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The accrual anomaly analysis at different stages of the corporate life cycle of companies listed on the Tehran stock exchange

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Abstract

Financial theorists believe that low accruals firms have higher returns compared to those with high accruals calling this relationship an accruals anomaly. Since the introduction of this concept, various studies have examined the factors causing accruals anomalies and their impact on corporate revenues. The current paper aims at investigating the impact of accruals anomalies on corporate profitability as well as the role of the corporate life cycle. Thus, the data was collected using 109 companies listed on the Tehran Stock Exchange data during the period 2012 to 2018. Then, the relationships were examined using regression modelling with a panel approach. The results indicate that there is no significant impact of life cycle on the relationship between accrual anomalies and profitability.

Keywords: Accruals Anomaly, Life Cycle, Stock Returns.

1. Introduction

Accruals anomalies is the strongest and most significant asset pricing anomalies. Sloan [23] shows that accruals have strong predictive power for corporate stock returns. He recognized that investors fail to distinguish between accrual and cash components of earnings. Sloan's work (1996) was further developed by Richardson et al. [21] who describe that by using balance sheet classification, categorization of liabilities into components, companies with more credible accruals components earn more

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than other companies with less credible accruals components. This study also shows that an investor who fails to categorize the credibility of different segments of accruals has a lower chance of achieving a high return on the stock market. One explanation for these findings is that investors do not recognize that positive accruals are a sign of higher income and that future profitability will remain high over a shorter period. There are other studies on accrual anomalies such as that of Pincus et al. [20] addressed the effect of accruals in the international environment. Zhang [25] found that working capital liabilities are a strong predictor of future stock returns because individual components provide reliability and explanations of stock returns. Therefore, the current paper investigates the impact of accruals anomalies on stock returns in the Tehran Stock Exchange.

On the other hand, the corporate life cycle variable, its role as well as different aspects and relationships have been studied by some researchers [24]. In the growth phase, the corporate has relatively little asset and experiences high operational risk. [18]. The decline phase is usually marked by a decrease in sales and profits and an increase in unauthorized production capacity. To date, the accounting literature has little to do with the concept of life cycle. Anthony and Ramesh [2] examine the market response to sales and investment growth at each stage of the life cycle. They record the maturity of uniformity in the response factors of sudden growth in sales and unexpected investment as the company's maturity. Black [5] examines the importance of the value of changes in operation, investment, and financing liquidity at the life cycle stage, and in particular whether investing in cash flows given the greater value that firms are growing. Hribar and Yehuda [10] examined the effect of the company's life cycle stage on the main determinants of the revenue-return relationship and found that profit permanence, profitability, cost of capital and profit pricing vary at different stages of the life cycle. Accordingly, the current paper investigates the impact of life cycle on the relationship between accruals and stock returns.

2. Theoretical foundations and research background

Sloan [23] finds that the performance of income attributable to liabilities is less durable than the performance of income from cash flow. Mashruwala et al. [16] argue that anomalies may be a feature of firms with ultimate accruals. Similar claims were found in the studies of Collins et al. [6], Lev and Nissim [13], and Ali et al. [1]. Louis et al. [15] found no evidence of accrual anomalies in cases where companies disclose accruals information at the time of the profit announcement. Using the Accruals Percentage Scale, Papanastasopoulos [19] empirically predicted earnings stability hypothesis and arbitrage constraint hypothesis on accrual anomalies in the UK stock market and found a strong negative relationship between accrual percentage and future profitability and stock returns. Showed. Huang et al. [12] evaluated the explanations for accrual anomalies in the Chinese stock market using the breakdown method. The results show that institutional ownership better explains accrual anomalies with an explanatory power of about 46%. Arabzadeh et al.[3] analyzed accrual anomalies using accrual factor-mimicking portfolio, CMA (conservative minus aggressive).

Yeganeh and Bari [8] investigated the role of return dispersion in the interpretation of accruals anomalies. The results of their research showed that the dispersion of returns / relative dispersion of returns leads to positive and significant risk at the level of stocks and portfolio of accruals and there is a significant difference between the impact of relative dispersion of returns on risk in low and high accruals companies.

On the other hand, Corporate Life Cycle Theory suggests that firms have a number of predictable development models. Depending on the stages of development, resources, privileges, policies, structures, and operationalities are quite different [17]. The current paper investigates the impact of accruals anomalies on varous stages of corporate life cycle. This study roots in different perspectives.

Behavioral decision theory holds that overconfidence as a cognitive bias encourages decision makers to overestimate their problem-solving abilities, and underestimate firms innovative risk resources and uncertainty [22]. These theories support the argument that managers at different stages of a corporate life cycle meet different risk metrics to survive during the introduction and decline stages, and show a dominant position in the competitive environment in adulthood and growth stages [14]. As the level of product differentiation increases further in the growth phase, the company's profitability begins to increase in the mature phase [7]. However, due to the negative investment of NPV for the survival of firms, in the downturn phase, the company's profitability is still likely to deteriorate [4]. Hribar and Yehuda [11] applied the concept of corporate life cycle to expand the understanding of anomalies in accrual information and cash flow through the stock market.

3. Research hypotheses

First Hypothesis: The accruals anomaly impacts on the profitability of companies.
Second Hypothesis: The impact of accruals anomalies on corporate profitability is affected by the corporate life cycle.

4. Research methodology

The statistical population is companies listed on the Tehran Stock Exchange data during the period 2012 to 2018. Systematic deletion sampling method was used to select a suitable statistical sample. In this method, first the sample inclusion criteria are defined and then nonconsistent sapless are deleted.

1. Companies whose fiscal year ends on March 20 of each year;
2. Do not leave the stock market during the research period.
3. Do not stop the symbol for more than 6 months.
4. Financial and credit institutions, banks, insurance companies and investment funds are not included.
5. The required information of companies should be available in databases.

A sample of 109 companies became available to test hypotheses, given the inclusion criteria and imposing restrictions.

5. Measuring research variables

Return on stock (R_i): The economic value created by the investment, which usually defined as a percentage of the initial investment.

$$R_i = \frac{P_t(1+\alpha+\beta) + Div - (P_{t-1} + c\alpha)}{P_{t-1} + c\alpha} \tag{5.1}$$

$$HML = \frac{\left(\frac{S}{H}+\frac{B}{H}\right)-\left(\frac{S}{L}+\frac{B}{L}\right)}{2}.$$

Where, P_{ti} =stock price i is in period t, Div = dividend of the current year, β =percentage of capital increase from the reserve, α =percentage of capital increase from the receivables and cash flow
C = subscription amount per share for capital increase (usually 1000 Rials).
Size factor (SMB): The difference between the returns of a large stock portfolio and a small stock

based on market value

$$SMB = \frac{\left(\frac{S}{L} + \frac{S}{M} + \frac{S}{H}\right) - \left(\frac{B}{L} + \frac{B}{M} + \frac{B}{H}\right)}{3}. \tag{5.2}$$

Value factor (HML): The difference between the return of a value portfolio and a growth portfolio.

$$HML = \frac{\left(\frac{S}{H} + \frac{B}{H}\right) - \left(\frac{S}{L} + \frac{B}{L}\right)}{2}. \tag{5.3}$$

In patterns (5.1) to (5.3), S/L are companies that are small in size and low in value, S/M companies that are small in size and medium value, S/H companies that are small in size and high value, B/L are companies that are big in size and low in value, B/M are companies that are big in size and medium in value, B/H are companies that are big in size and high in value. Each company is assigned the number 1 if they are in each category, otherwise the number is zero.
Accruals Factor (CMA): The Difference Between a Portfolio Yield with a High Accrual Anomaly and a Low Accrual Anomaly

$$HML = \frac{\left(\frac{S}{L} + \frac{B}{L}\right) - \left(\frac{S}{H} + \frac{B}{H}\right)}{2}. \tag{5.4}$$

In pattern (5.4), S/L are companies that are small in size and low in accruals anomaly , S/M companies that are small in size and medium accruals anomaly , S/H companies that are small in size and high accruals anomaly, B/L are companies that are big in size and low in accruals anomaly, B/M are companies that are big in size and medium in accruals anomaly, B/H are companies that are big in size and high in accruals anomaly. Each company is assigned the number 1 if they are in each category, otherwise the number is zero.

Anomaly accruals (ABACC): Accruals are defined as changes in net operating assets. Net operating assets are defined as non-cash assets less liabilities other than liabilities or their equivalent in working capital (WC) plus long-term net operating assets (LTNOA). Anomal accruals are obtained from the following model:

$$TA = \alpha 0 + \alpha 1(\frac{1}{LASSETS}) + \alpha 2(\Delta SALES - \Delta AR) + \alpha 3PPE + \alpha 4LAGROA + \varepsilon, \tag{5.5}$$

TA: Total accruals, $LASSETS$: Total assets at the end of the previous year, $\Delta SALES$: Sales changes for two consecutive years, ΔAR: Changes in accounts receivable, PPE: Property, plant and equipment, $LAGROA$: Total return on assets (profit before interest and Tax / total assets) of the previous year, the remaining amount of Model (5.5) is considered as an unusual accruals.

Corporate Life Cycle: The method presented by Anthony and Ramesh (1992) is used to categorize companies during the life cycle stages. In this method, the life cycle is evaluated using two variables of sales growth and capital expenditures.

These two variables are added together, then the resulting number is divided into three groups. If the company is in the lowest group, it is in the decline stage, in the middle group, it is in the maturity stage, and if it is in the highest group, it is in the growth stage.

6. Research hypotheses testing model

First Hypothesis: The accruals anomaly impacts on the profitability of companies. To investigate the effect of accruals anomalies on corporate profitability, the following model is used, which is taken

Variable	Minimum	Maximum	Mean	Median	Standard Deviation	Skewness	Elongation	No
NPTACC	-0.996	0.856	-0.190	-0.176	0.233	-0.377	2.746	763.000
INVTACC	-0.978	0.967	0.155	0.148	0.324	-0.232	0.690	763.000
MB	0.516	6.975	1.816	1.578	1.021	2.200	5.877	763.000
Size	10.505	18.860	13.869	13.629	1.624	0.809	0.372	763.000
Ri	-0.031	1.152	0.212	0.187	0.211	1.950	4.289	763.000
RM	-0.095	0.306	0.110	0.105	0.133	0.009	-1.206	763.000
ROA	-0.880	0.986	0.110	0.094	0.189	0.310	6.608	763.000
OFOL	0.000	1.000	0.250	0.000	0.433	1.155	-0.668	763.000
BOLOQ	0.000	1.000	0.499	0.000	0.500	0.003	-2.005	763.000
ROSHD	0.000	1.000	0.250	0.000	0.433	1.155	-0.668	763.000
SMB	-0.494	0.493	0.006	-0.002	0.102	0.281	3.963	763.000
HML	-0.573	0.034	-0.088	-0.071	0.094	-2.228	6.128	763.000
CMA	-0.706	0.742	0.005	-0.004	0.153	0.345	3.967	763.000

Table 1: Descriptive statistics of research variables

from the research of Hirshleifer et al. [9]

$$\begin{aligned} R_i - R_f &= \alpha + \beta(R_m - R_f) + \zeta_1(SMB_{i,t}) + \zeta_2(HML_{i,t}) + \varepsilon \\ R_i - R_f &= \alpha + \beta(R_m - R_f) + \zeta_1(SMB_{i,t}) + \zeta_2(HML_{i,t}) + \zeta_3(CMA_{i,t}) + \varepsilon \end{aligned} \tag{6.1}$$

In pattern 6.1, R_i is the company stock returns, R_f is the risk-free return, R_m is the market return, SMB is the size factor, HML is the value factor and CMA is the anomaly accruals factor. If ζ_3 is significant (with a t-statistic greater than 1.96) and the value of the second pattern is higher than the first pattern, it indicates the effect of anomaly accruals.

Second Hypothesis: The impact of accruals anomalies on corporate profitability is affected by the corporate life cycle. To investigate the effect of life cycle on the relationship between anomalies of accruals on corporate profitability, the following model is used, which is based on the research of Hirshleifer et al. [9] and Hribar and Yehuda [11].

$$\begin{aligned} R_{i,t} - R_{f,t} = \alpha + \beta(R_{m,t} - R_{f,t}) + \zeta_1(SMB_{i,t}) + \zeta_2(HML_{i,t}) + \zeta_3(CMA_{i,t}) + \zeta_4(CMA_{i,t}) \\ *OFOL_{i,t} + \zeta_5(CMA_{i,t}) * BOLOQ_{i,t} + \zeta_6(CMA_{i,t}) * ROSHD_{i,t} + \varepsilon_{i,t}. \end{aligned} \tag{6.2}$$

In pattern 6.2, R_i is the company stock returns, R_f is the risk-free return, R_m is the market return, SMB is the size factor, HML is the value factor and CMA is the anomal accruals factor. Pattern 7 is fitted to the data and then the pattern coefficients are compared pairwise using a parent test to determine whether the relationship between accruals anomalies and firms' profitability at different life cycles is different or not.

7. Findings and analysis of results

Table 1 shows the results of descriptive analysis. Descriptive statistics include minimum, maximum, mean, median, standard deviation, skewness, and elongation.

Model	Statistics	Degrees of freedom	Significance
$R_i - R_f = \alpha + \beta(R_m - R_f) + \zeta_1(SMB_{i,t}) + \zeta_2(HML_{i,t}) + \varepsilon;$ (1)	6.246383	(108,651)	0.0000
$R_i - R_f = \alpha + \beta(R_m - R_f) + \zeta_1(SMB_{i,t}) + \zeta_2(HML_{i,t}) + \zeta_3(CMA_{i,t}) + \varepsilon;$ (2)	5.517065	(108,650)	0.0000

Table 2: Limer test

Research model	Chi-square statistics	Degree of freedom of chi-square statistics	Significance
$R_i - R_f = \alpha + \beta(R_m - R_f) + \zeta_1(SMB_{i,t}) + \zeta_2(HML_{i,t}) + \varepsilon;$ (1)	0.0000	3	1.0000
$R_i - R_f = \alpha + \beta(R_m - R_f) + \zeta_1(SMB) + \zeta_2(HML) + \zeta_3(CMA) + \varepsilon;$ (2)	0.0000	4	1.0000

Table 3: Hausman test

7.1. First Hypothesis: The accruals anomaly impacts on the profitability of companies

Before fitting the model to the observations, it must be determined which model is suitable for fitting the data. The F-Limer statistic was used to select one of the methods of panel data or composite (cross-sectional) data. Thus, as an elongation, it is appropriate to use the cross-sectional data method, reject and use the panel data method, otherwise the cross-sectional data method will be used. After the Limer test, the Hausman test is used to be able to make a comparison between the fixed and random effects methods in terms of the explanatory power of the dependent variable. If the significance value is less than 0.05, the null hypothesis is rejected and the model is fitted with a fixed effect to the observations, otherwise the model is fitted with a random effect.

Table 2 - Lemer test

Given that the significance level of the Limer test (0.000) is less than 5%, therefore the panel data approach is accepted versus the composit data (money). According to the obtained results, the significance value of Chi-square test $(1,000)$ is more than 0.05 and this indicates that the random effects approach is accepted against the fixed effects of width from the origin. The Fisher test is used to determine whether the fitted model is suitable for the observations. Given that the significance level of the Fisher test is less than five percent, the assumption of a linear relationship between at least one of the independent / control variables and the dependent variable is confirmed. Durbin-Watson statistics is used to examine the autocorrelation in model variables. According to the result of the above table, the amount of this statistic is in the allowable distance and therefore there is no autocorrelation in the remaining sentences of this regression pattern and the absence of

$\boldsymbol{R_i - R_f = \alpha + \beta(R_m - R_f) + \zeta_1(SMB_{i,t}) + \zeta_2(HML_{i,t}) + \varepsilon;\ (1-4)}$				
Variable	Regression coefficient	Standard deviation	t- statistics	Significance
RM-RF	0.686	0.311	2.209	0.028
SMB	-0.665	0.102	-6.493	0.000
HML	-2.275	0.069	-32.773	0.000
C	0.291	0.102	2.859	0.004
The coefficient of determination	0.877	F- statistics		1808.291
Adjusted coefficient of determination	0.877	Significance		0.000
Durbin-Watson	1.981			

Table 4: Model fitting results

$$R_i - R_f = \alpha + \beta(R_m - R_f) + \zeta_1(SMB_{i,t}) + \zeta_2(HML_{i,t}) + \zeta_3(CMA_{i,t}) + \varepsilon; \ (2)$$

Variable	Regression coefficient	Standard deviation	t- statistics	Significance
RM-RF	0.927	0.292	3.180	0.002
SMB	-0.819	0.089	-9.232	0.000
HML	-2.203	0.052	-42.414	0.000
CMA	0.280	0.043	6.504	0.000
C	0.306	0.086	3.562	0.000
The coefficient of determination	0.895	F- statistics		1618.471
Adjusted coefficient of determination	0.895	Significance		0.000
Durbin-Watson	2.049			

Table 5: Model fitting results

autocorrelation between errors, as one of the basic regression assumptions about the fitted model is accepted. The t-test is used to measure the effect of the independent / control variable on the dependent. According to the results, the effect of all three elements of the difference between market return and risk-free return, size factor and market factor on the difference between company return and risk-free return is significant.

Given that the significance level of the Fisher test is less than five percent, the assumption of a linear relationship between at least one of the independent / control variables and the dependent variable is confirmed. According to the result of the above table, the amount of Durbin-Watson statistics is in the allowable distance and therefore there is no autocorrelation in the remaining sentences of this regression pattern and the absence of autocorrelation between errors, as one of the basic regression assumptions about the fitted model is accepted. According to the results, the effect of all three elements of the difference between market return and risk-free return, size factor and market factor and anomal accruals factor on the difference between company return and risk-free return is significant.

By comparing the results of fitting the two models (5.1) and (5.2) to the observations, since the effect of CMA (accrual anomaly factor) on the return in the second model is significant and the coefficient of determination of the second model is increased compared to the first model, it can be said that the accruals anomaly impacts the profitability of companies and the assumption is confirmed. The results show that by increasing the yield difference between portfolios with high and low anomalies, the amount of companies' returns increases.

7.2. Second Hypothesis: The impact of accruals anomalies on corporate profitability is affected by the corporate life cycle

The F-Limer statistic was used to select one of the methods of panel data or composite (cross-sectional) data. After the Limer test, Hausman test is used if the null hypothesis is rejected to be able to compare the fixed and random effects methods in terms of the explanatory power of the dependent variable. Since the significance level of the Limer test (0.000) is less than 5%, therefore the panel data approach is accepted versus the composite data (money). According to the obtained results, the significance value of Chi-square test $(1,000)$ is more than 0.05 and this indicates that the random effects approach is accepted against the fixed effects of width from the origin. Given that the significance level of the Fisher test is less than five percent, the assumption of a linear relationship between at least one of the independent / control variables and the dependent variable is confirmed. According to the result of the above table, the amount of Durbin-Watson statistics is in the allowable

Model	Statistics	Degrees of freedom	Significance
$R_{i,t} - R_{f,t} = \alpha + \beta(R_{m,t} - R_{f,t}) + \zeta_1(SMB_{i,t}) + \zeta_2(HML_{i,t}) + \zeta_3(CMA_{i,t}) + \zeta_4(CMA_{i,t}) * OFOL_{i,t} + \zeta_5(CMA_{i,t}) * BOLOQ_{i,t} + \zeta_6(CMA_{i,t}) * ROSHD_{i,t} + \varepsilon_{i,t}$; (3)	5.020313	(108,648)	0.0000

Table 6: Limer test

Research model	Chi-square statistics	Degree of freedom of chi-square statistics	Significance
$R_{i,t} - R_{f,t} = \alpha + \beta(R_{m,t} - R_{f,t}) + \zeta_1(SMB_{i,t}) + \zeta_2(HML_{i,t}) + \zeta_3(CMA_{i,t}) + \zeta_4(CMA_{i,t}) * OFOL_{i,t} + \zeta_5(CMA_{i,t}) * BOLOQ_{i,t} + \zeta_6(CMA_{i,t}) * ROSHD_{i,t} + \varepsilon_{i,t}$; (3)	0.0000	6	1.0000

Table 7: Hausman test

$$\boldsymbol{R_{i,t} - R_{f,t} = \alpha + \beta(R_{m,t} - R_{f,t}) + \zeta_1(SMB_{i,t}) + \zeta_2(HML_{i,t}) + \zeta_3(CMA_{i,t}) + \zeta_4(CMA_{i,t}) * OFOL_{i,t} + \zeta_5(CMA_{i,t}) * BOLOQ_{i,t} + \zeta_6(CMA_{i,t}) * ROSHD_{i,t} + \varepsilon_{i,t};} \quad (3)$$

Variable	Regression coefficient	Standard deviation	t- statistics	Significance
RM-RF	0.109	0.031	3.520	0.001
SMB	-0.828	0.089	-9.349	0.000
HML	-2.216	0.055	-40.373	0.000
CMA*OFOL	0.281	0.053	5.341	0.000
CMA*BOLOQ	0.318	0.059	5.349	0.000
CMA*ROSHD	0.201	0.082	2.452	0.014
C	0.019	0.009	2.092	0.037
The coefficient of determination	0.885	F- statistics		967.053
Adjusted coefficient of determination	0.884	Significance		0.000
Durbin-Watson	2.037			

Table 8: Model fitting results

Stages vs. each other	First stage		Second stage		Parent statistics	Result
	Regression coefficient	t-statistics	Regression coefficient	t- statistics		
Decline vs. maturity	0.281	5.341	0.318	5.349	0.659	Rejected
Decline vs. growth	0.281	5.341	0.201	2.452	1.162	Rejected
Maturity vs. growth	0.318	5.349	0.201	2.452	1.634	Rejected

Table 9: Parent statistics to measure relationship differences in different stages of the life cycle

distance and therefore there is no autocorrelation in the remaining sentences of this regression pattern and the absence of autocorrelation between errors, as one of the basic regression assumptions about the fitted model is accepted. The t-test is used to measure the effect of the independent / control variable on the dependent variable. According to the obtained results, the effect of anomal accruals in all three periods of decline, growth and maturity on profitability is significant. The parent statistics are used to examine whether the effect of anomal accruals on profitability changes at different stages of the life cycle, the results of which are shown below. According to the results obtained from the parent statistic, since the statistic value is less than 1.96, the difference between the effect of life cycle on the relationship between accrual anomalies and profitability is rejected.

8. Discussion

In this study, the accruals anomaly at different stages of life cycle was analyzed in a sample of companies listed on the Tehran Stock Exchange during 2012 to 2018. The first hypothesis results show the effect of accrual anomalies on corporate profitability, they indicated that the regression coefficient of the accrual anomalies factor is 0.280 and the t-statistic is 6.504, which indicates that any difference between a portfolio return with high anomalies and the lower the anomaly of accruals, the higher the return on the company. The results of the present study are consistent with that of Hirshleifer et al. [9] who showed that the accruals anomaly affects the profitability of companies. Given the positive effect of accrual anomaly factor on corporate profitability, it can be said that increasing the difference between accruals among companies leads to increasing corporate profitability and therefore it is suggested that individuals care for anomalities when investing in companies. It is also suggested that when pricing assets, the accrual anomaly factor should be used as an independent and significant variable in the model. Companies are advised to be more prudent in evaluating and reporting accruals so as not to lose their market position. The stock exchange organization is advised to have more control over the reports submitted on the components of accruals so that investors can invest more confidently based on this information. In the second hypothesis, the results obtained from the study of the effect of corporate life cycle on the relationship between accruals anomaly and corporate profitability, indicated that the difference between the effect of life cycle on the relationship between accruals anomaly and profitability is rejected.

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