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

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Abstract

This study examines how corporate governance (CG) and leverage affect real earnings management (REM) in non-financial firms listed on the Korea Composite Stock Price Index during 2003-2011 by employing corporate governance score (CGS) and total, short-term, and long-term debt ratios (i.e., leverage) as independent variables, and four REM metrics as dependent variables. We find a significant positive relationship between leverage and REM, while there is a negative effect of CG on real manipulations. We also find that firms with a high-level of CG are low-leverage firms, whose managers are less likely to conduct REM activities than those of firms with a low-level of CG. Moreover, our results reveal that CG moderates and weakens the relationship between leverage and REM. These findings are consistent with the controlling hypothesis, alignment of interest between managers and owners, and increase of the firm's transparency and reliability, which are characteristics of firms with strong CG, whose managers reduce their opportunistic behavior and do not engage frequently in REM activities. Our study complements the literature by detecting the moderating effect of CG, which might be considered an effective mechanism to reduce and avoid REM activities.

Keywords: real earnings management; corporate governance; leverage

1. Introduction

Schipper (1989) defined earnings management (EM) as "a purposeful intervention in the external financial reporting process, to obtain some private gains" [1]. Managers incur in EM practices to avoid earnings volatility and to meet or beat earnings benchmarks because investors prefer firms with consistent profitability and stability, which is also accompanied by executives' bonuses according to the firm's earnings performance. Managers prefer to manage earnings through real earnings management (REM) than accrual-based earnings management (AEM) because REM shows less pressure of debt covenants [2], [3] and it is less scrutinized by auditors and regulators, and therefore, has a less probability of being detected [4]–[6]. The adoption of the International Financial Reporting Standards (IFRS) shows a replacement from AEM to REM because the implementation of international standards improves the accounting quality and the legal regimen, and reduces the possibility to manipulate directly transactions in the financial statements [7]. Thus, firms tend recently to engage in REM activities instead of AEM.

Prior studies provide evidence of both positive and negative relationships between REM and leverage. The positive association between debt and REM is grounded in the managerial avoidance of reporting annual losses and the high default risk of high-leverage firms. Roychowdhury (2006) documents that executives from high-leverage firms manage real earnings activities by (1) providing price discounts to temporarily increase sales volume, (2) overproducing inventory to decrease the cost of goods sold (COGS), or (3) cutting discretionary expenses to improve reported margins [8]. Therefore, firms might increase their REM activities (1) to show stable results and less volatile earnings to their lenders and future investors [9], [10], (2) to reduce their debt convent violations, contraventions, and penalties [11], [12], and (3) to secure debt refinancing [8], [13]. Kuo, Ning, and Song (2014) and Ho, Liao, and Taylor (2015) evidence a positive relationship between REM and leverage using easy "masked" transactions for the Chinese firms, concluding that market participants underreact to REM [14]–[16]. In contrast, the negative relationship between leverage and REM focuses on the reduction of managers' opportunistic behavior, which modifies their astute conduct into discipline, because lenders and institutional investors increase their scrutiny and control in firms using spending conditions and predefined payments and repayments [17], [18]. Moreover, there is a reduction on the free cash flow when managers engage in REM practices, which also decreases the firms' leverage [19], suggesting that lenders and investors of high-leverage firms are more susceptible to increase their accounting' and financial' scrutiny and control by corporate governance (CG) policies.

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The agency theory motivates the adoption of CG practices to decrease the two types of disputes in firms. The first is the conflict of interest between the majority and minority shareholders grounded in the expropriation risk, while the second problem suggests different benefits between managers and shareholders inspired by personal's and firm's wealth, respectively. Appropriate governance structures are created to protect the interests of all market parties using national and international codes and laws to defend stakeholders' rights, to increase the board's and committees' independence, to raise the access of transparent information and disclosure, and to own high-level audit committees. The Organization for Economic Cooperation and Development (OECD) proposes that well-governed and transparent firms might promote the inclusion of a supervisory board, equal treatment of shareholders, respect and promotion of shareholder's rights, and presence of stakeholders in commitments. Therefore, strong CG might reduce agency conflicts and improve firms' disclosure while weak CG might increase the asymmetry of information between parties and conduce to bankruptcy. In the presence of agency problems and asymmetric information, executives increase their probability to engage in REM activities.

Prior studies show that firms with strong CG are more likely to avoid REM activities [20], [21], suggesting a negative relationship between both variables because the controlling hypothesis and the supervisory role of the majority owner decrease the opportunistic behavior of managers and their motivations to engage in REM. The convergence and alignment of interests between managers and owners provoke the reduction of managerial discretionary behavior. Piosik and Genge (2019) show 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 [22]. By using American firms, He, Labelle, Piot, and Thornton (2009) show that strong CG decreases REM practices, increases the accounting-monitoring process, improves the financial reporting quality, and rises the shareholders' confidence [23], [24]. Similarly, García-Osma and Noguer (2007), Alves (2012), and Hashim and Devi (2012) mention that managers of Spanish', Portuguese', and Malaysian' well-governed firms are less likely to engage in REM activities in the presence of high-level institutional investors and independent directors, managerial ownership, and ownership concentration, respectively [25]–[27], suggesting that strong CG measures might decrease REM practices, accounting violations, and frauds [28].

Prior studies only show the relationship between (1) REM and leverage [2], [29], [30] and (2) REM and CG, including leverage as a control variable [31], [32]. We empirically examine whether CG moderates the relationship between REM and leverage using a large sample compared to previous studies in Korea [31]. Moreover, we try to detect the CG characteristics that affect the association between REM and leverage, if any. We improve the accounting and finance literature by documenting the importance of incorporating CG as a corporate finance tool, which provides credible and sustainable financial information to make decisions in firms, rises the market efficiency by investors' confidence, and reduces the managers' possibility to engage in REM activities. We use a large sample

The controlling hypothesis suggests the reduction of the opportunistic behavior of managers in the presence of strong CG, which also decreases the firms' leverage and REM activities and improves firms' earnings quality [21]. Moreover, the active supervision of regulators and the implementation of CG indicators in the financial and corporate annual reports decrease the asymmetric information between parties, and therefore, the relationship between leverage and REM decreases by the disclosure and transparency of CG practices using monitoring and reporting regulations [33]. Jin, Hwang, and Kang (2018) show that CG, measured by the dual audited system for Chinese firms, reduces the REM activities and improves the earnings quality [34]. Managers do not access freely to the firms' cash flow while the firms' debt position is limited given the double financial and accounting supervision, suggesting that the managers' position loss risk increases when executives engage in REM activities in firms with strong CG.

By using Korean non-financial firms during the 2003-2011 period, we find a positive relationship between leverage and REM activities and a negative association between CG and REM. Moreover, we show that shareholders' rights and audit organizations are the most important CG characteristics that affect REM activities. We also find that the interaction variable between leverage and CG has a positive relationship with real manipulations. Using residual tests and classifying our sample into firms with high- and low-level of CG according to their CG median value, we show that CG moderates and weakens the relationship between leverage and REM. We conclude that executives are less likely to manage earnings in high-leverage firms with strong CG, while managers conduct REM activities in high-leverage firms with a low-level of CG. As a consequence, strong CG reduces agency costs and debt covenant violations and improves the investor-company relationship. 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.

The rest of the paper is composed as follows. Section 2 presents a literature review and describes the development of the hypotheses. Section 3 shows the empirical design. Section 4 defines the data collection

procedure and presents empirical findings. Section 5 discusses the results, highlights the conclusions, and offers recommendations for future research.

2. Development of Hypothesis

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, which is consistent with [11], [23], [35], [36]. Thus, there is a positive relationship between REM and leverage, suggesting that the market participants underreact to REM [14]–[16]. In contrast, in the presence of low free cash flow caused by the engagement of REM practices, managers prioritize their debt payments and its repayment and increase their prudency to invest in non-value maximizing projects, which reduce the firms' leverage [19]. Therefore, there is a negative relationship between REM and leverage motivated by the reduction of managers' opportunistic behavior given the scrutiny and control in firms imposed by lenders and institutional investors to meet or beat earnings targets [4], [17], [18].

Managers show two types of motivations related to their opportunistic behavior. The first incentive is that they will work to enhance the value of shares in a firm if they hold shares, while the second motivation is that managers will make an effort to inspire the confidence of shareholders to be promoted and increase their prestige [37]. Therefore, the managers' opportunistic behavior affects REM activities, given that executives manage earnings to maximize their compensation, reduce the likelihood of dismissal, and increase their reputation and ability of leadership. Furthermore, most of the managers' contracts are for one or two years and they are not renewed if the firms' performance is not satisfactory, motivating managers to show stable financial results to stay in the same or higher position during their work life.

The opportunistic manager behavior decreases when firms adopt CG policies since the conflict of interest is reduced by the application of effective governance structures with transparent information and disclosure, suggesting that the asymmetry of information is declined by agency theory. Agency theory claims that the shareholdings' interests held by managers are aligned with those of shareholders [38], which suggests that there is a monotonically negative relationship between corporate performance and the opportunistic managerial behavior, called alignment effect, which is dominant for the low and high level of ownership. In contrast, the management entrenchment effect identifies a positive association between corporate performance and the greater scope for opportunistic behavior, which argues that greater ownership would provide managers with deeper entrenchment, which is predominant for intermediate levels of managerial ownership [39].

Most of previous studies show a negative relationship between CG and REM practices grounded on (1) the controlling hypothesis, given the supervisory role of regulators, majority owner, independent directors, and institutional investors, (2) the alignment effect, which decreases the managerial discretional behavior and increases the shareholders' confidence, and (3) the freely access to transparent financial information and high quality of financial reporting.

The active supervisory role of regulators and the presence of strong CG structure in firms, decrease the firms' leverage and reduce the possibility to engage in REM activities [21], given the permanently monitoring and reporting standards, which decrease the managers' incentives to invest in non-value maximizing projects that reduce firms' leverage and decline the possibility to engage in REM activities due to the high possibility to be discovered. Therefore, CG practices might affect the relationship between leverage and REM. Waweru and Riro (2013) show that the board composition and ownership structure affect significantly negatively and positively to earnings management, respectively. They mention that the higher composition of independent directors is less likely to engage in real manipulations because boards of directors play an important role in the financial reporting process, which increases the reporting quality. Moreover, the increase of ownership concentration motivates the engagement in REM activities, given that there is no pressure from outsiders for higher reporting quality. They also show that high-leverage firms are more likely to conduct REM practices, implying a positive relationship between leverage and REM, aligned with signaling theory and the avoidance of debt covenant violations [40].

Similarly, Swai (2016) shows a significant negative relationship between REM and CG, which suggests that audit quality decreases the managers' possibility to engage in REM activities. Furthermore, the adoption of CG practices also reduces the firms' leverage [41]. Fitri, Muda, and Badaruddin (2018) demonstrate a significant negative relationship between REM activities and institutional and managerial ownership, whereas leverage does not affect significantly on REM. Therefore, institutional and managerial ownership act as a monitor of managers' performance, which limits and reduces the opportunistic behavior of executives, suggesting that managers might act in concordance with the shareholders' interests as managers' benefits are aligned with them. As a consequence, there is a reduction in agency costs and REM [42]. Finally, Amertha, Ulupui, and Putri (2014) study the relationship between the management of earnings, leverage, and CG. They show that CG has a significant negative effect on REM, whereas REM is insignificantly affected by leverage in the Indonesian firms [43].

The magnitude of the positive association between leverage and REM decreases in the presence of a high-level of CG because it introduces high transparency and public information disclosure. CG increases firms' reliability, which mitigates the stakeholders' risk and shareholders' expropriation. Thus, the REM occurrence might be minimized by the implementation of strong CG in firms, which also improves the quality of financial statements, decreases agency conflicts, and reduces the firms' leverage. Therefore, our hypothesis is:

Moderating Effect Hypothesis. *CG weakens the relationship between leverage and REM.*

3. Empirical Design

3.1. Detecting REM

We introduce Roychowdhury's (2006) model to measure manipulation in real earnings activities because it is the most frequent and convenient method used in the previous REM studies [4], [5], [8], [16], [30]. We examine patterns in the individual and aggregate value 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.

Abnormal aggregate REM (ABN_REM) is measured by the aggregation of 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, given that both measurements will show negative residuals when firms engage in REM activities. We estimated Equation (1) with annual information, therefore, high residuals correspond to high levels of real earnings manipulation, suggesting 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 for firm i in year t; $ABN_CFO_{i,t}$ is the abnormal CFO for firm i in year t, $ABN_SG\&A_{i,t}$ is the abnormal SG&A expenses for firm i in year t, and $ABN_PROD_{i,t}$ is the abnormal production costs for firm i in year t.

We estimated ABN_CFO in Equation (2).

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

where $ABN_CFO_{i,t}$ is measured by $ABN_CFO_{i,t} = \frac{CFO_{i,t}}{A_{i,t-1}}$; $CFO_{i,t}$ is the CFO for firm i in year t; $A_{i,t-1}$ denotes the total assets of firm i in year t-1; $\Delta S_{i,t}$ is the change in sales for firm i in year t, measured by $\Delta S_{i,t} = \frac{S_{i,t} - S_{i,t-1}}{S_{i,t-1}}$; $S_{i,t}$ is the total sales for firm i in year t; $S_{i,t-1}$ is the total sales for firm i in year t-1; α_0 is the intercept term; and $\varepsilon_{i,t}$ is the error term.

We estimated ABN_SG&A expenses 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 for firm i in year t.

We estimated ABN_PROD in Equation (4).

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

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 for firm i in year t, measured by $PROD_{i,t} = COGS_{i,t} + \Delta INV_{i,t}$; $COGS_{i,t}$ is the cost of goods sold for firm i in year t; $\Delta INV_{i,t}$ is the change in inventory for firm i in year t, measured by $\Delta INV_{i,t} = \frac{INV_t - INV_{t-1}}{INV_{t-1}}$; $INV_{i,t}$ is the total inventory for firm i in year t; $INV_{i,t-1}$ is the total inventory for firm i in year t-1; and $\Delta S_{i,t-1}$ is the change in sales for firm i in year t-1, measured by $\Delta S_{i,t-1} = \frac{S_{i,t-1} - S_{i,t-2}}{S_{i,t-2}}$.

3.2. Corporate Governance Metrics

Standard and Poor's (S&P) calculates the CG score (CGS). The CGS method uses the CG principles established by the OECD in 1999. The CGS is calculated by aggregating the scores of five CG characteristics. Higher CGS suggests better CG implementation and higher transparency. The scoring process uses public and private information. The maximum value of the CGS is 300 and its characteristics are presented in Figure 1.

Figure 1. CGS characteristics

CG1: Shareholders' rights (90 points)	• Voting rights and general shareholders' meetings • Shareholders protection from loss or dilution • Periodical revision of property concentration and its effect
CG2: Board structure (90 points)	• All shareholder's interests need to be represented fairly and objectively • Responsible for the firm's internal risk management • Independence of outside directors
CG3: Disclosure (60 points)	• Internal transparency and effective internal controls • Publicly available information and freely accesible • Firms' reports and investment information available in its own language and in English (website)
CG4: Audit organization (50 points)	• Auditors with good reputation • Auditors' independence of the board and company's performance
CG5: Management error (10 points)	• Failure to communicate • Inadequacy to set priorities

3.3. Research Model

We use panel data regression models with fixed effects to investigate the relationship between leverage, CG, and REM in Korean non-financial firms. We adopt ABN_REM, ABN_CFO, ABN_SG&A, and ABN_PROD as the dependent variables, with CGS and leverage as independent variables. The CGS is calculated as the sum of five measures, which are (1) shareholder's rights (CG1), (2) board structure (CG2), (3) disclosure (CG3), (4) audit organization (CG4), and (5) management error (CG5), while leverage is composed by total (TLev), short-term (StLev), and long-term (LtLev) debt ratios. Our models include the most frequent control variables from previous studies, which are asset tangibility, profitability, size, and firm liquidity [44]. Profitability includes ROA in the lagged form following prior studies methodologies [2], [10], [30]. Furthermore, we incorporate net interest payment and foreign investors ownership rate as a new control variables, given that an increase in leverage might increase interest expense, which lowers net income, while foreign investor ownership rate might contribute with transparent information [2], [17], [45].

In Equation (5), coefficient β_1 measures the relationship between leverage and REM. If coefficient β_1 is positive, leverage will positively affect the real earning manipulation activities.

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

where $ABN_REM_{i,t}$ is the abnormal aggregate REM for firm i in year t. It is composed of abnormal CFO $ABN_CFO_{i,t}$, abnormal SG&A expenses $ABN_SG\&A_{i,t}$, and abnormal production cost $ABN_PROD_{i,t}$, $Lev_{i,t}$ is the debt ratio for firm i in year t. It is composed of total debt ratio $TLev_{i,t}$, short-term debt ratio $StLev_{i,t}$, and long-term debt ratio $LtLev_{i,t}$. $TLev_{i,t} = \left(\frac{Current\ liabilities + Non-current\ liabilities}{Total\ assets}\right)_{i,t}$ for firm i in year t, $StLev_{i,t} = \left(\frac{Current\ liabilities}{Total\ assets}\right)_{i,t}$ for firm i in year t, $LtLev_{i,t} = \left(\frac{Non-current\ liabilities}{Total\ assets}\right)_{i,t}$ for firm i in year t, $Tang_{i,t} = \left(\frac{Net\ fixed\ assets}{Total\ assets}\right)_{i,t}$ is the assets tangibility for firm i in year t, $ROA_{i,t-1} = \left(\frac{Net\ income}{Total\ assets}\right)_{i,t-1}$ is the proxy for firm profitability for firm i in year t-1, $Size_{i,t} = Log\ (Total\ assets)_{i,t}$ is the size for firm i in year t and is represented by natural logarithm of total assets, $Liq_{i,t} = \left(\frac{Current\ assets}{Current\ liabilities}\right)_{i,t}$ is the liquidity for firm i in year t, $NIP_{i,t} = \left(\frac{Interest\ income - Interest\ expenses}{Total\ assets}\right)_{i,t}$ is the net interest payment for firm i in year t, $FIOR_{i,t}$ is the foreign investors ownership rate for firm i in year t, $Industry_{i,t}$ is a dummy that represents a firm's industry

(there are eleven non-financial industries in our sample), $Year_{i,t}$ is a dummy that represents the year of information of firm i, and $\varepsilon_{i,t}$ is the error term for firm i in year t.

In Equation (6), coefficient β_1 measures the relationship between CG and REM. If coefficient β_1 is positive, CG will positively affect the real earning manipulation activities.

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

where $CGS_{i,t}$ is the CG score for firm i in year t. It is composed of shareholder's rights $CG1_{i,t}$, board structure $CG2_{i,t}$, disclosure $CG3_{i,t}$, audit organization $CG4_{i,t}$, and management error $CG5_{i,t}$. $CGS_{i,t} = Log\ (CG1 + CG2 + CG3 + CG4 + CG5)_{i,t}$ for firm i in year t.

In Equation (7), coefficients β_1 and β_2 measure the relationship between (1) leverage and REM and (2) CG and REM, respectively.

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

In Equation (8), we introduce an interaction variable TLev*CGS in our model. Coefficient β_3 measures the relationship between both leverage and CG and REM.

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

where $(TLev * CGS)_{i,t}$ is the interaction variable between total leverage and CG for firm i in year t.

The moderating effect of CG on the relationship between leverage and REM is measured by the residual test. The steps of the residual examination are detailed as follows (1) regress CGS towards TLev (Equation (9)), (2) calculate the absolute value of residuals, and (3) regress the absolute value of residuals with ABN_REM as independent variable (Equation (10)). If β_2 is negative, then CG is a moderating variable and weakens the relationship between leverage and REM.

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

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

where $|\varepsilon_{i,t}|$ is the absolute value of residuals for firm i in year t.

4. Empirical Results

The initial sample consists of non-financial firms listed on KOSPI. The financial sector was excluded as those firms are considered financially different from industrial companies. Therefore, high leverage for financial companies probably does not have the same meaning for non-financial firms [46]. Financial statements of 556 Korean non-financial firms, with 3,725 firm-year observations, during the 2003–2011 period must be complete and available to include these firms in the sample. Firms must also report sales during three consecutive years. The last sample resulted in 2,997 firm-year observations. Firms' information was collected from the S&P webpage and KisValue version 3.2 [47] using CGS, cash flow statement, income statement, and statement of financial position. Table 1 describes the sample selection.

Table 1. 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 [48]	-115
	Final sample of firm-year observations	2,997

4.1. Descriptive Statistics

The descriptive statistics for all variables are given in Table 2. The mean of all abnormal REM measures (ABN_REM, ABN_CFO, ABN_SG&A, and ABN_PROD) is positive, suggesting that most of managers engage in REM activities. Shareholder's rights show the highest mean of CG characteristics and this category might be considered as the most important determinant of CGS.

Table 2. Descriptive statistics

Variables	Mean	Std. Dev.	Min	Max
Dependent variables				

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
Independent variables				
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
Control variables				
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 (1) abnormal aggregate REM (ABN_REM), (2) abnormal CFO (ABN_CFO), (3) abnormal SG&A expenses (ABN_SG&A), and (4) abnormal production cost (ABN_PROD). Independent variables are (1) total debt ratio (TLev), (2) short-term debt ratio (StLev), (3) long-term debt ratio (LtLev), (4) corporate governance score (CGS), (5) shareholder's rights (CG1), (6) board structure (CG2), (7) disclosure (CG3), (8) audit organization (CG4), and (9) management error (CG5). Control variables are (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).

4.2. Correlation Analysis

Table 3 shows that ABN_REM and ABN_PROD have a significant positive correlation at the 1% level with all leverage ratios. On the contrary, ABN_CFO and ANB_SG&A show a significant negative correlation with total, short-term, and long-term borrowings. Moreover, ABN_REM shows a significant negative correlation at the 1% level with CGS, CG1, and CG3. CGS presents a significant positive and negative correlation with long-term and short-term debt ratios, respectively. The correlation values themselves are not large enough for the multicollinearity problem to arise.

Table 3. Pearson Correlation Matrix

	ABN_ REM	ABN_ CFO	ABN_ SG&A	ABN_ PROD	TLev	StLev	LtLev	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														
StLev	0.150***	-0.179***	-0.053***	0.128***	0.813***	1													
LtLev	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 the 1% and 5% levels, respectively.

4.3. Regression Analysis

4.3.1. Relationship between REM and Leverage

Table 4 shows the results of 12 multiple linear regressions to explain the relationship between leverage and real earnings manipulation activities measured by 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 confirm the significant positive relationship between all debt ratios and all REM measures, except for ABN_SG&A. The regression coefficient of total leverage indicates that when total borrowings raises by one unit, with the statement that other variables remain constant, the REM initiatives will increase by 0.458 (ABN_REM). Similar significant positive coefficients are estimated for short-term and long-term debt ratios for ABN_CFO and ABN_PROD. These results imply that firms are more likely to conduct real earnings manipulation activities by price discounts, tolerant credit terms, and overproduction, rather than cutting SG&A expenses.

Our results are aligned with previous studies. Zamri, Rahman, and Isa (2013), Ho, Liao, and Taylor (2015), and Vakilifard and Mortazavi (2016) show that leverage has a significant positive effect on REM in firms from Malaysia, China, and Tehran, respectively [2], [15], [30]. However, there is not a significant relationship between total debt and disaggregated REM measures. These results indicate that "real-time" adjustments would be underestimated or misread in annual reports because those earnings alterations can be reversed in subsequent periods.

Our control variables are significantly negative in the majority of the statistical models. The possibility to exercise managers' discretion over REM depends on the levels of current and non-current assets and liabilities. We find that higher asset tangibility mitigates the extent of real adjustments. We also identify a negative relationship between ROA and REM measures. These results imply that the lower firm's performance might increase the manager's incentive to engage in REM activities to signal the future firm value. We show a significant negative relationship between liquidity and REM measures. These findings indicate the managers' ability to engage in REM activities in the absence of firms' liquidity. Jensen (1986) mentions that higher interest expense might control the managers' opportunistic behavior [45]. Therefore, there is a negative relationship between NIP and REM measures because managers prioritize the interest' and principal' payment. A higher interest payment might limit managers from exercising their own discretion and reduce the possibility to engage in REM. We find that higher FIOR reduces REM activities. These results imply that foreign investors play an independent role in restraining REM by continuous financial and accounting controls, which improves earnings quality.

Table 4. REM and leverage regression results

Variables	ABN_REM			ABN_CFO (-1)			ABN_SG&A (-1)			ABN_PROD		
TLev	0.458***			0.067***			0.016			0.378***		
	(7.469)			(4.505)			(0.850)			(8.408)		
StLev		0.284***			0.029***			0.009			0.250***	
		(4.753)			(2.962)			(0.494)			(5.702)	
LtLev			0.252***			0.060***			0.010			0.181***
			(3.203)			(3.188)			(0.444)			(3.131)
Tang	0.053	-0.095**	-0.004	-0.077***	-0.074***	-0.090***	0.001	0.003	-0.001	-0.131***	-0.168***	-0.088***
	(1.350)	(-2.282)	(-0.098)	(-7.848)	(-7.139)	(-8.718)	(0.117)	(0.212)	(-0.078)	(-4.514)	(-5.521)	(-2.852)
ROA	-0.191**	-0.200**	-0.201**	-0.155***	-0.156***	-0.156***	-0.035	-0.035	-0.035	0.055	0.048	0.046
	(-2.441)	(-2.542)	(-2.545)	(-8.544)	(-8.585)	(-8.616)	(-1.565)	(-1.574)	(-1.581)	(0.955)	(0.824)	(0.799)
Size	0.002	0.014**	0.004	0.002	0.004**	0.002	0.003	0.003*	0.003	-0.004	0.006	-0.002
	(0.401)	(2.407)	(0.628)	(1.460)	(2.522)	(1.043)	(1.465)	(1.693)	(1.385)	(-0.932)	(1.347)	(-0.423)
Liq	-0.017***	-0.011*	-0.007	-0.003**	0.001	-0.001	-0.003*	0.003	0.002	-0.010**	0.006	-0.010***
	(-2.991)	(-1.768)	(-1.455)	(-2.130)	(0.904)	(-0.687)	(-1.697)	(1.485)	(1.402)	(-2.419)	(1.275)	(-2.681)
NIP	-0.174**	0.098	-0.119*	-0.081***	-0.125***	-0.111***	0.030	-0.040**	-0.039*	-0.282***	-0.064	-0.028
	(-2.183)	(1.511)	(-1.746)	(-4.307)	(-8.284)	(-6.881)	(1.304)	(-2.127)	(-1.952)	(-4.822)	(-1.336)	(-0.566)
FIOR	-0.019**	-0.021***	-0.021**	-0.005***	-0.006***	-0.005***	-0.015***	-0.015***	-0.015***	0.000	-0.002	-0.002
	(-2.317)	(-2.596)	(-2.529)	(-2.630)	(-2.796)	(-2.748)	(-5.921)	(-5.955)	(-5.952)	(-0.063)	(-0.383)	(-0.339)
Intercept	-0.110	-0.352**	0.033	-0.044	-0.068*	-0.002	-0.031	-0.038	-0.024	0.008	-0.202*	0.105
	(-0.723)	(-2.237)	(0.203)	(-1.203)	(-1.786)	(-0.055)	(-0.679)	(-0.807)	(-0.489)	(0.072)	(-1.753)	(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 leverage and REM metrics, except for ABN_SG&A. Beta corresponds to unstandardized coefficients. Numbers inside parenthesis are t-statistics. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

4.3.2. Relationship between REM and CG

Table 5 shows the results of seven multiple linear regressions to explain the relationship between ABN_REM and the six CG measures. The highest adjusted R-Square value is presented when all CG metrics are independent variables, with adjustment of 33.6%. We confirm that shareholders' rights and audit organizations are the most important CG characteristics that affect REM activities. We are able to conclude that the appropriate firm's governance structure mitigates REM activities. Strong CG reduces agency conflicts by the decrease of asymmetric information. CG also defends the shareholders' 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.

Our findings are consistent with the controlling hypothesis and the decrease of the opportunistic behavior of managers, which reduce the executives' motivations to engage in REM activities. Prior studies show that strong CG mechanisms might decline the managers' possibility to conduct real manipulations, given the increase of shareholders' confidence and the presence of an extensive audit process [24]. Moreover, the negative relationship between CG and REM is grounded on the alignment of shareholders' and managers' interests. Executives are subjected to extensive supervisory control in well-governed firms, therefore, they reduce their ability to conduct REM activities, given the high probability of being discovered. Managers from strong CG firms assess firstly their professional stability and reputation in the long-term, rather than their short-term incentives.

Table 5. REM and CG regression results

Variables	**ABN_REM**						
CGS	-0.419***						
	(-4.254)						
CG1		-0.258***					-0.307***
		(-3.063)					(-2.873)
CG2			-0.017				-0.080
			(-0.357)				(-1.248)
CG3				-0.054			-0.078
				(-1.425)			(-1.611)
CG4					-0.108***		-0.111**
					(-2.862)		(-2.331)
CG5						-0.030	-0.012
						(-0.885)	(-0.365)
Tang	0.041	0.057	0.037	0.031	0.039	-0.019	-0.009
	(1.025)	(1.404)	(0.922)	(0.784)	(0.967)	(-0.359)	(-0.167)
ROA	-0.197**	-0.192**	-0.200**	-0.206***	-0.216***	-0.478***	-0.434**
	(-2.502)	(-2.430)	(-2.514)	(-2.578)	(-2.725)	(-2.818)	(-2.554)
Size	0.026***	0.010*	0.012*	0.015**	0.020***	0.025***	0.046***
	(3.894)	(1.803)	(1.907)	(2.355)	(3.047)	(3.504)	(4.887)
Liq	-0.005	-0.004	-0.006	-0.006	-0.005	0.005	0.009
	(-0.927)	(-0.704)	(-1.111)	(-1.178)	(-1.090)	(0.794)	(1.278)
NIP	0.197***	0.212***	0.229***	0.221***	0.224***	0.487***	0.463***
	(3.299)	(3.563)	(3.809)	(3.696)	(3.759)	(5.029)	(4.784)
FIOR	-0.020**	-0.019**	-0.023***	-0.022***	-0.023***	-0.028***	-0.027**
	(-2.388)	(-2.315)	(-2.709)	(-2.616)	(-2.754)	(-2.624)	(-2.504)
Intercept	0.272	0.219	-0.182	-0.198	-0.251	-0.565***	-0.407
	(1.483)	(1.042)	(-1.167)	(-1.281)	(-1.612)	(-2.894)	(-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 CG metrics and ABN_REM. Beta corresponds to unstandardized coefficients. Numbers inside parenthesis are t-statistics. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

4.3.3. Relationship between REM, leverage, and CG

Table 6 shows the results of three multiple linear regressions to explain the relationship between ABN_REM and both leverage and CG. The highest adjusted R-Square value is shown when the independent variables are total debt ratio and CGS, with adjustment of 29.9%. All regressions confirm (i) the significant positive relationship between the total leverage and the real earnings manipulation activities and (ii) the significant negative relationship between CG and ABN_REM. These results are consistent with our previous findings, imply that high-leverage firms are more likely to engage in REM activities, however, CG might mitigate the conduction of REM activities, given firms with strong CG show more transparency and supervision in the accounting process.

The regression coefficient of total leverage indicates that when total borrowings raises by one unit, with the statement that other variables remain constant, the REM initiatives will increase by 0.460. In contrast, the regression coefficient of CGS shows that when CGS increases by one unit, with the statement that other variables remain constant, REM will decrease by 0.426. Moreover, the highest regression coefficient of CGS is presented when short-term debt is independent variable. Previous studies analyze separately the relationship between REM and leverage and REM and CG. We test simultaneously the effect of leverage and CG on REM activities. Our findings reveal that the opportunistic behavior of managers to conduct REM initiatives decreases in the presence of CG, while leverage has a significant positive effect on real earnings manipulation activities.

Table 6. REM, leverage and CG regression results

Variables	**ABN_REM**		
TLev	0.460***		
	(7.538)		
StLev		0.298***	
		(4.996)	
LtLev			0.235***
			(2.985)
CGS	-0.426***	-0.444***	-0.403***
	(-4.375)	(-4.524)	(-4.092)
Tang	0.056	0.101**	0.002
	(1.433)	(2.432)	(0.039)
ROA	-0.184**	-0.192**	-0.194**
	(-2.354)	(-2.451)	(-2.468)
Size	0.018***	0.030***	0.019***
	(2.610)	(4.443)	(2.641)
Liq	0.019***	0.012**	-0.006
	(3.186)	(2.066)	(-1.254)
NIP	-0.206***	0.062	0.099
	(-2.580)	(0.941)	(1.447)
FIOR	-0.017**	-0.019**	-0.019**
	(-2.035)	(-2.303)	(-2.276)
Intercept	0.334*	0.101	0.439**
	(1.838)	(0.542)	(2.290)
Year-fixed effects	Yes	Yes	Yes
Industry-fixed effects	Yes	Yes	Yes
Adj. R^2	0.299	0.291	0.287
F-Stat.	51.993***	50.040***	49.056***
DW	1.898	1.903	1.892

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

4.3.4. Relationship between REM, leverage, and CG with the interaction variable

Table 7 shows the results of four multiple linear regressions to explain the relationship between REM and both leverage and CG. The highest adjusted R-Square value is shown when the dependent variable is ABN_REM, with an adjustment of 30.0%. All regressions confirm the significant negative relationship between CG and all REM metrics. The regression coefficient of CGS indicates that when CGS rises by one unit, with the statement that other variables remain constant, the REM initiatives will decrease by 0.794 (ABN_REM). These results are consistent with our previous results. Furthermore, there is a significant positive relationship between the interaction variable CGS*TLev and all REM measures, suggesting that when the interaction variable increases by one unit, with the statement that other variables remain constant, the REM activities will rise by 0.199 (ABN_REM), which is the highest regression coefficient of the interaction variable. In contrast, the regression coefficients for total leverage are not significant. There is not a significant relationship between total debt ratio and real earnings manipulation activities. We are able to conclude that the effect of CG and the interaction variable is significantly negative and positive on REM, respectively.

Our findings are consistent with previous studies. Swai (2016) and Fitri, Muda, and Badaruddin (2018) show (i) a significant negative relationship between CG and REM and (ii) a not significant relationship between leverage and REM, in firms listed in East Africa and Indonesia, respectively [41], [42]. They suggest that the signaling theory and the increase of reporting quality might reduce the agency costs, which limits the managerial opportunistic behavior to engage in REM. However, leverage does not play an important role in determining REM activities in the presence of a strong CG structure, given CG practices promote transparency, monitoring, and disclosure. Jin, Hwang, and Kang (2018) mention that CG introduces more control in the firm's accounting process [34]. Managers do not access freely to the firm's cash flow and the firms' debt position is supervised and approved by the financial committee. Therefore, managers' motivation to engage in REM activities decreases.

Table 7. REM, leverage, CG, and interaction variable regression results

Variables	ABN_REM	ABN_CFO (-1)	ABN_SG&A (-1)	ABN_PROD
TLev	-0.138	-0.372	-0.215	-0.367
	(-1.563)	(-1.592)	(-1.221)	(-0.729)
CGS	-0.794***	-0.176***	-0.290***	-0.271***
	(-4.304)	(-4.163)	(-5.591)	(-2.994)
TLev * CGS	0.199***	0.077***	0.069***	0.064***
	(2.646)	(3.075)	(3.312)	(2.886)
Tang	0.056	-0.077***	0.002	0.132***
	(1.427)	(-7.828)	(0.207)	(4.536)
ROA	-0.176**	-0.152***	-0.031	0.060
	(-2.248)	(-8.417)	(-1.405)	(1.051)
Size	0.016**	0.004***	0.011***	-0.001
	(2.449)	(2.626)	(5.312)	(-0.179)
Liq	0.018***	0.003**	0.003*	0.010**
	(3.107)	(2.165)	(1.926)	(2.425)
NIP	-0.177**	0.084***	0.016	-0.276***
	(-2.198)	(4.417)	(0.680)	(-4.648)
FIOR	-0.016**	-0.005**	-0.013***	0.000
	(-1.977)	(-2.337)	(-5.390)	(0.065)
Intercept	0.102***	0.250***	0.343***	0.470*
	(2.944)	(2.976)	(3.325)	(1.704)
Year-fixed effects	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes	Yes	Yes	Yes
Adj. R^2	0.300	0.130	0.255	0.211
F-Stat.	50.138***	20.391***	72.525***	31.647***
DW	1.898	1.945	1.821	1.860

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

4.3.5. Moderating effect of CG on the relationship between REM and leverage

Table 8 shows the results of the residual test to explain the moderating effect of CG on the relationship between total borrowings and REM. We find significant negative beta coefficients for all REM metrics, suggesting that CG might weaken the relationship between leverage and REM. We show that the increase of monitoring and controlling mechanisms protects all the stakeholders' interests, which contributes to the alignment between managers' and corporates' goals. The presence CG in a firm increases the company's transparency and reliability by the information disclosure, which also reduces the firms' risk and the expropriation of minority shareholders. As a consequence, managers reduce their opportunistic behavior and do not engage frequently in REM activities. Our findings are consistent with Amertha, Ulupui, and Putri's research (2014) in Indonesian firms. They show that CG moderates the relationship between leverage and AEM and concludes that there is a lack of fit between CG and AEM, suggesting that CG can affect the relationship between leverage and earnings management [43]. Therefore, our hypothesis is accepted for all REM metrics, implying a significant moderating effect of CG on the relationship between leverage and REM.

Table 8. Moderating effect with residual test regression results

Model		Unstandardized Coefficients		Standardized Coefficients	t
		Beta	Std. Error	Beta	
1	(Constant)	0.020	0.002		11.012***
	ABN_REM	-0.015	0.005	-0.056	-3.078***
2	(Constant)	0.006	0.002		1.003
	ABN_CFO (-1)	-0.005	0.020	-0.004	-2.056**
3	(Constant)	0.036	0.002		1.004
	ABN_SG&A (-1)	-0.079	0.015	-0.087	-5.253***
4	(Constant)	0.012	0.002		10.910***
	ABN_PROD	-0.007	0.007	-0.018	2.326**

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

4.3.6. Robustness test

For robustness purposes, we classify firms with high- and low-level of CG according to their CGS median value. The median value of the CGS logarithm is 1.996 for all the sample. Therefore, firm-year observations with CGS higher than 1.996 are classified as *firms with a high-level of CG*, while firm-year observations with CGS lower than 1.996 are called *firms with a low-level of CG*.

Table 9 shows the results of eight multiple linear regressions to explain the relationship between ABN_REM and both leverage and CG, employing a sample divided into 1,724 (Panel A) and 1,273 (Panel B) firm-year observations with high- and low-level of CG, respectively. The highest adjusted R-Square value is presented when the independent variables are total leverage and the five CG metrics with adjustment of 39.8%.

All panels confirm the significant negative relationship between CGS and ABN_REM in firms with high- and low-level of CG while the effect of all debt ratios is significantly positive on ABN_REM. Furthermore, our findings reveal that the effect of shareholder's rights and audit organization is significantly negative on REM in firms with a high-level of CG while the unique significant negative effect on REM is generated by shareholder's right in firms with low-level of CG.

Our findings are consistent with previous studies. Byard, Li, and Weintrop (2006), García-Osma and Noguer (2007), and He, Labelle, Piot, and Thornton (2009) show a negative relationship between CG and REM grounded in the controlling hypothesis, supervisory role of owners, alignment of interest between managers and owners, and the increase of company's financial statement quality. These strong CG signals, reduce the possibility to incur in accounting violations and frauds. Therefore, there is a reduction of the opportunistic and discretionary behavior of managers to engage in REM. Furthermore, our results of the positive relationship between debt ratios and REM, are associated with those of Roychowdhury's (2006), Huang and Sun's (2017), and Wijesinghe and Kavinda's (2017) research because managers of firms with high debt ratios increase REM (1) to show less volatile earnings to their future investors and get refinancing of their lenders, (2) to decrease the intervention of the government, regulators, and auditors in firms' business, and (3) to increase the company's debt negotiation, which reduces the probability of debt covenant violations.

Table 9. Regression results for robustness check

Variables	Panel A: High-level of CG (N= 1,724) ABN_REM				Panel B: Low-level of CG (N= 1,273) ABN_REM			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
TLev	0.386***			0.287***	0.490***			0.470***
	(4.528)			(2.720)	(5.635)			(3.228)
StLev		0.252***				0.319***		
		(3.137)				(3.665)		
LtLev			0.159**				0.278**	
			(2.480)				(2.446)	
CGS	-0.677***	-0.669***	-0.658***		-0.585***	-0.619***	-0.519**	
	(-4.245)	(-4.184)	(-4.105)		(-2.793)	(-2.924)	(-2.444)	
CG1				-0.458***				-0.335*
				(-2.892)				(-1.914)
CG2				-0.074				-0.098
				(-0.742)				(-1.161)
CG3				-0.141				-0.082
				(-1.262)				(-0.912)
CG4				-0.229***				-0.072
				(-3.250)				(-1.029)
CG5				0.002				-0.044
				(0.039)				(-0.908)
Tang	-0.049	-0.016	-0.098*	-0.007	0.191***	0.244***	0.142**	0.083
	(-0.918)	(-0.288)	(-1.753)	(-0.108)	(3.220)	(3.950)	(2.255)	(0.970)
ROA	-0.245*	-0.250*	-0.259**	-0.319	-0.076	-0.084	-0.079	-0.521*
	(-1.920)	(-1.953)	(-2.019)	(-1.493)	(0.083)	(-0.853)	(-0.799)	(-1.916)
Size	0.034***	0.044***	0.037***	0.050***	0.001	0.014	-0.001	0.020
	(3.627)	(4.758)	(3.779)	(3.986)	(-0.783)	(1.297)	(-0.067)	(1.219)
Liq	0.026***	0.021**	0.006	0.031***	0.008	0.002	-0.019***	0.021*
	(3.207)	(2.534)	(0.818)	(3.050)	(0.911)	(0.236)	(-2.638)	(1.711)
NIP	0.098	0.352***	0.394***	0.402**	-0.467***	-0.214**	-0.173**	-0.250
	(0.801)	(3.591)	(3.749)	(2.553)	(-4.476)	(-2.463)	(-1.961)	(-1.258)
FIOR	-0.031**	-0.033***	-0.033***	-0.034**	-0.006	-0.007	-0.007	-0.012
	(-2.562)	(-2.793)	(-2.722)	(-2.343)	(-0.528)	(-0.623)	(-0.665)	(-0.822)
Intercept	0.455*	0.213	0.486*	-0.020	0.919**	0.705	1.031**	0.153
	(1.694)	(0.783)	(1.714)	(-0.053)	(2.005)	(1.520)	(2.201)	(0.285)
Industry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.368	0.364	0.361	0.398	0.213	0.200	0.195	0.242
F-Stat.	41.947***	41.212***	40.685***	31.444***	14.312***	13.307***	12.898***	9.194***
DW	1.856	1.939	1.935	1.859	1.943	1.936	1.935	1.994

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

Table 10 shows the standardized beta coefficients of the independent variables presented in Table 9. The standardized beta coefficients of different regressions and samples can be compared because the beta coefficients are expressed in units of standard deviations [52]. The higher and lower magnitude of CGS and leverage regression coefficients are presented in firms with a high-level of CG, respectively. For model 1, if CGS is increased by one standard deviation, ABN_REM, on average, will be decreased by 0.121 and 0.097 units of standard deviation, in firms with high- and low-level of CG, respectively; while if total debt rises by one standard deviation, ABN_REM, on average, will be increased 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 is higher and lower in firms with a high-level of CG than their standardized value in firms with a low-level of CG, respectively.

Table 10. Standardized Beta coefficients

Model	Dependent Variables	High-level of CG (N=1,724)	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 magnitude of standardized CG and standardized leverage coefficients is higher and lower in firms with a 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 the 1%, 5%, and 10% levels, respectively.

Table 11 shows the results of the relationship between REM and both CG and leverage using an interaction variable TLev*CGS. Panel A confirms the significant positive relationship between the interaction variable and REM metrics in firms with a high-level of CG. Moreover, we identify a significant negative relationship between (i) leverage and REM and (ii) CGS and REM in firms with a high-level of CG. These results are consistent with the signaling theory and the increase of accounting and finance supervision, which reduce the managerial discretional behavior and regulate the firms' leverage, given the exhaustive control in everyday transactions. Therefore, managers reduce their ability to engage in REM activities, suggesting that a high-level of CG is a strong strategy to increase earnings quality. Panel B shows a significant negative relationship between CG and REM, while leverage and the interaction variable do not affect significantly REM activities in firms with a low-level of CG. We are able to conclude that firms with a high-level of CG show a strong relationship between leverage and CG, whereas the relationship between leverage and CG affects insignificantly on firms with a low-level of CG.

Table 11. Regression results with moderating variable for robustness check

Variables	ABN_REM	
	High-level of CG	Low-level of CG
TLev	-0.190**	-0.175
	(-2.376)	(-0.416)
CGS	-0.459***	-0.379**
	(-4.373)	(-2.514)
TLev * CGS	0.184***	0.568
	(2.669)	(0.719)
Tang	-0.046	0.193***
	(-0.879)	(3.242)
ROA	-0.221*	-0.073
	(-1.732)	(-0.752)
Size	0.032***	0.000
	(3.498)	(0.024)
Liq	0.024***	0.008
	(2.942)	(0.906)
NIP	0.159	-0.462***
	(1.280)	(-4.420)

FIOR	-0.030**	-0.005
	(-2.542)	(-0.479)
Intercept	0.114***	0.499
	(3.123)	(1.615)
Year-fixed effects	Yes	Yes
Industry-fixed effects	Yes	Yes
Adj. R^2	0.371	0.213
F-Stat.	40.650***	13.731***
DW	1.845	1.943

Note: The results indicate a significant positive relationship between the interaction variable TLev*CGS and REM and a significant negative relationship between (i) total leverage and REM and (ii) CG and REM in firms with high-level of CG. There is a significant negative relationship between CG and REM in firms with a low-level of CG. Beta corresponds to unstandardized coefficients. Numbers inside the parentheses are t-statistics. *** and ** indicate statistical significance at the 1% and 5% levels, respectively.

5. Conclusion

This study analyzes the relationship between REM, leverage, and CG using a sample of 2,997 firm-year observations during the 2003-2011 period of non-financial firms listed on KOSPI. Using abnormal aggregate REM, abnormal CFO, abnormal SG&A expenses, and abnormal production costs as proxies for REM, we find that the effect of all debt ratios is significantly positive on REM activities, while CG effect is significantly negative on REM metrics. These results imply that the managerial discretional behavior motivates executives to engage in REM activities by providing price discounts, tolerant credit terms, and overproduction. We also find that CG is a powerful barrier to conduct REM initiatives given it increases the accounting transparency by active supervision, which reduces the probability to engage in "masked" everyday transactions. We show that shareholders' rights and audit organizations are the most important CG characteristics that affect REM activities.

Moreover, for robustness test, we classify our sample into firms with high- and low-level of CG. We identify that firms with a low-level of CG, which are considered as high-leverage firms, are more likely to conduct REM activities than those firms with a high-level of CG. Our findings are consistent with García-Osma and Noguer's (2007), He, Labelle, Piot, and Thornton's (2009), and Wijesinghe and Kavinda's (2017) view that CG mechanisms increase the supervisory and controlling role of owners, which raise the quality of firm' financial statements, and reduce the opportunistic behavior of managers.

Furthermore, by looking at the moderating effect of CG on the relationship between leverage and REM, we find a significant positive relationship between the interaction variable and REM activities. These results imply that there is a reduction of agency costs by the interests' alignment of firms, shareholders, and managers, which reduces the debt covenant violations, increases the reporting quality and motivates managers to decrease REM initiatives. We also show that CG moderates and weakens the relationship between leverage and REM. Firms with a high-level of CG show a strong relationship between leverage and CG, while this relationship is not enough strong in firms with a low-level of CG. Our findings are aligned with Amertha, Ulupui, and Putri's research (2014) in Indonesian firms. They mention that firms with high-level of CG are reliable and transparent compared with firms with low-level of CG, and therefore, managers might decrease the firms' leverage position since it is supervised and approved by a financial committee and executives do not have strong motivations to engage frequently in REM activities because they prefer to conserve their position and reputation instead of short-term gains.

We use a large sample compared with previous studies for Korean non-financial firms [31] and we test the moderating effect of CG on the relationship between total leverage and REM using a residual test. Prior researches only examine the relationship between REM and leverage, or REM and CG with leverage as a control variable. We focus on the effect of CG as an effective mechanism to detect and mitigate REM activities and we suggest that a high-level of CG might break the strong relationship between leverage and REM. Our results have implications for managers and corporate decision-makers. We suggest them to implement a robust planning and financial-control system to be able to recognize and anticipate the manager's strategies to conduct earnings manipulation activities during the fiscal year. The audit frequency of the financial statements is an important determinant to detect REM activities and it is considered as a powerful tool for regulators and government to determine the corporate finance policy, which raises the sustainable firm's performance. Moreover, it necessary that managers review and adjust their business strategic plan and their CG strategy according to the customers' perceptions and firms' goals, to increase the firms' trust and consumer satisfaction. Furthermore, it is important to include CG indicators in the annual reports presented by companies to increase the disclosure and transparency of corporate information.

However, there are certain limitations to our study. Our study employs total, short-term, and long-term debt as independent variables, while it is important to introduce the ratio of long-term to short-term debt to determine the preference for long-term borrowings over short-term borrowing in capital structure decisions. For future research, the authors suggest including the degree of REM activities provided by Roychowdhury's (2006) definition and introducing the degree of leverage as a disaggregation sample.

Author Contributions: All authors contributed extensively to the work presented in this paper. Supervision, Younghwan Lee; Writing-original draft, Ana Belen Tulcanaza-Prieto.

Funding: This research was funded by Kumoh National Institute of Technology (2020-XXX-XXX).

Conflicts of Interests: The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

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