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Real Earnings Management and Firm Value using Quarterly Financial Data: Evidence from Korea

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A B S T R A C T

Purpose: This study examines whether real earnings management (REM) affects firm value by introducing quarterly financial data in the Korean market.
Design/methodology/approach: The study employed four REM metrics as independent variables, and Tobin's Q as dependent variable. Ordinary least-squares (OLS) panel data regressions were used. To control the endogeneity issue, the two-stage least square (2SLS) regression model was implemented in the analysis.
Findings: A significant negative relationship between REM and firm value was found in suspicious firms, whereas no statistically significant relationship was found in non-suspicious firms. Findings revealed that the negative relationship tends to prevail for at least two consecutive quarters. The result of 2SLS regression supports the previous findings that REM activities negatively affect firm value.
Research limitations/implications: These results are consistent with the view that managers' opportunistic behavior in terms of REM, may result in decreasing firm values. Mover, the REM effect reverberates not only in the current cash flow from operations (CFO) but also in the next period.
Originality/value: Financial regulators need to review carefully the quarterly and annual financial statements to detect firms with relatively high REM activities because these temporarily increased or decreased real activities are underestimated or reversed in subsequent quarters, which reduces earnings sustainability or decreases the firms' performance. The study suggests the implementation of a robust planning and financial-control system in firms to recognize and anticipate the earnings manipulations.

Keywords: Firm value, Real earnings management, Manager's opportunistic behavior

I. Introduction

Investors make resource allocation decisions based on information provided in financial reports. These reports might be influenced by management discretion. Accounting literature shows various instances where managers incorporate their judgment in the determination of earnings. Both accrual-based management (AEM) and Real earnings management (REM) could be considered practical methods to manipulate financial information. Specifically, REM can be characterized as the management actions that easily alter the period or adjust operations, by deviating from the normal business practices to meet certain earnings thresholds or beat short-term earnings objectives (Roychowdhury 2006; Vakilifard and Mortazavi 2016), which have

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accounting and financial implications for the short- and long-term firm value. REM activities are preferred because arbitrary decisions by management are more difficult to detect, while abnormal accruals are easily perceived by auditors and regulators, suggesting that REM activities are less subject to (1) extensive audits and controls, (2) external monitoring by society, media, and political parties, and (3) pressure due to debt covenants (Cohen, Dey, and Lys 2008; Cohen and Zarowin 2010; Graham, Harvey, and Rajgopal 2005; Vakilifard and Mortazavi 2016). Moreover, there was a reduction of manipulating of direct transactions in financial statements after the adoption of International Financial Reporting Standards (IFRS), showing the managers' partiality to conduct REM manipulations (Ferentinou and Anagnostopoulou 2016), given the low regulatory scrutiny in the financial reports.

REM might be beneficial for the firm if it is efficient, or detrimental if it is opportunistic. In the first case, when discretion and flexibility are efficiently used, it enhances the quality of financial information. REM increases the quality of the firm, since investors are able to access transparent information, which creates a stable financial scenario with improved information and better private communication (Subramanyam 1996). Ronen and Yaari (2008) (Ronen and Yaari 2008) mentioned that efficient earnings management is taking advantage of the flexibility in the choice of accounting treatment, to signal the manager's private take on future cash flows. On the other hand, if the discretion is used opportunistically, it may deteriorate the firm's value or modify the resource allocation by reporting earnings to gain personal benefits (Jiraporn et al. 2008). The opportunistic behavior of managers prevails in the discretion of information management, which causes inefficient resource allocation. Alternatively, the markets may not reflect the real value of the firm, given the distortion of the financial information. REM may also harm firm value, because actions taken by management to boost earnings may also decrease long-term cash flows and future firm value. REM may be beneficial for the short term, as it increases cash flow from operations (CFO). However, this short-term benefit comes at the expense of long-term performance. Previous studies to improve reported margins showed evidence of: (1) reduction or delay in research and development (R&D) expenses, (2) alterations of the shipment schedule, (3) saving advertising expenditures, (4) price discounts to temporarily increase sales volume, (5) overproduction and high inventory to decrease the cost of goods sold (COGS), and (6) reduction of discretionary expenses (Cohen, Dey, and Lys 2008; Cohen, Mashruwala, and Zach 2010; Dechow and Skinner 2000).

This study examines the prevalence of opportunistic REM activities caused by the absence of corporate governance strategies, the misalignment of incentives between parties, the reduced vigilance of investors, and the difficulty in monitoring quarterly financial statements. Depending on the degree of corporate governance in a firm, managers choose the level of openness and willingness to disclose financial performance. Most managers may engage in REM activities to increase their personal wealth instead of the firm's profit, which denotes the prevalence of managers' opportunistic behavior. Moreover, when the opportunistic behavior of managers prevails, the firm's transparency decreases, and the firm value also declines. Furthermore, shareholders and stakeholders do not have access to transparent financial information due to the decrease of firm reliability, which also affects the firm value.

Several studies have investigated the effect of management discretion of financial information on firm value, and their results still appear to be controversial. Darmawan, Sutrisno, and Mardiati (2019) (Darmanwan, Sutrisno, and Mardiati 2019) showed that AEM did not significantly affect the value of Indonesian firms. They insist that managers cannot detect this practice early and the market does not give any response to the earnings manipulations. Their results are consistent with earlier findings of Challen and Siregar (2012) (Challen and Siregar 2012). Subramanyan (1996) (Subramanyam 1996), Siregar and Utama (2008) (Siregar and Utama 2008), and Abbas and Ayub (2019) (Abbas and Ayub 2019) showed that AEM positively affects firm value, suggesting the

prevalence of the efficient earnings management hypothesis. There are also a couple of research studies that focus on the relationship between REM and firm value. Khuong, Ha, and Thu (2019) (Khuong, Ha, and Thu 2019) show that REM positively impacts the firm value in Vietnamese energy companies, suggesting that managers who currently manage their income may produce a good representation of the current financial situation of the firm, but this may be uncertain in the future. Alternatively, Suffian, Sanusi, and Mastuki (2015) (Suffian, Sanusi, and Mastuki 2015) found a significant negative relationship between REM and firm value caused by the existence of information asymmetry and friction between managers and shareholders in Malaysian firms. This study revisits this bilateral relationship using REM as an independent variable and firm value as a dependent variable by introducing quarterly financial data and the Korean emerging market. Unlike most previous studies that use annual financial data, using quarterly data enables us to detect more accurate evidence of an opportunistic view of REM, because earnings alterations can be modified or reversed in subsequent quarters or might experience a trade-off between REM activities in each quarter, and thus, REM would be underestimated or misread in annual reports (Tulcanaza-Prieto, Lee, and Koo 2020).

When using Korean non-financial firms during the 2010-2018 period, the study's findings reveal a significant negative relationship between all REM metrics and firm value in suspicious firms. These results are consistent with the opportunistic behavior of management engaging in REM. In order to control the endogeneity problem of the model, a two-stage least square (2SLS) regression analysis was conducted. Results in the second-stage regression confirms the robustness of the previous findings. The suspicious firms are more likely to engage in REM activities than non-suspicious firms. These findings suggest that regulators need to analyze quarterly and annual financial statements to detect window-dressing of the firm's performance. The study's findings can be generalized for firms with similar characteristics to the sample disaggregation, depending on the national accounting and financial regulations. IFRS adoption has improved the comparability of financial statements among firms in Korea and international firms, whose primary purpose is to increase transparency in accounting information (W. Lee 2019; Y. Lee, Kang, and Cho 2015).

II. Development of Hypothesis

Subramanyam (1996) (Subramanyam 1996) and Siregar and Utama (2008) (Siregar and Utama 2008) showed that managers exercise discretion to improve earnings ability to reflect the fundamental value of a firm. They argue that the expectation of future smooth earnings tends to provide positive information about firm value to the markets. Moreover, smoother earnings may serve to aid future investors in assessing the future prospects of the firm by enhancing the usefulness of the information conveyed for predictive purposes (Chaney and Lewis 1995). Therefore, in equilibrium, the strategic management of reported earnings influences investors' assessments of the market values of companies' shares. On the other hand, managers might be tempted to incorporate flexibility provided by the financial reporting standards, which increases their opportunistic income management and the distortion of the reported earnings via the misalignment of incentives between managers and shareholders (Burgstahler and Dichev 1997; Dechow, Sloan, and Sweeney 1995). Managers are allowed to choose the firm's accounting method regulated by national and international laws, and generally, they demonstrate opportunistic behavior in order to conserve their business position and reputation, suggesting that they avoid losses when earnings are just above zero (Burgstahler and Dichev 1997). Moreover, Ronen and Yaari (2008) (Ronen and Yaari 2008) defined the concept of efficient and opportunistic earnings management. They mention that efficient earnings management takes advantage of the flexibility of accounting choice, which affects the future cash

flow by utilizing the manager's private information. On the other hand, opportunistic earnings management only focuses on the maximization of the manager's utility by the accounting treatment. Efficient earnings management adds value to the firm i.e., it has a positive relationship with firm value, while opportunistic earnings management deteriorates its value i.e., it has a negative relationship with firm value.

In practical terms, opportunistic REM activities are conducted to boost managers' compensation (Healy 1985), avoid debt covenant violations, meet or beat the earning targets, and maximize the stock price before issuance of new stocks (Burgstahler and Dichev 1997; Gunny 2010). Therefore, there is a negative relationship between REM and firm value. REM is viewed as opportunistic in order to maximize managers' utility, which may result in firm value deterioration and cause a distortion in the reported earnings due to the misalignment of incentives between managers and shareholders. Abbas and Ayub (2019) (Abbas and Ayub 2019) mentioned that even efficient earnings management turns out to be opportunistic over time, showing a negative relationship between REM and firm value grounded in the tightness of standards and vigilance of investors. Moreover, the negative relationship between REM and firm value shows that the market is not completely successful in detecting earnings manipulation practices, providing a wrong assessment to the firm. Roychowdhury (2006) (Roychowdhury 2006) stated that REM increases profits in the current period; however, it has a negative effect on the firm's future cash flows and reduces the firm value in the long term. Similarly, Darmawan, Sutrisno, and Mardiati (2019) (Darmanwan, Sutrisno, and Mardiati 2019) concluded that REM was significantly negatively associated with the firm value in the Indonesian environment, because this technique of earnings manipulations was considered a dangerous tool to the market in the long term. Moreover, when managers have private information about the firm's future performance, future earnings might offset the REM in the current period, and thus, suspected REM firms use this information to manipulate accounting figures in the current period, suggesting a negative relationship between REM and firm's performance (Graham, Harvey, and Rajgopal 2005).

Another interpretation of the relationship between REM and firm value comes from the signaling hypothesis. Managers might communicate information regarding the firms' future profitability using private information, showing an efficient behavior by the rational equilibrium of information asymmetry (Adams and Ferreira 2007; Jiraporn et al. 2008; Siregar and Utama 2008; Subramanyam 1996). These research studies argue that REM can be considered as signaling evidence, which increases the efficient communication between information users and managers. The signal theory suggests that managers provide financial information using conservative accounting policies to generate higher profits, and with this relevant information, investors might predict the firm's future performance. Moreover, the signaling view of REM suggests that shareholders themselves sometimes demand earnings management. They do so because a more predictable income stream will reduce the cost of capital, while the investors' perception of firm value is influenced by a stable income stream to achieve the desired level of reported earnings (Dye 1998). Prior empirical studies showed that when efficient REM adds value to the firm, there is a positive relationship between REM and firm value. Susanto and Christiawan (2016) (Susanto and Christiawan 2016) using annual data, demonstrated that managers engage in earnings management to mislead the market and increase the firm value, showing a positive relationship between both variables under the condition of a less sophisticated market with non-existent information analysis. Similarly, Suffian, Sanusi, and Mastuki (2015) (Suffian, Sanusi, and Mastuki 2015) performed an empirical study with annual data and showed that the existence of information asymmetry created friction between managers and shareholders, and that managers refer to REM activities to increase firm value, because managers possess private information about the firm.

Prior studies using annual data show a contradictory relationship between earnings management and firm

value, providing evidence of both positive and negative associations between the two variables. This study introduces quarterly data to provide better evidence of the association of REM and firm value. Quarterly data are considered to be a more accurate source of information, given that they determine short-term financial and accounting movements, and offer a better determination of REM. Quarterly data include more detailed information and show improved transparency in the financial and operational results, compared to annual reports. On the other hand, annual data provide estimations and long-term forecasting; however, it suffers from bias in comparison to the more comprehensive data found in quarterly reports, which include a greater temptation for firms to cover up missteps (Tulcanaza-Prieto, Lee, and Koo 2020). Prior studies showed that REM activities positively or negatively influenced firm values, using annual data. However, these "real time" adjustments can be reversed in subsequent quarters or might experience a trade-off between REM activities in each quarter, giving the flexibility to managers to engage in real manipulation initiatives without detection. If previous studies modify their periodicity from annual financial statements to quarterly financial reports, their results might differ or become invalid, because quarterly data incorporate transparency and disclosure; therefore, REM activities might be easily detected by auditors and regulators using quarterly data.

In this context, the opportunistic behavior of managers prevails in the decision-making process of a firm and it decreases the transparency in the financial statements. Furthermore, it provides flexibility to managers to manipulate earnings using real activities, which also declines the firm value, which is more evident using quarterly data. Therefore, the study's hypothesis is as follows:

Hypothesis: There is a negative relationship between REM activities and firm value, showing opportunistic earnings management in firms.

III. Empirical Design

A. Detecting REM

Roychowdhury's (Roychowdhury 2006) model was employed to measure manipulation in REM as it is the most frequent and convenient method used in several REM studies (Anagnostopoulou and Tsekrekos 2017; Cohen, Dey, and Lys 2008; Cohen and Zarowin 2010; Tulcanaza-Prieto et al. 2020; Tulcanaza-Prieto, Lee, and Koo 2020; Zamri, Rahman, and Isa 2013). This study examines the pattern in the individual and aggregate values of 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 manipulation to avoid losses. The test power could detect REM by introducing the suspect firm-years concept, whose net income scaled by total assets is greater or equal to zero but less than 0.005. Therefore, the full sample was divided into suspicious and non-suspicious firms according to their real earnings manipulation activities. All metrics are calculated using the difference between the actual value and the normal value by estimating coefficients from the corresponding industry-quarter and the firm-quarter sales and lagged assets.

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, the inverted sign for the variables ABN_CFO and ABN_SG&A was reported, as both measurements show negative residual when firms engage in REM activities. Equation (1) was estimated using quarterly information; therefore, high residuals correspond to high levels of REM, resulting in positive ABN_REM when a firm manages earnings through REM initiatives.

$$\begin{aligned} ABN\_REM_{i,t} = \; & ABN\_CFO_{i,t}*(-1) \\ & + ABN\_SG\&A_{i,t}*(-1) \\ & + ABN\_PROD_{i,t}, \end{aligned} \tag{1}$$

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 quarter, respectively. The ABN_CFO is estimated as follows (Equation 2):

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

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, $A_{i,\,t-1}$ 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 quarters t and t-1, respectively. α_0 is the intercept term and $\epsilon_{i,t}$ is the error term.

ABN_SG&A expenses were estimated in Equation (3):

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

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 quarter t. The ABN_PROD was estimated as (Equation 4):

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

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 quarter t and $\Delta INV_{i,t}$ is the change in inventory measured by $\Delta INV_{i,t} = \frac{INV_t - INV_{t-1}}{INV_{t-1}}$, where $INV_{i,t}$ and $INV_{i,t-1}$ are the total inventories for firm i in the quarters 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. Research Model

Ordinary least-squares (OLS) panel data regression models with fixed effects were used to investigate the relationship between REM and firm value in the Korean non-financial firms. This method was chosen because the results of the Hausman test show that error terms are not correlated with the constant, which captures the individual characteristics (Nwakuya and Ijomah 2017). ABN_REM, ABN_CFO, ABN_SG&A, and ABN_PROD metrics were adopted as the independent variables, with Tobin's Q as the dependent variable. Models included the most frequent control variables from previous studies, which are leverage, asset tangibility, size, firm liquidity, and net interest payment (Jelinek 2007; Tulcanaza-Prieto, Koo, and Lee 2019; Vakilifard and Mortazavi 2016).

In Equation (5), coefficient β_1 measures the relationship between REM and firm value. If coefficient β_1 is negative, REM will negatively affect the firm value, showing an opportunistic earnings management. Therefore, a negative value for β_1 is expected.

$$Tobin's\ Q_{i,t} = \beta_0 + \beta_1 ABN\_REM_{i,t} + \beta_2 Lev_{i,t} + \beta_3 Tang_{i,t} + \beta_4 Size_{i,t} + \beta_5 Liq_{i,t} + \beta_6 NetIntPay_{i,t} + \sum_{j=1}^{n}\beta_j Industry_{i,t} + \sum_{k=11}^{f}\beta_k Quarter_{i,t} + \epsilon_{i,t} \quad (5)$$

where $Tobin's\ Q_{i,t}$ is the market value of equity plus book value of short-term liabilities net of short- term assets, plus book value of long-term debt, divided by the book value of total assets for firm i in quarter t. $ABN\_REM_{i,t}$ 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 $ABN\_PROD_{i,t}$. $Lev_{i,t}$ is the debt ratio, composed of 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 $Lt \leq v_{i,t} = \left(\frac{Non-current\ liabilities}{Total\ assets}\right)_{i,t}$, respectively. $Tang_{i,t} = \left(\frac{Net\ fixed\ assets}{Total\ assets}\right)_{i,t}$ is the assets tangibility, $Size_{i,t} = Log(Total\ assets)_{i,t}$ 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, $NetIntPay_{i,t} = \left(\frac{Interest\ income - Interest\ expenses}{Total\ assets}\right)_{i,t}$ is the net interest payment. The dummy terms $Industry_{i,t}$ and $Quarter_{i,t}$ represent the industry of a firm (there are ten non- financial industries listed on KOSPI) and the quarter of information, and $\epsilon_{i,t}$ is the error term. The subscripts i and t denote the firm and quarter year, respectively.

To reinforce the previous findings, the dependent variable of Equation (5) was modified into $Tobin's\ Q_{i,t+1}$, which represents the firm value in the next quarter. Therefore, a negative value for β_1 is expected, showing that the negative effect of REM persists over time.

C. Sample

The initial sample consisted of non-financial firms listed on the Korea Composite Stock Price Index (KOSPI). The financial sector was excluded, as those firms are considered financially different from industrial companies. Thus, high leverage firms for financial companies probably do not have the same meaning for non-financial firms (Fama and French 1992). Financial statements of 187 Korean non-financial firms, with 5735 firm-quarter observations during the 2010-2018 period, had to be complete and available to include these firms in the sample. Firms must also have reported sales during three consecutive quarters. The last sample resulted in 4681 firm-quarter observations. Firm information was collected from KisValue version 3.2 using a cash flow statement, income statement, and statement of financial position. KisValue is a financial database composed of financial, price, valuation, company, and estimated report from Korean firms, where its version depends on the actualization of the software to download the financial statements. Table 1 describes the sample selection.

The period of the study involved nine years to provide a robust sample. Moreover, this study only considered data up to 2018, as the COVID19 outbreak affected the Republic of Korea in February 2020; and therefore, the financial figures might not be comparable given the external shock caused by the pandemic. Moreover, the adoption of IFRS allows the comparability of financial statements among firms in Korea during the period of 2010-2018.

Table 1. Sample selection

Detail		No.
Initial firm-quarter observations		5735
Less:	Firm-quarter observations with incomplete information	-530
Less:	Firm-quarter observations without three consecutive quarters of sales	-327
Less:	Firm-quarter observations with extreme values (Chen and Dixon 1972)	-197
Final sample of firm-quarter observations		4681

IV. Empirical Results

A. Descriptive Statistics

The descriptive statistics for all variables are given in Table 2. Firms were classified into suspicious and non-suspicious firms according to Roychowdhury's (Roychowdhury 2006) definition. There were 618 suspicious firm-quarters in the full sample. The mean of Tobin's Q in suspicious firms was lower than that in non-suspicious firms, implying that suspicious firms that conduct REM activities are considered low-profit companies compared to non-suspicious firms, which serves as the first evidence of the study's hypothesis. Moreover, using the absolute values, the mean of all abnormal REM measures (ABN_REM,

Table 2. Descriptive statistics

	Suspicious Firm-Quarter (N=618)				Non-Suspicious Firm-Quarter (N=4063)			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
Dependent variables								
Tobin's Q	0.366	0.263	0.041	1.299	0.464	0.282	0.020	1.319
Independent variables								
ABN_REM	0.054	0.119	-1.089	0.581	-0.001	0.199	-1.414	0.783
ABN_CFO	-0.013	0.047	-0.253	0.175	0.001	0.058	-0.317	0.340
ABN_SG&A	-0.016	0.053	-0.179	0.574	0.000	0.089	-0.319	0.669
ABN_PROD	0.024	0.059	-0.551	0.268	0.000	0.095	-0.691	0.358
Control variables								
Lev	0.548	0.185	0.086	1.052	0.483	0.198	0.065	1.128
Tang	0.326	0.211	0.000	0.949	0.340	0.197	0.000	0.954
Size	27.050	1.447	24.410	32.250	27.045	1.510	23.736	32.778
Liq	1.287	0.851	0.282	8.411	1.534	1.152	0.205	9.878
NetIntPay	0.007	0.007	0.000	0.041	0.007	0.008	0.000	0.083

Note: "Suspicious" is defined as firms whose net income scaled by total assets is greater than or equal to zero but less than 0.005. Independent variables are (1) abnormal aggregate real earnings management (ABN_REM), (2) abnormal cash flow from operations (ABN_CFO), (3) abnormal selling, general, and administrative expenses (ABN_SG&A), and (4) abnormal production costs (ABN_PROD). Control variables are (1) total debt ratio (Lev), (2) asset tangibility (Tang), (3) size (Size), (4) firm liquidity (Liq), and (5) net interest payment (NetIntPay).

Table 3. T-test for equality of means for suspicious and non-suspicious firms

Variable	Suspicious Firms	Non-Suspicious Firms	Difference	t-value
Tobin's Q	0.366	0.464	-0.098	-8.608***
ABN_REM	0.054	-0.001	0.055	6.905***
ABN_CFO	-0.013	0.001	-0.014	-6.013***
ABN_SG&A	-0.016	0.000	-0.016	-4.694***
ABN_PROD	0.024	0.000	0.024	6.329***

Note: *** indicates statistical significance at the 1% level.

ABN_CFO, ABN_SG&A, and ABN_PROD) was higher in suspicious firms than the mean values in non-suspicious firms, which is approximately zero.

Table 3 shows the results of the t-test for equality of means for dependent and independent variables using independent samples. This test was performed to demonstrate that the mean of Tobin's Q and REM measures for suspicious firms was significantly different from those of non-suspicious companies. The average of all dependent and independent variables was statistically different for suspicious and non-suspicious firms, showing that managers intervene intentionally in the financial reporting process to get private benefits (Schipper 1989).

B. Descriptive Statistics

Table 4 shows that all REM measures had a significant negative correlation with Tobin's Q at the 1% level, which serves as evidence of the study's hypothesis. Moreover, all control variables, except firm liquidity, showed a significant negative correlation with the dependent variable. The correlation values themselves were not large enough to increase multicollinearity.

C. Regression Analysis

Table 5 shows the results of 16 multiple linear

Table 4. Pearson Correlation Matrix

	Tobin Q	ABN_REM	ABN_CFO	ABN_SG&A	ABN_PROD	Lev	Tang	Size	Liq	NetIntPay
Tobin's Q	1									
ABN_REM	-0.265***	1								
ABN_CFO	-0.174***	0.434***	1							
ABN_SG&A	-0.191***	0.518***	-0.080***	1						
ABN_PROD	-0.271***	0.660***	0.215***	0.331***	1					
Lev	-0.441***	0.188***	0.183***	0.106***	0.182***	1				
Tang	-0.093***	-0.081***	-0.205***	-0.014	-0.029**	0.048***	1			
Size	-0.055***	-0.110***	-0.046***	-0.107***	-0.097***	0.249***	0.084***	1		
Liq	0.228***	-0.121***	-0.065***	-0.087***	-0.131***	-0.631***	-0.245***	-0.160***	1	
NetIntPay	-0.289***	0.060***	0.118***	-0.007	0.064***	0.565***	0.084***	0.068***	-0.351***	1

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

Table 5. Regression results

Panel A: Suspicious Firms (N=618)

Variables	Tobin's Q				Tobin's Q+1			
ABN_REM	**-0.349*** (-15.692)**				**-0.018*** (-4.507)**			
ABN_CFO		**-0.494*** (-8.163)**				**-0.122*** (-11.540)**		
ABN_SG&A			**-0.574*** (-11.275)**				**-0.044*** (-5.079)**	
ABN_PROD				**-0.794*** (-16.872)**				**-0.049*** (-5.909)**
Lev	-0.477*** (17.102)	-0.487*** (-17.367)	-0.524*** (-19.138)	-0.493*** (-17.721)	-0.059*** (-11.645)	-0.053*** (-10.704)	-0.061*** (-12.475)	-0.059*** (-11.724)
Tang	-0.097*** (-4.115)	-0.082*** (-3.495)	-0.072*** (-3.116)	-0.086*** (-3.661)	-0.006 (-1.303)	-0.001** (-2.323)	-0.001 (-0.210)	-0.006 (-1.316)
Size	0.008*** (3.074)	0.012*** (5.101)	0.010*** (3.976)	0.007*** (2.802)	0.004*** (8.204)	0.004*** (8.883)	0.004*** (9.370)	0.004*** (7.988)
Liq	-0.017*** (-4.378)	-0.013*** (-3.425)	-0.016*** (-4.255)	-0.018*** (-4.616)	0.001* (1.925)	0.001** (2.050)	0.002** (2.529)	0.001* (1.784)
NetIntPay	-0.456*** (-4.920)	-0.583*** (-3.992)	-0.322*** (-4.697)	-0.238*** (-4.508)	-0.305*** (-3.385)	-0.259*** (-2.958)	-0.223** (-2.513)	0.299*** (-3.287)
Intercept	0.715*** (10.648)	0.557*** (8.444)	0.667*** (10.051)	0.743*** (11.076)	-0.062*** (-4.866)	-0.068*** (-5.632)	-0.076*** (-6.184)	-0.058*** (-4.604)
Quarter-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.384	0.358	0.365	0.385	0.129	0.143	0.126	0.132
F-Stat.	125.711***	119.386***	123.443***	128.284***	33.872***	39.606***	34.269***	34.602***

Table 5. Continued

Panel B: Non-Suspicious Firms (N=4063)

Variables	Tobin's Q				Tobin's Q+1			
ABN_REM	-0.484				0.011			
	(-1.547)				(0.877)			
ABN_CFO		-0.316				-0.033		
		(-1.571)				(-1.211)		
ABN_SG&A			-0.059				0.051	
			(-0.994)				(1.509)	
ABN_PROD				-0.016				0.033
				(-1.013)				(1.320)
Lev	-0.544***	-0.556***	-0.552***	-0.569***	-0.047***	-0.045***	-0.047***	-0.047***
	(-7.213)	(-7.329)	(-7.426)	(-7.562)	(-4.401)	(-4.283)	(-4.448)	(-4.342)
Tang	-0.196***	-0.185***	-0.165***	-0.183***	0.007	0.005	0.006	0.006
	(-3.078)	(-2.868)	(-2.625)	(-2.872)	(0.703)	(0.555)	(0.629)	(0.663)
Size	-0.005	-0.004	-0.007	-0.004	-0.001	-0.001	-0.001	-0.001
	(-0.673)	(-0.648)	(-1.105)	(-0.589)	(-1.117)	(-0.902)	(-0.919)	(-1.149)
Liq	-0.053***	-0.058***	-0.051***	-0.054***	0.002	0.003	0.001	0.001
	(-3.617)	(-3.906)	(-3.489)	(-3.690)	(-0.007)	(0.115)	(-0.073)	(-0.021)
NetIntPay	-0.370	-0.452	-0.386	-0.120	0.004	0.023	0.013	-0.006
	(-0.885)	(-0.946)	(-0.920)	(-0.724)	(0.018)	(0.108)	(0.061)	(-0.027)
Intercept	0.598***	0.488***	0.063***	0.494***	0.065***	0.060***	0.059***	0.065***
	(5.481)	(5.389)	(5.941)	(5.466)	(2.330)	(2.191)	(2.167)	(2.344)
Quarter-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.367	0.339	0.362	0.368	0.062	0.063	0.065	0.064
F-Stat.	16.547***	15.141***	16.669***	16.673***	2.905***	2.982***	3.068***	2.952***

Note: The results indicate a significant negative relationship between REM and Tobin's Q in suspicious firms. Beta corresponds to unstandardized coefficients. Numbers inside the parentheses are t-statistics. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

regressions to explain the relationship between firm value and REM activities measured by ABN_REM, ABN_CFO, ABN_SG&A, and ABN_PROD, employing a sample of 4681 firm-quarter observations of non-financial firms listed on KOSPI, divided into 618 (Panel A) and 4063 (Panel B) suspicious and non-suspicious firm-quarter observations, respectively.

Panel A confirmed the negative at the 1% level relationship between all REM measures and the current and next quarter firm value in suspicious firms. The regression coefficient of the abnormal aggregate REM indicated that when ABN_REM rose by one unit, with the statement of other variables remain constant, the firm value would decrease by 0.349 and 0.018 in the current and next quarter, respectively. Similar significant negative coefficients were estimated for ABN_CFO, ABN_SG&A, and ABN_PROD. These results also implied that suspicious firms experienced real earnings manipulation activities in the form of price discounts, tolerant credit terms, cutting SG&A expenses, and overproduction, which deteriorated the firm value over time. On the contrary, for non-suspicious firms (Panel B), the regression coefficients of all REM measurements were not significant. The effect of REM activities is significantly negative on the firm value for suspicious firms, while

its influence is insignificant for non-suspicious firms. F-statistics were significantly higher for all models, showing that the linear regression models fit the data better than the intercept-only model.

The results obtained in this study reflected that opportunistic earnings management deteriorates the firm value over time. Managers are motivated to conduct REM activities to increase the firms' performance (Burgstahler and Dichev 1997; Darmanwan, Sutrisno, and Mardiati 2019; Roychowdhury 2006). However, this study supports the idea that in the presence of a misalignment of incentives between managers and shareholders, and the prevalence of a personal need to conserve a manager's business position and reputation, REM does not reflect the market reality. This results in a reduction in the firm value, provides an inaccurate assessment of the firm to future investors, and leads to a decline in the firm's future cash flow. The study's findings, using quarterly data, showed that the opportunistic maximization of the manager's utility and compensation deteriorates the firm value and generates distortions in the reported earnings. Moreover, quarterly data allowed us to identify that the critical factor in the managers' decision to engage in REM activities, is the strictness of accounting standards and the reduced vigilance of investors; therefore, there is a predominance of an opportunistic earnings management by the negative relationship between REM and firm value.

Furthermore, findings using Tobin's Q in the next quarter, supported the previous negative association between REM and firm value, where opportunistic earnings management prevails over time, and its effect is the deterioration of the firm value. Findings clearly demonstrated that the negative influence of REM on the firm value might not be reversed or underestimated when quarterly data are used, because they increase the transparency of the financial reports. Managers exercise their discretion to conserve their privileged position and access to their private firm's information; thus, they can manipulate earnings by real activities in the current quarter to indicate better performance. However, this manipulation also leads to the firm's detriment in the next quarter.

The control variables were significantly negative in the majority of the statistical models. The firm value depends on the levels of current and non-current assets and liabilities. Leverage and asset tangibility displayed a negative relationship with the firm value, showing that suspicious firms do not reach their optimal capital structure and their financial quality is not sustainable over time. This study also showed the significant negative relationship between liquidity and Tobin's Q. Generally, liquidity increases the information of market prices and shows the performance-sensitive managerial compensation. However, for suspicious firms, liquidity does not reflect the market reality given the introduction of REM manipulation activities. Jensen (1986) (Jensen 1986) mentioned that higher interest expense might control managers' opportunistic behavior. Therefore, there is a negative relationship between NetIntPay and Tobin's Q, because managers prioritize the interest and principal payments, which causes a reduction in the firm value.

D. Two-Stage Least Square Regression Analysis

It is important to discuss whether REM activities cause a decrease in the firm value, or if low firm value causes the managers to engage in REM activities. This is why this study conducts a 2SLS regression analysis. Equations (6) and (7) were employed to control the endogeneity problem. The 2SLS model assumes that the dependent variable's error terms are correlated with the independent variable (Tobin's Q). Error terms from Equation (5) were not normally distributed in the sample, and the Pearson correlation matrix did not reveal high and significant coefficients between independent variables and Tobin's Q residuals (Tulcanaza-Prieto, Koo, and Lee 2019). To increase the econometric specification, the 2SLS regression procedure was used. Black, Jan, and Kim (Black, Jang, and Kim 2006) implemented simultaneous equations using 2SLS to solve the endogeneity problem, if any. In the first stage, Tobin's Q and REM metrics were run, where "Size_Dummy" and "Size"

were controlled. In the second stage included results from the first stage.

First stage:

$$ABN\_REM_{i,t} = \beta_0 + \beta_1 \ Tobin's \ Q_{i,t} + \beta_2 Size\_Dummy_{i,t} + \beta_3 Size_{i,t} + \epsilon_{i,t}, \quad (6)$$

Second stage:

$$Tobin's \ Q_{i,t} = \alpha_0 + \alpha_1 ABN\_REM_{i,t} + \alpha_2 Lev_{i,t} + \alpha_3 Tang_{i,t} + \alpha_4 Size_{i,t} + \alpha_5 Liq_{i,t} + \alpha_6 NetIntPay_{i,t} + \sum_{j=1}^{n} \alpha_j \ Industry_{i,t} + \sum_{k=11}^{f} \alpha_k \ Quarter_{i,t} + \epsilon_{i,t}, \quad (7)$$

where $ABN\_REM_{i,t}$ is the abnormal aggregate REM for firm i in quarter t. It is composed of abnormal CFO $ABN\_CFO_{i,t}$, abnormal SG&A expenses $ABN\_SG\&A_{i,t}$, and abnormal production costs $ABN\_PROD_{i,t}$. $Size\_Dummy_{i,t}$ is an indicator variable with a value of 1 of 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), and 0 otherwise.

Results in the second-stage regression (Table 6) were consistent with previous studies' findings, showing that there is a negative relationship between REM activities and firm value. Therefore, the study's hypothesis is accepted, suggesting the prevalence of managers' opportunistic behavior to conduct REM

Table 6. Regression results of the 2SLS model

First-Stage Regression Results

Variable	ABN_REM	ABN_CFO	ABN_SG&A	ABN_PROD
Tobin's Q	-0.723*** (-4.420)	-0.681*** (-3.217)	-0.512** (-2.582)	-0.224*** (-4.194)
Intercept	0.643*** (9.922)	0.542*** (8.885)	0.747*** (4.951)	0.620*** (9.882)
Adj. R^2	0.029	0.015	0.019	0.028
F-Stat.	19.536***	10.350***	6.669**	17.586***
Covariance Tobin's Q	0.012	0.017	0.010	0.013

Second-Stage Regression Results

Variables	Tobin's Q			
ABN_REM	-0.778*** (-8.907)			
ABN_CFO		-0.822*** (-4.056)		
ABN_SG&A			-0.106*** (-9.928)	
ABN_PROD				-0.224*** (-4.619)
Lev	-0.544*** (-7.213)	-0.556*** (-7.329)	-0.552*** (-7.426)	-0.569*** (-7.562)
Tang	-0.196*** (-3.078)	-0.185*** (-2.868)	-0.165*** (-2.625)	-0.183*** (-2.872)
Size	-0.005 (-0.673)	-0.004 (-0.648)	-0.007 (-1.105)	-0.004 (-0.589)
Liq	-0.053*** (-3.617)	-0.058*** (-3.906)	-0.051*** (-3.289)	-0.054*** (-3.690)

Table 6. Continued

Variables	Tobin's Q			
NetIntPay	-0.370*** (-3.885)	-0.452*** (-3.946)	-0.386*** (-2.920)	-0.120*** (2.724)
Intercept	0.544*** (2.986)	0.532*** (2.899)	0.612*** (3.423)	0.0544*** (2.992)
Quarter-fixed effects	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes	Yes	Yes	Yes
Adj. R^2	0.408	0.423	0.421	0.457
F-Stat.	19.534***	21.236***	21.071***	23.634***

Note: The results indicate a significant negative relationship between REM and firm value in suspicious firms, using a 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% levels, respectively.

activities in suspicious firms.

V. Conclusions

This study analyzes the relationship between REM activities and firm value for suspicious and non-suspicious firms using a sample of 6207 firm-quarter observations during the 2010-2018 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, findings revealed that the effect of REM activities is significantly negative on firm value in suspicious firms, while the REM effect is not significant in non-suspicious firms. These results imply that firms are more likely to conduct REM activities by providing price discounts, tolerant credit terms, cutting SG&A expenses, and overproduction. Managers tend to be motivated to engage in "masked" daily transactions to increase their wealth and reputation. Therefore, these results are consistent with the view that includes opportunistic behavior by managers, where REM may result in decreasing firm value.

These findings may add an intrinsic value to the literature, because of the introduction of quarterly financial data in the model, unlike previous studies that use annual data. Using quarterly data can provide more accurate evidence about the relationship between REM and firm value, because earnings alterations can be modified or reversed in subsequent quarters, or experience a trade-off between REM activities in each quarter; thus, REM would be underestimated or misread in annual reports (Tulcanaza-Prieto, Lee, and Koo 2020). Moreover, they determine short-term financial and accounting movements by the introduction of highly accurate information, and detect REM activities, which might not be easily reversed or underestimated in subsequent periods.

Findings also revealed that both the firm value variables for the current and following quarter in the regression model, revealed a significant negative relationship with REM activities. These results indicate that the relationship prevails over at least one more quarter in sequence, and imply that the REM effect reverberates not only in the current CFO, but also in the next period. It is important to discuss whether low firm value causes managers' engagement in REM activities or REM activities lead to a decrease in the firm value. To control the endogeneity issue, the 2SLS regression analysis is used. The results of the second-stage regression are consistent with the previous finding, in terms of the negative relationship between REM activities and firm value.

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