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Evaluating the Role of Company Life Cycle for an Appropriate Model in Predicting the Quality of Discretionary Accruals (Abnormal) Based on Dickinson Cash Flow Model Approach

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ABSTRACT

The main purpose of this research is to evaluate the role of the company life cycle in providing an appropriate model in predicting the quality of discretionary accruals (Abnormal) using the Dickinson Cash Flow Model approach. The statistical population of the research consisted of 180 company observations that were divided into three stages of life cycle using Dickinson's model variables (2011). Multivariate regression technique was used to test the hypotheses based on the cross-sectional data. Then, using initial models for measuring the quality of discretionary accruals (Abnormal), the error values of each model were compared with the error values obtained from the life cycle adjusted models. The results show that the coefficients of determination in the Kasznik adjusted model are not significantly increased compared to the initial model, but in the other models, the coefficient of determination increases significantly compared to the initial model, indicating that the values estimated by the adjusted models are an appropriate approximation of the real values. They predict and identify more exactly up to a few percent of accruals quality or the operational cash flow difference and net profit compared to the initial models; so, except for the Kasznik model, in the other models an increase in the life cycle increases the predictive power of the Models.

Keywords:

Company Life Cycle, Profit Management, Accruals Quality, Dickinson Cash Flow Model, Discretionary Accruals.

1. Introduction

In the accounting literature, profit is divided into cash and accruals; its cash is sufficiently reliable due to being accompanied by the cash flows, but its accruals have been controversial for many users and analysts of financial statements. cash flows as well as future earnings represent the future performance of the business unit and their prediction is of great importance. Future cash flows can be considered on the basis of two criteria of free cash flow and operational cash flows. Contrary to the superiority of cash flows in the asset valuation models, there is much evidence that many analysts and users rely on the financial statements to predict future profitability of the company. However, it is possible for users to predict profits first and then predict cash flows. On the other hand, there are accounting estimates that can be effective in these predictions. The key point is that many of the underlying estimates are not directly published in the financial statements, so they focus on the accruals because the accruals are based on accounting estimates. The US Financial Accounting Standards Board also states about the accruals that are used more than estimates and which affect the future cash flows of an economic unit: Information on the earnings of an economic unit resulting from the accounting accruals represents the cash flows interested that come from cash receipts and payments and are very important because they can be manipulated. On the other hand, the life cycle of companies is considered as one of the most important factors in assessing the status of companies; in other words, according to life cycle theory, the companies have financially and economically different indicators and behaviors at the different stages of life cycle. this means that economic and financial characteristics of a trading house are affected by a stage in its life cycle. In the field of accounting, some scholars have also examined the impact of a firm's life cycle on accounting information (Anthony and Ramash, 1992), (Black, 1998), (Jenkins, 2004), (Sojianis, 1996).

2. Literature Review

2.1. Theoretical background

Company Life Cycle Theory: Adizes (1998) states that all living things, including plants, animals, and humans, all follow the life-cycle. Such creatures are born, grow, mature, and eventually die. These living systems have specific behavioral patterns at each stage of their lifecycle to overcome the problems of that period and the problems associated with the transition from one period to another. Company Life Cycle Theory assumes that companies and trading houses, like all living beings that are born, grow and die, have a life-cycle (Karami & Omrani, 2010). One of the important features considered in the various researches is the life cycle of the company (Chen, 2009). Researchers have outlined four steps for describing a company life cycle, each imposing certain characteristics on the company and affecting the composition of the profit management model (through the accruals and actual activities):

Birth Stage (beginning): At this stage, companies invest large amounts of money in marketing and innovation activities compared to their sales level or market share so that they can be accepted in the market or increase their market share. Accordingly, the net cash flows resulting from the investment and operational activities of the companies are appeared as output at this stage. What drives managers to invest is their belief in the prospect of corporate growth (Asna Ashari, Naderi Noureini, 2016). It is worth noting that management investment decisions will reduce the level of profit in the short run. For this reason, at this stage they embark upon managing profit more through accruals (rather than actual activities), because they believe in the company's future performance, so they do not have to worry about the reverse effects of accruals in the long-term (Chen, 2009) and (Graham, 2005); while they are not pressured to report earnings. Therefore, emerging companies are expected to apply the profit management model through the accruals. At this stage, the most important characteristic of business units is that they are young, run by their owners, and have a simple and informal organizational structure. For this reason, the birth stage is also called the entrepreneurial stage. At this stage, usually the amount of assets (company size) is at a low level. Cash flows resulting from operational and profitability activities are low, and the companies need high liquidity to finance and realize growth opportunities. Companies pay irreversible costs to enter the market and start operations and receive misleading information on their cost and performance levels (Jawanik, 1982). Current operational information in estimating equity returns in companies may be irrelevant at this stage.

Growth and maturity stage: At the growth stage, the size of the company is much larger than the emerging companies, and the sales and revenue growth are higher than at the emergence stage. The financial resources are invested more in the productive assets, and the company has more flexibility in the liquidity indices. Investment return or adjusted return on investment also often outweighs the equity cost of financing (Adizes, 1998). Companies can generate temporary monopoly rents during the growth stage (Etemadi, Rahimimogoi, Aghai, Anvarirostami, 2016). Companies, although partially introduced to the market during the growth stage, require internal and external financing to expand their operations (Asna Ashari, Naderi Noureini, 2016). Mature companies are also under pressure by the market to achieve certain levels of profit. Therefore, the managers of companies being in the stage of growth and mature have a good incentive to manage profit through the real activities. However, they also have sufficient authority to reduce investment in the inefficient innovations and marketing activities or to delay investment in new projects, because the managers in both stages face a basket of different projects; so, the combination of motivation and authority provides a good platform for managing profit through actual activities. However, it should also be kept in mind that the growth prospect of the company is among the factors that can influence the profit management model through the accruals of companies that are in the growth and maturity stage (Asna Ashari, Naderi Noureini, 2016); because what persuades the managers to such a management model is whether future profitability can cover the reverse effects of this profit management model. For this reason, it is expected that companies being in the growth and maturity stage will use mostly the profit management model through actual activities. At the same time, it is expected that the use of accruals for the profit management will be higher in the companies active in the growth and maturity stage that have a higher growth prospect than other companies being in this stage.

Decline Stage: At this stage, companies reduce the amount of investment and restructuring due to the decline in the technology used in operations. For this reason, the managers of the companies present at this stage do not have much authority to manage profit through actual activities. Because at this stage, deviation from the optimal decision making through the actual activities for profit management leads to high costs for the company (Asna Ashari, Naderi Noureini, 2016) and (Zhang, 2012). So, the companies at this stage are expected to make more use of the accrual-based profit management model. The erosion of competitive advantages, which is characteristic of the maturity stage, leads to decline, although the companies can resume operations through restructuring such as education, integration or specific participation, or expansion to other markets (Etemadi, Rahimimogoi, Aghai, Anvarirostami, 2016).

Dickinson Cash Flow Model (2011): Dickinson (2011) introduced defects using (Anthony and Ramesh, 1992) method which can be read by the elderly at the expense of life cycle engine power (in Anthony and Ramesh method), assuming that The company used to. But by using new products, entering new markets or finding a construction company, established companies are not possible. By this way, you have claimed that the company has a limited company life cycle that can oversee its international company and can paint Provide feedback to the manufacturer. Despite the difference in Brother Management, the descriptions of recreation and leisure across organizations vary, at the risk, with the company being accredited, and both of the companies being involved in different projects and companies (Mardani, 2014).

In addition, Antony and Ramesh (1992) method requires a hypothetical consideration of the uniform distribution of categorized variables and optional breakpoints for life cycle determination. The use of ordered portfolios based on a uniform distribution is not in line with economic theory, on the other hand, the cash flow pattern method is a natural consequence of important economic activities. Therefore, such an assumption about how it is distributed is not necessary (Dickinson, 2006). Anthony and Ramesh (1992), the firm's life cycle is determined by the sample under study. In other words, if a company is in the growth stage it may be in other stages of the life cycle by changing the companies under review. This problem does not exist in the cash flow modeling approach, and companies are separated into life cycle stages. The benefits of the Dickenson method have made it widely accepted by researchers (Mardani, 2014). Dickenson uses operational cash flow, investment, and financing to separate life cycle stages. Because it believes that cash flows reflect differences in profitability, risk and

growth. However, since the cash flow is according to Iranian five-storey standards, to match existing data with the Dickinson model, cash flows from payroll tax classes and stock returns and investments with cash flows from aggregate operating activities are computed.

Dickinson (2011) classification is based on the pattern of systematic cash flows over the life cycle. For example, investment during the introduction and growth phase is relatively limited with negative cash flows from investment activities. Companies are more reliant on financing activities, and as a result, cash flows from positive financing activities. The levels of investment and the need for financing activities decrease as companies move on to other stages of the life cycle. While the firm's higher operating performance in growth and maturity, the result of positive cash flows from the firm's higher operating performance and maturity, is the result of positive cash flow from operating activities and is likely to be negative in other stages. Dickinson (2011) life cycle classification is based on patterns of operational, investment, and financing activities as shown in Tables 1 and 2.

Table 1. Economic Theories of Cash Flow from Dickinson's View (2011)

Life Cycle Stage	operational activities	investment activities	Financing activities
Birth Stage (beginning)	A company with little knowledge of potential revenue and costs enters the market.	Management optimism is an effective factor in investing. Companies make a lot of initial investment.	Hierarchy theory states that companies have more access to bank debt. Corporate growth increases debt.
Growth stage	The profit margin is maximized during the period when the investment is highest.	Companies make a lot of initial investment.	Hierarchy theory states that companies have more access to bank debt. Corporate growth increases debt.
maturity stage	Productivity and efficiency are maximized through increased operational knowledge.	New investment is made as it enters maturity.	Focus on switching financing activities to debt services and distributing surplus funds, including for mature companies that reduce their debt.
Recession	The decline in growth rates will lead to lower prices	No theory	No theory
Decline Stage	The decline in growth rates will lead to lower prices	Sale of assets for debt service.	Focus on debt service repayment and debt negotiation again.

Table 2: Breakdown of Life Cycle Stages by Dickinson Cash Flow Model(2011)

activities	Birth	Growth	maturity	Recession	Recession	Recession	Decline	Decline
operational activities	-	+	+	+	-	+	-	-
investment activities	-	-	-	+	-	+	+	+
Financing activities	+	+	-	+	-	-	+	-

Dickinson Cash Flow model (2011) as follows:

(1) Growth: If CFO> 0, INVCF <0, FINCF> 0

(2) Maturity: If CFO> 0, INVCF <0, FINCF <0

(3) Decline: If CFO <0, INVCF> 0, FINCF ≤ or ≥ 0

CFO: Net cash flow resulting from operational activities, INVCF: Net cash flow resulting from investing activities, FINCF: Net cash flows resulting from financing activities.

Accruals: One of the criteria for calculating profit quality is to assess the level of accruals of a trading house. The lower the level of these accruals in the financial statements, the higher the quality of profit and the higher the level of these accruals, the lower the quality of profit. In practice, there are different criteria and approaches for calculating earnings quality, but in recent years, the calculation of profit quality with the accruals quality approach has been used by researchers more than other criteria. The same approach has been used in this research. For Hoagland (2011) the accruals is a general term that includes both accruals and

accruals accounts. In the research literature related to this research, accruals are divided into two types: discretionary accruals (Abnormal) and non-discretionary accruals. However, such a distinction in practice will not be as easy as distinguishing black from white. However, the discretionary accruals are a good tool for profit management. Mirzaei, Mehrazian, Masyhaabadi (2012) believe that accruals send signals to the users of financial statements that have been overlooked in the cash system. These signals, on the one hand, provide a true picture of the current state of the business unit and, on the other hand, enable users of financial reports to have a more accurate prediction of the future situation, and in particular future cash flows. So these signals have informational contents. In a research entitled "Cost of Equity and profit Characteristics", Francis et al. categorized the profit quality criteria based on the accounting information and market information into the following seven approaches: A) Profit quality criteria based on accounting information: Accrual quality, Profitability, Predictability. B) Profit quality criteria based on market information: relevance to equity, timing of profit, conservatism (Karimi, Sadeghi, 2010). Mashayekhi, Mehrani, Mehrani, Karami (2005) state that in his researches Jones identified as accruals the difference between profit and cash resulting from operations. Accruals are separable discretionary accruals (Abnormal) and non- discretionary accruals are not restricted by the regulations, organizations and other external factors and cannot be manipulated by management, while discretionary accruals can be manipulated by management. Because of lower cost and easier manipulation, the managers often use accounting accruals as a method for managing profit (Dechow, Patricia, Catherine, Schrand, 2004). The accruals are the difference between a company's accounting profit and its main cash flow; it means that the large positive accruals represent an increase in the reported profit in relation to the company's produced cash flow. In the profit management literature, the accruals are the difference between earnings (profit net) and cash flows resulting from operations. The expected (normal) level of accruals that is normally estimated based on the information available to investors is called non- discretionary accruals. discretionary accruals (Abnormal) are the result of subtracting estimated non- discretionary accruals from the total accruals. The accounting literature indicates a negative relationship between accruals and future stock returns. This negative relationship is called the "inaccurate pricing of accruals", first introduced by Sloan (1996).

Accounting Flexibility: The manner in which the accounting practices and management judgments have been applied in previous periods affects the accruals management model in the current period and limits it, because accruals are reversible over time. It is worth noting that the company operational cycle moderates this limitation so that accruals are returned with increasing operational cycle length with a low slope (Zhang, 2012) and (Justin, 2012).

Legal context: Strengthening the legal framework extends the supervision of the legislating institutions to protect shareholders' rights and affects corporate reporting behavior by increasing accruals management costs (Justin, 2012). The above factors lead the manager to try to manage the periodic profit through the cash flows and actual operations; thus, the manager adjusts the company performance by making decisions that are not in the ordinary and operational decisions of the company and are not efficient (like decision-making on R&D spending, advertising, investment in tangible assets); such measures are called profit management through real operations (Zhang, 2012) and (Justin, 2012). The authority the manager has to take decisions regarding the resource allocation has caused the cost does not show a similar behavior concerning the increase and decrease of income. That is, the rate of increase in cost in conditions with increasing trend of income is greater than the rate of decrease in conditions with decreasing trend of it. In other words, the cost represents an asymmetric behavior against income changes. This behavior was first noted by Anderson et al in 2003 and referred to as cost stickiness (Banker, Fang, 2013). There are two main theories as to why managers make decisions that result in sticky cost behavior:

Theory of Economic Behavior: Considers that asymmetric cost behavior is the result of the manager's rational decision against the costs of resource adjustment; that is, the managers do not respond appropriately to short-term income reduction in order to manage the long-term re-financing costs. Based on this theory, the higher the costs of adjusting resources (such as high levels of assets, capital expenditures, or staffing) or the greater the ambiguity of a manager's

progress (such as fluctuations in sales or returns), the cost represents stickier behavior.

Representation theory: Recent researches show that managers use a combination of accruals and actual activities to manage the profit so that they can balance the costs of applying them to achieve their goals. These costs are influenced by the characteristics of the company. Asymmetric cost behavior is seen as a sign of managerial opportunistic behavior stemming from representation problems; thus, the factors like the company's financial performance, firm size, and financing status can influence cost behavior from this perspective (Ho Koo, Song, Paik, 2015) and (Chen, Xu, Wu, 2014). On the other hand, Rubin and Guing (2016) argue that the stocks of companies that have had steady profit growth for several consecutive years are valued at more than the shares of similar firms that have not had such growth. They continue to argue that when the profits of such companies stop growing, their stocks fall. It makes it more profitable for companies with continued profit growth to manage profits and manipulate discretionary accruals; also the high-growth companies (companies with high growth rates of income and profit and rich investment opportunities) have characteristics that increase managers' motivation to use discretionary accruals, especially positive discretionary accruals (income enhancers), in marking the company's future desired performance; these characteristics include problems of Information asymmetry and representation costs in the high-growth companies. The source of the large part of information asymmetry is investment opportunities and corporate growth; part of it is rooted in the methods of collecting and reporting information from the management side.

2.2. Research background

In a research Imani, Rahnamaroudposhti, Bani Mahd (2010) investigated the relationship between actual activity manipulation and accrual-based profit management using the recursive equation system approach. The results of this research indicate an inverse relationship between actual profit management and accruals-based management. This means that when managers increase (decrease) the amount of accruals-based profit management, the manipulation of actual activities will unexpectedly decrease (increase). Also, studies in the area of profit management indicate that there are two main ways of managing profit. Corporate managers can manage profits by manipulating accruals and manipulating actual activities. Salem Dezfuli, Salehi, Naciri, Jerjrezade (2019) investigated the effect of economic uncertainty on the accruals-based profit management and real profit management. The results show that economic uncertainty measures (GDP growth, inflation rate, exchange rate and interest rate) have a positive and significant effect on the real profit management (abnormal voluntary cost, abnormal production costs and abnormal operational cash flows).

Etemadi, Rahimimogoi, Aghai, Anvarirostami (2016) evaluated the role of the company life cycle in optimizing Olson's valuation model. The purpose of this research was to investigate the improvement of Olson's valuation model by considering the life cycle variable. Their results showed that in both periods, the adjusted model estimation performed better in predicting anomalous returns and corporate valuation than the initial model. In a research aimed at investigating the potential of improving Olson's valuation model taking into account the life cycle variable. Etemadi, Rahimimogoi, Aghai, Anvarirostami (2016), stated that the company life cycle (growth, maturity and decline) affects the relationship between the profit quality and information asymmetry, so that the companies of the growth stage decrease the information asymmetry with the improvement of the quality. Ebrahimi, Bahraminasab, Jafarpor (2016) examined the impact of accounting quality on information asymmetry considering the life cycle of companies. Evidence showed that there was a significant negative relationship between the profit quality and information asymmetry. The research model was then tested separately for each of the life cycle stages; the results indicated a significant negative relationship at the growth stage, but at the maturity and decline stages there was no significant relationship between the profit quality and information asymmetry. in a research entitled the profit management model in the company life cycle. Asna Ashari, Naderi Noureini (2017), studied the model of profit management in the different stages of company life cycle and the role of growth prospects in it. The results showed that companies in the emergence and decline phases are more likely to apply accruals-based profit management model, whereas in the growth and maturity stages, the actual activities play a dominant role in the profit management; in addition, as the

growth prospects of companies in the stages of growth and maturity increase, the share of accruals in the profit management increases. Jarjarzadeh, Nikbakht (2017), examined the impact of discretionary accruals and operational cash on the stock returns in growth companies. The research findings showed that discretionary accruals manipulation has more effect on the stock returns in the growth companies than other ones. Also, positive accruals in growth companies have more impact on the stock return, meaning that discretionary accruals manipulation for the profit management purpose in growth companies have more impact on the stock returns. In addition, the results show that changes in operational cash flows have less impact on the stock returns in the growth companies (compared to other companies). Goal (2014), Profit Manipulation is a strategy used by a company manager to manipulate corporate profit during which the digits are matched with the predetermined goals (Roozbehani, Bani Mahd, Moradzadeh, 2017). The motivations for the profit management can be divided into efficient profit and opportunistic profit management (Karimi & Rahnamaroodposhti, 2015). The results of Burns and Merchant (1990) and Graham, Harvey, Rajgopal (2005), indicate the executive managers' tendency toward managing profit through the actual activities rather than accruals manipulation, because the accruals-based profit management is more frequently considered by the auditors and legislators. (Cohen, Dey, Lys, 2008), (Badershar, 2011), (Zhang, 2012) and (Rahnamaroudposhti, Imani, Bani Mahd, 2019), believe that the greater the value of actual profit management, the greater will be the use of profit management. Eskandarli, (2019) in a research investigated the effect of accruals on the heterogeneity of investors' beliefs and the effect of their interaction on the stock return. The findings showed that the amount of accruals has a significant positive effect on the level of heterogeneity of investors' beliefs and the heterogeneity of investors' beliefs affect the stock return. The results also show that the heterogeneity of investors' beliefs affects the relationship between the accruals and stock returns. Shakeri, Jahanshad, (2018) examined the optimal flow of cash during the company's cycle of activity (maturity, growth, decline), with emphasis on the risk of financing and profitability. The results showed that, in the stages of growth, maturity and decline, there are different adjustment speeds towards the optimal cash flow; the highest adjustment belongs to the maturity period and the lowest one belongs to the decline period. Financing risk is of effect on the gap between actual and optimal cash flow; at high financing risk, this gap is greater, that is, there is a lower adjustment rate; in high profitability companies, the adjustment speed towards optimal cash flow is higher than low profitable companies. Shirzadi, Dolatyari, (2019), examined the application of the Dickinson Cash Flow Model instead of using the company age to differentiate life cycle stages. The findings indicated that the growth and maturity stages were negatively and significantly correlated with the cost of capital. That is, the cost of capital is lower in these stages. While the decline stage has a significant positive relationship with the cost of capital, it means that the cost of capital is higher at this stage. But the emergence stage has nothing to do with the cost of capital. Zou (2007) examined the relevance of risk factors to the company life cycle. His research led to two important findings: First, risk factors were priced differently at different stages of the life cycle. Also, the increasing explanatory power of risk factors changes with the change in life cycle stages. Kalunky, Silula (2008) showed that the use of activity-based costing system at different stages of the life cycle was different due to changes in the managers' information needs, and the rate of use of this system in the companies of the maturity stage was more than growth stage. Yu, Jiang (2010) examined the relationship between the company life cycle and shareholder repurchase decisions. The results of their research indicated that the reasons for the share repurchase by the companies vary at different stages in the life cycle of companies. Also, their research results showed that the theory of company life cycle makes the companies' stock repurchase motivation more transparent. Chen, Yang, Huang (2010) found that the inclusion of a life cycle variable into the accruals patterns increases the explanatory power of these patterns and reduces Type I and Type II errors. In 2013 Saleh et al found that increasing the life of a company and moving from the growth stage to the decline diminished the relevance of profit information value. Heidarpor, Rajabdorri, Khalifesharifi (2017) showed that company profitability follows the U model during the life cycle stages; this means that the company profitability starts from the introduction stage, reaches its peak in maturity and then declines in the decline stage.

Mashayekhi, Faraji, Tahriri (2014) found that the value relevance during the life cycle of companies was not significantly different from one another. Karami, Omrani (2010) stated that companies in the stage of growth and maturity manage their profits through the real activities, while they do not so at the emergence stage, and this affects their future performance. Chen, Xu, Wu (2014) that the process of generating ordinary accruals is different at the different stages of a company life cycle, and the Jones modified model is not equally capable of detecting profit management at different stages of the life cycle, so that this model performs better at the growth and maturity stages. Chen, Xu, Wu (2014) showed that the managers at the maturity stage are more inclined to the profit management, and therefore the quality of internal controls at this stage can help improve profit quality. But this is not the case in the stages of growth and decline. Karami, Omrani (2010) concluded that the lifecycle affects the classification pattern of companies' profit components, especially those that are in decline, use this approach to avoid reporting operational losses. The question therefore arises whether, considering the variable of company life cycle, we can improve the models in predicting the quality of discretionary accruals (Abnormal) and determine the level of usefulness of each model in predicting the quality of discretionary accruals (Abnormal). Accordingly, the main hypothesis of the research is formulated as follows: Considering the life cycle of the company increases the predictive power of profit quality in the quality of discretionary accruals models. It includes the following sub-hypotheses:

Hypothesis 1: Considering the corporate life cycle increases the predictive power of profit quality in Jonse model (1991).

Hypothesis 2: Considering the corporate life cycle increases the predictive power of profit quality in the model of Decho, Sloan and Sweeney (1995).

Hypothesis 3: Considering the corporate life cycle increases the predictive power of profit quality in the Kasznik model (1992).

Hypothesis 4: Considering the corporate life cycle increases the predictive power of profit quality in the model of Kutari, Lyon, and Weasley (2005).

3. Methodology

In this research, using the following criteria and also considering the availability of required data, 180 companies from Tehran Stock Exchange companies were selected as sample in 2006-2016 (10 years). In accordance with taking a combinatory approach, a size of 1800 company-year observations was created: 1- Their financial period is ended in March; 2- Accepted in Tehran Stock Exchange prior to 2006; 3- Not to be an intermediary, investment, leasing and insurance company. 4. Being available their required financial information; 5- not to be among the stock companies. After determining the sample, the research data were extracted from Kodal database and T-S-A Client software and the variables were calculated using Excel and iviews software. Iviews software was also used to test the hypotheses. Table (3) models were used to measure accruals quality.

Table 3. Models based on the optional accruals

Model 1	Jones	Initial model	$TACC_t/A_{t-1}=\beta_0+\beta_1 1/A_{t-1}+\beta_2\Delta REV_t/A_{t-1}+\beta_3 PPE_t/A_{t-1}+\varepsilon_t$
Model 2		Adjusted model	$TACC_t/A_{t-1}=\beta_0+\beta_1 1/A_{t-1}+\beta_2\Delta REV_t/A_{t-1}+\beta_3 Life\text{-}cycle_t+\beta_3 PPE_t/A_{t-1}+\beta_4\Delta REV_t/A_{t-1}*Life\text{-}cycle_t+\varepsilon_t$
Model 3	Decho, Sloan and Sweeney	Initial model	$TACC_t=\beta_0+\beta_1 1/TA_{t-1}+\beta_2(\Delta REV_t-\Delta REC_t)+\beta_3 PPE_t+\varepsilon_t$
Model 4		Adjusted model	$TACC_t=\beta_0+\beta_1 1/TA_{t-1}+\beta_2(\Delta REV_t-\Delta REC_t)+\beta_3 Life\text{-}cycle_t+\beta_4 PPE_t+\beta_5(\Delta REV_t-\Delta REC_t)*Life\text{-}cycle_t+\varepsilon_t$
Model 5	Kasznik	Initial model	$TACC_t=\beta_0+\beta_1 1/TA_{t-1}+\beta_2(\Delta REV_t-\Delta REC_t)+\beta_3 PPE_t+\beta_4\Delta CFO_t+\varepsilon_t$
Model 6		Adjusted model	$TACC_t=\beta_0+\beta_1 1/TA_{t-1}+\beta_2(\Delta REV_t-\Delta REC_t)+\beta_3 Life\text{-}cyclet+\beta_4 PPE_t+\beta_5\Delta CFO_t+\beta_6(\Delta REV_t-\Delta REC_t)*Life\text{-}cycle_t+\beta_7\Delta CFO_t*Life\text{-}cycle_t+\varepsilon_t$
Model 7	Kutari, Lyon and Weasley	Initial model	$TACC_t=\beta_0+\beta_1 1/TA_{t-1}+\beta_2(\Delta REV_t-\Delta REC_t)+\beta_3 PPE_t+\beta_4 ROA_t+\varepsilon_t$
Model 8		Adjusted model	$TACC_t=\beta_0+\beta_1 1/TA_{t-1}+\beta_2(\Delta REV_t-\Delta REC_t)+\beta_3 Life\text{-}cyclet+\beta_4 PPE_t+\beta_5 ROA_t+\beta_6(\Delta REV_t-\Delta REC_t)*Life\text{-}cycle_t+\beta_6 ROA_t*Life\text{-}cycle_t+\varepsilon_t$

The t-statistic will be used to examine the significance of the coefficient of independent variables in each model. The profit management values will be equal to the residuals of the models resulting from estimating the models at the cross-sectional level of the data each year.

Table 4. Operational Definition of Research Variables

Row	Variable symbol	Operational definition	Row	Variable symbol	Operational definition
1	TACC	The difference between operating cash flow and net profit	12	REC_t	Accounts and Documents Receivable This Year
2	TA	Total assets this year	13	REC_{t-1}	Accounts and documents received last year
3	TA_{t-1}	Total assets of the previous year	14	CFO	Operating cash flow
4	CFO_{t-1}	Operating cash flow last year	15	INVCF	The sum of the net flow of investment activities
5	CFO_t	This year's operating cash flow	16	FINCF	The sum of the net flow of financing activities
6	CFO_{t+1}	Operating cash flow the following year	17	Life-cycle	life cycle
7	ΔCFO_t	Operational Cash Flow Changes	18	$ROI_{i,t}$	Gross profit divided by the sum of total assets
8	$Sales_t$ REV	Sales revenue this year	19	$ROE_{i,t}$	Special after-tax profit (loss) divided by the total equity
9	$Sales_{t-1}$ REV_{t-1}	Sales revenue last year	20	$ROA_{i,t}$	Special Profit (Loss) after deduction of tax on the sum of total assets
10	$\Delta sales_t$ REV	Sales changes	21	$Lev_{i,t}$	Total debt divided by the sum of total assets
11	PPE_t	Property of machinery and equipment	22	$PEration_{i,t}$	The closing price of the shares divided by net profit

Dickinson Cash Flow Model (2011) has also been applied to differentiate the life cycle of companies into three stages of growth, maturity and decline. The methodology in this research is based on the classification of Dickinson Cash Flow model (2011) as follows:

(1) Growth: If CFO> 0, INVCF <0, FINCF> 0

(2) Maturity: If CFO> 0, INVCF <0, FINCF <0

(3) Decline: If CFO <0, INVCF> 0, FINCF ≤ or ≥ 0

CFO: Net cash flow resulting from operational activities, INVCF: Net cash flow resulting from investing activities, FINCF: Net cash flows resulting from financing activities. Therefore, life cycle stages are defined in three forms: growth, maturity and decline due to inactivity of stock trading or non-stock exchange in Iran (Farajzadeh, 2013). In this research, $Life\text{-}cycle_t$, $Life\text{-}cycle_{t+1}$, $Life\text{-}cycle_{t-1}$ are defined as the virtual variables with zero and one values; zero (0) value is given, if the year-company belongs to the stages of growth and decline and the value of one to the stage of maturity, similar to (Bluck, 1998), (Jenkins, 2004), (Cassinides, 2005) and (Kalunaki and Silola, 2008). All the variables in the models are subdivided into total assets at the beginning of the year for homogenization. Therefore, according to the above conditions all statistical society companies are presented as follows table:

Table 5. Combine companies according to life cycle variables

life cycle	Number of year/company	Ratio
Growth and decline	1268	70%
Maturity	532	30%

4. Results

4.1. Descriptive statistics

The above descriptive statistics table is used only to describe the data in terms of central indices, dispersion and data. The values of skewness and kurtosis for the TACC dependent variable are 0.20 and 1.07. This means that the distribution is symmetric.

Table 6. Descriptive statistics for the research variables

Variables	Number	Mean	Median	Standard deviation	Skewness	Kurtosis	Minimum	Maximum
$1/TA_{t-1}$	1800	0.000003	0.000001	0.000004	4.89	35.16	0.000000	0.000051
TACC	1800	0.016-	0.020-	0.158	0.204	1.075	0.665-	0.619
CFO_{t-1}	1800	0.113	0.097	0.128	0.614	2.013	0.460-	0.812
CFO_t	1800	0.125	0.104	0.148	0.968	3.624	0.427-	1.148
CFO_{t+1}	1800	0.144	0.106	0.198	1.678	5.598	0.419-	1.267
CFO_{t-1}*LifeCycle	1800	0.038	0.000	0.090	2.307	7.052	0.380-	0.599
CFO_t*LifeCycle	1800	0.056	0.000	0.112	2.464	6.904	0.000	0.733
CFO_{t+1}*LifeCycle	1800	0.049	0.000	0.129	3.399	18.069	0.501-	1.354
$\Delta Sale_t$	1800	0.118	0.082	0.297	1.183	6.548	1.158-	1.937
PPE_t	1800	0.298	0.242	0.238	1.491	3.366	0.000	1.690
ΔREV	1800	0.802	0.733	0.545	2.714	14.359	0.000	5.444
ΔREV*LifeCycle	1800	0.246	0.000	0.460	2.188	5.361	0.000	3.132
(ΔREV-ΔREC)	1800	0.595-	0.486-	0.659	1.943-	7.169	4.817-	1.603
ΔCFO_t	1800	0.011	0.009	0.144	0.131-	3.629	0.875-	0.744
ΔCFO_t*LifeCycle	1800	0.022	0.000	0.086	3.059	16.789	0.337-	0.744
ROA_t	1800	0.087	0.078	0.143	0.044-	2.254	0.585-	0.726
ROA_t*LifeCycle	1800	0.028	0.000	0.090	1.808	8.539	0.411-	0.627

4.2. Investigating the normality of the dependent variable distribution

The probability value for the TACC dependent variable is 0.223 which is greater than 0.05, so the null assumption cannot be rejected out, its distribution is normal.

Table 7. Kolmogorov-Smirnov test for the normality of the research dependent variable

TACC					
Number	**Mean**	**Standard deviation**	**z-value of Kolmogorov-Smirnov**	**Value of probability**	**Result**
1800	-0.02	-0.05	1.04	0.233	Normal

4.3. Data analysis

Data were collected in cross-sectional-temporal way. In terms of the panel analysis, there are three types of models: with fixed effects, without fixed effects and with random effects; different tests are used to identify the appropriate model. The following is a summary of these tests:

4.3.1. Model Selection

The probability value of the Chau test for all models is 0.000, which is less than 0.05, so the models used have separate effects for companies; since the Hausman test probability values for all models are less than 0.05, therefore, the fixed effects model is the most appropriate model for the data. This model is then used to test the hypotheses. The following assumptions can be made for estimating the coefficients using partial t-statistics. The value of the test statistic is calculated as follows:

$$t_{\beta_i} = \frac{\beta_i - 0}{S_{\beta_i}} \quad i = 0,1,2,3,4$$

Adjusted coefficient of determination was used to compare the predictive power.

Table 8. Chau test and Hausman test to select the appropriate model

Models	Chau & Limer test			Hausman test			Result
	f-value	Freedom of degree	Value of probability	Value of chi-square	Freedom of degree	Value of probability	
Model 1	3.64	1791.617	0.000	28.90	3	0.000	Model with the constant effects
Model 2	3.51	1791.615	0.000	34.26	5	0.000	Model with the constant effects
Model 3	3.86	1791.617	0.000	46.72	3	0.000	Model with the constant effects
Model 4	3.89	1791.615	0.000	52.50	5	0.000	Model with the constant effects
Model 5	3.90	1791.616	0.000	71.77	4	0.000	Model with the constant effects
Model 6	5.65	1791.613	0.000	92.44	7	0.000	Model with the constant effects
Model 7	3.28	1791.616	0.000	84.26	4	0.000	Model with the constant effects
Model 8	3.55	1791.613	0.000	98.64	7	0.000	Model with the constant effects

4.4. Good fit of the models

4.4.1. First Hypothesis - Investigating the Jones Model:

The Durbin-Watson statistic value for the initial model is 1.94 and for the adjusted model is 1.90. Values of VIF (variance increase factor) do not show the collinearity between the independent variables. In the initial model and the adjusted model, the variable ΔREV is significant, but the variables $1/TA_{t-1}$ and PPE_t are meaningless. In the adjusted model the Life-Cycle is significant and negative and the interaction of this variable (ΔREV*LifeCycle) is also significant. The increase in the adjusted coefficient of determination of the adjusted model compared to the initial model is 7% and indicates that the values estimated by the adjusted model are a good approximation of the true values; it predicts and identifies up to 7% of the accruals quality or the difference between operational cash flow and net profit more accurately than the initial model. Thus the life cycle has increased the model's predictive power.

Table 9. Estimation and testing of the parameters of the main model (1) and the modified model (2) of Jones(1991)

$TACC_t/A_{t-1}=\beta_0+\beta_1 1/A_{t-1}+\beta_2\Delta REV_t/A_{t-1}+\beta_3 PPE_t/A_{t-1}+\varepsilon_t$					(model 1)
Parameters	**Value of coefficients**	**t-value**	**Value of probability**	**Result**	**VIF**
Constant value	0.051-	3.805-	0.000	Significant & negative	-
1/TAt-1	917-	0.571-	0.568	Non-significant	1.00
ΔREV	0.052	4.138	0.000	Significant & positive	1.00
PPEt	0.012-	0.528-	0.598	Non-significant	1.00
f-value		3.86	Value of probability of F		0.000
Adjusted determination coefficient		0.22	Durbin-Watson		1.94
$TACC_t/A_{t-1}=\beta_0+\beta_1 1/A_{t-1}+\beta_2\Delta REV_t/A_{t-1}+\beta_3 Life\text{-}cycle_t+\beta_3 PPE_t/A_{t-1}+\beta_4\Delta REV_t/A_{t-1}*Life\text{-}cycle_t+\varepsilon_t$					(model 2)
Parameters	**Value of coefficients**	**t-value**	**Value of probability**	**Result**	**VIF**
Constant value	0.029-	2.172-	0.030	Significant & negative	-
1/TAt-1	247	0.160	0.873	Non-significant	1.01
ΔREV	0.056	4.537	0.000	Significant & positive	1.22
Life-Cycle	0.046-	3.484-	0.001	Significant & negative	3.04
PPEt	0.018-	0.844-	0.399	Non-significant	1.01
ΔREV*LifeCycle	0.053-	3.922-	0.000	Significant & negative	3.25
f-value		5.03	Value of probability of F		0.000
Adjusted determination coefficient		0.29	Durbin-Watson		1.90

4.4.2. Second Hypothesis - Investigation of the Decho, Sloan and Sweeney's Model:

The adjusted coefficient of determination for the model, namely in the initial model is 24% and in the adjusted model is 32% of the changes of dependent variable stated by independent and control variables. The increase in the adjusted coefficient of determination of the adjusted model compared to the initial model is 8% and indicates that the values estimated by the adjusted model are a good approximation of the true values; it predicts and identifies up to 8% of the accruals quality or the difference between operational cash flow and net profit more accurately than the initial model. Thus the life cycle has increased the model's predictive power.

Table 10. Estimation and Testing of the Parameters of Main Model (3) and the Modified Model (4) of Decho, Sloan and Sweeney(1995)

$TACC_t=\beta_0+\beta_1 1/TA_{t-1}+\beta_2(\Delta REV_t-\Delta REC_t)+\beta_3 PPE_t+\varepsilon_t$					(model 3)
Parameters	**Value of coefficients**	**t-value**	**Value of probability**	**Result**	**VIF**
Constant value	-0.046	-4.480	0.000	Significant & negative	-
$1/TA_{t-1}$	-1297	-0.813	0.416	Non-significant	1.00
(ΔREV-ΔREC)	-0.066	-6.637	0.000	Significant & negative	1.03
PPE_t	-0.019	-0.889	0.374	Non-significant	1.03
f-value	4.07	Value of probability of F	0.000		
Adjusted determination coefficient		0.24	Durbin-Watson		1.95
$TACC_t=\beta_0+\beta_1 1/TA_{t-1}+\beta_2(\Delta REV_t-\Delta REC_t)+\beta_3 Life\text{-}cycle_t+\beta_4 PPE_t+\beta_5(\Delta REV_t-\Delta REC_t)*Life\text{-}cycle_t+\varepsilon_t$					(model 4)
Parameters	**Value of coefficients**	**t-value**	**Value of probability**	**Result**	**VIF**
Constant value	-0.029	-2.956	0.003	Significant & negative	-
$1/TA_{t-1}$	-368	-0.244	0.807	Non-significant	1.01
(ΔREV-ΔREC)	-0.084	-8.703	0.000	Significant & negative	1.24
Life-Cycle	-0.045	-4.535	0.000	Significant & negative	1.86
PPE_t	-0.026	-1.251	0.211	Non-significant	1.04
(ΔREV-ΔREC)*LifeCycle	0.076	6.821	0.000	Significant & positive	2.10
f-value		5.62	Value of probability of F		0.000
Adjusted determination coefficient		0.32	Durbin-Watson		1.93

4.4.3. Hypothesis 3 - Investigation of the Kasznik Model:

The increase in the adjusted coefficient of determination of the adjusted model compared to the initial model is 3% and indicates that the values estimated by the adjusted model are a good approximation of the true values; it predicts and identifies up to 3% of the accruals quality or the difference between operational cash flow and net profit more accurately than the initial model. Thus the life cycle has increased the model's predictive power.

Table 11. Estimation and testing of the parameters of the initial model (5) and the modified model (6) of Cazink (1992)

$TACC_t=\beta_0+\beta_1 1/TA_{t-1}+\beta_2(\Delta REV_t-\Delta REC_t)+\beta_3 PPE_t+\beta_4 ROA_t+\varepsilon_t$					model (5)
Parameters	**Value of coefficients**	**t-value**	**Value of probability**	**Result**	**VIF**
Constant value	-0.043	-5.119	0.000	Significant & negative	-
$1/TA_{t-1}$	-1554	-1.172	0.242	Non-significant	1.00
(ΔREV-ΔREC)	-0.080	-9.728	0.000	Significant & negative	1.04
PPEt	-0.034	-1.890	0.059	Non-significant	1.03
ΔCFOt	-0.516	-26.870	0.000	Significant & negative	1.01
f-value		9.79	Value of probability of F		0.000
determination coefficient		0.47	Durbin-Watson		1.50

$TACC_t=\beta_0+\beta_1 1/TA_{t-1}+\beta_2(\Delta REV_t-\Delta REC_t)+\beta_3$Life-cyclet$+\beta_4 PPE_t+\beta_5\Delta CFO_t+\beta_6(\Delta REV_t-\Delta REC_t)$*Life-cycle$_t+\beta_7\Delta CFO_t$*Life-cycle$_t+\varepsilon_t$ model (6)					
Parameters	**Value of coefficients**	**t-value**	**Value of probability**	**Result**	**VIF**
Constant value	-0.036	-4.250	0.000	Significant & negative	-
$1/TA_{t-1}$	-1026	-0.790	0.430	Non-significant	1.01
(ΔREV-ΔREC)	-0.091	-10.903	0.000	Significant & negative	1.25
Life-Cycle	-0.017	-1.926	0.054	Non-Significant	1.90
PPE_t	-0.036	-2.048	0.041	Significant & negative	1.04
ΔCFO_t	-0.465	-20.383	0.000	Significant & negative	1.44
(ΔREV-ΔREC)*LifeCycle	0.050	5.091	0.000	Significant & positive	2.23
$dCFO_t$*LifeCycle	-0.004	-0.093	0.926	Non-Significant	1.62
f-value		10.49	Value of probability of F		0.000
determination coefficient		0.50	Durbin-Watson		1.52

4.4.5. Hypothesis 4 - Investigation of the model of Kutari, Lyon and Weasley:

The increase in the adjusted coefficient of determination of the adjusted model compared to the initial model is 8% and indicates that the values estimated by the adjusted model are a good approximation of the true values; it predicts and identifies up to 8% of the accruals quality or the difference between operational cash flow and net profit more accurately than the initial model. Thus the life cycle has increased the model's predictive power.

Table 12. Estimation and Testing of the Parameters of the Main Model (7) and the Modified Model (8) of Kutari, Lyon, and Weasley (2005)

$TACC_t=\beta_0+\beta_1 1/TA_{t-1}+\beta_2(\Delta REV_t-\Delta REC_t)+\beta_3 PPE_t+\beta_4 ROA_t+\varepsilon_t$ model (7)					
Parameters	**Value of coefficients**	**t-value**	**Value of probability**	**Result**	**VIF**
Constant value	-0.079	-9.465	0.000	Significant & negative	-
$1/TA_{t-1}$	-1941	-1.500	0.134	Non-significant	1.01
(ΔREV-ΔREC)	0.030	3.404	0.001	Significant & positive	1.07
PPE_t	0.031	1.734	0.083	Non-significant	1.03
ROA_t	0.884	29.029	0.000	Significant & positive	1.04
f-value		**10.76**	Value of probability of F		**0.000**
determination coefficient		**0.50**	Durbin-Watson		**2.01**
$TACC_t=\beta_0+\beta_1 1/TA_{t-1}+\beta_2(\Delta REV_t-\Delta REC_t)+\beta_3$Life-cyclet$+\beta_4 PPE_t+\beta_5 ROA_t+\beta_6(\Delta REV_t-\Delta REC_t)$*Life-cycle$_t+\beta_6 ROA_t$*Life-cycle$_t+\varepsilon_t$ model (8)					
Parameters	**Value of coefficients**	**t-value**	**Value of probability**	**Result**	**VIF**
Constant value	-0.057	-7.219	0.000	Significant & negative	-
$1/TA_{t-1}$	-1032	-0.876	0.381	Non-significant	1.02
(ΔREV-ΔREC)	0.015	1.808	0.071	Significant & positive	1.30
Life-Cycle	-0.068	-8.159	0.000	Significant & negative	2.14
PPE_t	0.025	1.551	0.121	Non-significant	1.04
ROA_t	0.852	26.909	0.000	Significant & positive	1.63
(ΔREV-ΔREC)*LifeCycle	0.061	6.971	0.000	Significant & positive	2.14
ROA_t*LifeCycle	0.092	2.298	0.022	Significant & positive	1.97
f-value		**14.61**	Value of probability of F		**0.000**
determination coefficient		**0.58**	Durbin-Watson		**2.01**

5. Discussion and Conclusions

The following test was used to examine the significance of the difference between the two models. To test for equality, the coefficients of determination of the assumptions zero and the opposite assumption are as follows:

$$\begin{cases} H_0 : R_i^2 = R_j^2 \\ H_1 : R_i^2 \neq R_j^2 \quad i = 1,2 \end{cases}$$

The test statistic is defined as follows:

$$Z^* = \frac{R_i^2 - R_j^2}{\sqrt{Var(R_i^2) + Var(R_j^2)}}$$

The above statistic distribution is standard for the large samples of normal distribution. The way to judge is that if the value of Z is in the rejection zone, the assumption zero is rejected. In different models, the rate of increase of the coefficient of determination of the adjusted model is higher than the initial model.

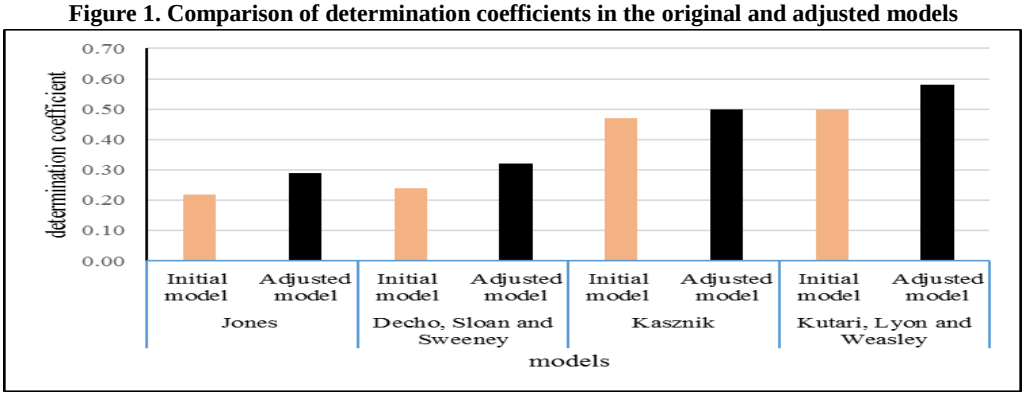
The results of the determination of coefficients of determination for the original and modified models in different models are as follows:

Table 13. Comparison of determination coefficients in the initial and adjusted models

Models		Determination coefficient	Number of observations minus parameters	Z*	Result
Jones	Model 1	0.220	1797	-2.244	The difference between the determination coefficient between the initial model and the adjustment is significant.
	Model 2	0.290	1795		
Decho, Sloan and Sweeney	Model 3	0.240	1797	-2.602	The difference between the determination coefficient between the initial model and the adjustment is significant.
	Model 4	0.320	1795		
Kasznik	Model 5	0.470	1796	-1.175	The difference between the determination coefficient between the initial model and the adjustment is not significant.
	Model 6	0.500	1793		
Kutari, Lyon and Weasley	Model 7	0.500	1796	-3.388	The difference between the determination coefficient between the initial model and the adjustment is not significant.
	Model 8	0.580	1793		

In the diagram below, the index is plotted for both modes. In different models, the adjusted model determination coefficient increases more than the original model.

Figure 1. Comparison of determination coefficients in the original and adjusted models



The results show that the estimation of the adjusted models by considering the life cycle has, compared to the initial models, better performance in predicting the quality of accruals of the companies except the Kasznik model. Generally speaking, the empirical evidence from our research contributes to

the growing body of accounting and financial literature that emphasizes the concept of corporate life cycle. In particular, this study contributes to the accounting and financial literature by providing evidence of the role of the company life cycle in predicting the quality of discretionary accruals. Based on to the research done by Rahmani and Bashirmanesh (2013), the McNichols model (2002) is more reliable and accurate among the different models such as those of Jones, the adjusted Jones, Kasznik and Kutari. The results of testing the hypotheses of this research also show that the values estimated by the adjusted models are accurate approximation of the true values and predict and identify up to a few percent of accruals quality or the difference between operational cash flow and net profit compared to the initial models. Therefore, with the exception of the Kasznik model, in the other models the increased life cycle has caused an increase in the prediction power of the models. Comparison of the six adjusted models with the initial six models showed that the adjusted models of accrual quality prediction (except for the Kasznik model) had a higher significance coefficient and less prediction error than the initial and primary models. this indicates the superiority of the adjusted models compared to the primary and initial models in predicting accrual quality. This result is not unexpected because when the predictive model considers the company's position in the life cycle, it performs the accrual quality prediction process better by understanding the different reality and importance of the quality of accruals. The theoretical foundation of company life cycle is that changing organizational capacity of the company has a significant impact on the investment decisions, financing and operational performance of the company. Therefore, the extra-organizational users of financial information are advised to consider the effectiveness of each model in measuring accruals quality when making their decisions so that they can make appropriate ones. Corporate managers are also advised to keep an eye on the market situation with regard to life cycle stages so that when making investment decisions and other financial decisions, the outcome of their decisions will not diminish the value of the company.

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