The Effects of Macroeconomic Business Cycle on Earnings Management: Evidence from Korean Companies

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Abstract: This paper examines the relationship between macroeconomic business cycles and earnings management, specifically, whether firms make more earnings management during the boom period of the macroeconomic business cycle or during contraction period of the business cycle. Earnings management is activities of getting certain benefits by involving in external financial reporting or confusing certain stakeholders through adjustments to accruals without involvement of cash flows or with cash flows through real activities. In examining the relationship, we used the models of Kothari et al. (2005) and Cohen et al. (2008) for accrual-based earnings management (AEM) and real activities earnings management (REM), respectively, for earnings management proxies. We also used composite economic indicators, real GDP growth and BSI for proxies of macroeconomic business cycles. Using a data set for Korean companies listed from 2005 to 2017, we developed and tested a panel regression model with fixed effects to capture the relationship. The results show that companies perform earnings management more often during economic booms than during contraction periods. This is interpreted that firms try to avoid disclosure of lower net income compared to the expectations of analysts or average net income of companies in the same industry. This study is giving insights to external auditors when they perform external audit on the firms' financial statement, they need to spend more attention on the firms' earning management behaviors during boom period rather than contract period. It applies the same to analysts of securities.

Keywords: Earnings Management, Business Cycle, Detrended real GDP Growth Rate, Manufacturing Industry Average Utilization Rate, Unemployment Rate

1. Introduction

In this paper, we study the relationship between earnings management and macroeconomic business cycles. Earnings management is the manipulation of the process of financial reporting to take an advantage from the act [1]. Earnings management is activities of getting certain benefits by involving in external financial reporting or confusing certain stakeholders through adjustments to accruals without involvement of cash flows or with cash flows through real activities. According to Schipper [2], the motivation of earnings management can be considered in many ways. The first one is carrying out income smoothing [3]. A firm can prefer for presenting more stable earnings because it implies a lower risk and a higher market value of the firm. The second possible motivation is the need to maintain the levels of some financial ratios to meet debt covenant requirements. In last, a firm tries to beat analyst targets.

The researches on the act of earnings management have been centered on the relationship between the decision of earnings management and the financial condition of an individual company, including relationships between earnings management and key financial indicator, business sizes, industry size and other. However, a company's tendency to use earnings management might depend not only on the financial variables shown in the

financial statement of the company, but also on the macroeconomic environment. For example, in an economic recession, firms may encounter unfavorable financial market conditions. In this case, the companies are motivated to appeal investors or analysts that their financial structures are sound, because, under the same conditions in the financial statements, they might be exposed to a higher risk of stock price decline or difficult to borrow working capitals from banks.

In respect with the macroeconomic business cycle, there can be a conflict in different motivations of earnings management. One theory is the counter-cyclical earnings management. Companies are more likely to apply earnings management during a recession period because they do not want to show negative earnings to investors and creditors or because they want to appeal the stability of income process and financial condition. Another theory is the pro-cyclical adjustment of earnings management. Companies could perform earnings management more often during a boom period to avoid disclosing net incomes lower than expected by analysts or lower than the average net income of companies in the same industry. Since expectations of analyst and the average net income of other companies increase in boom periods, a firm could more heavily perform earnings management in a boom period compared to be in a recession period, if the financial statement of the firm is same. If the latter motivation is dominant over the former motivation, the tendency of earnings management would be pro-cyclical to the phase of the macroeconomic business cycle.

Butthere is no consensus on whether earnings management is pro-cyclical or counter-cyclical. According to Conrad et al. [4], companies will perform more upward earnings management during periods of economic prosperity based on the premise that investors react more negatively to poor performance reports during such times. This provides greater incentive to companies to apply upward earnings management to avoid poor performance reports. Using data on US companies from 1984-2006, Cohen and Zarowin [5] indicated that earnings management

is positively associated with the overall market level. Ze-To [6] conducted a study on earnings management and accrual anomaly across market states and business cycles using companies listed in NYSE and AMEX from 1989 to 2007. Study results revealed that managers use a higher fraction of accruals to boost company earnings under UP markets to avoid drastic impacts on stock prices. Wang et al. [7] conducted research on the relationship between earnings management and business cycles using Chinese company data from 2001 to 2011. Their studies showed that Chinese companies perform more earnings management during growth stages of a macroeconomy, which reflects a pro-cyclical tendency. They also showed that companies are more likely to perform earnings management when they perceive their earnings level to be lower than the average industry earnings level. Unlike the three studies referenced, which illustrate a pro-cyclical tendency for the relationship between earnings management and business cycles, other studies show a negative relationship between earnings management and business. Jahmani et al. [8] investigated earnings management during the recession and recovery periods from 2008 to 2013 for S&P 500 companies. Using the modified Jones model, the results suggest that they managed their earnings much more in the recession period, which may be attributed to the desire to avoid or mitigate the negative consequences of experiencing deep losses. Paulo and Mota [9] showed that Brazilian companies made more accrual based earnings management during recession periods using data of Brazilian companies from 2000 to 2015. Park [10] examined the relationship between investor sentiment and earnings management using 2003-2011 Korean Securities Market data. The study showed that Korean companies tend to implement more upward earnings management to meet analyst forecasts, to sustain prior year performance, and to show a positive profit during pessimistic sentiment periods than they do during optimistic periods. Kang [11] analyzed the effects of economic conditions, investor sentiment, and foreign investors on real earnings management for Korean companies using 2005-2012 data. The study showed that foreign investors had a negative relationship to real earnings management when economic conditions and investor sentiment are positive.

Our study has several key differences from the previous studies. The first is analysis tool. While previous studies used pooled OLS, we used the panel regression method, which is a better tool due that all firm-specific unobserved time-invariant effects could be controlled. In this kind of analysis, we have to consider that each company's financial condition can be affected by its own characteristic or situation. Since many of those factors are basically unobservable, the pooled OLS model can be exposed to an omitted variable bias. We can efficiently avoid this problem by using a fixed effect model. The second is we used both of accrual based- earnings management (AEM) and real activities earnings Management (REM) while most previous studies used AEM only. So we extended studies earnings management activities from AEM to REM. AEM/REM.Third key difference is that we conduct the same tests into further details on manufacturing and non-manufacturing firms separately. By looking at manufacturing and non-manufacturing level, we can see how macroeconomic business cycles impact on earnings management of manufacturing and non-manufacturing. The last one is that we use more extensive dataset, spanning thirteen years (2005-2017) compared to the previous studies whose data span is seven to eight years. The data on financial statement of companies is obtained from samples of both KOSPI and KOSDAQ Korean listed companies, excluding financial companies, from 2004 to 2017. Macroeconomic business cycles are measured in several ways; the composite economic index of coincident indicators, the growth rate in real GDP, the detrended growth rate in real GDP, and the business survey index (BSI).

Our study shows the tendency of earnings management is positively affected by macroeconomic business cycles after controlling for the unobservable firm-level factors. It implies that companies perform earnings management more often during economic booms than during contraction periods. This pro-cyclicality of earnings management can be interpreted that the firms try to avoid disclosure of lower net income compared to the expectations of analysts or average net income of companies in the same industry, which support the results of Cohen and Zarowin [5] and Wang et al. [7].

This paper is structured as follows. Section 2 outlines a review of the literature on macroeconomic conditions and earnings management. Section 3 presents the research methodology, and Section 4 outlines the descriptive statistics of the variables used in this work and the results of the empirical test. Section 5 concludes the paper.

2. Literature Review

While conventional studies have been conducted on relationships among firm-level variables, a growing volume of studies have examined the role of macroeconomic environments on an individual company's financial and business behaviors. For example, we could find the studies on business cycle and investor sentiment [12], business cycle and capital raising capability [13], business cycle and capital structure choice [14] and business cycle and expected bond and stock returns [15].

Studies on the relationship between earnings management and business cycles are increasing. Earnings management has been defined differently by researchers. Healy and Wahlen [1] said that earnings management occurs when "managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers. Schipper [2] argued four motivations for earnings management. Out of the four motivations, compensation contract motivation and capital market motivation are most closely related to earnings management. Capital market motivation refers to increasing short-term share prices to acquire a high IPO price or decreasing net income to support a cheap buy-out. Compensation

contract motivation refers to using earnings management to earn a higher bonus or to obtain an employment extension. Two methods of earnings management have been used, namely, AEM and REM. AEM is accomplished by adjusting accruals in accounting ledgers without cash flow involvement, while REM is accomplished by decreasing actual expenses and cash flows or managing production costs [16]. Cohen et al. [4] showed that after the Sarbanes–Oxley Act was passed, companies shifted from using AEM to using REM. According to Zang [17], managers incorporate aspects of the two earnings management methods based on relative costs, and they use REM and AEM as substitutes for each other. Studies on the REM method have also increased.

Cohen and Zarowin[5] performed a study on the relationship between earnings management and business cycles, based on a study by Conrad et al. [18] in which the researchers concluded that investors respond more negatively to poor performance news during periods of economic prosperity than during contraction periods. Cohen and Zarowin predicted that companies will implement more upward earnings management during positive financial periods, as the firms have a greater incentive to avoid poor performance news. The analysis by Conrad et al. [18] was in line with the Prospect Theory, which proposes that people's sensitivity to 'gain' and 'loss' are asymmetrical, and that the pain from loss is much greater than the happiness from gain, with the decision-maker's 'loss aversion' behavior acting as a concrete manifestation [19] and [7]. Cohen and Zarowin's study indicated that earnings management was applied more often during good economic times to avoid a penalty response from investors for reports of poor performance during such periods. Ze-To [6] conducted a study on earnings management and accrual anomaly across market states and business cycles using companies listed in NYSE and AMEX from 1989 to 2007. Results from the study revealed that managers use a higher fraction of accruals to boost company earnings under financially healthy markets to avoid drastic impacts on stock prices. Wang et al. [7] researched the relationship between earnings management and business cycles using Chinese company data from 2001 to 2011. Results showed that Chinese companies perform earnings management more often under growth stages of a macroeconomy, which is a pro-cyclical tendency. In addition, they also showed that companies implement earnings management more often when they perceive their earnings level to be lower than the average industry earnings level. Unlike the three studies referenced above showing a pro-cyclical tendency for the relationship between earnings management and business cycles, other studies show a negative relationship between earnings management and business cycles. Park [10] conducted a study on the relationship between investor sentiment and earnings management using Korean Securities Market data from 2003 to 2011. The study showed that Korean companies tend to make more upward earnings management to meet analyst forecasts, to sustain prior year performance, and to show a positive profit during pessimistic sentiment periods than during optimistic periods. Kang [11] studied the effects of business cycle, investor sentiment, and foreign investors on real earnings management for Korean companies using 2005 to 2012 data. The study showed that foreign investors had a negative relationship to real earnings management when the business cycle and investor sentiment is good.

3. Research Methodology

3.1. Proxies For Earnings Management

3.1.1. Measuring AEM

In this study we used discretionary accrual as a proxy for AEM. AEM represents unexplained accruals, which are determined by subtracting estimated normal accruals from total accruals. Kothari et al. [20] developed a performance-matched AEM measure using the revised Jones model to control for performance effects when estimating AEM. The author also used ROA as a performance variable to control for the overestimation of AEM. In the current study, we calculated the coefficients of total accruals using equation (1) and then estimated AEM by subtracting normal accruals from total accruals using equation (2). In addition, we controlled for the effects of firm-level characteristics using the fixed-effect panel regression model. With the firm-level fixed effect, we could reduce the possibility of disturbances from unobserved time-invariant factors affecting the earnings management decision.

$$\frac{TA_{i,t}}{A_{i,t-1}} = \alpha_0 + \beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{\Delta S_{i,t} - \Delta AR_{i,t}}{A_{i,t-1}} + \beta_3 \frac{PPE_{i,t}}{A_{i,t-1}} + \beta_4 ROA_{i,t} + u_i + \varepsilon_{i,t} \quad (1)$$

$$AEM_{i,t} \equiv \hat{\varepsilon}_{i,t} = \frac{TA_{i,t}}{A_{i,t-1}} - \hat{\alpha}_0 - \hat{\beta}_1 \frac{1}{A_{i,t-1}} - \hat{\beta}_2 \frac{\Delta S_{i,t} - \Delta AR_{i,t}}{A_{i,t-1}} - \hat{\beta}_3 \frac{PPE_{i,t}}{A_{i,t-1}} - \hat{\beta}_4 ROA_{i,t} - \hat{u}_i \quad (2)$$

$TA_{i,t}$: Total accrual (Net Income – CFO) of each firm i in period t

$AEM_{i,t}$: Accrual-based earnings management of each firm i in period t

A_{t-1} : Total assets of each firm i in period t-1

$\Delta S_{i,t}$: Sales change of each firm i in period t

$\Delta AR_{i,t}$: Accounts receivable change of each firm i in period t

$PPE_{i,t}$: Plant, properties and equipment (net) of each firm i in period t

$ROA_{i,t}$: Return on total assets ($\equiv \frac{\text{Net Income}_t}{A_{t-1}}$) of each firm i in period t

$u_{i,t}$: Fixed-effect terms for each firm i in period t

ε_t : Error-term

In measuring AEM, we controlled the credit sales impact by subtracting it from sales change and the financial performance of the company by subtracting ROA from the model because they potential could impact AEM.

3.1.2. Measuring REM

We used Cohen's model for REM. Cohen et al. [4] developed an integrated REM measure that is similar to equation (3). In this definition, the combination of Abnormal Cash Flows from Operation (ACFO), Abnormal Production Costs (APC), and Abnormal Selling, General and Administrative Expense (ASGA) determine the extent of REM implemented in corporations. ACFO, APC, and ASGA were developed by Roychowdhury [21]. Roychowdhury assumed that normal cash flows from operation, production costs and selling, general and administrative expense are in linear relationship with sales and sales increase during the year. So, he defined cash flows from operations, production costs and selling, general and administrative expenses exceeding the normal portion as ACFO, APC and ASGA.The signs of ACFO and ASGA are opposite those of APC. REM occurs when ACFO and ASGA decrease, but it increases when APC decreases.

$$\mathrm{REM}_{i,t} \equiv \frac{1}{3}(\mathrm{APC}_{i,t} - \mathrm{ACFO}_{i,t} - \mathrm{ASGA}_{i,t}) \qquad (3)$$

Roychowdhury (2006) developed a representative REM model, which consists of ACFO, APC, and abnormal discretionary expenses. It also represents abnormal management activities as a measure of earnings management.

ACFO activities include price discounts and increases in credit sales, which are achieved in several ways, such as loosening credit controls. ACFO measures abnormal cash flows by comparing increases in sales and cash flows. Roychowdhury developed equations (4) and (5) using Dechow et al. [22], which assumes that normal cash flow from operations has a linear relationship with the change in sales. He estimated the coefficient of equation (4) and calculated ACFO by subtracting normal operations cash flow from total operations cash flow, as in equation (5).

$$\frac{\mathrm{CFO}_{i,t}}{\mathrm{A}_{i,t-1}} = \alpha_0 + \beta_1 \frac{1}{\mathrm{A}_{i,t-1}} + \beta_2 \frac{\mathrm{S}_{i,t}}{\mathrm{A}_{i,t-1}} + \beta_3 \frac{\Delta \mathrm{S}_{i,t}}{\mathrm{A}_{i,t-1}} + \mathrm{u}_i + \varepsilon_{i,t} \qquad (4)$$

$$\mathrm{ACFO}_{i,t} = \frac{\mathrm{CFO}_{i,t}}{\mathrm{A}_{i,t-1}} - \hat{\alpha}_0 - \hat{\beta}_1 \frac{1}{\mathrm{A}_{i,t-1}} - \hat{\beta}_2 \frac{\mathrm{S}_{i,t}}{\mathrm{A}_{i,t-1}} - \hat{\beta}_3 \frac{\Delta \mathrm{S}_{i,t}}{\mathrm{A}_{i,t-1}} - \hat{\mathrm{u}}_i \qquad (5)$$

$\mathrm{CFO}_{i,t}$: Accrual cash flow from operations of each firm i in period t

$\mathrm{ACFO}_{i,t}$: Abnormal cash flow from operations of each firm i in period t

$\mathrm{S}_{i,t}$: Sales of each firm i in period t

$\Delta \mathrm{S}_{i,t}$: Sales change of each firm i in period t

$\mathrm{A}_{i,t-1}$: Total assets of each firm i in period t-1

$\mathrm{u}_{i,t}$: Fixed-effect terms for each firm i in period t

ε_t : Error-term

APC can be examined by determining whether a corporation has increased or decreased its production by adjusting the costs of goods sold in order to engage in earnings management. Roychowdhury (2006) used an equation similar to (6) to estimate the coefficient and then estimated total production costs on the basis of the relationship between changes in normal sales and production costs. Using equation (7), he then calculated APC by subtracting normal production costs from total production costs.

$$\frac{\mathrm{PC}_{i,t}}{\mathrm{A}_{i,t-1}} = \alpha_0 + \beta_1 \frac{1}{\mathrm{A}_{i,t-1}} + \beta_2 \frac{\mathrm{S}_{i,t}}{\mathrm{A}_{i,t-1}} + \beta_3 \frac{\Delta \mathrm{S}_{i,t}}{\mathrm{A}_{i,t-1}} + \beta_4 \frac{\Delta \mathrm{S}_{i,t-1}}{\mathrm{A}_{i,t-1}} + \mathrm{u}_i + \varepsilon_{i,t} \quad (6)$$

$$\mathrm{APC}_{i,t} = \frac{\mathrm{PC}_{i,t}}{\mathrm{A}_{i,t-1}} - \hat{\alpha}_0 - \hat{\beta}_1 \frac{1}{\mathrm{A}_{i,t-1}} - \hat{\beta}_2 \frac{\mathrm{S}_{i,t}}{\mathrm{A}_{i,t-1}} - \hat{\beta}_3 \frac{\Delta \mathrm{S}_{i,t}}{\mathrm{A}_{i,t-1}} - \hat{\beta}_4 \frac{\Delta \mathrm{S}_{i,t-1}}{\mathrm{A}_{i,t-1}} - \hat{\mathrm{u}}_i \qquad (7)$$

$\mathrm{PC}_{i,t}$: Actual production costs (COGS + Inventory Change) of each firm i in period t

$\mathrm{APC}_{i,t}$: Abnormal production costs of each firm i in period t

$\mathrm{S}_{i,t}$: Sales of each firm i in period t

$\Delta \mathrm{S}_{i,t}$: Sales change of each firm i in period t

$\mathrm{A}_{i,t-1}$: Total assets of each firm i in period t-1

$\mathrm{u}_{i,t}$: Fixed-effect terms for each firm i in period t

ε_t : Error-term

ASGA measures the effects of REM on sales, general, and administrative expenses. Managers tend to increase or decrease these discretionary expenses to engage in earnings management. Roychowdhury [21] estimated normal discretionary expenses (SGA) by using equation (8) on the basis of a linear relationship with sales. He then calculated ASGA by subtracting normal SGA from total SGA using equation (9).

$$\frac{\mathrm{SGA}_{i,t}}{\mathrm{A}_{i,t-1}} = \alpha_0 + \beta_1 \frac{1}{\mathrm{A}_{i,t-1}} + \beta_2 \frac{\mathrm{S}_{i,t-1}}{\mathrm{A}_{i,t-1}} + \mathrm{u}_i + \varepsilon_{i,t} \quad (8)$$

$$\mathrm{ASGA}_{i,t} = \frac{\mathrm{SGA}_{i,t}}{\mathrm{A}_{i,t-1}} - \hat{\alpha}_0 - \hat{\beta}_1 \frac{1}{\mathrm{A}_{i,t-1}} - \hat{\beta}_2 \frac{\mathrm{S}_{i,t-1}}{\mathrm{A}_{i,t-1}} - \hat{\mathrm{u}}_i \qquad (9)$$

3.2. Research Model

In this paper, we examined the pattern of a firm's earnings management corresponding to macroeconomic business cycles. The frame of our empirical tests is designed using the panel regression model with fixed effect as follows:

$$\mathrm{EM}_{i,t} = \beta_0 + \beta_1 Y_t + \mathrm{Z}_{it}\beta + \mathrm{u}_i + \varepsilon_t \quad (10)$$

$\mathrm{EM}_{i,t}$: The proxies of earnings management for each firm i in period t (measured by AEM or REM)

Y_t : A macroeconomic variable representing the phase in a real business cycle

$Z_{i,t}$: A 1 × j regressor matrix for firm-level control variables
$u_{i,t}$: Fixed-effect terms for each firm i in period t
ε_t : Error-term

Based on the features of fixed-effect panel regression, we can control the effects of unobserved time-invariant firm-level characteristics affecting earnings management decisions. Since the tendency of a firm's earnings management could be related to observable variables, such as the volume of total sales, and also affected by unobservable or un-codified characteristics of the firm, it could be exposed to the omitted variable bias problem if we conduct a typical OLS regression. This type of distortion can be substantially reduced in the panel regression framework. Basically, effects from the time-invariant factors relevant to the dependent variable are completely captured by the firm-level fixed-effectu_i. It is sufficient to consider some major time-variant characteristics as the model's explicit control variables.

In the model, the dependent variable $EM_{i,t}$ denotes earnings management. We apply two variables, AEM and REM, to the position of dependent variable. As mentioned in the previous section, AEM indicates the accrual earnings management measured based on Kothari et al. [20]. REM indicates the real earnings management, and the method of measurement is based on Roychowdhury [21] and Cohen et al. [4]. β_0 is the constant term. In a fixed-effect model, without further constraints, parameters for constant and fixed effects do not have a unique solution. We estimated the model under the assumption $\sum u_i = 0$, which is commonly used in this case. Y_t indicates the phase of the macroeconomic business cycle. The time variant 1×j regressor matrix for firm-level control variables is Z_{it}, where j is the number of control variables. In this model, we controlled the size of total assets ($SIZE_{i,t}$), liability-to-equity ratio ($LEV_{i,t}$), return on total assets ($ROA_{i,t}$), total asset growth ($GRW_{i,t}$), prior-year total accruals ($TA_{i,t}$), and net losses ($LOSS_{i,t}$) (Becker et al. 1998; Ashbaugh et al. 2003; DeFond and Jiambalvo 1994; Kaszkin 1999; Kothari et al. 2005, etc.). The unobserved time-invariant effect for each individual firm is u_i. Finally, $\varepsilon_{i,t}$ is the error-term of the equation.

3.3. Definition And Data

3.3.1. Measuring Business Cycle

To measure the effect of macroeconomic business cycles on earnings management, we first must capture the business cycle phases. However, the macroeconomic environmental conditions could depend on the variable used, so it is better to use several variables and compare the results obtained from applying those. We considered four variables that are widely used in the study of macroeconomics.

First, we used the composite economic index[1](CI), which is a measurement of current economic conditions that examines overall economic change using major economic indices, such as the industrial production, value of construction completed, retail sales, employment size, domestic shipment index, and imports. The composite economic index of coincident indicators can be decomposed into two parts: trend component and cyclical component. In this context, we used the cyclical component of the composite index to measure the phase of business cycle. A positive sign of index indicates that the economy goes through a boom period. This index has been published monthly by Statistics Korea (the official statistics institute of the Korean government). We archived the data from the official webpage of Statistics Korea.

Second, we considered the annual growth rate of real gross domestic product, RGDP. That might be the most representative real variable for measuring phases of the business cycle. When the real Gross Domestic Product (GDP) growth rate in a year is relatively higher (or lower) than that of other years, it is commonly considered that the economy is in a boom period (or a contraction).

Third, we considered the de-trended version of the annual growth rate of real GDP, ($\widetilde{RGDP}$). The economic growth rate contains not only the cyclical factors (business cycles) but also the trend factors (long-term balanced path in economic growth). Therefore, if there is a substantial change in the long-term trend of economic growth within the period, the result from the empirical test applying the raw real GDP growth rate data might be dubious. In order to eliminate that risk, we also applied the de-trended real GDP growth rate into our test. We used the OLS model to regress real GDP growth, which contains only a time variable and the constant term as its independent variables. The de-trended real GDP could be obtained from the residual of the regression.

Last, the Business Survey Index (BSI) is considered. This index measures business conditions for the current month and the forecast for conditions in the subsequent month, obtained through surveys of entrepreneurs' based on their perceptions. We used the survey index for the current month. Fifteen items, including business conditions, sales, and profitability, were surveyed from more than 3,000 corporations, selected using a stratified systematic sampling of the Korean Standard Industrial Classification (KSIC). The survey responses are translated into indices in accordance with the following formula:

$$\text{BSI} = \frac{number\ of\ companies\ responding\ above\ normal - number\ of\ companies\ responding\ below\ normal}{total\ number\ of\ companies} \times 100 + 100$$

The BSI benchmark is 100, which indicates that the number of companies responding positively was equal to the number responding negatively; a reading above (below) 100 indicates the number of firms responding

positively exceeded (was less than) the number responding negatively. Real GDP growth and the BSI could be achieved from the online database of the Bank of Korea. Since the firm-level panel data is annual, the measurements for business cycles are also annualized to match frequencies.

3.3.2. Other Variable

As mentioned previously, in the panel regression framework, it is not necessary to control for all firm-level characteristics to obtain the estimator. The time-invariant characteristics, which can affect the dependent variable, can be completely absorbed by the firm-level fixed effect. Therefore, in this study, we only considered a portion of major time-variant factors as control variables. To obtain firm-level panel data, we used the Korean credit rating agency KIS (Korea Investors Service) database, or KISVALUE database, which provides micro-data on financial statements, stock quotes, stock valuation, and capital changes. We obtained firm-level data from financial statements from 2005 to 2017 for all companies listed on KOSPI and KOSDAQ. We used various control variables adopted in prior research to reduce statistical error and increase accuracy of statistical inferences. The control variables used in this research were corporation size (SIZE), liability-to-equity ratio (LEV), return on total assets (ROA), total asset growth (GRW), prior-year total accruals (TA), and net losses (LOSS) (Becker et al. 1998; Ashbaugh et al. 2003; DeFond and Jiambalvo 1994; Kaszkin 1999; Kothari et al. 2005, etc.). Corporation size is measured using the natural logarithm of total assets; return on total assets is a division of net income; total asset growth is a division of final total; prior-year total accrual is the net income in a previous year minus the operating cash flow in that year. For net income and net loss, we used dummy variables, namely, 1 for net loss and 0 for net income.

In order to avoid potential distortions in the results, we removed the outliers from the samples. For example, it is possible that the leverage of some firms has an extreme value when its equity is squeezed. In a linear regression framework, such outlier observations are not desirable. The same outlier problems can also occur for other variables, such as return on total assets (ROA), total asset growth (GRW), and prior-year total accruals (TA), so we eliminated the highest and lowest 1% samples from the observations for all control variables and the dependent variables in measuring AEM and REM.

4. Results of Empirical Study

4.1. Descriptive Statistics

Table 1 presents the descriptive statistics of the firm-level variables over the sample period (2005-2017). The means of AEM and REM are zero, since the values are estimated by subtracting expected values, which are obtained from the regression and actual values. We checked that the means of the proxies are all zero, similar to what was done in previous studies.

The mean and median of AEM and REM as earnings management proxies are zeros (rounded to the third decimal place). The control variables are company size, leverage, return on total assets, total asset growth, prior-year total accruals, and net losses. Company sizes were measured using the natural logarithm of total assets. Since net losses (LOSS) is a logistic variable, which means that about 17% of the observations reflect net losses.

Table 1. Descriptive Statistics for the variables

	Mean	**Median**	**Standard Deviation**	**Min**	**Max**
AEM	0	0	0.071	-0.442	0.406
REM	0	0	0.046	-0.388	0.304
SIZE	25.56	25.36	1.506	20.474	32.794
LEV	0.89	0.66	0.828	0.012	8.045
ROA	0.04	0.04	0.089	-0.577	0.55
GRW	0.12	0.07	0.225	-0.409	2.339
TA	-0.02	-0.02	0.089	-0.487	0.419
LOSS	0.17	0	0.373	0	1

AEM : Accrual-based Earnings Management
REM : Integrated Real Earnings Management
SIZE : Logarithm of Total Assets
LEV : Liability to Asset Ratio
ROA : Return on Total Assets($\equiv \frac{\text{Net Income}_t}{A_{t-1}}$)
GRW : Total Assets Growth rate
TA : Total Accrual (Net Income – CFO) to Prior year Total Assets
LOSS : A logistic variable for net loss (1 if net loss is positive, 0 otherwise)

4.2. Regression Analyses Results

4.2.1. Main Results

Tables 2-1 and 2-2 present the empirical testing results for AEM and REM, respectively. The first column shows the results of the model that includes only control variables and fixed effect. The second through fifth columns show the effect of the business cycle on earnings management. We applied several measurements to capture the phase of the business cycle: the composite economic index, the real GDP growth, the detrended real GDP growth, and the BSI. If all measurements properly capture the phase of the business cycle, the signs of the coefficients of the measurements should be same.

In short, the results show that the effect of the business cycle on a company's earnings management decision is significantly positive. As shown in Tables 2-1 and 2-2, we found that the null-hypothesis (typical 0-effect hypothesis) for the coefficients of the composite economic index, real GDP growth, detrended real GDP growth, and BSI were strongly rejected, even in using 0.1% criteria. the signs of the effect were consistently positive. As shown in the second through fourth columns in both tables, the coefficients for all business cycle indicators are positive. We also found that the effect of the business cycle on AEM and REM are same. The results strongly support the position that firms tend to implement earnings management more often during good financial periods and less often during contraction periods.

The effects of control variables identified in this study seem consistent with previous studies. The results indicate that all control variables (cash flow from operations, total assets, leverage, return on total assets, total asset growth rate, total accrual, and net loss) are significant. For AEM, the effect of cash flow from operations, total assets, and net loss are negative. For example, the coefficient of cash flow from operations (on total assets) is slightly larger than -1. The liability to asset ratio, the return on total assets, the total asset growth rate, and the total accrual positively affect the tendency to use earnings management. For REM, the effects of total asset size and return on assets are opposite those for AEM. For example, the coefficient of total asset (logged) for the model 1 in Table 3-1 is -0.003, while the coefficient for the same model in Table 3-2 is 0.002. This might imply that the effects of firm size on AEM and REM are different, but the sign and magnitude of the control variables' coefficients seem irrelevant with consideration of macroeconomic conditions.

Table 2-1. Main Regression Results for AEM

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Cash Flow from Operations to Assets	-0.990*** (0.000)	-0.989*** (0.000)	-0.989*** (0.000)	-0.989*** (0.000)	-0.989*** (0.000)
Logarithm of Total Assets	-0.003*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)
Liability to Asset Ratio	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)
Return on Total Assets	0.473*** (0.000)	0.474*** (0.000)	0.473*** (0.000)	0.473*** (0.000)	0.473*** (0.000)
Total assets growth rate	0.011*** (0.000)	0.011*** (0.000)	0.012*** (0.000)	0.012*** (0.000)	0.011*** (0.000)
Total Accrual to Total Assets (lagged)	0.003*** (0.000)	0.002*** (0.003)	0.003*** (0.001)	0.003*** (0.001)	0.002** (0.013)
Net Loss (dummy)	-0.001*** (0.005)	-0.001*** (0.005)	-0.001*** (0.010)	-0.001*** (0.010)	-0.001** (0.011)
Composite Economic Index		0.001*** (0.000)			
Real GDP growth			0.0004*** (0.000)		
Real GDP growth (de-trended)				0.0004*** (0.000)	
Business Survey Index					0.0001*** (0.000)
Constant	0.107*** (0.000)	0.100*** (0.000)	0.093*** (0.000)	0.095*** (0.000)	0.083*** (0.000)
R^2 (within)	0.991	0.991	0.991	0.991	0.991
R^2 (between)	0.101	0.102	0.102	0.102	0.102
Number of observations	12,295	12,295	12,295	12,295	12,295

* p<.1, ** p<.05, *** p<.01

The numbers in bracket indicate p-value of t-statistics for null hypothesis

Table 2-2. Main Regression Results for REM

	Model 6	**Model 7**	**Model 8**	**Model 9**	**Model 10**

Cash Flow from Operations to Total Assets	-0.428*** (0.000)	-0.426*** (0.000)	-0.427*** (0.000)	-0.427*** (0.000)	-0.425*** (0.000)
Logarithm of Total Assets	0.002*** (0.003)	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.004*** (0.000)
Liability to Asset Ratio	0.005*** (0.000)	0.005*** (0.000)	0.005*** (0.000)	0.005*** (0.000)	0.005*** (0.000)
Return on Total Assets	-0.069*** (0.000)	-0.069*** (0.000)	-0.070*** (0.000)	-0.070*** (0.000)	-0.070*** (0.000)
Total assets growth rate	0.016*** (0.000)	0.016*** (0.000)	0.016*** (0.000)	0.016*** (0.000)	0.016*** (0.000)
Total Accrual to Total Assets (lagged)	0.014*** (0.000)	0.013*** (0.000)	0.014*** (0.000)	0.014*** (0.000)	0.012*** (0.001)
Net Loss (dummy)	-0.006*** (0.000)	-0.006*** (0.000)	-0.006*** (0.000)	-0.006*** (0.000)	-0.006*** (0.000)
Composite Economic Index		0.002*** (0.000)			
Real GDP growth			0.001*** (0.001)		
Real GDP growth (de-trended)				0.001*** (0.001)	
Business Survey Index					0.0002*** (0.000)
Constant	-0.036* (0.085)	-0.048** (0.024)	-0.059*** (0.008)	-0.055** (0.011)	-0.090*** (0.000)
R^2 (within)	0.555	0.556	0.556	0.556	0.557
R^2 (between)	0.018	0.018	0.018	0.018	0.018
Number of observations	12,053	12,053	12,053	12,053	12,053

* p<.1, ** p<.05, *** p<.01

The numbers in bracket indicate p-value of t-statistics for null hypothesis

4.2.2. Results For Manufacturing/Non-Manufacturing Firms

We also performed the same tests on manufacturing and non-manufacturing firms separately. The results were essentially the same as the main study results. The null hypotheses were strongly rejected; the direction of the coefficients of variables measuring the business cycle were positive. The magnitude of the coefficients seems similar to that for the main results. This may imply that decisions to perform earnings management do not differ by industry.

Tables 3-1 and 3-2 show the results of empirical testing for AEM and REM of non-manufacturing firms. The results for AEM and REM for manufacturing firms are consistent. The null hypothesis tests for all macro-variables was completely rejected (even at a 1% confidence interval), and the signs of the coefficients were all positive. The magnitude of the coefficients was slightly different between AEM and REM. In the case of AEM, the coefficients of the real GDP growth rate and the detrended real GDP growth rate are 0.0004 and 0.0004, respectively, (rounding off from the fifth decimal), while the effects of the same variables on REM are 0.001 and 0.001, respectively (rounding off from the fifth decimal).

Tables 3-3 and 3-4 present the results of the test for non-manufacturing firms. In this case, the significancy of the main results are sustainable for AEM. All of the macro-variables are significantly positive. However, in the case of REM, the significancy of the coefficients was undermined.

Table 3-1. Regression Results for AEM (manufacturing firms only)

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Cash Flow from Operations to Total Assets	-0.989*** (0.000)	-0.988*** (0.000)	-0.989*** (0.000)	-0.989*** (0.000)	-0.988*** (0.000)
Logarithm of Total Assets	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)
Liability to Asset Ratio	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)
Return on Total Assets	0.475***	0.475***	0.474***	0.474***	0.474***

	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Total assets growth rate	0.012*** (0.000)	0.012*** (0.000)	0.013*** (0.000)	0.013*** (0.000)	0.012*** (0.000)
Total Accrual to Total Assets (lagged)	0.002** (0.017)	0.002** (0.043)	0.002** (0.019)	0.002** (0.019)	0.001 (0.141)
Net Loss (dummy)	-0.001** (0.047)	-0.001** (0.040)	-0.000* (0.086)	-0.000* (0.086)	-0.000* (0.078)
Composite Economic Index		0.001*** (0.000)			
Real GDP growth			0.0004*** (0.000)		
Real GDP growth (de-trended)				0.0004*** (0.000)	
Business Survey Index					0.0001*** (0.000)
Constant	0.102*** (0.000)	0.096*** (0.000)	0.087*** (0.000)	0.089*** (0.000)	0.084*** (0.000)
R^2 (within)	0.991	0.991	0.991	0.991	0.991
R^2 (between)	0.109	0.110	0.110	0.110	0.110
Number of observations	9,540	9,540	9,540	9,540	9,540

* p<.1, ** p<.05, *** p<.01

The numbers in bracket indicate p-value of t-statistics for null hypothesis

Table 3-2. Regression Results for REM (manufacturing firms only)

	Model 6	**Model 7**	**Model 8**	**Model 9**	**Model 10**
Cash Flow from Operations to Total Assets	-0.427*** (0.000)	-0.426*** (0.000)	-0.426*** (0.000)	-0.426*** (0.000)	-0.424*** (0.000)
Logarithm of Total Assets	0.000 (0.758)	0.001 (0.361)	0.001 (0.149)	0.001 (0.149)	0.002* (0.069)
Liability to Asset Ratio	0.006*** (0.000)	0.006*** (0.000)	0.006*** (0.000)	0.006*** (0.000)	0.006*** (0.000)
Return on Total Assets	-0.063*** (0.000)	-0.062*** (0.000)	-0.064*** (0.000)	-0.064*** (0.000)	-0.064*** (0.000)
Total assets growth rate	0.017*** (0.000)	0.016*** (0.000)	0.017*** (0.000)	0.017*** (0.000)	0.017*** (0.000)
Total Accrual to Total Assets (lagged)	0.016*** (0.000)	0.015*** (0.000)	0.016*** (0.000)	0.016*** (0.000)	0.013*** (0.001)
Net Loss (dummy)	-0.006*** (0.000)	-0.006*** (0.000)	-0.006*** (0.000)	-0.006*** (0.000)	-0.006*** (0.000)
Composite Economic Index		0.002*** (0.000)			
Real GDP growth			0.001*** (0.000)		
Real GDP growth (de-trended)				0.001*** (0.000)	
Business Survey Index					0.0002*** (0.000)
Constant	0.017 (0.438)	0.003 (0.888)	-0.012 (0.599)	-0.008 (0.727)	-0.034 (0.142)
R^2 (within)	0.570	0.572	0.571	0.571	0.574
R^2 (between)	0.039	0.039	0.039	0.039	0.038

Number of observations	9,510	9,510	9,510	9,510	9,510

* p<.1, ** p<.05, *** p<.01
The numbers in bracket indicate p-value of t-statistics for null hypothesis

Table 3-3. Main Regression Results for AEM (non-manufacturing firms only)

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Cash Flow from Operations to Total Assets	-0.991*** (0.000)	-0.990*** (0.000)	-0.990*** (0.000)	-0.990*** (0.000)	-0.990*** (0.000)
Logarithm of Total Assets	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)
Liability to Asset Ratio	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)
Return on Total Assets	0.467*** (0.000)	0.467*** (0.000)	0.466*** (0.000)	0.466*** (0.000)	0.466*** (0.000)
Total assets growth rate	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)
Total Accrual to Total Assets (lagged)	0.004*** (0.007)	0.004** (0.020)	0.004*** (0.008)	0.004*** (0.008)	0.004** (0.021)
Net Loss (dummy)	-0.001** (0.010)	-0.001** (0.013)	-0.001** (0.011)	-0.001** (0.011)	-0.001** (0.015)
Composite Economic Index		0.001*** (0.000)			
Real GDP growth			0.0002*** (0.004)		
Real GDP growth (de-trended)				0.0002*** (0.004)	
Business Survey Index					0.0001*** (0.000)
Constant	0.128*** (0.000)	0.121*** (0.000)	0.119*** (0.000)	0.120*** (0.000)	0.104*** (0.000)
R^2 (within)	0.992	0.992	0.992	0.992	0.992
R^2 (between)	0.086	0.086	0.086	0.086	0.086
Number of observations	2,755	2,755	2,755	2,755	2,755

* p<.1, ** p<.05, *** p<.01
The numbers in bracket indicate p-value of t-statistics for null hypothesis

Table 3-4. Main Regression Results for REM (non-manufacturing firms only)

	Model 6	**Model 7**	**Model 8**	**Model 9**	**Model 10**
Cash Flow from Operations to Total Assets	-0.426*** (0.000)	-0.426*** (0.000)	-0.426*** (0.000)	-0.426*** (0.000)	-0.425*** (0.000)
Logarithm of Total Assets	0.013*** (0.000)	0.013*** (0.000)	0.013*** (0.000)	0.013*** (0.000)	0.013*** (0.000)
Liability to Asset Ratio	-0.002 (0.342)	-0.002 (0.341)	-0.002 (0.341)	-0.002 (0.341)	-0.002 (0.337)
Return on Total Assets	-0.096*** (0.000)	-0.096*** (0.000)	-0.096*** (0.000)	-0.096*** (0.000)	-0.096*** (0.000)
Total assets growth rate	0.014*** (0.002)	0.014*** (0.002)	0.014*** (0.002)	0.014*** (0.002)	0.014*** (0.002)
Total Accrual to Total Assets (lagged)	0.005 (0.530)	0.005 (0.534)	0.005 (0.530)	0.005 (0.530)	0.005 (0.567)
Net Loss (dummy)	-0.007*** (0.007)	-0.007*** (0.007)	-0.007*** (0.007)	-0.007*** (0.007)	-0.007*** (0.007)

Composite Economic Index		0.000 (0.955)			
Real GDP growth			-0.000 (0.848)		
Real GDP growth (de-trended)				-0.000 (0.848)	
Business Survey Index					0.0001 (0.519)
Constant	-0.300*** (0.000)	-0.301*** (0.000)	-0.297*** (0.000)	-0.298*** (0.000)	-0.317*** (0.000)
R^2 (within)	0.520	0.520	0.520	0.520	0.520
R^2 (between)	0.002	0.002	0.002	0.002	0.001
Number of observations	2,543	2,543	2,543	2,543	2,543

* p<.1, ** p<.05, *** p<.01
The numbers in bracket indicate p-value of t-statistics for null hypothesis

5. Conclusion

This study was intended to examine major relationships between business cycles and earnings management for Korean listed companies. A fixed-effect panel regression model was applied to estimate the effects of business cycles on the tendency of earnings management. We used Korean listed company data from 2005 to 2017 and measured macroeconomic business cycles in several ways; the composite economic index of coincident indicators, the growth rate in real GDP, the detrended growth rate in real GDP, and BSI.

We found that business cycles had a positive relationship with earnings management. The result implies that companies are performing earnings management more often during economy boom stages and less often during contraction periods. This result is consistent with the findings of Cohen and Zarowin (2007), Ze-To (2012), and Wang et al. (2015). The explanation for the result is that companies are performing earnings management more often in the booming stage to avoid investors' penalty negative responses for poor performance during good economic periods. This result is different from the theories that firms will perform earnings management more often during economic contraction periods to show better results.

This early study to examine the relationship between earnings management and business cycles provides insight into companies' behavior related to earnings management under different business cycles. This study result could provide insight to auditors, investors, and accounting policy setters in terms of company behaviors regarding earnings management. For example, auditors could pay attention to the possibility of earnings management during good times in performing company audits. Also, investors can pay more attention to the disclosed numbers of the companies.

A limitation of this study is that our simplistic model does not allow for the specification of which incentives and conditions were inter-related among business cycle factors. To explore those structures further, it is necessary to design a complex structural equation model. However, we adopted a simple linear regression model to enjoy the advantage of panel regression and to avoid the complexity of the issue.

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