

The Effects of Business Cycles on Earnings Management of Korean Companies

Jengei Hong¹ and Geun Bae Jang^{2*}

¹ Assistant Professor of Economics, School of Management and Economics at Handong Global University;
hwgh024@handong.edu.

² Assistant Professor of Accounting, School of Management and Economics at Handong Global University;
geunbae.jang@handong.edu.

Abstract: Earnings management is an activity of adjusting corporate earnings to take advantage of the activities. 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. However, a company's tendency to make earnings management might depend not only on the financial variables shown in the financial statement of the company but also on the macroeconomic environment. There have been not much researches on the relations between earnings management and macroeconomic environment. Hence, we investigate whether the firms are making more earnings management during the contraction period of macroeconomic business cycles or the boom period of the business cycle. Using a data set of Korean companies, we examined a fixed effect panel regression model. The results revealed that firms were making more earnings management during the boom period of the microbusiness cycle rather than the contraction period. This could stem due that firms would like to avoid disclosure of lower net income compared to the expectations of analysts or the average net income of companies in the same industry. This result can help external auditors in identifying key risks in performing external audits and, also, it could give an insight to investors.

Keywords: *Business Cycle; Earnings Management; Economic Motivation; Financial Decisions; Real GDP Growth Rate*

1. Introduction

Earnings management is activities of getting certain benefits by involving in external financial reporting or confusing certain stakeholders through adjustments to accruals without the involvement of cash flows or with cash flows through real activities [1]. It can be considered as the manipulation of the process of financial reporting to take advantage of the act. The advantages of earnings management can be considered in several ways. 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.

Hence, the motivation of earnings management might closely be related to the economic situation in which a firm is in. The researches on the act of earnings management have been long 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 motivation for earnings management depends not only on the financial variables shown in the financial statement of the company but also on the macroeconomic environment.

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on the macroeconomic environment. There have not been many reaches on the relationship between earnings management and the macroeconomic environment. In this paper, we study the relationship between earnings management and 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. In examining the relationship, we used the models of Kothari et al. [3] and Cohen et al. [4] for measuring accrual-based earnings management (AEM) and real activities earnings management (REM), respectively, as proxies of earnings management. 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 [5]. To measure macroeconomic business cycles, we use real GDP growth rate.

The result shows the tendency of earnings management is positively affected by macroeconomic business cycles after controlling for 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 previous findings of Cohen and Zarowin [6] and Wang et al. [7].

2. Materials and Methods

2.1. Proxies for Earnings Management: AEM, REM

In this study, we use AEM and REM to measure the scale of earnings management carried out. For AEM, we apply discretionary accrual as a proxy. AEM represents unexplained accruals, which are determined by subtracting estimated normal accruals from total accruals. Kothari et al. [3] developed a performance-matched AEM measure using the revised Jones model to control for performance effects when estimating AEM. The authors [3] also use 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). Also, 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.

$$TA_{i,t}/A_{i,t-1} = \alpha_0 + \beta_1(1/A_{i,t-1}) + \beta_2(\Delta S_{i,t} - \Delta AR_{i,t}/A_{i,t-1}) + \beta_3(PPE_{i,t}/A_{i,t-1}) + \beta_4ROA_{i,t} + u_i + \varepsilon_{i,t} \quad (1)$$

$$AEM_{i,t} = TA_{i,t}/A_{i,t-1} - \alpha_0 - \beta_1(1/A_{i,t-1}) - \beta_2(\Delta S_{i,t} - \Delta AR_{i,t}/A_{i,t-1}) - \beta_3(PPE_{i,t}/A_{i,t-1}) - \beta_4ROA_{i,t} - u_i \quad (2)$$

- $TA_{i,t}$: 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

For REM, we used Cohen's model. 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 [8]. Roychowdhury [8] assumed that normal cash flows

from operation, production costs, and selling, general and administrative expenses are in a 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.

$$REM_{i,t} = (APC_{i,t} - ACFO_{i,t} - ASGA_{i,t}) / 3 \quad (3)$$

Roychowdhury [8] 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. [9], 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).

$$CFO_{i,t}/A_{i,t-1} = \alpha_0 + \beta_1(1/A_{i,t-1}) + \beta_2(S_{i,t}/A_{i,t-1}) + \beta_3(\Delta S_{i,t}/A_{i,t-1}) + u_i + \varepsilon_{i,t} \quad (4)$$

$$ACFO_{i,t} = CFO_{i,t}/A_{i,t-1} - \alpha_0 - \beta_1(1/A_{i,t-1}) - \beta_2(S_{i,t}/A_{i,t-1}) - \beta_3(\Delta S_{i,t}/A_{i,t-1}) - u_i \quad (5)$$

- $CFO_{i,t}$: Accrual cash flow from operations of each firm i in period t
 $ACFO_{i,t}$: Abnormal cash flow from operations of each firm i in period t
 $S_{i,t}$: Sales of each firm i in period t
 $\Delta S_{i,t}$: Sales change of each firm i in period t
 $A_{i,t-1}$: Total assets of each firm i in period $t-1$
 $u_{i,t}$: 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 to engage in earnings management. Roychowdhury [8] used an equation similar to (6) to estimate the coefficient and then estimated total production costs based on 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.

$$PC_{i,t}/A_{i,t-1} = \alpha_0 + \beta_1(1/A_{i,t-1}) + \beta_2(S_{i,t}/A_{i,t-1}) + \beta_3(\Delta S_{i,t}/A_{i,t-1}) + \beta_4(\Delta S_{i,t-1}/A_{i,t-1}) + u_i + \varepsilon_i \quad (6)$$

$$APC_{i,t} = PC_{i,t}/A_{i,t-1} - \alpha_0 - \beta_1(1/A_{i,t-1}) - \beta_2(S_{i,t}/A_{i,t-1}) - \beta_3(\Delta S_{i,t}/A_{i,t-1}) - \beta_4(\Delta S_{i,t-1}/A_{i,t-1}) - u_i \quad (7)$$

- $PC_{i,t}$: Actual production costs (COGS + Inventory Change) of each firm i in period t
 $APC_{i,t}$: Abnormal production costs of each firm i in period t
 $S_{i,t}$: Sales of each firm i in period t
 $\Delta S_{i,t}$: Sales change of each firm i in period t
 $A_{i,t-1}$: Total assets of each firm i in period $t-1$
 $u_{i,t}$: 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 [8] estimated normal discretionary expenses (SGA) by using equation (8) based on a linear relationship with sales. He then calculated ASGA by subtracting normal SGA from total SGA using equation (9).

$$SGA_{i,t}/A_{i,t-1} = \alpha_0 + \beta_1(1/A_{i,t-1}) + \beta_2(S_{i,t}/A_{i,t-1}) + u_i + \varepsilon_{i,t} \quad (8)$$

$$ASGA_{i,t} = SGA_{i,t}/A_{i,t-1} - \alpha_0 - \beta_1(1/A_{i,t-1}) - \beta_2(S_{i,t}/A_{i,t-1}) - u_i \quad (9)$$

2.2. Fixed Effect Model

In this paper, we examined the pattern of a firm's earnings management corresponding to macroeconomic business cycles. The advantage of fixed-effect panel regression is that it controls 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. The effects of the time-invariant factors relevant to the dependent variable are completely captured by the firm-level fixed-effect term. It is sufficient to consider some major time-variant characteristics as the model's explicit control variables. The model specifications are expressed as follows:

$$AEM_{i,t} = \beta_0 + \beta_1RGDP_t + \beta_2(CFO_{i,t} / A_{i,t-1}) + \beta_3SIZE_{i,t} + \beta_4LEV_{i,t} + \beta_5ROA_{i,t} + \beta_6GRW_{i,t} + \beta_7(TA_{i,t} / A_{i,t}) + \beta_8LOSS_{i,t} + u_i + \varepsilon_{i,t}, \quad (10)$$

$$REM_{i,t} = \beta_0 + \beta_1RGDP_t + \beta_2(CFO_{i,t} / A_{i,t-1}) + \beta_3SIZE_{i,t} + \beta_4LEV_{i,t} + \beta_5ROA_{i,t} + \beta_6GRW_{i,t} + \beta_7(TA_{i,t} / A_{i,t}) + \beta_8LOSS_{i,t} + u_i + \varepsilon_{i,t}, \quad (11)$$

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 $\sum_i u_i = 0$, which is commonly used in this case. $RGDP_t$ indicates the phase of the macroeconomic business cycle measured by the growth rate in real gross domestic product. We use various control variables adopted in prior research to reduce statistical error and increase the accuracy of statistical inferences (Kothari et al. 2005 [3] and others). The control variables used are the accrual cash flow from operations ($CFO_{i,t} / A_{i,t-1}$), 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 ($TA_{i,t} / A_{i,t}$), and net losses ($LOSS_{i,t}$). 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. The unobserved time-invariant effect for each firm is denoted by u_i . In last, $\varepsilon_{i,t}$ indicates the error-term of the equation.

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. The growth rate in real GDP is achieved from the economic database of the bank of Korea. To avoid potential distortions in the results, we removed the outliers from the samples. For example, the leverage of some firms may have 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, total asset growth, and prior-year total accruals. We eliminated the highest and lowest 1% samples from the observations for all control variables and the dependent variables in measuring AEM and REM.

3. Results and Discussion

3.1. 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 logit variable, which means that about 17% of the observations reflect net losses.

Table 1. Descriptive Statistics.

	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

3.2. Regression Results and Discussion

Table 2 presents the empirical testing results for AEM and REM, respectively.

Table 2. Regression results.

	Dependent variable	
	AEM	REM
CFO to Assets	-0.989*** (0.000)	-0.427*** (0.000)
Total Assets	-0.002*** (0.000)	-0.003*** (0.000)
Liability to Asset	0.002*** (0.000)	0.005*** (0.000)
Return on Asset	0.473*** (0.000)	-0.070*** (0.000)
Asset Growth rate	0.012*** (0.000)	0.016*** (0.000)
Accrual to Asset	0.003*** (0.001)	0.004*** (0.000)
Net Loss (dummy)	-0.001*** (0.010)	-0.006*** (0.000)
Real GDP growth	0.0004*** (0.000)	0.001*** (0.000)
Constant	0.093*** (0.000)	-0.059*** (0.008)

R^2 (within)	0.991	0.556
R^2 (between)	0.102	0.018
Observations	12,295	12,053

¹ * p<.1, ** p<.05, *** p<.01.

² The numbers in the bracket indicate p-value of t-statistics for null hypothesis.

First, the results show that the effect of the business cycle on a company's earnings management decision is significantly positive for both AEM and REM at 0.1% level. The positive relationship means that companies are making more earnings management during the boom period rather than during the contraction period. This can be interpreted that the companies are doing earnings management during the boom period to avoid a potentially negative response if they do not meet the expectations of analysts and other users of financial statements. They are reducing accruals and cash expenses or increasing sales without increasing cash income.

Second, 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 either positively or negatively. For AEM, the effect of cash flow from operations, total assets, and the 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. The coefficient's value of the liability to asset ratio, return on total assets, total asset growth rate, and total accrual are 0.002, 0.473, 0.012, and 0.003, respectively. The occurrence of net loss negatively affects earnings management, which could be captured by the negative effect of the dummy variable of net loss, -0.001. For REM, except for the return on assets, the sign and significance of control variables are similar to the AEM model. The sign of return on assets estimated in the REM model is different from AEM. This might imply that the effects of firm size on AEM and REM are different and we controlled all important variables, which potentially can impact the results.

4. Conclusion

We investigated the relationship between earnings management and macroeconomy environments using Korean company data. We used the AEM and REM model to check the macroeconomic business cycle impact on earnings management.

Based on the test results, conclusions follow. First, the results show that the effect of the business cycle on a company's earnings management decision is significantly positive. It implies that firms tend to implement earnings management more often during good financial periods and less often during contraction periods. 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 opposed to the general expectation that firms will perform earnings management more often during economic contraction periods to show better results but supports the findings of Cohen and Zarowin [6] and Wang et al. [7].

Second, the effects of control variables seem consistent with previous findings. 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 not only significant but also intuitive and consistent with previous researches. It implies that the model used in the estimation of the effect of business fluctuation on earnings management is well specified.

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 companies.

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