

The impact of life cycle on the value-relevance of cash flows versus accrual financial information: An empirical study based on Tehran Stock Exchange

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CHRONICLE

Article history:

Received May 12, 2013
Received in revised format
30 June 2013
Accepted 28 July 2013
Available online
July 31 2013

Keywords:

Life cycle
Cash flows
Accrual financial information
Tehran Stock Exchange

ABSTRACT

The purpose of this research is to determine the relationship between life cycle and cash flows of automotive and machinery industry among firms whose shares are accepted in Tehran Stock exchange. The multivariate linear regression is used and the classification is based on the applied researches. The study population consists of accepted automotive and machinery industries in Tehran Stock Exchange. According to limitation in population of study, the total population has been considered and because of the nature of this research, Eviews software is used. The results indicate that the effect of cash flows are superior to accrual financial information and by increasing of the company's life cycle and entering to maturity and decline stages, the information of cash flows and accrual flows will reduce.

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1. Introduction

One of the most important criteria on stock valuation is to predict return of a firm based on different criteria such as operating cash flow and accrual accounting information (Sugianis, 1996; Adizes & Naiman, 1988; Dechow & Skinner, 2000; Xu, 2007). In fact, precise information of return reduces the risk of investment in portfolio management and there are several studies in this area. Anthony and Ramesh (1992) performed an investigation to find out the relationship between accounting performance measures and stock prices based on different life cycle hypotheses. Chen et al. (2010) investigated whether the incorporation of corporate life cycle variables into the accrual model could improve the model's explanatory power. Results of the empirical study indicated that the inclusion of corporate life cycle variables could reduce the likelihood of both type I and II errors, and it could significantly improve the explanatory power of the accrual model.

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Jenkins et al. (2004) investigated the relative impacts of key components of earnings change in explaining the value relevance of earnings across various life-cycle stages of the company. They investigated whether firms in various life-cycle stages take various strategic actions: change in sales was emphasized in the growth and mature stages, while in later stages, profitability was emphasized. They reported that when firms were in the growth stage, the value-relevance of change in sales is relatively greater than that of change in profitability.

Kallunki and Silvola (2008) investigated whether the use of an activity-based cost-accounting system differs among companies in various organizational life cycle stages. They applied the Miller and Friesen life cycle model (1983, 1984) internal characteristics of firms and the external contexts. They conduct different robustness checks of the results using several control variables and checking the effect of potential non-response bias. Stepanyan (2011) examined the emergence and evolution of three distinct groups of payers, companies that pay cash to shareholders in the form of (i) repurchases, (ii) dividends, and (iii) the combination of dividends and share buybacks, to recognize what determines firms' preferences for certain distribution techniques. The study indicated that the choice of the form of payout was a reflection of a life cycle stage and evolved as firms alternate between the introductory, growth and maturity stages of their life cycle. The findings implied that viewing paying population of industrial firms as a homogeneous group may be seriously flawed.

Wang et al. (2011) examined the dividend policy for firms listed on the Taiwan Stock Exchange and tested the life cycle hypothesis. The sample involved 6031 observations of dividend payments over the period 1992-2007. The results stated that dividend payers were associated with higher profitability, higher asset growth rate, and higher market-to-book ratio than non-payers (none dividends). These results were consistent with the life cycle hypothesis of dividend payment because younger firms with higher growth potential but lower profitability would be more likely to distribute more stock dividends than cash dividends.

2. The proposed study

The purpose of this research is to determine the relationship between life cycle and cash flows of automotive and machinery industry among firms whose shares are accepted in Tehran Stock exchange. The multivariate linear regression is used and the classification is based on the applied researches. The study population consists of accepted automotive and machinery industries in Tehran Stock Exchange. According to limitation in population of study, the total population has been considered and because of the nature of this research, Eviews software is used.

Anthony and Ramesh, (1992) performed an investigation on relationship between accounting performance measures and stock prices by testing the life cycle hypothesis. In their study, in order to categorize the life cycle, they used four financial ratios including sales growth, capital expenditures, ratio of dividend per share (DPS) on earnings per share (EPS) and size of companies. They measured these ratios in different cycles of firms and then using multiple regression method, they examined various hypotheses. Table 1 summarizes how we assign different numbers in various stages of firms based on their method,

Table 1

Life cycle model

Quintile	Age	Sales growth (SG)	Capital expenditure (CE)	DPR
The first quintile	5	1	1	5
The second quintile	4	2	2	4
The third quintile	3	3	3	3
The fourth quintile	2	4	4	3
The fifth quintile	1	5	5	3

In Table 1, two variables sales growth (SG), capital expenditure (CE_{it}) and dividend per share (DPR) are calculated as follows,

$$SG_{it} = \left[1 - \frac{\text{Sales}_{it}}{\text{Sales}_{it-1}} \right] \times 100, \quad (1)$$

$$DPR_{it} = \left[\frac{\text{DPS}_{it}}{\text{EPS}_{it}} \right] \times 100, \quad (2)$$

$$CE_{it} = (\text{Increase(reduction) on fixed assets during the cycle} / \text{Market value of firms}) \times 100. \quad (3)$$

The proposed study uses the procedure described in Eqs. (1-3) to categorize firms into different stages, which are growth, maturity and decline. According to Table 1, if the number obtained is between 16 to 20, the firm is considered in growth stage, if the number obtained is between 9 to 15, the firm is considered in maturity stage, the number obtained is between 1 to 8, the firm is considered in decline stage. The proposed model of this paper uses the following regression model to find the relationship between return and different cash flow components,

$$R_{i,t} = \alpha_0 + \alpha_1 CFO_{i,t} + \alpha_2 CFI_{i,t} + \alpha_3 CFF_{i,t} + \alpha_4 PLF_{i,t} + \varepsilon_{i,t}, \quad (4)$$

where $R_{i,t}$ represents return of i^{th} share at time t , $CFO_{i,t}$, $CFI_{i,t}$ and $CFF_{i,t}$ are changes of the operating cash flow, cash flow from investment activities and cash flow from financial activities of i^{th} share at time t from the previous year $t-1$. In addition, $PLF_{i,t}$ is a dummy variable, which is equal to one when $NI_{i,t}$ changes in the accrual operating activities, is less than equal zero and zero, otherwise. In addition, let $ABI_{i,t}$ be the changes in capital flows undertaking activities and $ABF_{i,t}$ be the changes in the accrual financing activities of i^{th} share at time t from the previous year $t-1$. Therefore, we have,

$$R_{i,t} = \beta_0 + \beta_1 NI_{i,t} + \beta_2 ABI_{i,t} + \beta_3 ABF_{i,t} + \beta_4 FLF_{i,t} + \varepsilon_{i,t}, \quad (5)$$

where $\alpha_0, \dots, \alpha_4$ and β_0, \dots, β_4 are coefficients, which are estimated using regression technique and $\varepsilon_{i,t}$ represents the residuals.

The proposed study of this paper gathers the necessary data from Tehran Stock exchange over the period 2006-2011. There were some conditions in selection strategy: First, they must have the same fiscal calendar ending March. The shares of all eligible firms must be listed on stock exchange before year 2006, they were not permitted to change their fiscal year and finally, we must have the access to necessary data. Our survey has indicated that there were 40 firms and we decided to collect the necessary information of all these firms. The main hypothesis of the survey is as follows,

Main hypothesis: There is a relationship between life cycle and cash flow information.

The main hypothesis consists of six sub-hypotheses as follows,

1. There is a relationship between growth cycle and operating cash flow.
2. There is a relationship between maturity cycle and operating cash flow.
3. There is a relationship between decline cycle and operating cash flow.
4. There is a relationship between growth cycle and accrual operating activities.
5. There is a relationship between maturity cycle and accrual operating activities.
6. There is a relationship between decline cycle and accrual operating activities.

Table 2 demonstrates the summary of some of the basic information.

Table 2

The summary of some statistical observations

Variable	Observations	Mean	Standard deviation	Min	Max	Skewness	Kurtosis
(R)	240	457.21	667.61	-230.58	430.411	284.3	362.15
(Δ CFO)	235	-951.23	780.447	-67.2876	78.1937	-532.1	196.14
(Δ CFI)	236	915.31	556.267	-82.985	92.1492	132.3	694.16
(Δ CFE)	237	-976.35	875.419	-57.2939	3.1421	-574.2	445.17
(Δ NI)	238	-534.16	410.24	-79.1362	6.1603	462	440.19
(Δ ABI)	237	548.104	96.663	-13.1346	40.46	586.4	554.25
(Δ ABF)	237	111.53	604.231	-57.792	34.1489	114.3	490.14

We have also measured some basic information in terms of different stages and Table 3 summarizes the results of our survey.

Table 3

The summary of basic statistics associated with different stages

Life cycle	Statistics	R	Δ CFO	Δ CFI	Δ CFE	Δ NI	Δ ABI	Δ ABF
Growth	Mean	85.4	931.24	-281.21	487.26	436.13	642.3	257.25
	Median	700.18	-808.2	-133.0	352.3	66.1	194.2	887.1
	Standard deviation	754.83	95.342	16.151	2.113	290.55	790.62	25.125
Maturity	Mean	893.19	-796.27	560.29	-984.23	-003.14	1.104	311.44
	Median	415.7	815.1	66	-255.1	-265.1	409	198.2
	Standard deviation	233.58	27.466	25.256	21.403	70.258	81.657	0.215
Decline	Mean	-673.2	-034.99	447.211	-42.395	-37.137	56.407	91.268
	Median	-880.1	-285.0	24.23	-627.77	-087.28	-858.7	761.1
	Standard deviation	480.32	58.4	357.53	19.868	11.209	91.137	33.495

The other useful information associated with the independent variables of the survey is the correlations among them. Table 4 summarizes the necessary information of correlations among various variables.

Table 4

The summary of Pearson correlation

Correlation							
Probability	R	Δ CFO	Δ CFI	Δ CFE	Δ NI	Δ ABI	Δ ABF
R	1						
Δ CFO	0.537094 0.0000	1					
Δ CFI	-0.171812 0.0090	-0.155521 0.0183	1				
Δ CFE	0.093285 0.1585	-0.121570 0.0657	-0.211541 0.0012	1			
Δ NI	0.653690 0.0000	0.638644 0.0000	-0.024857 0.7077	0.015886 0.8106	1		
Δ ABI	-0.075403 0.2547	-0.034202 0.6058	0.194727 0.0030	-0.418886 0.0000	-0.056718 0.3919	1	
Δ ABF	-0.056378 0.3947	-0.090928 0.1693	0.002922 0.9648	-0.381404 0.0000	-0.115339 0.0809	0.072620 0.2727	1

As we can observe from the results of Table 4, there are not strong correlation among most of the independent variables, which means we may not face and linear dependency among these variables.

3. The results

In this section, we present details of our findings for testing various hypotheses of this survey.

3.1. The first hypothesis: The relationship between growth cycle and operating cash flow in growth cycle

The first hypothesis of this survey is associated with the relationship between growth cycle and operating cash flow. Table 5 summarizes the results of our findings on testing the first sub-hypothesis.

Table 5

The summary of testing the first hypothesis: The effect of cash flow on return during the growth cycle

Variable	Coefficient	t-value	P-Value	Relationship
Intercept	0.1840	6.369	0.000	Positive
Δ CFO	0.00106	5.996	0.000	Positive
Δ CFI	-0.00101	-5.811	0.000	Negative
Δ CFE	0.00242	5.575	0.000	Positive
Profitability	0.35534	0.646	0.5234	Not significant

$R^2=0.7828$ $F = 24.339$ $P\text{-value}=0.0000$

As we can observe from the results of Table 5, all coefficients are statistically significance in terms of t-value and P-value. In addition, the regression represents approximately 78% of the changes on return, which means cash flow is able to determine the return of a firm during the growth cycle much better than other stages.

3.2. The second hypothesis: The relationship between growth cycle and operating cash flow in maturity cycle

The second hypothesis of this survey is associated with the relationship between maturity cycle and operating cash flow during the maturity cycle. Table 6 summarizes the results of our findings on testing the second sub-hypothesis.

Table 6

The summary of testing the second hypothesis: The effect of cash flow on return during the maturity cycle

Variable	Coefficient	t-value	P-Value	Relationship
Intercept	0.1378	2.507	0.0130	Positive
Δ CFO	0.00080	5.389	0.0000	Positive
Δ CFI	-0.00068	-2.217	0.0278	Negative
Δ CFE	0.00020	2.400	0.0174	Positive
Profitability	0.8017	-6.838	0.0000	Negative

$R^2=0.3396$ $F = 23.663$ $P\text{-value}=0.0000$

As we can observe from the results of Table 6, all coefficients are statistically significance in terms of t-value and P-value. In addition, the regression represents approximately 34% of the changes on return, which means cash flow is able to determine the return of a firm during the maturity cycle stage.

3.3. The third hypothesis: The relationship between growth cycle and operating cash flow in decline cycle

The third hypothesis of this survey is associated with the relationship between decline cycle and operating cash flow during the maturity cycle. Table 7 summarizes the results of our findings on testing the third sub-hypothesis. As we can observe from the results of Table 7, most coefficients are not statistically significance in terms of t-value and P-value when the level of significance is one percent. In addition, the regression represents approximately 21% of the changes on return, which means cash flow is not able to determine the return of a firm during the decline cycle stage.

Table 7

The summary of testing the third hypothesis: The effect of cash flow on return during the decline cycle

Variable	Coefficient	t-value	P-Value	Relationship
Intercept	-0.2686	-1.119	0.2953	Not-significance
Δ CFO	0.00147	2.898	0.0199	Positive
Δ CFI	-0.00037	-1.319	0.2236	Not-significance
Δ CFE	0.000109	0.606	0.5610	Not-significance

$R^2=0.2196$ $F = 4.343$ $P\text{-value}=0.0429$

3.4. The fourth hypothesis: The relationship between growth cycle and accrual operating activities in growth cycle

The fourth hypothesis of this survey is associated with the relationship between growth cycle and accrual operating activities. Table 8 summarizes the results of our findings on testing the fourth sub-hypothesis.

Table 8

The summary of testing the fourth hypothesis: The effect of accrual operating activities on return during the growth cycle

Variable	Coefficient	t-value	P-Value	Relationship
Intercept	0.0890	1.498	0.1455	Not significant
Δ NI	0.00111	3.477	0.0017	Positive
Δ ABI	-0.0008	-0.065	0.9486	Not significant
Δ ABF	0.00153	2.125	0.0428	Positive
Profitability	0.4485	0.949	0.3510	Not significant

$R^2=0.4520$ $F = 5.568$ $P\text{-value}=0.0000$

As we can observe from the results of Table 8, the regression represents approximately 45% of the changes on return. However, most individual coefficients are not statistically significance, which means the model does not provide strong prediction of return.

3.5. The fifth hypothesis: The relationship between growth cycle and accrual operating activities in maturity cycle

The fifth hypothesis of this survey is associated with the relationship between growth cycle and accrual operating activities. Table 9 summarizes the results of our findings on testing the fifth sub-hypothesis.

Table 9

The summary of testing the fifth hypothesis: The effect of accrual operating activities on return during the maturity cycle

Variable	Coefficient	t-value	P-Value	Relationship
Intercept	0.0694	1.032	0.3030	Not significant
Δ NI	0.00136	5.595	0.0000	Positive
Δ ABI	0.000043	0.553	0.5807	Not significant
Δ ABF	0.000581	1.979	0.0492	Positive
Profitability	-0.9497	-4.779	0.0000	Negative

$R^2=0.2689$ $F = 17.195$ $P\text{-value}=0.0000$

As we can observe from the results of Table 9, the regression represents approximately 27% of the changes on return. However, some individual coefficients are not statistically significance, which means the model does not provide strong prediction of return.

3.6. The sixth hypothesis: The relationship between growth cycle and accrual operating activities in decline cycle

The sixth hypothesis of this survey is associated with the relationship between growth cycle and accrual operating activities. Table 10 summarizes the results of our findings on testing the last sub-hypothesis.

Table 10

The summary of testing the fifth hypothesis: The effect of accrual operating activities on return during the decline cycle

Variable	Coefficient	t-value	P-Value	Relationship
Intercept	-0.1831	-0.934	0.3776	Not significant
Δ NI	0.002972	2.106	0.0683	Not significant
Δ ABI	-0.00028	-1.836	0.1036	Not significant
Δ ABF	0.00047	0.992	0.3502	Not significant

$R^2=0.1107$ $F = 6.552$ $P\text{-value}=0.0150$

As we can observe from the results of Table 10, the regression represents approximately 11% of the changes on return. However, none of the individual coefficients is statistically significance, which means the model does not provide strong prediction of return.

4. Conclusion

In this paper, we have investigated the relationship between operating cash flow as well as accrual accounting information with return of some selected firms on Tehran Stock Exchange. The proposed study of this paper gathered all the necessary information from the machinery sector and using regression analysis, we examined different hypotheses. Based on the results of our survey, we can conclude that operating cash flow is capable of predicting return very strongly during the growth stage but accrual information is not able to provide such prediction very well.

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