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Leverage, Corporate Governance and Real Earnings Management: Evidence from Korean Market

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ABSTRACT

Purpose: This study examines how corporate governance (CG) and leverage simultaneously influence real earnings management (REM).

Methodology: We employed CG score (CGS), total, short-term, and long-term debt ratios as independent variables, and REM metrics as dependent variables. We include ordinary least-squares (OLS) panel data regressions, residual test, and interaction analysis in our study.

Findings: While a significant positive relationship existed between leverage and REM, CG had a negative effect on real manipulations. Our results from the interaction analysis and residual test show that CG is a key player in explaining the relationship between leverage and REM. We also find that firms with a low-level of CG were more likely to conduct REM activities than those with a high-level CG.

Research limitations/implications: These results imply that the reduction in opportunistic behavior of managers in the presence of strong CG could decrease the leverage of firms and REM activities and improve the quality of their earnings. Moreover, shareholder rights and audit organizations were the prominent CG characteristics influencing REM activities, as they enforce additional monitoring of financial reporting quality and increase audit standards. CG strategies mitigate the corporate corruption scandals through the adoption of high-quality accounting and financial norms in reporting and management. Thus, executives decrease their incentives to conduct REM activities and leverage cannot be used freely as a mechanism to manipulate earnings, given firms' leverage position is audited and reviewed by the financial committee in firms with strong CG. For future research, the authors suggest including the degree of leverage as a disaggregation sample and adding the degree of cost stickiness.

Originality/value: Several studies have investigated either the relationship between (1) REM and leverage, or (2) REM and CG, including leverage as a control variable. Our study, extends this bilateral relationship to simultaneous relationship between leverage, CG, and REM. Moreover, we investigate the predominant CG characteristics that influence the association among leverage and REM. We conduct interaction analysis and residual effect to investigate if CG should be considered as a determinant variable in the recurrence of REM activities of managers. We include firms with high- and low- levels of CG to show which firms are leveraged.

Keywords: Real earnings management, Corporate governance, Leverage

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I . Introduction

Schipper (Schipper, 1989) defines earnings management (EM) as “a purposeful intervention in the external financial reporting process with the intent of obtaining some private gain”. EM influences on stock market perceptions, increases managers’ rewards, reduce the probability of violating lending agreements, and avoid any regulatory intervention (Healy & Wahlen, 1999). Furthermore, managers engage in various EM practices to avoid earnings volatility and to meet or beat earnings benchmarks because investors prefer firms with consistent profitability and stability, which would affect their bonuses, based on the financial performance of the firm. Hence, they prefer to manage earnings through real earnings management (REM) because of the lesser pressure of debt covenants (Kim & Sohn, 2013; Vakiliifard & Mortazavi, 2016), lesser scrutiny by auditors and regulators, and therefore, a lesser probability of being detected (Cohen et al., 2008; Cohen & Zarowin, 2010; Graham et al., 2005).

Studies have provided evidence of both positive and negative relationships between REM and leverage. The positive association between debt and REM is grounded in the high default risk of high-leverage firms, which might lead managers to adopt measures such as evading the reporting of annual losses. Roychowdhury (Roychowdhury, 2006) documents that managers from high-leverage firms manipulate real earnings, activities by, (1) providing price discounts to temporarily increase the sales volume, (2) overproducing inventory to decrease the cost of goods sold (COGS), or (3) cutting discretionary expenses to improve the reported margins. Tulcanaza-Prieto, Lee, and Koo (Tulcanaza-Prieto, Lee, et al., 2020) also reports the positive relationship between leverage and REM using quarterly financial data. Therefore, firms might increase their REM activities (1) to show stable results and fewer volatile earnings to their lenders and future investors (Burgstahler & Dichev, 1997; Wijesinghe & Kavinda, 2017), (2) to reduce their debt covenant violations, contraventions, and penalties (Y. Chen et al., 2015; Lemma et al., 2013), and (3) to secure

debt refinancing (Huang & Sun, 2017; Roychowdhury, 2006). In contrast, the negative relationship between leverage and REM focuses on reducing the opportunistic behavior of managers, which modifies their astute conduct into discipline, as lenders and institutional investors increase their scrutiny and control on firms (Jelinek, 2007; López-Iturriaga & Hoffman, 2005). Moreover, there is a reduction in the free cash flow when managers engage in REM practices, which also decreases the leverage of the firm (Wasimullah & Abbas, 2010), suggesting that lenders and investors of high-leverage firms are more susceptible to increase their accounting and financial scrutiny and control by adopting corporate governance (CG) policies.

The agency costs also develops an important argument on the literature of REM. First, the agency costs of debt motivate the positive relationship between leverage and REM activities, if REM would be associated with stockholders’ selfish strategies against bond holders such as taking large risks, engaging underinvestment, or milking properties. On the other hand, an increase of leverage may result in heavy monitoring activities on firm’s financial policies by the institutional bond holders, which insists on the negative relationship between leverage and REM. Second, the agency cost of equity raises the two types of disputes in firms. The first disagreement is the conflict of interest between the majority and minority shareholders, grounded in the expropriation risk (Goh et al., 2013), while the second problem arises from different benefits between managers and shareholders inspired by wealth of individuals and of the firm, respectively. For both types of conflicts, REM could be considered as a manager’s expedient of personal extortion from shareholders. Therefore, the agency cost of equity implies the negative relationship between leverage and REM. Appropriate governance structures are created to protect the interests of all stakeholders by increasing independence of the board and committees, raising the access of transparent information and disclosure, and owning high-level audit committees. A strong CG might improve transparency and reduce both agency conflicts of debt and equity, while a weak CG might increase

the asymmetry of information between parties and increase the agency costs. Agency problems and asymmetric information often increase the probability of managers engaging in REM activities. Therefore, CG could loosen the relationship between leverage and REM activities.

Several studies have investigated either the relationship between (1) REM and leverage (Kaushik & Kumar, 2018; Tulcanaza-Prieto, Lee, et al., 2020; Vakilifard & Mortazavi, 2016; Zamri et al., 2013), or (2) REM and CG, including leverage as a control variable (Kang & Kim, 2012; Kurnia & Pradipta, 2016; Lee et al., 2015). This study, however, extends this bilateral relationship to simultaneous relationship among leverage, CG, and REM. We also analyze which characteristics of CG influence the association between REM and leverage. For this purpose, we incorporate five CG characteristics in our statistical analysis, namely, shareholder rights, board structure, disclosure, audit organization, and management error. We conduct interaction analysis and residual effect to investigate if CG should be considered as a determinant variable in the recurrence of REM activities of managers. Moreover, to reinforce our previous findings, we divide our sample into firms with high- and low-levels of CG based on the median value of their CG score. We compare the standardized beta coefficients of four regressions between both the samples to verify that firms with high-level of CG show lower leverage standardized beta coefficients than those with low-level of CG.

Analyzing Korean non-financial firms for the period of 2003-2011, we find a positive relationship between leverage and REM activities and a negative association between CG and REM. Moreover, the interaction term between leverage and CG has a positive relationship with real manipulations. Using residual tests, we show that CG is a key player in explaining the relationship between leverage and REM. These findings imply that CG could act as a corporate finance tool reducing REM activities of the managers. Furthermore, our findings suggest that the reduction in the opportunistic behavior of managers in the presence of strong CG could decrease leverage

and REM activities of the firm and improve its quality of earnings. We also find that managers are less likely to manage earnings in high-leverage firms with strong CG, whereas they are more likely to conduct REM activities in high-leverage firms with a low-level of CG. We show that shareholder rights and audit organizations are the prominent CG characteristics that influence REM activities in the Korean market. Finally, we conduct a two-stage least square (2SLS) regression analysis, which provides a robustness check for our results and controls the endogeneity problem.

The rest of the paper is composed as follows. Section 2 presents a literature review and describes the development of the hypothesis. Section 3 illustrates the empirical design. Section 4 defines the data collection procedure and presents the empirical findings. Section 5 discusses the results, highlights the conclusions, and offers recommendations for future research.

II. Development of Hypothesis

Managers show personal motivations to manipulate earnings using their judgment to alter the financial reports by structuring transactions in order to increase the firm performance or influence the contractual outcomes (Healy & Wahlen, 1999; Schipper, 1989). In the accounting literature, there are two methodologies to conduct EM in a firm, namely accrual-based EM and REM. Zang (Zang, 2012) suggests that there is a trade-off between accrual-based EM and REM because both EM categories are substitutes and are influenced by the relative costliness and the timing of EM activities. Previous studies suggest the preference of managers to conduct real manipulations instead of accrual-based modifications due to its low probability of being detected (Graham et al., 2005). Firms might increase their real manipulation activities to show good results to their lenders to reduce their debt covenant violations and secure refinancing of debt (Klein, 2002; Lemma et al., 2013; Othman & Zeghal,

2006; Sweeney, 1994). Thus, there is a positive relationship between REM and leverage, suggesting that the market participants underreact to REM (Anagnostopoulou & Tsekrekos, 2017; Kuo et al., 2014). In contrast, there is a negative relationship between REM and leverage, motivated by the reduction in the opportunistic behavior of managers to meet (or beat) earnings targets, owing to the scrutiny and control imposed on firms by lenders and institutional investors (Jelinek, 2007). If the free cash flow decreases by their REM practices, managers prioritize their debt payments and repayments, and increase their prudence to invest in non-value maximizing projects, which reduce leverage of the firms (Wasimullah & Abbas, 2010).

The presence of a high-level of CG introduces a higher transparency and public information disclosure in a firm, which decrease the agency costs, asymmetric information, and opportunistic behavior of managers. Transparency is aligned with openness and willingness to disclosure financial performance, suggesting that firms provide clear information to shareholders and stakeholders. Transparency guarantees that stakeholders show confidence in the decision-making and management processes of a firm, which increases the quality of CG. Transparency is a characteristic of the high-level of CG, which increases reliability of firms. Black, Jang, and Kim (Black et al., 2006) mentioned that most Korean companies have a controlling shareholder or family, which is considered as a tool of CG, because it increases the control of managers and their actions, promoting more efficient operations, increasing overall firm value, or transferring part of this value from majority to minority shareholders (Yoon et al., 2006).

Prior studies show that firms with strong CG policies are more likely to avoid REM activities (Byard et al., 2006; Jianga et al., 2008), suggesting a negative relationship between both variables, because the supervisory role of the majority owner decreases the opportunistic behavior of managers, and their motivations to engage in REM. Piosik and Genge (Piosik & Genge, 2019) shows that the optimal level of ownership concentration minimizes the

magnitude of REM and increases financial transparency, which is one of the pillars of sustainable firms. Analyzing American firms, He et al. (2009) shows that a strong CG decreases REM practices, increases the accounting-monitoring process, improves the quality of financial reporting, and raises the shareholder confidence (He et al., 2009). Similarly, García-Osma and Noguera (García-Osma & Noguera, 2007), Alves (Alves, 2012), and Hashim and Devi (Hashim & Devi, 2012) found that managers of well-governed firms in Spain, Portugal, and Malaysia are less likely to engage in REM activities because of the high-level institutional investors and independent directors, managerial ownership, and ownership concentration, respectively. These findings suggest that strong CG measures might decrease REM practices, accounting violations, and frauds (Xie et al., 2003). Therefore, effective CG mitigates REM activities. Lee, Kang, and Cho (Lee et al., 2015) showed that the improved CG through adopting IFRS impulses the manager to avoid REM. Waweru and Riro (Waweru & Riro, 2013) also showed that the board composition and ownership structure significantly influence the earnings management respectively in a negative and positive manner. They mention that the higher composition of independent directors reduces real manipulations because boards of directors play an important role in the financial reporting process and increase the reporting quality. However, the increase in ownership concentration motivates the engagement in REM activities, as there is a reduction in external pressure for higher reporting quality (Saona et al., 2020). Byun, Kwak, and Hwang (Byun et al., 2008) showed that shareholders' rights protection is the most representative practice for the reduction of the cost of equity because it mitigates the agency problems and the information asymmetry, and improves the financial reporting quality.

The opportunistic behaviors of managers decrease when the firms adopt CG policies with transparent information and disclosure. According to the agency theory, the improved transparency reduces conflict of interest and the asymmetry of information, as well. There is evidence in the finance and accounting literature that contracts with identification of roles,

rights, and obligations of managers provide more transparent information, which influence on the negative relationship between leverage and REM activities (Cohen et al., 2008; López-Iturriaga & Hoffman, 2005). Furthermore, the active supervisory role of regulators and the presence of a strong CG structure in firms might decrease leverage of the firms and reduce the opportunities for managers to engage in REM activities given the high possibility of being discovered. Therefore, CG practices might loosen the relationship between leverage and REM. A couple of the previous studies analyze the relation among CG, leverage, and REM together. Swai (Swai, 2016) argues for a significant negative relationship between REM and CG. He asserts that audit quality decreases the possibility of managers engaging in REM activities, and that the adoption of CG practices reduces the financial leverage of firms. However, the study has not investigated the interaction effect of CG on the relationship between leverage and REM. Fitri et al. (Fitri et al., 2018) demonstrates a significant negative relationship between REM activities and institutional and managerial ownership, and found that influence of leverage on REM was insignificant. Therefore, institutional and managerial ownership act as a monitor of managerial performance, which limits and reduces the opportunistic behavior of managers. Amertha et al. (Amertha et al., 2014) studied the relationship among the management of earnings, leverage, and CG. They showed that CG has a significant negative effect on REM, whereas influence of leverage was insignificant. However, they did not investigate the simultaneous relationships among REM, leverage, and CG.

In this study, we simultaneously investigate the relationship among leverage, CG, and REM using descriptive statistical analysis, interaction effect, and residual test. All these tests are performed to evaluate CG as a predominant variable affecting managerial decision to engage in REM activities. We also examine which characteristics of CG play an important role in explaining the relationship between leverage and REM. Finally, the samples are classified into firms with high- and low-levels of CG, based on median value of their CG score to confirm our previous finding

of the relationship between REM and CG. Therefore, our hypothesis is:

Hypothesis: Effective CG mechanisms decrease the magnitude of relationship between leverage and REM.

III. Empirical Design

A. Detecting REM

We employ Roychowdhury's (Roychowdhury, 2006) model to measure manipulation in real earnings activities as it is the most frequent and convenient method used in several REM studies (Anagnostopoulou & Tsekrekos, 2017; Cohen et al., 2008; Cohen & Zarowin, 2010; Roychowdhury, 2006; Zamri et al., 2013). We examine patterns in the individual and aggregate values of cash flow from operations (CFO), selling, general, and administrative (SG&A) expenses, and production costs (sum of COGS and change in inventory) for firms close to the zero earnings benchmark, to detect real activities manipulation to avoid losses. All metrics are calculated using the difference between the actual value and the normal value by estimating coefficients from the corresponding industry-year and the firm-year sales and lagged assets. All parameters are calculated using estimation samples (all industries) and then we introduce these parameters in our models using test sample.

The abnormal aggregate REM (ABN_REM) is measured by the aggregation of the abnormal CFO (ABN_CFO), abnormal SG&A expenses (ABN_SG&A), and abnormal production costs (ABN_PROD). For understanding purposes, we report the inverted sign for the variables ABN_CFO and ABN_SG&A, as both measurements show negative residuals when firms engage in REM activities. We estimated Equation (1) using annual information; therefore, high residuals correspond to high levels of real earnings manipulation, resulting in positive ABN_REM when a firm manages earnings through REM initiatives.

$$ABN_REM_{i,t} = ABN_CFO_{i,t} * (-1) + ABN_SG\&A_{i,t} * (-1) + ABN_PROD_{i,t} \quad (1)$$

where $ABN_REM_{i,t}$ is the abnormal aggregate REM, $ABN_CFO_{i,t}$ is the abnormal CFO, $ABN_SG\&A_{i,t}$ is the abnormal SG&A expenses, and $ABN_PROD_{i,t}$ is the abnormal production costs. The subscripts i and t denote the firm and fiscal year, respectively. The ABN_CFO was estimated as follows:

$$ABN_CFO_{i,t} = \alpha_0 + \alpha_1 \frac{1}{A_{i,t-1}} + \alpha_2 \frac{S_{i,t}}{A_{i,t-1}} + \alpha_3 \frac{\Delta S_{i,t}}{A_{i,t-1}} + \varepsilon_{i,t}, \quad (2)$$

$$ABN_CFO_{i,t} \text{ is measured by } ABN_CFO_{i,t} = \frac{CFO_{i,t}}{A_{i,t-1}},$$

where $CFO_{i,t}$ is the CFO, $A_{i,t-1}$ denotes the total assets of a firm, and $\Delta S_{i,t}$ is the change in sales of the firm measured as $\Delta S_{i,t} = \frac{S_{i,t} - S_{i,t-1}}{S_{i,t-1}}$, where $S_{i,t}$ and $S_{i,t-1}$ are the total sales of firm i in the years t and $t-1$, respectively. α_0 is the intercept term and $\varepsilon_{i,t}$ is the error term.

We estimated the $ABN_SG\&A$ expenses as in Equation (3):

$$ABN_SG\&A_{i,t} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \alpha_4 \left(\frac{S_{i,t}}{A_{i,t-1}} \right) + \varepsilon_{i,t}, \quad (3)$$

where $ABN_SG\&A_{i,t}$ is measured by $ABN_SG\&A_{i,t} = \frac{SG\&A_{i,t}}{A_{i,t-1}}$, and $SG\&A_{i,t}$ is the SG&A expenses of firm i in year t . The ABN_PROD was estimated as:

$$ABN_PROD_{i,t} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \alpha_2 \left(\frac{S_{i,t}}{A_{i,t-1}} \right) + \alpha_3 \left(\frac{\Delta S_{i,t}}{A_{i,t-1}} \right) + \alpha_5 \left(\frac{\Delta S_{i,t-1}}{A_{i,t-1}} \right) + \varepsilon_{i,t}, \quad (4)$$

where $ABN_PROD_{i,t}$ is measured by $ABN_PROD_{i,t} = \frac{PROD_{i,t}}{A_{i,t-1}}$. $PROD_{i,t}$ is the production cost measured by $PROD_{i,t} = COGS_{i,t} + \Delta INV_{i,t}$, where $COGS_{i,t}$ is the COGS of firm i in year t and $\Delta INV_{i,t}$ is the change in inventory measured by $\Delta INV_{i,t} = \frac{INV_{i,t} - INV_{i,t-1}}{INV_{i,t-1}}$, where $INV_{i,t}$ and $INV_{i,t-1}$ are the total inventories for firm i in the years t and $t-1$, respectively. $\Delta S_{i,t-1}$

is the change in sales measured by $\Delta S_{i,t-1} = \frac{S_{i,t-1} - S_{i,t-2}}{S_{i,t-2}}$.

B. Corporate Governance Metrics

Standard and Poor's (S&P) calculates the CG score (CGS) using the CG principles established by the OECD in 1999. The CGS is calculated by aggregating the scores of five CG characteristics. A higher CGS suggests better CG implementation and higher transparency. The scoring process uses both public and private information. The maximum value of the CGS is 300 and its characteristics are presented in Figure 1. The Korean Commercial Code is the primary source of law relating to CG, which applies to both listed and unlisted firms. All listed companies need to show public disclosure, establish an audit committee, elect outside directors, and issue securities. The applicability and practice of CG scoring is challenging because most of the components are assessed as a qualitative exercise, which is the main difference with the financial analysis where quantitative measures are the components of benchmarks. The CGS in Korea assesses the CG practices in a firm and extends to the firms' financial stakeholders, emphasizing on shareholders' interests. Furthermore, CGS allow the comparison of individual companies within a national context, as well as comparisons of companies in different jurisdictions (Standard & Poor's Governance Services, 2004).

C. Research Model

We used ordinary least-squares (OLS) panel data regression models with fixed effects to investigate the relationship between leverage, CG, and REM in the Korean non-financial firms because the results of the Hausman test revealed that error terms are not correlated with the constant, which captures the individual characteristics (Nwakuya & Ijomah, 2017). We adopted ABN_REM , ABN_CFO , $ABN_SG\&A$, and ABN_PROD as the dependent variables, with



Figure 1. Characteristics of corporate governance score (CGS).

CGS and leverage as the independent variables. The CGS is calculated as the sum of five measurements, which are (1) shareholder rights (CG1), (2) board structure (CG2), (3) disclosure (CG3), (4) audit organization (CG4), and (5) management error (CG5), while leverage from debt ratios (Lev) comprises total (TLev), short-term (StLev), and long-term (LtLev) debt ratios. Our models included the most frequent control variables from previous studies, which are asset tangibility, profitability, size, and firm liquidity (Tulcanaza-Prieto & Lee, 2019). Profitability includes return on assets (ROA) in the lagged form following methodologies in previous studies (Vakilifard & Mortazavi, 2016; Wijesinghe & Kavinda, 2017; Zamri et al., 2013). Furthermore, we incorporated net interest payment and foreign investor ownership rate as new control variables because an increase in leverage might raise interest expense, which lowers net income, while foreign investor ownership rate might contribute transparent information (Jelinek, 2007; Jensen, 1986; Vakilifard & Mortazavi, 2016).

In Equation (5), the coefficient β_1 measures the relationship between leverage and REM. If the β_1 is positive, leverage will positively influence the real earning manipulation activities. Therefore, we expect a positive value for β_1 .

$$\begin{aligned}
 ABN_REM_{i,t} = & \beta_0 + \beta_1 Lev_{i,t} + \beta_2 Tang_{i,t} & (5) \\
 & + \beta_3 ROA_{i,t-1} + \beta_4 Size_{i,t} + \beta_5 Liq_{i,t} \\
 & + \beta_6 NIP_{i,t} + \beta_7 FIOR_{i,t} \\
 & + \sum_{j=1}^n \beta_j Industry_{i,t} \\
 & + \sum_{k=12}^l \beta_k Year_{i,t} + \varepsilon_{i,t}
 \end{aligned}$$

where $ABN_REM_{i,t}$ is the abnormal aggregate REM and is composed of the abnormal CFO $ABN_CFO_{i,t}$, abnormal SG&A expenses $ABN_SG\&A_{i,t}$, and abnormal production cost $ABN_PROD_{i,t}$ of firm i for year t . $Lev_{i,t}$ is the debt ratio of firm i in year t , composed of a total debt ratio $TLev_{i,t}$, short-term debt ratio $StLev_{i,t}$, and long-term debt ratio $LtLev_{i,t}$, estimated as $TLev_{i,t} = \left(\frac{Current\ liabilities + Non-current\ liabilities}{Total\ assets} \right)_{i,t}$, $StLev_{i,t} = \left(\frac{Current\ liabilities}{Total\ assets} \right)_{i,t}$, and $LtLev_{i,t} = \left(\frac{Non-current\ liabilities}{Total\ assets} \right)_{i,t}$, respectively. $Tang_{i,t} = \left(\frac{Net\ fixed\ assets}{Total\ assets} \right)_{i,t}$ is the assets tangibility, $ROA_{i,t-1} = \left(\frac{Net\ income}{Total\ assets} \right)_{i,t-1}$ is the proxy for firm profitability, $Size_{i,t} = \log(Total\ assets)_{i,t}$ is the size of the firm represented by natural logarithm of total assets, $Liq_{i,t} = \left(\frac{Current\ assets}{Current\ liabilities} \right)_{i,t}$ is the firm liquidity, $NIP_{i,t} = \left(\frac{Interest\ income - Interest\ expenses}{Total\ assets} \right)_{i,t}$ is the net interest payment, and $FIOR_{i,t}$ is the foreign investor ownership rate. The dummy terms $Industry_{i,t}$ and $Year_{i,t}$ represent industry of a firm (there are eleven

non-financial industries listed on KOSPI) and the year of information, respectively, and $\varepsilon_{i,t}$ is the error term. The subscripts i and t denote the firm and fiscal year, respectively.

In Equation (6), the coefficient β_1 measures the relationship between CG and REM. If β_1 is negative, CG will negatively influence the real earning manipulation activities. We expect a positive value for β_1 .

$$ABN_REM_{i,t} = \beta_0 + \beta_1 CGS_{i,t} + \beta_2 Tang_{i,t} + \beta_3 ROA_{i,t-1} + \beta_4 Sze_{i,t} + \beta_5 Liq_{i,t} + \beta_6 NIP_{i,t} + \beta_7 FIOR_{i,t} + \sum_{j=1}^n \beta_j Industry_{i,t} + \sum_{k=12}^f \beta_k Year_{i,t} + \varepsilon_{i,t} \quad (6)$$

where $CGS_{i,t}$ is the CG score of firm i in year t. It is composed of shareholder rights $CG1_{i,t}$, board structure $CG2_{i,t}$, disclosure $CG3_{i,t}$, audit organization $CG4_{i,t}$, and management error $CG5_{i,t}$. $CGS_{i,t} = \text{Log}(CG1 + CG2 + CG3 + CG4 + CG5)_{i,t}$ for firm i in year t.

In Equation (7), the coefficients β_1 and β_2 measure the relationship between (1) leverage and REM, and (2) CG and REM, respectively. We expect a positive value for β_1 and negative value for β_2 based on previous findings from Equations (5) and (6).

$$ABN_REM_{i,t} = \beta_0 + \beta_1 Lev_{i,t} + \beta_2 CGS_{i,t} + \beta_3 Tang_{i,t} + \beta_4 ROA_{i,t-1} + \beta_5 Sze_{i,t} + \beta_6 Liq_{i,t} + \beta_7 NIP_{i,t} + \beta_8 FIOR_{i,t} + \sum_{j=1}^n \beta_j Industry_{i,t} + \sum_{k=12}^f \beta_k Year_{i,t} + \varepsilon_{i,t} \quad (7)$$

In Equation (8), the coefficient β_1 measures the relationship between leverage and REM while β_2 measures the relationship between CG and REM. We introduce an interaction term $Lev*CGS$ in our model. The coefficient β_3 is the result of our hypothesis, which shows the interaction effect of CG on the relationship between leverage and REM. If β_3 is positive, CG provides more incremental information than the information provided by the individual relationship between leverage and REM, and CG and REM. We expect positive values for the coefficients β_1 and β_3 , and a negative value for the coefficient β_2 .

$$ABN_REM_{i,t} = \beta_0 + \beta_1 Lev_{i,t} + \beta_2 CGS_{i,t} + \beta_3 Lev*CGS_{i,t} + \beta_4 Tang_{i,t} + \beta_5 ROA_{i,t-1} + \beta_6 Sze_{i,t} + \beta_7 Liq_{i,t} + \beta_8 NIP_{i,t} + \beta_9 FIOR_{i,t} + \sum_{j=1}^n \beta_j Industry_{i,t} + \sum_{k=12}^f \beta_k Year_{i,t} + \varepsilon_{i,t} \quad (8)$$

where $(Lev*CGS)_{i,t}$ is the interaction term between debt ratio and CGS of firm i in year t.

To reinforce our findings, we included the residual test, which shows the effect of CG on the relationship between leverage and REM. The residual value in a regression model shows the lack of fit resulting from the deviation in the linear relationship between independent variables (Gujarati, 1988).

The steps for the residual examination are detailed as follows: (1) Regress CGS towards Lev (Equation (9)), (2) calculate the absolute value of residuals, and (3) regress the absolute value of residuals with ABN_REM as the independent variable (Equation (10)). In Equation (10), the coefficient β_2 reinforces the result of our hypothesis because it can explain the abnormal volatility of CGS given firms' leverage. If β_2 is negative, then CG is a key variable on the relationship between leverage and REM.

$$CGS_{i,t} = \beta_0 + \beta_1 Lev_{i,t} + \varepsilon_{i,t}, \quad (9)$$

$$|\varepsilon_{i,t}| = \beta_0 + \beta_2 ABN_REM_{i,t}, \quad (10)$$

where $|\varepsilon_{i,t}|$ is the absolute value of residuals of firm i in year t. Residuals from Equation (9) collects the abnormal CGS that leverage does not explain. In Equation (10), we use the absolute value of estimated residual. Therefore, the absolute value of estimated residual contains the abnormal volatility of CGS that total leverage cannot explain.

IV. Empirical Results

The initial sample consists of non-financial firms listed on the Korean Composite Stock Price Index (KOSPI). The financial sector was excluded, as those firms are considered financially different from the industrial companies. Therefore, a high leverage for

financial companies probably does not mean the same for non-financial firms (Fama & French, 1992). Financial statements of 556 Korean non-financial firms, with 3,725 firm-year observations, for the years 2003-2011 were included in the sample as they were complete and available. The firms also had to report sales for three consecutive years to be included in the sample. The last sample resulted in 2,997 firm-year observations. The information of firms was collected from the web page of S&P and KisValue version 3.2 (*Kis-Value Version 3.2*, 2018) using CGS, cash flow statement, income statement, and statement of financial position. KisValue is a financial database composed by financial, price, valuation, company, and estimates report from Korean firms, where its version depends on the actualization of the software to download the financial statements. Current CG information is difficult to collect given the stealth of information of each firm; therefore, we use the available CG data. We accessed to CG dataset only for the period of 2003-2011 because firms protect the internal data and they inform the CG status using their own reports, however, S&P collects, processes, and standardizes all information allowing comparison to make decisions. The findings can be generalized for firms with similar characteristics of our sample disaggregation depending on the national accounting and financial regulations. Table 1 describes the selected samples.

A. Descriptive Statistics

The descriptive statistics for all variables are given in Table 2. The mean values of all abnormal REM

measures (ABN_REM, ABN_CFO, ABN_SG&A, and ABN_PROD) were positive, indicating that most of the managers engage in REM activities. Shareholder rights showed the highest mean among the CG characteristics and this category should be considered as one of the prominent determinants of CGS.

B. Correlation Analysis

Table 3 shows that the ABN_REM and ABN_PROD had a significant positive correlation with all leverage ratios at the 1% level. On the contrary, the ABN_CFO and ANB_SG&A showed a significant negative correlation with TLev, StLev, and LtLev. Moreover, the ABN_REM showed a significant negative correlation with CGS, CG1, and CG3 at the 1% level. CGS presented a significant positive and negative correlation with LtLev and StLev, respectively. The correlation values themselves were not large enough to increase multicollinearity.

C. Regression Analysis

1. Relationship between REM and Leverage

Table 4 shows the results of 12 multiple linear regressions to explain the relationship between leverage and REM activities measured by the ABN_REM, ABN_CFO, ABN_SG&A, and ABN_PROD, employing a sample of 2,997 firm-year observations of non-financial firms listed on KOSPI. We confirmed the significant positive relationships between all Lev and REM measures, except for the ABN_SG&A. The regression coefficient of total leverage indicated that

Table 1. Criteria for sample selection

	Detail	No.
	Initial firm-year observations	3,725
Less:	Firm-year observations with incomplete information	-428
Less:	Firm-year observations without three consecutive years of sales	-185
Less:	Firm-year observations with extreme values (E. Chen & Dixon, 1972)	-115
	Final sample of firm-year observations	2,997

Table 2. Descriptive statistics

Variables	Mean	Std. Dev.	Min	Max
<i>Dependent variables</i>				
ABN_REM	0.017	0.376	-2.775	1.305
ABN_CFO	0.001	0.095	-0.948	0.617
ABN_SG&A	0.000	0.129	-0.258	0.912
ABN_PROD	0.017	0.262	-3.132	0.983
<i>Independent variables</i>				
TLev	0.454	0.190	0.045	1.181
StLev	0.326	0.158	0.023	1.133
LtLev	0.129	0.111	0.001	0.740
CGS	1.990	0.116	1.580	2.415
CG1	1.661	0.087	1.301	1.857
CG2	1.167	0.273	0.000	1.903
CG3	1.194	0.196	0.477	1.724
CG4	1.143	0.316	0.000	1.699
CG5	0.545	0.243	0.000	1.000
<i>Control variables</i>				
Tang	0.349	0.174	0.001	0.923
ROA	0.028	0.095	-0.915	0.657
Size	26.325	1.442	22.591	32.182
Liq	1.811	1.485	0.146	14.751
NIP	0.149	0.133	0.000	0.963
FIOR	0.387	0.946	-2.000	1.942

Note: Dependent variables are the (1) abnormal aggregate real earnings management (REM) (ABN_REM), (2) abnormal cash flow from operations (CFO) (ABN_CFO), (3) abnormal selling, general, and administrative (SG&A) expenses (ABN_SG&A), and (4) abnormal production cost (ABN_PROD). Independent variables are the (1) total debt ratio (TLev), (2) short-term debt ratio (StLev), (3) long-term debt ratio (LtLev), (4) corporate governance score (CGS), (5) shareholder rights (CG1), (6) board structure (CG2), (7) disclosure (CG3), (8) audit organization (CG4), and (9) management error (CG5). All CG metrics are calculated using their natural logarithm. Control variables are the (1) asset tangibility (Tang), (2) return of assets (ROA), (3) size (Size), (4) firm liquidity (Liq), (5) net interest payment (NIP), and (6) foreign investor ownership rate (FIOR). Statistical terms standard deviation, minimum, and maximum are denoted as Std. Dev, Min, and Max, respectively.

when total borrowing rose by one unit, keeping the other variables constant, the REM initiatives would increase by 0.458 (ABN_REM). Similar significant positive coefficients were estimated for StLev and LtLev for the ABN_CFO and ABN_PROD. These results also implied that firms were more likely to conduct REM activities by price discounts, tolerant credit terms, and overproduction, rather than cutting the SG&A expenses (Tulcanaza-Prieto et al., 2019). F-statistics were significantly higher for all models showing that the linear regression models fit the data better than the intercept-only model. Furthermore, the Durbin Watson statistics were ranged from 1.814

to 1.945 (values close to 2.0) meaning that there is no autocorrelation detected in the sample.

The results obtained in this study were consistent with those in previous studies. Vakilifard and Mortazavi (Vakilifard & Mortazavi, 2016) and Zamri et al. (Zamri et al., 2013) showed that leverage has a significant positive effect on REM in firms from Malaysia and Tehran, respectively. However, there was no significant relationship between total debt and disaggregated REM measures. These results indicated that “real-time” adjustments would be underestimated or misread in annual reports because those earnings reported therein could be reversed

Table 3. Pearson Correlation Matrix

	ABN_REM	ABN_CFO	ABN_SG&A	ABN_PROD	TLev	SLLev	LLev	CGS	CG1	CG2	CG3	CG4	CG5	Tang	ROA	Size	Liq	NIP	FIOR
ABN_REM	1																		
ABN_CFO	-0.334**	1																	
ABN_SG&A	-0.585**	0.069**	1																
ABN_PROD	0.623**	-0.071**	-0.197**	1															
TLev	0.202**	-0.227**	-0.078**	0.168**	1														
SLLev	0.150**	-0.179**	-0.053**	0.128**	0.813**	1													
LLev	0.133**	-0.135**	-0.059**	0.107**	0.557**	-0.032	1												
CGS	-0.064**	0.012	0.090**	-0.024	-0.032	-0.074	0.051**	1											
CG1	-0.112**	0.008	0.153**	-0.071**	-0.149**	-0.125**	-0.077**	0.631**	1										
CG2	0.014	-0.035**	0.017	0.024	0.058**	0.005	0.092**	0.788**	0.318**	1									
CG3	-0.044**	0.043**	0.081**	-0.002	0.029	-0.026	0.086**	0.585**	0.112**	0.328**	1								
CG4	-0.018	-0.041**	0.028	-0.017	0.040**	0.001	0.068**	0.795**	0.351**	0.669**	0.304**	1							
CG5	-0.028	0.059**	-0.013	-0.024	-0.125**	-0.028	-0.180**	0.201**	0.001	-0.085**	-0.003	-0.142**	1						
Tang	0.063**	0.110**	-0.065**	0.098**	0.083**	-0.111**	0.300**	-0.037**	0.054**	-0.047**	-0.112**	-0.048**	-0.002	1					
ROA	-0.076**	0.213**	0.048**	-0.001	-0.251**	-0.214**	-0.126**	0.115**	0.107**	0.020	0.085**	0.039*	0.053**	0.005	1				
Size	0.083**	-0.024	-0.057**	0.078**	0.154**	-0.034**	0.312**	0.508**	0.035*	0.414**	0.490**	0.430**	-0.116**	0.071**	0.170**	1			
Liq	-0.115**	0.081**	0.062**	-0.106**	-0.609**	-0.600**	-0.189**	-0.011	0.135**	-0.072**	-0.047**	-0.070**	0.041**	-0.247**	0.124**	-0.167**	1		
NIP	0.121**	-0.225**	-0.070**	0.055**	0.716**	0.518**	0.490**	-0.196**	-0.200**	-0.054**	-0.103**	-0.099**	-0.106**	0.094**	-0.344**	-0.049**	-0.365**	1	
FIOR	-0.065**	0.082**	0.107**	-0.015	-0.074**	-0.134**	0.064**	0.352**	0.149**	0.261**	0.322**	0.228**	-0.080**	-0.066**	0.199**	0.517**	0.042**	-0.187**	1

Note: ** and * indicate statistical significance at 1% and 5% levels, respectively.

Table 4. Relationship between REM and leverage

Variables	ABN_REM			ABN_CFO (-1)			ABN_SG&A (-1)			ABN_PROD		
TL _{lev}	0.458*** (7.469)			0.067*** (4.505)			0.016 (0.850)			0.378*** (8.408)		
St _{lev}		0.284*** (4.753)			0.029*** (2.962)			0.009 (0.494)			0.250*** (5.702)	
Lt _{lev}			0.252*** (3.203)			0.060*** (3.188)			0.010 (0.444)			0.181*** (3.131)
Tang	0.053 (1.350)	-0.095** (-2.282)	-0.004 (-0.098)	-0.077*** (-7.848)	-0.074*** (-7.139)	-0.090*** (-8.718)	0.001 (0.117)	0.003 (0.212)	-0.001 (-0.078)	-0.131*** (-4.514)	-0.168*** (-5.521)	-0.088*** (-2.852)
ROA	-0.191** (-2.441)	-0.200** (-2.542)	-0.201** (-2.545)	-0.155*** (-8.544)	-0.155*** (-8.585)	-0.156*** (-8.616)	-0.035 (-1.565)	-0.035 (-1.574)	-0.035 (-1.581)	0.055 (0.955)	0.048 (0.824)	0.046 (0.799)
Size	0.002 (0.401)	0.014** (2.407)	0.004 (0.628)	0.002 (1.460)	0.004** (2.522)	0.002 (1.043)	0.003 (1.465)	0.003 ⁺ (1.693)	0.003 (1.385)	-0.004 (-0.932)	0.006 (1.347)	-0.002 (-0.423)
Liq	-0.017*** (-2.991)	-0.011 ⁺ (-1.768)	-0.007 (-1.455)	-0.003** (-2.130)	0.001 (0.904)	-0.001 (-0.687)	-0.003 ⁺ (-1.697)	0.003 (1.485)	0.002 (1.402)	-0.010** (-2.419)	0.006 (1.275)	-0.010*** (-2.681)
NIP	-0.174** (-2.183)	0.098 (1.511)	-0.119* (-1.746)	-0.081*** (-4.307)	-0.125*** (-8.284)	-0.111*** (-6.881)	0.030 (1.304)	-0.040** (-2.127)	-0.039* (-1.952)	-0.282*** (-4.822)	-0.064 (-1.336)	-0.028 (-0.566)
FIOR	-0.019** (-2.317)	-0.021*** (-2.596)	-0.021** (-2.529)	-0.005*** (-2.630)	-0.006*** (-2.796)	-0.005*** (-2.748)	-0.015*** (-5.921)	-0.015*** (-5.955)	-0.015*** (-5.952)	0.000 (-0.063)	-0.002 (-0.383)	-0.002 (-0.339)
Intercept	-0.110 (-0.723)	-0.352** (-2.237)	0.033 (0.203)	-0.044 (-1.203)	-0.068* (-1.786)	-0.002 (-0.055)	-0.031 (-0.679)	-0.038 (-0.807)	-0.024 (-0.489)	0.008 (0.072)	-0.202 ⁺ (-1.753)	0.105 (0.868)
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.295	0.286	0.283	0.126	0.121	0.123	0.343	0.342	0.342	0.211	0.200	0.193
F-Stat.	53.132***	51.020***	50.234***	21.293***	20.475***	20.789***	74.681***	74.649***	74.646***	34.310***	32.149***	30.864***
DW	1.896	1.901	1.891	1.944	1.947	1.945	1.814	1.814	1.813	1.859	1.867	1.859

Note: The results indicate a significant positive relationship between the leverage and REM metrics, except for ABN_SG&A. Beta corresponds to unstandardized coefficients. Numbers inside the parentheses are t-statistics. ***, **, and * indicate statistical significance at 1%, 5%, and 10% levels, respectively.

in subsequent periods.

Our control variables were significantly negative in majority of the statistical models. The possibility to exercise managerial discretion over REM depends on the levels of current and non-current assets and liabilities. We found that higher Tang mitigates the extent of real adjustments. We also identified a negative relationship between ROA and REM measures. These results imply that poor performance of a firm might become an incentive for managers to engage in REM activities to signal the future firm value. Moreover, there was a significant negative relationship between Liq and REM measures, indicating the managerial ability to engage in REM activities in the absence of Liq. Jensen (Jensen, 1986) has showed that a higher interest expense would

control the opportunistic behavior of managers. Therefore, there was a negative relationship between NIP and REM measures because managers prioritize the interest and principal payments. A higher interest payment would limit managers from exercising their discretion and reduce the possibility to engage in REM. We found that a higher FIOR reduces the REM activities. These results implied that foreign investors play an independent role in restraining REM by continuous financial and accounting controls, which improves the earnings quality.

2. Relationship between REM and CG

Table 5 shows the results of seven multiple linear regressions to explain the relationship between

Table 5. Relationship between REM and CG

Variables	ABN_REM						
CGS	-0.419*** (-4.254)						
CG1	-0.258*** (-3.063)						
CG2	-0.017 (-0.357)						
CG3	-0.054 (-1.425)						
CG4	-0.108*** (-2.862)						
CG5	-0.030 (-0.885)						
Tang	0.041 (1.025)	0.057 (1.404)	0.037 (0.922)	0.031 (0.784)	0.039 (0.967)	-0.019 (-0.359)	-0.009 (-0.167)
ROA	-0.197** (-2.502)	-0.192** (-2.430)	-0.200** (-2.514)	-0.206*** (-2.578)	-0.216*** (-2.725)	-0.478*** (-2.818)	-0.434** (-2.554)
Size	0.026*** (3.894)	0.010* (1.803)	0.012* (1.907)	0.015** (2.355)	0.020*** (3.047)	0.025*** (3.504)	0.046*** (4.887)
Liq	-0.005 (-0.927)	-0.004 (-0.704)	-0.006 (-1.111)	-0.006 (-1.178)	-0.005 (-1.090)	0.005 (0.794)	0.009 (1.278)
NIP	0.197*** (3.299)	0.212*** (3.563)	0.229*** (3.809)	0.221*** (3.696)	0.224*** (3.759)	0.487*** (5.029)	0.463*** (4.784)
FIOR	-0.020** (-2.388)	-0.019** (-2.315)	-0.023*** (-2.709)	-0.022*** (-2.616)	-0.023*** (-2.754)	-0.028*** (-2.624)	-0.027** (-2.504)
Intercept	0.272 (1.483)	0.219 (1.042)	-0.182 (-1.167)	-0.198 (-1.281)	-0.251 (-1.612)	-0.565*** (-2.894)	-0.407 (-1.488)
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.285	0.283	0.280	0.281	0.282	0.229	0.336
F-Stat.	50.733***	50.179***	49.525***	49.694***	50.103***	43.728***	38.170***
DW	1.896	1.898	1.893	1.893	1.894	1.858	1.851

Note: The results indicate a significant negative relationship between the CG metrics and ABN_REM. Beta corresponds to unstandardized coefficients. The numbers inside the parentheses are t-statistics. ***, **, and * indicate statistical significance at 1%, 5%, and 10% levels, respectively.

ABN_REM and the six CG measures. The highest adjusted R-Square value was obtained when all the CG metrics were independent variables, with an adjustment of 33.6%. F-statistics were significantly higher for all models and the Durbin Watson statistics showed a little positive autocorrelation meaning that CG has a positive influence on itself over time.

We confirm that shareholder rights and audit organizations are the prominent CG characteristics that influence REM activities. We conclude that the appropriate governance structure of firms mitigates REM activities. Strong CG reduces agency conflicts by decreasing asymmetric information. CG also defends the shareholder rights, promotes the adoption

of national and international accounting standards, integrates transparent information in financial reports, and incorporates high-level audit committees in their business. Prior studies have recognized that strong shareholder rights enforce additional monitoring of financial reporting managers of the firms, as it influences the board and managers, which reduces REM activities through higher quality of financial reporting (Geiger & North, 2013; Lasfer, 2006; Luoma & Goodstein, 1999). The negative relationship between shareholder rights and REM activities suggests that shareholder rights are an effective component of CG. Therefore, firms with strong shareholder rights show reduced levels of REM activities. Furthermore, the negative relationship between audit organizations and manipulating activities obtained in this study are consistent with Prawitt et al. (Prawitt et al., 2009). They showed that the quality of internal audit reduces the level of REM practices because of higher quality of auditing standards and CG. Similarly, Lopes (Lopes, 2018) suggested that the level of earning manipulations in Portuguese firms have significantly lowered through the contract with a Big Four accounting firm because of their higher levels of audit quality.

Our findings are consistent with the decrease in the opportunistic behavior of managers, which reduces their motivation to engage in REM activities. Prior studies have shown that strong CG mechanisms might decline the possibility of managers conducting real manipulations because of an increase in the shareholder confidence and the presence of an extensive audit process (He et al., 2009). Moreover, the negative relationship between CG and REM is grounded in the alignment of interests of management with those of the shareholders. Managers are subjected to extensive supervisory control in well-governed firms, which reduces their REM activities, owing to the high probability of being discovered. Managers from firms with strong CG assess firstly their professional stability and reputation in the long-term, rather than their short-term incentives.

3. Relationship between REM, leverage, and CG with interaction effect

Table 6 shows the results of five multiple linear regressions that show relationship between REM and both leverage and CG. The highest adjusted R-Square value was obtained when the ABN_REM was kept as the dependent variable and total borrowings and all CG metrics were kept as the independent variables, with an adjustment of 34.1%. F-statistics were significantly higher for all models. All regressions confirmed the significant negative relationship between CGS, CG1, and CG4, and all the REM metrics. The regression coefficient of CGS indicates that when CGS rose by one unit, keeping the other variables constant, the REM initiatives decreased by 0.794 (ABN_REM). Furthermore, there was a significant positive relationship between the interaction term TLev * CGS and all REM measures, suggesting that when the interaction term was increased by one unit, keeping the other variables constant, the REM activities would rise by 0.199 (ABN_REM), which was the highest regression coefficient of the interaction term. In contrast, the regression coefficients for TLev were not significant. There was no significant relationship between TLev and the REM activities. We conclude that the effects of CG and the interaction term on REM are significantly negative and positive, respectively. Therefore, the effect of CG is predominant in the REM activities compared to the leverage effect, suggesting that CG and the interaction term provide incremental information than the information given by the individual relationship between leverage, REM, and between CG and REM.

Our previous findings suggested a significant positive relationship between leverage and REM. However, leverage itself is no longer an effective variable for our model. The interaction effects of CG and leverage determine the possibility to engage in REM activities and they become effective variables for our model. Our findings are consistent with previous studies. Swai (Swai, 2016) and Fitri et al. (Fitri et al., 2018) showed (i) a significant negative relationship between CG and REM and (ii) there was no significant relationship between leverage and

Table 6. Relationship between REM, leverage, CG, and interaction term

Variables	ABN_REM		ABN_CFO (-1)	ABN_SG&A (-1)	ABN_PROD
TLev	-0.138 (-1.563)	-0.621 (-0.749)	-0.372 (-1.592)	-0.215 (-1.221)	-0.367 (-0.729)
CGS	-0.794*** (-4.304)		-0.176*** (-4.163)	-0.290*** (-5.591)	-0.271*** (-2.994)
CG1		-0.404*** (-2.978)			
CG2		-0.116 (-1.514)			
CG3		-0.104 (-1.072)			
CG4		-0.139** (-2.568)			
CG5		-0.020 (-0.585)			
TLev * CGS	0.199*** (2.646)	0.086*** (2.751)	0.077*** (3.075)	0.069*** (3.312)	0.064*** (2.886)
Tang	0.056 (1.427)	0.024 (0.439)	-0.077*** (-7.828)	0.002 (0.207)	0.132*** (4.536)
ROA	-0.176** (-2.248)	-0.397** (-2.338)	-0.152*** (-8.417)	-0.031 (-1.405)	0.060 (1.051)
Size	0.016** (2.449)	0.037*** (3.760)	0.004*** (2.626)	0.011*** (5.312)	-0.001 (-0.179)
Liq	0.018*** (3.107)	0.026*** (3.186)	0.003** (2.165)	0.003* (1.926)	0.010** (2.425)
NIP	-0.177** (-2.198)	0.179 (1.423)	0.084*** (4.417)	0.016 (0.680)	-0.276*** (-4.648)
FIOR	-0.016** (-1.977)	-0.024** (-2.225)	-0.005** (-2.337)	-0.013*** (-5.390)	0.000 (0.065)
Intercept	0.102*** (2.944)	-0.025 (-0.062)	0.250*** (2.976)	0.343*** (3.325)	0.470* (1.704)
Year-fixed effects	Yes	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.300	0.341	0.130	0.255	0.211
F-Stat.	50.138***	36.384***	20.391***	72.525***	31.647***
DW	1.898	1.853	1.945	1.821	1.860

Note: The results indicate (1) a significant negative relationship between CGS, CG1, and CG4, and all REM metrics, (2) a significant positive relationship between all REM metrics and the interaction term (TLev * CGS), and (3) an insignificant negative relationship between total borrowings and REM metrics. Beta corresponds to unstandardized coefficients. The numbers inside the parentheses are t-statistics. ***, **, and * indicate statistical significance at 1%, 5%, and 10% levels, respectively.

REM, in firms listed in East Africa and Indonesia, respectively. They suggested that the signaling theory

and the increase in reporting quality would reduce the agency costs, limiting the managerial opportunistic

behavior to engage in REM. Jin et al. (Jin et al., 2018) found that CG introduces more control in the accounting processes of firms. Managers do not freely access the cash flow and the financial committees supervise and approve the debt position of firms. Therefore, motivation to engage in REM activities in the managerial level decreases.

Finally, F-test results from Table 5 were higher than those results from Table 6. We concluded that CG metrics are key determinants that influence REM activities, while leverage's importance decreases when we included the interaction term, implying that the joint effect of CG metrics (CG1-CG5) over REM activities are significantly higher than leverage effect.

4. Residual effect of CG on relationship between REM and leverage

Table 7 shows the results of the residual test conducted to explain the residual effect of CG on the relationship between total borrowings and REM. Therefore, if the result of the residual regression is negative, and the independent variable is considered as a key variable as it affects and breaks the relationship between the variables used in the first step of regression.

We found significant negative beta coefficients for all REM metrics, suggesting that CG would weaken the relationship between leverage and REM. We showed that the increase in monitoring and

controlling mechanisms protects all the stakeholder interests, which would align the managerial goals with those of corporates. The existence of CG in a firm increases the transparency and reliability of a company by information disclosure, which also reduces company risk and expropriation of minority shareholders. As a consequence, managers reduce their opportunistic behavior and do not engage frequently in REM activities. Therefore, our hypothesis was true for all REM metrics, implying a significant residual effect of CG on the relationship between leverage and REM.

5. Robustness test

To confirm our previous results, we conducted a robustness test. We classified firms with high- and low-level of CG according to the median value of their CGS. The median value of the CGS logarithm was 1.996 for all samples. Therefore, firms with firm-year observations having a CGS higher than 1.996 were classified as firms with a high-level of CG, whereas those with firm-year observations having a CGS lower than 1.996 were classified as firms with a low-level of CG. Our sample was classified into 1,724 and 1,273 firm-year observations with high- and low-levels of CG, respectively. We decided to classify our sample into two groups to identify the degree of preference of managers to engage in

Table 7. Residual test

Model	Unstandardized Coefficients		Standardized Coefficients	t
	Beta	Std. Error	Beta	
1	(Constant)	0.020	0.002	11.012***
	ABN_REM	-0.015	0.005	-3.078***
2	(Constant)	0.006	0.002	1.003
	ABN_CFO (-1)	-0.005	0.020	-2.056**
3	(Constant)	0.036	0.002	1.004
	ABN_SG&A (-1)	-0.079	0.015	-5.253***
4	(Constant)	0.012	0.002	10.910***
	ABN_PROD	-0.007	0.007	-0.018

Note: The result indicates that CG is a key variable on the relationship between leverage and all REM metrics. Dependent variable: the absolute value of leverage residuals. Steps: (1) regress CGS towards TLev, (2) calculate the absolute value of residuals ($|e_{i,t}|$), and (3) $|e_{i,t}|$ regressed by all REM metrics. *** and ** indicate statistical significance at 1% and 5% levels, respectively.

REM activities depending on the CG level. Therefore, we expect lower REM incurrence in firms with high-level of CG than its value in firms with low-level of CG, because the adoption of CG increases the control and supervision in firms, and thus, managers might not have free access to the internal and external financing, which decreases the frequency of REM engagement.

Table 8 shows that the mean of REM activities was higher in suspicious firms (whose net income scaled by total assets was ≥ 0.0 but < 0.005) than that in non-suspicious firms, which was approximately zero. Similarly, the mean of the leverage ratio in suspicious firms was higher than that in non-suspicious firms. Moreover, we show that firms with high-level of CG are less likely to engage in REM activities

(31.03%), while firms with low-level of CG frequently manage their earnings by real activities (52.16%), suggesting that one-third of the firms with high-level of CG engage in REM activities compared to half of the firms with low-level of CG that engage in REM. These findings are consistent with our previous results and with our hypothesis that CG could be considered as an effective variable to demotivate managers to engage in REM activities. Therefore, the interaction term of CG and leverage might weaken the relationship between leverage and REM.

Table 9 shows the standardized beta coefficients of the independent variables to explain the relationship between REM and both CG and leverage. We confirmed the significant negative relationship between CGS and ABN_REM in firms with high- and low-levels

Table 8. REM activities by level of CG

Disaggregation	ABN_REM	TLev	High-level of CG		Low-level of CG	
	Mean		No.	%	No.	%
Non-Suspicious firms	-0.004	0.401	1,189	68.97%	609	47.84%
Suspicious firms	0.053	0.526	535	31.03%	664	52.16%
Total	0.017	0.454	1,724	100.00%	1,273	100.00%

Note: "Suspicious" is defined as firms whose net income scaled by total assets is ≥ 0.0 but < 0.005 .

Table 9. Standardized beta coefficients

Model ABN_REM	Independent Variables	Firms with high-level of CG (N = 1,724)	Firms with low-level of CG (N = 1,273)
(1)	TLev	0.179***	0.269***
	CGS	-0.121***	-0.097***
(2)	StLev	0.094***	0.151***
	CGS	-0.120***	-0.103***
(3)	LtLev	0.042**	0.083**
	CGS	-0.118***	-0.086**
(4)	TLev	0.117***	0.225***
	CG1	-0.069***	-0.075*
	CG2	-0.028	-0.076
	CG3	-0.064**	-0.040
	CG4	-0.094***	-0.052
	CG5	0.001	-0.033

Note: The magnitudes of standardized CG and standardized leverage coefficients are higher and lower in firms with high-level of CG than their standardized value in firms with a low-level of CG, respectively. Beta corresponds to standardized coefficients. ***, **, and * indicate statistical significance at 1%, 5%, and 10% levels, respectively.

of CG, whereas the effects of all Lev on ABN_REM were significantly positive. The effects of shareholder rights and audit organization were significantly negative on REM in firms with a high-level of CG, whereas shareholder rights in firms with a low-level of CG showed a significant negative effect on REM.

The standardized beta coefficients of different regressions and samples could be compared because the beta coefficients are expressed in units of standard deviations (Gujarati, 1988). The higher and lower magnitudes of CGS and leverage regression coefficients of firms with both high-and low-levels of CG are presented. For model 1, if CGS increases by one standard deviation, ABN_REM, on average, will decrease by 0.121 and 0.097 units of standard deviation, in firms with high- and low-level of CG, respectively. Meanwhile, if total debt rises by one standard deviation, ABN_REM, on average, will increase by 0.179 and 0.269 units of standard deviation, in firms with high- and low-level of CG, respectively. Similar findings and interpretation of the remaining models. Therefore, the magnitude of standardized CGS and standardized leverage coefficients was higher and lower in firms with a high-level of CG than its standardized value in firms with a low-level of CG, respectively.

6. Two-Stage Least Square Regression Analysis

In the literature of finance and accounting, there is concern about the endogenous relationship between REM and CG. To address this concern, we employed Equations (11) and (12) to control the endogeneity problem by a 2SLS regression analysis. The possible endogenous problem arises because our dependent variable is created using lagged assets while our independent variables are expressed using assets in term t (Equations 1-8). To increase the econometric specification, we recur to 2SLS regression procedure. Black, Jang, and Kim (Black et al., 2006) implemented simultaneous equations using 2SLS. According to their study, CG can be influenced by firm size, long term profitability, and industry factors. In the first stage, we ran *ABN_REM* and CGS, where we controlled

for “*Size_Dummy*” and “*Size*”. In the second stage, we ran our model using results from the first stage.

First stage:

$$CGS_{i,t} = \beta_0 + \beta_1 ABN_REM_{i,t} + \beta_2 Size_Dummy_{i,t} + \beta_3 Size_{i,t} + \varepsilon_{i,t} \quad (11)$$

Second stage:

$$ABN_REM_{i,t} = \alpha_0 + \alpha_1 Lev_{i,t} + \alpha_2 CGS_{i,t} + \alpha_3 Tang_{i,t} + \alpha_4 ROA_{i,t-1} + \alpha_5 Size_{i,t} + \alpha_6 Liq_{i,t} + \alpha_7 NIP_{i,t} + \alpha_8 FIOR_{i,t} + \sum_{j=1}^n \alpha_j Industry_{i,t} + \sum_{k=11}^7 \alpha_k Year_{i,t} + \varepsilon_{i,t} \quad (12)$$

where *Size_Dummy* is an indicator variable with a value of 1, if total assets are equal to or above 2 trillion Korean Won (firms that have assets of over 2 trillion Korean Won are required by law to have an internal audit committee, which provides an internal control mechanism for monitoring management’s activity), an 0 otherwise. (Table 10) shows the results of 2SLS regression that are consistent with our previous results, even though each coefficient of CGS, α_2 , is larger than the coefficients presented in Table 5 and Table 6. These results suggest that there is a negative relationship between CG and REM activities, and it is aligned with the hypothesis that effective CG mechanisms might decrease the magnitude of the relationship between leverage and REM using the interaction variable between CG and leverage.

V. Conclusions

This study analyzes the simultaneous relationship between REM, leverage, and CG using a sample of 2,997 firm-year observations of non-financial firms listed on KOSPI for the years 2003-2011. By introducing ABN_REM, ABN_CFO, ABN_SG&A, and ABN_PROD as proxies for REM, we find that all of long-term and short-term leverage variables are significantly positive on REM activities and that

Table 10. Regression results of the 2SLS model

First-Stage Regression Results		
Variable	CGS	
ABN_REM	-0.043 ***	(3.601)
Intercept	0.489***	(6.708)
Adj. R2	0.014	
F-Stat.	12.966***	
Covariance ABN_REM	0.016	
Second-Stage Regression Results		
Variables	ABN_REM	
TLev	0.494***	0.549 (1.553)
CGS	-0.840***	-0.817*** (-6.882)
TLev * CGS		0.493*** (2.924)
Tang	-0.449***	-0.448*** (-4.725)
ROA	-0.124***	-0.109*** (-6.328)
Size	0.093***	0.091*** (5.710)
Liq	0.039***	0.038*** (2.827)
NIP	-0.520***	-0.603*** (-3.278)
FIOR	-0.110***	-0.108*** (-5.589)
Intercept	0.582***	-0.576*** (-6.865)
Year-fixed effects	Yes	Yes
Industry-fixed effects	Yes	Yes
Adj. R ²	0.318	
F-Stat.	64.310***	62.224***
DW	1.230	1.237

Note: The results indicate a significant negative (positive) relationship between CGS (interaction term) and REM, using 2SLS regression to control endogeneity. Beta corresponds to unstandardized coefficients. Numbers inside the parentheses are t-statistics. *** and ** indicate statistical significance at the 1% and 5% level, respectively.

most of CG variables are significantly negative on REM metrics. These results imply that the managerial discretionary behavior motivates managers to engage

in REM activities by providing price discounts, tolerant credit terms, and overproduction. We also find that CG acts as a powerful barrier to conduct REM initiatives as it increases the accounting transparency by active supervision, which reduces the probability to engage in “masked” everyday transactions. Moreover, introducing an interaction term between leverage and CG and performing a residual test, we find that CG plays a significant role to explain the positive relationship between leverage and REM. Unlike previous studies, leverage is no longer effective in preventing the firms from engaging in REM because it acts only in an interactive role with CG, suggesting that the CG influences the relationship between leverage and REM. These findings imply that CG could act as a corporate finance tool, providing credible and sustainable financial information to make decisions in firms, and reducing the possibility of managers engaging in REM activities.

For robustness test, our results show that (a) 31% of firms with a high-level of CG engage in REM while 69% of them do not manage earnings while (b) 52% of firms with low-level of CG engage in REM while the remaining 48% do not manipulate real earnings. We also find that most of firms with high-level CG are characterized with low-level leverage while most of firm with low-level CG are characterized with high-level leverage. These results imply that the reduction in opportunistic behavior of managers in the presence of strong CG could decrease the leverage of firms and REM activities and improve the quality of their earnings. Our findings are consistent with those of Wijesinghe and Kavinda (Wijesinghe & Kavinda, 2017), He et al. (He et al., 2009), and García-Osma and Noguera (García-Osma & Noguera, 2007) which show that the CG mechanisms increase the supervisory and controlling role of owners, raise the quality of financial statements, and reduce the opportunistic behavior of managers. We also provide evidence that shareholder rights and audit organizations are the most prominent CG characteristics which influence REM activities. Both of these CG characteristics enforce additional monitoring on the quality of financial reporting and increase the audit standards

of firms. These results suggest that the frequency of managerial engagement in REM activities depends on the degree of CG because it is an effective mechanism to control the opportunistic behavior of managers and it decreases the possibility to freely access the internal and external financing (Tulcanaza-Prieto, Shin, et al., 2020). Specifically, improving shareholder rights or establishing secure audit organizations would help to avoid management's incentive to engage in REM. Finally, we conducted a 2SLS regression analysis to control endogeneity problem in our regression model. In the second-stage regression, we find a negative relationship between CG and REM and a positive association between the interaction term and REM. These results are consistent with our previous results.

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