Relation Between Real Earnings Management And Audit Quality

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**Abstract**

*Net income is composed of CFO and accruals. Auditors generally detect discretionary accruals to raise reliability of financial reporting and call upon managers to correct their financial reports according to the materiality. From these viewpoints, prior researches use the size of discretionary accruals as proxies for the audit quality. However, manager can also use CFO factors as means of earnings management. We confirm whether abnormal CFO factors, that is, real activity earnings management (hereafter RAM) by Roychordhury model(2006), can be as a proxy for the audit quality with comparing the size of RAM with existing proxies of audit quality such as auditors’ size (e.g. big4), audit time and audit fee. Our results show that the size of RAM is positively correlated with some existing proxies of audit quality. Also, we find discretionary accruals positively correlated with RAM in Korea. The result implies managers in Korea simultaneously use RAM as well as discretionary accruals as a means of earnings management.*

**Keywords:** Real Activity Earnings Management; Audit Quality; Operation Cash Flow

**1. Introduction**

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et income consists of cash flows from operating activities (hereafter, CFO) and accruals. Because accruals match the timing of the accounting recognition with the timing of the economic benefits, with accrual-based earnings we can measure firm performance better (Dechow and Dichev 2002). However, accruals are mainly based on assumptions and estimates that, if wrong, must be corrected for the future earnings (Dechow and Dichev 2002). In particular, discretionary accruals can be used for the means of manager's earnings management. Therefore auditors are needed to detect discretionary accruals to raise reliability of financial reporting and recommend managers to correct their financial reports according to materiality. From these viewpoints, prior researches used discretionary accruals as proxies for the audit quality. Meanwhile, there is a view of CFO used in earnings management in addition to accruals. As mentioned above, CFO as well as accruals is included in net income. Manager can use various means for earnings management. CFO can be also one of the means.

Traditionally there were a lot of studies about discretionary accrual earnings management (hereafter, DAM). However, after Bugstahler and Dichev (1997) who maintain that CFO can be the means of earnings management as well, studies on earnings management by the means of affecting CFO have proceeded actively. Especially, Roychowdhury (2006) defined the earnings management through affecting CFO as real-activity earnings management (hereafter, RAM), measured by combining three elements, i.e. costs of goods sold (hereafter COGS), production costs, and discretionary expenses.

The recent researches focus on the relation between DAM and RAM, and report that due to several factors which make it difficult to use DAM for the earnings management (for example, regulations by Sarbanes-Oxley Act, etc.), managers use RAM more than DAM (Cohen, 2008). Most of prior researches about RAM hold that managers use RAM so frequently that auditors have difficulties to detect earnings management as policies, such as SOX, have increased auditor's assurance responsibility.

If auditors conduct audits of high quality according to the auditing standards, RAM as well as DAM will decrease. In this way, auditors would improve audit quality by supplying reliable information, solving uncertainty by reducing earnings management, in any case of DAM or RAM. This implies that RAM just like DAM can be a proxy for audit quality. Therefore, this study investigates the relation between the audit quality and the abnormality of RAM, and analyzes whether RAM can be a suitable proxy for audit quality.

We organize the paper as follows: Section 2 reviews existing literature on earnings management and audit quality. Section 3 develops arguments for our hypothesis, and discusses our methodology. In Section 4, we present descriptive statistics and the results of the empirical test. Section 5 deals with the conclusion and discusses the contribution and limitation of the results in this paper.

**2. HYPOTHETICAL BACKGROUND**

Audit quality is defined to be the market-assessed joint probability that a given auditor will both discover frauds and errors in the client's financial statements, and report the ones as they are (DeAngelo 1981). But, it is impossible to measure audit quality as the above definition because the elements of audit quality are determined by auditors whose view tends to be subjective rather than objective, and audit quality is not instantly perceivable. In addition, because of various circumstantial variables such as auditor, contract, and audit fee which influence audit quality, it is almost impossible to measure this as the definition. As a result, prior research used several proxies to measure audit quality.

DeAngelo (1981) used accounting firm’s size as a proxy for audit quality. As its size gets bigger, inputted costs (fixed costs) increase the audit-related experience and knowledge of auditors, and they also increase an economic quasi-rent. Meanwhile, as the weight of depending on a certain company applied to external audit for an auditor, whose economic quasi-rent is big, gets smaller, it increases the probability that the auditor detects frauds and errors and reports them honestly. Therefore, accounting firm's size can be a good proxy for audit quality. And auditor's size is also relatively easy to measure when using various tools like auditor's sales amounts, total assets size, the number of its clients and total audit fees, etc. And the measurement costs are so inexpensive that the size variable has excellent several conditions as a proxy for audit quality.

Chung and Kallapur (2003) used the absolute value (size) of DAM for measurement through Adjusted Jones Model (1995) as proxy for audit quality. It is an unavoidable matter, due to the inherent limit of audit, that earnings management may be included partially in the financial statements although they were audited by external auditors. However, because an auditor may decrease managers’ earnings management through auditing efficiently and effectively, magnitude of earnings management that is included in the assured financial statements can be a basis to be used as proxy for audit quality.

Khurana and Raman (2004) studied whether high audit quality of Big 4 is due to a litigation risk or it is needed for its auditor's reputation matters. They used an implied cost of equity capital to measure the reliability of financial information as a proxy for audit quality. It is thought that the reliability of a company’s financial statements decreases as an implied cost of equity capital cost increases because information asymmetry between information users is reflected in this cost of capital.

Traditionally, most of studies on earnings management are involved in discretionary accruals, but studies on real-activity earnings management that affects cash flows have existed partially. Bartov (1993) proved that managers conduct the act of income smoothing because they have discretionary powers to control the disposal timing of fixed assets and investment assets.

Mande et al. (2000) proved that managers use short-term decision making of discretionary controlling the expenditure for research and development expenses according to economic conditions. Gunny (2005) investigated four types of earnings management i.e. research and development expenses, selling and administrative expenses, gains on disposal of long-term assets and investment assets, and diminishment of COGS through RAM of current period exert a negative influence on future operating activities. Roychowdhury (2006) developed a model of measuring RAM which aims to increasing earnings through price cutting, over-production of inventories and reduction of discretionary expenditures.

Zang (2012) confirmed that DAM and RAM can be used as substitutes for each other. And he confirmed that there is the sequence between these two, i.e. using RAM firstly, then DAM secondly. And a company’s manager who has litigation risks switches using DAM to depending on RAM, from this result, it can be asserted that there exists the trade-off relation between RAM and DAM. This hints that RAM is a type of earnings management that is hardly exposed than DAM.

Mizik et al. (2008) insisted that the market does not properly evaluate a company that carries out earnings management at the time of seasoned equity offerings. It is because the earnings management through RAM aiming higher income report is carried out more than through DAM. According to Edelstein et al. (2008), American investment companies in real estate have to pay out 90% of net income for the current year by the federal law, and he showed that these companies increased expense and reduced net income using RAM to reduce amounts of their obligatory dividend.

Coulton et al. (2008) confirmed that a manager use RAM in the fourth quarter mainly to meet earnings objectives. And they added the type of earnings management can be altered according to the purpose of financial reporting. Cohen and Zarowin (2010) showed that RAM as well as DAM is used at the time of seasoned equity offerings and these have significant negative (-) correlation meaning these have a relation of contradiction. Cohen et al. (2008) proved that types of earnings management are changed to RAM from DAM after implementation of SOX, and they insisted as the reason that compensations to managers are mainly a type of share compensation such as stock option before the implementation of SOX.

**3. HYPOTHESIS AND METHODOLOGY**

**3.1 Hypothesis Development**

Net income is an index of a company’s management results for current years, and consists of cash flows from operating activities and accruals. Accruals are applied for the accrual basis which is a basic principle in accounting areas. And they match the accounting recognition with the timing of events which are the causes of cash inflows and outflows rather than the timing of actual cash inflows and outflows; accruals are regarded as an indispensable factor to deliver useful information to information users. However, accruals are frequently based on assumptions and estimations; this feature is criticized for a means of earnings management by adjusting values listed in financial statements. That is, discretionary accruals can be used by manager's earnings management means. Therefore, to raise reliability of financial reporting, auditors have responsibilities of detecting discretionary accruals which make it possible to distort financial reporting, and they are required correcting these ones according to the level of materiality. From these viewpoints, many prior researches used discretionary accruals as a proxy for audit quality.

However, CFO as well as accruals is included in net income. CFO is also used in earnings management, isn’t it? It may be possible. Earnings management is implemented according to the discretionary powers given to managers; means of earnings management for which managers use accruals or CFO come under other problems. That is, manager can use various means to earnings management. CFO can be one of the means. For example, it is an adjustment of accounting numbers related to accruals that manager recognizes what should be treated as development costs (asset) as routine development expenses (expense); it shall be earnings management influencing on the current year’s cash flows that managers increase routine development expenses to decrease net income. Both these two methods of earnings management affect net income, but there is a difference between the former (the adjustment of time recognition), which does not affect cash flows, and the latter (the adjustment of an amount of expenses), which does affect cash flows.[[1]](#footnote-1)

Traditionally, there were a lot of studies about earnings management using discretionary accruals (hereafter, DAM). While these studies suppose that CFO is difficult to be used by the means of earnings management, Bugstahler and Dichev (1997) argued that CFO should also analyzed empirically because CFO can be the means of earnings management. Accordingly, recent studies about earnings management that affects CFO are proceeding actively. Especially, Roychowdhury (2006) and his followers analyze earnings management affecting CFO known as real-activity earnings management (hereafter RAM), and measure the value of RAM by combining three elements of sales amounts, production costs, and discretionary expenses.

Many recent researches focus on the relation between DAM and RAM, and report that due to several institutional factors (seasoned equity offerings, hereafter, SEO and Sarbanes-Oxley Act, hereafter SOX, etc.), it is empirically shown that managers are using RAM more than DAM (Cohen 2008). This result means that managers use RAM a lot as a means of earnings management, for it is hard to be detected by the auditor as policies, such as SOX, have increased auditor's assurance responsibility.

If an auditor conducts audit properly according to GAAP (generally accepted accounting standards) and GAAS (generally accepted auditing standards), RAM as well as DAM will decrease. In this way auditors solve uncertainty problems by reducing discretionary earnings management by a manager (even if it is earnings management through DAM or through RAM), and supplying reliable information; this aims to improve audit quality. This implies that RAM as well as DAM can be a proxy for audit quality.

Therefore, this paper analyzes whether RAM can be used as a proxy for audit quality by measuring the size of discretionary (abnormal) RAM, and how RAM is related to other proxies for audit quality.

**Hypothesis:** Ceteris paribus, as the level of audit quality increases, the value of RAM decreases.

**3.2 Methodology**

*3.2.1 Measure of Real Activity-Based Earnings Management*

One of most favored proxies of real activity-based income adjustments is the model used by Roychowdhury (2006), which is intended to capture the abnormality level of cash flows from operating activities (CFO), production costs and discretionary expenses. And Zang (2012) and Gunny (2006) increased the validity of this method by verifying this proxy of Roychowdhury (2006) empirically.

The details of real activity-based income adjustments from those three variables in the above can be stated as follows:

1. CFO: A company can accelerate point of sales by price discounts or relief of credit conditions
2. Production costs: A company can lower the cost of sales by increasing production volumes.
3. Discretionary expenses: A company can reduce cash outflows by decreasing discretionary expenses including advertising expenses, research & development expenses and selling and administrative expenses.

Roychowdhury used the method of the actual amounts minus the normal amounts which are considered as not exercising real activity-based income adjustments, to measure abnormal amounts of *CFO,* production costs and discretionary expenses. Meanwhile, the normal amounts of *CFO,* production costs and discretionary expenses are computed from the method developed by Dechow, Kothari and Watts (1998) as it is. In the viewpoint of Dechow, Kothari and Watts, the normal *CFO* is tacitly considered to have a linear relation with the sales amounts and the change of sales amounts. And the details of equations are as follows:

CFOit/Ai,t-1 = a0[1/Ai,t-1] + b1[Salesit/Ai,t-1] + b2[ΔSalesit/Ai,t-1] + εit (1)

Ait-1: total assets in year t-1

Salesit: Sales in year t

ΔSalesit: Salesit - Salesit-1

The cost of production is defined as the sum of the cost of goods sold *(COGS)* and the change of inventories. We can derive this below equation from equation (1), as it is acceptable that the relation between the *COGS* and sales of certain year is almost linear.

CFOit/Ai,t-1 = a0[1/Ai,t-1] + b1[Salesit/Ai,t-1] + εit (2)

The change of inventories can be derived as follows:

ΔINVit/Ai,t-1 = a0[1/Ai,t-1] + b1[ΔSalesit/Ai,t-1] + b2[ΔSalesi,t-1/Ai,t-1]+ εit (3)

When using equation (2) and equation (3), the normal costs of production can be derived as follows:

Prodit/Ai,t-1 = a0[1/Ai,t-1] + b1[Salesit/Ai,t-1] + b2[ΔSalesit/Ai,t-1] + b3[ΔSalesi,t-1/Ai,t-1]+ εit (4)

The normal discretionary expenses are the sum of advertising expenses, research & development expenses (R&D) and selling and administrative expenses (SG&A). In this paper, we consider the normal discretionary expenses in the current year have a linear relation with sales in the prior year as we adopt the method used by Cohen et al. (2008). If we apply sales in the current year in the model, it will be difficult to capture the decrease in the residual for a case that the management exaggerates sales amount which is not actually occurred; we may have very little residuals in that case, as a result, sales in the prior year is used in the equation. The details of the equation are as follows:

DisExpit/Ai,t-1 = a0[1/Ai,t-1] + b1[Salesi,t-1/Ai,t-1] + εit (5)

From this equation (1) ~ (5), we can calculate the abnormal *CFO,* the abnormal production costs and the abnormal discretionary expenses. And, in using these three factors to output the proxy of the real earnings management, we calculate the standardized variable by connecting all of these three factors to be denoted as *RAM* suggested by Cohen and Zarowin (2010) through equation (6).

RAM\_Proxy=Abnormal CFO×(-1)+Abnormal Prod+Abnormal DisExp×(-1) (6)

The reason that abnormal CFO and abnormal DisExp are given the negative sign(-) in equation (6) is to homologize sign of earnings management through real activity. Concretely, RAM and abnormal CFO, abnormal Production costs, and abnormal discretionary expenses have following relativity.

First, because acceleration of the timing of sales through increased price discounts or more lenient credit terms increases credit sales than cash sales, account receivables increases. Therefore, acceleration decreases firm's CFO. Increasing of production costs too decreases CFO. On the other hand, decreasing of discretionary expenses can increase CFO itself, but decreasing of sales promotional, advertisement, and R&D expenses in current period can decrease sales and CFO in next period. Considering above, it is expected that there is a negative (-) relation between CFO and real-activity earnings management.

Second, reporting of lower cost of goods sold through increased production increases production costs. Therefore, lower cost of goods sold through increased production has positive (+) relation with real-activity earnings management.

Third, because it is meaning to increase earnings through real activity to decrease discretionary expenses including advertising, R&D, and SG&A expenses, discretionary expenses have negative (-) relation with real-activity earnings management.

RAM\_ Proxy's value itself means direction of earnings management. Exactly, if RAM\_Proxy has positive (+) value, it means that manage earnings upward through real-activity. In contrary, value has negative (-) value, it means that manage earnings downward through real-activity.

However, we used absolute value of RAM\_ Proxy to measure earnings management. It is because upward and downward management of earnings have same meaning in earnings management to auditor.

*3.2.2 Measurement of Audit Quality*

Audit quality is defined as the joint probability of detecting and reporting material financial statement errors (DeAngelo, 1981), which will partially depend on the auditor’s independence. On the other hand, if audit reports are limited as an end result produced by auditors, auditors’ opinion will be recognized as the audit quality depending on contexts.

However, it is difficult to measure audit quality using the above-mentioned definition; auditors’ subjectivity prevents factors of audit quality from fair and objectively estimated ones. In addition, various circumstantial variables, such as the condition of contract between the auditor and the auditee, and the audit fee, etc., influence audit quality, it is almost impossible to measure this as the definition.

So prior researches used several proxies to measure audit quality as follows; first, auditor's reputation can be a suitable proxy for audit quality. Auditor’s reputation is essential for keeping current audit clients and attracting major new clients. Besides, auditor's reputation brings augmentation of audit fee, and can offer the auditee incentives to prevent or detect oneself frauds or errors. In summary, auditor's reputation has a positive relation with audit quality. Second, it is auditor's size. DeAngelo (1981) used the size of audit firm as proxy for audit quality. As an auditor's size grows bigger, economic quasi-rents of the auditor also increase; these rents are good things to be explained for the auditor’s suitability and independence. As an auditor’s size grows bigger, inputted costs (fixed costs) increase auditor’s various experience and knowledge, and also increase economic quasi-rents. In other words, for an auditor whose economic quasi-rents are big, the possibility of fairly stated opinion becomes higher by the promoted independence; consequently, an auditor’s size will be a good proxy for audit quality.

Auditor’s size has various ways to be measured, like auditor's sales amounts and assets size, the number of auditees and total audit fees, etc., and the measurement cost is so inexpensive that it has excellent several conditions to be used as proxy for audit quality.

Third, it is possible to measure audit quality through the magnitude of earnings management. It is an unavoidable matter, due to the inherent limit of audit, that earnings management may be included partially in the financial statements although they were assured by external auditors. Nevertheless, the magnitude of earnings management that is included in the assured financial statements can be a basis to use as proxy for audit quality, for it will be possible that an auditor reduces earnings management by auditing efficiently and effectively. Generally, discretionary accruals are used to capture earnings management. And Jones Model (1991) is used mostly to measure discretionary accruals, in which normal (non-discretionary) accruals are measured by time-series or cross-sectional analysis and the value of DAM is calculated through total accruals minus non-discretionary accruals.

Fourth, litigation risk can be a proxy for audit quality. Auditors are liable to be sued by many kinds of law. For it is necessary to protect information users who make their own decisions on the basis of the assured financial reporting by external auditors. As a result, auditors are needed to avoid litigation risk by performing higher-quality auditing. Litigation risk may be measured through the number of litigation cases.

Finally, there is a proxy such as the reliability of financial information. This is like logic of earnings management because the reliability of financial statements is assured by external auditors. The reliability of financial information can be measured by CAR of the ERC Model at the time of public announcement, analyst-expected information, or cost of owner’s capital.

The purpose of this paper is to provide RAM as proxy for audit quality, and to prove the validity of RAM through comparing this with existing proxies for audit quality. So, in this paper we are willing to compare RAM with as many other proxies as possible. Existing proxies used in this paper are auditor’s reputation (Big 4 or non-Big 4), auditor’s size (auditor's sales amounts, assets, audit fees and audit hours, etc.), implied cost of capital, which is a measure of the reliability of the financial statements, and DAM, which is often used in the prior studies as a proxy of earnings management measured by Jones Model (1991).

When we compare DAM to RAM, although DAM just like RAM is used for the purpose of earnings management and DAM have an innate relation with RAM, there may be some differences between them because of certain conditional variables of companies subject to external audit.[[2]](#footnote-2) For this reason, we may have a high value for RAM against a low value for DAM, and vice versa. In conclusion, both are proxies of earnings management, but they have different characteristics and meanings; although they can be independently used as proxies of audit quality, it is meaningless to inspect the relation between the two or to compare values of the two for a company. Therefore, it is appropriate to study in which cases DAM has different directions or values from RAM.

One weakness of recognizing RAM as a proxy of audit quality is that RAM will be an inadequate variable to influence the audit opinion of a company, if the manager claims that the decision-making of the management was inevitable to deal with change in the corporate environment in response to the demand of an auditor to disengage earnings management from real activities including the acceleration of sales by price discounts or relaxation of credit conditions and increase of production volumes or the ending of inventories, which of the manager are within the discretion of the manager.

And another weakness of RAM, as compared to DAM, is that, although we use total non-discretionary accruals in the financial statements inclusively to calculate the value of DAM (Top-down Approach), for RAM, we should separate out the abnormalities in every account and then sum them up to compute the value of RAM (Bottom-up Approach); there may therefore be the possibility of omitting some parts of RAM related to non-operating income or expenses. However, most auditors focus on three factors which make up the Roychowdhury(2006) Model, and RAM can be a means of capturing frauds and errors that might not be recognized using DAM. Consequently, we consider that the utilities of RAM are adequate.

**3.3 Regression Model**

We use regression analysis to verify our hypothesis. Our regression model is as follows:

RAMit = γ0+ γ1AQit + γ2 SIZEit + γ3 LEVit + γ4OCFit + γ5GROWTHit + γ6MCGit + γ7FCGit

 + γ8NEGEit + γk∑YEARit + γk∑INDit + εit (7)

*RAMit*: level of real-activity earnings management in year t

AQit: proxy of audit quality (=auditor’s size/audit fee/audit time) in year t

SIZEit: natural logarithm of total assets for firm i in year t

LEVit: total debt divided by total equity for firm i in year t

OCFit: Operating Cash Flow for firm i in year t

GROWTHit: growth rate of sales for firm i in year t

MCGit: ratio of the largest shareholder and the related party ownership for firm i in year t

FCGit: ratio of foreign investment ownership for firm i in year t

NEGEit: 1 if firm i's net income is negative and 0 otherwise

YEAR: year dummy variable

IND: industry dummy variable

As auditor's reputation becomes higher, the size of RAM will decrease because the auditor will try to decrease the degree of earnings management to elevate his or her own reputation.

In addition, we expect the magnitude of RAM will tend to decrease as the size or the effort of auditor increases, since the scale or the endeavor of an audit company or partnership is considered to elevate audit quality. As the cost of the owner’s equity of an audited corporation increases, an increase in RAM is also to be expected because the information asymmetry between management and other information users gets larger, which results in a reduction in the credibility of the financial statements and makes it difficult to detect RAM, one of the causes making for asymmetries of information. In the above table, our expectation for the predicted sign of the size of discretionary accruals is a question mark. The reason is as follows: DAM and RAM are tools for the measurement of earnings management for accruals and for the measurement of cash flows from operating activities, respectively, which results in their innately negative (-) relation. In many prior research papers, it was found that these two variables are negatively correlated (Cohen 2008; Zang 2012). However, when there is the possibility that the manager uses both DAM and RAM for earnings management, is not unreasonable to expect these two variables to have a positive (+) relation.

Meanwhile, some variables like a term dummy, an industry dummy, the leverage of liabilities (LEV), the asset size of a firm (SIZE) and the growth rate of total assets (GROWTH), all of which are considered to influence the size of RAM, are also included in this model as control variables. DeFond and Jiambalvo (1994) claim that if the debt leveraging is increasing, managers will tend to increase their reported income. According to Watts and Zimmerman (1986), the larger the size of a firm, the greater the likelihood of its being a political target; an increase in political costs provides managers with an incentive to underreport accounting profits. When deducing the size of the firm *(SIZE),* sales are usually used, but in this study, the logarithm of total assets is applied because t strong correlations exist between real activities manipulation *(RAM)* and sales amounts. If the growth rate of the firm *(GROWTH)* is high, managers will be inclined to report higher returns for tax purposes. We use the annual growth rates of total assets as proxies for growth patterns. Operating Cash Flow (CFO) is used to control not only firms’ size and their earnings management (Dechow et al. 1995). Corporate governance can affect earnings management. Therefore, we includes both the ratio of the largest shareholder and the related party ownership (*MCG*) and the ratio of foreign investment ownership (*FCG*) as control variables for earnings management (Bamber et al. 2010). Finally, we consider loss firm (*NEGE*) because loss firm may affect reporting way in order to reduce the deficits (Bugstahler and Dichev 1997; Bamber et al. 2010).

**3.4 Sample Selection**

The sample consists of all firms with available financial data from TS-2000 (Korea Listed Companies Association). The sample includes non-financial firms that are traded on Korea Stock Exchange and KOSDAQ. We exclude firms in the financial industry because accounting rules are different for these firms. And the sample includes annual data for firms covering years from 2001 to 2010. The final sample consists of 13,822 firm-year observations.

**Table 1.** Total Sample Selection

|  |  |
| --- | --- |
| **Sample characteristics** | **Number of firm-year observations** |
| Total number of firm-year observations | 17,119 |
| Less: Issues for administration | (991) |
| Financial firms | (1,092) |
| Outlier and unavailable data | (1,214) |
| Total | 13,822 |

**4. EMPIRICAL RESULTS**

**4.1 Descriptive Statistics and Correlation**

Table 2 represents the descriptive statistics of all the variables, proxies of audit quality and RAM and its components. Panel A of table 2 presents descriptive statistics of the variables by time periods of 2001–2010. The mean (median) of the ratio of assets size (*SIZE*) is 18.401(18.211). The mean (median) of leverage (*LEV*) is 1.211(0.766). The mean (median) of ownership of foreign investment (*FCG*) is 0.063(0.069). Panel B of Table 2 shows descriptive statistics of the variables linked to proxies of audit quality. The mean of auditor size (*BIG4*) is 0.561. The mean (median) of audit fee (*AUDITFEE*) and audit hour (*AUDITHOUR*) is 11.357(11.207) and 6.939(6.816). Panel C shows descriptive statistics of proxies of earnings management. The mean (median) of discretionary accruals (*DA*) is 0.001(0.001). The mean (median) of real activity earnings management (*RAM*) is 0.002 (0.001). This result implies that proxies of earnings management are in the form of a normal distribution.

**Table 2.** Summary statistics for variables used in the regression models

|  |
| --- |
| **Panel A.** descriptive statistics of control variables |
| **Variables** | **Mean** | **Std. dev.** | **Min** | **Q1** | **Median** | **Q3** | **Max** |
| SIZE | 18.401  | 1.456  | 13.710  | 17.409 | 18.211  | 19.131  | 25.398  |
| LEV | 1.211  | 14.010  | 0.000 | 0.343  | 0.766  | 1.319  | 821.30 |
| OCF | 0.048  | 0.144  | -2.913  | -0.010 | 0.048  | 0.119  | 1.240  |
| GROWTH | 0.210  | 13.695  | -1.109 | -0.053  | 0.134 | 0.351 | 0.893  |
| MCG | 0.391  | 0.173  | 0.000  | 0.261 | 0.383  | 0.514  | 0.954  |
| FCG | 0.063  | 0.119 | 0.000  | 0.023  | 0.069  | 0.091 | 0.879  |
| NEGE | 0.261  | 0.431  | 0.000  | 0.000  | 0.000  | 1.000  | 1.000  |

|  |
| --- |
| **Panel B.** descriptive statistics for proxy of audit quality |
| **Variables** | **Mean** | **Std. dev.** | **Min** | **Q1** | **Median** | **Q3** | **Max** |
| BIG4 | 0.561  | 0.451  | 0.000 | 0.000 | 1.000 | 1.000 | 1.000 |
| AUDITFEE | 11.357 | 0.793 | 8.948 | 10.013 | 11.207 | 13.991 | 15.753 |
| AUDITHOUR | 6.939 | 0.845 | 4.610 | 6.091 | 6.816 | 8.192 | 10.958 |

|  |
| --- |
| **Panel C.** descriptive statistics for proxy of earnings management |
| **Variables** | **Mean** | **Std. dev.** | **Min** | **Q1** | **Median** | **Q3** | **Max** |
| DA | 0.001 | 0.091 | -0.751 | -0.050 | 0.001 | 0.051 | 0.551 |
| Ab\_CFO | -0.002 | 0.108 | -0.316 | -0.064 | -0.001 | 0.041 | 0.490 |
| Ab\_Prod | 0.003 | 0.110 | -0.467 | -0.059 | 0.002 | 0.071 | 0.418 |
| Ab\_DisExp | 0.006 | 0.061 | -0.340 | -0.011 | 0.009 | 0.039 | 0.213 |
| RAM | 0.002 | 0.142 | -0.732 | -0.107 | 0.001 | 0.098 | 0.695 |

Panel A, Panel B and Panel C of table 2 report Summary statistics.

Variable descriptions are as follow: SIZE is natural logarithm of total assets for firm i in year t, LEV is total debt divided by total equity for firm i in year t, OCFit: Operating Cash Flow for firm i in year t, GROWTH is growth rate of sales for firm i in year t, MCG is ratio of the largest shareholder and the related party ownership for firm i in year t, FCG is ratio of foreign investment ownership for firm i in year t, NEGE is 1 if firm i's net income is negative and 0 otherwise. BIG4 is 1 if firm i's auditor is big4 and 0 otherwise, AUDITFEE is natural logarithm of audit fee for firm i in year t, AUDITHOUR is natural logarithm of audit hour for firm i in year t. DA are discretionary accruals by using modified Jones Model (1995) for firm i in year t, Ab\_CFO are abnormal cash flows for firm i in year t, Ab\_Prod are abnormal production costs for firm i in year t, Ab\_DisExp are abnormal discretionary expenses for firm i in year t, and RAM is real activity earnings management by using Roychowdhury (2006) and Cohen et al. (2008) model.

Panel A of Table 3 shows Pearson correlation coefficients of the control variables. The correlation coefficient between *FCG* and *SIZE* is 0.455. It means that firms’ size is positively correlated with ownership of foreign investment. Other correlation coefficients among control variables are not significant. This implies the multi-collinearity problem is expected to be minimal.

Cohen and Zarowin (2010) and Zang (2012) argue that RAM and DAM are substitutes for each other from their finding of s strongly negative correlations between RAM and DAM. However, as can be seen from panel B of Table 3, RAM is positively correlated with discretionary accruals (*DA*) in the case of Korea. This result indicates that managers conduct earnings management by using both DAM and RAM simultaneously.

**Table 3.** Correlation coefficients for variables used in the regression models (Pearson)

|  |
| --- |
| **Panel A.** Correlation coefficients linked to control variables |
|  | **SIZE** | **LEV** | **OCF** | **GROWTH** | **MCG** | **FCG** | **LOSS** |
| SIZE | 1.000 | 0.0010.921 | 0.141\*\*\*<.0001 | 0.0000.952 | 0.074\*\*\*<.0001 | 0.455\*\*\*<.0001 | -0.219\*\*\*<.0001 |
| LEV |  | 1.000 | -0.031\*\*\*0.000 | -0.0010.859 | -0.021\*\*0.012 | -0.0130.141 | 0.041\*\*\*<.0001 |
| OCF |  |  | 1.000 | 0.031\*\*\*0.000 | 0.175\*\*\*<.0001 | 0.154\*\*\*<.0001 | -0.371\*\*\*<.0001 |
| GROWTH |  |  |  | 1.000 | 0.0120.113 | -0.0070.418 | -0.0080.236 |
| MCG |  |  |  |  | 1.000 | -0.021\*\*\*0.002 | -0.282\*\*\*<.0001 |
| FCG |  |  |  |  |  | 1.000 | -0.147\*\*\*<.0001 |
| LOSS |  |  |  |  |  |  | 1.000 |

|  |
| --- |
| **Panel B.** Correlation coefficients linked to earnings management |
|  | **DA** | **Ab\_CFO** | **Ab\_PROD** | **Ab\_DisExp** | **RAM** |
| DA | 1.000 | -0.236\*\*\*(<0.001) | -0.108(0.102) | -0.005(0.938) | 0.075\*\*\*(0.007) |
| Ab\_CFO |  | 1.000 | -0.361\*\*\*(<0.001) | -0.118\*(0.073) | -0.669\*\*\*(<0.001) |
| Ab\_PROD |  |  | 1.000 | -0.604\*\*\*(<0.001) | 0.894\*\*\*(<0.001) |
| Ab\_DisExp |  |  |  | 1.000 | -0.582\*\*\*(<0.001) |
| RAM |  |  |  |  | 1.000 |

\*,\*\*,\*\*\* significant at 10%, 5%, and 1% levels, respectively.

Panel A and Panel B of table 3 report Correlation coefficients for variables used in the regression models

Variable descriptions are as follow: SIZE is natural logarithm of total assets for firm i in year t, LEV is total debt divided by total equity for firm i in year t, OCFit: Operating Cash Flow for firm i in year t, GROWTH is growth rate of sales for firm i in year t, MCG is ratio of the largest shareholder and the related party ownership for firm i in year t, FCG is ratio of foreign investment ownership for firm i in year t, NEGE is 1 if firm i's net income is negative and 0 otherwise. DA are discretionary accruals by using modified Jones Model (1995) for firm i in year t, Ab\_CFO are abnormal cash flows for firm i in year t, Ab\_Prod are abnormal production costs for firm i in year t, Ab\_DisExp are abnormal discretionary expenses for firm i in year t, and RAM is real activity earnings management by using Roychowdhury (2006) and Cohen et al. (2008) model.

**4.2 Regression Analysis**

Our regression results of equations (7) are shown in Table 4, Table 5 and Table 6. In Table 4, the coefficient (t-value) of γ1 is significant negatively, which implies that firms employing BIG4 decrease earnings management of their operating cash flow (RAM). Results dividing RAM into three factors (Ab\_CFO, Ab\_Prod, and Ab\_DisExp) show in the same direction of coefficients.

According to prior studies, it is generally difficult to detect RAM by regulators or auditors as compared to DAM because real-activity earnings management is determined by the discretion of managers’ operating decision making (Roychowdhury 2006; Cohen et al. 2008). However, our result indicates that the larger the scale of auditors, firms decrease RAM. In fact, many cases of accounting fraud have been detected by Big4.

**Table 4.** Regression results: proxy of audit quality (*AQ*) is Big4

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Defendant****variables** | **DA** | **Ab\_CFO** | **Ab\_Prod** | **Ab\_DisExp** | **RAM** |
|  | **Coefficient****(t value)** | **Coefficient****(t value)** | **Coefficient****(t value)** | **Coefficient****(t value)** | **Coefficient****(t value)** |
| Intercept | 0.036\*\*\*(3.41) | -0.189\*\*\*(-13.13) | -0.084\*\*\*(-3.98) | 0.083\*\*\*(7.10) | -0.272\*\*\*(-9.03) |
| AQ(BIG4) | -0.001(-0.41) | -0.001(-1.54) | -0.011\*\*\*(-4.11) | -0.008\*\*\*(-5.87) | -0.010\*\*\*(-3.10) |
| SIZE | -0.002\*\*(-2.31) | 0.012\*\*\*(18.63) | 0.005\*\*\*(4.64) | -0.005\*\*\*(-7.02) | 0.015\*\*\*(10.91) |
| LEV | -0.001\*\*\*(-6.93) | 0.001\*\*\*(6.03) | 0.001\*\*(2.47) | 0.000(-0.52) | 0.001\*\*\*(4.58) |
| OCF | -0.347\*\*\*(-24.11) | -0.452\*\*\*(-69.50) | -0.215\*\*\*(-21.43) | -0.015\*\*\*(-2.71) | -0.645\*\*\*(-48.14) |
| GROWTH | 0.002\*\*\*(2.81) | 0.003\*\*\*(5.63) | 0.003\*\*\*(4.23) | -0.005\*\*\*(-12.09) | 0.005\*\*\*(5.12) |
| MCG | 0.028\*\*\*(4.89) | 0.006(1.43) | 0.013\*(1.78) | 0.003(0.73) | 0.019\*\*(2.04) |
| FCG | 0.012(1.08) | -0.031\*\*\*(-7.18) | -0.119\*\*\*(-10.91) | -0.031\*\*\*(-5.12) | -0.179\*\*\*(-12.14) |
| NEGE | -0.141\*\*\*(-40.13) | 0.031\*\*\*(15.13) | 0.033\*\*\*(10.61) | -0.002(-0.89) | 0.061\*\*\*(14.58) |
| ∑IND | included | included | included | included | included |
| ∑YEAR | included | included | included | included | included |
| F value | 105.18\*\*\* | 311.37\*\*\* | 37.14\*\*\* | 17.21\*\*\* | 148.61\*\*\* |
| Adj. R2 | 0.2659 | 0.4851 | 0.1261 | 0.0614 | 0.3654 |

\*Two-tailed t-tests, \*,\*\*,\*\*\* significant at 10%, 5%, and 1% levels, respectively.

Variable descriptions are as follow: BIG4 is 1 if firm i's auditor is big4 and 0 otherwise, SIZE is natural logarithm of total assets for firm i in year t, LEV is total debt divided by total equity for firm i in year t, OCFit: Operating Cash Flow for firm i in year t, GROWTH is growth rate of sales for firm i in year t, MCG is ratio of the largest shareholder and the related party ownership for firm i in year t, FCG is ratio of foreign investment ownership for firm i in year t, NEGE is 1 if firm i's net income is negative and 0 otherwise. DA are discretionary accruals by using modified Jones Model (1995) for firm i in year t, Ab\_CFO are abnormal cash flows for firm i in year t, Ab\_Prod are abnormal production costs for firm i in year t, Ab\_DisExp are abnormal discretionary expenses for firm i in year t, and RAM is real activity earnings management by using Roychowdhury (2006) and Cohen et al. (2008) model.

Results of Table 4 may be taken to imply that auditors making a lot of effort may not pass over real-activity earnings management. So we investigate the effects of the auditor effort such as audit fee or audit time on real activity earnings management. Our result of Table 5 is that the more audit fee is increasing, the more size of RAM is decreasing, which implies that auditor’s effort can have impacts on certain elements of RM.

**Table 5.** Regression results: proxy of audit quality (*AQ*) is Audit fee (*AUDITFEE*)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Defendant****variables** | **DA** | **Ab\_CFO** | **Ab\_Prod** | **Ab\_DisExp** | **RAM** |
|  | **Coefficient****(t value)** | **Coefficient****(t value)** | **Coefficient****(t value)** | **Coefficient****(t value)** | **Coefficient****(t value)** |
| Intercept | 0.061 (1.37) | -0.204\*\*\*(-10.94) | 0.114\*(1.90) | 0.084\*\*\*(9.09) | 0.812\*\*\*(6.22) |
| AQ(AUDITFEE) | -0.010\*\*\*(-2.69) | -0.001\*\*\*(-4.38) | -0.024\*\*\*(-13.53) | -0.009\*\*\*(-8.17) | -0.100\*\*\*(-9.20) |
| SIZE | 0.007\*\*\*(3.59) | 0.008\*\*\*(14.42) | 0.014\*\*\*(14.92) | -0.003(-1.02) | 0.054\*\*\*(9.32) |
| LEV | -0.002\*\*\*(-4.92) | 0.001\*\*\*(5.91) | 0.003\*\*\*(2.99) | -0.001(-0.72) | 0.004\*\*\*(3.10) |
| OCF | -0.737\*\*\*(-46.45) | -0.452\*\*\*(-57.75) | -0.151\*\*\*(-14.41) | -0.419\*\*\*(-3.97) | -1.338\*\*\*(-28.91) |
| GROWTH | 0.004\*\*\*(3.56) | 0.001\*(1.72) | 0.001(1.23) | -0.001\*(-1.04) | 0.002(0.62) |
| MCG | 0.029\*\*\*(3.53) | -0.006(1.01) | 0.018\*(1.49) | 0.003(0.93) | -0.050\*\*(-2.06) |
| FCG | 0.033\*\*\*(3.05) | -0.138\*\*\*(-6.95) | -0.142\*\*\*(-11.19) | -0.038\*\*\*(-3.08) | -0.161\*\*\*(-5.07) |
| NEGE | -0.108\*\*\*(-26.90) | 0.028\*\*\*(14.33) | 0.043\*\*\*(3.65) | 0.007\*\*\*(3.89) | 0.050\*\*\*(4.25) |
| ∑IND | included | included | included | included | included |
| ∑YEAR | included | included | included | included | included |
| F value | 280.16\*\*\* | 353.81\*\*\* | 41.15\*\*\* | 19.28\*\*\* | 213.07\*\*\* |
| Adj. R2 | 0.5495 | 0.4931 | 0.1167 | 0.0781 | 0.3932 |

\*Two-tailed t-tests, \*,\*\*,\*\*\* significant at 10%, 5%, and 1% levels, respectively.

Variable descriptions are as follow: AUDITFEE is natural logarithm of audit fee for firm i in year t, SIZE is natural logarithm of total assets for firm i in year t, LEV is total debt divided by total equity for firm i in year t, OCFit: Operating Cash Flow for firm i in year t, GROWTH is growth rate of sales for firm i in year t, MCG is ratio of the largest shareholder and the related party ownership for firm i in year t, FCG is ratio of foreign investment ownership for firm i in year t, NEGE is 1 if firm i's net income is negative and 0 otherwise.

DA are discretionary accruals by using modified Jones Model (1995) for firm i in year t, Ab\_CFO are abnormal cash flows for firm i in year t, Ab\_Prod are abnormal production costs for firm i in year t, Ab\_DisExp are abnormal discretionary expenses for firm i in year t, and RAM is real activity earnings management by using Roychowdhury (2006) and Cohen et al. (2008) model.

Our result of Table 6 is that the more audit time is increasing, the more size of RAM is also decreasing, which means that auditor’s effort does have preventive effects on real activity earnings management. When the effort of auditors is increasing, the components of RAM were significantly decreased because there is a possibility of some of RAM's components being prevented or detected by auditor’s effort. This implies that the reputation of auditors is positively correlated with RAM and that the size of RAM can be used as a proxy of audit quality.

**Table 6.** Regression results: proxy of audit quality (*AQ*) is Audit hour (*AUDITHOUR*)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Defendant****variables** | **DA** | **Ab\_CFO** | **Ab\_Prod** | **Ab\_DisExp** | **RAM** |
|  | **Coefficient****(t value)** | **Coefficient****(t value)** | **Coefficient****(t value)** | **Coefficient****(t value)** | **Coefficient****(t value)** |
| Intercept | -0.037(-1.44) | -0.104\*\*\*(-3.13) | -0.017\*(-1.78) | -0.118\*\*(-2.10) | -0.169\*\*\*(-2.19) |
| AQ(AUDITHOUR) | -0.004\*\*(-2.10) | -0.010\*\*\*(-2.72) | -0.018\*\*\*(-3.51) | -0.012\*\*\*(-4.93) | -0.022\*\*\*(-3.25) |
| SIZE | 0.005\*\*(3.17) | 0.013\*\*\*(3.48) | 0.015\*\*\*(3.48) | 0.009\*\*\*(6.92) | 0.019\*\*\*(4.52) |
| LEV | -0.002\*\*\*(-5.09) | 0.002\*\*\*(5.75) | 0.001\*\*(2.41) | 0.001(0.94) | 0.002\*\*(2.41) |
| OCF | -0.737\*\*\*(-46.44) | -0.815\*\*\*(-31.19) | -0.472\*\*\*(-27.91) | -0.915\*\*\*(-22.19) | -1.341\*\*\*(-28.47) |
| GROWTH | 0.031\*\*\*(3.80) | 0.001 (1.08) | 0.002(0.81) | 0.005(0.79) | 0.001(0.30) |
| MCG | 0.028\*\*\*(4.89) | -0.006(-0.92) | 0.002(1.43) | -0.007\*(-1.73) | -0.026(-1.06) |
| FCG | 0.012\*\*\*(2.96) | -0.118\*\*\*(-4.59) | -0.184\*\*\*(-5.80) | -0.191\*\*\*(-6.04) | -0.175\*\*\*(-5.44) |
| NEGE | -0.109\*\*\*(-27.08) | 0.031\*\*\*(5.80) | 0.039\*\*\*(5.10) | 0.042\*\*\*(3.09) | 0.043\*\*\*(3.62) |
| ∑IND | included | included | included | included | included |
| ∑YEAR | included | included | included | included | included |
| F value | 179.96\*\*\* | 294.88\*\*\* | 31.73\*\*\* | 18.95\*\*\* | 125.91\*\*\* |
| Adj. R2 | 0.4488 | 0.4117 | 0.1378 | 0.0809 | 0.3714 |

\*Two-tailed t-tests, \*,\*\*,\*\*\* significant at 10%, 5%, and 1% levels, respectively.

Variable descriptions are as follow: AUDITHOUR is natural logarithm of audit hour for firm i in year t, SIZE is natural logarithm of total assets for firm i in year t, LEV is total debt divided by total equity for firm i in year t, OCFit: Operating Cash Flow for firm i in year t, GROWTH is growth rate of sales for firm i in year t, MCG is ratio of the largest shareholder and the related party ownership for firm i in year t, FCG is ratio of foreign investment ownership for firm i in year t, NEGE is 1 if firm i's net income is negative and 0 otherwise.

DA are discretionary accruals by using modified Jones Model (1995) for firm i in year t, Ab\_CFO are abnormal cash flows for firm i in year t, Ab\_Prod are abnormal production costs for firm i in year t, Ab\_DisExp are abnormal discretionary expenses for firm i in year t, and RAM is real activity earnings management by using Roychowdhury (2006) and Cohen et al. (2008) model.

**5. CONCLUSION**

Audit quality may be seen as combination of the possibilities that auditors may detect errors or frauds and one that they may report their findings in full. For the estimation of this the reputation or size of the auditors and the degree of earnings management are used as proxies for audit quality. In prior research studies, discretionary accruals have been used to measure earnings management, but this method is only a fraction of measurements of earnings management, which is irrelevant to cash flows of a firm. Therefore, in this study, we examine whether real-activity earnings management as an alternative to discretionary accruals can be used as a proxy of audit quality. We find that the reputation of auditors is positively correlated with the size of RAM. That is, this study show that earnings management of operating cash flows can be controlled by auditor size or effort unlike the previous studies that found no connections between RAM and the possibility of detection by the regulator or auditor. Our results imply that auditors of high independence may reduce RAM preventively or point out some of it in an effort to lower auditing risks.

Meanwhile, DAM and RAM when exercised by managers tend in Korea toward a relation that is complementary rather than one of substitution. This implies that that Korean managers tend to make use of DAM and RAM at the same in order time to adjust their earnings.

**ACKNOWLEDGEMENTS**

This work was supported by the 2013 Yeungnam University Research Grant.

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1. In the case of earnings management using discretionary accruals, a company may also have a change of cash flows when considering the corporate income tax because discretionary accruals might affect income tax expenses which eventually change cash outflows. But, in this paper this effect will be disregarded. [↑](#footnote-ref-1)
2. The innate reason is that there is a negative (-) relation between CFO and accruals. On the other hand, according to the circumstances of clients, the relation between DAM and RAM can have a positive (+) or a negative(-) value. For example, in the case of owner -managers, there is the possibility of making greater use of DAM which does not influence cash flow rather than utilizing RAM which has a negative influence on cash flow. We will explain again the relation between DAM and RAM by undertaking additional analysis in Chapter 5. [↑](#footnote-ref-2)