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Does Earnings Management Influence Credit Rating Changes in Subsequent Periods?: An Analysis of KRX Firms*

Mali Dafydd** · Choi Jong-seo***

〈 Abstract 〉

There is a potential for firms to engage in earnings management to influence a credit change (Ali and Zhang 2008; Jung et al. 2013; Alissa et al. 2013). However, Mali and Lim (2016) find that firms that engage in earnings management in period t do not experience a credit rating increase in period t+1; rather these firms are more likely to experience a decrease. Their evidence suggests that credit rating agencies capture both accrual earnings management (AEM) and real earnings management (REM) in the credit watch period (t-1 to t). Firms that potentially experience a credit rating change must experience a 1 year credit watch period in advance of potential change. Therefore, we conjecture a firm may engage in REM in period t-2 because firms are under less scrutiny from rating agencies, and REM is more difficult to detect.

We use the residual from the Dechow et al. model (1995) and Kothari's (2005) model as proxies for AEM. We use models suggested by Cohen et al. (2010) as proxies for REM. Using a sample of 1,481 observations from 2002 to 2013, we find a negative association between AEM in period t-1 and credit rating changes in period t, suggesting that credit rating agencies consider low levels of abnormal accruals as a form of strong corporate governance. We find a positive association between REM in period t-2 and a positive change in period t, suggesting that a firm may use earnings management to influence credit ratings increase. Moreover, we find no association between credit rating decreases and earnings management suggesting that firms have the opportunity to engage in earnings management to influence credit ratings. Overall, the results suggest that firms may engineer their financial structure by using REM in period t-2 to increase the probability of credit rating change.

Key word : credit ratings, earnings management, AEM, REM.

선제적 이익조정이 후속기간의 신용등급 변경에 미치는 영향*

말리 다피드** · 최 종 서***

〈 국문초록 〉

기업은 신용등급에 유리한 영향을 미치기 위하여 이익조정을 수행하려 할 수 있다(Ali and Zhang 2008; Jung et al. 2013; Alissa et al. 2013). 그러나 Mali and Lim (2015)의 연구에 의하면 특정 시점에 이익조정을 수행한 기업의 신용등급은 그 다음해에 상향조정되지 않고 오히려 강등되는 경향이 있는 것으로 확인되었다. 이러한 증거는 신용평가기관이 최근 기간의 평가대상 기업의 발생액 및 실제 활동을 이용한 이익조정 경향을 간파하여 제재를 가하고 있을 가능성을 제시한다. 일반적으로 신용등급이 변동하는 기업은 직전 년도 중에 평가기관의 집중적인 관찰대상이 된다. 따라서 신용등급의 상향조정을 기대하는 기업은 그 이전인 t-2기에 이익을 선제적으로 조정할 가능성이 있고 이 때 발생액을 조정하기 보다는 관찰가능성이 상대적으로 낮은 실제활동을 조정할 개연성이 존재한다.

본 연구에서는 발생액을 이용한 이익조정의 대용치로 Dechow et al. (1995) 및 Kothari et al. (2005)의 모형에서 산출되는 잔차를 이용하고 실제활동을 이용한 이익조정의 대용치로 Cohen et al.(2010)의 모형에서 구한 잔차를 이용한다. 2002년부터 2013년까지의 기간에 걸친 1,481건의 관찰치로 구성된 표본으로부터 t-1기의 발생액 이익조정과 t기의 신용등급 변동 사이에 음의 관계가 있음을 재확인할 수 있었는데 이는 신용평가 기관이 낮은 수준의 비정상 발생액을 효율적인 지배구조가 작동하고 있음을 나타내는 징후로 간주하고 있음을 시사한다. 또한 t-2기의 실제활동을 이용한 이익조정과 t기의 신용등급 변화 사이에는 양의 관계가 존재함을 관찰하였는데 이는 기업이 실제이익조정을 이용하여 등급의 유리한 변경을 유도하는 경향이 있음을 제시한다. 나아가 기업의 이익조정과 신용등급의 하향변동 사이에는 유의한 관련성이 존재하지 않는 것으로 나타났는데 이는 기업이 신용평가에 영향을 미칠 수 있는 기회를 누리고 있음을 시사한다. 요컨대 표본기간 중 국내기업은 t-2기의 선제적 실제이익조정을 이용하여 신용등급의 상향조정 가능성을 높이려는 경향을 지니고 있는 것으로 판단할 수 있다.

주제어 : 신용평가, 이익조정, 발생액조정, 실제이익조정

I. Introduction

Evidence suggests that managers would take economic actions to manage earnings to meet benchmarks (Graham and Harvey 2001; Graham at al 2005). Previous South Korean studies are based on models that suggest that negative earnings management in period t influence credit rating changes in period t+1 (Mali and Lim 2016). The study suggests that credit rating agencies capture earnings management in the credit watch period. Credit ratings agencies predict a firm's credit ratings 1 year in advance. Thus, a firm is unlikely to engage in earnings management in period t-1 to influence credit ratings in period t, the credit watch period because a firm is likely under more scrutiny from credit rating agencies. We conjecture that there is an incentive for a firm to engage in REM in period t-2 to be placed on the credit watch list in period t-1. It is likely that a firm will demonstrate lower level of (REM henceforth) and (AEM henceforth) within the credit watch period to demonstrate robust corporate governance. Therefore, the opportunistic behaviour of managers a calendar year prior to the announcement of possible change is an important consideration. This paper is motivated by this caveat.

The overall period of this research is 2002 to 2013. The sample consists of 1481 observations. We use the residual from the Dechow et al. model (1995) (DAMJ henceforth) and Kothari's (2005) model (DAKW henceforth) as proxies for accrual earnings management AEM. Moreover, we use two proxies for REM. The REM models suggested by Cohen et al. (2010) are a combination of the cash flow from operations, production cost and discretionary expense models, as suggested by Roychowdhury (2006).

First, we test whether firms that engage in earnings management are able to influence their credit ratings in subsequent periods. We perform Multivariate OLS regression with lagged independent variables to establish if earnings management in period t-2 and t-1 influence credit rating changes in period t. The results suggest that accrual AEM have a significant negative association with credit rating changes in period t-1, suggesting that firms with higher level of discretionary accruals are more likely to experience a credit rating change/downgrade. However, we find that TRM1 in period t-2 is positively associated with credit rating change in period t.

Next, we use logistic regression to test the relation between credit ratings increases in period t and earnings management in lagged prior periods, period t-2 and t-1. We find

REM in period t-2 has a positive relation with positive credit ratings change in period t, and firms with lower levels AEM in period t-1 are more likely to experience a credit increase. Moreover, we find an insignificant relation between earnings management and credit rating decreases suggesting that credit rating agencies do not punish firms that engage in AEM or REM; giving firms the opportunity to engage in earnings management to influence credit ratings.

We make the following contributions to the extant literature. To our knowledge, we are the first find evidence that in a Korean context, REM may influence credit ratings in subsequent periods. A negative association between AEM in period t-1 and credit rating change in period t is interpreted as firms signaling strong corporate governance within the credit watch period to facilitate a credit rating increase, consistent with pervious literature (Mali and Lim 2016). However, our results suggest that managers may use earnings management to engineer their financial structure to influence a credit rating increase. A statistically significant negative association between REM in period t-2 and positive credit rating change is interpreted as managerial opportunistic behaviour in order to facilitate credit watch list placement.

This study expands the literature in several ways. First, we consider both AEM and REM measures to establish a relation between earnings management in the period before credit rating change, and the period before the credit watch announcement (t-1, t-2). Secondly, we perform a series of tests to examine whether level of earnings management is significantly related with credit rating increases and decreases. Therefore, this analysis can be considered as the most robust analysis of a relation between earnings management and credit ratings changes in a South Korean context, suggesting that managers may use REM to facilitate placement on the credit watch list.

The remainder of this paper proceeds as follows. Section II reviews relevant literature and develops hypotheses. In Section III, we explain the research design. In Section IV, we present details of our results. Section V concludes.

II. Literature Review and Hypotheses Development

2.1 Literature Review

Credit ratings provide information to market participants about the probability of a firm's financial default. The highest broad category in descending order are AAA, AA, A, BBB, BB, B, CCC, CC, C, D; each category from AA to CCC is divided into subcategories, plus (+) and minus (−) notches. Firms consider their credit rating when making decisions about equity capital (Graham and Harvey 2001; Graham et al.'s 2005). Improving or maintaining credit ratings play a key role in corporate financing and investment decisions (Hovakimian at al. 2001). Credit ratings and changes have significant cost implications for companies (Holthausen and Leftwich 1986; Ederington and Goh 1998; Dichev and Piotroski 2001). Firms care deeply about credit ratings, and change leverage structures to influence credit rating changes (Kisgen 2006, 2009).

Graham et al.'s (2005) survey evidence finds that 78% of managers would manage earnings to meet benchmarks. Jones (1991), Dechow et al. (1995) and Kothari et al. (2005) develop models that demonstrate that manager use abnormal level of accruals to manage earnings levels opportunistically. Ali and Zhang (2008) find evidence that notch category firms use higher levels of earnings management compared middle category firms suggesting that firms believe that by inflating earnings they can influence credit ratings' decision to upgrade or downgrade. Jung et al. (2013) extends Ali and Zhang's research to consider earnings smoothing as a tool to influence credit ratings. Jung et al. (2013) find that earnings smoothing via earnings management is more concentrated around plus and minus firms.

However, firms are likely to use a mix of AEM and REM to manage reported earnings. Gunny (2010) finds a firm may choose between the two earnings management mechanisms using the technique that is less costly to them. REM is defined as management actions that deviate from normal business practices undertaken for purposes of achieving certain earnings thresholds (Roychowdhury, 2006). Gunny (2010) examines the relation between REM and ex-post performance. Gunny (2010) finds evidence that REM is associated with firms just meeting earnings benchmarks. Zang (2012) finds that the trade-off between the two earnings management methods is a function of their relative costs. Consistent with Roychowdhury (2006), we identify three levels of abnormal 'real activities'; abnormal levels of cash flow from operations (CFO), production costs (Prod) and discretionary expenses (SGA). Deviations from normal levels of real activities are considered to be real earnings management (the residual from one of the three estimation models). The residuals from the linear model are considered to be abnormal

levels. Cohen et al. (2010) borrow from Roychowdry (2006) to develop two comprehensive models of earnings management because SGA is considered a function of (CFO) and (Prod). In this paper, we use the models suggested by Cohen et al. (2010).

Evidence with regards to the relation between earnings management and credit ratings is mixed in South Korea. Oh (2005) finds a positive association between discretionary accruals and credit ratings. On the other hand, there is evidence that REM has a negative association with credit ratings (Lee and Chung 2012). Park and Roh (2011) find that firms with lower credit ratings engage in earnings management in the subsequent period. Ahn and Kim (2014) find that credit ratings levels have a significantly positive correlation with abnormal CFO/abnormal production cost, but have negative correlation with abnormal discretionary expenses. Mali and Lim (2016) consider the time lagged effect suggested by Alissa et al. (2013), and find a negative relation between earnings management in period t and credit rating change in period t+1, suggesting that in the credit watch period, a firm that engage in upward earnings management is more likely to experience a credit rating decrease.

We borrow from Alissa et al. (2013), who find that income increasing/decreasing earnings management is associated with positive/negative changes in future periods, period t+1 to t-5. A potential credit ratings change in period t is decided in period t-1, a year in advance. From period t-1 to period t, it would be virtually impossible for a firm to experience a credit rating increase after engaging in earnings management because credit a rating agency is likely to place firms with the potential credit rating increase/decrease on a credit watch list. Therefore, the firm will be under the scrutiny of credit rating agencies. However, there is a potential for firms to engage in REM in period t-2 to influence credit watch list placement. Cohen and Zarowin (2010) suggest executives have a greater willingness to manage earnings through REM and not through AEM because AEM is more likely to be scrutinized by auditors and regulators.

We posit an additional explanation, managers may use REM as a tool to influence a credit rating's decision to increase credit rating is REM's relation to default risk. The primary concern of credit rating agencies is that firms possess enough cash to meet principle payments (Standard and Poor's 2015). Engaging in REM by reducing discretionary expenses, providing discounts to customers and increasing production to reduce production costs has a direct effect on a firm's cash levels. Thus, whilst REM is considered opportunistic, we conjecture that increasing cash reserves has the potential to

reduce a credit rating analyst's perception of a firm's potential financial default. The above argument is consistent with Ali and Zhang's (2008) evidence that credit rating agencies do properly assess REM.

2.2 Hypothesis Development

Ashbaugh-Skaife et al. (2006) document a positive association between accounting quality and credit rating. Thus, AEM is more likely to be scrutinized by auditors and regulators. A credit rating agency's primary concern is default risk, the inability of firms to make cash payments. Therefore, a firm is more likely to influence credit ratings through engaging in REM compared to AEM. Credit ratings increases/decreases in period t are decided in advance in period t-1. Therefore, it is unlikely for a firm placed on the credit watch list in period t-1 to benefit from a credit rating change in period t by engaging in AEM because of closer scrutiny. We conjecture REM in period t-2 influences a credit rating agency's perception of financial performance. Thus, firms are more likely to be added to the probationary 1 year watch period after engaging in REM in period t-2, and then experience a credit increases in the subsequent period. We predict that a firm is more likely to use REM to influence credit ratings because a credit rating agency is likely to associate a reduction in expenses and increased cash flow with lower levels of risk. Whilst firm's may use AEM to modify financial statements, AEM does not influence the ability of a firm to make principal payments. Therefore, based on the above, we make the following hypothesis:

H1: There is a positive relation between REM in period t-2 and credit rating changes in period t.

III. Research Design

3.1 Sample Selection

All credit rating and financial data is collected from KISS-VALUE. A total of firm 7,344

observations were downloaded from KRX listed firms from 2002-2013. 5,263 firm observations were deleted for three reasons, 1) they did not issue bonds; 2) financial data was not available; 3) financial firms were deleted consistent with previous studies, leaving a total sample of 2,051 from 2002-2013. An additional 333 observations were excluded for the t-1 sample, leaving 1,718 observations. 237 observations were deleted for the t-2 sample leaving a total of 1481 observations. The sample selection process is illustrated in <Table 1> Panel A. Table 1 <Panel B> shows the sample distribution. A CR score of 17 represents the highest credit ratings levels issued by either KIS, KR, NICE and SCI within a single calendar year, AAA. All other CR scores represent the remaining credit rating levels and are coded with CR scores that take on ordinal value from 16 (AA+) to 1 (B- to CCC+ and below). We base this approach on Alissa et al. (2013). Overall, we find firms that borrow public debt are normally distributed.

<Table 1> Audit fee sample selection by credit ratings

Panel A: CR sample from 2002-2013						
Initial CR Sample				2,501		
Excluding Post periods				(1,020)		
Final Sample				1,481		
Panel B: Sample selection by credit ratings						
CR scores	CR	Obs	CR sores	CR	Obs	
17	AAA	63	8	BBB-	121	
16	AA+	50	7	BB+	95	
15	AA	90	6	BB	83	
14	AA-	113	5	BB-	81	
13	A+	114	4	B+	52	
12	A	124	3	B	32	
11	A-	140	2	B-	13	
10	BBB+	145	1	Below B-	32	
9	BBB	133	Total		1,481	

3.2 Model Specifications and Variables Descriptions

3.2.1 Accrual Based Earnings Management

We measure abnormal accruals using the residual from the modified Jones model suggested by Dechow (1995) as a proxy for earnings management. $TACC$ is Net income –

cashflow from operations. $Asset_{t-1}$ is total assets in period t-1. $\triangle REV$ is changes in sales, calculated at sales in period t minus sales in period t-1. $\triangle REC$, changes in accounts receivables is calculated as the changes in accounts receivable in period t and period t-1. PPE is property, plant and equipment. The model is shown below as equation (1):

Modified Jones Model (Dechow et al., 1995)

$$TAAC_{i,t}/Asset_{i,t-1} = \beta_1 1/Asset_{i,t-1} + \beta_2(\triangle REV_{i,t} - \triangle REC_{i,t})/Asset_{i,t-1} + \beta_3 PPE_{i,t}/Asset_{i,t-1} + v_{i,t} \quad (1)$$

Where,
$TACC$: Total accruals (=Net income - cashflow from operations)
$Asset_{i,t-1}$: Total Assets at time t-1
$\triangle REV$: Changes in sales (=$Sales_t - Sales_{t-1}$)
$\triangle REC$: Changes in accounts receivables (=$REC_t - REC_{t-1}$)
PPE : Property, Plant, Equipment

In addition, we use the performance adjusted model, suggested by Kothari et al. (2005). We include an additional variable, ROA_{t-1} in equation (2) since Kothrai et al. (2005) suggest that its inclusion helps to decrease potential measurement error.

Performance Adjusted Model (Kothari et al., 2005);

$$TAAC_{i,t}/Asset_{i,t-1} = \beta_0 + \beta_1 1/Asset_{i,t-1} + \beta_2(\triangle REV_{i,t} - \triangle REC_{i,t})/Asset_{i,t-1} + \beta_3 PPE_{i,t}/Asset_{i,t-1} + \beta_4 ROA_{i,t-1} + v_{i,t} \quad (2)$$

Where,
$ROA_{i,t-1}$: Return on assets at time t-1

3.2.2 Real Earnings Management

Real earnings management proxies are based on Roychowdhury's model (2006). We identify three levels of abnormal 'real activities'; abnormal levels of cash flow from operations (CFO) in equation (3), production costs (Prod) in equation (4) and discretionary expenses (SGA) in equation (5). Deviations from normal levels of real activities are considered to be real earnings management. Positive deviations are interpreted as earnings management for production costs (Prod). A negative deviation is interpreted as

management making upward earnings management decisions based on (CFO) and discretionary expenses (SGA). We multiply -1 by abnormal SGA and abnormal CFO to facilitate the interpretation. CFO represents cash flow from operations in period t scaled by assets in period t-1. Prod, Production cost at time t is calculated as cost of sales plus changes in inventory scaled with assets in t-1. SGA, sales and general administration expenses, are calculated as the variable definition above. $Sales_{i,t}$ is revenue at time t and $\triangle Sales_{i,t}$ is changes in sales revenue at time t.

$$CFO_{i,t}/Asset_{i,t-1} = \beta_1 1/Asset_{i,t-1} + \beta_2 Sales_{i,t}/Asset_{i,t-1} + \beta_3 \triangle Sales_{i,t} /Asset_{i,t-1} + v_{i,t} \tag{3}$$

$$Prod_{i,t}/Asset_{i,t-1} = \beta_1 1/Asset_{i,t-1} + \beta_2 Sales_{i,t}/Asset_{i,t-1} + \beta_3 \triangle Sales_{i,t}/ Asset_{i,t-1} + \beta_4 \triangle Sales_{i,t-1}/Asset_{i,t-1} + v_{i,t} \tag{4}$$

$$SGA_{i,t}/Asset_{i,t-1} = \beta_1 1/Asset_{i,t-1} + \beta_2 Sales_{i,t-1}/Asset_{i,t-1} + v_{i,t} \tag{5}$$

Where,
CFO	: Cashflow from operation at time t
Prod	: Production cost at time t (=Cost of sales + Changes in inventory)
SGA	: Sales and general administration expenses (=General administration expenses – taxes – depreciation expenses – rent expenses – insurance expenses) + (sales expenses + research and development expenses)
$Sales_{i,t}$	: Sales revenue at time t
$\triangle Sales_{i,t}$	: Changes in sales revenue at time t

Total REM measures (Cohen and Zarowin, 2010)

In order to capture the total effects of REM activities, we combine the three individual measures to calculate two comprehensive metrics of REM activities (Cohen and Zarowin, 2010)[1]. The values from equations (3), (4) and (5) are added into equations (6) and (7).

TRM1: $REM1 = abProd + abSGA^*(-1)$ \hfill (6)

TRM2: $REM2 = abCFO^*(-1) + abSGA^*(-1)$ \hfill (7)

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[1] We do not combine *abCFO* and *abProd*, since the same activities that lead to high *abProd*, also lead to high *abCFO*, hence double counting(Cohen and Zarowin, 2010).

where,
abCFO   : Abnormal CFO calculated from the equation (3)
abProd   : Abnormal production cost calculated from the equation (4)
abSGA   : Abnormal discretionary expenses calculated from the equation (5)

3.2.3 Earnings Management: Association with Credit Ratings Change

The purpose of equation (8) is to establish if earnings management in period t-2 or t-1 has the potential to influence credit ratings in period t. The dependent variable is defined previously as an ordinal level representing a firm's credit rating from AAA to below B- and below The independent variable of interest, EM are numerous earnings management metrics calculated in equations (1), (2), (6) and (7). Changes is defined as CR in period t minus credit ratings in period t-1 in equation (8). The independent variables are taken from the credit rating literature based on target leverage (Flannery and Rangan, 2006; Hovakimian et al., 2001; Rajan and Zingales, 1995). Size, the natural logarithm of total assets. Lev, Total liabilities divided by Total assets is a proxy for default risk. *Grw*, $(Sales_t / Sales_{t-1}) - 1$ is a proxy for future growth options. *ROA*, net income divided by total assets and *CPS*, cashflow from operation divided by outstanding shares are proxies for firm performance. ID and YD are industry fixed effect and Year fixed effect.

We use multivariate OLS regression to establish a relation between credit rating change in period t and lagged values of earnings management in period t-2 and t-1. A positive EM coefficient suggests that earnings management influences a credit ratings increase. A negative relation would suggest credit rating agencies may reward firms with lower earnings management with credit rating increases. Based on previous studies, we expect β_2 to be negative. β_1 has the potential to be positive. We posit a different sign for β_1 and β_2 suggest that firms engineer their financial structure to influence credit rating increase.

Credit Rating Change Models

$$Changes_t = \beta_0 + \beta_1 EM_{i,t-2,k=1,2,3,4} + \beta_2 EM_{i,t-1,k=1,2,3,4} + \beta_3 Size_{i,t} + \beta_4 Lev_{i,t} + \beta_5 Grw_{i,t} + \\ \beta_6 ROA_{i,t} + \beta_7 CPS_{i,t} + \beta_8 Loss_{i,t} + ID + YD + \epsilon_{i,t} \tag{8}$$

Where,
Dependent Variables

$Changes_t$: Changes in credit ratings (= $CR_t - CR_{t-1}$)

Variables of Our Interest

EM_1: ABMJ (=Abnormal accruals computed from the modified Jones model, suggested by Dechow et al.(1995)

EM_2: ABKW (=Abnormal accruals computed from the performance adjusted model, suggested by Kothari et al.(2005)

EM_3: TRM1 (=$REM1 = abProd + abSGA*(-1)$)

EM_4: TRM2 =$REM2 = abCFO*(-1) + abSGA*(-1)$)

The purpose of equations (9) and (10) is to establish a relation between earnings management in period t-2 and t-1 and credit ratings increases / decreases in period t. To test the relation between earnings management and a positive credit rating change, we use logistic regression, where D_Pos takes the value of 1 if a credit rating increases in period t, all other observations take the value of 0. To test the relation between earnings management and negative credit rating change, we use logistic regression, where D_Ng takes the value of 1 if a credit rating decrease in period t, all other observations take the value of 0.

In equation (9) we capture the association between earnings management in period t-2 and t-1 and a firm experiencing a credit ratings increase in period t. We interpret a positive EM coefficient as firms have experiencing a credit rating increase due to earnings management. A negative, result would suggest that firms with lower levels of earnings management are more likely to experience a credit rating increase. We expect β_2 to show a negative sign, and conjecture that β_1 may be positive. Equation (10) tests if credit rating agencies punish firms that engage in earnings management. Positive/negative β_1 or β_2 would suggest that credit rating agencies punish/reward firms with higher/lower levels of earnings management with credit rating decreases/increases.

$$D\_Pos_t = \beta_0 + \beta_1 EM_{i,t-2,k=1,2,3,4} + \beta_2 EM_{i,t-1,k=1,2,3,4} + \beta_3 Size_{i,t} + \beta_4 Lev_{i,t} + \beta_5 Grw_{i,t} + \\ \beta_6 ROA_{i,t} + \beta_7 CPS_{i,t} + \beta_8 Loss_{i,t} + ID + YD + \epsilon_{i,t} \qquad (9)$$

$$D\_Ng_t = \beta_0 + \beta_1 EM_{i,t-2,k=1,2,3,4} + \beta_2 EM_{i,t-1,k=1,2,3,4} + \beta_3 Size_{i,t} + \beta_4 Lev_{i,t} + \beta_5 Grw_{i,t} + \\ \beta_6 ROA_{i,t} + \beta_7 CPS_{i,t} + \beta_8 Loss_{i,t} + ID + YD + \epsilon_{i,t} \qquad (10)$$

Where,

Dependent Variables

D_Pos: Dummy variable that takes 1 if credit rating increased from period t-1 to t, 0 otherwise

D_Ng: Dummy variable that takes 1 if credit rating decreased from period t-1 to t, 0 otherwise

VI. Empirical Results

4.1 Descriptive Statistics and Pearson Correlation

〈Table 2〉 provides details about our sample's central tendency and standard deviations for all variables of interest. Overall, the average credit rating is 10.46, between the investment grade threshold and non-investment grade threshold, BBB+ and A. The results show that the mean for size is positive as expected (20.68). Positive leverage is expected because bonds are a form of debt that a firm has acquired. Firms that borrow equity in the forms bonds have positive performance as proxied by ROA (0.02) and CPS (5.68). Overall, 17% of the firms make a financial loss. The average levels of earnings management are close to zero for all samples. However, the results suggest sufficient variation in the earnings management metrics DAMJ, DAKW, TRM1 and TRM2.

〈Table 2〉 Descriptive Statistics of Main Variables

Panel A. Full sample					
Variable	Obs	Mean	S. D.	Min	Max
CR	1481	10.46	3.84	1	17
DAMJ	1481	-0.00	0.11	-1.29	0.97
DAKW	1481	-0.00	0.07	-0.38	0.58
Total_Rm1	1481	-0.03	0.23	-2.01	1.24
Total_Rm2	1481	-0.02	0.15	-1.18	1.26
size	1481	20.68	1.61	16.80	25.76
lev	1481	0.52	0.19	0.02	1.72
grw	1481	0.08	0.41	-0.99	11.35
Loss	1481	0.17	0.38	0	1
ROA	1481	0.02	0.15	-3.47	3.36
CPS	1481	5.68	15.54	-84.18	167.18

<div align="center"><Table 3> Pearson Correlations</div>

	CR	size	lev	Grw	ROA	CPS	Loss	DAMJ	DAKW	TRM1	TRM2
CR	1.00										
Size	0.52***	1.00									
Lev	-0.42***	0.02**	1.00								
Grw	0.02	0.04	-0.03	1.00							
ROA	0.23***	0.12***	-0.30***	0.10***	1.00						
CPS	0.28***	0.28***	-0.21***	0.02	0.12***	1.00					
Loss	-0.28***	-0.10***	0.35***	-0.15***	-0.43***	-0.16***	1.00				
DAMJ	-0.08***	0.04***	-0.16***	0.10***	0.31***	-0.11***	-0.26***	1.00			
DAKW	-0.04***	-0.04***	0.04***	0.09***	0.03***	-0.25***	-0.03***	0.63***	1.00		
TRM1	-0.19***	-0.09***	0.14***	-0.03	-0.08***	-0.17***	0.08***	0.04***	0.12***	1.00	
TRM2	-0.21***	-0.14***	0.16***	-0.05**	-0.09***	-0.28***	0.10***	0.22***	0.42***	0.85***	1.00

Note 1: Variable Definitions

CR : Credit ratings levels

$DAMJ$: Abnormal accruals computed from the modified Jones model, suggested by Dechow et al.(1995)

$DAKW$: Abnormal accruals computed from the performance adjusted model, suggested by Kothari et al.(2005)

$TRM1$: $REM1 = abProd + abSGA*(-1)$

$TRM2$: $REM2 = abCFO*(-1) + abSGA*(-1)$

$Size$: Natural logarithm of total assets at time t-1

Lev : Debt ratio

Grw : Sales growth ratio

ROA : Return on assets

CPS : Cashflow from operation scaled by total outstanding shares

$Loss$: Dummy variable that takes 1 if a firm experienced loss at time t-1, 0 otherwise

Note 2: ***, **, * t test indicate significance level at 1%, 5%, 10% respectively.

<Table 3> shows the Pearson correlations for the variables of interest. Size is positively correlated with credit ratings, suggesting that larger firms have larger credit ratings. Moreover, firms with lower levels of leverage have higher credit ratings. The association between growth and credit rating is insignificant. The proxies for performance ROA and CPS are positively correlated with CR (ROA 0.23; CPS 0.28), suggesting that firms with positive performance have higher credit ratings. There is a negative association between credit ratings and loss, suggesting that firms with lower credit ratings are more likely to be loss firms. There is a negative association between credit ratings and EM metrics consistent with previous literature. We test for multicollinearity using VIF tests. We find the average VIF value to be 1.01. The most correlated variables are 3.16, suggesting that multicollinearity does not influence our results.

4.2 Multivariate Analysis Results

<Table 4> shows results of multivariate OLS regression with lagged independent variables. The dependent variable, Changes is a continuous variable, calculated by subtracting credit rating scores at time t-1 from credit ratings t. The variables of interest are the levels of earnings management in lagged periods. We find a negative association between AEM in period t-1, and credit rating changes in period t, suggesting that firms with higher level of discretionary accruals are more likely to experience a credit rating change/downgrade. We interpret that credit rating agencies effectively monitor AEM as a proxy of corporate governance; thus do not reward firms that engage in AEM opportunistically.

<Table 4> Multvariate OLS Regression Analysis (Changes)

$$Changes_t = \beta_0 + \beta_1 EM_{i,t-2,k=1,2,3,4} + \beta_2 EM_{i,t-1,k=1,2,3,4} + \beta_3 Size_{i,t} + \beta_4 Lev_{i,t}$$

$$+ \beta_5 Grw_{i,t} + \beta_6 ROA_{i,t} + \beta_7 CPS_{i,t} + \beta_8 Loss_{i,t} + ID + YD + \epsilon_{i,t}$$

Var	Sign	Model 1	Model 2	Model 3	Model 4
DAMJ t-1	-	-1.17 (-2.21)**			
DAMJ t-2	+/-	0.58 (1.03)			
DAKW t-1	-		-2.06 (-2.90)***		
DAKW t-2	+/-		-0.16 (-0.24)		
TRM1 t-1	-			0.32 (1.38)	
TRM1 t-1	+/-			1.12 (2.92)***	
TRM2 t-1	-				0.26 (0.87)
TRM2 t-2	+/-				0.70 (1.61)
Size		-0.10 (-0.33)	-0.01 (-0.35)	-0.01 (-0.32)	-0.12 (-0.35)
Lev		0.01 (0.01)	0.16 (0.54)	0.15 (0.05)	0.40 (0.13)
Grw		0.11 (1.02)	0.11 (1.02)	0.15 (1.35)	0.15 (1.33)
ROA		0.51 (1.10)**	0.34 (0.76)	0.94 (2.01)**	0.93 (1.99)**
CPS		0.00 (-0.30)	0.00 (-0.06)	0.00 (1.08)	0.00 (0.98)
Loss		-0.62 (-3.91)***	-0.60 (-3.55***)	-0.56 (-3.33)***	-0.56 (-3.33)***
ID		Included	Included	Included	Included
YD		Included	Included	Included	Included
Chi2		5.45***	6.30***	5.02***	4.79***
PseudoR2		0.0206	0.0245	0.0187	0.0176
OBS		1481	1481	1481	1481

where;

$Changes$: Changes in credit ratings (= $CR_t - CR_{t-1}$)

$DAMJ$: Abnormal accruals computed from the modified Jones model, suggested by Dechow et al.(1995)

$DAKW$: Abnormal accruals computed from the performance adjusted model, suggested by Kothari et al.(2005)

$TRM1$: $REM1 = abProd + abSGA*(-1)$

$TRM2$: $REM2 = abCFO*(-1) + abSGA*(-1)$

$Size$: Natural logarithm of total assets at time t-1

Lev: Debt ratio

Grw: Sales growth ratio

ROA: Return on assets

CPS: Cashflow from operation scaled by total outstanding shares

$Loss$: Dummy variable that takes 1 if a firm experienced loss at time t-1, 0 otherwise

ID: Industry fixed effect

YD: Year fixed effect

Note 1: ***, **, * t test indicate significance level at 1%, 5%, 10% respectively.

There is an insignificant relation between REM in period t-1 and credit changes in period t. However, the relation between a CR change in period t and REM in period t-2 is statistically significant for TRM1 at the 1%. The results suggest that a firm may signal higher performance or engage in earnings management opportunistically through increasing production to facilitate placement on the credit watch list to potentially experience a credit rating change in the next period. The control variables show expected signs consistent with our Pearson correlations.

In <Table 5>, we provide results for logistic regression testing the relation between a positive change in period t and earnings management in period t-2 and t-1. We compare the levels of earnings of 304 that experience a credit rating increase in period t (against a sample of 1,481 observations). The variables of interest are the levels of earning management in previous periods. We find a negative relation between AEM measures in period t-1 and credit rating upgrades in period t at the 5% level, suggesting that firms with high level of earnings management are more likely to decrease their credit rating or remain at an unchanged level. The evidence is consistent with previous finding that credit ratings agencies have the potential to consider AEM management as an opportunistic accounting practice; hence, reward firms with lower levels of earnings management with credit rating increase between period t and t-1.

<Table 5> Logistic Regression: Positive Change vs All Other

$$D\_Pos_t = \beta_0 + \beta_1 EM_{i,t-2,k=1,2,3,4} + \beta_2 EM_{i,t-1,k=1,2,3,4} + \beta_3 Size_{i,t} + \beta_4 Lev_{i,t}$$

$$+ \beta_5 Grw_{i,t} + \beta_6 ROA_{i,t} + \beta_7 CPS_{i,t} + \beta_8 Loss_{i,t} + ID + YD + \epsilon_{i,t}$$

Var	Sign	Model 1	Model 2	Model 3	Model 4
DAMJ t-1	-	-1.32 (-1.98)**			
DAMJ t-2	+/-	-0.21 (-0.27)			
DAKW t-1	-		-2.26 (-2.36)**		
DAMJ t-2	+/-		-0.20 (0.25)		
TRM1 t-1	-			1.64 (0.10)	
TRM1 t-2	+/-			0.97 (1.68)*	
TRM2 t-1	-				1.34 (1.50)
TRM2 t-2	+/-				1.03 (1.70)*
Size		0.11 (2.47)***	0.13 (3.51)***	0.13 (3.49)***	0.11 (2.46)**
Lev		0.63 (1.47)	0.73 (1.99)**	0.71 (1.93)*	0.62 (1.44)
Grw		0.17 (1.35)	0.90 (0.73)	0.07 (-0.58)	0.14 (1.13)
ROA		3.85 (2.80)***	3.83 (3.04)***	3.36 (2.73)***	3.21 (2.50)**
CPS		0.00 (-0.35)	0.00 (-0.72)	0.00 (-0.08)	0.00 (-0.28)
Loss		-0.36 (-1.29)	-0.67 (-2.75)***	-0.64 (-2.64)***	-0.32 (-1.19)
ID		Included	Included	Included	Included
YD		Included	Included	Included	Included
Chi2		35.42***	37.30***	34.02***	34.74***
PseudoR2		0.0256	0.0238	0.0310	0.0238
OBS		1481	1481	1481	1481

Where,

$_{D\_Pos}$: Dummy variable that takes 1 if credit rating increased from period t, 0 otherwise

$_{EM_1}$: ABMJ (=Abnormal accruals computed from the modified Jones model, suggested by Dechow et al.(1995)

$_{EM_2}$: ABKW (=Abnormal accruals computed from the performance adjusted model, suggested by Kothari et al.(2005)

$_{EM_3}$: TRM1 (=$REM1 = abProd + abSGA*(-1)$)

$_{EM_4}$: TRM2 =$REM2 = abCFO*(-1) + abSGA*(-1)$)

$_{Size}$: Natural logarithm of total assets at time t-1

$_{Lev}$: Debt ratio

$_{Grw}$: Sales growth ratio

$_{ROA}$: Return on assets

$_{CPS}$: Cashflow from operation scaled by total outstanding shares

$_{Loss}$: Dummy variable that takes 1 if a firm experienced loss at time t-1, 0 otherwise

ID: Industry fixed effect

YD: Year fixed effect

Note 1: ***, **, * z test indicate significance level at 1%, 5%, 10% respectively.

<div align="center">

<Table 6> Logistic Regression: Negative Change vs All Other

</div>

$$D\_Ng_t = \beta_0 + \beta_1 EM_{i,t-2,k=1,2,3,4} + \beta_2 EM_{i,t-1,k=1,2,3,4} + \beta_3 Size_{i,t} + \beta_4 Lev_{i,t}$$

$$+ \beta_5 Grw_{i,t} + \beta_6 ROA_{i,t} + \beta_7 CPS_{i,t} + \beta_8 Loss_{i,t} + ID + YD + \epsilon_{i,t}$$

Var	Sign	Model 1	Model 2	Model 3	Model 4
DAMJ t-1	+/-	0.00 (0.00)			
DAMJ t-2	+/-	-1.18 (-1.09)			
DAKW t-1	+/-		1.63 (1.15)		
DAKW t-2	+/-		0.52 (0.39)		
TRM1 t-1	+/-			0.26 (0.34)	
TRM1 t-2	+/-			-0.12 (-0.16)	
TRM2 t-1	+/-				0.36 (0.59)
TRM2 t-2	+/-				-0.04 (-0.05)
Size		0.06 (0.84)	0.05 (1.82)*	0.05 (0.86)	0.05 (0.89)
Lev		0.91 (1.44)	0.50 (0.82)	0.94 (1.49)	0.92 (1.45)
Grw		-0.25 (-1.73)*	-0.26 (-1.85)*	-0.27 (-1.94)*	-0.27 (-1.95)*
ROA		-0.47 (-0.88)	-0.11 (-0.13)	-0.19 (-0.20)	-0.20 (-0.21)
CPS		-0.01 (-1.52)	-0.01 (-1.45)	-0.02 (-1.94)*	-0.02 (-1.70)*
Loss		0.67 (-2.87)***	0.68 (2.90)***	0.65 (2.80)*	0.65 (2.82)***
ID		Included	Included	Included	Included
YD		Included	Included	Included	Included
Chi2		23.71***	22.67***	29.85***	30.58***
PseudoR2		0.0306	0.0292	0.0292	0.0299
OBS		1481	1481	1481	1481

Where,

D_Ng: Dummy variable that takes 1 if credit rating decreased in period t, 0 otherwise

EM_1: ABMJ (=Abnormal accruals computed from the modified Jones model, suggested by Dechow et al.(1995)

EM_2: ABKW (=Abnormal accruals computed from the performance adjusted model, suggested by Kothari et al.(2005)

EM_3: TRM1 (=$REM1 = abProd + abSGA*(-1)$)

EM_4: TRM2 =$REM2 = abCFO*(-1) + abSGA*(-1)$)

$Size$: Natural logarithm of total assets at time t-1

Lev: Debt ratio

Grw: Sales growth ratio

ROA: Return on assets

CPS: Cashflow from operation scaled by total outstanding shares

$Loss$: Dummy variable that takes 1 if a firm experienced loss at time t-1, 0 otherwise

ID: Industry fixed effect

YD: Year fixed effect

Note 1: ***, **, * z test indicate significance level at 1%, 5%, 10% respectively.

There is no relation between REM in period t-1 and credit rating changes in period t, suggesting that credit rating agencies do not reward firms that engage in REM in period t-1. However, there is positive a relation between earnings management in period t-2 and credit rating changes in period t, after controlling for period t-1 at the 10% level (1.68 TRM1 and 1.70 for TRM2). The results suggest that there is a possibility that firms engage in earnings management opportunistically to influence a credit rating agency's decision to place a firm on the credit watch list. Taken together, the results suggest that firms may use a combination of earnings management strategies to influence credit ratings, consistent with hypothesis 1. We interpret the above results as managers using REM in period t-2 to signal superior performance by increasing earnings consistent with the conjecture that managers are likely to prefer REM because AEM is more likely to be scrutinized by credit rating agencies.

Next, we use logistic regression to compare the levels of earnings management of 111 firms that experience a credit rating decrease in period t against the sample of 1,481 observations. The results in <Table 6> provide insignificant results, suggesting that there is no association between earnings management in period t-2, t-1 and credit rating downgrades in period t. The results suggest that credit rating agencies do not necessarily punish firms for engaging in AEM or REM. The results suggest that credit rating agencies do not consider themselves to be auditors and take financial statement data as accurate and assume financial statements to be reasonable and accurate (Securities and Exchange Commission, 2003; Standard & Poor's, 2008; Standard & Poor's 2015). Thus, given that credit ratings do not punish firms that engage in earnings management, firms are not likely to be dissuaded from engaging in earnings management to influence credit ratings.

V. Additional Analysis

We include numerous additional controls for robustness including earnings volatility, the presence of a BIG4 auditor, audit fee (hour) and FOR, foreign investor share ownership. Firms followed by BIG4 are controlled using a dummy variables that take the value of 1 if a firm's external auditor is a BIG4 auditor, 0 otherwise. Untabulated results suggest that FOR is strongly associated with credit ratings at time t suggesting that higher

foreign investor share ownership is considered to influence corporate governance; therefore, has the potential lower credit risk. BIG4 audit firms have a positive relation with credit rating, suggesting that credit rating agencies may consider firms audited by Big4 auditors to have lower credit risk.

V. Conclusions

We examine the relation between earnings management and credit rating changes in subsequent periods. We find a negative association with abnormal accruals in period t-1 and credit rating changes in period t, consistent with previous literature. However, we find a positive association between REM in period t-2 and a positive change in period t. We conjecture that managers opportunistically increase earnings to demonstrate strong financial performance in period t-2 to influence a credit rating agency's decision to place a firm on the credit watch period in period t-1. The evidence is consistent with Cohen et al.'s (2010) suggestions that firms are more likely to engage in REM because AEM is more likely to be scrutinized by auditors and regulators. Moreover, we posit that it is more likely for a firm to be considered for a future credit rating increase after engaging in REM because REM is liked to cash, which is linked to the ability to make principle payments, the primary consideration of default risk. We do not find an association between credit rating decrease and earnings management suggesting that firms have the opportunity to engage in earnings management to influence credit ratings. Overall, we interpret the results as firm's engineering their financial structure to experience a credit rating increase. Thus, the paper adds to the extant literature with evidence that REM may influence credit ratings in subsequent periods, and managers may use REM to improve credit ratings in a Korean context.

A weakness of the paper is that results based on a Korean context may not be applicable to other countries because the financial, legal and legislative systems may be different. Possible future research may examine the relationship between earnings management in prior periods and subsequent credit rating an international context.

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