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RESEARCH ARTICLE

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Corporate Life Cycle and the Accrual Model: An Empirical Study Based on Chinese Listed Companies

Abstract Based on data from China's listed companies from 1998 to 2005, this paper investigates whether the incorporation of corporate life cycle variables into the accrual model improves the model's explanatory power. Results of the empirical study show that the inclusion of corporate life cycle variables reduces the likelihood of both type I and II errors, and it also significantly improves the explanatory power of the accrual model.

Keywords accrual model, corporate life cycle, type I error, type II error

1 Introduction

Under the accrual basis accounting, accrual earnings are regarded a better measure of firm performance than cash flows, due to its matching principle (Dechow, 1994). In extant accounting studies, modeling the accrual process is

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important when examining management's financial choices (Fields, Lys and Vincent, 2001; Kothari, 2001). Because accrual is the net effects of numerous accounting policies on earnings, it thereby better captures the likelihood of income management (Watts and Zimmerman, 1990). Abnormal accrual has been widely used as a proxy for accrual quality and earnings management in accounting studies (Francis, LaFond and Schipper, 2005; Gu, Lee and Rosett, 2005).

The purpose of the accrual model is to accurately separate accruals into abnormal and normal components based on management discretionary capacity.[1] However, the current model specification is short of solid theoretical foundation, and the estimation powers of existing accrual models are weak (Thomas and Zhang, 2000), which might result in bias when using the estimated abnormal accrual in studies (Dechow, Sloan and Sweeney, 1995; Guay, Kothari and Watts, 1996).

Healy (1996) proposes some directions for improving existing accrual models, including truthfully reflecting fundamental changes in firms, to capture how accruals are affected by corporate life cycle, and taking into account the ex post forecast errors of managers and the effects of accounting rules on accruals. However, current studies mostly focus on testing and analyzing different management incentives. Without a theoretical model for accruals process, those tests and analyses heavily rely on the accuracy of accrual models: a typical joint test (Kothari, Leone and Wasley, 2005). Due to the bias in existing accrual models, the reliability of the test on management accounting choices is questionable to a certain extent.

In accounting studies, the life cycle theory explains the differences in value relevance between earnings and cash flows across different life cycle stages (Anthony and Ramesh, 1992; Black, 1998). As accrual is the difference between earnings and operating cash flow, prior research also suggests that accrual has a systematic variation in its value relevance across different life cycle stages. Chen and Huang (2008) examine how corporate life cycle affects the relationship between accruals and accounting conservatism. They find that the accruals in Chinese listed companies systematically vary with corporate life cycle.

However, existing accrual models do not incorporate the impacts of corporate life cycle on accruals. If corporate life cycle and accruals correlate with each other, incorporating corporate life circle variables into accrual models is likely to improve the estimation power and accuracy of these models. Similar to Kothari, Leone, and Wasley (2005) and Ball and Shivakumar (2006), this study examines whether the incorporation of corporate life cycle variables improves the

[1] Following conventional practice, the term "abnormal accruals" and "discretionary accruals" can be used interchangeably. So do the terms of "nondiscretionary accruals" and "normal accruals."

specification and power of accrual models, based on data from Chinese listed companies from 1998 to 2005.

The remainder of this paper proceeds as follows. Section 2 reviews related studies. Section 3 introduces the research design. Section 4 presents the empirical results. Section 5 conducts other sensitivity analyses. Section 6 discusses alternative explanations for our results and Section 7 concludes.

2 Corporate Life Cycle and Accruals Models

Firms are evolving entities, and the path and rate of their evolution are jointly determined by internal factors (such as business strategies, financial resources, and managerial capabilities) and external factors (e.g., changes in the competitive environment and macroeconomic conditions). Corporate life cycle consists of distinct and identifiable phases resulting from changes in these fundamental factors, which arise from the strategic activities undertaken by a firm. Therefore, corporate life cycle is the combined result of business strategies and allocation of resources, comprehensively reflecting a firm's innate factors. The five stages of corporate life cycle identified by Gort and Klepper (1982) are as follows: (1) introductory, (2) growth, (3) maturity, (4) shakeout, and (5) decline. Firms move through these phases as the result of the changes in strategic decisions and the competition environment, reflecting a firm's reality and its actual operations. It provides a dynamic analysis framework for interpreting financial and accounting policy choices, and helps to achieve a deeper understanding of the changes in accounting choices and accrual accounting from a multi-period dynamic perspective (Chen and Huang, 2008).

The purpose of the accrual model is to accurately separate accruals into abnormal and normal ones based on management's discretionary capacity to capture the accrual process. Starting with Jones (1991), recent studies have tried to estimate a firm's normal accruals by regressing accruals on certain financial variables. The commonly used financial variables include changes in revenue, operating cash flow, book value of property plant and equipment, etc. That is, accruals = f (financial variables) + ε. The residuals from such regressions represent abnormal accruals, and we refer to these models as accrual models.

The existing Jones-like accrual models are based on business transactions, and few of them fully incorporate the effect of changes in business fundamentals on accruals. The normal accrual amount and process are highly context-dependent. For example, changes in accounts receivable are affected by various factors, such as credit terms, revenue recognition policies, operating capital management, other than sales change. The existing studies have also documented that, accruals are closely related to business fundamentals, such as company growth or specific life cycle stage. Therefore, to analyze the accrual attributes and model the accruals process, it is necessary to take business fundamentals into consideration. As suggested by Khan (2008), the source of low persistence in and mispricing of accruals is due to the neglect of economic variables related to firm growth. Khan suggests inclusion of the variables of the expected future growth and financial difficulties. Zhang (2007) finds that accruals vary with changes in growth attributes, such as growth in the number of employees, sales growth, capital expenditure, and external financing. The investment (growth) information contained in accruals could not be well captured by current sales growth. Therefore, the abnormal accruals estimated from current models are likely to capture growth rather than earning management due to the misspecification of these models. Ball and Shivakumar (2008) find that accounting characteristics of IPO companies and those experiencing major events, such as seasoned equity offerings, rights offerings, acquisition and merger, are not the result of manipulation by management, but reflect the differences between fundamentals before and after these events. Therefore, Kothari, Leone and Wasley (2005) use performance matching method to improve the accuracy of accruals estimation. Ball and Shivakumar (2006) introduce accounting conservatism into the relationship between accruals and cash flow, and adopt non-linear method to improve the explanatory power of accrual models.

Extant studies suggest that financial ratios for different stages of corporate life cycle show a systematic variation. The corporate life cycle framework helps understanding decision usefulness and value relevance of accounting variables (Anthony and Ramesh, 1992; Black, 1998; Stickney and Brown, 1999). Since accruals arise from the difference between earnings and operating cash flows, the above findings imply that accruals might demonstrate systematic variation associated with corporate life cycle. Chen and Huang (2008) find that accruals in Chinese listed companies present a systematic variation associated with corporate life cycle. Therefore, the accrual model will be subject to omitted variable issue when not incorporating the impact of corporate life cycle on accrual models. Liu (2007) also documents significant differences between normal and abnormal accruals over the corporate life cycles. Failing to include corporate life cycle in accrual models may lead to wrong inference.

Gu, Lee and Rosett (2005) examine the fluctuation in accrual variances among companies during different periods. They find that accruals are related to many factors and systematically vary across firms; that is, accruals are heteroscedastic. Existing studies, however, always assume homoscedasticy or identical variance across observations. The low test power of existing accrual models could be partly attributed to the failure in addressing the heteroscedasticy of accruals. Most existing accrual models estimate annual-industrial cross sectional regressions. However, classification based on industries is not very effective: It would be affected by the grouped number, resulting in huge differences among companies within the same group. Chen (2009) also finds that the accrual behavior is more homogeneous when grouped by corporate life cycle than those grouped by industry. Therefore, using the homogenization method to partition sample companies into more homogeneous groups would achieve a better estimation result.

Kothari, Leone and Wasley (2005) use the performance matching method to improve accrual models. They suggest that incorporating ROA or adopting ROA matching method could improve specification and estimation power of the existing accrual models. As the amount and sign of accruals vary with corporate life cycle (Chen and Huang, 2008), it is then reasonable to explore whether the incorporation of life cycle factors can improve the explanatory power of accrual models (as compared with the performance matching method). We use two approaches to control for the corporate life cycle effect: the first one includes proxy variables; the second uses life cycle stage-annual cross sectional regression, instead of the commonly adopted annual-industrial cross sectional regression to estimate normal accruals because the accrual behavior is more homogeneous grouped by corporate life cycle stage than those grouped by industry.

3 Research Design

3.1 Research Method

To test whether accrual models can be improved by including proxy variables for corporate life cycle, the following methods and steps are used in the empirical test.

If existing accrual models have already fully reflected the impacts of corporate life cycle on changes in accruals, including variables for firm life cycle will not improve the explanatory power of accrual models. Ball and Shivakumar (2006) find that including conditional conservatism into accrual models substantially improve the model's explanatory power.

Kothari, Leone and Wasley (2005) improve the specification and power of accrual models by using a performance matching method. We want to determine whether the explanatory power of their modified accrual model will be significantly improved after further including the proxy variables for corporate life cycle. In other words, after adding *ROA* to accrual model, we proceed to integrate firm life cycle indicators into the model, and examine whether the model has higher explanatory power.

If the accrual model has good specification, the mean and median of its estimated residuals should be close to zero, even in extreme cases.

To further examine whether the specification and power of accrual models have been improved after including corporate life cycle indicators, we use the simulation procedure proposed by Kothari, Leone, and Wasley (2005). 100 sample companies are drawn from the population and we calculate the mean of their abnormal accruals, and then repeat the process for 250 times. The specification of the test is then estimated, that is, the probability of type I error (the null is rejected when it is true), and the power of the test, that is, the probability of type Ⅱ error (the null is not rejected when it is false). For each of the 250 simulations, we assess the significance of the mean abnormal accruals using a t-test, as defined as follows:

$$\overline{DA}/(s(DA)/\sqrt{N} \sim t_{N-1},$$

where

$$\overline{DA} = \frac{1}{N}\sum_{i=1}^{N} DA_{it},$$

and

$$s(DA) = \sqrt{\sum_{i=1}^{N}(DA_{it} - \overline{DA})^2 / N - 1},$$

where DA_{it} is the abnormal accrual, $\overline{DA}$ is the mean abnormal accrual for the sample, $s(DA)$ is the estimated standard deviation of $\overline{DA}$ and N is sample size (i.e., 100).

For type I error, we use binominal test to assess whether the empirical rejection frequencies are significantly different from the specific significant levels.

Simulation procedure has been widely adopted in prior research examining accrual model's specification and power (e.g., Dechow, Sloan and Sweeney, 1995; Peasnell, Pope and Young, 2000; Chen and Jiang, 2005; Zhou, Luo and Jing, 2006).

3.2 Choice of Accrual Models

The Jones model is the most widely used accrual model (Ball and Shivakumar, 2006).[2]

$$ACC_t = \beta_0 + \beta_1 \Delta REV_t + \beta_2 PPE_t + \varepsilon. \tag{1}$$

McNichols (2002) argues that the Dechow and Dichev (2002) model and the Jones model can be combined to improve the explanatory power of accrual

[2] The intercept of Jones (1991) is 1/total assets, but Peasnell, Pope, and Young (2000) think that there is no theoretical reason for doing so, and such an approach makes the goodness of fit unreliable. Kothari, Leone, and Wasley (2005) think there should be a constant retained in the model, but they retain both the constant and 1/total assets items. Ball and Shivakumar (2006) retain interpret as the constant. In this paper, we regard the intercept as a constant.

models, as demonstrated in Larcker and Richardson's (2004) "mixed" model:

$$ACC_t = \beta_0 + \beta_1 CFO_t + \beta_2 \Delta REV_t + \beta_3 PPE_t + \varepsilon. \quad (2)$$

Subramanyam (1996) argues that cross-sectional model is superior to time-series model, for the former overcomes the problem that a sufficiently long time series data are required when using time-series regression estimation. We therefore adopt the cross-sectional approach.

3.3 Calculation of Accruals

Hribar and Collins (2002) find that when mergers and acquisitions occur or operations are discontinued, the balance sheet approach is potentially contaminated by measurement errors in accrual estimates. The results differ significantly from those based on the cash flow statement approach, which has smaller deviations in the calculation for accruals. We therefore collect our data from the cash flow statements of sample companies. Richardson, Sloan, Soliman and Tuna (2005), examining the definition of accruals in detail, argue that prior studies defining accruals as the change in non-cash financial working capital minus depreciation omit many accruals and deferral relating to non-current operating assets, non-current operating liabilities, non-cash financial assets, and financial liabilities. They provide a comprehensive definition in which accruals represent the change in all non-cash assets minus changes in all liabilities. From the view of the cash flow statement, total accruals are equal to "net income (or operating income) – (operating cash flows + financing cash flows + investing cash flows) + (sales of common stock – stock repurchase – cash dividends)." Dechow and Ge (2006) defined total accruals as net income – (operating cash flows + investing cash flows)." We follow Dechow and Ge (2006) to define accruals in this article.

3.4 Proxy Variable for Corporate Life Cycle

Dickinson (2007) suggests that cash flow pattern represents a firm's resource allocation, financing, and operational capabilities, as well as its choices of strategy in responding to the macroeconomic environment. This finding, without using arbitrary breakpoints or assuming a uniform distribution, uncovers a nonlinear relationship between cash flows and the corporate life cycle and underscores the difficulty in using univariate analyses or multi-variable method to capture the construct of the corporate life cycle, as shown in Table 1. Meanwhile, Dickinson (2007) examines the validity of cash flow pattern as a proxy for firm life cycle. Cash flow pattern provides a parsimonious, but robust, indicator of firm life cycle stage. Its results in a life cycle mappings are more consistent with relevant economic theories. Table 2 summarizes the relevant theory and cash flow patterns related to firm life cycle.

Chen (2009) examines the applicability of cash flow patterns as a proxy for firm life cycle in Chinese listed companies. His results reveal that for Chinese listed companies, firm characteristics, such as profitability, investment expenses, and other financial ratios, vary with corporate life cycle. Firm-specific life cycle and industry life cycle are different, and the naive inclusion of industry control variable can not capture the distinct economic differences at each firm life cycle stage. The evolving process of firm life cycle does not evolve in a sequential manner. For example, at the shakeout and decline stage, there are higher frequencies of delisting warnings in Chinese stock market. The research results show that proxy based on a combination of firm's cash flows and corporate life cycle can more accurately and parsimoniously classify different development stages of Chinese listed firms, which can be employed in large-sample analysis and help us gain a deeper understanding of the relationship between earnings attribute and accounting behavior. [3]

Therefore, this paper uses proxy variables based on cash flow patterns proposed by Dickinson (2007). As the impact of corporate life cycle on accounting variables is nonlinear, multi-dummy variables are used in the research design.

3.5 Sample

Chinese listed companies have been required to disclose cash flow statements since 1998. In addition, China's accounting system underwent major reforms in 1993 and 1998. This paper thus uses data from 1998 to 2005. We exclude financial institutions, PT companies, and companies with missing data.

Table 1 Cash Flow Patterns at Different Corporate Life Cycle Stages

	Introductory	Growth	Maturity	Shakeout	Shakeout	Shakeout	Decline	Decline
Operating cash flow	–	+	+	–	+	+	–	–
Investing cash flow	–	–	–	–	+	+	+	+
Financing cash flow	+	+	–	–	+	–	+	–

Note: When financing cash flow is zero, the life cycle is classified into the maturity, shakeout, and decline stage respectively, based on the characteristics of operating and investing cash flows. When investing cash flow is zero, the life cycle is classified into the maturity, shakeout, and decline stage respectively, based on the characteristics of operating and financing cash flows.

[3] For applicability and detailed results of cash flow patterns as a proxy for firm life cycle in Chinese listed companies, see Chapter 2 of Chen (2009).

Table2 Summary of Corresponding Economic Theories on the Cash Flow Patterns at Different Life Cycle Stage

Cash flow type	Introductory stage	Growth stage	Maturity stage	Shakeout stage	Decline stage
Operating	Firms enter market with knowledge deficit about potential revenues and costs (Jovanovic, 1982) **(–) Cash flows**	Profit margins are maximized during the period of the greatest investment (Spence, 1977, 1979, 1981) **(+) Cash flows**	Efficiency maximized through increased knowledge of operations (Spence, 1977, 1979, 1981; Wernerfelt, 1985) **(+) Cash flows**	Declining growth rates lead to declining prices (Wernerfelt, 1985) The Routines of established firms hinder the flexibility of competition (Hannan and Freeman, 1984) **(+/–) Cash flows**	Declining growth rates lead to declining prices (Wernerfelt, 1985) **(–) Cash flows**
Investing	Managerial optimism drives investment (Jovanovic, 1982) Firms make early large investments to deter entry (Spence, 1977, 1979, 1981) **(–) Cash flows**	Firms make early large investments to deter entry (Spence, 1977, 1979, 1981) **(–) Cash flows**	Obsolescence Increases relative to new investment as firms mature (Jovanovic, 1982; Wernerfelt, 1985) **(–) Cash flows**	Void in theory **(+/–) Cash flows**	Liquidation of assets to service debt **(+) Cash flows**
Financing	Pecking order theory predicts firms will prefer bank loan to equity (Myers, 1984; Diamond, 1991) **(+) Cash flows**	Pecking order theory predicts firms will prefer bank loan to equity (Myers, 1984; Diamond, 1991) **(+) Cash flows**	Focus shifts from financing to servicing debt and distributing excess funds to shareholders **(–) Cash flows**	Void in theory **(+/–) Cash flows**	Focus on debt repayment and /or renegotiation of debt **(+/–) Cash flows**

Meanwhile, if the data of the beginning or ending period are not available for calculating average total assets, either value is used as a substitute. Our final sample consists of 8177 firm-year observations. The sample size is reduced to 7 981 observations after excluding invalid observations. All data are taken from the CSMAR database developed by Shenzhen GTA Information Technology Co., Ltd.

4 Results

In Part one of the empirical test, we test whether incorporating life cycle indicator into accrual models has increased the explanatory power of Model (2). We also control for the impact of industry and year by using dummy variables. Industries are classified in accordance with the "Listed Companies Classification and Codes" issued by the China Securities Regulatory Commission in 2005. For the manufacturing sector, sample companies belonging to sub-categories such as the wood and furniture industry are grouped into "other manufacturing" because their numbers are comparatively small.

In Table 3, the regression results show that the coefficients of introduction stage and growth stage are positive and significant at the 1% level, while the coefficients of shakeout stage and the decline stage are negative and significant at the 1% level. The explanatory power of the model has significantly improved

Table 3 Relationship between Corporate Life Cycle and Accrual Models

Panel A: Results of the Basic Model

	Predicted sign	Without life cycle stage		With life cycle stage	
		Coefficient	*t* value	Coefficient	*t* value
Intercept		0.097***	15.42	0.085***	12.18
Introductory	+			0.051***	7.51
Growth	+			0.088***	25.44
Maturity					
Shakeout	–			–0.090***	–16.27
Decline	–			–0.110***	–9.81
CFO		–0.544***	–20.64	–0.629***	–19.81
ΔREV		0.110***	8.2	0.084***	7.67
PPE		0.026***	3.25	0.012*	1.74
Year and industry control variables		yes		yes	
No. of observations		8 177		8 177	
Adjusted R^2		0.142		0.309	

Panel B：Results after Controlling for Seasoned Equity Offerings, Rights Offerings and Losses

	Predicted sign	Without life cycle stage		With life cycle stage	
		Coefficient	*t* value	Coefficient	*t* value
intercept		0.121***	9.66	0.102***	8.81
Introductory	+			0.047***	8.00
Growth	+			0.071***	22.80
Maturity					
Shakeout	–			–0.074***	–15.37
Decline	–			–0.088***	–9.14
CFO		–0.696***	–30.76	–0.735***	–25.74
ΔREV		0.056***	5.74	0.043***	5.05
PPE		0.034***	4.86	0.023***	3.48
ZF	+	0.088***	6.27	0.054***	4.08
SEO	+	0.053***	10.54	0.019***	4.13
LOSS	–	–0.216***	–29.50	–0.188***	–27.65
Year and industry control variables		yes		yes	
No. of observations		8 177		8 177	
Adjusted R^2		0.345		0.450	

Note: 1. ***, **, and * denote coefficients significant at the 1%, 5 %, and 10% levels, respectively.
2. *t* values are heteroscedasticity adjusted.
3. All financial variables are standardized with average total assets.
4. The Model is $ACC_t = \beta_0 + \beta_1 CFO_t + \beta_2 \Delta REV_t + \beta_3 PPE_t + \varepsilon$, dummy variables for each industry group and each fiscal year are included.
5. In the regression model, the dependent variable *ACC* (total accruals) = net income – operating cash flow – investing cash flow; *CFO* is operating cash flow; Δ*REV* is change in revenue; *PPE* is gross property, plant, and equipment; *ZF* is the dummy variable for rights offering; *SEO* is the dummy variable for seasoned equity offerings; and *LOSS* represents the dummy variable for losses. Each life cycle stage is determined by the company's cash flow patterns as shown in Table 1.

after including indicators for controlling for corporate life cycle, and adjusted R^2 increases from 14.2% to 30.9%. Compared to the accrual model excluding corporate life cycle variables, the sign and significant levels of corresponding coefficients in the modified model remain unchanged. The results show that extant commonly used accrual model neglects some important variables – corporate life cycle factors.

In Part 2 of the empirical test, we test whether the model will have the same effects as performance-matched accrual model or have greater explanatory power after including the proxy variables for corporate life cycle. To show the effect of including both *ROA* and life cycle stage variables into the accruals regressions, we use five indicator variables for ROA (in quintiles) and five indicator variables for each of the stages in a firm life cycle. The results of Panel A in Table 4 show that the model has significant incremental explanatory power after including the proxy for corporate life cycle; the adjusted R^2 increases by about 11% (from 36.7% to 47.6%). So, even when *ROA* variables are included in the accrual model, the adding of life cycle variables still enhance significantly the model's explanatory power.

In China, research is mostly concerned with accounting choices or earnings management in Chinese listed companies as they try to meet or avoid the regulatory requirements for listing, delisting, and refinancing. Findings show that Chinese listed companies have strong incentives to manage earnings in the event of seasoned equity offerings, rights offerings, and losses (Cai, Li and Zhang, 2003). When these events occur, managers are motivated to make positive abnormal accruals in order to increase earnings. In the growth phase, companies also have a strong tendency to finance externally; therefore, these companies will report higher earnings to obtain long-term benefits from external financing. Therefore, the specifications of the accrual model should control for these factors, and so in Model (2), we add control variables for seasoned equity offerings, rights offerings, and losses. The estimated results are shown in the Panel B of Table 3 and Table 4. Comparing Panel A to Panel B in Table 4, there are no changes in the sign of coefficients and significant level at the introductory, growth, shakeout and decline stages, and other related financial variables such as *CFO*, *PPE* and ΔREV. Therefore, our results are not sensitive to the control variables.

In Part 3 of the empirical test, we assess descriptive statistics for abnormal accruals based on alternative approaches. The result rejects the null hypothesis of no earnings management, and that is, mean abnormal accruals should be zero. A value closer to zero indicates better measure for abnormal accruals. To compare with the results of Kothari, Leone and Wasley (2005), Table 5 lists the results of the Jones model and other models. Panel A shows that, without performance matching, the accrual model with life cycle stage variable produces the residual closest to zero (mean, lower quartile, median and upper quartile is 0, –0.057, 0, 0.06, respectively); the performance matching accrual model with life-cycle control variables also produces the residual that is the closest to zero (mean, lower quartile, median and upper quartile is 0.000, –0.049, –0.003, 0.042, respectively). Panel B shows that in the stratified sample, though not in all cases, the adding of corporate life cycle stage variables make the model performs better. All these results reveal that Jones model residuals and performance-matched accrual residuals are enhanced and improved when adding life cycle variables into these models.

Table 4 Comparison of ROA and ROA + Life Cycle Adjustments to Accruals Models

Panel A: Results of the Basic Model

	Predicted sign	ROA adjustments only		ROA and life cycle adjustments	
		Coefficient	*t* value	Coefficient	*t* value
Intercept		0.117***	22.74	0.100***	17.41
CFO		–0.798***	–36.78	–0.843***	–31.1
ΔREV		0.040***	4.43	0.028***	3.53
PPE		0.036***	5.23	0.023***	3.6
ROA Quintile 1	+	0.082***	21.05	0.084***	24.97
ROA Quintile2	+	0.035***	10.7	0.032***	11.48
ROA Quintile 3					
ROA Quintile 4	–	–0.037***	–12.58	–0.027***	–10.61
ROA Quintile 5	–	–0.165***	–30.19	–0.136***	–27.76
Introductory	+			0.043***	7.61
Growth	+			0.070***	24.34
Maturity					
Shakeout	–			–0.072***	–14.92
Decline	–			–0.098***	–9.94
Year and industry control variables		yes		yes	
Number of observations		8177		8177	
Adjusted R^2		0.367		0.476	

Panel B: Regression Results after Controlling for the Effect of Seasoned Equity Offerings, Rights Offerings, and Losses

	Predicted sign	ROA adjustments only		ROA and life cycle adjustments	
		Coefficient	*t* value	Coefficient	*t*-value
Intercept		0.116***	9.65	0.096***	8.70
CFO		–0.812***	–37.96	–0.855***	–31.92
ΔREV		0.030***	3.47	0.019**	2.53
PPE		0.035***	5.16	0.023***	3.68
ROA Quintile 1	+	0.083***	21.56	0.086***	25.54
ROA Quintile2	+	0.035***	10.66	0.032***	11.60
ROA Quintile 3					
ROA Quintile 4	–	–0.037***	–12.62	–0.027***	–11.11

(*To be continued*)

(*Continued*)

	Predicted sign	ROA adjustments only		ROA and life cycle adjustments	
		Coefficient	*t* value	Coefficient	*t*-value
ROA Quintile 5	−	−0.066***	−17.56	−0.052***	−16.07
Introductory	+			0.043***	7.74
Growth	+			0.067***	23.70
Maturity					
Shakeout	−			−0.070***	−14.91
Decline	−			−0.092***	−9.68
ZF	+	0.0623***	4.65	0.033***	2.61
SEO	+	0.037***	8.19	0.007*	1.67
LOSS	−	−0.150***	−19.40	−0.133***	−18.58
Year and industry control variables		yes		yes	
No. of observations		8177		8177	
Adjusted R^2		0.413		0.476	

Note: 1. The Model is $ACC_t = \beta_0 + \beta_1 CFO_t + \beta_2 \Delta REV_t + \beta_3 PPE_t + \varepsilon$, dummy variables for each industry group and each fiscal year are included. Each life cycle stage is determined by the company's cash flow patterns as shown in Table 1. Each firm-year observation is assigned into one of the five quintiles: *ROA* Quintile 1(for highest return on assets), *ROA* Quintile2, *ROA* Quintile 3, *ROA* Quintile 4, *and ROA* Quintile 5(for lowest return on assets).

2. In the regression, the dependent variable *ACC* (total accruals) = net income − operating cash flow − investing cash flow; *CFO* is operating cash flow; Δ*REV* is change in revenue; *PPE* is gross property, plant, and equipment; *ZF* is the dummy variable for rights offering; *SEO* is the dummy variable for seasoned equity offerings; and *LOSS* represents the dummy variable for losses.

3. ***, **, and * denote coefficients significant at the 1%, 5 %, and 10% levels, respectively.

4. *t* values are heteroscedasticity adjusted.

Table 5 Descriptive Statistics for Various Abnormal Accrual Measures
Panel A: Descriptive Statistics for Abnormal Accrual Measures for Full Sample

Full sample	Mean	Standard deviation	Lower quartile	Median	Upper quartile
Jones model	**0.000**	0.148	−0.068	0.001	0.073
Jones model (life cycle stage as substitute for industrial classification)	**0.000**	0.138	−0.059	0.002	0.062
Jones model with life cycle stage	**0.000**	**0.126**	**−0.057**	**0.000**	**0.060**
Performance matched approach					
Jones model with *ROA*	**0.000**	0.108	−0.061	−0.007	0.053
Jones model with *ROA* (life cycle stage as substitute for industrial classification)	**0.000**	0.095	−0.052	−0.005	0.042

(*To be continued*)

(*Continued*)

Full sample	Mean	Standard deviation	Lower quartile	Median	Upper quartile
Jones model with *ROA* and life cycle stage	**0.000**	**0.086**	**–0.049**	**–0.003**	**0.042**
Jones model (matched based on industry and current year's *ROA*)	–0.005	0.170	–0.096	–0.002	0.090
Jones model (matched based on life cycle stage and current year's *ROA*)	–0.006	0.143	–0.075	0.000	0.072
Jones model with life cycle stage (matched based on industry and current year's *ROA*)	–0.005	0.145	–0.081	–0.002	0.075

Panel B: Means (medians) of Abnormal Accrual Measures for Stratified-Random Sub-Sample

	Size		Operating cash flow		E/P ratio		Sales growth	
	Small	Large	Low	High	Small	Large	Low	High
Jones model	–0.015	**–0.002**	0.041	–0.037	–0.072	0.033	–0.024	0.010
	(–0.005)	(–0.009)	(0.043)	(–0.040)	(–0.057)	(0.023)	(–0.014)	(0.004)
Jones model (life cycle stage as substitute for industrial classification)	–0.012	–0.003	0.019	–0.024	–0.067	0.034	–0.023	0.011
	(–0.004)	(–0.006)	(0.024)	(–0.029)	(–0.049)	(0.025)	(–0.009)	(0.005)
Jones model with life cycle stage	–0.007	–0.005	**0.015**	**–0.022**	–0.054	0.027	–0.016	0.006
	(0.000)	(–0.009)	(0.012)	**(–0.023)**	(–0.038)	(0.019)	(–0.007)	(0.000)
Performance matched approach								
Jones model including *ROA*	–0.004	–0.007	0.060	–0.057	–0.008	**0.000**	–0.005	0.010
	(–0.008)	(–0.012)	(0.043)	(–0.060)	(–0.013)	(–0.009)	(–0.009)	(0.003)
Jones model including *ROA*	–0.002	–0.009	0.024	–0.044	–0.003	–0.002	–0.002	**0.005**
	(–0.006)	(–0.013)	(0.010)	(–0.047)	(–0.006)	(–0.010)	(–0.006)	(0.001)
Jones model including *ROA* and life cycle stage	**–0.001**	–0.008	0.019	–0.037	**–0.003**	**0.000**	**–0.002**	**0.005**
	(–0.002)	(–0.011)	**(0.006)**	(–0.037)	**(–0.002)**	(–0.006)	**(–0.003)**	**(0.000)**
Jones model (matched based on industry and current year's *ROA*)	–0.015	–0.008	0.055	–0.063	–0.017	–0.005	0.002	–0.015
	(–0.006)	(–0.006)	(0.052)	(–0.061)	(–0.009)	**(–0.005)**	(0.009)	(–0.014)

(*To be continued*)

(*Continued*)

	Size		Operating cash flow		E/P ratio		Sales growth	
	Small	Large	Low	High		Small	Large	Low
Jones model (matched based on life cycle stage and current year's *ROA*)	–0.006	–0.007	0.021	–0.047	–0.006	–0.005	0.010	–0.009
	(–0.001)	**(–0.005)**	(0.025)	(–0.051)	(–0.003)	**(–0.005)**	(0.013)	(–0.006)
Jones model including life cycle stage (matched based on industry and current year's *ROA*)	–0.008	–0.011	0.027	–0.045	–0.013	–0.007	0.006	–0.013
	(–0.001)	(–0.010)	(0.024)	(–0.040)	(–0.004)	(–0.006)	(0.014)	(–0.015)
No. of observations	1 992	1 999	1 992	1 999	1 992	1 999	1 992	1 999

Note: 1. Abnormal accruals are estimated for the corresponding sample. Abnormal accruals are measured as the residuals (ε) from cross-sectional regressions (within each year and industry) using the following competing models:

Jones Model is $ACC_t = \beta_0 + \beta_1 \Delta REV_t + \beta_2 PPE_t + \varepsilon$; Jones Model including *ROA* is $ACC_t = \beta_0 + \beta_1 \Delta REV_t + \beta_2 PPE_t + \beta_3 ROA_t + \varepsilon$; Jones model including life cycle stage is $ACC_t = \beta_0 + \beta_1 \Delta REV_t + \beta_2 PPE_t + \beta_3 LIFECYCLESTAGE_t + \varepsilon$; each life cycle stage is determined by the company's cash flow patterns as shown in Table 1. *LIFECYCLESTAGE* variable takes on a value of 1 if the firm-year is in that stage, and 0 otherwise. Life cycle stage maturity is omitted and used as a benchmark. *ACC* (total accruals) is net income – operating cash flow – investing cash flow; *CFO* is operating cash flow; Δ*REV* is change in revenue; *PPE* is gross property, plant, and equipment; *ROA* = net earnings/average of total assets.

To obtain a performance-matched abnormal accrual for firm *i* we subtract the model abnormal accrual of the firm with the closest ROA that is in the same industry as firm *i* or in the same life stage of firm *i*. All variables are standardized by average total assets. All abnormal accrual measures are reported as a percentage to total assets and the values in the parentheses indicate median.

2. In panel B, size is average of total assets; Operating cash flow = operating cash flow/average of total assets; E/P ratio = net earnings/closing share price at year end; Sales growth = (current net sales/previous net sales) – 1; ROA = net earnings/average of total assets; The samples in Panel B are from the lower and upper quartiles of the firms ranked on each partitioning variable at the end of the year *t*.

3. Numbers in bold indicate the value closest to zero in each column of the table.

In Part 4 of the empirical test, we use simulation procedure to test whether the specification and power of accrual models are improved after including proxy variables for corporate life cycle. Test results are shown in Table 6 and 7, respectively.

Table 6 shows the percentage of times out of the 250 simulations the null hypothesis of no abnormal accruals are rejected at the 5% level of significance.

Table 6 Comparison of the Type I Error Rates of Alternative Abnormal Accrual Measures
Panel A: The full sample

The null hypothesis of zero abnormal accrual is not supported at the 5% level	Abnormal accruals > 0	Abnormal accruals < 0
Jones model	7.2%	5.4%
Jones model (life cycle stage as substitute for industrial classification)	11.1%*	4.3%
Jones model including life cycle stage	7.1%	3.7%
Performance matched approach		
Jones model including *ROA*	4.4%	2.6%
Jones model including *ROA* (life cycle stage as substitute for industrial classification)	5.1%	6.3%
Jones model including *ROA* and life cycle stage	4.5%	6.9%
Jones model (matched based on industry and current year's *ROA*)	2.6%	10.3%*
Jones model (matched based on life cycle stage and current year's *ROA*)	10.1%*	6.4%
Jones model including life cycle stage (matched based on industry and current year's *ROA*)	1.8%	5.8%

Panel B: Stratified-Random Sub-Sample, Abnormal Accruals > 0

The null hypothesis of zero abnormal accrual is not supported at the 5% level	Size		Operating cash flow		E/P ratio		Sales growth	
	Small	Large	Low	High	Small	Large	Low	High
Jones model	1.5%	3.6%	53.3%*	0.0%	0.0%	48.2%*	2.6%	5.8%
Jones model (life cycle stage as substitute for industrial classification)	2.3%	1.9%	25.4%*	0.0%	0.0%	64.4%*	0.0%	10.9%
Jones model including life cycle stage	5.2%	1.1%	23.0%*	0.0%	0.0%	47.3%*	2.0%	6.8%
Performance matched approach								
Jones model including *ROA*	5.7%	1.5%	98.0%*	0.0%	4.7%	2.7%	2.4%	6.7%
Jones model including *ROA* (life cycle stage as substitute for industrial classification)	2.3%	0.0%	35.6%*	0.0%	3.1%	2.9%	5.4%	4.5%

(*To be continued*)

(*Continued*)

The null hypothesis of zero abnormal accrual is not supported at the 5% level	Size		Operating cash flow		E/P ratio		Sales growth	
	Small	Large	Low	High	Small	Large	Low	High
Jones model including *ROA* and life cycle stage	6.4%	1.7%	30.1%*	0.0%	4.0%	3.7%	5.8%	6.7%
Jones model (matched based on industry and current year's *ROA*)	7.1%	1.3%	61.0%*	0.0%	5.4%	3.8%	6.8%	0.0%*
Jones model (matched based on life cycle stage and current year's *ROA*)	9.6%*	2.2%	16.4%*	0.0%	5.9%	3.7%	8.2%*	2.7%
Jones model including life cycle stage (matched based on industry and current year's *ROA*)	5.4%	1.7%	27.5%*	0.0%	2.6%	3.0%	10.6%*	1.5%

Panel C: Stratified-Random Sub-Sample, Abnormal Accruals < 0

The null hypothesis of zero abnormal accrual is not supported at the 5% level	Size		Operating cash flow		E/P ratio		Sales growth	
	Small	Large	Low	High	Small	Large	Low	High
Jones model	4.9%	7.1%	0.0%	57.8%*	94.8%*	0.0%	18.9%*	1.3%
Jones model (life cycle stage as substitute for industrial classification)	5.5%	9.5%*	0.0%	34.5%*	92.0%*	0.0%	13.9%*	2.7%
Jones model including life cycle stage	2.0%	9.0%*	0.0%	31.3%*	84.0%*	0.0%	11.6%*	1.1%*
Performance matched approach								
Jones model including *ROA*	6.1%	9.8%*	0.0%	92.0%*	12.9%*	3.4%	9.1%*	1.4%
Jones model including *ROA* (life cycle stage as substitute for industrial classification)	5.5%	16.5%*	0.0%	84.8%*	5.9%	6.9%	5.0%	4.2%

(*To be continued*)

(*Continued*)

The null hypothesis of zero abnormal accrual is not supported at the 5% level	Size		Operating cash flow		E/P ratio		Sales growth	
	Small	Large	Low	High	Small	Large	Low	High
Jones model including *ROA* and life cycle stage	4.3%	11.5%*	0.0%	78.8%*	6.6%	5.2%	5.5%	2.3%
Jones model (matched based on industry and current year's *ROA*)	11.7%*	5.8%	0.0%	78.0%*	9.8%*	8.3%	2.6%	13.0%*
Jones model (matched based on life cycle stage and current year's *ROA*)	7.1%	7.5%	0.0%	63.2%*	4.7%	4.9%	3.0%	7.4%
Jones model including life cycle stage (matched based on industry and current year's *ROA*)	8.3%*	8.3%*	0.0%	62.5%*	9.3%*	7.4%	1.1%*	13.7%*

Note: 1. Abnormal accruals are estimated from the corresponding sample. Abnormal accruals are measured as the residuals (ê) from cross-sectional regressions (within each year and industry) using the following competing models:

Jones Model is $ACC_t = \beta_0 + \beta_1 \Delta REV_t + \beta_2 PPE_t + \varepsilon$; Jones Model including *ROA* is $ACC_t = \beta_0 + \beta_1 \Delta REV_t + \beta_2 PPE_t + \beta_3 ROA_t + \varepsilon$; Jones model including life cycle stage is $ACC_t = \beta_0 + \beta_1 \Delta REV_t + \beta_2 PPE_t + \beta_3 LIFECYCLESTAGE_t + \varepsilon$; each life cycle stage is determined by the company's cash flow patterns as shown in Table 1. *LIFECYCLESTAGE* variable takes on a value of 1 if the firm-year is at that stage, and 0 otherwise. Life cycle stage maturity is omitted and used as a benchmark. *ACC* (total accruals) is net income – operating cash flow – investing cash flow; *CFO* is operating cash flow; Δ*REV* is change in revenue; *PPE* is gross property, plant, and equipment; *ROA* = net earnings/average of total assets. To obtain a performance-matched abnormal accrual for firm *i* we subtract the model abnormal accrual of the firm with the closest ROA that is in the same industry as firm *i* or in the same life stage as firm *i*.

2. In panel B and panel C, size is the average of total assets; Operating cash flow = operating cash flow/average of total assets; E/P ratio = net earnings/closing share price at the end of the year; Sales growth = (current net sales/previous net sales) – 1; *ROA* = net earnings/average of total assets; The samples in Panel B and panel C are from the lower and upper quartiles of the firms ranked on each partitioning variable at the end of the year *t*.

3. All variables are standardized by average total assets. * means the value is significantly different from the specified test level at the 5 percent level using a two-tailed binomial test.

4. The table reports the percentage of cases out of the 250 stimulation cases where the null hypothesis of zero abnormal accrual is rejected at the 5% level.

The rejection rates measure each metric's Type Ⅰ error rate. Binominal test is used to determine whether the rejection rate is significantly different from 5%. Percentages significantly different from the 5% level are marked by * in Table 6, and low rejection rate indicates tests infrequently reject the null hypothesis.

Results of Table 6 are similar to that of in Kothari, Leone, and Wasley's research (2005): All abnormal accrual measures exhibit some degree of misspecification. No single measure is well-specified under the null hypothesis in each of all sample partitions (columns). But most cases, including indicator variables to control for corporate life cycle, mitigate the average bias in abnormal accrual estimates. Especially in extreme circumstances, such as particularly low operating cash flow, when the abnormal accruals >0, rejection rate is decreased from 53.3% in Jones model to 23.0% after introducing into the model the corporate life cycle indicator. Therefore, in most cases, the inclusion of corporate life cycle proxy relatively reduces excessive rejection problems. These results also show that in a random sample, whether control for corporate life cycle or not does not lead to misspecification in widely used accrual models.

Table 7 reports the rejection frequencies for the 250 random samples each plus/minus 1%, 2%, or 4% accrual added to its firm's estimated abnormal accruals. The percentage accrual refers to the ratio of accrual to its firm's total assets. Similar to the above, significant level is 5%, and the null hypothesis of non-negative and non-positive abnormal accruals are rejected at the 5% level. The rejection rates measure each metric's Type Ⅱ error rate, and high rejection rates indicate that the model is more likely to identify the seeded abnormal accruals. As shown in Table 7, both the model with control variable of life cycle and model replacing industrial classification by life cycle can increase rejection rate, indicating a better explanatory power than conventional performance matched approach and the Jones model. This evidence suggests that including indicators variables for life cycle does not affect negatively the explanatory power of the model.

Based on the results in Tables 3, 4, 5, 6 and 7, the estimating accuracy of the Jones model including corporate life cycle, which controls for performance, as well as company's operating efficiency and various operation-related factors, is better than that of the accrual model which only controls corporate performance. Corporate life cycle is the combined result of business strategies and allocation of resources, comprehensively reflecting of a company's innate factors. Our results support the findings that introduction of variables for each life cycle stages into accrual models can generate similar, or lower, type I and type II error rates. Therefore, introducing life cycle into accrual models can improve the explanatory power of these models.

Table 7 Comparison of the Type II Errors of Alternative Abnormal Accrual Measures

The null hypothesis of zero abnormal accrual is not supported at the 5% level	Abnormal accruals > 0	Abnormal accruals < 0	Abnormal accruals > 0	Abnormal accruals < 0	Abnormal accruals > 0	Abnormal accruals < 0
Seeded abnormal accruals	1%	–1%	2%	–2%	4%	–4%
Jones model	19.6%	11.9%	39.7%	25.7%	78.0%	78.4%
Jones model (life cycle stage as substitute for industrial classification)	21.6%	13.1%	49.1%	29.3%	81.9%	82.8%
Jones model including life cycle stage	20.0%	11.3%	52.8%	35.2%	85.2%	90.0%
Performance matched approach						
Jones model including *ROA*	16.5%	18.1%	51.0%	42.3%	97.2%	94.4%
Jones model including *ROA* (life cycle stage as substitute for industrial classification)	24.0%	20.4%	63.6%	55.9%	99.2%	96.0%
Jones model including *ROA* and life cycle stage	24.6%	21.2%	69.8%	63.8%	100.0%	98.4%
Jones model (matched based on industry and current year's *ROA*)	9.0%	16.2%	25.0%	30.0%	63.4%	72.6%
Jones model (matched based on life cycle stage and current year's *ROA*)	17.5%	18.7%	31.1%	37.6%	73.8%	81.5%

(*To be continued*)

(*Continued*)

The null hypothesis of zero abnormal accrual is not supported at the 5% level	Abnormal accruals > 0	Abnormal accruals < 0	Abnormal accruals > 0	Abnormal accruals < 0	Abnormal accruals > 0	Abnormal accruals < 0
Jones model including life cycle stage (matched based on industry and current year's *ROA*)	9.1%	16.2%	24.4%	36.9%	79.8%	89.6%

Note: 1. Abnormal accruals are estimated from the corresponding sample. Abnormal accruals are measured as the residuals (ê) from cross-sectional regressions (within each year and industry) using the following competing models:

Jones Model is $ACC_t = \beta_0 + \beta_1 \Delta REV_t + \beta_2 PPE_t + \varepsilon$; Jones Model including *ROA* is $ACC_t = \beta_0 + \beta_1 \Delta REV_t + \beta_2 PPE_t + \beta_3 ROA_t + \varepsilon$; Jones model including life cycle stage is $ACC_t = \beta_0 + \beta_1 \Delta REV_t + \beta_2 PPE_t + \beta_3 LIFECYCLESTAGE_t + \varepsilon$; each life cycle stage is determined by the company's cash flow patterns as shown in Table 1. *LIFECYCLESTAGE* variable takes a value of 1 if the firm-year is at that stage, and 0 otherwise. Life cycle stage maturity is omitted and used as a benchmark. *ACC* (total accruals) is net income–operating cash flow–investing cash flow; *CFO* is operating cash flow; *ΔREV* is change in revenue; *PPE* is gross property, plant, and equipment; *ROA* = net earnings/average of total assets. To obtain a performance- matched abnormal accrual for firm *i* we subtract the model abnormal accrual of the firm with the closest ROA that is in the same industry as firm *i* or at the same life stage as firm *i*. All variables are standardized by average total assets.

2. For each sample the indicated seed level is added to total accruals before estimating the respective accrual model. The table reports the percentage of cases out of the 250 stimulation cases where the null hypothesis of zero abnormal accrual is rejected at the 5% level.

5 Sensitivity Test

In Part one and two of the empirical test, the results in Model (1) (Jones model) are similar to Tables 3 and 4.

In Part three of the empirical test, the results in Model (2) and modified Jones model are similar to Table 5.

In Part four of the empirical test, the results in Model (2) and modified Jones model are similar to Tables 6 and 7, and our conclusion is not changed when the significant level is set to 1%.

When using the following method to calculate total accruals: total accruals = operating income – (operating cash flow + investment cash flow), our results do not change significantly.

Taken together, the sensitivity analyses show that the results of this paper are not sensitive to the choice of accrual models, significance levels, and the specific calculation methods of accruals.

6 Discussion

Accrual models are usually used in studies on management's accounting choices and earnings management. However, does the aforementioned improvement of accrual model have alternative explanations? That is, is it possible that, along with different corporate life cycle stages, systematic variation of accruals might be caused by the management's specific motive at different life cycle stages? The existing literature also suggests that when managers experience large events, such as IPO, seasoned equity offerings, there tends to be strong incentives for earnings management. For example, Teoh, Welch and Wong (1998) find that in the IPO year, companies usually have high accruals, followed by poor stock returns. They believe that due to a high degree of information asymmetry during IPO process, earnings management behaviors prevail. Teoh, Wong and Rao (1998) find that companies usually have positive abnormal accruals in IPO year. Therefore, when these events occur, managers have strong incentives to report higher earnings using positive abnormal accruals. As companies at the growth stage also have a strong preference to external financing, it is possible that both the IPO companies and high growth companies will overestimate future earnings to obtain long-term external funds. Therefore, companies at growth stages are more likely to report positive abnormal accruals than companies at the maturity stage. Such explanation is consistent with the prediction of corporate life cycle theory.

However, recent studies have not achieved consensus on whether companies will manipulate accruals to obtain external funds in large events, such as IPO. Ball and Shivakumar (2008) find that, IPO company's accounting features are not the results of manipulation, but rather the endogenous results of decisions on seeking external financing, reflecting the fact that firms are most likely to experience unusual growth around the time of IPO. Their findings show, quite contrary to popular belief, that companies will enhance the quality of accounting reports around the time of IPO, to meet high quality accounting information requirements of investors and greater regulatory scrutiny to pubic companies. Previous earnings management research and conventional estimates of abnormal accruals are unreliable and biased in favor of apparent upward earnings management around large transactions and events. It is generally believed that in large events, such as IPO, seasoned equity offerings, mergers and acquisitions, management buyouts and so on, issuers can report unusually high earnings by adopting discretionary accounting accrual adjustments that raise reported earnings relative to actual cash flows. But few studies note that large transactions and events face higher than usual litigation and regulatory risk from inflating earnings, and higher than usual scrutiny by market monitors such as analysts, underwriters, auditors, boards, the press and other parties to the transaction, as well as by regulators, or that poor reporting quality could lead to the increase of cost of capital or adverse reputational effects. There is strong demand in public company for high quality accounting reports, and the market mechanism will bring this demand into effect.

The existing literature suggests that managers have a strong incentive to manage earnings to avoid violating debt covenants. Sweeney (1994) finds managers facing debt covenants violation tend to use accounting choices that can increase earnings. Defond and Jiambalvo (1994) find that managers will report significantly positive abnormal accruals one year before contract breach. Companies in financial difficulties and at the shakeout stage will face closure of some lines of the production due to poor business performance, therefore, managers of these enterprises have incentives of reporting good business performance to avoid closure or dismissing. Under such argument, we can expect that companies at the shakeout stage are more likely to record positive abnormal accruals than those at the maturity stage. This is opposite to prediction from the firm life cycle perspective. In the literature, the earnings management motivation of "taking a big bath" is generally associated with management turnover, which generally can not simultaneously appear in all firms at the shakeout and decline stage. In addition, under the Chinese context, accounting performance is not the only and the most important factor in manager turnover.

In academic research, it is generally believed that only when the manager's incentives are supported by evidence, there is earnings management (Healy and Wahlen, 1999). At different stages of corporate life cycle, it is difficult to believe that all managers share a similar motivation at the same time. Specifically, there are upward manipulations of accruals in first half of the corporate life cycle, while downward manipulations of accruals in the latter half of the corporate life cycle. Because of the unique institutional characteristics in China, a notable feature of earnings management in China is related-party transactions (Chen and Yuan, 2004). As both the operating cash flow and accruals are changed by related-party transactions, such earnings management does not only change the amount of accruals. Therefore, the traditional accrual models are not fully applicable to this type of earnings management in China. In addition, in our final sample, the proportion of companies issuing IPO, seasoned equity offering, rights offering, or money-losing companies are relatively small in the total samples, and they all distribute dispersedly at various stages of the corporate life cycle.

Therefore, earnings management literature can not fully explain the regular changes in accruals along with the corporate life cycle. Prediction of earnings management at the shakeout stage is opposite to the empirical results. For earnings management due to specific large events, the findings in existing literature are mixed. At different enterprise life cycle stage, it is difficult to assume that all managers have the same or similar earnings management motivation in large samples. Earning is superior to the operating cash flow in performance measurement, as accruals should reflect the fundamental economic issues.

The results in this article show that corporate life cycle is independent of the estimated financial variables and reflects the result of dynamic accounting choice. These results are not caused by earnings management.

7 Conclusion

One of the fundamental questions that accounting research has to answer is under what kind of environmental conditions accounting choice is made. Because of the complexity of business environment and unobservablility of accounting choice incentives, this question is difficult to answer. Results of this paper show that features of accruals are much richer and more complicated than existing accrual models have assumed. Incorporating life cycle factors into accrual models can significantly improve the specification and power of these models. In addition, the sources of accrual changes have not been fully recognized in previous empirical studies. Our results show that corporate life cycle factors are important omitted variables in the current accrual models. As a conclusion, we need to control for corporate life cycle factors to more accurately separate normal accruals from abnormal accruals, and pay attention to factors of corporate life cycle to significantly improve the modeling of accruals process, and enhance the accuracy and reliability of related studies, such as related empirical proxies for abnormal accruals, earnings management and earnings quality.

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