The Relationship between Life Cycle and Cost of Equity on the Firms Listed In Tehran Stock Exchange (TSE)

Hassan Zalaghi[1]

Department of Accounting, Economic & Social Sciences Faculty, Bu-Ali Sina University, Hamden, Iran

Nasim Rezaei

Department of Accounting, Economic & Social Sciences Faculty, Bu-Ali Sina University, Hamden, Iran

Abstract

The difference of cost of equity in different life cycles of firms from growth to decline can help the firms to provide finance and understand the effect of life cycle in costs of financial provision with the important consequences in strategic planning of firms. This research investigates the stages of life cycle of firms and costs of equity with data from 113 firms of The Firms Listed in Tehran Stock Exchange from 2003 to 2014. Testing the hypotheses, multiple regressions was used based on the combined data. The results showed that the cost of equity in the stages of decline increases and in growth and mature stage decreases than that in shake out stage. The findings of this research are consistent with life cycle theory of firms.

Keywords: life cycle, growth, decline, cost of Equity.

Introduction

The investor's decisions and manager's decisions are made in order to increase return and wealth. The financial and investment decisions and dividend distribution of firms must be carried out in such a way that they increase the value of firms. These decisions need some assessment which includes attention to costs of equity (Paulo, 2010). The cost

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[1] *Corresponding author's email: zalaghi@basu.ac.ir*

of equity is of importance in within-organization an out-of-organization aspect. In the latter, the cost of equity is used in firm valuation, Investment management firm performance. In the former, the cost of equity plays a key role in decisions of investing priorities, determination of optimal capital structure and evaluation of sectors performance (Ottomani, 2003). All living things including plants, animals and humans follow the life curve, are born, grow, become old and finally die. These systems have specific behavioral patterns in each life stage to overcome on the problems of the same period and or related to the shake out from a stage to another one. But the organizations as well as (organic) systems follow life curve and also confronting with some problems in the shakeout stage. Some of these problems are inevitable and it is the duty of managers to conduct them in evolution trend. Therefore, in this study we have tried to investigate the relationship between cost of equity and life cycle until to help the decision makers to act with sufficient knowledge for corporate finance.

Literature review and hypothesis development

Life Cycle

In economic and management theories, the life cycle of firms can be divided into stages. The firms follow some policies regarding each stage of economic life. These policies in a way reflected in firms accounting information. In accounting area, some researchers studied the effect of life cycle on accounting information. Based on Gordon and Walter`s view, the firms divided into growth, mature and decline stages in terms of life cycle. The growing firms increase the price of stock by earning accumulating. But the maturing firms do not have suitable opportunity and their dividend policy does not affect the price; while the constant rate of dividend payout leads to decrease in risk. The declining firms are forced to dividend payout and show high risk (Tehrani, 2006). On the other, the firms can be classified by assignment of firm features in each stage from life cycle. The firms with sales growth, high capital expenditure growth, and short life are known as growing firms. The firms with sales growth, low capital expenditure, and long life are known as declining firms and the mature firms are between. (Kothari, 2001; Dimitrios, 2005)

Cost of Equity

Capital structure is a combination of debt and cost of equity, which through it, firms finance their assets. The capital structure is a combination of long term resources in the firms and changing it can affect the cost of equity. The main purpose of capital structure decisions is to create a suitable combination of long term resources in order to minimize the firm capital cost and maximize the firm value. This combination is called the optimal capital structure. The equity is representing the interest of main owners of an economic unit relative to the net assets. The residual equity shows the remaining of main owners` interest in firms` assets that is resulted after deducting debts. The cost of equity is importance in internal and external aspects. In the external dimension it applied to securities evaluation and firm performance valuation. In the internal dimension, the cost of equity has a key role in decisions of investments priority, determination of optimal capital structure and evaluation of sectors performance (Ottomani, 2003).

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The decisions and policies of profit distribution in firms can be decisive in making a picture of prospect profits. Investors on the firms listed in Tehran Stock Exchange aims to obtain profits from distributed profits of firms and increase the stock value and exchange drafts to increase wealth. In this respect, the cost of equity can affect the investors` motivation. Maximization of equity` wealth and minimizing financial supply expenses along with increase of stock exchange value are of importance in financial management. (Nissim and Penman, 2001) studied ratio analysis and assessment of cost of equity. They found six ratios of sales gross interest margin, ratio of variable asset flow of operation items other than sales to net operating items, financial leverage, borrowing expense, operating debt lever from remaining interest pattern as determinant of efficiency rate of equity and three sales factors, rate of asset flow and financial leverage as determinant of booking value and growth rate of operating remaining interest as the growth criterion of total remaining interest.

Relationship of life cycle and cost of equity

The ability of firms in different stages of life cycle in supplying financial resources varies (Berger & Udell, 1998). The firms in the early stages of life cycle are unknown and relatively small and analysts pay less attention to them. Therefore, these firms suffer the asymmetry of noticeable information which may come from wrong pricing of equity (Myers & Majluf, 1984) with a positive relationship of risk taking and capital expense.(Armstrong et al., 2011). On the other hand, the firms in maturity stage have a long history in market and are paid more attention by investors and analysts. They suffer less asymmetry of information and are less risky. Easley and O`Hara (2004) found that the long history firms are acknowledged more by investors and their information accuracy increases with capital expenses reduced. The investors prefer to invest in less risk, low exchange costs and less information asymmetry letters of credit (Boston, 2006).

(Gebhardt et al., 2001) showed that maturity stage of firms is associated with systematic risk reduction. Furthermore, resource-based theory assumes that firms vary depending on resources (financial, physical, human resources, technology and organizational resources) and capabilities (Barney, 1991) which are critical in explaining growth and performance of firms (Penrose, 1959). Based on this approach, the resources and capabilities of big firms in mature stage are enriched and various while they are limited in small firms. The firms in mature stage utilize cheap and simple resources in financial supply along with competitive benefits. Specifically, life cycle affects the firm risk taking and the firms in mature stage become situated in a better position to increase the capital and reduce the expenses.

(Wang,et al., 2011) studied the policy of profit distribution and life cycle on Taiwan capital market showing that paying stock profit in young trade units with high growth power and low profitability results in contribution interest distribution versus cash interest. Also, in the more mature trade units with low growth power and high profitability, it results in more distribution of cash interest. Gohar and Stepanyan (2010) reviewed the life cycle and payment type of stock interest in three different groups of trade units distributing cash including stock repurchase, cash interest and a combination of both. Stock repurchase in rapid growth stage is more probable and is a sign of trade

unit quality for investors. Cash interest payment to equity increases in mature trade units and managers tend more to spread the trade relative to equity` wellbeing. Finally, using a combination of cash interest and stock repurchase happens in more mature trade units. This study shows that life cycle of trade unit is one of the most important factors to choose the methods of stock interest payment. When a growing firm enters the maturity stage, it will have less investment opportunities resulting in the increase of free cash flows. The, the mature firms spend these free cash flows in distribution interest or stock repurchase. Therefore, the increase of distributed interest shows that the managers do not intend to overinvest.

De Angello et al. (2006) propose the life cycle theory with this question that there is a relationship between dividend probability and the rate of acquire capital to paid capital (measured by the ratio of retained earnings to equity or to total assets). The firms with lower ratio of retained earnings to equity or to (assets) tend to rely on external capital in the growth stage while firms with higher rates tend to have more maturity an greater retained earnings. Therefore, such firms are suitable options for payment amount of dividend. According to life cycle theory, this research finding shows that the mentioned ratio has a positive significant relationship with the probability of dividend in the firm. This relationship holds for the firms which first remove or enforces the dividend distribution. In a research titled the effect of life cycle of firm on the disclosure quality and capital structure, the authors found that in both stages of growth and decline of life cycle, the quality of accounting disclosure has a significant effect on capital structure. Yet, in mature stage, there is no significant relationship between disclosure quality and capital structure. Further research showed that disclosure quality has less effect on capital structure of firms being in decline stage in comparison to firms in growth stage. (Jamshidi, 2015)

(Khodamipour et al., 2014) in the review of effect information asymmetry and life cycle on future return of stocks on the exchange listed firms, found out that there is a positive significant relationship between life cycle and future returns. In another word, with the increase of firm life, their stock returns will rise. Bolu (2008), In investigating the relationship of earning quality features and capital cost, with using of four earning quality features based on accounting data including accruals quality, sustainability, predictability and smoothness showed that only sustainability has a negative relationship with capital cost and other features have positive relationship with that. Currant paper aims at answer to question that is capital cost affected by different stages of life cycle.

Therefore, the research hypotheses are presented as follows.

H_1: cost of equity in growth stage is lower than that in shake out stage.

H_2: cost of equity in mature stage is lower than that in shake out stage.

H_3: cost of equity in Decline stage is higher than that in shake out stage.

Methodology

The data required for the research are of annual type. In this research, data are collected in two stages. First, library method is used to develop the theoretical foundations. Second, data for this study will be collected from the published annual reports of the sample Firms. Our sample covers listed firms in Tehran Stock Exchange (TSE) across the period from 2003 to 2015. The sample selection criteria are:

1. The end of fiscal year is March 20,

2. Data is available at least for all years, and

3. The firm is not loss frequently for three years.

Regarding the lack of information for some of the firms in the sample, only 113 firms were selected as statistical sample.

The model presented by Mostafa Monzur et al. (2015), is used to test the hypotheses one to three. The research is applied in aim and correlation in nature, while following a combination of inductive and deductive methods. The data are analyzed through quantity methods of descriptive statistics such as mean, SD, and correlation coefficient of Pearson and Eviews8 software was used to test the hypotheses through correlation analysis of multiple Regressions in panel data.

The first hypothesis: Based on view of dynamic resources and life cycle, it is predicted that B_1 is negative in the first hypothesis.

Second hypothesis: Based on view of dynamic resources and life cycle, it is predicted that B_1 is negative in the second hypothesis.

Third hypothesis: Based on view of dynamic resources and life cycle, it is predicted that B_1 is positive in the third hypothesis.

In the above hypotheses, the stages are defined as the following:

GRT= growth stage, MAT= mature stage, DEC= decline stage

Due to inactive transaction or out of stock market emerging firms, the life cycle is defined in growth, maturity, and decline stages.

Research Variable*s*

Life cycle

Life cycle of CLC is the imaginary variable vector for firms in different stages of life cycle in Dickenson`s model (2011). Antony and Ramesh (1992) used four variables of sales growth, capital expenses, distributed interest ratio, and firm age to separate firms in

stages of life cycle. We used the same trend except we removed the firm age due to difficulty in determining it and applied three other variables for classification.

The values of three variables were measured for year-firm and were classified in low, medium, and high classes based on statistical percentile. (Data were sorted from small to big and the data relate to 33% and 66% were identified. Therefore, data were classified into three classes.). An score is attribute to each of observation located in the three classes. (low 1, medium 2, high 3). Then, for each firm-year, a panel score is obtained classified in one of stages of growth, maturity, and decline based on Table 1. Finally, the observations out of the framework of life cycle in Table 1 are removed from the initial model.

Table 1: the model of life cycle for firms

Stages of life cycle	(SG)	(CE)	(DPR)
Growth	3	3	1
Maturity	2	2	2
Decline	1	1	3

The operational definition of the above variables is as follows:

$$SG_{it} = [\left(\frac{Sale_{it}}{Sale_{it-1}}\right) - 1] \times 100$$

$$DPR_{it} = \left(\frac{DPS_{it}}{EPS_{it}}\right) \times 100$$

CE: Increase (Decrease) of fixed assets / market value of firm) $\times 100$

SG: sales growth (sale change relative to the previous year)

DPS: Dividend per Share

EPS: Earning per Share

DPR:distributed percentage of EPS

Cost of equity

In the study done by Saghafi et al (2011), to calculate cost of equity, three methods of Gordon, O`Hanlon and Steele (2000) and capital asset pricing were used and they found that Gordon`s method worked best Method. Therefore, Gordon`s method was used to calculate cost of equity in the study.

The calculation of cost of equity through growth model of Gordon (Damodaran, 2002):

$$\text{Cost of equity} = \frac{D_1}{P_0} + g$$

In which:

D_1: Dividend per Share at the end of first year

P_0: stock price at the beginning of year

G: growth rate of Dividend which obtained from the following:

$$g = \left[\frac{EPS_t}{EPS_0} \right]^{\left(\frac{1}{t} \right)} - 1$$

Control variables

As all variables in a research conditions can not be studied simultaneously, there are found some variables the effect of which must be removed in determination of relationship between independent and dependent variables. The control variables are entered in the model as the following.

Size of firm: to control the effect of firm size on cost of equity, according to Fernando et al. (2010), natural logarithm of all firm assets is taken to be the index of size firm, which is likely to affect cost of equity. The results of the study on this effect show that large firms have lower risks than small firms. For example, Gomez et al. (2006) and Goschen et al. (2001) argued that small firms may need to disclose information voluntarily to maintain or attract analysts since in these firms the cash flow is low and the cost of getting final information is greater than the benefits of shake out based on final information. The rate of booking value of equity costs to market value of equity is an index to show the growth opportunity of the firm. The difference of market value and booking value can be a sign of invisible assets in the firm. The firms of high growth have greater risk; therefore, a positive relationship is expected to exist between booking value to market value rate and cost of equity (Hail & Leuz, 2006).

Systematic risk (*beta*): dividing stock return and market return by variance, the market return (total index) is obtained in the period, which is a risk criterion (Easton, 2004). Therefore, a positive relationship is obtained with cost of equity as the following:

$$\beta = \frac{\text{cov}(r_i, r_m)}{\delta^2(r_m)}$$

R_i: stock return for firm *i*

R_m: Stock return fot market

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Loss: if operational Income is negative, it is equal to one and Otherwise, it is zero.

Financial leverage

Financial decisions are of importance in the firm. Managers pay much attention to capital structure in the increase of financial leverage because using financial leverage can increase equity `wealth and if misconduct, it can have reverse effect decreasing wealth. In different studies (Bhayani, 2009, Ingram & Margetis, 2010 and Vithessonthi & Tongurai, 2009) financial leverage is focused. As increasing financial leverage increases costs and firm risk increases, it is predicted that there is a positive relationship between financial leverage and cost of equity. The financial leverage is obtained by dividing sum of debts on equity.

Results

Descriptive statistics

The descriptive statistics of research variable including mean, median, maximum, minimum, and SD are present in Table 2.

Table 2: descriptive statistics of research variables

Stages of life cycle	Variables	Mean	Median	Max	Min	SD
GRT	COE	0.041	0.013	0.067	-1.000	0.179
	BM	0.005	0.004	0.019	0.000	0.004
	BTA	-0.003	0.024	0.229	-0.464	0.112
	LEV	1.687	1.343	24.454	0.042	1.663
	LOSS	0.012	0.000	1.000	0.000	0.110
	SIZE	5.729	5.677	7.292	4.290	0.546
MAT	COE	0.135	0.130	0.225	0.067	0.044
	BM	0.004	0.003	0.033	0.000	0.003
	BTA	0.007	0.018	0.229	-0.463	0.084
	LEV	1.713	1.429	11.110	0.018	1.366
	LOSS	0.007	0.000	1.000	0.000	0.085
	SIZE	5.810	5.779	7.975	4.201	0.642
DEC	COE	0.593	0.415	3.890	0.226	0.502
	BM	0.007	0.006	0.041	0.000	0.005
	BTA	0.021	0.032	0.229	-0.463	0.087
	LEV	2.646	2.107	23.309	0.172	2.187
	LOSS	0.000	0.000	0.000	0.000	0.000
	SIZE	5.782	5.758	7.625	4.533	0.546

As shown in table 2, mean (median) of cost of equity in the sample firms is .041(.013) in growth stage and .135(.130) in maturity stage, and .593(.415) in decline stage having an ascending trend from growth to decline and mean (median). The ratio of book value of stock to market value of stock is .005 in growth stage, .004 in maturity stage and .007 in decline stage .The mean (median) of systematic risk is .003, .007 and .021 in growth, maturity and decline stages, respectively.

The results of correlation coefficient test show that there is a negative significant correlation at 10% level between cost of equity with firms in maturity stage and with firms in growth stage at 5% while there is a positive significant correlation with firms in decline stage at 10% level.

Results of regression model estimation

As shown in table 3, variable of ratio of book value to market value (BM) and LEV and firm size are significant at 1% level. The growth stage of life cycle with the coefficient -0.093 and significance .01 at level 5% has a negative significant relationship with cost of equity and its amount is less than that in shake out stage. This result show that there is problems of information asymmetry and less reputation by market stakeholders along with cash problems in the firms of the growth stage which use more financial leverage to supply finance of planned investment. The value of F- test is 217.4 and its significance level is 0.000 implying the significance of the entire regression model. Value of the adjusted determination coefficient shows that 63.8% of change in dependent variable can be explained. The results (Durbin –Watson, 2.029) also show that not exist auto-correlation in regression model.

Table 3: results of regression model estimation for first Hypothesis

Variable	Coefficient	t-Statistic	Prob.
C	-0.371	-2.973	0.003
GRT	-0.009	-2.347	0.019
BM	0.086	9.447	0.000
BTA	-0.052	-1.062	0.288
LEV	-0.012	-3.941	0.000
LOSS	-0.034	-1.288	0.197
SIZE	0.067	3.353	0.000
Adjusted R-squared			0.638
F-statistic			217.4
Prob(F-statistic)			0.000
Durbin-Watson stat			2.029

According to the first hypothesis, it is predicted that there is a negative significant relationship between cost of equity and growth stage of life cycle. The negative significant coefficient of growth stage and its lower value than that of maturity stage shows that cost of equity is lower in growth stage relative to maturity stage. This confirms the first hypothesis.

As shown in table 4, variables ratio of book value to market value (BM), LEV and firm size are significant at 1% level. The growth stage of life cycle with the coefficient -0.007 and significance .03 at level 5% has a negative significant relationship with cost of equity and its amount is less than that in shake out stage (from maturity to decline). This result show that there is problems of information asymmetry and less reputation by market stakeholders. Sales growth and revenues are higher than those in growth stage. The greater financial resources are invested in generating assets of firm and the firm enjoys more flexibility in cash indexes.

Table 4: results of regression model estimation for second Hypothesis

Variable	Coefficient	t-Statistic	Prob.
C	-0.332	-2.649	0.008
MAT	-0.007	-2.084	0.037
BM	0.085	9.305	0.000
BTA	-0.055	-1.131	0.258
LEV	-0.012	-4.020	0.000
LOSS	-0.032	-1.208	0.227
SIZE	0.061	3.051	0.002
Adjusted R-squared			0.638
F-statistic			216.9
Probe (F-statistic			0.000
Durbin-Watson stat			2.036

The value of F- test is 216.9 and its significance level is 0.000 implying the significance of the entire regression model. Value of the adjusted determination coefficient shows that 63.8% of change in dependent variable can be explained. The results (Durbin –Watson, 2.036) also show that not exist auto-correlation in regression model.

According to the second hypothesis, it is predicted that there is a negative significant relationship between cost of equity and mature stage of life cycle. The negative significant coefficient of mature stage (MAT) and its lower value show that cost of equity in maturity stage is lower in maturity stage relative to decline stage. This confirms the second hypothesis.

As shown in table 5, variables ratio of book value to market value (BM), LEV and firm size are significant at 1% level. Regression coefficient for decline stage

of life cycle equal to 0.013 and significance at level 1%. Thus there is a positive and significant relationship between cost of equity so this result show that its amount is greater relative to growth and maturity stages. Although the firm has less opportunity to invest, it confronts more cost of equity to maintain its position and high risk.

Table 5: results of regression model estimation for third Hypothesis

Variable	Coefficient	t-Statistic	Prob.
C	-0.384	-3.072	0.002
DEC	0.013	3.102	0.002
BM	0.086	9.434	0.000
BTA	-0.051	-1.042	0.297
LEV	-0.012	-4.082	0.000
LOSS	-0.030	-1.129	0.258
SIZE	0.068	3.414	0.000
Adjusted R-squared			0.640
F-statistic			219.0
Prob(F-statistic)			0.000
Durbin-Watson stat			2.023

The value of F-test is 219 and its significance level is 0.000 implying the significance of the entire regression model. Value of the adjusted determination coefficient shows that 64% of change in dependent variable can be explained. The results (Durbin–Watson, 2.023) also show that not exist auto-correlation in regression model.

According to the third hypothesis, it is predicted that there is a positive significant relationship between cost of equity and Decline stage of life cycle. The positive significant coefficient of decline stage and its greater value than that of previous stages, show that cost of equity is greater in decline stage than in other stages. This confirms the second hypothesis which is consistent with those of De Angello et al. (2006) and Khodamipour et al. (2014).

Conclusion and Recommendations

The results showed that life cycle of firm affects the cost of equity. Our findings support resource-based view, competitive benefits, and life cycle theory. According to the resource-based view, financial capital, physical resources, human resources, intangible technical knowledge, skills, and capabilities of big firms are rich and strong while those of small firms are limited. These resources help the mature firms to achieve competitive benefit to reduce information asymmetry and help to get financial resources to reduce cost of equity. These findings are consistent with theory of life cycle in different levels of disclosure, following the analysts and investors, stock liquidity, fame and prestige in market. Therefore, due to shake out from a stage to another, cost of equity changes. Our results have direct consequences for financial management and strategic management of the firm as the firms have less capital costs in early stage of life cycle.

The results obtained from test of first hypothesis (negative significant relationship between cost of equity and growth stage) is consistent with study findings of De Angello, et al (2006), Grollen et al. (2002), Khodamipour, et al., (2014). The result of second hypothesis (negative significant relationship between cost of equity and maturity stage) is consistent with study findings of Stepanyan (2010), de Angello et al (2006), Grollen et al. (2002), Khoamipour et al. (2014). Also he results obtained from testing the third hypothesis (positive significant relationship between cost of equity and decline stage) is consistent with de Angello etal (2006), and Khodamipour, et al., (2014).

Regarding to these results, the investors in capital market must understand that the position of firm in each life cycle stage can convey secret information on the situation of the firm which must be paid attention to in decision-making. It is suggested that the awareness of investors in the market must be increased through training programs and other conditions of market should be regarded. It is recommended to investors, who at time analyze decisions about investing in the firms, to consider life cycle. Because, the cost of capital can be different in the life cycles.

The following topics are suggested for future research:

- The Review of The Relationship between the life cycle cost of capital by various criteria

- The Review of relationship between the life cycle and capital cost in various industries

- The Relationship between financial and non-financial performance metrics and life cycle

- The Relationship between the life cycle and capital structure

- The Review of the relationship life cycle with dividend Policy

- The Review of The Relationship between the life cycle of interest rate

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