The Relationship between CEO Compensation and Earnings Management: Evidence from Korea*

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Previous research has shown that CEOs have incentives to manage reported earnings in order to maximise their own levels of compensation, which are typically determined by firm performance. The present study examines whether CEO overcompensation reduces earnings management in classic principal - agent settings by investigating the relationships between CEO compensation and upwards and downwards earnings management. We analyse data on Korean-listed firms from a sample period of 2005 to 2007 in order to estimate the levels of CEO overcompensation put forward by previous studies. Discretionary accruals are estimated by the modified Jones model, while we adopt established proxies of real activity-based earnings management. The presented findings show that earnings management significantly declines as CEO overcompensation increases. This negative relationship implies that managers reduce earnings management, when they receive overcompensation. We also find that CEO overcompensation has negative relationships with real earnings management under downwards earnings management and with discretionary accruals under upwards earnings management. These results suggest that that CEO overcompensation positively influences a firm's long-term value considering when real earnings management could negatively influence on firm value. Our findings therefore suggest that CEOs choose earnings management tools in order to maximise their personal benefits and it has a positive effect by reducing opportunistic behaviour as well as the firm's long-term risk. The results of this study showed as counterevidence on common criticism about CEO overcompensation and could thus be used as a guideline for future compensation systems.

Key words: CEO Compensation, Overcompensation, Earnings Management, Accruals, Real activity-based earnings management

Ⅰ. Introduction

The issue of CEO compensation has caused controversy over the past decade, provoking debate in academic as well as in business circles. As far back as 2001, for example, the boards of directors at GE and Verizon were both heavily criticised for taking excessive compensation on the basis of overinflated

management performance, despite a sluggish U.S. stock market. More recently, Greg Smith, the former vice president of Goldman Sachs, claimed[1] that the firm's culture had become too greedy and that employees were doing anything to increase sales, since changing its compensation system to one related to sales performance in 2005.

Interest in and criticism of CEO compensation increased fiercely when the large-scale accounting scandals at Enron and WorldCom were uncovered in 2002. At that point, there was growing consensus that CEOs were behaving opportunistically in order to pursue their individual interests when their compensation plans were linked to firm performance.

Empirical evidence suggests that managers control the accrual accounting system or discretionary investment and expenses as well as managing reported earnings in order to maximise firm value or utility (Chaney and Lewis, 1995; Kirschengeiter and Melumad, 2007; Truman and Titman, 1988; Healy, 1985; Holthausen et al., 1995; Gaver and Gaver, 1998). However, managers also control business performance through earnings management in order to maximise their own levels of compensation. For instance, managers who have advance information on firm performance can make subtle reporting changes via upwards or downwards earnings management

in order to maximise their own compensation levels.

The relationships between CEO compensation and the estimated value of earnings management differ in the case of each method used. For instance, although accrual-based earnings management, namely that based on a manager's accounting choices, can be detected easily by outsiders and is likely to cause some degree of reputational damage, it has a relatively low impact on long-term firm value. By contrast, real activity-based earnings management, namely the control of reported earnings through the abnormal reduction or expansion of aggressive sales or investment decisions, risks sacrificing long-term firm value. This distinction between accounting approaches makes it necessary to re-examine the CEO compensation - earnings management relationship using two types of earnings management.

The challenge for those undertaking empirical studies in Korea, however, is that the limited availability of firm data complicates any distinction between basic salary and incentive-based compensation (i.e., bonuses) for CEOs. To overcome this obstacle of the non-availability of data, we base the present analysis on the optimal compensation levels put forward by previous studies that have verified the determinants of CEO compensa-

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1) Greg Smith, Why I am leaving the Goldman Sachs, Opinion section of the *New York Times*, 14 March 2012.

tion (see Core et al., 1999; Aboody et al., 2004; Ashbaugh et al., 2006). The present study estimates overcompensation levels using this so-called 'compensation decision function' in order to examine the CEO compensation - earnings management relationship.

Specifically, this study focuses on whether managers who receive sufficient compensation take risk-averse actions when overcompensated. This approach contrasts with those of previous works that have assumed that managers take risk-taking actions such as earnings management in order to maximise their own compensation when payment schemes are related to firm performance. Put simply, if managers controlled earnings in order to maximise their compensation levels, they would not take earnings management-related risks in the case of overcompensation.

The results of our empirical analysis of 1,088 firm-year observations from 2005 to 2007 show that estimated level of overcompensation has a significantly negative relationship with discretionary accruals (DA) and with the estimated value of real earnings management (RM). They also point to the same finding when we analyse the relationships between overcompensation and both upwards and downwards earnings management. In the case of upwards (downwards) earnings management, overcompensation reduces DA (RM). These results are meaningful because they show that overcompensation reduces

earnings management, especially in the case of downwards earnings management. Hence, when target earnings for a specific timeframe are expected to be exceeded, overcompensation reduces RM. This result occurs because in a principal - agent relationship, overcompensation effectively restricts a manager's opportunistic behaviour.

These findings contribute to the body of knowledge on this topic by reconfirming the notion that CEO compensation influences earnings management, especially in principal - agent relationships, where the CEO compensation system actually serves as a tool to meet shareholders' interests. Further, they show that overcompensation could not be an object of public criticism. Indeed, it has a positive effect by reducing opportunistic behaviour as well as the firm's long-term risk. The results of this study could thus be used as a guideline for future compensation systems.

The remainder of the paper is organised as follows. Section 2 reviews previous studies of compensation and earnings management and formulates the hypotheses. Section 3 explains the research design and sample selection. Section 4 discusses the empirical results. Finally, Section 5 concludes and presents the limitations of this study.

II. Literature review and hypothesis development

2.1 Review of previous studies

In principal‐agent relationships, shareholders provide appropriate incentives to managers through the managerial compensation system. The rationale behind this approach is that setting compensation level to vary by firm performance motivates outstanding managers, thereby increasing firm value. The research by Jensen and Meckling (1976), Harris and Raviv (1979), and Holmstrom (1979) claimed that CEO compensation systems that are linked to firm performance could solve the agency problems. However, Watts and Zimmerman (1986) insisted that managers who operate under such performance-based compensation systems control earnings in order to maximise their levels of compensation. In addition, many other authors have confirmed that earnings management is used to maximise CEO compensation.

Healy (1985) examined the relationships between the CEO bonus system and earnings management in 250 firms listed on the U.S. stock exchange in 1980. The findings of this study showed that when the maximum and minimum levels of the bonus were fixed and expected bonus is to be outside the range, managers chose accruals that reduced earn-

ings, but when expected bonus is to be inside, they chose accruals that increased earnings. It was also reported that the revision of bonus plans tended to change accounting policies and *vice versa*. The findings of Christie (1990) supported this bonus plan hypothesis (see also Watts and Zimmerman, 1986).

In subsequent studies, Lewellen and Huntsman (1970) and Lambert and Larcker (1987) proved the relationship between CEO compensation level and accounting earnings (see also Natarajan, 1996). Further, Guidry et al. (1999) reported that managers make different accounting choices when the maximum and minimum levels of bonus plans were given, when considering whether managers elect to control earnings in order to maximise their bonuses in the short run. They showed that managers who did not receive the maximum bonus chose to increase earnings, whereas managers who did receive the maximum bonus chose to reduce earnings for the next year. The findings of all these studies are thus consistent with those of Healy (1985).

In Korea, many authors have investigated the CEO compensation‐firm value relationship in a variety of settings, but few have directly analysed the relationship between CEO compensation and earnings management. Some have analysed incentive-based compensation types such as stock options and suggested that CEO compensation serves as an incentive to make risk‐taking operating decision (Lee

et al., 2005; Park et al., 2006; Kim, 2012). They analyzed how executive stock options influence on firm R&D investment or stock return volatility, and suggested that higher stock option in executive compensation was associated with higher R&D investment and subsequent stock return volatility(Park et al., 2006; Lee et al., 2005). It implies that executive stock option mitigates the risk incentive problem by motivating managers to take high-risk projects. Further, Park et al.(2006) reported that the positive relation between stock option and firms' R&D investment was reinforced when firms were managed by non-owner manager or when executives were closer to their retirement age. Thus, the positive association between CEO compensation and R&D investment is linked to firm performance by Kim(2012)'s study. She documented that the future expected R&D investment induced by the managers' compensation improved the future firm value because the adverse selection problem associated with R&D under-investment or over-investment was reduced. Lee at al.(2005) suggested that a non-linear regression model explains the firm value according to CEO stock options better than a linear regression model, thus the relationship between stock option and firm value was a reverse U shape. Recently, Lee et al.(2011) reported that CEO pay gap, the compensation gap between CEO and top management team(TMT), had a neg-

ative influence on firm innovation and co-location of TMT moderated this negative relationship.

There are a few studies examining the CEO compensation and accounting earnings (Chi and Kim, 2001; Chi et al., 2009; Park and lee, 2009). Chi and Kim(2001) examined the relationship between CEO cash compensation and permanent earnings component such as ordinary income or loss, or temporary earnings component such as extraordinary income or loss. They found permanent component has only influence on CEO cash compensation, thus determining factor of CEO cash compensation is limited to the permanent earnings component, which is reinforced when firms are belongs to the fast growing industry. Chi et al.(2009) documented that earnings smoothing influences CEO compensation. They analysed the relationships between upward (positive) or downward (negative) earnings smoothing and CEO compensation, and found that while there was nothing meaningful in the group with positive earnings smoothing, CEO compensation had a significantly positive relationship with negative earnings smoothing. This finding implies that additional compensation was provided to induce managers to choose negative earnings smoothing, which positively influences firm value. Meanwhile, Park and Lee's study (2009) determined the relationship between DA and CEO cash compensation. During their research from 2000 to 2007,

they found that managers increased their compensation levels by using positive DA opportunistically, whereas negative DA were unrelated to compensation.

The CEO compensation data used in previous empirical studies comprised cash compensation including salary and bonus, stock options, performance plans, phantom stock grants, and restricted stocks. However, as indicated by Core et al. (1999), compensation level remains rather consistent with cash compensation, which is normally provided every year, but fluctuates with long-term compensation factors such as stock options, which are typically determined using the value estimation method. This inconsistency is problematic because there is no way to assess the exact compensation level managers would eventually receive from long-term compensation factors at the point of granting compensation, despite the firm's intention to provide performance-based pay. This complexity further limits the generalization of compensation - earnings management relationships.

As discussed in the Introduction, Core at al. (1999), Aboody et al. (2004), and Ashbaugh et al. (2006) designed a so-called compensation decision function in order to estimate overcompensation level and thus overcome this limitation. Because large enterprises that

have high growth potential and complex sales activities need higher quality (and therefore more expensive) CEOs, the present study focuses on firm size and the complexity of sales activities as economic factors that influence compensation. Further, considering that CEO compensation level has a positive relationship with firm performance as indicated in previous principal‐agent models, we also take account of return on assets (ROA) and annual stock market return. Finally, we recognise that a firm's information environment and sales environment risk also influence decisions on CEO compensation level. In the next step, we adopt a CEO compensation decision function based on all the foregoing economic factors as well as the assumption that firms' boards of directors and ownership structures also influence compensation level[2]:

CEO_PAY = f (Economic determinants, Board and ownership structure attributes)

As discussed earlier, previous studies considered insufficiently the accurate estimation of short- and long-run compensation factors owing to the fragmentation of compensation data. They typically only estimated values using accruals as a proxy of earnings man-

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2) As mentioned in Ashbaugh et al. (2006), the structure of corporate governance is not related to CEO compensation from an optimal contract point of view. Therefore, estimated CEO compensation is only a function of economic determinants.

agement, making it difficult to detect a CEO's opportunistic behaviour. To bridge this gap the present study estimates overcompensation level using the compensation decision function defined above, and analyses the relationships between the level and the two types of earnings management. In contrast to previous approaches, it further examines whether overcompensation reduces earnings management.

2.2 Hypotheses development

According to Healy (1985), managers choose accruals that reduce earnings when the maximum and minimum levels of bonus plans are fixed and accruals that increase earnings when no range is set. Guidry et al. (1999) presented similar results and concluded that managers adopt earnings management in order to maximise their levels of compensation. However, both Holthausen et al. (1995) and Graver et al. (1995) found that the incentive for earnings management is not to maximise a CEO's compensation but rather to smooth earnings.

However, whether a CEO's incentive for earnings management is compensation maximisation or earnings smoothing, if sufficient compensation is paid, managers are expected to reduce earnings management. Ji et al. (2009) claimed that in the case of negative earnings smoothing (that reduces reported earnings), if compensation level is determined

by reduced reported earnings, managers have a weak incentive to smooth earnings aggressively. Similarly, the firm will provide additional compensation to managers in order to induce them to take actions to smooth negative earnings, which will positively influence firm value. If managers are overcompensated, they will thus aim to reduce earnings to maximise future compensation. In light of the foregoing, we can formulate the following hypotheses:

H 1: Ceteris paribus, CEO overcompensation has a negative relationship with earnings management.

H 1-1: Ceteris paribus, CEO overcompensation has a negative relationship with DA.

H 1-2: Ceteris paribus, CEO overcompensation has a negative relationship with RM.

Reported earnings management includes both upwards reported earnings management, when firm performance is lower than expected, and downwards reported earnings management, when firm performance is higher than expected. Downwards earnings management is carried out in order to plan performance in the following term when performance in the current term has exceeded targets. In this case, if additional compensation is provided, managers are expected to avoid opportunistic behaviour in order to increase reported earnings. Choosing RM for upward earnings management, such as the

abnormal expansion of sales on credit or abnormal reduction of discretionary expenses (e.g., advertising costs), would sacrifice the firm's long-term value. Hence, it is expected that under downwards earnings management, CEO overcompensation reduces RM which is relatively more harmful to the firm, whereas under upward earnings management, CEO overcompensation reduces DA. In light of the foregoing, we can formulate the following hypotheses:

H2: Ceteris paribus, the relationship between CEO overcompensation and two types of earnings management depends on the direction of earnings management.
H2-1: Ceteris paribus, CEO overcompensation has a negative relationship with DA under upwards earnings management.
H2-2: Ceteris paribus, CEO overcompensation has a negative relationship with RM under downwards earnings management.

III. Research Design

3.1 Model

The present study examines earnings management in two ways. We use the modified Jones model (Dechow et al., 1995) in order to estimate DA, whereas for RM, we estimate and analyse the abnormal cash flow from operations (Ab_OCF), abnormal production costs (Ab_PROD_cost), and abnormal discretionary expenses (Ab_EXP) values proposed by Roychowdhury (2006). The two models used to test H1 are thus presented below:

[Model 1]
$$EM_{jit} = a_0 + a_1 OVER\_PAY_{1it} + a_2 SIZE_{it}$$
$$+ a_3 LEV_{it} + a_4 BTM_{it} + a_5 ROA_{it}$$
$$+ a_6 BIG4_{it} + a_7 I\_Dum + a_8 Y\_Dum$$
$$+ e_{it} \qquad (1)$$

[Model 2]
$$EM_{jit} = a_0 + a_1 OVER\_PAY_{2it} + a_2 SIZE_{it}$$
$$+ a_3 LEV_{it} + a_4 BTM_{it} + a_5 ROA_{it}$$
$$+ a_6 BIG4_{it} + a_7 I\_Dum + a_8 Y\_Dum$$
$$+ e_{it} \qquad (2)$$

where EM_{1it}: Discretionary accruals (DA) estimated by the modified Jones model of firm i in year t, EM_{2it}: Aggregated (individual) real activity-based earnings management (RM, $Ab.OCF$, Ab_PROD_cost, $Ab.EXP$) of firm i in year t, RM: $Ab.OCF*(-1) + Ab\_PROD\_cost + Ab.EXP*(-1)$, $Ab.OCF$: Abnormal cash flow from operations, Ab_PROD_cost: Abnormal production costs, $Ab.EXP$: Abnormal discretionary expenses (fringe benefits + advertising + R&D expenses + education and training expenses), $OVER\_PAY_{1it}$: Natural log of CEO cash overcompensation (cash compensation) of firm i in year t, $OVER\_PAY_{2it}$: Natural log of CEO total overcompensation (cash compensation + stock options) of firm i in year t, $SIZE_{it}$: Natural log of total assets of firm i in year t, LEV_{it}: Debt ratio of firm i in year t, (Total Debt in year t/Total Assets in year t),

BTM_{it}: Book to market Ratio of firm i in year t, (Total amount of capital in year t/Total current market value in year t), ROA_{it}: Return on assets of firm i in year t, (Earnings before tax in year t/ Total Assets in year t), $BIG4_{it}$: Dummy variable that equals 1 if the firm's auditor belongs to the Big 4 auditors and 0 otherwise, I_dum: Industry dummy, Y_dum: Year dummy

Model 1 is designed to examine the over-compensation‐earnings management relationship after considering the control variables. The dependent variables are the estimated earnings management values, including DA, Ab_OCF, Ab_PROD_cost, Ab_EXP, and aggregated RM. Our variable of interest is CEO overcompensation level ($OVER\_PAY_1$), which is the difference between the actual cash amounts and the expected cash compensation level estimated from Model 11. If over-compensation decreases earnings management, the regression coefficient of overcompensation (a_1) will show a significantly negative value. Model 2 uses total overcompensation ($OVER\_PAY_2$), namely cash compensation and stock options. H2 divides the sample into two groups (i.e., upwards earnings management and downwards earnings management) and then follows the same procedure using Models 1 and 2. We examine whether sufficient CEO compensation reduces earnings management but a reverse causation might be possible.

Causation would then run partially from earnings management to CEO compensation. So, we ran two stage least squares in order to avoid an overstatement of OLS coefficient.

3.2 Measurement of variables

In this study, we use DA and individual or aggregated abnormal real activities as a proxy for RM. We also use the modified Jones model to estimate nondiscretionary accruals (NDA). As mentioned above, RM is estimated from Ab_OCF, Ab_PROD_cost, and Ab_EXP and is used individually or aggregately.

Specifically, DA is calculated by deducting NDA from total accruals. NDA are estimated by the modified Jones model using cross-sectional data[3] by year and by industry. They are estimated from Model 4 using the regression coefficient estimated by Model 3. DA is estimated from Model 5.

$$TA_{it}/A_{it-1} = a_0(1/A_{it-1}) + a_1(\triangle REV_{it}/A_{it-1}) + a_2(PPE_{it}/A_{it-1}) + e_{it} \quad (3)$$
$$NDA_{it} = \hat{a}_0(1/A_{it-1}) + \hat{a}_1[(\triangle REV_{it}-\triangle AR_{it}) /A_{it-1}] + \hat{a}_2(PPE_{it}/A_{it-1}) \quad (4)$$
$$DA_{it} = (TA_{it}/A_{it-1}) - NDA_{it} \quad (5)$$

where TA_{it}: Total accruals of firm i in year t (earnings before taxes – cash flow from operations), $\triangle REV_{it}$: Change in sales of firm i in year t, $\triangle AR_{it}$: Change in accounts receivables of firm i in year t,

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3) The modified Jones model uses a time-series model when estimating NDA. However, because it needs long time-series data, Subramanyam (1996) used cross-sectional data as an alternative.

PPE_{it}: Property plant and equipment of firm i in year t, A_{it-1}: Total assets of firm i at the end of year $(t-1)$, DA_{it}: Discretionary accruals of firm i in year t estimated by the modified Jones model

RM is estimated from the model developed by Dechow et al. (1998) and implemented by Roychowdhury (2006). Normal cash flow from operations is estimated by linear functions of sales and sales growth. Normal production costs are defined by the cost of goods sold ($COGS$) and change in inventory assets (C_INV). Moreover, the abnormal level of each variable is estimated by the residuals derived from Models 6 to 10.

Consistent with the findings of Zang (2006), we combine these three individual measures to compute comprehensive metrics of RM in order to capture its total effects. The higher the amount of this aggregate measure, the more likely a firm is to engage in RM activities. Excessive price discounting and loose conditions for credit sales negatively influence abnormal cash flow from operations, while reducing production costs by overproduction increases production costs relative to sales. Upwards earnings management by reducing DA also leads to abnormal discretionary expenses relative to sales.

$$OCF_{it}/A_{it-1} = a_0 (1/A_{it-1}) + a_1(S_{it}/A_{it-1}) + a_2(C\_S_{it}/A_{it-1}) + e_{it} \quad (6)$$

$$COGS_{it}/A_{it-1} = a_0 (1/A_{it-1}) + a_1(S_{it}/A_{it-1}) + e_{it} \quad (7)$$

$$C\_INV_{it}/A_{it-1} = a_0(1/A_{it-1}) + a_1(C\_S_{it}/A_{it-1}) + a_2(C\_S_{it-1}/A_{it-1}) + e_{it} \quad (8)$$

$$PROD_{it}/A_{it-1} = a_0(1/A_{it-1}) + a_1(S_{it}/A_{it-1}) + a_2(C\_S_{it}/A_{it-1}) + a_3(C\_S_{it-1}/A_{it-1}) + e_{it} \quad (9)$$

$$DISCEXP_{it}/A_{it-1} = a_0(1/A_{it-1}) + a_1(S_{it-1}/A_{it-1}) + e_{it} \quad (10)$$

where OCF_{it}: Cash flow from operations of firm i in year t. $PROD_{it}$: COGS plus C_INV of firm i in year t. $COGS_{it}$: Cost of goods sold of firm i in year t. C_INV_{it}: Change in inventory of firm i in year t. $DISCEXP_{it}$: Discretionary expenses of firm i in year t (fringe benefits + Advertising + R&D expenses + Education and training). A_{it-1}: Total assets of firm i at the beginning of year t. S_{it}: Sales of firm i in year t. C_S_{it}: Change in sales of firm i in year $t(S_{it} - S_{it-1})$. C_S_{it-1}: Change in sales of firm i in year $t-1(S_{it-1} - S_{it-2})$

In the present study, CEO overcompensation is determined by the difference between the actual values and the estimation of normal compensation level given the economic factors included in Model 11. We use a previously validated model (Core et al., 1999; Aboody et al., 2004; Ashbaugh et al., 2006), which suggests that current CEO compensation is determined by sales, total ROA, total return on stocks, growth factors, and risk factors from the previous year.

$$CEO\_PAY_{jit} = a_0 + a_1 SALE_{it-1} + a_2 BTM_{it-1} + a_3 ROA_{it-1} + a_4 RET_{it-1} + a_5 Std\_ROA_{it} + a_6 Std\_RET_{it}$$

$$+ a_7 I\_dum_{it} + a_8 Y\_dum_{it} + e_{it} \quad (11)$$

where CEO_PAY_{1it}: Natural log of CEO cash compensation of firm i in year t, CEO_PAY_{2it}: Natural log of CEO total compensation (cash compensation + stock options) of firm i in year t, $SALE_{it-1}$: Sales of firm i in year t, BTM_{it-1}: Book to market ratio of firm i in year $t-1$ (Average ratio of net book value vs. current market value for three years from year $t-1$), ROA_{it-1}: Return on assets of firm i in year $t-1$ (Earnings before tax in year $t-1$/ Total Assets in year $t-1$), RET_{it-1}: Stock returns of firm i in year $t-1$, Std_ROA_{it}: Standard deviation of ROA of firm i for the past three years, Std_RET_{it}: Standard deviation of stock returns of firm i for past three years, I_dum: Industry dummy, Y_dum: Year dummy

The control variables in Models 1 and 2 are variables that are expected to influence earnings management, namely firm size ($SIZE$), debt ratio (LEV), book to market ratio (BTM), business performance (ROA), and auditor ($BIG4$) (see Becker et al., 1998; Francis and Krishnan, 1999; Krishnan, 2003; Ashbaugh et al., 2003; Xie et al., 2003).

3.3 Sample selection

Our sample was chosen from Korean-listed firms (except financial firms) that have fiscal years ending in December and for which CEO compensation data were available. The study period ran from 2005 to 2007. We excluded financial firms because of their different accounting rules compared with non-financial sectors. We restricted the sample to firms that have a fiscal year ending in December for comparability purposes, and also excluded firms that had impaired capital during the period considered.

Panel A of Table 1 shows the sample selection process. *Panel B* and *Panel C* indicate sample distribution by year and by industry. Our final sample comprised 1,088 firm-year observations. We collected financial data and stock returns through KIS-VALUE, and CEO compensation data from business reports released in the Data Analysis, Retrieval, and Transfer system of the Financial Supervisory Service.

IV. Empirical results

4.1 Descriptive statistics

Table 2 reports the descriptive statistics of the variables used in the present study. The average cash compensation (PAY_1) of sample firms is KRW 246 million and the median is KRW 134 million during the study period, while the average total compensation (PAY_2) including cash compensation and stock options and the median are KRW 249 million and KRW 135 million, respectively. There is only a small gap between cash compensation and total compensation, because most Korean-

〈Table 1〉 Sample Selection

Panel A: Process of sample selection

Firms listed on the Korean stock exchange (Fiscal year ending in December, except financial firms)	2005	2006	2007	Total
	581	590	599	1,770
Impaired capital	(12)	(2)	(0)	(14)
Insufficient CEO compensation	(171)	(195)	(196)	(562)
Extremes[4]	(24)	(38)	(44)	(106)
Final sample	374	355	359	1,088

Panel B: Time distribution

Year	Frequency	%	Cumulative %
2005	374	34.38	34.38
2006	355	32.63	67
2007	359	33	100
Total	1,088		

Panel C: Industry distribution

Industry	Frequency(%)	Industry	Frequency(%)
Construction	69(6.34)	Medical Instruments	10(0.92)
Machinery	78(7.17)	Medicine	62(5.7)
Non-metal Minerals	50(4.6)	Electronics	95(8.73)
Service	34(3.13)	Electricity & Gas	22(2.02)
Textile Products	47(4.32)	Manufacturing	30(2.76)
Transport	80(7.35)	Paper & Lumber	50(4.6)
Transport & Storage	31(2.85)	Steel & Metals	91(8.36)
Distributions	74(6.8)	Chemical	184(16.91)
Food	81(7.44)		

listed firms provide cash compensation rather than stock options. Hence, the fair value of stock options would have little influence on total compensation during the study period. However, the gap between average and median CEO compensation level occurs because firms that provide higher compensation levels disproportionately affect the average.[5]

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4) We omitted the top and bottom 1% of samples, considering them to be extremes.
5) CEO compensation level shows heteroskedasticity according to firm size. Because each firm has its own level of compensation, we use the natural log of general compensation level for the empirical analysis.

With regard to CEO overcompensation level (*OVER_PAY₁*), our variable of interest, the average and median are 6.423 and 6.438, respectively. Because of the similarity of these two values, we assume they follow a normal distribution and perform a standard regression analysis. Finally, the average debt ratio of sample firms is 47% and total ROA is 5.7%.

Table 2-1 presents average compensation

levels by industry. This table shows that the medical instruments sector has the highest compensation level in the sample (KRW 1,028 million), whereas textile products have the lowest compensation level (KRW 112 million; one 10th of medical instruments). Further, construction and textile products have the highest stock options, while the industries that present the highest over-

⟨Table 2⟩ Descriptive Statistics

Total samples (N=1,088)	Mean	Std. Dev	1Q	Median	3Q
PAY₁(KRW 1,000)	246,110	489,533	84,000	134,000	244,000
PAY₂(KRW 1,000)	249,208	493,744	84,000	134,944	247,000
LN(PAY₁)	18.834	0.885	18.246	18.713	19.313
LN(PAY₂)	18.841	0.891	18.246	18.720	19.325
OVER_PAY₁	6.423	1.664	5.141	6.306	7.646
OVER_PAY₂	6.438	1.664	5.161	6.314	7.659
SIZE	19.334	1.171	18.444	19.142	20.075
LEV	0.474	0.204	0.318	0.467	0.610
BTM	1.660	0.113	1.581	1.660	1.736
ROA	0.057	0.070	0.020	0.054	0.095
DA	0.007	0.065	-0.033	0.007	0.043
RM	-0.017	0.166	-0.116	-0.016	0.083
Ab_OCF	0.002	0.075	-0.044	-0.001	0.051
Ab_PROD_cost	-0.018	0.109	-0.074	-0.011	0.044
Ab_EXP	0.000	0.023	-0.006	0.002	0.010

Notes to Table 2: *PAY₁*: CEO cash compensation, *PAY₂*: CEO total compensation (cash compensation and stock options), *LN (PAY₁)*: Natural log of *PAY₁*, *LN(PAY₂)*: Natural log of *PAY₂*, *OVER_PAY₁*: Natural log of CEO cash overcompensation, *OVER_PAY₂*: Natural log of CEO total overcompensation (cash + stock options), *SIZE*: Natural log of total assets, *LEV*: Debt ratio, *BTM*: Book to market ratio, *BIG4*: Dummy variable that equals 1 if the firm's auditor belongs to the Big 4 auditors and 0 otherwise, *ROA*: Return on assets, *DA*: Discretionary accruals estimated by the modified Jones model, *RM*: *Ab_OCF*×(-1) + *Ab_PROD_cost* + *Ab_EXP*×(-1), *Ab_OCF*: abnormal cash flow from operations, *Ab_PROD_cost*: Abnormal production costs, *Ab_EXP*: Abnormal discretionary expenses. We multiply *Ab_OCF* and *Ab_EXP* by negative one so that the higher amount of this aggregate measure, the more likely the firm is engaged in RM activities.

〈Table 2-1〉 Average CEO Compensation by Industry

Industry	PAY_1 (KRW 1000)	PAY_2	$LN(PAY_1)$	$LN(PAY_2)$	$OVER\_PAY_1$	$OVER\_PAY_2$
Medical Instruments	1,018,200	1,018,767	20.316	20.319	8.478	8.494
Service	311,403	311,403	19.238	19.238	6.958	6.972
Distribution	310,250	311,327	19.092	19.097	6.746	6.764
Transport & Storage	245,216	245,479	19.048	19.049	6.698	6.711
Machinery	242,919	243,716	18.936	18.937	6.264	6.279
Food	223,886	225,718	18.934	18.938	6.929	6.944
Construction	217,781	220,216	18.885	18.888	6.542	6.559
Electricity & Gas	210,400	210,400	19.09	19.09	6.676	6.69
Chemical	204,900	204,933	18.793	18.793	6.376	6.39
Steel & Metal	202,392	202,392	18.834	18.834	6.253	6.268
Manufacturing	176,993	176,993	18.749	18.749	6.22	6.233
Paper & Lumber	171,180	171,291	18.687	18.688	6.356	6.372
Medicine	167,869	167,869	18.723	18.723	6.369	6.382
Non-metal Minerals	166,954	166,954	18.689	18.689	6.405	6.42
Transportation	160,091	160,091	18.659	18.659	5.919	5.932
Electronics	151,545	151,545	18.547	18.547	6.364	6.378
Textile Products	112,496	114,787	18.28	18.291	5.721	5.746

compensation are food products (6th in compensation vs. 3rd in overcompensation), non-metal minerals (14th vs. 8th), and electronics (16th vs. 11th).

Table 3 reports that cash overcompensation has significantly negative relationships with all variables. Specifically, the correlation coefficient between overcompensation ($OVER\_PAY_1$) and DA is -0.143 and between overcompensation and RM is -0.107. These results are significant at the 1% level, which leads us to assume that earnings management (i.e., a manager's opportunistic behaviour) decreases as overcompensation increases. Moreover, firm size ($SIZE$) and overcompensation have a positive correlation coefficient of 0.452 (significant at the 1% level).[6] However, overcompensation has a significant negative relationship with book to market ratio (BTM).

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6) There is some concern about multicollinearity between variables because of the positive relationship between firm size and compensation/overcompensation. After verifying the variance influence factors (VIFs) between the explanatory variables, we confirmed that the VIFs of all the variables used in this study were less than 1.5, implying there was no concern about multicollinearity.

⟨Table 3⟩ Correlations

	Over_PAY₁	DA	RM	Ab_OCF	Ab_PROD_cost	Ab_EXP	SIZE	LEV	BTM	ROA	BIG4
Over_PAY₁		-0.143***	-0.107***	-0.130***	-0.058*	-0.071*	0.452***	0.038	-0.410***	-0.040	0.225***
DA	-0.126***		0.343***	0.659***	0.069**	-0.028	0.040	0.104***	0.012	0.171***	-0.073*
RM	-0.132***	0.363***		0.709***	0.906***	0.565***	-0.130***	0.245***	0.366***	-0.452***	-0.112***
Ab_OCF	-0.146***	0.627***	0.709***		0.363***	0.099***	0.209***	0.268***	0.293***	-0.459***	-0.128***
Ab_PROD_cost	-0.077**	0.099***	0.890***	0.376***		0.575***	-0.036	0.177***	0.308***	-0.358***	-0.067**
Ab_EXP	-0.106***	0.026	0.534***	0.138***	0.561***		-0.078**	0.042	0.214***	-0.047	-0.065**
SIZE	0.413***	-0.021	-0.107***	-0.196***	-0.017	-0.108***		0.182***	-0.607***	0.166***	0.350***
LEV	0.036	0.069**	0.237***	0.267***	0.159***	0.051*	0.170***		0.113***	-0.181***	0.042
BTM	-0.385***	0.000	0.358***	0.283***	0.308***	0.229***	-0.583***	0.120***		-0.461***	-0.294***
ROA	0.001	0.144***	-0.430***	-0.427***	-0.349***	-0.023	0.156***	-0.194***	-0.468***		0.095***
BIG4	0.215***	-0.070**	-0.098***	-0.131***	-0.075**	-0.088***	0.356***	0.048	-0.290***	0.096***	

Notes to Table 3:
***Significant at the 1% level, **Significant at the 5% level, *Significant at the 10% level.
This table reports Pearson (above the diagonal) and Spearman (below the diagonal) correlations for the sample over 2005 - 2007.
OVER_PAY₁: CEO cash overcompensation, DA: Discretionary accruals, RM: Aggregated value of real earnings management ($Ab\_OCF*(-1) + Ab\_PROD\_cost + Ab\_EXP*(-1)$), Ab_OCF: Abnormal cash flow from operations, Ab_PROD_cost: Abnormal production costs, Ab_EXP: Abnormal discretionary expenses, SIZE: Natural log of assets, LEV: Debt ratio, BTM: Book to market ratio, ROA: Return on assets, BIG4: Dummy variable that equals 1 if the firm's auditor belongs to the Big 4 auditors and 0 otherwise. We multiply Ab_OCF and Ab_EXP by negative one so that the higher amount of this aggregate measure, the more likely the firm is engaged in RM activities.

4.2 Relationships between overcompensation and earnings management

Table 4 presents the results of testing H1, showing that sufficient compensation leads to managers reducing earnings management. *Panel A* and *Panel B* show the linear regression analysis on cash overcompensation ($OVER\_PAY_1$) and total overcompensation ($OVER\_PAY_2$), as well as the relationships between DA and the proxies of RM. *Panel A* shows when the dependent variables are DA and RM, the regression coefficients of cash overcompensation ($OVER\_PAY_1$) are -0.004

and -0.008, respectively (both significant at the 1% level). These results imply that as CEO overcompensation increases, earnings management reduces. If managers receive sufficient compensation, there is no longer any incentive to report inflated earnings. Therefore, compensation provided excessively has a negative relationship with earnings management. Further, as overcompensation increases, the direction of earnings management changes to reduce earnings. This occurs because managers no longer take risks that might affect earnings management since their utility has already been maximised due to

〈Table 4〉 Regression Analysis of Overcompensation on Earnings Management

Panel A: Cash overcompensation (OVER_PAY₁)

Dependent variable	DA	RM	Ab_OCF	Ab_PROD_cost	Ab_EXP
	Coefficient(t-statistics)				
Intercept	-0.045 (-0.56)	-0.690 (-3.77***)	0.260 (3.23**)	-0.832 (-6.6***)	-0.118 (-4.13***)
$OVER\_PAY_1$	-0.004 (-3.23***)	-0.008 (-2.47**)	-0.005 (-3.82***)	-0.003 (-1.28)	0.000 (0.55)
SIZE	0.000 (-0.1)	0.010 (1.81*)	-0.010 (-4.19***)	0.018 (4.85***)	0.002 (1.97**)
LEV	0.053 (5.09***)	0.120 (5.02***)	0.093 (8.85***)	0.028 (1.7*)	-0.001 (-0.21)
BTM	0.006 (0.23)	0.257 (4.26***)	-0.064 (-2.42**)	0.262 (6.29***)	0.060 (6.35***)
ROA	0.193 (5.87***)	-0.791 (-10.49***)	-0.454 (-13.75***)	-0.369 (-7.12***)	0.033 (2.82***)
BIG4	-0.009 (-2.04**)	-0.014 (-1.36)	-0.006 (-1.35)	-0.007 (-0.95)	-0.001 (-0.75)
I_dum			Inc.		
Y_dum			Inc.		
Adj R-Sq	0.076	0.269	0.311	0.205	0.057
F Value	7.01	27.91	34.09	19.86	5.42
N	1,088	1,088	1,088	1,088	1,088

〈Table 4〉 Regression Analysis of Overcompensation on Earnings Management (continued)

Panel B: Total overcompensation (OVER_PAY₂)

Dependent variable	DA	RM	Ab_OCF	Ab_PROD_cost	Ab_EXP
	Coefficient(t-statistics)				
Intercept	−0.044 (−0.55)	−0.690 (−3.77***)	0.350 (4.54***)	−0.821 (−6.76***)	−0.144 (−5.3***)
OVER_PAY₂	−0.004 (−3.23***)	−0.008 (−2.46**)	−0.005 (−3.41***)	−0.002 (−0.99)	0.000 (0.63)
SIZE	0.000 (−0.11)	0.010 (1.8*)	−0.011 (−4.84***)	0.019 (5.01***)	0.002 (2.3**)
LEV	0.053 (5.09***)	0.120 (5.02***)	0.088 (8.59***)	0.036 (2.22**)	0.000 (0.09)
BTM	0.006 (0.23)	0.257 (4.25***)	−0.066 (−2.49**)	0.283 (6.81***)	0.063 (6.77***)
ROA	0.193 (5.86***)	−0.791 (−10.49***)	−0.465 (−13.98***)	−0.360 (−6.87***)	0.035 (2.96***)
BIG4	−0.009 (−2.04**)	−0.014 (−1.36)	−0.007 (−1.56)	−0.006 (−0.9)	−0.001 (−0.75)
I_dum			Inc.		
Y_dum			Inc.		
Adj R-Sq	0.076	0.269	0.291	0.176	0.048
F Value	7.01	27.91	71.09	37.44	9.65
N	1,088	1,088	1,088	1,088	1,088

Notes to Table 4: DA_{it}: Discretionary accruals of firm i and year t estimated by the modified Jones modes, RM_{it}: Aggregated abnormal real activity of firm i in year t ($Ab\_OCF*(-1) + Ab\_PROD\_cost + Ab\_EXP*(-1)$), Ab_OCF: Abnormal cash flow from operations, Ab_PROD_cost: Abnormal production costs, $Ab.EXP$: Abnormal discretionary expenses (fringe benefits + advertising + R&D expenses + education and training expenses), $OVER\_PAY_{1it}$: Natural log of CEO cash overcompensation (cash compensation) of firm i in year t, $OVER\_PAY_{2it}$: Natural log of CEO total overcompensation (cash + stock options) of firm i in year t, $SIZE_{it}$: Natural log of assets of firm i in year t, LEV_{it}: Debt ratio of firm i in year t (Total Debt in year t/Total Assets in year t), BTM_{it}: Book to market ratio of firm i in year t (Total amount of capital in year t/Total current market value in year t), ROA_{it}: Return on assets of firm i in year t (Earnings before tax in year t/ Total Assets in year t), $BIG4_{it}$: Dummy variable that equals 1 if the firm's auditor belongs to the Big 4 auditors and 0 otherwise, I_dum: Industry dummy, Y_dum: Year dummy. We multiply Ab_OCF and Ab_EXP by negative one so that the higher amount of this aggregate measure, the more likely the firm is engaged in RM activities.

overcompensation. Total overcompensation (*OVER_PAY₂*) in *Panel B* shows the same results. These findings confirm that H1-1 and H1-2 are both supported, namely that overcompensation has a negative relationship with earnings management.

4.3 Relationships between overcompensation and earnings management according to the direction of earnings management

Table 5 reports the results of the difference analysis between upwards and downwards earnings management for each variable. We

use the directions of DA estimated by Model 5 as criteria for the division of the sample. If the direction of DA is positive (negative), the firm belongs to the upwards (downwards) earnings management group. As a result, 596 samples belong to the upwards earnings management group and 492 to the downwards earnings management group. The firm sizes in these groups vary slightly, but the upwards earnings management group has on average a 1.9% higher ROA (significant at the 1% level). This means there is a difference in ROA as a result of downwards earnings management. The upwards earnings management group also has slightly higher CEO cash compensation ($LN(PAY_1)$), but the difference between the two groups in this regard is not significant. By contrast, the downwards earnings management group has 19% higher overcompensation ($OVER\_PAY_1$) on average, which is significant at the 10% level.

Table 6 shows the overcompensation‐earnings management relationships by group. As before (see Table 4), the results confirm that overcompensation has a negative relationship with earnings management. However, under upwards earnings management, the relationships between overcompensation and DA are significant, while the significance of the relationships between overcompensation and RM is relatively lower. Under downwards earnings management, however, the significance of the relationships between overcompensation and DA decreases, while overcompensation has a negative relationship with RM. These findings imply that (i) managers in firms that present upwards earnings management choose DA to maximise their compensation, leading to increased firm performance, and (ii) if they are overcompensated, they are less likely to engage in DA because of the reduced incentive to manage earnings.

〈Table 5〉 Difference in the Variables of the Upwards and Downwards Earnings Management Groups

Variables	Upwards EM	Downwards EM	Difference	t-value
$OVER\_PAY_1$	6.338	6.525	-0.188	-1.80*
$LN(PAY_1)$	18.834	18.795	0.039	0.81
ROA	0.065	0.046	0.019	4.36***
SIZE	19.348	19.318	0.030	0.42
LEV	0.484	0.462	0.022	1.78*
BTM	1.659	1.661	-0.002	-0.29
DA	0.051	-0.047	0.098	37.38***
RM	0.026	-0.069	0.095	9.75***
N	596	492		

Notes to Table 5: Refer to Table 2 for the definition of the variables

By contrast, managers in firms that present downwards earnings management are likely to postpone earnings to the next term if they expect to exceed targeted performance. Thus, if managers are overcompensated, they will relatively reduce RM which harms firm value. For example, when earnings in the current term are expected to be high, managers expect to receive the maximum level of compensation and are motivated to carry out downwards earnings management by postponing

earnings to secure firm performance, and thus individual compensation, in the following term.

In this case, they must choose which method to apply in order to reduce reported earnings, with reasonable managers likely to choose the method that presents relatively less risk to firm value. In other words, if managers are overcompensated following higher-than-expected earnings in the current term, they will not take a risk damaging the firm's

⟨Table 6⟩ Regression Analysis of Overcompensation on Earnings Management by Group

Dependent variable	Upwards EM Group(DA≧0)		Downwards EM Group(DA⟨0)	
	DA	RM	DA	RM
	Coefficient (t-statistics)		Coefficient (t-statistics)	
Intercept	0.199 (2.59***)	-0.322 (-1.49)	0.097 (1.18)	-0.638 (-3.27***)
OVER_PAY$_1$	-0.004 (-2.68***)	-0.005 (-1.18)	-0.001 (-0.97)	-0.007 (-1.98**)
SIZE	-0.006 (-2.39**)	0.001 (0.16)	-0.003 (-1.37)	0.010 (1.64)
LEV	0.063 (6.26***)	0.132 (4.69***)	0.005 (0.46)	0.084 (3.04***)
BTM	-0.040 (-1.51)	0.217 (2.91***)	-0.033 (-1.2)	0.253 (3.86***)
ROA	0.262 (8.03***)	-0.766 (-8.33***)	0.143 (4.3***)	-1.043 (-13.12***)
BIG4	-0.009 (-2.13**)	-0.010 (-0.82)	-0.013 (-2.63***)	0.005 (0.43)
I_dum	Inc.		Inc.	
Y_dum	Inc.		Inc.	
Adj R-Sq	0.168	0.249	0.066	0.419
F Value	22.19	35.94	7.5	67.23
N	596	596	492	492

Notes to Table 6: Refer to Table 2 for the definition of the variables. The results are the same in the cases of total compensation($LN(PAY_2)$) and total overcompensation ($OVER\_PAY_2$).

long-term value by changing their policy for sales on credit or reducing production costs through overproduction. This finding confirms that H2-1 and H2-2 are also supported.

V. Conclusions

The present study confirms that over-compensation affects earnings management under traditional principal‑agent relationships. While previous studies have examined the compensation‑earnings management relationship by arbitrarily estimating cash compensation or stock options as a proxy of CEO compensation, we first estimated expected compensation and then predicted overcompensation. Further, whereas previous studies have shown fragmentary results by using only DA as a proxy for earnings management, this study also considered RM, which has different consequences on performance-based incentives and thus on the choice of earnings management approach.

Based on the investigation of data obtained from Korean-listed firms between 2005 and 2007, we find that as overall overcompensation increases, earnings management declines. Further, in the upwards earnings management group, overcompensation has a significant and negative relationship with DA and in the downwards earnings management group, overcompensation has a significant and negative relationship with RM. This result suggests that if a CEO is overcompensated, he or she will choose downwards earnings management both to maximise compensation and smooth earnings. Firms thus provide overcompensation in order to induce managers to take actions for negative earnings smoothing, which positively influences firm value, in line with the results of Sungkwon et al. (2009). More importantly, we showed that the greater the level of compensation firms provide managers, the less RM (which can damage the firm's long-term value) they engage in. This finding implies that they tend to choose earnings management methods that are relatively riskier for their firms.

The findings presented herein demonstrate that overcompensation should not be the target of public criticism, and highlight the importance of taking a long-term perspective on firm benefits. Although the model used to estimate compensation is somewhat limited, this study nevertheless confirms the importance of compensation as an incentive for earnings management. Further, overcompensation actually has the positive effect of mitigating opportunistic behaviour by managers and thereby reducing firms' long-term risks. The results of this study should be used as a guideline for future compensation decision systems.

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경영자보상과 이익조정간 관계연구: 한국의 사례*

강선아** · 김용식***

요 약

경영자보상과 관련된 기존의 연구들은 주로 경영자(CEO)가 자신의 보상수준을 극대화하기 위해 보고이익을 조정한다고 보고하였고 이를 기업의 성과를 이용하여 검증해왔다. 본 연구는 기존의 일반적인 접근방식에서 벗어나, 경영자의 초과보상이 전형적인 대리인관계에서의 상·하향 이익조정행위를 줄이는 역할을 하는지에 대해 실증검증하였다. 연구의 표본은 2005년부터 2007년까지 한국상장기업을 대상으로 하고 경영자의 초과보상수준은 선행연구에서 밝혀진 보상함수를 이용하여 초과보상의 수준을 추정하였다. 이익조정여부와 수준은 수정 Jones모형에 의해 추정된 재량적발생액과 실제이익조정추정치를 이용하였다. 연구결과, 경영자의 초과보상이 늘어날수록 이익조정행위가 유의하게 줄어드는 것을 발견하였다. 경영자초과보상과 이익조정간의 음(–)의 관계는 결국 경영자가 보상을 충분히 받는 경우 이익조정과 같은 risk taking행위가 줄어들 수 있다는 점을 의미한다. 또한 경영자의 초과보상은 실제이익조정치를 이용한 하향이익조정과 음(–)의 관계를 보인 반면 재량적발생액을 이용한 추정치와는 상향이익조정과 음(–)의 관계를 발견하였다. 이러한 결과는 경영자가 자신의 사적효익을 극대화하기 위해 이익조정의 방법을 전략적으로 선택하고 있음을 의미한다.

실제이익조정방법을 통한 보고이익 조정 시 장기적으로 기업의 가치를 훼손시킬 수 있다는 점에서 볼 때, 경영자초과보상이 오히려 장기적인 측면에서는 기업가치에 긍정적 영향을 줄 수 있을 것으로 판단된다. 이러한 결과는 기존에 알려진 경영자초과보상에 대한 부정적인 사회인식에 대해 반증을 제시함으로써 경영자 보상의 결정함수에 대해 의미있는 시사점을 제시한다.

주제어: CEO 보상, 초과보상, 이익조정, 발생액, 실제이익조정