Does Board Characteristics Constrain Real Earnings Management? Evidence From Korea

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ABSTRACT

This study empirically analyzes the effect of board characteristics on real earnings management, which is measured by using three proxies including abnormal cash flows from operations, abnormal discretionary expenses, and abnormal production costs. Specifically, we will investigate how board independence (or board size) affects real earnings management. Additionally, we will investigate the relation between the board characteristics and real earnings management according to before K-IFRS mandatory adoption or after K-IFRS mandatory adoption.

The empirical results of this study are as follows. First, the relation between board independence (board size) and the absolute value of abnormal cash flows from operations is statistically significant and positive (+). Second, the relation between board independence (board size) and the absolute value of abnormal production costs is statistically significant and positive (+). Third, the relation between board independence (board size) and the absolute value of abnormal discretionary expenses is statistically significant and positive (+). These findings present that the board independence (or board size) does not constrain real earnings management. Thus, these mean that board independence (or board size) does not work as a mechanism to reduce real earnings management.

This study contributes to accounting research as it directly tests the relation between the board characteristics and real earnings management in Korea, providing empirical support that a board independence (board size) does not constrain real earnings management as effectively as it constrains accrual earnings management.

Keywords: Board Characteristics; Outside Directors; Board Size; Real Earnings Management; K-IFRS

1. INTRODUCTION

U sing hand-collected data on the firm's board of directors from 2009 to 2014, we examine the relation between the board characteristics and real earnings management. The final sample size is 2,565 firm-year observations for this study. Specifically, we will investigate how board independence (or board size) affects real earnings management. Additionally, we will investigate the relation between the board characteristics and real earnings management according to before K-IFRS mandatory adoption or after K-IFRS mandatory adoption.

Managers have an incentive to adjust earnings for their own benefit while infringing upon the interests of shareholders. Prior studies show that managers have many incentives to manipulate opportunistically earnings (Sun & Liu, 2011). Meanwhile, corporate governance plays a role as a device for solving information asymmetry and efficient allocation of economic resources to resolve the agency problem among various stakeholders (Shin & Lee, 2014; Kang & Ko, 2014; Oh, Shin & Hong, 2015; Oh & Shin, 2016).

Independent directors who are outside the company must collect and process a significant amount of company-specific information in order to efficiently perform consulting and monitoring tasks (Armstrong, Core & Guay, 2014). Also, because outside directors are a means of effectively controlling managers, they can effectively monitor managers in the process of financial reporting rather than internal directors (Sun & Liu, 2011).

Also, the number of director's influences board decisions and corporate performance (Jensen, 1993). According to prior research, board size is negatively correlated with firm value (Yermack, 1996). However, Coles, Daniel, and Naveen (2008) insist to require a large board of directors that companies operating in various fields have difficulties in consultation and supervision.

Meanwhile, Cohen, Dey and Lys (2008) show that managers have switched from accrual-based to operating-based earnings management after the enactment of SOX. Cohen and Zarowin (2010) investigate firms' propensity to compromise operating-based versus accrual-based earnings management around seasoned equity. Managers compromise accrual vs. real earnings management depending on the relative costs (Zang, 2012).

Based on prior literature, we analyze the association between the board characteristics and real earnings management. We use Roychowdhury (2006)' method as real earnings management measure and also use the percentage of its outside directors (ratio of independent directors to board size), board size (number of directors on the board) as the board characteristics measure.

The empirical results of this study are as follows. First, the relation between board independence (board size) and the absolute value of abnormal cash flows from operations is statistically significant and positive (+). Second, the relation between board independence (board size) and the absolute value of abnormal production costs is statistically significant and positive (+). Third, the relation between board independence (board size) and the absolute value of abnormal discretionary expenses is statistically significant and positive (+). These findings present that the board independence (or board size) does not constrain real earnings management. Thus, these mean that board independence (or board size) does not work as a mechanism to reduce real earnings management.

The rest of the paper is as follows. Section II shows prior literature and develops the research hypothesis. Section III presents the research design. Section IV reports the empirical results. Section V sets forth the conclusion.

2. BACKGROUND AND HYPOTHESES DEVELOPMENT

2.1 Characteristics of the Board of Directors

Because outside directors are a means of effectively controlling managers, they can effectively monitor managers in the process of financial reporting rather than internal directors (Sun & Liu, 2011). Jaggi, Leung and Gul (2009) also document that board independence may lessen earnings management.

Prior research shows conflicting evidence about the effect of board size on firm valuation. For example, Yermack (1996) shows a negative relation between board size and Tobin's q. However, Cheng (2008) finds larger board can reduce firm risk.

2.2 Real Earnings Management

Roychowdhury (2006) documents that managers manipulate operating-based earnings through sales manipulation, discretionary expenditures, and production cost.

Cohen et al. (2008) show that, compared with before and after introduction, US firms have lowered discretionary accruals after SOX introduction.

Kim, Goh and Koh (2008) have examined whether firms conduct real earnings management to adjust their profits. As a result of the verification, it was confirmed that domestic firms do not only adjust profit through accruals but also use real earnings management in order to adjust profits.

Based on the prior literature, we hypothesize as follows:

H₁: There is a association between the board characteristics and the abnormal cash flows from operations.

H₁₋₁: There is aassociation between board independence and the abnormal cash flows from operations.

H₂: There is a association between the board characteristics and the abnormal production costs.

H₂₋₁: There is a association between board independence and the abnormal production costs.

H₂₋₂: There is a association between board size and the abnormal production costs.

H₃: There is a association between the board characteristics and the abnormal discretionary expenses.

H₃₋₁: There is a association between board independence and the abnormal discretionary expenses.

H₃₋₂: There is a association between board size and the abnormal discretionary expenses.

3. RESEARCH DESIGN

3.1 Regression Models

To test Hypothesis 1 - Hypothesis 3, we use a multivariate regression model to investigate whether board independence (or board size) constrains real earnings management as we have expected. Regression models are as follows;

$$REM_{it} = \beta_0 + \beta_1 OUTBOARD_{it} \ (or \ BOARDSIZE) + \beta_2 SIZE_{it} + \beta_3 MTB_{it} + \beta_4 LEV_{it} + \beta_5 ROA_{it} + \beta_6 LOSSDUM_{it} + \beta_7 OWN_{it} + \beta_8 FOR_{it} + \sum YD + \sum ID + \varepsilon_{it} \tag{1}$$

Variable Definitions

<u>Dependent Variables</u>

  REM   : real earnings management, measured as Roychowdhury (2006);
  $|AbOCF|$: the absolute value of the residual value of Eq. (2);
  $|AbPRD|$: the absolute value of the residual value of Eq. (3);
  $|AbSGA|$: the absolute value of the residual value of Eq. (4);

<u>Independent Variables</u>

  OUTBOARD : board independence, (independent directors / the board size);
  BOARDSIZE : board size, (the number of board of directors / the nature logarithm of total assets);

<u>Control Variables</u>

  SIZE   : firm size, the nature logarithm of total assets;
  MTB   : market-to-book ratio, (market value / book value of common equity);
  LEV   : debt ratio, (long-term debt / total assets);
  ROA   : return on assets, (income /total assets);
  LOSSDUM : loss dummy variable;
  OWN   : ownership;
  FOR   : foreign ownership;
  YD   : year dummy;
  ID   : industry dummy;
  ε_{it} : residual.

Based on prior literature, we predict a positive (+)/ negative (-) association between OUTBOARD (or BOARDSIZE) and REM. Control variables are SIZE, MTB, LEV, ROA, LOSSDUM, OWN, FOR (Roychowdhury, 2006; Klein, 2002). SIZE is added to control firm size effect and omitted variables effect (Francis, La Fond, Olsson & Schipper, 2005). OWN is ownership. FOR is foreign ownership. We included OWN and FOR to control corporate goverance.

3.2 Measures of Real Earnings Management (Roychowdhury 2006)

In this study, real earnings management was measured by Roychowdhury (2006). Expressed the following equation (2) - (4), Abnormal operating cash flow (AbOCF), abnormal production costs (AbPRD), and abnormal discretionary expenses (AbSGA) are the values obtained by subtracting normal operating cash flow, normal production costs, and normal discretionary expenses measured by Roychowdhury (2006) in actual operating cash flow, actual production costs, and actual discretionary expenses, respectively.

This means the residuals measured by the Roychowdhury (2006). In this study, the absolute value of the residual is used to analyze the magnitude of real earnings management. Thus, the larger the absolute value of the residual, the greater the real earnings management.

$$|AbOCF_{it}| = \left|\left(\frac{CFO_{it}}{TA_{it-1}}\right) - \left[\hat{a}_0 + \hat{a}_1\left(\frac{1}{TA_{it-1}}\right) + \hat{a}_2\left(\frac{SALES_{it}}{TA_{it-1}}\right)\right]\right| \tag{2}$$

$$|AbPRD_{it}| = \left|\left(\frac{PRD_{it}}{TA_{it-1}}\right) - \left[\hat{a}_0 + \hat{a}_1\left(\frac{1}{TA_{it-1}}\right) + \hat{a}_2\left(\frac{SALE_{it}}{TA_{it-1}}\right) + \hat{a}_3\left(\frac{\Delta SALE_{it}}{TA_{it-1}}\right) + \hat{a}_4\left(\frac{\Delta SALE_{it-1}}{TA_{it-1}}\right)\right]\right| \tag{3}$$

$$|AbSGA_{it}| = \left|\left(\frac{SGA_{it}}{TA_{it-1}}\right) - \left[\hat{a}_0 + \hat{a}_1\left(\frac{1}{TA_{it-1}}\right) + \hat{a}_2\left(\frac{SALES_{it-1}}{TA_{it-1}}\right)\right]\right| \tag{4}$$

Varible definitions,

i and t denote firm, year, respectively.

OCF_{it}:	: cash flows from operations;
PRD_{it}	: production costs (= cost of goods sold + change in inventory);
SGA_{it}	: discretionary expenses;
$|AbOCF_{it}|$	: the absolute value of abnormal cash flows from operations;
$|AbPRD_{it}|$	: the absolute value of abnormal production costs;
$|AbSGA_{it}|$	: the absolute value of abnormal discretionary expenses;
$SALES_{it}$	: sales;
$SALES_{it-1}$	: lagged sales;
$\Delta SALE_{it}$	: changes in sales;
$\Delta SALE_{it-1}$	: lagged changes in sales;
TA_{it-1}	: total assets at the beginning of year;
ε_{it}	: residual.

3.3. Sample Selection

We employ the data collected from 2009 to 2014 from the Korean stock market. The sample selection process is summarized in Table 1. We first eliminate the quoted non-financial December firms for which financial and stock data cannot be collected from FN-Guide. Those firms whose year-ends are not on December 31 are excluded because of data homogeneity. Financial firms are also eliminated since the nature of the business is different from our sample. The final sample for regression analyses is 2,565 firm-year observations. We winsorized each of the variables at the 1st and 99th percentiles to minimize the effect of outliers except dummy variables. Panel A of Table 2 presents the distribution across fiscal years in our sample. Panel B of Table 2 shows the distribution by industry in our sample, of which Cokes & Chemical (11.46%), Professional services (10.29%), Retail & Whole sales (8.38%), and Publishing & Broadcating (8.23%) are the most representative industries.

Table 1. Sample Selection

Criteria	Firm-Year Observations
Quoted December 31 firms for fiscal years 2009-2014	4,010
(less) financial firms	(264)
(less) Firms for which financial and board data cannot be collected from FN-Guide	(1,181)
final sample	2,565

Table 2. Distributions over the sample period

Panel A: Distribution across fiscal years

Year	Frequency	Percent (%)
2009	244	9.51
2010	235	9.16
2011	501	19.53
2012	510	19.88
2013	531	20.70
2014	544	21.21
Total	2,565	100

Panel B: Industry Distribution

Industry	Frequency	Percent(%)
Food, Beverage	143	5.58
Fiber, Clothes, Leathers	112	4.37
Timber, Pulp, Furniture	103	4.02
Cokes, Chemical	294	11.46
Medical Manufacturing	142	5.54
Rubber & Plastic	70	2.73
Non Metallic	79	3.08
Metallic	187	7.29
Pc, Medical	167	6.51
Machine & Electronic	170	6.63
Other Trnsportation	181	7.06
Construction	114	4.44
Retail & Whole Sales	215	8.38
Transportation Service	84	3.27
Publishing, Broadcating	211	8.23
Professional Services	264	10.29
Other	69	1.13
Total	2,565	100

4. EMPIRICAL RESULTS

4.1 Descriptive Statistics

Table 3 presents descriptive statistics of all variables used in regression analyses. The means (medians) of $|AbOCF|$, $|AbPRD|$, and $|AbSGA|$ are 0.071 (0.058), 0.094 (0.071), and 0.074 (0.051), respectively.

About 46% of board members are independent director (OUTBOARD), and the mean of board size 0.023. The average SIZE is 27.034. The mean leverage (LEV) is 48.5%. The mean MTB and ROA are is 1.019 and 0.024%, respectively. firms with loss are about 24%. The means (medians) of ownership (OWN) and foreign ownership (FOR) are 44.13% (44.50%) and 9.61% (3.81%), respectively.

Table 3. Descriptive Statistics (N=2,565)

Variable	Mean	Std. Dev.	25th percentile	Median	75th percentile
|AbOCF|	0.071	0.080	0.034	0.058	0.214
|AbPRD|	0.094	0.120	0.051	0.071	0.252
|AbSGA|	0.074	0.094	0.029	0.051	0.312
OUTBOARD	0.462	0.126	0.400	0.444	0.500
BOARDSIZE	0.023	0.006	0.020	0.023	0.026
SIZE	27.034	1.592	25.924	26.816	27.892
MTB	1.019	2.356	0.479	0.751	1.180
LEV	0.485	0.206	0.324	0.485	0.629
ROA	0.024	0.084	0.001	0.028	0.060
LOSSDUM	0.236	0.425	0.000	0.000	0.000
OWN	44.134	16.458	32.090	44.500	54.750
FOR	9.614	13.101	0.837	3.806	13.646

Variable Definitions

$\|AbOCF\|$	: the absolute value of the residual value of Eq. (2);
$\|AbPRD\|$	: the absolute value of the residual value of Eq. (3);
$\|AbSGA\|$	: the absolute value of the residual value of Eq. (4);
OUTBOARD	: board independence, (independent directors / the board size);
BOARDSIZE	: board size, (the number of board of directors / the nature logarithm of total assets);
SIZE	: firm size, the nature logarithm of total assets;
MTB	: market-to-book ratio, (market value / book value of common equity);
LEV	: debt ratio, (long-term debt / total assets);
ROA	: return on assets, (income /total assets);
LOSSDUM	: loss dummy variable;
OWN	: ownership;
FOR	: foreign ownership.

4.2 Correlation Analysis

Table 4 shows Pearson correlations among regression variables. $|AbOCF|$ is significantly and positively (+) correlated with BOARDSIZE at 1%. This means bigger board size makes larger real earnings management using cash flow from operating activities.

$|AbPRD|$ is significantly and positively (+) correlated with OUTBOARD and BOARDSIZE at 5% and 5%, respectively. This means higher board independence and bigger board size make larger real earnings management using production costs.

$|AbSGA|$ is significantly and positively (+) correlated with BOARDSIZE at 10%. This means bigger board size makes larger real earnings management using discretionary expenses.

Table 4. Pearson Correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1)|AbOCF|	1	0.187***	0.096***	0.031	0.040**	-0.026	0.019	0.012	0.048**	0.001	-0.022	0.051***
(2)|AbPRD|		1	0.410***	0.039**	0.045**	-0.015	0.019	0.040**	0.069***	-0.036*	-0.014	0.053***
(3)|AbSGA|			1	-0.002	0.033*	-0.108***	0.025	0.021	0.038*	-0.026	0.017	-0.057***
(4)OUTBOARD				1	0.950***	0.344***	0.042**	0.123***	-0.027	0.036*	-0.088***	0.176***
(5)BOARDSIZE					1	0.044**	0.045**	0.043**	-0.072***	0.074***	-0.072***	0.035*
(6)SIZE						1	-0.008	0.277***	0.124***	-0.108***	-0.052***	0.462***
(7)MTB							1	0.016	0.003	-0.001	-0.069***	0.085***
8)LEV								1	-0.367***	0.349***	-0.147***	-0.106***
(9)ROA									1	-0.627***	0.137***	0.207***
(10)LOSSDUM										1	-0.122***	-0.154***
(11)OWN											1	-0.185***
(12)FOR												1

1) Please refer to Table 3 for variable definitions.

2) ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively (two-tailed).

4.3 Multivariate Results

Using models (1), we perform a multivariate regression analysis to test whether board independence (board size) is associated with real earnings management. Table 5 presents the results from the regression model in equation (1) that predicts whether board independence (board size) is associated with $|AbOCF|$. The coefficient (β_1) on OUTBOARD (BOARDSIZE) is significantly positive (+) at 5% (5%) with $|AbOCF|$. Cosistent with our prediction, board independence (board size) does not costrain abnormal cash flows from operations.

Table 6 shows the results from the regression model in equation (1) that predicts whether board independence (board size) is associated with $|AbPRD|$. The coefficient (β_1) on OUTBOARD (BOARDSIZE) is significantly positive (+) at 1% (1%) with $|AbPRD|$. Cosistent with our prediction, board independence (board size) does not costrain abnormal production costs.

Table 7 shows the results from the regression model in equation (1) that predicts whether board independence (board size) is associated with $|AbSGA|$. The coefficient (β_1) on OUTBOARD (BOARDSIZE) is significantly positive (+) at 1% (1%) with $|AbSGA|$. Cosistent with our prediction, board independence (board size) does not costrain abnormal discretionary expenses.

Table 5. Results on abnormal cash flows from operations (H-1)

$$|AbOCF_{it}| = \beta_0 + \beta_1 OUTBOARD_{it} \ (or \ BOARDSIZE) + \beta_2 SIZE_{it} + \beta_3 MTB_{it} + \beta_4 LEV_{it} + \beta_5 ROA_{it} + \beta_6 LOSSDUM_{it}$$
$$+\beta_7 OWN_{it} + \beta_8 FOR_{it} + \sum YD + \sum ID + \varepsilon_{it} \tag{1}$$

Variables	Predicted Sign	Independent Variable OUTBOARD		Predicted Sign	Independent Variable BOARDSIZE	
		Coefficient	t-value		Coefficient	t-value
INTERCEPT		1.152***	5.900		1.074***	5.530
OUTBOARD	(+/-)	0.170**	2.140			
BOARDSIZE				(+/-)	3.216**	2.060
SIZE	(-)	-0.031***	-3.960	(-)	-0.027***	-3.590
MTB	(-)	0.016***	2.880	(-)	0.016***	2.940
LEV	(+)	0.128**	2.290	(+)	0.128**	2.300
ROA	(-)	0.535***	3.630	(-)	0.526***	3.580
LOSSDUM	(+)	0.042	1.480	(+)	0.042	1.480
OWN	(+)	0.001	0.200	(+)	0.001	0.210
FOR	(-)	0.003***	3.320	(-)	0.003***	3.320
YD		yes			yes	
ID		yes			yes	
No.		2,565			2,565	
F-VALUE		3.27***			3.25***	
ADJ R-SQ		2.04%			2.04%	

1) Please refer to Table 3 for variable definitions.

2) ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively (two-tailed).

Table 6. Results on Abnormal production costs (H-2)

$$|AbPRD_{it}| = \beta_0 + \beta_1 OUTBOARD_{it} (or\ BOARDSIZE) + \beta_2 SIZE_{it} + \beta_3 MTB_{it} + \beta_4 LEV_{it} + \beta_5 ROA_{it} + \beta_6 LOSSDUM_{it}$$
$$+\beta_7 OWN_{it} + \beta_8 FOR_{it} + \sum YD + \sum ID + \varepsilon_{it} \qquad (1)$$

Variables	Predicted Sign	Independent Variable OUTBOARD		Predicted Sign	Independent Variable BOARDSIZE	
		Coefficient	t-value		Coefficient	t-value
INTERCEPT		1.026***	5.530		0.858***	4.660
OUTBOARD	(+/-)	0.222***	2.960			
BOARDSIZE				(+/-)	4.285***	2.900
SIZE	(-)	-0.029***	-3.930	(-)	-0.023***	-3.240
MTB	(-)	0.002	0.320	(-)	0.002	0.400
LEV	(+)	0.250***	4.720	(+)	0.245***	4.630
ROA	(-)	0.597***	4.280	(-)	0.582***	4.180
LOSSDUM	(+)	-0.015	-0.550	(+)	-0.015	-0.560
OWN	(+)	0.001	0.480	(+)	0.001	0.500
FOR	(-)	0.003***	3.980	(-)	0.003***	3.950
YD		yes			yes	
ID		yes			yes	
No.		2,565			2,565	
F-VALUE		7.14***			8.35***	
ADJ R-SQ		6.38%			6.28%	

1) Please refer to Table 3 for variable definitions.
2) ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively (two-tailed).

Table 7. Results on Abnormal discretionary expenses (H-3)

$$|AbSGA_{it}| = \beta_0 + \beta_1 OUTBOARD_{it} (or\ BOARDSIZE) + \beta_2 SIZE_{it} + \beta_3 MTB_{it} + \beta_4 LEV_{it} + \beta_5 ROA_{it} + \beta_6 LOSSDUM_{it}$$
$$+\beta_7 OWN_{it} + \beta_8 FOR_{it} + \sum YD + \sum ID + \varepsilon_{it} \qquad (1)$$

Variables	Predicted Sign	Independent Variable OUTBOARD		Predicted Sign	Independent Variable BOARDSIZE	
		Coefficient	t-value		Coefficient	t-value
INTERCEPT		1.302***	7.420		1.139***	6.510
OUTBOARD	(+/-)	0.195***	2.730			
BOARDSIZE				(+/-)	3.925***	2.790
SIZE	(-)	-0.037***	-5.250	(-)	-0.031***	-4.670
MTB	(-)	0.005	0.970	(-)	0.006	1.090
LEV	(+)	0.187***	3.720	(+)	0.180***	3.590
ROA	(-)	0.454***	3.430	(-)	0.433***	3.280
LOSSDUM	(+)	-0.041	-1.600	(+)	-0.041	-1.580
OWN	(+)	0.001	0.500	(+)	0.001	0.530
FOR	(-)	0.001	0.390	(-)	0.001	0.330
YD		yes			yes	
ID		yes			yes	
No.		2,565			2,565	
F-VALUE		14.72***			17.42***	
ADJ R-SQ		13.23%			13.03%	

1) Please refer to Table 3 for variable definitions.
2) ***,**, * denote significance at the 1%, 5%, and 10% levels, respectively (two-tailed).

4.4 Additional Analyses

4.4.1 Regression Analyses Considering Before and After Adoption of K-IFRS

The adoption of Korea adopted International Financial Reporting Standards (hereafter K-IFRS) has led to significant changes for companies that comply with regulatory disclosure requirements. Also, the adoption of K-IFRS resulted in an exogenous and anecdotal change in the level of mandatory information. Under the changed institutional environment, corporate governance can work differently at managerial level of real earnings management. Accordingly, we divide the sample into Pre-IFRS and Post-IFRS sub-samples and analyses H1-H3 in each subsample.

1258   *The Clute Institute*

Table 8 – Table 10 present the results from the regression model in equation (1) that predicts whether board independence (board size) is associated with $|AbOCF_{it}|$, $|AbPRD_{it}|$, and $|AbSGA_{it}|$ according to each subsample, respectively.

Cosistent with our prediction, board independence (board size) does not constrain abnormal cash flows from operations, abnormal production costs, and abnormal discretionary expenses in Post-IFRS sub-samples only.

Table 8. Results on abnormal cash flows from operations:
Regression analyses considering before and after adoption of K-IFRS (H-1)

$$|AbOCF_{it}| = \beta_0 + \beta_1 OUTBOARD_{it} \ (or \ BOARDSIZE) + \beta_2 SIZE_{it} + \beta_3 MTB_{it} + \beta_4 LEV_{it} + \beta_5 ROA_{it} + \beta_6 LOSSDUM_{it}$$
$$+\beta_7 OWN_{it} + \beta_8 FOR_{it} + \sum YD + \sum ID + \varepsilon_{it} \tag{1}$$

Variables	Predicted Sign	Predicted Sign			
		Pre-IFRS (2009-2010)		Post-IFRS (2001-2014)	
		Coefficient	t-value	Coefficient	t-value
INTERCEPT		1.108**	2.420	1.148***	5.310
OUTBOARD	(+/-)	-0.012	-0.070	0.217**	2.380
BOARDSIZE					
SIZE	(-)	-0.028	-1.580	-0.031***	-3.600
MTB	(-)	0.057*	1.790	0.015***	2.650
LEV	(+)	0.065	0.460	0.139**	2.280
ROA	(-)	0.516	1.360	0.507***	3.140
LOSSDUM	(+)	0.068	0.910	0.037	1.190
OWN	(+)	0.001	0.510	0.001	-0.110
FOR	(-)	0.001	0.480	0.003***	3.360
YD		yes		yes	
ID		yes		yes	
No.		479		2,086	
F-VALUE		1.77**		2.36***	
ADJR-SQ		3.82%		1.69%	

(Table 8 continued)

Variables	Predicted Sign	Independent Variable BOARDSIZE			
		Pre-IFRS (2009-2010)		Post-IFRS (2001-2014)	
		Coefficient	t-value	Coefficient	t-value
INTERCEPT		1.149**	2.460	1.041***	4.860
OUTBOARD					
BOARDSIZE	(+/-)	-0.405	-0.120	4.068**	2.280
SIZE	(-)	-0.029*	-1.650	-0.026***	-3.150
MTB	(-)	0.059*	1.860	0.015***	2.670
LEV	(+)	0.065	0.460	0.141**	2.310
ROA	(-)	0.509	1.350	0.503***	3.120
LOSSDUM	(+)	0.069	0.910	0.036	1.180
OWN	(+)	0.001	0.500	0.001	-0.100
FOR	(-)	0.001	0.450	0.003***	3.370
YD		yes		yes	
ID		yes		yes	
No.		479		2,086	
F-VALUE		1.83**		2.46***	
ADJR-SQ		3.95%		1.61%	

1) Please refer to Table 3 for variable definitions.
2) ***,**, * denote significance at the 1%, 5%, and 10% levels, respectively (two-tailed).
   Table 9. Results on Abnormal production costs: Regression analyses considering before and after adoption of K-IFRS (H-2)

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$$|AbPRD_{it}| = \beta_0 + \beta_1 OUTBOARD_{it} \, (or \, BOARDSIZE) + \beta_2 SIZE_{it} + \beta_3 MTB_{it} + \beta_4 LEV_{it} + \beta_5 ROA_{it} + \beta_6 LOSSDUM_{it}$$
$$+ \beta_7 OWN_{it} + \beta_8 FOR_{it} + \sum YD + \sum ID + \varepsilon_{it} \tag{1}$$

Variables	Predicted Sign	Predicted Sign			
		Pre-IFRS (2009-2010)		Post-IFRS (2001-2014)	
		Coefficient	t-value	Coefficient	t-value
INTERCEPT		1.463***	3.360	0.953***	4.660
OUTBOARD	(+/-)	0.095	0.600	0.267***	3.090
BOARDSIZE					
SIZE	(-)	-0.045	-2.660	-0.027***	-3.270
MTB	(-)	0.004	0.130	0.002	0.330
LEV	(+)	0.299**	2.220	0.240***	4.150
ROA	(-)	1.104***	3.070	0.486***	3.180
LOSSDUM	(+)	0.029	0.410	-0.024	-0.820
OWN	(+)	0.001	0.040	0.001	0.340
FOR	(-)	0.001	-0.120	0.004***	4.500
YD		yes		yes	
ID		yes		yes	
No.		479		2,086	
F-VALUE		1.73**		7.30***	
ADJ R-SQ		3.63%		7.38%	

(Table 9 continued)

Variables	Predicted Sign	Independent Variable BOARDSIZE			
		Pre-IFRS (2009-2010)		Post-IFRS (2001-2014)	
		Coefficient	t-value	Coefficient	t-value
INTERCEPT		1.443***	3.250	0.749***	3.690
OUTBOARD					
BOARDSIZE	(+/-)	1.590	0.500	5.182***	3.070
SIZE	(-)	-0.044***	-2.610	-0.019**	-2.470
MTB	(-)	0.006	0.200	0.002	0.390
LEV	(+)	0.299**	2.220	0.234***	4.050
ROA	(-)	1.099***	3.060	0.469***	3.070
LOSSDUM	(+)	0.029	0.400	-0.024	-0.830
OWN	(+)	0.001	0.020	0.001	0.360
FOR	(-)	0.001	-0.150	0.004***	4.070
YD		yes		yes	
ID		yes		yes	
No.		479		2,086	
F-VALUE		1.78**		7.97***	
ADJ R-SQ		3.74%		7.24%	

1) Please refer to Table 3 for variable definitions.
2) ***,**, * denote significance at the 1%, 5%, and 10% levels, respectively (two-tailed).

Table 10. Results on Abnormal discretionary expenses:
Regression analyses considering before and after adoption of K-IFRS (H-3)

$$|AbSGA_{it}| = \beta_0 + \beta_1 OUTBOARD_{it} \ (or \ BOARDSIZE) + \beta_2 SIZE_{it} + \beta_3 MTB_{it} + \beta_4 LEV_{it} + \beta_5 ROA_{it} + \beta_6 LOSSDUM_{it}$$
$$+ \beta_7 OWN_{it} + \beta_8 FOR_{it} + \sum YD + \sum ID + \varepsilon_{it} \quad (1)$$

Variables	Predicted Sign	Predicted Sign			
		Pre-IFRS (2009-2010)		Post-IFRS (2001-2014)	
		Coefficient	t-value	Coefficient	t-value
INTERCEPT		1.143***	3.490	1.285***	6.570
OUTBOARD	(+/-)	-0.022	-0.150	0.264***	3.200
BOARDSIZE					
SIZE	(-)	-0.038**	-2.410	-0.038***	-4.810
MTB	(-)	0.004	0.130	0.005	1.020
LEV	(+)	0.174	1.390	0.194***	3.510
ROA	(-)	0.228	0.680	0.500***	3.420
LOSSDUM	(+)	-0.068	-1.020	-0.038	-1.370
OWN	(+)	0.001	0.360	0.001	0.380
FOR	(-)	-0.002	-0.980	0.001	0.980
YD		yes		yes	
ID		yes		yes	
No.		479		2,086	
F-VALUE		4.36**		12.75***	
ADJ R-SQ		14.83%		12.94%	

(Table 10 continued)

Variables	Predicted Sign	Independent Variable BOARDSIZE			
		Pre-IFRS (2009-2010)		Post-IFRS (2001-2014)	
		Coefficient	t-value	Coefficient	t-value
INTERCEPT		1.505***	3.630	1.075***	5.550
OUTBOARD					
BOARDSIZE	(+/-)	-0.389	-0.130	5.173***	3.210
SIZE	(-)	-0.040**	-2.560	-0.030***	-4.070
MTB	(-)	0.009	0.320	0.005	1.070
LEV	(+)	0.172	1.370	0.188***	3.400
ROA	(-)	0.215	0.640	0.484***	3.320
LOSSDUM	(+)	-0.067	-1.010	-0.039	-1.400
OWN	(+)	0.001	0.320	0.001	0.390
FOR	(-)	-0.002	-1.100	0.001	0.950
YD		yes		yes	
ID		yes		yes	
No.		479		2,086	
F-VALUE		4.33**		14.16***	
ADJ R-SQ		14.21%		12.83%	

1) Please refer to Table 3 for variable definitions.
2) ***,**, * denote significance at the 1%, 5%, and 10% levels, respectively (two-tailed).

5. CONCLUSION

We empirically examine the association between the characteristics of the board of directors and real earnings management and then investigate the extent to which this association is affected by characteristics of the board of directors according to before or after Korea adopted International Financial Reporting Standards (IFRS) in 2011. Real earnings management is measured by Roychowdhury (2006). Additionally, the characteristics of the board of directors is used by a board independence (the proportion of independent directors on the board) and board size.

The empirical results of this study are as follows. First, the relation between board independence (board size) and the absolute value of abnormal cash flows from operations, absolute value of abnormal production costs, and the absolute value of abnormal discretionary expenses is statistically significant and positive (+), respectively, suggesting that the board independence (or boardsize) does not reduce real earnings management.

This study contributes to accounting research as it directly tests the association between the characteristics of the board of directors and real earnings management in Korea, providing empirical support that a board independence (board size) does not effectively reduce real earnings management.

The limitations of this study are as follows. First, we might have not considered omitted other variables. Second, we might not have fully considered other proxies for the characteristics of the board of directors.

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