Evaluation of the Effect of Company's Life Cycle on the Cost of Equity

Mehdi Maranjory[1] & Samira Keykha[1]

[1] Department of Accounting, Islamic Azad University (IAU), Iran

Correspondence: Mehdi Maranjory, Department of Accounting, Noor Branch, Islamic Azad University (IAU), Noor, Iran. E-mail: Mr.Maranjory@gmail.com

Abstract

The aim of this study is to investigate effect of company's life cycle on cost of stockholders, in this regard, three hypotheses were developed that a sample of 118 companies during the period of 2009 to 2015 were selected in order test them and regression model and panel data was used to analyze hypotheses. In this study, Dickinson (DeAngelo et al., 2006; Dickinson, 2011; Rahmanian, Moghaddam et al., 2014) company life cycle criteria has been used to separate companies to different steps of company life cycle and the Gordon growth model has been used to measure cost of stockholders. The results show that the cost of stockholders has significant difference with each other in mature phase of Company life cycle Compared with recession of company's life cycle. The results also show that cost of stockholders have significant difference with each other compared with recession of company's life cycle in the growth stage of companies life cycle. Finally, the results show that cost of stockholders have significant difference with each other in the Company life cycle birth and decline compared with the record of company's life cycle.

Keywords: company life cycle, cost of stockholders, measure of the Dickinson Company's life cycle

1. Introduction

The cost of capital is one of the basic concepts in finance literature field. The cost of capital plays an important role in financing decisions**.** Company management in order to determine the financial resources, should specifies the cost of financing and determine factors affecting on it**.** The cost of capital is accounted as a measure to performance evaluating in Economic Added value model. The cost of capital has other applications, and is applied as Acceptance criteria of new investment projects and discount rate to calculate added value. Risk, growth and size are the common factors that effect on expected returns by investments. In addition three mentioned factors, recent research in the field of financing have introduced the company's life cycle as an important factor that affects on cost of capital**.** One of the concepts that have been entered into different fields associate with company in recent decades is Company's Life cycle (Yan and Zhao 2009; Hadi, Qasemi et al. 2014; Moghaddam, Elahinia et al. 2014). There is two types of Mechanical and organic approach. To growth and development in literature related to company's Growth & Development. While the mechanical approach imagined as a Machine and don't has Growth & Development; in the organic approach, the company is as a living creature that has growth and development**.** Based on organic approach, Garner (Gardner 1965, Moghaddam, Jahadakbar et al. 2016) stated that the company has its unique life cycle **.**Accordingly, the concept was used in human sciences studies and research including microeconomics, management, finance and accounting (Yan & Zhao, 2009; Moghaddam, Skoracki et al. 2016; Raad, Moghaddam et al. 2016). Much of this content is based on existence of different stages in company's life cycle and the unique characteristics of each stage with other stage (Cao, 2012).

So, two major axes in the company's life cycle literature are models of Company life cycle stages and each step feature descriptions**.** Features description of Company's life cycle are financial and nonfinancial characteristics associating with company that classification each step of the next stage in the company's life cycle (Yan and Zhao 2009).

In accounting and finance features such as age, growth, capital expenditures, size, growth and investment opportunities, the cost of capital, financial leverage, rate of Profit dividing, cash flow and capital structure pattern are used to classification and separation of company's life cycle,here are mentioned four common stage

that is common in the economic literature of life cycle. Emersion Stage: participation in the young, small stage and that's ownership is in the founders hands (Miller and Friesen 1984; Stepanyan 2012; Elahinia, Moghaddam et al. 2016). In addition, at this stage the company has the level of product innovation / Remarkable service, limited market scope, Informal organizational structure, the using of certain and raw information in decision-making and from simple solutions for decisions (Miller & Friesen 1984; Moores & Yuen, 2001). Also assets of the company (firm size) are in the low level. Cash flows from operating activities and profitability is in low level.

Companies need high liquidity for realize growth opportunities.Dividend profit ratio in this company's is usually zero or 10 percent maximum. Investment Return's is often negligible in compression with weighted rate of return of financing.

Growth stage: At this stage, the size of the Company is higher than that at birth stage. Sales and earnings Growth is higher compared to the birth stage. Financial resources more are invested in productive assets. Company has greater flexibility in liquidity indexes. And the ratio of Dividend profit in the spectrum of companies usually is in swing between 10 to 50 percent. Investment returns in most cases increases the weighted rate of capital cost.

Mature stage: in this stage comes down the innovation rate. Ownership is dispersed. Shareholders paid more value to dividends. Companies experience stable and balanced sale, and need to cash in most cases is funded through internal resources. The size of the company's assets is greater in proportion of the assets size of growth stage of companies.And dividing profit ratio is usually in swing between 50 to 100 percent. Because of abundant liquidity and reduce its dependence on outside funding policy, generally the investment return is equal or more than the rate of financing.

Decline stage: the decline shows the market downturn, companies with this recession began to decline. Buying is weak because of the products lack of interest to costumers. Profitability reduced because of Lack of innovation and external challenges, which in turn causes the scarcity of financial resources. Growth opportunities are minimal if they exist. Profitability Indicators, liquidity and obligations implementing have downtrend. Participation is in the very intense competition conditions. The cost of financing from external sources is also high in such a way that in most cases the rate of return is lower than investment financing (Moores & Yuen 2001; Stepanyan 2012; Shayesteh Moghaddam, 2015).

Tanataee (Thanatawee 2011) in a research paid to survey free cash flow hypothesis and Life-cycle theory in Thailand. In the present study Tanataee use of free cash flow of cash flow from operating activities After deduction of funds for investment to test the hypothesis. He also used of retained earnings ratio on book value of stockholders rights to Life cycle theory test. The results showed that there is a positive and significant relationship between free cash flow, life cycle stages and profit dividend policy.

According to declared issues the main purpose of this study is to investigate the relationship between the company life cycle and the cost of stockholders. In other words, this study seeks to answer the question of what effect have the different stages of company life cycle on cost of stockholders of admitted companies on the Stock Exchange in Iran?

2. Research's Hypotheses

According to the Research bases theory and in order to achieve the research goals, the following hypotheses are formulated:

First hypothesis: the cost of stockholders is significantly different in the maturity of company's life cycle compared with Company life cycle of recession.

Second hypothesis: the cost of stockholders is significantly different in the growth cycle of company's life cycle compared with Company life cycle of recession.

Third hypothesis: the cost of stockholders is significantly different In the process of birth and demise of company's life cycle compared with Company life cycle of recession .

Research methodology and variables

This study is an applied research. The data is based on actual figures and stock market information and financial statements of Iranian companies. Among stock companies were selected 118 companies considering limitations. In this study, the company's life cycle (birth, growth, maturity, decline) are independent variables. Cost of stockholders has been considered as the dependent variable. In addition, firm size, growth opportunities, systemic risk, losses, financial leverage and risk Bankruptcy risk have been considered as control variables

In The following has been paid to operational definition of each of these variables**.**

In this study, to determine the company's life cycle stages, following the Dickinson methodology (2011)by using cash flow from operating activities (CFO), cash flow from investing activities (CFI), cash flow from financing activities (CFF) divide the company's life cycle to five stages, including: birth stages, growth stage, maturity stage, the stage of stagnation and decline stage, we grouped. The grouping way, according to Dickinson methodology (2011) is as following:

If the CFO <0, CFI <0 and CFF> 0 the company is in birth stage (Introduction].

If the CFO> 0, CFI <0 and CFF> 0 the company is in growth stage (Growth).

If the CFO> 0, CFI <0 and CFF <0 the company is in mature stage (Mature).

If the CFO <0, CFI> 0 and CFF≥0 or CFF≤0 company is in decline stage (Decline).

If a company is not classified in any of the four above conditions that company is in (Shake-out) stage**.**

The cost of stockholders (COEQ): Since measuring and calculating the cost of capital is the most difficult stage of this research, due to required access possibility to calculate cost of stockholders, was used Gordon model to calculate cost of stockholders.

How to calculate the cost of stockholders by Gordon growth model is as following:

In this model, assuming that k represents the cost of common capital (ordinary shareholders expected rate of return); you can obtain k from the bellow relationship**:**

$$COEQ = \frac{D_1}{P_0} + g$$

In the above model:

D_1, paid dividend at the end of the first year

P_0, the price of per share at the beginning of the year

G, dividend growth rate, which obtained from the following equation

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

3. Company Size (SIZE)

one of the research control variables is, company's size that was used natural logarithm of market value of stockholders cost**.**

$$SIZE = Ln(market\ value\ of\ equity)$$

Growth opportunities (MB): opportunities of investment growth identify set of facing opportunity to investment.

In fact, the investment opportunities show potential abilities of company investment; this means that any investment be more in the future. The company has more investment opportunities.in this study, growth opportunities can be calculated as following:

(Book value of stockholders) / (market value of stockholders) = growth opportunities

$$\beta_j = \frac{COV(R_j, R_m)}{\sigma_{R_m}} = \frac{\rho_{R_j,R_m} \times \sigma_{R_j} \sigma_{R_m}}{\sigma_{R_m}} = \rho_{R_j,R_m} \cdot \frac{\sigma_{R_j}}{\sigma_{R_m}}$$

Systematic risk (Beta): This variable indicates the beta or systematic risk of company stock. In order to calculate beta of the stock of any company can be used the following equation. However, in this study, each company's Beta will be derived from Software data of processing policy.

β_j**: Sensitivity Degree of company's stock return changes into market Portfolios return changes**.

$COV(R_j, R_m)$**: Covariance between market stock return and portfolio return**.

σ_{R_m} **: Standard deviation of the market portfolio return**.

σ_{R_j}**: Standard deviation of J share return's rate**ρ_{R_j,R_m} :**Correlation coefficient between the J share return rate with market portfolio return**'s **rate**

Loss Virtual variable (LOSS): If the company has reported loss in the before year; Apply number one otherwise zero**.**

Company's Financial leverage (LEV): Another research control variables means that what percentage of company's assets has been supplied of company's debts. Financial leverage is calculated as the ratio of company's total debt to total assets at the end of the fiscal year**.**

$$LEV = total\ debts/total\ assets$$

Bankruptcy risk (Z score)

One of the control variables in this research is a binary variable (two-sided) that in this research use to classify companies to the financial health companies and companies with financial distress from Altman **bankruptcy prediction model (1983):**

$$Z^{\acute{\circ}}\ Score = 0.717 * X_1 + 0.847 * X_2 + 3.107 * X_3 + 0.42 * X_4 + 0.998 * X_5$$

Which on it:

$$X_1 = working\ capital/\ total\ assets$$
$$X_2 = retained\ earings/\ total\ assets$$
$$X_3 = EBIT/\ total\ assets$$
$$X_4 = Book\ value\ of\ equity\ /\ total\ assets$$
$$X_5 = total\ sales\ /\ total\ assets$$

In this model, if the calculated value be less than 1.**33 for companies the probability of bankruptcy is too high and if it be between 1**.**33 and 2**.**9, the company is in the area of bankruptcy and the possibility exists and if company's calculated Z Score be larger than 2**.**9, the probability of bankruptcy is very low**.

2.**9 < Z score= safe area (the companies with financial health (NSNB) are in this area)**

1.**33 < Score 2.9>z = gray area (companies with financial distress (SNB) are in this area)**

1.**33> Z score = bankruptcy area (bankrupt companies (SB) are in this area   )**

In this study, the risk of bankruptcy variable is a virtual variable if calculated amount of Z score be less than 2.**9 will be awarded 1 and otherwise zero number**.

We used multivariate regression model to test the research hypotheses test:

$$COEQ_{it} = \beta_0 + \beta_1 Introduction_{it} + \beta_2 Growth_{it} + \beta_3 Mature_{it} + \beta_4 Shakeout_{it} + \beta_5 Decline_{it} + \beta_6 SIZE_{it}$$
$$+ \beta_7 BM_{it} + \beta_8 BETA_{it} + \beta_9 LOSS_{it} + \beta_{10} LEV_{it} + \beta_{11} ZSCORE_{it} + \varepsilon_{it}$$

4. Research's Results

4.1 Data Analyzing

The following table some of the concepts of descriptive statistics of variables, including mean, median, minimum observations, maximum observations and standard deviation has been provided. The results show that the surveyed companies, on average have been supplied almost 61.6% of companies' financial resource through debt. And the average of stockholders cost is approximately 14.9% with obtained standard deviation (0.0957) can be said that the cost of stockholders of surveyed companies has relatively high distribution.

The results show that almost 8.35% companies are at birth stage, 39.8% of companies in the growth stage, 33.78% companies in the mature stage and 4.48% companies are at the stage of decline**.**

Table 1. Descriptive statistics of research variables

Standard deviation	Minimum	Maximum	Middle	Mean	Number of Views	Symbol	Variable name
0.095716	0.016705	0.443421	0.125750	0.149352	826	COEQ	Cost of equity
0.276857	0.000000	1.000000	0.000000	0.083535	826	Introd	Step of Birth
0.489846	0.000000	1.000000	0.000000	0.398305	826	Growth	Growth stage
0.473237	0.000000	1.000000	0.000000	0.337772	826	Mature	Stage of maturity
0.342564	0.000000	1.000000	0.000000	0.135593	826	Shake	Stage of recession
0.206977	0.000000	1.000000	0.000000	0.044794	826	Decline	Stage of decline
1.428343	9.254357	18.45324	13.24006	13.21025	826	SIZE	size of the company
0.474456	0.258829	2.662388	0.641896	0.787200	826	BM	Ratio of book value to market value
0.650559	-0.728409	2.278265	0.417124	0.527915	826	BETA	Systematic risk
0.304020	0.000000	1.000000	0.000000	0.102906	826	LOSS	Loss
0.155293	0.285482	0.924070	0.630490	0.616504	826	LEV	Financial Leverage
0.416351	0.000000	1.000000	1.000000	0.777240	826	ZSCORE	Bankruptcy risk

4.2 Testing Hypotheses

In this section will be paid to test the research hypotheses. Considering the regression model results of assumptions gathered in the below table, that results of hypothesis are interpreted.

4.3 First Hypothesis

The cost of stockholders in the company's life cycle maturity is significantly different compared with the stagnation of the company life cycle.

The results of the estimation model in Table 2 have been used to Testing this hypothesis.

The probability (or significance level) F had been equal 0.0000, and because the amount is less than 0.05, the null hypothesis is rejected at the 95% confidence level, i.e. the model is significant.

The amount of the Watson statistic Durbin is 1.782, it shows lack of correlation.

The related results to determination coefficient show, approximately 58.6% the independent variables changes by dependent variable and control models are explained.

The results show that except company's size variables, systemic risk and loss other existing variables in model are significant at the 95% confidence level.

The results of the control variables show, that the ratio of book value to market value has significant and negative impact on the cost of stockholders. However, financial leverage and bankruptcy risk have positive and significant effect on the cost of stockholders.

In general, the results show that coefficients of variables in maturity and stagnation stage in order had been -0.429301 and 0.590396 which reflects the negative impact of maturity and positive impact of decline on the cost of stockholders. Variables Coefficients in maturity and stagnation stage are significant According to the t statistic, In other words, the results show that in mature stage cost of stockholders is low and cost of stockholders in the stagnation stage is high.

Table 2. Results of the research model Estimates

$COEQ_{it} = \beta_0 + \beta_1 Introd_{it} + \beta_2 Growth_{it} + \beta_3 Mature_{it} + \beta_4 Shake_{it} + \beta_5 Decline_{it} + \beta_6 SIZE_{it} + \beta_7 BM_{it} + \beta_8 BETA_{it} + \beta_9 LOSS_{it} + \beta_{10} LEV_{it} + \beta_{11} ZSCORE_{it} + \varepsilon_{it}$					
Variable	Symbol	Estimated coefficient	standard error	T-statistic	Probability
Fixed value (intercept)	C	0.208506	0.024303	8.579462	0.0000
Stage of Birth	Introd	-0.427035	0.182827	-2.335737	0.0199
Growth stage	Growth	-0.239986	0.047344	-5.068952	0.0000
Stage of maturity	Mature	-0.429301	0.1798	-2.3878	0.0174
Stage of recession	Shake	0.590396	0.076438	7.723848	0.0000
Stage of decline	Decline	0.308878	0.122588	2.519641	0.0120
size of the company	SIZE	-0.001886	0.001524	-1.237203	0.2164
Ratio of book value to market value	BM	-0.006588	0.002317	-2.842916	0.0046
Systematic risk	BETA	0.001450	0.001071	1.353199	0.1764
Loss	LOSS	0.001256	0.006514	0.192796	0.8472
Financial Leverage	LEV	0.035048	0.013696	2.559034	0.0107
Bankruptcy risk	ZSCORE	0.298191	0.131603	2.265846	0.0238
The coefficient of determination		0.649			
Adjusted determination coefficient		0.586			
Durbin-Watson		1.782			
F statistic		10.1893			
Probability (statistics F)		0.0000			

4.4 The Second Hypothesis

The cost of stockholders in Growth stage of company's life cycle is significantly different compared with the stagnation stage of company's life cycle. The results of the model estimates in Table 2 have been used to test these study hypotheses **.**

In general, the results show that the Coefficients of growth and stagnation stage variables had been 0.239986 and 0.590396. Which reflects the negative impact of maturity stage and positive impact of stagnation stage on the cost of stockholders, According to the t statistic the coefficients of growth and stagnation stage variables are significant.In other words, the results show that growth in the growth stage the cost of stockholders is low and in stagnation stage cost of stockholder is high.

According to the above cases, it can be considered the second hypothesis.

The third hypothesis: the cost of stockholders in the company's birth and decline life cycle is significantly different compared with the company's life cycle stagnation.

The results of the model estimates in Table 2 have been used to test this hypothesis.

In general, the results show that the Coefficients of birth, decline and stagnation stage variables had been -0.427035, 0.308887 and 0.590396. Which reflects the negative impact of birth stage and positive impact of decline and stagnation stage on the cost of stockholders, According to the t statistic the coefficients of birth, decline and stagnation stage variables are significant.In other words, the results show that in the decline and stagnation stage the cost of stockholders is low but cost of stockholders sensitivity in stagnation stage is more than decline stage and in birth stage cost of stockholders is low.

According to the above we can be considered third hypothesis. This means that the cost of stockholders in the company's birth and decline life cycle have significant differences with each other compared with the company's life cycle stagnation.

5. **Conclusion and Discussion**

According to the first hypothesis, expects that the cost of stockholders in the company's life cycle maturity has a significant difference compared with the company's life cycle stagnation. The regression model by using panel data (fixed effects model) was estimate to test this hypothesis**.** significant of estimate coefficients of maturity and

stagnation stage variables were investigated by using t test that results show Significant of estimated coefficients of maturity and stagnation stage variables. The F-statistic shows that the all of the estimating model is valid**.** In general, at the 95%Confidence level, results show in maturity stage the cost of stockholders is low, and the cost of stockholders in stagnation stage is high**.** This means that the cost of stockholders in the company's life cycle maturity have a significant differences with each other compared with the company's life cycle stagnation. According to the second hypothesis, expects that the cost of stockholders in companies' life cycle growth stage has a significant difference compared with the company's life cycle stagnation**.** The regression model by using panel data (fixed effects model) was estimated to test this hypothesis **.**significant of estimate coefficients of growth and stagnation stage variables were investigated by using t test that results show Significant of estimated coefficients of growth and stagnation stage variables. The F-statistic indicates that the entire estimating model is valid. In general, results in 95% level show that in growth stage cost of stockholders is low and cost of stockholders in stagnation stage is high**.** This means that the cost of stockholders in growth stage of companies life cycle have significant differences with each other compared with the stagnation of company life cycle. According to the third hypothesis expects that the cost of stockholders in the birth and decline of company life cycle have a significant difference compared with the stagnation of company's life cycle. The regression model by using panel data (fixed effects model) was estimated to test this hypothesis. Significant of estimate coefficients of birth, decline and stagnation stage variables were investigated by using t test that results show Significant of estimated coefficients of birth, decline and stagnation stage variables. The F-statistic indicates that the entire estimating model is valid**.**

In general, in 95% confidence level results show that in decline and stagnation stage is high cost of stockholders,But sensitivity of stockholders cost in stagnation stage is higher than decline stage and the cost of stockholders is low at birth Stage. According to the above cases can be considered that the third hypothesis has been approved. This means that the cost of stockholders in the birth and decline stage of company life cycle have significant differences with each other compared with stagnation stage of company's life cycle **.**According to this study findings, are suggested to capital market participants, decision makers, analysts and potential investors of Tehran Stock Exchange that when making decisions about investments or credit, in addition to other factors also pay attention to the effects of different stages of company's life cycle. And consider the impact of this process on the cost of stockholders of companies. Thereby enhancing and improving wealth and be utility function of themselves.

References

Cao, Y. (2012). MCELCCh-FDP: Financial distress prediction with classifier ensembles based on firm life cycle and Choquet integral. *Expert Systems with Applications, 39*(8), 7041-7049.

DeAngelo, H., et al. (2006). Dividend policy and the earned/contributed capital mix: a test of the life-cycle theory. *Journal of Financial Economics, 81*(2), 227-254.

Dickinson, V. (2011). Cash flow patterns as a proxy for firm life cycle. *The Accounting Review, 86*(6), 1969-1994.

Elahinia, M., et al. (2016). Fabrication of NiTi through additive manufacturing: A review. *Progress in Materials Science, 83*, 630-663.

Gardner, J. W. (1965). How to prevent organizational dry rot. *Rice Thresher, 53*(5).

Hadi, A., et al. (2014). Modeling and Experiment of a Flexible Module Actuated by Shape Memory Alloy Wire. ASME 2014 Conference on Smart Materials, Adaptive Structures and Intelligent Systems, American Society of Mechanical Engineers.

Miller, D. and P. H. Friesen (1984). A longitudinal study of the corporate life cycle. *Management Science, 30*(10), 1161-1183.

Moghaddam, N. S., et al. (2014). *Enhancement of Bone Implants by Substituting Nitinol for Titanium (Ti-6Al-4V): A Modeling Comparison.* ASME 2014 Conference on Smart Materials, Adaptive Structures and Intelligent Systems, American Society of Mechanical Engineers.

Moghaddam, N. S., et al. (2016). Metallic Fixation of Mandibular Segmental Defects: Graft Immobilization and Orofacial Functional Maintenance. Plastic and Reconstructive Surgery–Global Open.

Moghaddam, N. S., et al. (2016). Three dimensional printing of stiffness-tuned, nitinol skeletal fixation hardware with an example of mandibular segmental defect repair. *Procedia CIRP, 49,* 45-50.

Moores, K., & S. Yuen (2001). Management accounting systems and organizational configuration: A life-cycle

perspective. *Accounting, Organizations and Society, 26*(4), 351-389.

Raad, B., et al. (2016). *A numerical simulation of the effect of using porous superelastic Nitinol and stiff Titanium fixation hardware on the bone remodeling*. SPIE Smart Structures and Materials+ Nondestructive Evaluation and Health Monitoring, International Society for Optics and Photonics.

Rahmanian, R., et al. (2014). *Load bearing and stiffness tailored niti implants produced by additive manufacturing: A simulation study*. SPIE Smart Structures and Materials+ Nondestructive Evaluation and Health Monitoring, International Society for Optics and Photonics.

Shayesteh Moghaddam, N. (2015). Toward Patient Specific Long Lasting Metallic Implants for Mandibular Segmental Defects, University of Toledo.

Stepanyan, G. G. (2012). Revisiting Firm Life Cycle Theory for New Directions in Finance. Available at SSRN 2126479.

Thanatawee, Y. (2011). Life-cycle theory and free cash flow hypothesis: Evidence from dividend policy in Thailand. *International Journal of Financial Research, 2*(2).

Yan, Z., & Zhao, Y. (2009). A new methodology of measuring firm life-cycle stages. *International Journal of Economic Perspectives, Forthcoming*.

Copyrights