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論文題名

The Relationship Between Company Life-cycle And The Choice of Earnings Management

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論 文 要 旨

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（論文題名）

The Relationship Between Company Life-cycle And The Choice of Earnings Management

内容の要旨）

My research relates to how earnings management tools are jointly affected by firm life-cycle particularly in introduction and growth firms.

There are substantial prior researches relating to accrual-based earnings management (AEM). Lately, real earnings management (REM) becomes more concerning issues among accounting researchers. However, there are a few mixed empirical evidences on how managers choose between AEM and REM. Because differences in investing activities and financing activities in each firm-life cycle probably have impacts on the manager's financial reporting behavior, I believe that there is a relationship between firm life-cycle and the choice of earnings management. My study is to investigate managers' choice of REM and AEM in introduction and growth firms.

In order to find the relationship between earnings management tool with firm life-cycle, I performed regression analysis by using the listed companies data in Tokyo Stock Exchange during the 2007–2013 period. By using regression model proposed by Roychowdhury(2006), I find evidences that managers in introduction and growth firms choose AEM to boost the current income, rather than REM because of the dominance of earnings growth over the adverse impact of accrual reversal and the high cost of REM.

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1. Introduction

Lately, concern for accounting scandals among many investors and related people has grown. Enron and WorldCom are used as examples of accounting scandals that occurred in western countries. Meanwhile, Kanebo, a large manufacturer of cosmetics and textiles in Japan, admitted having exaggerated its earnings improperly by 214 billion JPY in 2005, which is also an example of earnings management in Japan.

Earnings management has widely been studied among researchers. Substantial evidences state that managers engage in accrual-based earnings management (AEM) and/or real earnings management (REM) to achieve certain earning targets (Burgstahler and Divchev 1997; Roychowdhury 2006). AEM refers to earnings management through the flexibility allowed under general accepted accounting principles (GAAP) without affecting cash flow. The impact of AEM is the iron law of accrual reversal. Meanwhile, REM refers to earnings management through timing and structuring of operating, investment, and financing transactions that impact cash flow. Roychowdhury (2006) and Gunny (2010) suggest the following types of REM : decreasing discretionary R&D expense; decreasing discretionary selling, general, and administrative (SG&A) expense; timing the sale of fixed assets to report gains; and reporting of lower cost of goods sold through increasing production. The consequence of REM includes suboptimal (underinvestment) business, which later imposes a real cost on firms. Both AEM and REM may have subsequent impacts on firms' performance. The factors causing managers to choose AEM or REM to perform earnings management has become more interesting among many accounting researchers. Therefore, this study presents empirical evidence on cross-sectional variation in managers' choice of AEM and REM. In particular, it examines the manner in which firms' life cycles and the cost of REM influence AEM and REM.

There are some empirical evidences on the ways in which managers choose between AEM and REM. Chen (2009) states that a firm will boost current period earnings through AEM, but not REM, when its growth prospects are good. His study employs firms that barely meet or beat analysts' earnings forecasts to test the model's prediction. Zang (2012) provides large sample evidence that managers trade-off using AEM and REM regarding its cost, implying that AEM is performed when cost of REM is high, and vice versa. My study investigates managers' choice of REM and AEM in introduction and growth firms.

Following Roychowdhury (2006), the model yields testable hypotheses regarding firms' prospects that introduction and growth firms are more likely to perform AEM to boost current earnings. Second, introduction and growth firms are less likely to perform REM to boost current earnings because the cost of REM is high.

I find empirical evidence that is consistent with my hypotheses. AEM increases in introduction and growth firms, implying that introduction and growth firms are more likely to use AEM to boost earnings. REM decreases in introduction and growth firms, indicating that firms are less likely to use REM to boost current earnings. Chen (2009) reports similar findings, except that he focuses only on the barely meeting or beating annual analysts' earnings forecasts. In addition, I find support for the prediction that the level of REM decreases with the cost of REM, implying that high cost of REM results in the lower use of REM.

My study contributes to the literature concerning earnings management in Japan. While there is extensive literature on earnings management, especially on AEM, there are few studies on REM. Herrmann D. et al. (2002), find that a negative relation exists between income from asset sales and management forecast error. My study considers determinants such as firm life cycle and cost of REM for choice of AEM and REM. As recommended by Fields et al. (2001), examining only one earnings management technique may not demonstrate the overall effect of earnings management activities. In particular, if managers use AEM and REM to fulfill the same objective, investigating one type of manipulation may lead to an understatement of the overall level of earnings management. Moreover, my empirical model, which follows Roychowdhury (2006), can be used to compare both types of earnings management. This enables me to investigate Japanese managers' behavior on the choice of AEM and REM.

Second, my study can be effectively applied to reduce accounting flexibility in GAAP and to measure earnings management issues by considering the ways in which managers use AEM or REM to perform earnings management in different firm prospects. Recently, there exist many laws and regulations focusing on reducing accounting manipulation by improving corporate governance environment. However, the management also performs REM, which adversely impacts long-term operating performance (Gunny 2005). Relying on decreasing AEM alone might not be effective to control or decrease the earnings management activities.

Third, my study contributes to the auditor's industry in implementing better audit procedures in different firm life cycles. According to my working experience, the audit plan mainly

focuses on AEM in all firm prospects. From my study, the audit plan should also consider focusing on REM aligning with firm life cycles.

This study proceeds as follows: Section 2 presents the background on earnings management and cash flow patterns used as a proxy of firm life cycles. Section 3 reviews relevant prior literatures and develops hypotheses. Section 4 reports the data used in the regression model and describes the research design, measurement of AEM, REM, cost of REM, and related control variables. Section 5 presents the empirical results, and Section 6 concludes the study.

2. Background

2.1. Background on Accrual-based earnings management and Real earnings management

Earnings management

Two important accounting principles guiding the production of earnings include revenue recognition and the matching principle. The former requires revenues to be recognized when a firm has delivered all its services and cash receipt is reasonably certain. The latter requires cash outlays associated directly with revenue to be expensed in the period in which the firm recognized revenue. Therefore, the accrual process is to mitigate timing and matching problems embedded in cash flows. Additionally, according to DeChow and Dichev (2002), the net income (earnings) comprises cash flow from operations adjusted by net accruals or future cash flow derived from current change in non-cash working capital accounts, such as receivables, allowance for doubtful accounts, inventories, and so on. The following equation suggested by DeChow and Dichev (2002) presents the concept of net income (earnings).

$$\text{Net income} = \text{Cash flow from operations} \pm \text{Net accrual}$$

Accrual is classified into non-discretionary and discretionary accruals (Dechow, 1994). The former term is accrual occurred from the choice of accounting policies set in GAAP, such as straight-line versus declining-balance amortization, or policies for revenue recognition. The latter term is accrual over which the manager can exercise some control or judgment, such as provisions for credit losses, warranty costs, inventory value, and timing and amounts of low possibility in profit generating items including write-offs and provisions for restructuring. The net income equation can be written as follows:

$$\begin{aligned}\text{Net income} = {} & \text{Cash flow from operations} \pm \text{Net non} - \text{discretionary accruals} \\ & \pm \text{Net discretionary accruals}\end{aligned}$$

How does a manager manage net income (earnings)? Alternatively, how does a manager perform earnings management? According to Paul M. Healy and James M. Wahlen (1999), earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports either to mislead some stakeholders on the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers. Moreover, according to William R. Scott (2012), earnings management is the choice of accounting policies manager, or real actions affecting earnings to achieve some specific objective on reported earnings. From both definitions, earnings management

through the choice of accounting policies is called **accrual-based earnings management (AEM).** The other one through the cash flow from operations is called **real earnings management (REM).**

Accrual-based earnings management (AEM)

Providing management to choose from a set of accounting policies opens up the possibility of opportunistic behavior to choose accounting policies from the set for their own purposes. According to William R. Scott, positive accounting theory (PAT) is concerned with predicting such actions as the choices of accounting policies by firm managers and the manner in which managers will respond to the proposed new accounting standards. PAT assumes that managers are rational and will choose accounting policies in their own best interest if they are able to do so, and that managers simply maximize their own expected utility, but not maximize firm profits.

PAT is supported by the following hypotheses. First, the bonus plan hypothesis states that firms' managers with bonus plans are more likely to choose accounting procedures that shift reported earnings from future periods to the current period. Second, the debt covenant hypothesis states that the closer a firm is to violation of accounting-based debt covenants, the more likely the firm manager is to select accounting procedures that shift reported earnings from future period to the current period. Finally, the political cost hypothesis states that the greater the political costs faced by a firm, the more likely the manager is to choose accounting procedures that defer reported earnings from current to future period.

The usage of accrual process under GAAP enables managers to have opportunistic behavior over the accrual recognition. Because of the strong interest in the bottom line, managers rather choose the accounting policies to maximize his/her interests. The earnings management through the choice of accounting policies and the ability to exercise judgment as allowed in GAAP, which does not affect the cash flow operations, is classified as AEM. Based on my working experience, high-risk areas that managers used to perform AEM, or areas that managers have some flexibility to control the amount are the estimated doubtful receivable account, the inventory write-off, warranty expenses, and so on. Certainly, such areas do not affect cash flow from operations.

Regarding the consequence of performing AEM, accrual reverse is an iron law surrounding AEM. It means that current earnings managed by accounting methods always reverse in the future earnings in opposite direction. For example, if the current bad debt estimated by manager is too low (raised earnings), bad debt expense must be higher in the future (downward future earnings).

Additionally, Sok-Hyon Kang and Ying Li (2011) suggest that the ability to manage future earnings is constrained by the magnitude of past AEM and the reversal speed of past discretionary accruals. Furthermore, Bhojraj et al. (2009) reveal that firms that beat analyst forecasts by using AEM has worse operating performance and stock market performance in the subsequent three years than firms that miss analyst forecasts without earnings management.

AEM became tremendously interesting for many researchers especially after the evidences of Enron and WorldCom in 2000. However, as earning is the result of cash flow from operations and accrual portion (explained above), earnings management through cash flow from operations has also recently become the next topic of interest among researchers.

Real earnings management (REM)

REM method is employed by managers for managing earnings through decreasing or increasing cash flow from operations. The real variables include advertising, R&D, maintenance, timing of purchases and disposals of capital assets, stuffing the channels, and so on. For example, to beat or meat the earnings target, managers decrease R&D expenditure or the expenditure amount that management can control to increase current earnings. According to Ewert & Wagenhofer (2005), REM involves management's attempts to alter report earnings by making suboptimal decisions on the timing and scale of the underlying business activities. Apart from earnings management through AEM, there are signs that managers also perform REM. Roychowdhury (2006) finds that firms with earnings close to zero opportunistically manage real variables, such as sales discounts, production levels, R&D, and other discretionary expenditure, to increase current reported earnings. Moreover, in the case of Japanese managers, Don Herrmann et al. (2002) find a negative relation between income from asset sales and management forecast error. In other words, firms increase (decrease) earnings through the sale of fixed assets and marketable securities. Although the amount of accounting research concerning REM is still sparse, REM would become more concerning because its consequence to future performance is similar to AEM's consequence toward future performance.

Similar to accrual reversal, REM also has impact on subsequent performance. According to Gunny K. (2005) and Roychowdhury (2006), REM can reduce firm value because actions taken in the current period to increase earnings can negatively affect cash flows in future or future operating performance. For example, excess inventories from overproduction can impose greater inventory holding cost on the company in the future. According to Ewert and Wagenhofer (2005)

and Chen (2009), REM implies that the managers depart from the first best decision only to alter earnings, and REM is inefficient and imposes real costs on the firm. Moreover, Cohen and Zarowin (2010) argue that when firms issue additional share, the one suspected to perform earnings management use both AEM and REM strategies, and REM compromises long-term performance. Furthermore, Bhojraj et al. (2009) indicate that firms suspected to perform earnings management through cutting discretionary spending, including R&D and advertising expense, adversely impact operating performance and stock market in the subsequent three years than firms that miss analyst forecasts without earnings management.

Patterns of earnings management

According to William R. Schott (2012), taking a bath, income minimization, income maximization, and income smoothing are considered as the patterns of earnings management. Taking a bath, which probably occurred in organization's restructuring, used the accrual reversal from the written-off assets to report loss in current earnings and increased the possibility of future reported profit. Income minimization, which probably occurred in high profitable firms, is used by managers to decrease earnings via rapid write-offs of capital assets and intangibles, and the expensing of advertising and R&D expenditure. Subsequently, based on PAT, managers may engage in income maximization of reported net income for bonuses, and escape from debt covenant violations. Finally, risk-averse managers smooth reported earnings overtime to receive relatively constant compensation.

2.2. Background on firm life cycle

According to Anthony and Ramesh (1992), firm life cycles are distinct phases that result from changes in internal factors such as strategy choice, financial resources, and managerial ability, and external factors such as competitive environment and macroeconomic factors. Firm life cycles are categorized into five stages: (1) *introduction* where an innovation is first produced; (2) *growth* where the number of producers increases dramatically; (3) *maturity* where the number of producers reaches maximum; (4) *shake out* where the number of producers begins to decline; and (5) *decline* where there is essentially a zero new entry. According to Linant and Zarowin (1990), the decomposition of cash flows into operating, investing, and financing activities differentially affects stock returns. Moreover, Dickinson (2011) provides evidence that cash flow patterns could capture the construct of a firm life cycle by proving that cash flow captures the financial outcome of these distinct life cycle stages. In other words, cash flow pattern can be used as a proxy for firm life cycle.

Cash flow type	**Introduction**	**Growth**	**Mature**	**Shake-out**	**Decline**
Operating	(−) Cash Flows	(+) Cash Flows	(+) Cash Flows	(+/−) Cash Flows*	(−) Cash Flows
Investing	(−) Cash Flows	(−) Cash Flows	(−) Cash Flows	(+/−) Cash Flows*	(+) Cash Flows
Financing	(+) Cash Flows	(+) Cash Flows	(−) Cash Flows	(+/−) Cash Flows*	(+/−) Cash Flows*

**According to Dickinson (2011), there is a void in the literature with respect to cash flow from operating, financing, and investing activities in shake-out life cycle and cash flow in financing activities in decline stage; therefore, no directional prediction is made.*

Cash Flow Mapping to Life Cycle Theory

Cash flow from operations

The lack of established customers and knowledge deficits regarding potential revenues and costs in introduction firms result in negative operating cash flows (Jovanovic 1982). Meanwhile, growth and maturity stages have positive cash flow from operations because profit margins are maximized during increases in investment and efficiency (Spence 1977; Wernerfelt 1985). According to Wernerfelt (1985), declining growth rates eventually lead to fall in selling prices. Therefore, the operating cash flow decreases and becomes negative as the firm enters the decline stage.

Investing cash flows

The investing cash flows in growth and introduction firms are negative because of the concept of managerial optimism that encourages firms to make early investment that hinder competitor's entries into the market (Spence 1977). Comparing to growth firms, mature firms decrease investment, however, they still continue to invest to maintain capital (Jovanovic 1982; Wenerfelt 1985). If maintenance cost increases over time (rising prices), investing cash flows are negative for mature firms, but at a lesser magnitude than investing cash outflows for introduction and growth firms. Meanwhile, decline firms liquidate assets to repay existing debt and to support operations, which lead to positive investing cash flows.

Financing cash flows

Introduction and growth firms need debt to expand the business because they need funds to spend in investing activities, but as they increase their leverage, they eventually need to decrease cash flow as they service debt (Myers 1977; Jensen 1986; Barclay and Smith 2005). However, Barclay and Smith (2005) state that the expectation of less liquidity in the future leads to underinvestment in positive net present value projects as the firm grows. From both assumptions, financing cash flows are expected to be positive for introduction (and likely growth) firms as they access credit for expansion. Meanwhile, mature firms have fewer investment opportunities in the future, which decreases the need for additional borrowing despite the fact that these firms are in the best financial position to do so. Moreover, the signaling literature indicates that firms distribute free cash flows to investors to prove that they are not investing in value-destroying endeavors (Barclay and Smith 2005). Mature firms pay back their debt and repurchase equity, leading to negative financing cash flow.

3. Prior literature and Hypotheses

3.1. Prior literature

As discussed in Section 2, earnings management—both downward and upward earnings—can be performed by two methods: AEM and REM. The former does not affect operating cash flow from operations, but the latter does. After considering the cash flow patterns in each firm life cycle and the earnings management method, I believe that there is a relationship between firm life cycle and earnings management. The following are some prior research efforts concerning firm life cycle and earnings management.

1) Roychowdhury (2006)

Roychowdhury (2006) finds evidence consistent with managers manipulating real activities to avoid reporting annual losses. Such real activities are price discounts to temporarily increase sales, overproduction to report lower cost of goods sold, and reduction of discretionary expenditures to improve reported margins. Moreover, cross-sectional analysis reveals that these activities are less prevalent in the presence of sophisticated investors. Other factors that influence real activities manipulation include industry membership, stock of inventories and receivables, and incentives to meet zero earnings.

2) Jeff Z. Chen (2009)

Chen (2009) presents empirical evidence on cross-sectional variation in managers' choice of AEM and REM by analyzing the manner in which AEM and REM are jointly affected by firms' growth prospects, managers' market-based compensation incentives, and the cost of REM. Chen found that in a large sample of suspected firm years beating/meeting zero earnings benchmark during 1997–2008, when the firm's growth prospects are good, the firm will boost current period earnings through AEM, but not REM. Second, when the sensitivity of the manager's compensation to stock price and/or value relevance of earnings increase, the firm will use AEM, but not REM to inflate current period earnings. Third, when the cost of REM increases, the manager will reduce opportunistic excess investment.

3) Amy Y. Zang (2012)

Zang (2012) examines whether managers use REM and AEM as substitutes in managing earnings. Using an empirical model that incorporates the costs associated with AEM and REM and capturing managers' sequential decisions, Zang finds that managers trade-off the two earnings

management methods based on their relative costs and they adjust the level of AEM according to the level of REM realized. She states that due to the different levels of constraints for AEM and REM in each firm, a manager's trade-off decision depends on the relative costliness of the two earnings management methods. This implies that when discretion is constrained for one earnings management tool, the manager will make more use of the other.

3.2. Research hypotheses

I believe that managers in each life cycle perform different earnings management methods because of the different cash flow patterns in each firm's life cycle.

Referring to Jovanovic (1982), the cash flow from investment activities in introduction and growth firms are negative because of managerial optimism encouraging firms to make early investments that deter competitor's entry into the market. Moreover, according to Chen (2009), for introduction and growth firms, the high future return to the manager's current excessive investment dominates his/her concern regarding reporting a lower level of current earnings. Because of huge investment activities, current earnings are likely to be decreased. William R. Scott (2012) posits that current net income reveals the profitability of current project, and the market believes that firms with successful current project are able to identify and implement additional successful projects. Therefore, I believe that managers in those firms are likely to boost current earnings to keep firms attracted to capital.

As I mentioned in Section 2, there are two methods of earnings management, AEM, which does not affect cash flow from operations, and REM, which affects cash flow from operations. First, because of their focus on investment activities, managers in introduction and growth firms are less likely to use REM to boost short-term earnings. Moreover, introduction and growth firms are expected to have high growth in assets and improved future performance. Therefore, managers of these firms are less concerned regarding the impact of accrual reversal, which decreases future reported performance. This is because managers expect subsequent earnings growth to offset such reversal, so that the reversal will not appear as detrimental. This is also supported by the survey interviews of Graham et al. (2005) where majority of the CFOs stated that managers in a growing firm expect future earnings growth to offset reversals from past accounting earnings management decisions. In addition, Stephen H. Penmam stated that income shifting managers often engage in such practice anticipating that subsequent growth would bail them out so that the reversal will not appear as harmful. Meanwhile, mature and declining firms reduce their investments in new asset activities. The investment rather focuses on repair and maintenance of existing assets. Therefore, managers in mature and declining firms focus more on accrual reversal because there is less subsequent earnings growth to offset such reversal.

H1: Introduction and growth firms exhibit more AEM than mature and declining firms.

Second, introduction and growth firms are perceived to have high investment opportunity, implying that they have many positive net present value projects or projects that can generate high returns to firms in future, such as investment in discretionary expenditure, considered as growth option by Myers (1977). The change in investment course or performing suboptimal decision, such as decreasing or underinvestment in discretionary expenditure claims high adverse impact on firm's long-term performance, especially in the introduction and growth firms. The cost of deviating from optimal business strategies, such as investment in R&D, is likely to be high. In this case, managers perceive REM as relatively costly due to the cost of investment opportunity arising from decision on suboptimal business. Meanwhile, the mature and declining firms have fewer investment opportunities in future. Thus, the cost of suboptimal decision is likely to be low because of the low investment opportunity cost. According to Zang (2012), the degree of AEM and REM depends on their costs. Therefore, managers in introduction and growth firms are less likely to perform REM due to its high cost.

H2: Introduction and growth firms exhibit less REM than mature and declining firms.

4. Data and Variable Measurement

Data

I used the population of listed companies in Tokyo Stock Exchange during 2007–2013 period in the Nikkei Economic Electronic Databank System (NEEDS) database. Finance and insurance industries (7050, 7100, 7150, and 7200) are excluded. The sample size is 5,253 firm-year observations after removing firms with insufficient data to calculate AEM, REM, and other variable measurements. Of this sample, 1,248 firm-year observations are classified as introduction and growth firms, and 4,005 firm-year observations are classified as mature and declining firms. I used 5,253 firm-year observations to conduct the test of H1 and H2.

Accrual-based earnings management (AEM)

Following prior literature, I use discretionary accruals to proxy for AEM. Discretionary accruals are the residual between firms' actual accruals and the normal level of accruals. Following Daneil A. Cohen et al. (2007) and Jones (1997), I estimate the normal level of accruals using the modified Jones (1991) model as described in Dechow et al. (1995), which is given by

$$\frac{TA_t}{A_{t-1}} = \alpha_0 \left(\frac{1}{A_{t-1}}\right) + \beta_1 \left(\frac{\Delta S_t - \Delta AR_t}{A_{t-1}}\right) + \beta_2 \left(\frac{PPE_t}{A_{t-1}}\right) + \varepsilon_t \qquad (1)$$

where TA_t represents the earnings before extraordinary items and discontinued operations minus cash flow from operations reported in the statement of cash flows in year t. ΔS_t denotes the change in sales from preceding years. ΔAR_t denotes the change in revenues from the preceding years. PPE_t denotes the gross property, plant, and equipment. I estimate the above regression cross-sectionally for industry years. I measured AEM as the residual from equation (1). A higher value of AEM implied that managers are more likely to engage in income-increasing AEM.

Real earnings management (REM)

I focus on managers' REM of R&D expenditures for the following reasons: First, according to Graham et al. (2005), most managers decrease discretionary spending on R&D to meet short-term earnings targets. Second, R&D is a discretionary expenditure that can be perceived as one type of investment and is easy to be controlled by the management, which is different from SG&A including salary and other fixed overhead expenses that are less controllable by the management. Third, previous studies, such as those by Chen (2009) and Gunny (2005), use R&D as proxy for REM. Therefore, R&D is appropriate for performing the analysis for my study.

Following Berger (1993), Gunny (2005), and Chen (2009), I estimated the normal level of R&D expenditures as: Q is calculated by the proportion of the sum of market capital, long-term debt, and

$$\frac{RD_t}{A_{t-1}} = \alpha_0 + \alpha_1\left(\frac{1}{A_{t-1}}\right) + \beta_1 MV_t + \beta_2 Q_t + \beta_3\left(\frac{INT_t}{A_{t-1}}\right) + \beta_3\left(\frac{R\&D_{t-1}}{A_{t-1}}\right) + \varepsilon_t \qquad (2)$$

where *MV* is a logarithm of the market value of equity to control for size. Tobin's Q is a proxy for the marginal benefit to marginal cost of installation of an additional unit of a new investment. debt in current liabilities to total assets. *INT* denotes internal funds (the sum of net income, depreciation and amortization, and research and development expense) used as a proxy for reduced funds available for investment. Moreover, the prior year's R&D, $R\&D_{t-1}$, served as a proxy for the firm's R&D opportunity set. I estimate the above regression cross-sectionally for industry years. The abnormal level of R&D (REM) is measured as the estimated residual from equation (2). I multiply the residuals by −1 such that higher values indicate greater amounts of discretionary R&D expenditures cut by firms to increase reported earnings.

Classification of firm life-cycle stages

Dickinson (2011) uses cash flow patterns as indicators of a firm's life cycle. She finds that the expected variations in profit margin, earnings performance, and asset turnover across the firm's life cycle align with the theory behind the categorization approach. Following Dickinson (2011), the combination of firms' patterns of operating, investing, and financing cash flows indicates the firm's life cycle stages, which are introduction, growth, mature, and declining. However, I considered introduction and growth firms together because both stages have the same pattern of cash flow from investing and financing activities, which are the main points of my assumption. Because my study focuses on introduction and growth firms, firms whose cash flow patterns do not match the cash flow patterns of introduction and growth firms are classified as mature and declining firms. In order to test H1 and H2, introduction and growth firms are set as dummy variables with a value of 1, and 0 otherwise.

Cost associated with REM

Following Chen (2009) and Zang (2012), I identify two proxies for the cost of REM and use these proxies to compute a cost score for each firm. The first proxy is the firm's market share ($MSHARE_t$), measured as the percentage of the firm's sales to the total sales of its industry. Market share is used to capture the firm's leadership in the industry. Different firms probably face different levels of competition in the same industry. Therefore, when firms deviate from their first-best real

decisions, market leaders may perceive these suboptimal decisions as less costly than market followers (Zang 2012). This implies that market leaders can afford relatively more REM. Following Chen (2009), I multiply MSHARE_t by −1 so that larger MSHARE_t implies higher cost of REM.

The second proxy is the firm's financial health. According to Chen (2009) and Zang (2012), the marginal cost of deviating from the optimal business strategy is likely to be high for financially distressed firms. REM is perceived as very costly for managers in those firms because their primary goal is to improve operation. The evidence by Graham et al. (2005) states that CFOs admit that if a company is in financial stress, the manager's efforts to survive will dominate their reporting concerns.

I used a modified Altman *Z-score* (1968, 2000) to proxy for a firm's financial health.

$$ZSCORE_t = 0.3\frac{NI_t}{Asset_t} + 1.0\frac{Sales_t}{Asset_t} + 1.4\frac{Retained\ Earnings_t}{Asset_t} + 1.2\frac{Working\ Capital_t}{Asset_t} + 0.6\frac{Stock\ Price\ \times Shares\ Outstandning_t}{Total\ Liabilities_t}$$

Following Chen (2009), I multiply ZSCORE_t by -1 so that larger ZSCORE_t implies higher cost of REM.

Regression analyses

Following Roychowdhury (2006) and Chen (2009), I test H1 and H2 using the following model.

$$\text{AEM} = \alpha + \beta_1 * \text{I\_GDummy} + \beta_2 * \text{ZSCORE}_t + \beta_3 * \text{MSHARE}_t + \beta_4 * (SIZE)_{t-1} + \beta_5 * (MTB)_{t-1} + \beta_6 * (Netincome - AEM)_t + \text{Years Controls} + \text{Industries Controls} + \varepsilon \quad (4)$$

$$\text{REM} = \alpha + \beta_1 * \text{I\_GDummy} + \beta_2 * \text{ZSCORE}_t + \beta_3 * \text{MSHARE}_t + \beta_4 * (SIZE)_{t-1} + \beta_5 * (MTB)_{t-1} + \beta_6 * (Netincome - AEM)_t + \text{Years Controls} + \text{Industries Controls} + \varepsilon \quad (5)$$

The dependent variable, Y_t, denotes abnormal AEM or AEM in period t in equation (4) and represents abnormal discretionary R&D expense or REM in period t in equation (5). I_GDummy is an indicator variable that equals 1 if firm years belong to introduction and growth firms and 0 otherwise. ZSC0RE_t and MSHARE_t are used as proxies of the cost of REM. Following Roychowdhury (2006), to control for systematic variation in AEM and REM with size and growth opportunities, the regression includes two control variables: SIZE calculated by logarithm of the market value of equity, and MTB calculated by market to book ratio at the beginning of the year. According to Wiedman (1996), larger firms have richer information environment that reduce opportunities for successful earnings management. This means that earnings management are correlated with SIZE; therefore, SIZE is included as a control variable. Netincome −AEM, calculated by net income before

adjusting with AEM scaled by lagged total assets, is used as another control variable to address the possibility that abnormal value from estimated model have measurement error correlated with performance (Dechow et al., 1995, 1996). Moreover, following Chen (2009), year dummies and industry dummies are included to control for industry-wide and time-wide effects that could potentially explain some variation in firms' earnings management behavior across different industries and time periods.

H1 predicts that introduction and growth firms exhibit more AEM than other firms. That is, managers in introduction and growth firms are more likely to choose AEM to boost current earnings. Therefore, the dummy variable coefficient of introduction and growth firms or β_1 in equations (4) and (5) is expected to be positive and negative respectively.

H2 predicts that introduction and growth firms exhibit less REM than other firms. Thus, the coefficient of $ZSCORE_t$ and $MSHARE_t$ variable or β_2 and β_3 in equation (5) are expected to be negative because when the cost of REM is high, the level of REM is expected to be decreased.

5. Results

$$\text{AEM} = \alpha + \beta_1 * \text{I\_GDummy} + \beta_2 * \text{ZSCORE}_t + \beta_3 * \text{MSHARE}_t + \beta_4 * (SIZE)_{t-1} + \beta_5 * (MTB)_{t-1} + \beta_6 * (Netincome - AEM)_t + \text{Years Controls} + \text{Industries Controls} + \varepsilon$$

$$\text{REM} = \alpha + \beta_1 * \text{I\_GDummy} + \beta_2 * \text{ZSCORE}_t + \beta_3 * \text{MSHARE}_t + \beta_4 * (SIZE)_{t-1} + \beta_5 * (MTB)_{t-1} + \beta_6 * (Netincome - AEM)_t + \text{Years Controls} + \text{Industries Controls} + \varepsilon$$

Explained variables (Y)	AEM			REM		
	Pred. sign	Coefficient	T Value	Pred. sign	Coefficient	T Value
Intercept		-0.065***	-11.772		0.000	-0.055
Assumptions' verification						
I_GDummies	+	+0.003**	2.41	-	-0.001**	-2.32
Zscore		-0.018***	-31.771	-	-0.001***	-3.829
Marketshrae		-0.001	-0.606	-	0.000	0.338
Control variables						
Size(t-1)		+0.004***	3.481		0.000	-1.458
MTB(t-1)		+0.001***	2.861		0.000	0.23
(Netincome-AEM)t		-0.635***	-57.098		0.011***	3.296
Year Dummies		Yes			Yes	
Industries Dummies		Yes			Yes	
Adjusted R squares		64%			13%	
*,**,*** Represent significance at 10 %, 5%, and 1% levels, respectively						
Number of observation: 5,253. Samples period 2007 to 2013						

Variable definitions:
AEM: discretionary accruals computed using the Modified Jones Model ;
REM: abnormal R&D expenditures, multiplied by -1.
I_G Dummies: the dummy variable for introduction and growth prospect firm set as 1, otherwise 0.
ZSCORE: Z-score calculated according to Altman (1968, 2000)
MSHARE: total sales devided by total industry-sales.
SIZE: the logarithm of market capital.
MTB: market to book ratio
Netincom-AEM: net income of adjusted by AEM

Table 1. Regression analyses

Table 1 presents the results of equations (4) and (5). H1 predicts a positive sign on coefficient on dummy variable or β_1 in equation (4) and a negative coefficient on dummy variable or β_1 in equation (5). Consistent with this hypothesis, β_1 is 0.003 and significant at the 5% level (t = 2.41) in equation (4), which means that introduction and growth firm years have AEM that is higher on average by 0.3% of assets compared to the rest of the sample. Moreover, β_1 is negative (−0.001) and significant at the 5% level (t = −2.32) in equation (5), meaning that introduction and growth firm years have REM that is lower on average by 0.1% of assets compared to the rest of the sample. This result suggests that managers in introduction and growth firms are more likely to use AEM to boost earnings, but not REM. The investment activities are more likely to be driven by incentive to report better performance in the future or keep earnings growing. Therefore, the result supports H1. H2 predicts a negative sign on coefficient of ZSCORE and MSHARE

in equation (5). The coefficient of ZSCORE β_2 in equation (5) is negative, which is consistent with the prediction that as the cost of REM becomes higher, it is less likely to use REM as earnings management's tool. Therefore, the result supports H2.

6. Conclusions

This study mainly aims to find the relationship between the firm life cycle and the choice of AEM and REM. In other words, by focusing on introduction and growth firms, it demonstrates the ways in which earnings management tools, AEM and REM, are jointly affected by firms' life cycle. Using the listed companies data in Tokyo Stock Exchange during the 2007–2013 period, I find the evidence of the relation between introduction and growth firms and the choice of AEM and REM.

The regression model proposed by Roychowdhury (2006) generates testable hypotheses. First, AEM increases in introduction and growth firms, whereas REM decreases in these firms. The results conclude that managers in introduction and growth firms choose AEM to boost the current income, rather than REM. Second, REM decreases in introduction and growth firms with the cost of REM. The empirical results are generally consistent with the model's predictions.

My study implies that to control earnings management solely through AEM such as improving corporate governance may not be sufficient because management can perform earnings management through real activities, which cause more adverse impact on subsequent operating performance in the long term (Gunny, 2005). Therefore, the measurements to control both AEM and REM become more important in the near future. Moreover, according to the results, auditors should focus not only on AEM but also on REM and implement these in audit procedures by considering the firm's life cycle stages.

7. Research limitations

The limitation of my study is that the cost of AEM is excluded. Indeed, referring to Chen (2009) and Zang (2012), it shows that the cost of AEM variable is included in their regression model. According to Zang (2012), the cost of AEM is calculated from a firm's auditor whether they are one of the Big 4, the well-known auditing firms or not, audit tenures, the implementation of US Sarbanes–Oxley Act (SOX) 2002. However, I believe that the exclusion of the cost of AEM in my regression model will not affect my results and conclusion because, first, Japan Sarbanes–Oxley Act (J-SOX) was announced in 2006. I consider that the J-SOX announcement can, to some extent, escalate management tension on performing AEM. Therefore, the sample size I selected from 2007 to 2013 will not be beneficial to my study. Moreover, large firms and listed firms tend to hire Big 4 auditing firms as firms' auditor because of high quality of audit reports. Therefore, they face high cost of performing AEM. From the aforementioned reasons, I believe that adding the cost of AEM in my regression model will not benefit my study.

However, it would be interesting to use a sample of suspect firms that meet or just beat management forecasts. Firms that report earnings slightly above the benchmark set by management forecast are more likely to engage in earnings management. Focusing on these firms could improve the quality of analyses.

8. Appendix

Table 8.1 Correlation variables of regression model for AEM

	1	2	3	4	5	6	7
1. AEM		0.075***	-0.114***	0.030**	-0.031**	-0.012	-0.508***
2. I_Gdummy	0.075***		0.214***	-0.095***	0.048***	-0.014	-0.200***
3. ZSCORE	-0.114***	0.214***		-0.097***	-0.234***	-0.047***	-0.396***
4. MSHARE	0.030**	-0.095***	-0.097***		-0.481***	-0.041***	-0.046***
5. SIZE	-0.031**	0.048***	-0.234***	-0.481***		0.194***	0.287***
6. MTB	-0.012	-0.014	-0.047***	-0.041***	0.194***		0.108***
7. Netincome-AEM	-0.508***	-0.200***	-0.396***	-0.046***	0.287***	0.108***	
***, **, and * Representindicate significance at the 10 %, 5%, and 1% levels, respectively							

Table 8.2 Correlation variables of regression model for REM

	1	2	3	4	5	6	7
1. REM		0.057***	-0.071***	0.009	-0.003	0.006	0.068***
2. I_Gdummy	0.057***		0.214***	-0.095***	0.048***	-0.014	-0.200***
3. ZSCORE	-0.071***	0.214***		-0.097***	-0.234***	-0.047***	-0.396***
4. MSHARE	0.009	-0.095***	-0.097***		-0.481***	-0.041***	-0.046***
5. SIZE	-0.003	0.048***	-0.234***	-0.481***		0.194***	0.287***
6. MTB	0.006	-0.014	-0.047***	-0.041***	0.194***		0.108***
7. Netincome-AEM	0.068***	-0.200***	-0.396***	-0.046***	0.287***	0.108***	
***, **, and * Representindicate significance at the 10 %, 5%, and 1% levels, respectively							

Table 8.3 Descriptive statistics

	Mean	**Median**	**Std. deviation**	**Minimum**	**Maximum**
AEM	-0.009	-0.009	0.0543	-0.5	1.3
REM	0.001	0.001	0.0125	-0.5	0.2
I_GDummy	0.24	0	0.426	0	1
ZSCORE	-2.543	-2.321	1.2467	-5.4	5.4
MSHARE	-0.018	-0.005	0.036	-0.167	0
SIZE	4.652	4.573	0.75	2.574	7.339
MTB	1.151	0.885	1.645	-3.696	96.21
Netincome-AEM	0.023	0.024	0.0602	-1.4	0.4
Numbers of observations	5,253				

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