Corporate Life Cycle, Real Activity Manipulation, and Future Performance

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ABSTRACT
The documented prevalence of real activity manipulation (RAM) over the last decade emphasizes the importance of its economic consequences (Graham et al. 2005, Cohen et al. 2008, Chi et al. 2011, Courteau et al. 2015). This study investigates the impact of RAM on subsequent operating performance in terms of return on assets (ROA) and cash flow from operating activities (CFO) across life cycle stages, which may vary due to the different costs and benefits of RAM across life cycle stages. Using the life cycle proxy developed by Dickinson (2011), we find that the RAM methods of increasing sales, and cutting discretionary expenses have positive effects on subsequent ROA, especially in growth firms, and the method of reducing cost of sales by overproduction have negative effects on ROA. The methods of increasing sales and cutting discretionary costs have negative effects on subsequent CFO, again especially in growth firms, but overproduction to reduce cost of sales have positive effects on subsequent CFO. Our findings are of interest to investors, auditors, regulators, and academics with respect to financial statement analysis and earnings quality.

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1. Introduction

Most existing research on earnings management has concentrated on accrual-based earnings management (AEM), in which earnings are managed by manipulating accruals without directly influencing cash flow. However, well-publicized accounting scandals and the passage of the Sarbanes–Oxley Act in the US (SOX, July 30, 2002) have led to the investigation of earnings management in a new area, i.e., real activity manipulation (RAM). Recent studies (Graham et al. 2005, Cohen et al. 2008, Chi et al. 2011, Courteau et al. 2015) have documented the substitution from AEM to RAM and the increasing prevalence of RAM. Unlike AEM, RAM involves deliberately altering the operations of the firm to influence reported accounting numbers while influencing the underlying cash flows of the firm. Roychowdhury (2006) documents several forms of RAM, such as offering price discounts or extending lenient credit to temporarily increase sales, overproduction to report lower cost of goods sold, and reduction of discretionary expenditures to improve reported earnings. To the extent that managers thereby diverge from optimality, such interventions in the firm's operations can have real performance effects (Ewert and Wagenhofer 2005).

The literature addressing the economic consequences of RAM has been growing. However, empirical results have been mixed. Conflicting empirical results regarding the impacts of RAM on performance have led to opposing explanations regarding the reasons why managers adopt RAM. A positive correlation between RAM and the subsequent operating performance of firms suggests that the signaling mechanism may drive the conduction of RAM (Gunny, 2010; Taylor and Xu, 2010), while a negative correlation suggests that managers have opportunistic motivations in adopting RAM (Zang, 2012; Cohen and Zarowin, 2010; Filip et al. 2015; Kothari et al. 2016). Vorst (2016) suggests that the impact of RAM on future operating performance varies depending on the incentives of RAM and the factors that affect its associated costs and benefits. Overall, the increased tendency of firms to make use of RAM, combined with its varying effects on future performance, reflects the importance of further study on the effect of RAM on future operating performance.

Some working studies examining the relationship between RAM and future operating performance have considered accounting flexibility (i.e., net operating assets) or earnings management incentives (i.e., meeting or slightly surpassing set thresholds). However, none of these studies has provided a stricter or more comprehensive means of distinguishing firms in various stages of their life cycles. This paper extends the work on the relation between a firm's RAM behavior and the subsequent performance by incorporating the life cycle factor into the puzzle. Firms in different stages of their life cycles employ different portfolios of optimal operating strategies (including earnings management strategies) while facing disparate resources and constraints. Therefore, the purpose for firms employing RAM (and the other factors they have to consider) varies according to their stage in the life cycle. All these factors may influence subsequent operating performance in dissimilar ways. Thus, firms conducting RAM in different stages may experience different economic consequences.

We employ the life cycle proxy developed by Dickinson (2011) and the RAM proxy developed by Roychowdhury (2006) and Cohen and Zarowin (2010) to investigate the impact of RAM on subsequent operating performance in different life cycle stages. We look at three main types of RAM intending to, first, increase sales with discounts, second, cut discretionary expenses, and third, reduce cost of sales by overproduction. We examine the effects of RAM on the future ROA and CFO for the firms over the following three years. Our empirical results indicate that the impact of RAM activities on subsequent operating performance in terms of ROA and CFO vary with the RAM forms and life-cycle stages. Specifically, we document that (1) the RAM methods of increasing sales, and cutting discretionary expenses are positively related with subsequent ROA, especially in growth firms, while the method of reducing cost

of sales by overproduction is negatively related with subsequent ROA; (2) the methods of increasing sales and cutting discretionary costs are negatively related with subsequent CFO, again especially in growth firms, but overproduction to reduce cost of sales is positively related with subsequent CFO. The results are robust in the earnings-management-suspect sample and in the sample without shake-out firms which is a "catch-all" and thus noisy category.

Arthur Levitt (1998) of the SEC stated that the process of earnings management "has evolved over the years into what can best be characterized as a game among market participants. A game that, if not addressed soon, will have adverse consequences for America's financial reporting system." Accounting ethicists have found from surveys that RAM methods, referred to as operational earnings management, are often considered ethical by many firm managers, and by managerial accountants as well (Bruns and Merchant 1990, Rosenzweig and Fischer 1994). Our study extends the knowledge about firms' RAM strategies and the economic consequences of RAM. The results can potentially assist investors, auditors, and regulators in understanding the firms' earnings management strategies and in reevaluating their decisions.

Section 2 provides a literature review and hypothesis development. Section 3 describes our variable definition and research design. Section 4 presents sample selection, descriptive statistics, and empirical results. Section 5 summarizes the robustness tests. Section 6 concludes this study.

2. Literature Review and Hypotheses Development

2.1 Literature Review

This study is related to two streams of literature: the literature on the impact of RAM on subsequent operating performance and the literature on management strategies across corporate life cycles.

2.1.1 Literature on the Impact of RAM on Subsequent Operating Performance

Several studies have investigated the effects of RAM on future performance but have reported mixed results. For example, Gunny (2010) finds that RAM is positively associated with future operating performance, which suggests that RAM plays a signaling role in which the firm obtains benefits from enhanced reputation and credibility. However, Eldenburg et al. (2011) finds evidence of RAM negatively affecting subsequent operating performance for a group of nonprofit hospitals with managers whose compensation is strongly tied to their performance, which suggests opportunistic RAM. Similarly, Cohen and Zarowin (2010) find evidence of lower subsequent operating performance for firms that have engaged in RAM around seasoned equity offerings. Kothari et al. (2016) report that overvaluation at the time of the SEO is more likely when managers actively engage in RAM to overstate earnings. Vorst (2016) finds that, on average, reversing cuts of discretionary investments are associated with lower future operating performance. However, the author suggests that such results vary significantly depending on the various incentives to engage in RAM, as well as other factors that affect its associated costs and benefits.

2.1.2 Corporate life cycle

According to the concept of the corporate life cycle theorized by Adizes (1979), firms face different opportunities and challenges in different stages of their life cycles, and thus undertake different strategic actions. Firms in the introduction stage make heavy investments in developing, introducing, and marketing new products in order to gain a competitive advantage. This stage is characterized by uncertainty in revenue flows and costs, high cost of capital, high levels of managerial opportunism, and product innovation (Hasan et al 2015). Firms in the growth stage tend to broaden their product line by adapting existing products to new markets through dramatic innovation, as well as by supporting product extension, market development,

and advancement controls (Hasan et al 2015). Entering the mature stage, firms tend to become more conservative, providing fewer innovations, avoiding costly product extensions, economizing production, ensuring favorable prices, and emphasizing sales volumes to achieve better operating efficiency and profitability (Young and Huang 2004). In the decline stage, products begin to lose appeal and sales volumes become harder to sustain, making it necessary to conserve resources by abstaining from innovation, cutting prices, and so on.

Previous studies used the life-cycle stage to explore the accrual anomaly relationship (Taso et al., 2010, Hribar and Yehuda 2015), analysts' forecasts (Taso et al., 2009), and the value-relevance of R&D and capital expenditure (Chin et al., 2005). They found that the consideration of life cycle was an important factor, and that further exploration of its different stages can explain the mixed results obtained by previous studies. In this study, we extend the prior studies on the relation between RAM and subsequent operating performance by incorporating the life cycle factor into the picture.

2.2 Hypothesis Development

In the introduction and growth stage, product and market development are critical to gain market acceptance and market share, thus expenditures on R&D, advertising, and other promotions will be greater. Conducting RAM by cutting discretionary expenditures may weaken their competitive advantage, thereby harming the long-term profitability of the firm (Zang, 2012). However, RAM by extending lenient credit and discounts along with overproduction can help gain market share and promote long-term performance. Moreover, firms in the introduction and growth stages have higher information asymmetry compared to mature firms. Those firms may have an incentive to convey information to financial market through RAM. Therefore, we expect a positive correlation between RAM by offering lenient credit and discounts and overproduction with firms' subsequent operating performance while a negative correlation would exist between RAM involving reducing discretionary expenditures with firms' subsequent operating performance.

During the decline stage, reducing costs by increasing capacity (i.e., increasing production to lower fixed costs), improving production efficiency, and sustaining favorable prices and sales volumes is generally the best strategy (Young and Huang 2004). For decline firms, engaging in RAM to achieve earnings thresholds tends to be myopic. Therefore, we expect the opportunistic intention of management conducting RAM and thus a negative correlation between RAM and the subsequent operating performance of firms in the decline stages. In sum, we predict differential impact of RAM on subsequent operating performance. Therefore, our null hypothesis is:

H_0: The impact of RAM on subsequent industry-adjusted ROA (industry-adjusted CFO) is the same for introduction, growth firms, and decline firms versus mature and shake-out firms, ceteris paribus.

3. Research Design

3.1 Variable Definition

3.1.1 Identification and measurement of RAM

Following previous studies (Roychowdhury 2006, Cohen and Zarowin 2010), we adopt three proxies of operating RAM: the abnormal levels of CFO measuring RAM involving extending lenient credit and offering deep discounts, the abnormal levels of discretionary expenses measuring RAM by cutting discretionary expenditures, and the abnormal levels of production costs measuring RAM of overproduction to reduce cost of goods sold. We calculate

the three RAM proxies by estimating the following cross-sectional regression equations for each industry and year.

$$\frac{CFO_t}{A_{t-1}} = \beta_0 + \beta_1\left(\frac{1}{A_{t-1}}\right) + \beta_2\left(\frac{S_t}{A_{t-1}}\right) + \beta_3\left(\frac{\Delta S_t}{A_{t-1}}\right) + \varepsilon_t \quad (1)$$

$$\frac{DISEXP_t}{A_{t-1}} = \gamma_0 + \gamma_1\left(\frac{1}{A_{t-1}}\right) + \gamma_2\left(\frac{S_{t-1}}{A_{t-1}}\right) + \varepsilon_t \quad (2)$$

$$\frac{PROD_t}{A_{t-1}} = \delta_0 + \delta_1\left(\frac{1}{A_{t-1}}\right) + \delta_2\left(\frac{S_t}{A_{t-1}}\right) + \delta_3\left(\frac{\Delta S_t}{A_{t-1}}\right) + \delta_4\left(\frac{\Delta S_{t-1}}{A_{t-1}}\right) + \varepsilon_t \quad (3)$$

where CFO_t is cash flows from operations in period *t*; $DISEXP_t$ is discretionary expenses in period *t* (the sum of advertising expenses, R&D expenses, and SG&A expenses); $PROD_t$ is production costs in period *t*; A_{t-1} is total assets at the beginning of period *t*; S_t is net sales during period *t*; ΔS_t is change in net sales in period *t*.

The opposite of standardized residual of regression (1) for firm *i* in year *t* scaled by 100 is referred as $RCFO_{it}$. The opposite of standardized residual of regression (2) for firm *i* in year *t* scaled by 100 is referred as $RDISX_{it}$. The standardized residual of regression (3) for firm *i* in year *t* scaled by 100 is referred as $RPROD_{it}$. Higher values indicate higher RAM levels. In Eq. (2), we use S_{t-1} instead of S_t because, according to Roychowdhury (2006), dealing with discretionary expenses using S_t would result in a mechanical problem—that is, if sales are manipulated upward to increase reported earnings in any year, it would result in unusually low residuals for that year, regardless of whether the discretionary expenses were reduced. To control for this problem, the normal level of discretionary expenses is estimated using the lagged sales.

In addition to the three individual proxies of RAM, we employ the method developed by Cohen and Zarowin (2010) and Zang (2012) to capture the aggregate effects of different RAM. We developed the aggregate measure *RAM123* as sum of *RCFO*, *RDISX* and *RPROD*. A high aggregate measure indicates the firm engages in high level of RAM.

3.1.2 Classification of life-cycle stages

Dickinson (2011) developed a firm life cycle proxy using cash flow patterns, which provide a parsimonious indicator of life cycle stage. Following Dickinson (2011), we define five dummy variables: INTRO, GROWTH, MATURE, SHAKE, and DECLINE indicating firms' life cycle stages:

1) firms with negative cash flows from operating and investing activities and positive cash flows from financing activities are classified as firms in the introductory stage;

2) firms with positive cash flows from operating and financing activities and negative cash flows from investing activities are classified as firms in the growth stage;

3) firms with positive cash flows from operating activities and negative cash flows from investing and financing activities are classified as firms in the mature stage;

4) firms with negative cash flows from operating activities and positive cash flows from investing activities are classified as firms in the decline stage;

5) all other firms are classified as shake-out firms. Dickinson (2011) considers shake-out as a "catch-all" category. In addition, shake-out firms are not well-defined in economic theory. Therefore, we cannot make directional predictions about firms in this category. We

focus on introduction firms, growth firms, and decline firms using the mature and shake-out category as the benchmark life cycle stage.

3.2 Regression Model

To investigate the performance consequences of RAM in different life-cycle stages, we employ the equation (4) and (5). Following Gunny (2010), we use subsequent industry-adjusted ROA and CFO in the following k year(s) (denoted ROA^k and CFO^k, k=1, 2 or 3) as the dependent variables. We include firm size (*SIZE*), market to book ratio (*MTB*), contemporary industry-adjusted firm performance (ROA^0 or CFO^0), industry-adjusted stock return (*RET*), and Altman Z-Score (*Z*) as control variables for the size, growth opportunities, operating performance, stock performance, and financial health of firms. Moreover, we include year and industry dummies to control for year and industry effect. Variable definitions are presented in the Appendix. The coefficients of the interaction terms present the disparate impacts of RAM on subsequent firm performance in the different life cycle stages. *RAM* is alternatively the three individual RAM proxies (*RCFO*, *RDISX, and RPROD*) and the aggregate RAM proxy (*RAM123*).

$$ROA^k = \alpha_0 + \alpha_1 INTRO + \alpha_2 GROW + \alpha_3 DECLINE + \alpha_4 RAM + \alpha_5 RAM * INTRO + \alpha_6 RAM * GROW + \alpha_7 RAM * DECLINE + \alpha_8 ROA^0 + \alpha_9 SIZE + \alpha_{10} MTB + \alpha_{11} RET + \alpha_{12} Z + \sum INDUSTRY + \sum YEAR + \varepsilon \quad (4)$$

$$CFO^k = \alpha_0 + \alpha_1 INTRO + \alpha_2 GROW + \alpha_3 DECLINE + \alpha_4 RAM + \alpha_5 RAM * INTRO + \alpha_6 RAM * GROW + \alpha_7 RAM * DECLINE + \alpha_8 CFO^0 + \alpha_9 SIZE + \alpha_{10} MTB + \alpha_{11} RET + \alpha_{12} Z + \sum INDUSTRY + \sum YEAR + \varepsilon \quad (5)$$

4. Empirical Results

4.1 Sample Selection, Descriptive Statistics and Correlations

We start with all the companies in COMPUSTAT North America Annual database from 1996 to 2014 because the tests require the data availability in the previous two years and following three years. The financial institutions (SIC codes between 6000 and 7000) are excluded due to their special regulations. We further exclude all the firm-year observations without information on total assets, cash flows from operating, financing and investing activities. All continuous variables are winsorized at 1% and 99% to reduce the effect of outliers. The final sample consists of 34,486 firm-years as presented in Table 1. We lose 115,201 firm-year observations because of the winsorization. We decided to report the results after winsorization for three reasons. First, the empirical results are consistent before and after the winsorization. Second, it is consistent with prior literature (for example, Zang 2012) to winsorize at 1% and 99% for outlier controls. Third, the final sample size is comparable to prior literature (for example, Roychowdhury 2006).

Table 1 Sample Selection

All firm-year observations during 1996-2014 on COMPUSTAT North America Annual Database	288,954

Less:	Observations of financial institutions (SIC between 6000 and 7000)	128,522
	Observations with missing data for assets and cash flows from operating, financing, and investing activities.	10,745
	Winsorize all continuous variables at level 1% and 99%	115,201
Final Sample		34,486

Table 2 reports the mean, standard deviation, min, 25th, median, 75th, and max value for our key variables. The mean and median of the industry-adjusted subsequent performance in terms of ROA and CFO are insignificantly different from zero. The standard deviations of ROA^1, ROA^2, and ROA^3 range from 2.56 to 4.36. The standard deviations of CFO^1, CFO^2, and CFO^3 range from 309.41 to 852.82. Of the 34,486 firm-year observations, 21% are in the introduction stage; 25% are in the growth stage; 35% are in the mature stage; 11% are in the shake-out stage; and 7% are in the decline stage. *RCFO* has median 1.12 with standard deviation 3.62. *RDISX* has median 2.85 with standard deviation 8.22. *RPROD* has median -6.11 with standard deviation 20.28. *RAM123* has mean -0.15 and median -2.05 with standard deviation 13.08. Industry-adjusted contemporary ROA and CFO (ROA^0 and CFO^0) have mean -0.18 and 69.50. The average firm size (*SIZE*) is 4.78. The average market-to-book ratio is 1.28. The industry-adjusted abnormal return (*RET*) is on average 17.89. The average *Z* score is 42.60. The statistics are largely comparable with prior literature (Roychowdhury 2006).

Table 2 Descriptive Statistics

	Mean	SD	Min	Q1	Median	Q3	Max
ROA^1	-0.18	2.56	-216.29	-0.07	0.00	0.05	46.15
ROA^2	-0.24	3.77	-292.65	-0.13	0.00	0.10	441.00
ROA^3	-0.31	4.36	-477.09	-0.18	0.00	0.14	201.11
CFO^1	68.98	309.41	-1,818.00	-8.65	0.00	24.73	5,558.00
CFO^2	136.69	588.39	-3,135.00	-17.68	0.00	55.51	10,747.00
CFO^3	203.02	852.82	-4,171.00	-28.20	0.00	90.40	12,691.00
INTRO	0.21	0.41	0	0	0	0	1
GROW	0.25	0.43	0	0	0	1	1
MATURE	0.35	0.48	0	0	0	1	1
SHAKE	0.11	0.31	0	0	0	0	1
DECLINE	0.07	0.26	0	0	0	0	1
RCFO	0.00	3.62	-53.16	0.48	1.12	1.25	6.40
RDISX	0.00	8.22	-93.98	0.80	2.85	3.41	3.65
RPROD	0.00	20.28	-142.20	-6.75	-6.11	-2.54	349.89
RAM123	-0.15	13.08	-100.50	-2.73	-2.05	-1.13	313.61
ROA^0	-0.18	2.98	-365.23	-0.07	0.00	0.05	54.89
CFO^0	69.50	318.53	-1,821.00	-8.35	0.00	22.42	5,505.00
SIZE	4.78	2.45	-4.27	3.17	4.92	6.53	10.85
MTB	1.28	218.63	-33,923.00	0.92	1.91	3.70	6,600.00
RET	17.89	1,046.00	-5,239.00	-0.36	0.00	0.44	174,685.00
Z	42.60	2,292.00	-34,012.00	-0.17	1.37	2.73	256,930.00

Table 3 Panel A presents the correlations of subsequent operating performance in terms of ROA with life cycle indicators, the aggregate RAM proxy (*RAM123*), and control variables. Panel B reports the correlations of subsequent operating performance in terms of CFO with life cycle indicators, *RAM123*, and control variables. The correlations of other RAM proxies with the variables are untabulated but available upon request. **Black** numbers are correlation coefficients that significantly differ from zero. *Italic* numbers represent p values, indicating the significance levels. Variables are defined in Appendix.

Panel A and B indicate that *RAM123* are positively and significantly related with the subsequent performance measured by both ROA and CFO, which is consistent with Gunny (2010). It suggests that RAM play a signaling role in which the firm obtains benefits from enhanced reputation and credibility. The *INTRO*, *SHAKE*, and *DECLINE* indicators are negatively and significantly related with the subsequent performance measured by both ROA and CFO. The *MATURE* indicator is positively and significantly related with the future industry-adjusted ROA and CFO. The *GROW* indicator is positively and significantly related with the future industry-adjusted ROA and the industry-adjusted CFO in the following three years. The results indicate that growth and mature firms have higher future ROA and CFO compared to firms in the introductory, shake-out, and decline stages. The correlation of *RAM123* with life-cycle indicators suggest that firms in the introductory, shake-out, and decline stages have lower level of RAM activities compared to growth and mature firms. It is consistent with the perception that those firms have high information asymmetry and thus low detection cost, which makes accrual-based earnings management more cost-beneficial as compared to mature firms (Xie et al. 2019). 9 out of 15 correlation coefficients of the subsequent performance measures and control variables are significantly different from zero.

4.2 Empirical results

The regression results of ROA^1, ROA^2, and ROA^3 as dependent variables are respectively reported in Table 4 Panel A, Panel B, and Panel C. ROA measures profitability, showing the percentage of profit a company earns in relation to its overall resources. The regression results of CFO^1, CFO^2, and CFO^3 as dependent variables are respectively reported in Table 5 Panel A, Panel B, and Panel C. CFO tells investors about liquidity, showing how much cash flow is generated from the business operations without regard to secondary sources of revenue like interest or investments. We used the two-way cluster-robust standard errors (cluster by firm and by year) to adjust for both cross-sectional and time-series dependences in our data (Petersen 2009; Gow et al. 2010). Numbers in parentheses represent p-values. ***, **, * indicate significance at the 1%, 5% and 10% level, respectively (two-tailed). Variables are defined in Appendix. We test our hypothesis with the interaction terms. Positive coefficients of interaction terms mean RAM activity affects future operating performance positively. Negative coefficients mean RAM activity hurts future operating performance.

Table 3 Pearson Correlation

Panel A Real earnings management and future performance in terms of ROA

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1.ROA[1]	1.000												
2.ROA[2]	**0.458**	1.000											
	<.0001												
3.ROA[3]	**0.210**	**0.426**	1.000										
	<.0001	*<.0001*											
4.INTRO	**-0.085**	**-0.083**	**-0.087**	1.000									
	<.0001	*<.0001*	*<.0001*										
5.GROW	**0.045**	**0.041**	**0.046**	**-0.300**	1.000								
	<.0001	*<.0001*	*<.0001*	*<.0001*									
6.MATURE	**0.061**	**0.054**	**0.061**	**-0.384**	**-0.429**	1.000							
	<.0001	*<.0001*	*<.0001*	*<.0001*	*<.0001*								
7.SHAKE	**-0.025**	**-0.019**	**-0.028**	**-0.181**	**-0.203**	**-0.259**	1.000						
	<.0001	*0.000*	*<.0001*	*<.0001*	*<.0001*	*<.0001*							
8.DECLINE	**-0.029**	**-0.020**	**-0.024**	**-0.146**	**-0.164**	**-0.209**	**-0.099**	1.000					
	<.0001	*0.000*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*						
9.RAM123	**0.013**	**0.013**	**0.013**	**-0.063**	-0.004	**0.104**	**-0.038**	**-0.043**	1.000				
	0.065	*0.067*	*0.067*	*<.0001*	*0.491*	*<.0001*	*<.0001*	*<.0001*					
10.ROA[0]	**0.273**	**0.207**	**0.190**	**-0.087**	**0.042**	**0.057**	**-0.018**	**-0.025**	0.009	1.000			
	<.0001	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*0.001*	*<.0001*	*0.168*				
11.SIZE	**0.175**	**0.144**	**0.157**	**-0.375**	**0.185**	**0.327**	**-0.114**	**-0.183**	**0.246**	**0.148**	1.000		
	<.0001	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*			
12.MTB	0.001	**-0.011**	0.002	**-0.015**	0.007	**0.009**	-0.006	0.003	0.001	0.001	**0.019**	1.000	
	0.807	*0.057*	*0.719*	*0.003*	*0.194*	*0.082*	*0.250*	*0.582*	*0.925*	*0.853*	*0.000*		
13. RET	0.002	0.002	0.002	**0.010**	0.002	-0.004	-0.005	-0.002	-0.002	0.000	0.005	0.001	1.000
	0.698	*0.708*	*0.716*	*0.083*	*0.763*	*0.423*	*0.348*	*0.704*	*0.753*	*0.991*	*0.396*	*0.904*	
14.Z	0.006	0.007	0.006	**-0.013**	0.002	**0.016**	-0.005	-0.007	**0.037**	**0.015**	**0.033**	0.000	**0.028**
	0.269	*0.206*	*0.301*	*0.017*	*0.719*	*0.004*	*0.348*	*0.186*	*<.0001*	*0.005*	*<.0001*	*0.940*	*<.0001*

Panel B Real earnings management and future performance in terms of CFO

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1.CFO[1]	1.000												
2.CFO[2]	**0.948**	1.000											
	<.0001												
3.CFO[3]	**0.898**	**0.973**	1.000										
	<.0001	*<.0001*											
4.INTRO	**-0.122**	**-0.120**	**-0.117**	1.000									
	<.0001	*<.0001*	*<.0001*										
5.GROW	0.002	0.006	**0.009**	**-0.300**	1.000								
	0.771	*0.282*	*0.076*	*<.0001*									
6.MATURE	**0.153**	**0.145**	**0.139**	**-0.384**	**-0.429**	1.000							
	<.0001	*<.0001*	*<.0001*	*<.0001*	*<.0001*								
7.SHAKE	**-0.031**	**-0.031**	**-0.032**	**-0.181**	**-0.203**	**-0.259**	1.000						
	<.0001	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*							
8.DECLINE	**-0.062**	**-0.059**	**-0.058**	**-0.146**	**-0.164**	**-0.209**	**-0.099**	1.000					
	<.0001	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*						
9.RAM123	**0.187**	**0.182**	**0.172**	**-0.063**	-0.004	**0.104**	**-0.038**	**-0.043**	1.000				
	<.0001	*<.0001*	*<.0001*	*<.0001*	*0.491*	*<.0001*	*<.0001*	*<.0001*					
10.CFO[0]	**0.794**	**0.767**	**0.735**	**-0.144**	**-0.011**	**0.204**	**-0.043**	**-0.080**	**0.169**	1.000			
	<.0001	*<.0001*	*<.0001*	*<.0001*	*0.027*	*<.0001*	*<.0001*	*<.0001*	*<.0001*				
11.SIZE	**0.382**	**0.381**	**0.373**	**-0.375**	**0.185**	**0.327**	**-0.114**	**-0.183**	**0.246**	**0.420**	1.000		
	<.0001	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*<.0001*			
12.MTB	0.005	0.005	0.004	**-0.015**	0.007	**0.009**	-0.006	0.003	0.001	0.005	**0.019**	1.000	
	0.355	*0.419*	*0.529*	*0.003*	*0.194*	*0.082*	*0.250*	*0.582*	*0.925*	*0.300*	*0.000*		
13. RET	0.006	0.007	0.006	**0.010**	0.002	-0.004	-0.005	-0.002	-0.002	-0.001	0.005	0.001	1.000
	0.336	*0.255*	*0.281*	*0.083*	*0.763*	*0.423*	*0.348*	*0.704*	*0.753*	*0.865*	*0.396*	*0.904*	
14.Z	**0.026**	**0.028**	**0.029**	**-0.013**	0.002	**0.016**	-0.005	-0.007	**0.037**	**0.034**	**0.033**	0.000	**0.028**
	<.0001	*<.0001*	*<.0001*	*0.017*	*0.719*	*0.004*	*0.348*	*0.186*	*<.0001*	*<.0001*	*<.0001*	*0.940*	*<.0001*

4.2.1 RAM and Future Performance Measured by ROA

In Table 4 Panel A, the significant and positive coefficients of *RCFO*GROW* indicate that, when growth firms engage in RAM by extending lenient credit or deep discounts (*RCFO*), the RAM activity is more positively related with ROA in the next year, compared to mature and shake-out firms. The RAM activities of introductory and decline firms have no differential impact on ROA in the next year. In addition, the four significant coefficients of *RAM* suggest that the impact of RAM on ROA in the next year varies with the RAM type. The RAM by extending lenient credit and deep discounts and cutting discretionary expenditures is positively related with ROA in next year, while the RAM by overproduction is negatively related with ROA in next year. The aggregate RAM (*RAM123*) is negatively related with ROA of the next year.

In Panel B, the significant coefficients of *RAM*INTRO* and *RAM*GROW* indicate that (1) when introductory and growth firms engage in RAM by extending lenient credit or deep discounts (*RCFO*), the RAM activity is more positively related with ROA in the next two years; (2) if growth firms engage in RAM by reducing discretionary expenditures (*RDISX*), the RAM activity is more positively related with ROA in the next two years; and (3) if introductory firms manage earnings by overproduction (*RPROD*), the RAM activity hurts ROA more in the next two years, compared to mature and shake-out firms. The RAM activities of decline firms have no differential impact on ROA in the next two years. The aggregate impact of RAM on ROA is significantly lower for introductory firms than the benchmark group.

In Panel C, the significant coefficients of *RAM*GROW* and *RAM*DECLINE* indicate that (1) when growth and decline firms engage in RAM by extending lenient credit or deep discounts (*RCFO*), the RAM activity is more positively related with ROA in the next three years; (2) if growth firms engage in RAM by reducing discretionary expenditures (*RDISX*), the RAM activity is more positively related with ROA in the next three years; and (3) if decline firms manage earnings by overproduction (*RPROD*), the RAM activity hurts ROA more in the next three years, compared to the benchmark group. The RAM activities of introductory firms have no differential impact on ROA in the next three years.

Table 4 Panel A: Industry-adjusted ROA in the following year (ROA^1) as Dependent Variable

RAM	RCFO	RPROD	RDISX	RAM123
Intercept	-0.7907***	-0.7711***	-0.7808***	-0.6211***
	(<.0001)	*(<.0001)*	*(<.0001)*	*(<.0001)*
INTRO	0.0080	-0.0428	0.0100	-0.0472
	(0.9484)	*(0.2780)*	*(0.8783)*	*(0.1945)*
GROW	0.0072	0.0181	0.0177	0.0449*
	(0.7563)	*(0.4341)*	*(0.5142)*	*(0.0961)*
DECLINE	0.4022*	0.0233	-0.0448	0.0256
	(0.0789)	*(0.7454)*	*(0.7179)*	*(0.6910)*
RAM	0.0322***	-0.0056***	0.0158***	-0.0037***
	(<.0001)	*(<.0001)*	*(<.0001)*	*(0.0005)*
RAM*INTRO	-0.0709	0.0064	-0.0216	0.0090
	(0.4376)	*(0.1651)*	*(0.2747)*	*(0.2082)*
RAM*GROW	0.0147**	-0.0008	0.0057	-0.0004
	(0.0399)	*(0.4608)*	*(0.1079)*	*(0.8416)*
RAM*DECLINE	-0.2590	-0.0056	0.0364	-0.0176
	(0.1210)	*(0.5669)*	*(0.3538)*	*(0.4349)*
ROA^0	0.2358***	0.2351***	0.3076***	0.3136***
	(<.0001)	*(<.0001)*	*(<.0001)*	*(<.0001)*
SIZE	0.1373***	0.1328***	0.1355***	0.1028***
	(<.0001)	*(<.0001)*	*(<.0001)*	*(<.0001)*
MTB	-0.0001**	-0.0001**	-0.0001**	-0.0001**
	(0.0123)	*(0.0117)*	*(0.0104)*	*(0.0120)*
RET	0.0001	0.0001	0.0002	0.0001
	(0.9525)	*(0.9525)*	*(0.8882)*	*(0.8528)*
Z	0.0002	0.0001	0.0001	0.0001
	(0.6291)	*(0.5853)*	*(0.4804)*	*(0.3738)*
N	27,458	27,458	19,298	19,298
Adj. R^2	0.1027	0.1024	0.1346	0.1308
F	261.65	260.79	250.02	241.92

Panel B: Industry-adjusted ROA in the following 2 years (ROA^2) as Dependent Variable

RAM	RCFO	RPROD	RDISX	RAM123
Intercept	-1.0015***	-1.0288***	-1.1301***	-0.8913***
	(<.0001)	*(<.0001)*	*(<.0001)*	*(<.0001)*
INTRO	-0.9287***	-0.3435***	-0.3579***	-0.3253***
	(<.0001)	*(<.0001)*	*(<.0001)*	*(<.0001)*
GROW	0.0143	0.0243	0.0242	0.0635*
	(0.6115)	*(0.3856)*	*(0.4810)*	*(0.0635)*
DECLINE	0.3337	-0.0162	-0.1532	-0.0389
	(0.2274)	*(0.8523)*	*(0.3291)*	*(0.6342)*
RAM	0.0390***	-0.0075***	0.0230***	-0.0054***
	(<.0001)	*(<.0001)*	*(<.0001)*	*(<.0001)*
RAM*INTRO	0.4946***	-0.0124**	0.0284	-0.0181**
	(<.0001)	*(0.0264)*	*(0.2578)*	*(0.0464)*
RAM*GROW	0.0190**	-0.0012	0.0094**	-0.0008
	(0.0285)	*(0.3787)*	*(0.0342)*	*(0.7412)*
RAM*DECLINE	-0.2489	-0.0061	0.0477	-0.0109
	(0.2172)	*(0.6025)*	*(0.3377)*	*(0.7035)*
ROA^0	0.1817***	0.1874***	0.2201***	0.2307***
	(<.0001)	*(<.0001)*	*(<.0001)*	*(<.0001)*
SIZE	0.1762***	0.1803***	0.2010***	0.1523***
	(<.0001)	*(<.0001)*	*(<.0001)*	*(<.0001)*
MTB	-0.0003***	-0.0003***	-0.0003***	-0.0003***
	(<.0001)	*(<.0001)*	*(<.0001)*	*(<.0001)*
RET	0.0001	0.0001	0.0001	0.0001
	(0.8925)	*(0.9639)*	*(0.9526)*	*(0.9789)*
Z	0.0001	0.0001	0.0001	0.0001
	(0.7749)	*(0.7430)*	*(0.9325)*	*(0.9015)*
N	27,458	27,458	19,298	19,298
Adj. R^2	0.0852	0.0848	0.0910	0.0860
F	213.11	211.90	160.80	151.28

Panel C: Industry-adjusted ROA in the following 3 years (ROA^3) as Dependent Variable

RAM	RCFO	RPROD	RDISX	RAM123
Intercept	-1.2072***	-1.2251***	-1.1998***	-0.9867***
	(<.0001)	*(<.0001)*	*(<.0001)*	*(<.0001)*
INTRO	-0.0478	-0.2360***	-0.1694	-0.2969***
	(0.8316)	*(0.0010)*	*(0.1326)*	*(<.0001)*
GROW	0.0379	0.0502	0.0525	0.0902*
	(0.3711)	*(0.2343)*	*(0.2593)*	*(0.0513)*
DECLINE	-1.0608**	-0.2286*	-0.0592	-0.0986
	(0.0109)	*(0.0802)*	*(0.7809)*	*(0.3727)*
RAM	0.0431***	-0.0082***	0.0221***	-0.0056***
	(<.0001)	*(<.0001)*	*(<.0001)*	*(0.0017)*
RAM*INTRO	-0.1612	0.0005	-0.0352	-0.0067
	(0.3321)	*(0.9496)*	*(0.3003)*	*(0.5875)*
RAM*GROW	0.0239*	-0.0019	0.0115*	-0.0014
	(0.0663)	*(0.3547)*	*(0.0565)*	*(0.6883)*
RAM*DECLINE	0.7962***	-0.0406**	0.0082	-0.0310
	(0.0088)	*(0.0217)*	*(0.9027)*	*(0.4220)*
ROA^0	0.2708***	0.2690***	0.3399***	0.3481***
	(<.0001)	*(<.0001)*	*(<.0001)*	*(<.0001)*
SIZE	0.2089***	0.2111***	0.2102***	0.1664***
	(<.0001)	*(<.0001)*	*(<.0001)*	*(<.0001)*
MTB	0.0001	0.0001	0.0001	0.0001
	(0.7801)	*(0.7658)*	*(0.8434)*	*(0.8665)*
RET	0.0001	0.0001	0.0001	0.0001
	(0.9149)	*(0.9426)*	*(0.9770)*	*(0.9443)*
Z	0.0001	0.0001	0.0001	0.0001
	(0.7997)	*(0.7568)*	*(0.8628)*	*(0.7278)*
N	27,458	27,458	19,298	19,298
Adj. R^2	0.0604	0.0604	0.0811	0.0784
F	147.04	147.08	141.89	136.68

4.2.2 RAM and Future Performance Measured by CFO

In Table 5 Panel A, the significant coefficients of *RAM*INTRO* and *RAM*GROW* indicate that (1) when introductory and growth firms engage in RAM by extending lenient credit or deep discounts (*RCFO*), the RAM activity hurts CFO in the next year; (2) if growth firms cut discretionary expenditures (*RDISX*), the RAM activity also hurts CFO more in the next year; but (3) introductory and growth firms can improve CFO more in the next year by overproduction, compared to the benchmark group. The significant coefficients of *RAM*DECLINE* indicate that the RAM activities of decline firms negatively impact their CFO in the next year. In addition, the six significant coefficients of *RAM* suggest that the impact of RAM on CFO in the next years varies with the RAM type. The RAM by extending lenient credit and deep discounts and overproduction is positively related with CFO in next year, while the RAM by cutting discretionary expenditures is negatively related with CFO in next year. The aggregate RAM (*RAM123*) is not significantly related with CFO of the next year.

In Panels B and C, the significant coefficients of *RAM*INTRO* and *RAM*GROW* indicate that (1) when introductory and growth firms engage in RAM by extending lenient credit or deep discounts (*RCFO*), the RAM activity hurts CFO in the next two and three years; (2) if growth firms cut discretionary expenditures (*RDISX*), the RAM activity hurts CFO more in the following years; but (3) growth firms can improve CFO in the next two and three years by overproduction, compared to the benchmark group. The significant coefficients of *RAM*DECLINE* indicate that the RAM activities of decline firms negatively impact their CFO in the following years, especially if they over-produce to reduce cost of goods sold.

In sum, our empirical results indicate that the impact of RAM on subsequent operating performance varies with the life-cycle stages and RAM forms. In addition, the majority of the control variables' coefficients (*INTRO*, *GROW*, *DECLINE*, *RAM*, ROA^0, CFO^0, *SIZE*, *MTB*, *RET*, and *Z*) are significantly different from zero in Tables 4 and 5.

5. Robustness Tests

5.1 Use Earnings-Management-Suspect Sample

As a robustness test, we repeated the tests using only the firms that meet the previous year's earnings. Meeting zero earnings and/or the previous year's earnings has been used in the RAM literature as the criterion to identify the incentive of the manager to conduct earnings management. Burgstahler and Dichev (1997) confirm that firms manage reported earnings to avoid losses or a decrease in earnings. The relationship between RAM and earnings thresholds is examined by Gunny (2010), who confirms that abnormal levels of R&D and SG&A expenses are negatively related and abnormal production costs are positively and significantly related to firms just meeting zero earnings or zero earnings growth. Thus, earnings thresholds should effectively identify the incentive to engage in RAM.

In accordance with the method implemented by Gunny (2010), we constructed intervals of asset-scaled earnings and asset-scaled changes in earnings for widths of 0.01; firms with positive scaled earnings or positive scaled changes in earnings between 0 and 0.01 are identified as those avoiding losses and/or just meeting the previous year's earnings. We repeated all the tests. The untabulated results are consistent with Tables 4 and 5.

Table 5 Panel A: Industry-adjusted CFO in the following year (CFO^1) as Dependent Variable

RAM	RCFO	RPROD	RDISX	RAM123
Intercept	-35.4600***	-19.3130***	-9.2656*	-30.7346***
	(<.0001)	*(<.0001)*	*(0.0678)*	*(<.0001)*
INTRO	62.4234***	17.9920***	22.3594***	14.8205***
	(<.0001)	*(0.0003)*	*(0.0074)*	*(0.0013)*
GROW	6.1969**	7.5936***	8.8321**	7.3108**
	(0.0334)	*(0.0089)*	*(0.0105)*	*(0.0342)*
DECLINE	10.1313	8.0661	35.4031**	3.3667
	(0.7235)	*(0.3690)*	*(0.0249)*	*(0.6817)*
RAM	3.5568***	0.3781***	-2.1896***	0.1627
	(0.0001)	*(<.0001)*	*(<.0001)*	*(0.2226)*
RAM*INTRO	-38.5540***	1.0811*	-4.1420	-0.1304
	(0.0006)	*(0.0632)*	*(0.1007)*	*(0.8864)*
RAM*GROW	-9.0637***	1.4757***	-4.1593***	2.1110***
	(<.0001)	*(<.0001)*	*(<.0001)*	*(<.0001)*
RAM*DECLINE	3.4393	-0.9962	-7.8509	-6.0874**
	(0.8693)	*(0.4129)*	*(0.1164)*	*(0.0335)*
CFO^0	0.7879***	0.7523***	0.7239***	0.7619***
	(<.0001)	*(<.0001)*	*(<.0001)*	*(<.0001)*
SIZE	9.0615***	6.3026***	4.8841***	8.3474***
	(<.0001)	*(<.0001)*	*(<.0001)*	*(<.0001)*
MTB	0.0011	0.0014	0.0010	0.0009
	(0.8183)	*(0.7749)*	*(0.8401)*	*(0.8630)*
RET	0.0016	0.0016	0.0031	0.0030
	(0.5665)	*(0.5523)*	*(0.2808)*	*(0.3126)*
Z	0.0006	0.0007	-0.0039*	-0.0030
	(0.3400)	*(0.2660)*	*(0.0986)*	*(0.2003)*
N	27,458	27,458	19,298	19,298
Adj. R^2	0.6416	0.6430	0.6419	0.6401
F	4,095.15	4,118.65	2,880.41	2,857.87

Panel B: Industry-adjusted CFO in the following 2 years (CFO^2) as Dependent Variable

RAM	RCFO	RPROD	RDISX	RAM123
Intercept	-79.6891***	-48.9412***	-28.7850***	-76.1527***
	(<.0001)	*(<.0001)*	*(0.0042)*	*(<.0001)*
INTRO	106.9554***	35.8500***	48.2693***	34.4297***
	(0.0004)	*(0.0003)*	*(0.0035)*	*(0.0002)*
GROW	16.2230***	19.8168***	20.4237***	17.3558**
	(0.0053)	*(0.0006)*	*(0.0029)*	*(0.0115)*
DECLINE	63.2843	6.4516	55.3761*	5.5061
	(0.2683)	*(0.7193)*	*(0.0771)*	*(0.7359)*
RAM	9.3518***	0.7954***	-4.4306***	0.6468**
	(<.0001)	*(<.0001)*	*(<.0001)*	*(0.0147)*
RAM*INTRO	-60.6692***	1.0587	-7.6457	-2.0825
	(0.0068)	*(0.3628)*	*(0.1267)*	*(0.2513)*
RAM*GROW	-21.3416***	2.4937***	-9.3557***	2.3621***
	(<.0001)	*(<.0001)*	*(<.0001)*	*(<.0001)*
RAM*DECLINE	-21.5545	-4.8597**	-9.3343	-15.7550***
	(0.6054)	*(0.0457)*	*(0.3467)*	*(0.0057)*
CFO^0	1.4648***	1.3767***	1.3086***	1.3873***
	(<.0001)	*(<.0001)*	*(<.0001)*	*(<.0001)*
SIZE	20.8591***	15.6853***	13.2225***	20.8254***
	(<.0001)	*(<.0001)*	*(<.0001)*	*(<.0001)*
MTB	0.0002	0.0006	-0.0002	-0.0006
	(0.9843)	*(0.9506)*	*(0.9805)*	*(0.9484)*
RET	0.0043	0.0045	0.0064	0.0063
	(0.4365)	*(0.4169)*	*(0.2661)*	*(0.2818)*
Z	0.0018	0.0021	-0.0040	-0.0023
	(0.1661)	*(0.1153)*	*(0.3902)*	*(0.6285)*
N	27,458	27,458	19,298	19,298
Adj. R^2	0.6061	0.6064	0.6083	0.6046
F	3,519.68	3,523.61	2,495.69	2,457.00

Panel C: Industry-adjusted CFO in the following 3 years (CFO^3) as Dependent Variable

RAM	RCFO	RPROD	RDISX	RAM123
Intercept	-120.8009***	-81.0742***	-49.4878***	-120.0452***
	(<.0001)	*(<.0001)*	*(0.0013)*	*(<.0001)*
INTRO	123.0150***	46.6527***	69.0747***	53.6142***
	(0.0079)	*(0.0020)*	*(0.0062)*	*(0.0001)*
GROW	26.5926***	31.3980***	34.2139***	30.0078***
	(0.0028)	*(0.0004)*	*(0.0011)*	*(0.0042)*
DECLINE	114.5506	-12.3969	56.8638	-9.0213
	(0.1909)	*(0.6524)*	*(0.2339)*	*(0.7171)*
RAM	16.6805***	0.6074**	-5.8544***	0.6185
	(<.0001)	*(0.0206)*	*(<.0001)*	*(0.1262)*
RAM*INTRO	-61.9333*	0.0949	-9.4832	-4.1352
	(0.0712)	*(0.9576)*	*(0.2141)*	*(0.1353)*
RAM*GROW	-34.2688***	4.2449***	-15.1168***	3.1156***
	(<.0001)	*(<.0001)*	*(<.0001)*	*(<.0001)*
RAM*DECLINE	-50.3483	-10.3649***	-6.3486	-31.0418***
	(0.4309)	*(0.0054)*	*(0.6747)*	*(0.0004)*
CFO^0	2.0557***	1.9149***	1.8042***	1.9150***
	(<.0001)	*(<.0001)*	*(<.0001)*	*(<.0001)*
SIZE	32.9205***	26.5042***	22.5179***	33.8317***
	(<.0001)	*(<.0001)*	*(<.0001)*	*(<.0001)*
MTB	-0.0034	-0.0029	-0.0027	-0.0034
	(0.8225)	*(0.8445)*	*(0.8538)*	*(0.8196)*
RET	0.0053	0.0054	0.0070	0.0068
	(0.5302)	*(0.5228)*	*(0.4271)*	*(0.4462)*
Z	0.0036*	0.0039**	0.0007	0.0034
	(0.0725)	*(0.0481)*	*(0.9263)*	*(0.6321)*
N	27,458	27,458	19,298	19,298
Adj. R^2	0.5600	0.5598	0.5641	0.5598
F	2,910.88	2,908.56	2,079.47	2,043.54

5.2 Remove Shake-out Firms

Shake-out firms is a "catch-all" category. It may add noise and biases when used as a benchmark group. Therefore, we removed the shakeout firms and used only mature firms as the benchmark group. We repeated all the tests. The untabulated results are consistent with Tables 4 and 5.

6. Conclusion

In this study, we extend the prior studies on the relation between RAM and subsequent operating performance by incorporating the life cycle factor into the picture. Our results show that the impact of RAM activities on subsequent operating performance in terms of ROA and CFO vary with the RAM mechanisms and life-cycle stages. Specifically, when introductory, growth and decline firms engage in RAM by extending lenient credit or deep discounts, the RAM activity is more positively related with subsequent ROA but negatively with CFO, compared to mature and shake-out firms. If growth firms engage in RAM by reducing discretionary expenditures, the RAM activity is also more positively related with subsequent ROA but negatively with CFO. Growth firms can improve CFO in the next two and three years by overproduction. However, if introductory and decline firms manage earnings by overproduction, the RAM activity hurts subsequent ROA and CFO.

This study extends the research on the relation between firms' RAM behavior and the subsequent performance by incorporating the life cycle factor into the puzzle. The evidence confirms the importance of incorporating the life cycle factor into the investigation of firms' RAM behavior and subsequent performance. Our study also extends the knowledge about firms' RAM strategies and the economic consequences of RAM. The results can potentially assist regulators, auditors, and investors in understanding the firms' earnings management strategies and in reevaluating their decisions.

APPENDIX

Definition of Variables

CFO^0	Industry-adjusted cash flows from operations (CFO) in current year. Industry-adjusted CFO is the difference of firm CFO and the industry-median CFO in the same year;
CFO^k	Industry-adjusted CFO in the following k year(s), k=1, 2, or 3;
DECLINE	an indicator variable. It equals to 1 if operating cash flows are negative but investing cash flows are positive, and 0 otherwise.
GROW	an indicator variable. It equals to 1 if operating and financing cash flows are positive but investing cash flows are negative, and 0 otherwise.
INTRO	an indicator variable. It equals to 1 if operating and investing cash flows are negative but financing cash flows are positive, and 0 otherwise.
MATURE	an indicator variable. It equals to 1 if investing and financing cash flows are negative but operating cash flows are positive, and 0 otherwise.
MTB	market to book ratio, market value calculated as a product of the close market price at the calendar year end times the shares outstanding, book value calculated as difference of total assets and total liabilities;
RAM123	the sum of RCFO, RDISX, and RPROD;
RCFO	the standardized abnormal cash flows from operations, calculated as opposite of the residual estimated from Eq. (1) scaled by 100;
RDISX	the standardized abnormal discretionary expenses, calculated as opposite of the residual estimated from Eq. (2) scaled by 100;
RET	Industry-adjusted abnormal returns computed as the difference between the yearly buy and hold raw return of the specific firm and the industry-median return in the same year;
ROA^0	Industry-adjusted return on asset (ROA) in current year. Industry-adjusted ROA is the difference of firm ROA and the industry-median ROA in the same year;
ROA^k	Industry-adjusted ROA in the following k year(s), k=1, 2, or 3;
RPROD	the standardized abnormal production costs, calculated as the residual estimated from Eq. (3) scaled by 100;
SHAKE	an indicator variable. It equals to 1 if a firm is not in any of the stages (INTRO, GROW, MATURE, DECLINE), and 0 otherwise.
SIZE	the natural logarithm of total assets;
Z	Altman Z-Score measuring company financial health, computed as: $3.3*(\text{Net income}_t/\text{Assets}_{t-1}) + 1.0*(\text{Sales}_t/\text{Assets}_{t-1}) + 1.4*(\text{Retained Earnings}_t/\text{Assets}_{t-1}) + 1.2*(\text{Working Capital}_t/\text{Assets}_{t-1})$.

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