

# Internal Control, Life Cycle and Earnings Quality

## —An Empirical Analysis from Chinese Market

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### Abstract

Whether internal controls can effectively constrain earnings management, which is a hot topic in recent years. I investigate the impact of internal control on earnings quality based on a life cycle perspective using data of listed companies of China's market from 2010-2013. The empirical findings indicate that high quality internal control can suppress accrual earnings management and real earnings management (except for discretionary expenses manipulating earnings management) effectively, whilst in different life cycle stages (LCSs), the relation between internal control quality and accounting earnings quality (accrual quality and real earnings quality) is different. For the accrual quality aspect, in mature LCS, internal control quality and accrual quality is positively correlated. In growth or decline LCS, the relation between internal quality and accrual quality is not significant. For the real earnings quality aspect, in decline LCS, high quality internal control can improve real earnings quality; in growth LCS or mature LCS, the relation is just the opposite.

### Keywords

Internal Control, Life Cycle, Earnings Quality

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### 1. Introduction

In the US capital market, since the enactment of “Sarbanes-Oxley Act”, managers are required to assess and report on the effectiveness of internal control over financial reporting, and to disclose the existence of any MWs, thus providing possibility to measure internal control quality. Doyle *et al.* (2007) find that weaknesses are generally associated with poorly estimated accruals that are not realized as cash flows [1]. In addition, plenty of findings indicate that compared to companies with effective internal control, companies with existing material weaknesses have more accruals noise [2] [3]. Gao *et al.* (2009) find that provisions of SOX internal control re-

duce the quality of accounting information [4]. Altamuro and Beatty (2010) find that the internal control regulation improve the information quality [5].

Domestic studies on the relationship between earnings management and internal control start later, whether internal control can effectively suppress earnings management remains disputed. Zhang Guoqing (2008) selects seven metrics to measure corporate earnings management; empirical results show that high-quality internal control is not accompanied by high-quality accruals [6]. Zhang *et al.* (2010) find that compared to companies without internal control audit, companies with internal control audit have high accrual quality [7]. Since then, further research of earnings management on internal control focuses on accruals management and real earnings management. Fang Hongxing and Jin Yuna (2011) find that good internal control can effectively suppress accruals management behavior and real earnings management activities [8]. Fan *et al.* (2013) find that high quality internal control helps to inhibit the company's accruals earning management behavior, but the relation between high quality internal control and real earnings management is not significant [9].

Taken together, there has been debate on whether internal control can significantly restrain earnings management. Moreover, the life cycle of the enterprise is not taken into consideration, companies at the different stages of life cycle are regarded as the same, which is clearly not in line with the actual situation, and this will reduce the credibility of the findings. The author deems that the effect internal control on earnings quality is not isolated and absolute; the specific environment should not be neglected. Therefore, the author introduces corporate life cycle theory to analyze the relation between internal control quality and earnings quality in different life cycle stages.

To test the effect of life cycle, the author constructs two indicator variables to reflect corporate life cycle. Following Dickinson (2011), the author employs cash flow patterns to classify the firm-level life cycle. The author divides life cycle as four stages: introduction, growth, mature and decline. Given that most listing companies has gone through introduction stage, so this paper mainly discusses the relation between internal control quality and earning quality in three life cycle stages. Consistent with expectations, results in this study indicate that in different life cycle stages (LCSs), the relation between internal control quality and accounting earnings quality (accrual quality and real earnings quality) is different.

This study makes several important contributions to the existing literature and informs current regulatory discussions. First, my findings extend those of Fang Hongxing (2011) by introducing life cycle theory into the research of internal control and earnings management. As Dickinson (2011) states that firm life cycle stages have important implications for understanding the financial performance of firms, it is feasible and possible to incorporate life cycle theory [10]. Second, my findings are helpful for auditors to spot companies' earnings management behavior. For firms on the growing or mature stage, they are more cautious in earnings manipulation, compared to accrual management, they are more inclined to choose real earnings management. Third, concerning whether effective internal control can suppress earnings management, this study provide empirical evidence to support that internal control is positively related to earnings quality.

The remainder of the paper is organized as follows. Section 2 provides background and hypothesis development. Section 3 describes the research design and methodology. Section 4 presents the main findings and robustness tests. The paper concludes in Section 5.

## 2. Background and Hypothesis Development

### 2.1. Internal Control and Earnings Quality

Several studies have investigated relations between internal control and earnings management. Weaknesses are generally associated with poorly estimated accruals that are not realized as cash flows (Doyle *et al.* 2007). Compared to companies with effective internal control, companies with existing material weaknesses have lower earnings quality (Ashbaugh-Skaife *et al.*, 2008, Chan *et al.*, 2008). Moreover, the internal control regulation can improve the profitability of continuing to increase future cash flow predictability, thereby helping to improve the quality of financial reporting (Altamuro *et al.*, 2010).

Furthermore, Chinese studies on internal control and Earnings Management are still controversial. Some state that good internal controls can enhance earnings quality. Zhang Longping *et al.* (2010) find that compared to companies without internal control audit, companies with internal control audit have higher accruals quality. Fan Jinghua *et al.* (2013) find that high quality internal control helps to inhibit the company's accrual-based earnings management behavior, but the relation between high quality internal control and real earnings management is

not significant. Fang Hongxing and Jin Yuna (2011) find that good internal controls can effectively suppress accruals management behavior and real earnings management activities. Others insist that good internal control is helpless in enhancing earnings quality. Zhang Guoqing (2008) selects seven metrics to measure corporate earnings management, empirical results show that high-quality internal control is not accompanied by high-quality earnings. Therefore, the relation between internal control and earnings quality is to be further explored.

The mechanism that Internal control inhibits earnings management is mainly manifested in two ways: first, the internal controls within the firms contributes to achieving a balance of powers, and hence reducing the likelihood of unintentional misstatements and intentional manipulation; second, internal control's intrinsic objectives is to ensure reasonable legal compliance and authentic financial reporting, internal control can inhibit real earnings management activities or other short-sighted behavior, and therefore maximize firm value. Based on the above analysis, the author propose the following hypotheses:

H1: Internal control quality is positively associated with accruals quality.

H2: Internal control quality is positively associated with real earnings quality.

## 2.2. Firm-Level Life Cycle, Quality of Internal Control and Accounting Earnings Quality

In the early nineteen fifties, Mason Haire points out "biology life cycle can be used in business firms", thus the concept "firm life cycle" is proposed. Since then, many scholars study on the firm life cycle from different angles, so far, there are over twenty theoretical models, among which, Victoria Dickinson's classification method is the most widespread, he divides the firm life cycle into five stages: introduction, growth, mature, shake-out and decline. The most representative opinion in China is raised by Li Mingyu (2006), which divide life cycle as incubation, birth and survival, growth, mature and decline; some studies divide the firm life cycle into start-up, growth, mature and decline. By reviewing firm life cycle theory domestic and abroad, the author divide life cycle into introduction, growth, mature and decline.

The severity of agent problem is different at different stages of firm life cycle, the effect of internal control is varying. Miller and Friesen (1984) state that in the introduction LCS, firm's owner is predominant, and organization structure is informal, the role of internal control at this time is not important [11]. In the growth LCS, sales grow rapidly, plenty of resources are accumulated, and organizational structure is much more formal, managers are predominant. If scientific control system is established, firms are less likely to out of control. In the mature LCS, sales keep stable and innovation level drop [12], bureaucratic organizational structure is established. Firm's controllability and flexibility are balance, sound institutional and organizational structures can protect creativity and flexibility. In the decline LCS, firms are bureaucratic, rules and regulations are invalid, contradiction is severe among organizations. Therefore, for mature firms, internal control can significantly improve the efficiency and effectiveness of operations; for growth, mature and decline firms, internal control can significantly improve the quality of accounting information. Based on the discussion above, the author propose the following hypothesis:

H3: In the different stage of firm-level life cycle, the relation between internal control and earnings quality is different.

## 3. Research Design and Methodology

### 3.1. Sample Selection

The sample is comprised of firms listed on the Shanghai and Shenzhen A-share stock exchanges with necessary data on CSMAR. The sample period extends from 2010 through 2013. Firms with missing equity, profit, asset, return on equity (ROE) are excluded from the sample. Finally, financial firms are excluded because capital constraints materially alter their cash flow structure relative to other industries. These criteria result in a final sample of 4116 firm-year observations.

### 3.2. Variable Measurement

#### 3.2.1. Measure of Firm-Level Life Cycle

The author employs cash flow patterns to proxy firm-level life cycle. The patterns provide a parsimonious indicator of life cycle stage that is free from distributional assumptions (*i.e.*, uniformity). The proxy identifies differential behavior in the persistence and convergence patterns of profitability. Given that the majority of China's

listed companies have generally gone through the introduction period, so this enterprise life cycle is divided into growth, mature and decline stages. Specific partitioning method shown in **Table 1**. The author proxy life cycle by using two indicator variables (LCMATURE and LCGROWTH).

### 3.2.2. Measure of Internal Control Quality

The author selects Internal Control of Listed Companies Index issued by DIB Enterprise Risk Management Ltd. to evaluate internal control quality. The index system corporates financial data from annual reports, “corporate governance”, “Important events”, “Internal Control Self-Evaluation Report”, etc., this index combines internal control objectives, internal control elements and financial data to quantify the quality of internal controls, which can capture internal control quality more accurately. The author proxy the internal control quality (ICQ) by using the natural logarithm of the index.

### 3.2.3. Measures of Accrual Quality

The higher the degree of earnings management, the lower earnings quality (Lei Ying, 2013), and therefore earnings management can be used to measure earnings quality. Following Dechow (1995), the author measure the accrual quality using the modified Jones model.

$$TDA_t/A_{t-1} = \beta_0 + \beta_1(1/A_{t-1}) + \beta_2[(\Delta REV_t - \Delta REC_t)/A_{t-1}] + \beta_3(PPE_t/A_{t-1}) + \mu_t \quad (1)$$

$$TDA_t/A_{t-1} = \beta_0 + \beta_1(1/A_{t-1}) + \beta_2[(\Delta REV_t - \Delta REC_t)/A_{t-1}] + \beta_3(PPE_t/A_{t-1}) \quad (2)$$

$$DA_t/A_{t-1} = TDA_t/A_{t-1} - NDA_t/A_{t-1} \quad (3)$$

where  $TDA_t$  is the sum of accrual earnings in year  $t$ ;  $NDA_t$  is accruals that cannot be manipulated;  $DA_t$  is the absolute value of  $\mu_t$ , which represents the accruals management;  $A_{t-1}$  is the total asset of year  $t - 1$ ;  $\Delta REV_t$  is the current year change in sales;  $\Delta REC_t$  is the current year change of accounts receivable;  $PPE_t$  is the current year level of property, plant and equipment [13].

### 3.2.4. Measures of Real Earnings Quality

Following Roychowdhury (2006), the author investigate three different REM methods: sales manipulation (proxied by the abnormal level of cash flow from operations), reducing (increasing) discretionary expenditures (proxied by the abnormal level of discretionary expenditures), and increasing (decreasing) earnings by reducing (increasing) the cost of goods sold by overproducing (under producing) inventory (proxied by the abnormal level of production cost).

$$CFO_t/A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \alpha_2(S_t/A_{t-1}) + \alpha_3(\Delta S_t/A_{t-1}) + \varepsilon_t \quad (6)$$

where  $CFO_t$  is the sum of the cash flow from operating in year  $t$ ;  $S_t$  is the net sales;  $A_{t-1}$  is the total asset of year  $t - 1$ ; the absolute value of estimated residuals represent the abnormal level of operating cash flows (ACFO).

$$DISEXP_t/A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \alpha_2(S_{t-1}/A_{t-1}) + \varepsilon_t \quad (7)$$

where  $DISEXP_t$  is the discretionary expenditures (*i.e.*, the sum of advertising expense, research and development, and selling, general and administrative) in year  $t$ ;  $A_{t-1}$  is the total asset of year  $t - 1$ ; the absolute value of estimated residuals represent the abnormal level of discretionary expenses (ADISEXP).

$$PROD_t/A_{t-1} = COGS_t/A_{t-1} + \Delta INV/A_{t-1} \quad (8)$$

**Table 1.** Cash flow patterns of life cycle stages.

|  | Introduction | Growth | Mature | Decline  |
|--|--------------|--------|--------|--|
| Net Cash flows from operating activities | –            | +      | +      | Other combinations<br>other than the first<br>three combinations |
| Net Cash flows from investing activities | –            | –      | –      |  |
| Net Cash flows from financing activities | +            | +      | –      |  |

$$COGS_t/A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \alpha_2(S_t/A_{t-1}) + \varepsilon_t \quad (9)$$

$$\Delta INV_t/A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \alpha_2(\Delta S_t/A_{t-1}) + \alpha_3(\Delta S_{t-1}/A_{t-1}) + \varepsilon_t \quad (10)$$

$$PROD_t/A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \alpha_2(S_t/A_{t-1}) + \alpha_3(\Delta S_t/A_{t-1}) + \alpha_4(\Delta S_{t-1}/A_{t-1}) + \varepsilon_t \quad (11)$$

where  $PROD_t$  is the sum of the cost of goods sold in year  $t$  ( $COGS_t$ ) and the change in inventory from  $t - 1$  to  $t$  ( $\Delta INV_t$ );  $A_{t-1}$  is the total asset of year  $t - 1$ ; the absolute value of estimated residuals of Equation (11) is the abnormal level of production costs (APROD).

$$SREM\text{-Proxy}_t/A_{t-1} = APROD_t/A_{t-1} + ACFO_t/A_{t-1} + ADISEXP_t/A_{t-1} \quad (12)$$

where  $SREM\text{-Proxy}_t$  is the sum of real earnings management.  $A_{t-1}$  is the total asset of year  $t - 1$ .

### 3.2.5. Control Variables

The following five control variables were adapted from Ye *et al.* (2012). The author control for company size by including the natural logarithm of current total asset (SIZE); to control for the effect of indebtedness on earnings management, The author include the current year's leverage (LEV) in the model; the author add the return on equity (ROE) and growth rate of sales (GROWTH); to control for the effect of owner's characteristic, The author include an indicator variable for state-owned firms (STATE). Year and industry fixed effects control for temporal variation and industry differences in earnings management. The variables are defined in [Appendix A](#).

### 3.3. Model Specification

To test H1 and H2 on earnings management, the author estimates the following OLS regression model:

$$EM_{it} = \beta_0 + \beta_1 ICQ_{it} + \beta_2 X + \varepsilon_{it} \quad (13)$$

where EM is a group of earnings management which includes the accrual-based earnings manipulation (DA), abnormal level of operating cash flows (ACFO), the abnormal level of discretionary expenses (ADISEXP), the abnormal level of production costs (APROD) and the sum of real earnings management (SREM); ICQ is the internal control quality; X represents control variables group.

To test H3 on earnings management, the author estimated the following OLS regression model:

$$EM_{it} = \beta_0 + \beta_1 LCGROWTH_{it} + \beta_2 LCMATURE_{it} + \beta_3 ICQ_{it} + \beta_4 LCGROWTH_{it} \times ICQ_{it} + \beta_5 LCMATURE_{it} \times ICQ_{it} + \beta_6 X_{it} + \varepsilon_{it} \quad (14)$$

where EM is a group of earnings management which includes the accrual-based earnings manipulation (DA), abnormal level of operating cash flows (ACFO), the abnormal level of discretionary expenses (ADISEXP), the abnormal level of production costs (APROD) and the sum of real earnings management (SREM); LCGROWTH is a dummy variable set to 1 if a firm is classified as growth firm, and 0 otherwise; LCMATURE is also an indicator variable set to 1 if a firm is classified as mature firm, and 0 otherwise. ICQ is the internal control quality; X represents control variables group.

## 4. Results

### 4.1. Descriptive Statistics and Univariate Analysis

**Table 2** presents descriptive statistics of major variables. The mean (median) values of the variables of earnings quality are the following: DA is 0.060 (0.042), ACFO is 0.062 (0.045), ADISEXP is 0.053 (0.037), APROD is 0.091 (0.058), SREM is 0.206 (0.151). The mean (median) value of ICQ is 6.488 (6.526), GROWTH is 0.164 (0.093), ROE is 0.070 (0.067), LEV is 0.448 (0.449), SIZE is 21.974 (21.795).

Turning to the difference of growth, mature and decline, the author divide samples into three subsamples, and carry out an univariate analysis, the results presented in **Table 3**. DA, ACFO and SREM are significantly higher for decline firms, and then mature firms; ADISEXP is significantly higher for mature firms. Overall, the univariate results seem to provide initial support for H3; firms in different life cycle have different earnings quality.

**Table 2.** Descriptive statistics of major variables.

| Variable | Mean   | Std.  | Min    | Median | Max    |
|----------|--------|-------|--------|--------|--------|
| DA       | 0.060  | 0.064 | 0.000  | 0.042  | 0.527  |
| ACFO     | 0.062  | 0.058 | 0.000  | 0.045  | 0.355  |
| ADISEXP  | 0.053  | 0.058 | 0.000  | 0.037  | 0.415  |
| APROD    | 0.091  | 0.116 | 0.000  | 0.058  | 2.018  |
| SREM     | 0.206  | 0.181 | 0.007  | 0.151  | 2.333  |
| ICQ      | 6.488  | 0.199 | 5.136  | 6.526  | 6.810  |
| LCGROWTH | 0.294  | 0.456 | 0.000  | 0.000  | 1.000  |
| LCMATURE | 0.390  | 0.488 | 0.000  | 0.000  | 1.000  |
| GROWTH   | 0.164  | 0.436 | -0.499 | 0.093  | 2.939  |
| ROE      | 0.070  | 0.098 | -0.330 | 0.067  | 0.355  |
| LEV      | 0.448  | 0.220 | 0.046  | 0.449  | 0.903  |
| SIZE     | 21.974 | 1.259 | 19.563 | 21.795 | 25.800 |
| STATE    | 0.450  | 0.498 | 0.000  | 0.000  | 1.000  |

**Table 3.** Univariate analysis of major variables.

|         | Mean   |        |         | T statistics  |                |                |
|---------|--------|--------|---------|---------------|----------------|----------------|
|         | Growth | Mature | Decline | Growth-Mature | Mature-Decline | Growth-Decline |
| DA      | 0.047  | 0.057  | 0.076   | -4.7982***    | -7.5947***     | -10.4450***    |
| ACFO    | 0.042  | 0.058  | 0.085   | -8.1978***    | -12.5864***    | -19.6362***    |
| ADISEXP | 0.052  | 0.056  | 0.050   | -1.8343       | 3.0809***      | 1.024          |
| APROD   | 0.081  | 0.090  | 0.103   | -2.0704**     | -3.1004***     | -4.6373***     |
| SREM    | 0.175  | 0.204  | 0.238   | -4.2329***    | -5.0814***     | -8.9254***     |
| ICQ     | 6.504  | 6.505  | 6.451   | -0.241        | 8.7521***      | 7.8361***      |
| Growth  | 0.199  | 0.134  | 0.169   | 4.4005***     | -2.1466**      | 1.573          |
| ROE     | 0.076  | 0.085  | 0.045   | -2.7359**     | 10.6098***     | 7.7612***      |
| Lev     | 0.4814 | 0.3981 | 0.4797  | -10.5118***   | 9.6834***      | -0.1972        |
| Size    | 22.265 | 21.928 | 21.768  | 6.8821***     | 3.3629***      | 9.5948***      |
| State   | 0.474  | 0.445  | 0.434   | 1.548         | 0.556          | 1.9953         |

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

The innate variables associated with earnings quality also tend to be different in different life cycle.

## 4.2. Multivariate Analysis of Earnings Quality and Internal Control

The first column of results in **Table 4** contains the regression estimates of accruals-based earnings management on internal control quality, internal control quality is negatively related to the accruals-based earnings management, supporting H1 and suggesting effective internal control can suppress accruals management. The economic magnitude of the coefficient on ICQ is significant ( $t = -2.79$ ). The second column contains the regression estimates of sum of real earnings management on internal control quality, the coefficient between SREM and ICQ

**Table 4.** Earnings quality and internal control.

|                     | (1)                    | (2)                   | (3)                    | (4)                  | (5)                    |
|---------------------|------------------------|-----------------------|------------------------|----------------------|------------------------|
|                     | DA                     | SREM                  | ACFO                   | APROD                | ADISEXP                |
| ICQ                 | -0.0206**<br>(-2.79)   | -0.0404*<br>(-2.30)   | -0.0161**<br>(-2.81)   | -0.0222*<br>(-2.10)  | -0.00199<br>(-0.38)    |
| GROWTH              | 0.0352***<br>(7.29)    | 0.113***<br>(8.36)    | 0.0251***<br>(7.47)    | 0.0633***<br>(5.51)  | 0.0241***<br>(7.01)    |
| ROE                 | -0.0243<br>(-1.37)     | 0.411***<br>(8.13)    | 0.105***<br>(7.51)     | 0.227***<br>(6.34)   | 0.0795***<br>(5.85)    |
| SIZE                | -0.00686***<br>(-6.60) | -0.0119***<br>(-4.44) | -0.00386***<br>(-4.31) | -0.00428*<br>(-2.39) | -0.00379***<br>(-4.30) |
| LEV                 | 0.0520***<br>(8.30)    | 0.0774***<br>(4.43)   | 0.0294***<br>(5.47)    | 0.0437***<br>(3.57)  | 0.00431<br>(0.85)      |
| STATE               | -0.00593**<br>(-2.63)  | -0.00316<br>(-0.52)   | -0.000992<br>(-0.50)   | -0.00394<br>(-0.99)  | 0.00177<br>(0.87)      |
| _cons               | 0.326***<br>(7.00)     | 0.652***<br>(5.72)    | 0.232***<br>(6.10)     | 0.280***<br>(3.89)   | 0.140***<br>(4.13)     |
| Year                | Fixed                  | Fixed                 | Fixed                  | Fixed                | Fixed                  |
| Ind                 | Fixed                  | Fixed                 | Fixed                  | Fixed                | Fixed                  |
| N                   | 4116                   | 4116                  | 4116                   | 4116                 | 4116                   |
| Adj. R <sup>2</sup> | 0.1033                 | 0.1459                | 0.0833                 | 0.1140               | 0.0689                 |

*t* statistics in parentheses. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

is significantly negative, supporting H2 and indicating that effective internal control can restrain real earnings manipulation. Columns (3)-(5) report results of the abnormal level of operating cash flows (ACFO), the abnormal level of discretionary expenses (ADISEXP) and the abnormal level of production costs (APROD) on internal control quality. Both ACFO and APROD are negatively related to internal control quality, significant at 0.05 level in column (3) and at 0.10 level in column (4). For ADISEXP, the coefficient on internal control quality is negative but not significant in economic magnitude. Possible explanations are as follows: for one thing, effective internal control can suppress earnings management by manipulating discretionary expenses, making the actual discretionary expenses close to expected discretionary expenses, increasing the discretionary expense-based earnings quality; for another, effective internal control can promote the management efficiency, reducing the discretionary expenses, making actual discretionary expenses lower than expected discretionary expenses, which means discretionary expense-based earnings quality go down. These two adverse effects exist at the same time, which makes it unclear whether effective internal control can improve discretionary expense-based earnings quality.

The OLS regression results of earnings quality on internal control and life cycle are reported in [Table 5](#). The first column of results in [Table 5](#) contains the regression estimates of accruals-based earnings management on internal control quality and life cycle, the coefficient between DA and ICQ is not significant, suggesting decline firms' internal control has no effect on accruals quality.  $ICQ \times LCMATURE$  is negatively related to DA, which means compared to other firms, mature firms' internal control is positively related to accruals quality. The second column contains the regression estimates of sum of real earnings management on internal control quality and life cycle, the coefficient between SREM and ICQ is significantly negative, suggesting that effective internal control of decline firms can constrain real earnings manipulation. The coefficient between SREM and  $LCGROWTH \times ICQ$ ,  $LCMATURE \times ICQ$  is significantly positive, suggesting that for growth and mature firms, the higher internal control quality, the higher level of real earnings management, which indicates that compared

**Table 5.** Earnings quality, internal control quality and life cycle.

|                           | (1)                    | (2)                   | (3)                    | (4)                   | (5)                  |
|---------------------------|------------------------|-----------------------|------------------------|-----------------------|----------------------|
|                           | DA                     | SREM                  | ADISEXP                | ACFO                  | APROD                |
| ICQ                       | 0.00197<br>(0.15)      | -0.0852***<br>(-4.26) | -0.0166**<br>(-2.89)   | -0.0295***<br>(-3.43) | -0.0391**<br>(-3.05) |
| LCGROWTH                  | 0.170<br>(1.69)        | -0.570***<br>(-3.49)  | -0.174**<br>(-3.17)    | -0.153*<br>(-2.37)    | -0.243*<br>(-2.36)   |
| LCMATURE                  | 0.260**<br>(2.58)      | -0.649**<br>(-2.87)   | -0.155*<br>(-2.12)     | -0.271***<br>(-3.63)  | -0.223<br>(-1.81)    |
| LCGROWTH × ICQ            | -0.0301<br>(-1.95)     | 0.0768**<br>(3.02)    | 0.0270**<br>(3.18)     | 0.0164<br>(1.65)      | 0.0333*<br>(2.08)    |
| LCMATURE × ICQ            | -0.0419**<br>(-2.70)   | 0.0942**<br>(2.70)    | 0.0247*<br>(2.19)      | 0.0373**<br>(3.23)    | 0.0322<br>(1.68)     |
| GROWTH                    | 0.0356***<br>(7.35)    | 0.113***<br>(8.39)    | 0.0244***<br>(7.11)    | 0.0250***<br>(7.74)   | 0.0634***<br>(5.51)  |
| ROE                       | -0.0171<br>(-0.95)     | 0.437***<br>(8.69)    | 0.0767***<br>(5.67)    | 0.124***<br>(9.08)    | 0.237***<br>(6.61)   |
| SIZE                      | -0.00550***<br>(-5.28) | -0.00811**<br>(-3.04) | -0.00394***<br>(-4.41) | -0.00134<br>(-1.53)   | -0.00283<br>(-1.60)  |
| LEV                       | 0.0508***<br>(8.12)    | 0.0707***<br>(4.14)   | 0.00599<br>(1.19)      | 0.0236***<br>(4.59)   | 0.0411***<br>(3.40)  |
| STATE                     | -0.00613**<br>(-2.76)  | -0.00386<br>(-0.65)   | 0.00159<br>(0.78)      | -0.00125<br>(-0.67)   | -0.00420<br>(-1.06)  |
| _cons                     | 0.163<br>(1.91)        | 0.895***<br>(6.69)    | 0.234***<br>(6.11)     | 0.290***<br>(5.11)    | 0.371***<br>(4.25)   |
| <i>Year</i>               | Fixed                  | Fixed                 | Fixed                  | Fixed                 | Fixed                |
| <i>Ind</i>                | Fixed                  | Fixed                 | Fixed                  | Fixed                 | Fixed                |
| <i>N</i>                  | 4116                   | 4116                  | 4116                   | 4116                  | 4116                 |
| <i>Adj. R<sup>2</sup></i> | 0.1292                 | 0.1719                | 0.0722                 | 0.1844                | 0.1230               |

*t* statistics in parentheses. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

to accruals management which is easily detected by outsiders, growth firms and mature firms are more inclined to employ real earnings manipulation. Columns (3)-(5) report results of the abnormal level of operating cash flows (ACFO), the abnormal level of discretionary expenses (ADISEXP) and the abnormal level of production costs (APROD) on internal control quality and life cycle. Results and explanations are similar to column (2). Findings above support H3.

### 4.3. Robust Analysis

Accounting to Fang (2011), there is a certain substitution effect between internal control and external audit, and the cost of the audit has an impact on the substitution effect. In this paper, The author add audit opinion (AUDITTYPE) and audit costs (AUDITCOST) to the OLS model, the results still support the hypothesis, results of robots analysis are reported in **Table 6**.

**Table 6.** Robust analysis.

|                | (1)                    | (2)                   | (3)                    | (4)                   | (5)                  |
|----------------|------------------------|-----------------------|------------------------|-----------------------|----------------------|
|                | DA                     | SREM                  | ADISEXP                | ACFO                  | APROD                |
| ICQ            | 0.00115<br>(0.09)      | -0.0851***<br>(-4.23) | -0.0164**<br>(-2.86)   | -0.0296***<br>(-3.41) | -0.0390**<br>(-3.03) |
| LCGROWTH       | 0.167<br>(1.67)        | -0.553***<br>(-3.39)  | -0.154**<br>(-2.84)    | -0.162*<br>(-2.49)    | -0.238*<br>(-2.31)   |
| LCMATURE       | 0.260**<br>(2.58)      | -0.640**<br>(-2.80)   | -0.143<br>(-1.96)      | -0.276***<br>(-3.63)  | -0.221<br>(-1.77)    |
| LCGROWTH × ICQ | -0.0298<br>(-1.93)     | 0.0742**<br>(2.92)    | 0.0239**<br>(2.85)     | 0.0178<br>(1.77)      | 0.0325*<br>(2.02)    |
| LCMATURE × ICQ | -0.0420**<br>(-2.70)   | 0.0927**<br>(2.62)    | 0.0228°<br>(2.02)      | 0.0380**<br>(3.24)    | 0.0319<br>(1.65)     |
| GROWTH         | 0.0355***<br>(7.32)    | 0.113***<br>(8.37)    | 0.0246***<br>(7.18)    | 0.0248***<br>(7.68)   | 0.0633***<br>(5.49)  |
| ROE            | -0.0168<br>(-0.93)     | 0.440***<br>(8.65)    | 0.0798***<br>(5.87)    | 0.123***<br>(8.95)    | 0.237***<br>(6.55)   |
| SIZE           | -0.00517***<br>(-4.40) | -0.00916**<br>(-2.75) | -0.00574***<br>(-5.32) | -0.000225<br>(-0.21)  | -0.00320<br>(-1.40)  |
| LEV            | 0.0506***<br>(8.00)    | 0.0719***<br>(4.17)   | 0.00767<br>(1.50)      | 0.0226***<br>(4.34)   | 0.0415***<br>(3.41)  |
| AUDITCOST      | -1.62e-10<br>(-0.73)   | 1.18e-09<br>(0.68)    | 2.08e-09***<br>(3.70)  | -1.20e-09*<br>(-2.39) | 2.98e-10<br>(0.25)   |
| AUDITTYPE      | 0.00773<br>(0.58)      | 0.0107<br>(0.35)      | 0.00631<br>(0.60)      | -0.000750<br>(-0.06)  | 0.00513<br>(0.28)    |
| STATE          | -0.00649**<br>(-2.91)  | -0.00395<br>(-0.66)   | 0.00151<br>(0.74)      | -0.00140<br>(-0.75)   | -0.00406<br>(-1.02)  |
| _cons          | 0.154<br>(1.81)        | 0.905***<br>(6.38)    | 0.263***<br>(6.45)     | 0.269***<br>(4.53)    | 0.373***<br>(3.99)   |
| Year           | fixed                  | fixed                 | fixed                  | fixed                 | fixed                |
| Ind            | fixed                  | fixed                 | fixed                  | fixed                 | fixed                |
| Y2             | 0.1292                 | 0.1718                | 0.0745                 | 0.1851                | 0.1226               |

*t* statistics in parentheses. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

## 5. Conclusions

The author examines the relation between earnings quality and internal control quality based on the life cycle perspective, and finds that firms with effective internal control have higher earnings quality. However, the relation between earnings quality and internal control quality varies across life cycle stages. Specifically, mature firms' internal control quality is positively related to accruals quality, however, the internal control quality of growth and decline firms do not seem to have relation with accrual quality; for decline firms, internal control quality is positively related to real earnings quality, whereas, for growth and mature firms, the relation between internal control quality and real earnings quality is just opposite, suggesting that growth and mature firms are

more discreet in choosing methods of earnings management. Compared to accruals management, which is easily detected or constrained by outsiders, they are more inclined to manipulate real operational activities.

The findings of this study extend the research on internal control over financial reporting and the research on real earnings management by providing a new perspective on situations that can provide fertile ground for REM. This study is important especially to outsiders for assessing management's susceptibility to exercise effective internal control, which is difficult for outsiders. This study identifies a setting where there is a greater risk for information distortion.

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## Appendix A

| Variable                                 | Definition  |
|--|---|
| Dependent Variables                      |   |
| Accruals-based earnings management       | The residuals from the following regression:<br>$TDA_t/A_{t-1} = \beta_0 + \beta_1(1/A_{t-1}) + \beta_2[(\Delta REV_t - \Delta REC_t)/A_{t-1}] + \beta_3(PPE_t/A_{t-1}) + \mu_t$  |
| Abnormal Level of Operating Cash Flows   | The absolute value of residuals from the following regression:<br>$CFO_t/A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \alpha_2(S_t/A_{t-1}) + \alpha_3(\Delta S_t/A_{t-1}) + \varepsilon_t$                                     |
| Abnormal Level of Production Costs       | The absolute value of residuals from the following regression:<br>$PROD_t/A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \alpha_2(S_t/A_{t-1}) + \alpha_3(\Delta S_t/A_{t-1}) + \alpha_4(\Delta S_{t-1}/A_{t-1}) + \varepsilon_t$ |
| Abnormal Level of Discretionary Expenses | The absolute value of residuals from the following regression:<br>$DISEXP_t/A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \alpha_2(S_{t-1}/A_{t-1}) + \varepsilon_t$   |
| Sum of Real Earnings Management          | The sum of abnormal level of operating cash flows, abnormal level of production costs, abnormal level of discretionary expenses   |
| Variables of interest                    |   |
| Internal control quality                 | The natural logarithm of the Internal Control of Listed Companies Index   |
| Firm-level life cycle                    | Two indicator variables: LCGROWTH is equal to 1 if the firm is a growth firm, and 0 otherwise; LCMATURE is equal to 1 if the firm is a mature firm, and 0 otherwise   |
| Control variables                        |   |
| GROWTH                                   | The growth rate of sales  |
| ROE                                      | Net profit/Average equity   |
| LEV                                      | Total debt/total asset  |
| SIZE                                     | The natural logarithm of the total asset  |
| STATE                                    | An indicator variable that is equal to 1 if the firm is controlled by state, and 0 otherwise  |