded as the most powerful model to detect earning management (Dechow et al., 1995). Previous literature on audit quality, such as Chen et al. (2008) and Choi et al. (2010), also use the Modified Jones model to measure the value of discretionary accruals. Both the Jones model and the Modified Jones model are widely adopted to detect earnings quality, however, they suffer from some limitations and criticism. For example, the omission of other variables might cause biased results (Dechow et al., 1995). Additionally, the measured discretionary accruals may be the result of other changes, such as accounting policy rather than earnings management (Ronen and Yaari, 2008).

Further models to address the problem are developed as a cross-sectional Jones model (Jeter and Shivakumar, 1999), a cash-flow model (Dechow and Dichev, 2002).

METHODOLOGY

Measure of discretionary accruals

Following the previous studies on the audit quality (Myers et al., 2003; Chi and Huang, 2005; Choi et al., 2010), we use discretionary accruals (DA) to measure audit quality. As mentioned in the literature review, the Modified Jones model is regarded as the most powerful for testing earnings management (Dechow et al., 1995). This study also applies the Modified Jones model to calculate discretionary accruals.

In addition, because discretionary accruals can be both positive and negative, depending on the managers' need for the financial reports, some researches use the absolute value of discretionary accruals as the dependent variable (Johnson et al., 2002; Ghosh and Moon, 2005; Myers et al., 2003). In this respect, we calculate both the discretionary accruals and the absolute of discretionary accruals. Meanwhile, we classify the samples into two groups with positive DA and negative DA. Then regress on each group sample.

● **The Modified Jones Models**

$$NDA_t = \hat{\alpha}_1 \left(\frac{1}{A_{t-1}} \right) + \hat{\alpha}_2 \left(\frac{\Delta REV_t - \Delta REC_t}{A_{t-1}} \right) + \hat{\alpha}_3 \left(\frac{PPE_t}{A_{t-1}} \right) \quad (1)$$

Where NDA_t = Non-discretionary accruals in year t scaled by lagged total assets

ΔREV = Change in revenue from year t-1 to year t

ΔREC = Change in net debtors from year t-1 to year t

PPE_t = Gross property, plant and equipment at the end of year t

A_{t-1} = Lagged total assets.

$\hat{\alpha}_1, \hat{\alpha}_2, \hat{\alpha}_3$ = Firm specific estimated parameters

$$\frac{TA_t}{A_{t-1}} = \hat{\alpha}_1 \left(\frac{1}{A_{t-1}} \right) + \hat{\alpha}_2 \left(\frac{\Delta REV_t - \Delta REC_t}{A_{t-1}} \right) + \hat{\alpha}_3 \left(\frac{PPE_t}{A_{t-1}} \right) + \varepsilon_t \quad (2)$$

Where TA_t = total accruals in year t (earnings before extraordinary items minus net cash flow from operations)

ε_t = The residual, which represents the firm specific discretionary accruals proxy

$\alpha_1, \alpha_2, \alpha_3$ = The Ordinary Least Squares estimates of $\hat{\alpha}_1, \hat{\alpha}_2, \hat{\alpha}_3$

$$\frac{DA_t}{A_{t-1}} = \frac{TA_t}{A_{t-1}} - NDA_t \quad (3)$$

Measure of audit partner tenure and audit firm tenure

Audit partner tenure is distinguished from firm tenure in this study to examine the relation between audit tenure and quality. Therefore, partner tenure and firm tenure data are collected separately.

Audit firm tenure is measured as the length of continuous tenure in which auditors provide service to clients. In the process of calculation, if firm changes, firm tenure is recalculated. Any renaming or reorganization of audit firms is regarded as no influence on firm tenure. Collection of partner tenure is different from firm tenure. The partner tenure is also measured as uninterrupted (repeated/successive) years of auditors to provide audit service for clients (Chen et al., 2008). Therefore, the length of the partner with longer tenure is measured as it is considered with more impact on clients (Chen et al, 2008). Similar to the calculation of firm tenure, if the audit partner changes, then the partner tenure should be recalculated. Additionally, if the audit partner provides audit service to the same client but switches to another audit firm, the partner tenure is regarded as unchanged. Calculations of both audit firm tenure and partner tenure are therefore done manually.

Models for testing the hypothesis

According to the previous studies on the relationship between audit tenure and audit quality, factors such as auditor type, company size, growth rate, operation cash flows have a significant effect on audit quality (Chen et al., 2008; Myers et al., 2003). By referencing these studies, we construct the following model, 1, to test the relationship between audit partner tenure and discretionary accruals.

Model 1. Relationship between audit partner tenure and discretionary accruals

$$DA = \beta_0 + \beta_1 PT + \beta_2 KP + \beta_3 GROWTH + \beta_4 CF + \beta_5 SIZE + \beta_6 ROA + \varepsilon$$

Where DA= value of discretionary accruals;

PT= length of audit partner tenure;

GROWTH=growth rate of total assets from year t-1 to t;

CF=cash flow from operations divided by total assets in year t-1;

SIZE= natural logarithm of total assets in year t;

ROA= net income in year t divided by total assets in year t-1;

KP= dummy variable if company is audited by KPMG firms 1= Yes, 0=NO

Audit tenure includes both partner tenure and firm tenure. I use the following model, 2, to test on the relationship between audit firm tenure and discretionary accruals.

Model 2. Relationship between audit firm tenure and discretionary accruals

$$DA = \beta_0 + \beta_1 FT + \beta_2 KP + \beta_3 GROWTH + \beta_4 CF + \beta_5 SIZE + \beta_6 ROA + \varepsilon$$

Where DA= value of discretionary accruals;

FT= length audit firm tenure;

GROWTH=growth rate of total assets from year t-1 to t;

CF=cash flow from operations divided by total assets in year t-1;

SIZE= natural logarithm of total assets in year t;

ROA= net income in year t divided by total assets in year t-1;

KP= dummy variable if company is audited by KPMG firms 1= Yes, 0=NO

Statistical methods

To investigate the relationship between audit tenure and audit quality, descriptive analysis is completed first in order to introduce the variables. In this analysis, mean, median, standard deviation, max and min are presented.

Secondly, Pearson correlation coefficients are reported to test the correlation between variables. Thirdly, multivariate analysis is used to test the specific relationship between the dependent variable and the independent variables. In multivariate analysis, we regressed on the absolute value of discretionary accruals on the independent variable and, meanwhile, the value of discretionary accruals, positive discretionary accruals and negative accruals are also regressed on the independent variables. Lastly, to check the robustness of the results, we will test various models on a new sample through adding back some omissions. All the analyses will be performed using either SPSS or EViews.

RESULTS AND DISCUSSION

Descriptive Statistics

Table 1 presents the descriptive statistics of audit partner tenure, audit firm tenure and the other variables used in the regression model. The mean and median of DA is 19.2% and 13.3% of total assets in 2017. |DA| has similar data of 20.5% and 13.5%. The average growth rate (GROWTH) is 42.6% while the median is 14.5%, indicating a relatively quick development of the organisation. The operating cash flow has a mean value of 17.1% of lagged total assets, while the median is 5.4%. The mean and median of SIZE have a close result of 22.2 and 22.0. The average and median return on assets (ROA) equal 14.9% and 4.3, respectively. The longest audit partner tenure is 12 years, while the average and median is 2.9 and 3 years. Firm tenure is generally longer than the partner tenure with an average length of 8 years and a maximum of 19 years. Moreover, the average value of the KP (whether the company is audited by the KPMG firm) is 80%, suggesting a high market share of KPMG firm among others in Sierra Leone.

Table1. Descriptive statistics for the variables

Variable	Mean	Median	Max	Min	SD
DA	0.192612	0.13373	3.396801	-1.59164	0.269002
DA	0.204907	0.135287	3.396801	0.000785	0.259747
GROWTH	0.425975	0.145652	107.1283	-0.507	3.996127
CF	0.171043	0.054393	94.35368	-1.37592	3.377191
SIZE	22.18752	22.00143	28.13565	18.15785	1.37105
ROA	0.149018	0.043998	70.71298	-0.53931	2.529645
PT	2.960307	3	12	1	1.428541
FT	8.053777	8	19	1	4.735537
KP	0.807068	0	1	0	0.282115

DA=value of discretionary accruals; |DA|=absolute value of discretionary accruals ; GROWTH=growth rate of total assets from year t-1 to t; CF=cash flow from operations divided by total assets in year t-1; SIZE= natural logarithm of total assets in year t; ROA= net income in year t divided by total assets in year t-1; PT= length of audit partner tenure; FT= length audit firm tenure; KP= dummy variable if company is audited by KPMG firm 1= Yes, 0=NO

Correlations

Table 2 presents the correlation matrix of the variables. It shows that there is a negative correlation between the absolute value of discretionary accruals and audit partner tenure (-0.01), which is consistent with prior studies such as Gosh and Moon (2003). Audit firm tenure is also negatively associated with the absolute value of discretionary accruals (-0.012). However the correlation coefficient is relatively weaker than other pairs. Likewise, the discretionary accruals are negatively correlated with partner tenure and firm tenure. Moreover, a positive correlation is found between partner tenure and firm tenure (0.29) and discretionary accruals and its absolute value (0.89).

In addition, more negative correlations are presented between the absolute value of discretionary accruals and other variables. For example, it is negatively correlated with the log of total assets (SIZE) of -0.47, indicating that KPMG have lower discretionary accruals and higher audit quality. Meanwhile, the absolute value discretionary accruals have a positive correlation with return on assets, and operations cash flows, with 0.20 and 0.18 respectively. Besides, return on assets, operation cash flows and growth rate are positively correlated with each other.

Table 2 Pearson Correlation Matrix

Table 2 Pearson Correlation Matrix

	DA	DA	GROWTH	CF	SIZE	ROA	PT	FT	KP
DA	1								
DA	0.894354***1								
GROWTH	-0.14906***	0.265966***1							
CF	-0.25042***	0.179758***	0.395716***1						
SIZE	-0.47138***	-0.47591***	-0.01097	-0.02918	1				
ROA	-0.22926**	0.199867**	0.461251**	0.498991**	-0.02741	1			
PT	-0.0238**	-0.00974**	0.01613**	0.02431**	-0.04673**	0.026352**1			
FT	-0.00834	-0.01245	-0.04265	-0.03192	-0.10498***	-0.03242	0.29937**1		
KP	-0.09781***	-0.09522***	-0.00652	-0.00896	0.388319***	-0.00857	-0.02641*	0.12347***	1

***: significant at 1%, **: significant at 5%, *: significant at 10%

DA=value of discretionary accruals; |DA|=absolute value of discretionary accruals ; GROWTH=growth rate of total assets from year t-1 to t; CF=cash flow from operations divided by total assets in year t-1; SIZE=natural logarithm of total assets in year t; ROA= net income in year t divided by total assets in year t-1; PT=length of audit partner tenure; FT= length audit firm tenure; KP= dummy variable if company is audited by KPMG firm 1=yes, 0=N0.

Multivariate analysis

The relationship between audit partner tenure and audit quality

Table 3 Estimated regression of discretionary accruals on variables

Variable	DA	DA	+DA	-DA
PT	Coefficient -0.009	-0.011	-0.011	-0.013
	(t-statistics) (-1.989)**	(-2.320)**	(-2.345)**	(2.724)***
KP	0.103	0.102	0.104	0.017
	(4.131)***	(4.178)***	(3.752)***	(1.102)
GROWTH	0.045	0.042	0.044	-0.032
	(7.401)***	(7.019)***	(6.632)***	(2.665)**
CF	-0.717	-0.810	-0.787	-0.322
	(-16.269)***	(-18.647)***	(-14.794)***	(4.972)***
SIZE	-0.103	-0.108	-0.116	-0.011
	(-20.110)***	(-21.375)***	(-20.843)***	(2.054)**
ROA	0.906	0.990	0.958	0.455
	(14.681)***	(16.265)***	(9.527)***	(5.475)***
C	2.476	2.582	2.766	0.256
	(21.676)***	(22.927)***	(22.289)***	(2.153)**
Observations	781	781	723	58

***: significant at 1%, **: significant at 5%, *: significant at 10%

Variables are defined in Table 1. The second and third columns of results are the coefficients and t-statistics of each variable when dependent variables are |DA| and DA; the fourth and fifth columns of results are the coefficients and t-statistics of each variable when DA is positive and negative.

Table 3 presents the OLS regression results of the first model in terms of absolute value of discretionary accruals (|DA|), value of discretionary accruals (DA), positive discretionary accruals (+DA) and negative discretionary accruals (-DA).

To be detailed, the second column is the regression results when the dependent variable is absolute value of DA. The coefficient and t-statistic of PT are -0.009 and -1.989 respectively, indicating a significant negative relation between PT and DA. That is, DA becomes lower when audit partner tenure gets longer, thus audit quality improves with longer partner tenure. This is consistent with the prior studies such as Myers et al. (2003) and Yu (2008). Additionally, the KP has a positive impact on DA (0.103), which is consistent with the views of most prior papers such as Davidson and Neu (1993), and Sundgren and Svanstrom (2012). They suggest a positive relation between audit firm size and audit quality. This situation is plausible because, as discussed in Table 1, 80% of companies in Sierra Leone are being audited by KPMG. Other accounting firms may provide some audit services, however KPMG seems to be more popular relative to others. Furthermore, GROWTH has a significant positive impact on |DA| with a coefficient of 0.045, while SIZE and CF are significantly negative. These results are consistent with prior studies (Chen et al., 2008; Manry et al., 2008). The third column is regressed on DA.

Similar to the second column's regression results, the coefficient of PT, SIZE and CF are significantly negative while the KP and GROWTH are positive.

The fourth column is regressed on the samples with positive DA. The number of observations reduces to 723. However, the regressions results are very close to the second and third columns with |DA| and DA. The coefficient of PT, SIZE and CF are significantly negative while KP and GROWTH are positive. The fifth column is regressed on the samples with a negative DA. In this regression, the coefficient of PT is still significantly negative while the other variables remain with the same correlation with DA. The only change lies in GROWTH, which turns to be negatively related to DA.

The relationship between firm tenure and audit quality

Table 4 Estimated regression of discretionary accruals on variables

Variable	DA	DA	+DA	-DA
FT	-0.002	-0.003	-0.003	-0.003
(t-statistics)	(-1.510)	(2.071)*	(1.845)*	(2.***
KP	0.099	0.098	0.102	0.008
	(3.991)***	(3.991)**	(3.636)**	(0.532)
GROWTH	0.045	0.042	0.045	-0.028
	(7.427)***	(7.042)**	(6.669)**	(2.34*
CF	-0.712	-0.804	-0.784	-0.330
	(-16.170)***	(18.5***	(14.7***	(5.069)**
SIZE	-0.103	-0.108	-0.116	-0.012
	(-20.082)***	(-21.373)***	(-20.801)***	(2.362)**
ROA	0.900	0.983	0.945	0.459
	(14.581)***	(16.156)***	(9.388)	(5.501)
C	2.468	2.579	2.758	0.286
	(21.570)***	(
Observations	781	781	723	58

***: significant at 1%, **: significant at 5%, *: significant at 10%

Variables are defined in Table 1. The second and third columns of results are the coefficients and t-statistics of each variable when dependent variables are |DA| and DA; the fourth and fifth columns of results are the coefficients and t-statistics of each variable when DA is positive and negative.

Table 4 presents the regression results of testing the hypothesis of audit firm tenure. The estimations of other independent variables are very similar to the regression results in table 8. KP, GROWTH, ROA are significantly and positively related with |DA|, with coefficients of 0.099, 0.045, 0.9 respectively. Whereas, a significant and negative association is found between CF and |DA|, and between SIZE and |DA|. These results are consistent with previous literature

such as Shen et al. (2008). Additionally, the coefficients of audit firm tenure reflect that firm tenure is negatively related to $|DA|$, DA, +DA and -DA with -0.002, -0.003, -0.003, -0.003 respectively, indicating that when the audit firm tenure becomes longer, the audit quality is better by having less discretionary accruals. However, the impact is insignificant with $|DA|$. This result is not consistent with the Hypothesis that audit quality does not change with audit firm tenure. Overall, the evidence of positive relation between audit quality and audit firm tenure do not support the proposal of mandatory firm rotation.

Additional analyses of audit tenure

Other firm-based analyses

In order to test the robustness of the results, we replicate the regression process based on other firms in Sierra Leone. First of all, a distribution of firm list is produced as in Table 5. The number of sample used is after deleting improper observations as described in the samples selection section. Then re-estimations of equations (2) based on different firms are implemented to recalculate the absolute value of discretionary accruals. Finally, run regressions on each. The regression results are shown in Table 6 and Table 7.

Table 6 presents the regression results of model 1 based on each firm. We use the absolute value of the discretionary accruals as dependent variable in this case.

However, the sample firms are not evenly distributed. Some have more samples than the others, while some have insufficient observations.

Consequently, we pay more attention to firms C, H and J. The results are very similar to table 3. The audit partner is negatively associated with discretionary accruals. The coefficients of SIZE and CF are significantly negative while the KP and GROWTH are positive.

Table 7 presents the regression results of model 2 based on the auditing firm. The results are basically very similar to table 4 except for some with insufficient samples. KP, GROWTH, ROA are significantly and positively related with $|DA|$. Whereas, CF and SIZE are significantly and negatively associated with $|DA|$. In addition, firm tenure remains negatively related with $|DA|$, indicating that longer firm tenure enhances audit quality. Therefore, the prior conclusions are proved. Both partner tenure and firm tenure are positively with audit quality.

Table 5 Distribution of firms since 2010 to date

Firm code	A	B	C	D	E	F	G	H	I	J	K	L	M
Number of companies	19	40	469	47	24	55	44	69	29	65	23	15	38
Number of sample used	11	36	403	44	23	46	36	61	0	59	18	12	30

Notes: name and code of each industry:

A: Agriculture, forestry, livestock farming, fishery B: Mining

C: Manufacturing D: Utilities E: Construction

F: Transportation G: information transmission, software and information technology service

H: Wholesale and retail I: Finance J: Real estate K: social services

L: Culture, sports and entertainment M: Comprehensive

The number of sample used is after deleting improper observations as described in the samples selection section.

Table 6 Testing Hypothesis on different Firms**Table 6 Testing Hypothesis on different Firms**

Firm code	A	B	C	D	E	F	G	H	J	K	L	M
PT	0.008	-0.003	-0.005	-0.008	-0.006	-0.01	0.013	-0.007	-0.004	-0.004	0.033	-0.012
coefficient	(0.534)	(-0.449)	(-2.067)***	(-1.739)*	(0.765)	(-1.421)	(-1.151)	(-1.104)	(-0.414)	(-0.488)	(2.818)**	(-1.355)
t-statistics												
ΔP	-0.004	0.002	0.008	-0.005	-0.01	0.014	0.121	0.002	0.018	-0.039	-0.003	0.069
	(0.236)	(-0.094)	(-0.459)	(-0.194)	(0.304)	(-0.655)	(-2.022)**	(-0.035)	(-0.466)	(-1.583)	(0.325)	(-1.319)
GROWTH	0.011	0.056	0.003	-0.007	0.001	0.021	-0.005	0.136	0.086	0.114	0.107	0.063
	(0.087)	(6.005)****	(-0.811)	(-0.557)	(0.011)	(3.627)****	(-0.072)	(5.279)****	(-1.441)	(-1.109)	(2.949)**	(-1.171)
CF	-0.612	0.219	-0.262	0.035	-0.415	-0.396	0.062	-0.775	-0.597	0.472	-0.048	-0.846
	(1.76)	(-2.228)	(6.067)****	(-0.269)	(3.284)**	(5.584)****	(-0.725)	(19.955)**	(7.265)****	(3.579)****	(-0.278)	(8.988)****
SIZE	-0.031	-0.011	-0.008	-0.015	-0.008	-0.033	-0.054	-0.012	-0.039	0.003	0.02	-0.112
	(1.093)	(-1.982)	(-2.445)**	(2.959)****	(1.324)	(4.741)****	(4.843)****	(-1.571)	(3.454)****	(-0.264)	-1.226	(8.101)****
ROA	0.481	-0.024	0.357	0.081	-0.554	0.539	0.107	0.397	1.113	-1.007	-0.993	1.034
	(0.492)	(-0.161)	(6.947)****	(-0.521)	(-1.214)	(-2.411)**	(-0.767)	(2.212)**	(2.682)**	(3.311)**	(2.615)**	(6.449)****
CF	0.696	0.302	0.254	0.412	0.248	0.839	1.216	0.339	0.935	0.012	-0.422	2.653
	-0.741	(2.311)**	(3.358)****	(3.431)****	(1.633)	(5.239)****	(4.946)****	(2.078)**	(3.776)****	(-0.058)	(-1.155)	(8.646)****

***: significant at 1%, **: significant at 5%, *: significant at 10% .Notes: A: Agriculture, forestry, livestock farming, fishery B: Mining C: Manufacturing D: Utilities E: Construction F: Transportation G: information transmission, software and information technology service H: Wholesale and retail I: Finance J: Real estate K: social services L: Culture, sports and entertainment M: Comprehensive.

Table 7 Testing Hypothesis on other firm**Table 7 Testing Hypothesis on other firm**

Firm code	A	B	C	D	E	F	G	H	J	K	L	M
FT	-0.0006 (-0.106)	0.003 (0.991)	-0.004 (-0.12)	-0.002 (1.251)	-0.001 (-0.317)	-0.003 (-1.247)	0.002 (0.669)	-0.001 (-0.418)	-0.004 (-1.572)	-0.002 (-1.036)	-0.001 (0.284)	-0.005 (-2.095)**
KP	-0.004 (-0.276)	0.006 (0.231)	0.007 (0.441)	-0.011 (0.370)	-0.015 (-0.465)	0.009 (0.397)	0.133 (2.244)**	0.016 (-0.339)	0.015 (0.387)	-0.043 (-1.826)*	-0.003 (0.423)	0.062 (1.239)
ROWTH	0.022 (0.168)	0.057 (6.298)***	0.003 (0.872)	-0.010 (0.759)	0.002 (0.044)	0.021 (3.683)***	-0.031 (-0.424)	0.132 (5.113)***	0.093 (1.607)	0.102 (1.054)	0.089 (1.417)	0.067 (1.341)
CF	-0.763 (2.842)**	0.228 (2.366)**	-0.254 (5.839)***	0.025 (0.184)	-0.394 (3.163)***	-0.383 (5.089)***	0.056 (-0.642)	-0.782 (20.053)***	-0.561 (6.749)***	0.493 (3.821)***	-0.197 (0.755)	-0.907 (9.553)***
SIZE	-0.042 (2.089)*	-0.01 (-1.830)*	-0.008 (-2.324)**	-0.013 (2.611)*	-0.007 (-1.182)	-0.036 (4.906)***	-0.055 (4.863)***	-0.010 (-1.334)	-0.035 (3.044)***	0.003 (0.289)	0.003 (0.118)	-0.122 (8.454)***
ROA	0.656 (1.131)	0.024 (0.156)	0.349 (6.759)***	0.067 (0.423)	0.458 (1.021)	0.492 (2.083)**	0.141 (0.971)	0.412 (2.278)**	1.095 (2.702)	-1.018 (3.756)***	-0.641 (1.148)	1.108 (7.247)***
C	0.949 (2.277)*	0.247 (1.902)*	0.231 (3.056)***	0.371 (3.107)	0.221 (1.454)	0.913 (5.134)***	1.255 (5.107)***	0.326 (1.978)	0.818 (3.217)	0.015 (0.074)	-0.058 (0.119)	2.874 (8.894)

***: significant at 1%, **: significant at 5%, *: significant at 10%. Notes: A: Agriculture, forestry, livestock farming, fishery B: Mining C: Manufacturing D: Utilities
E: Construction F: Transportation G: information transmission, software and information technology service
H: Wholesale and retail I: Finance J: Real estate K: social services L: Culture, sports and entertainment M: Comprehensive

Adding-back omissions

As mentioned inter alia, we constructed our sample by deleting 55 observations without unqualified auditing opinion and 4 observations with missing auditor's information. In order to test the robustness of the previous conclusions, we added 84 omissions back. New firms were not added because the financial statements on them were unavailable, thus the Modified Jones model cannot be used. Based on these 865 observations, we replicate the process of calculating DA and running regressions of model 1 and model 2. The results are presented in Table 8.

The regression results are different from prior conclusions in section 4.3 with 781 observations or in section 4.4.1 other firm-based analysis. Partner tenure is insignificantly and positively related with discretionary accruals, while ROA is negatively related with |DA|. Moreover, the influence of CF on |DA| is positive rather than negative in the previous analyses. Such big changes may due to the inference from the added observations. Therefore, we think it is better to exclude these 84 observations as what we did in section 4.3.

Table 8 Estimated regression after adding-back omissions**Table 8 Estimated regression after adding-back omissions**

		Model 1 (PT)	Model 2 (FT)
PT/FT	Coefficient	0.003	-0.001
	t-statistics	(0.204)	(-0.147)
KP		0.050	0.048
		(0.687)	(0.658)
GROWTH		0.279	0.279
		(49.928)***	(49.975)***
CF		0.836	0.836
		(43.288)***	(43.215)***
SIZE		-0.039	-0.039
		(-3.063)***	(-3.059)***
ROA		-1.302	-1.301
		(-40.307)***	(-40.308)***
C		1.112	1.123
		(3.939)***	(3.977)***
□		0.824	0.823

***: significant at 1%, **: significant at 5%, *: significant at 10%

DA=value of discretionary accruals; |DA|=absolute value of discretionary accruals ; GROWTH=growth rate of total assets from year t-1 to t; CF=cash flow from operations divided by total assets in year t-1; SIZE= natural logarithm of total assets in year t; ROA= net income in year t divided by total assets in year t-1; PT=length of audit partner tenure; FT= length audit firm tenure; KP= dummy variable if company is audited by KPMG firm 1= Yes , 0=No

SUMMARY AND CONCLUSIONS

Prior researchers have investigated the relationship between audit tenure and audit quality before the implementation of the mandatory rotation policy either through partner tenure or firm tenure, in order to examine the necessity of the rotation policy. However, the conclusions have never reached a consensus. In Sierra Leone, audit partner rotation was adopted since 2005, and the main purpose of this study has been to investigate the relationship between audit tenure and audit quality in Sierra Leone with special reference to KPMG. In light of the above, data was collected from financial statements and auditing reports. Additionally, discretionary accruals measured by the Modified Jones model are used as the proxy of audit quality.

The results are consistent with the hypothesis that audit quality does not change with increasing audit tenure. The findings suggest that audit partner tenure has significant and negative effects on the absolute value discretionary accruals, indicating that long audit tenure can improve audit

quality. Besides, the absolute value of discretionary accruals is also negatively related with audit firm tenure. However, there is no evidence that the effect from firm tenure is significant. Hence, the findings do not support the proposal of audit firm rotation. Furthermore, additional analyses are applied to test the robustness. By classifying the sample into different firms and running regressions on each separately, we found a significantly negative relationship between audit partner tenure and audit quality, and insignificant effects from audit firm tenure. Therefore, the prior multivariate analysis findings are proved and a positive relation between audit tenure and audit quality is concluded.

This study is however subjected to some limitations. Firstly, we used discretionary accruals as the proxy for audit quality. Although it is a good measure of audit quality as suggested in prior research (Johnson et al., 2002; Myers et al., 2003; Choi et al., 2010), there is a loophole in this method. When the financial reporting quality is good, even if the audit quality is poor, the value of discretionary accruals is still low. More proxies are suggested in other studies, such as earnings response coefficients (Ghosh et al., 2009), and financial report restatement (Myers et al., 2004). Each proxy has its limitations, but using more proxies in one study may be more persuasive. Secondly, our models to test the hypothesis include control variables such as GROWTH, KP and SIZE to reduce the influence from other variables. But they cannot eliminate the inference from all factors. If other variables proposed in previous studies, such as audit fee and firm expertise are included, the empirical results could be more convincing. Furthermore, our sample include listed firms in 2017 and it is relatively small to use one year's data.

To sum up, our study contributes to the research on audit tenure and audit quality. The results reflect a positive relationship between both audit tenure and audit quality and therefore, this study does not support the proposal of firm rotation.

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Appendix

Definition of variables

NDA_t = Non-discretionary accruals in year t scaled by lagged total assets

ΔREV = Change in revenue from year t-1 to year t

ΔREC = Change in net debtors from year t-1 to year t

PPE_t = Gross property, plant and equipment at the end of year t

A_{t-1} = Lagged total assets

TAt = Total accruals in year t (earnings before extraordinary items minus net cash flow from operations)

ε_t = The residual, which represents the firm specific discretionary accruals proxy

$\alpha_1, \alpha_2, \alpha_3$ = The Ordinary Least Squares (OLS) estimates of

DA = value of discretionary accruals measured by Modified Jones model

FT = length audit firm tenure

GROWTH = growth rate of total assets from year t-1 to t

CF = cash flow from operations divided by total assets in year t-1

SIZE = natural logarithm of total assets in year t

ROA = net income in year t divided by total assets in year t-1

KP = dummy variable if company is audited by KPMG firm 1 = Yes, 0 =