

Explaining Analysis of the Relationship between Capital Structure, Cost of Capital and Yield Base Value

Meysam Kaviani¹, Seyed Reza Seyednezhad Fahim², Maryam Batebi³,
Mohammadali Kheyarkar Keshavarz⁴

Abstract

One of the key issues financial managers are expected to take care of for maximization of shareholders' wealth is assessment of the best combination of firm resources or the very capital structure. In such capital structure, financial resources are so allocated that with little Cost of Capital a greater rate of return is realized. Therefore, the capital structure which increases firm value or minimizes total Cost of Capital is claimed to be the optimum capital structure. One of the capital structure theories known as the Net Operating Income (NOI) approach maintains that a firm's Cost of Capital is independent of leverage and its value is not affected by capital structure. Present research, in an independent effort, examines the impact of capital structure and Cost of Capital on the Yield obtained via different measures for the companies in the Iranian capital market. The used Yield-based measures in this study are Earnings to Price ratio (E/P) and free cash flow yield or Free Cash Flow to Price (FCF/P). Of the total population of the listed companies on the Tehran Stock Exchange (TSE), 75 companies whose financial information during 2007-2011 was available were selected as the statistical sample subjected to further investigation. The results revealed inverse and significant impact of the changes in capital structure on Yield- Base Value of the companies on the Iranian capital market. According to the findings, in the understudy firms, the Cost of Capital was almost indifferent to the changes in

¹ Department of Management, Tonekabon Branch, Islamic Azad University, Tonekabon, Iran. Corresponding Author. E-mail: meysamkaviani@gmail.com

² Department of Accounting, Lahijan Branch, Islamic Azad University, Lahijan, Iran

³ Department of Accounting, Astaneh Ashrafieh Branch, Islamic Azad University, Astaneh Ashrafieh, Iran

⁴ Department of Accounting, Lahijan Branch, Islamic Azad University, Lahijan, Iran

capital structure. In addition, (changes in) Cost of Capital could not adequately explain the Yield-Base Value of the company (lack of significance in the relationship of the two variables).

Keywords: *Capital Structure, Cost of Capital, Value*

1. Introduction

Capital budgeting and financing are the two closely related major decision making areas of financial managers in modern time corporations. These decisions are supposed to maximize company's value for shareholders. The key factor in capital budgeting decisions is the company's Cost of Capital, since Cost of Capital is used as discount rate of the obtained cash flows from investment projects (Salavati and Rasaeian, 2007). On the other hand, maximization of firm value improves shareholder's wealth for realization of which an appropriate long term selection or composition of financial resources is very crucial. In a desirable capital structure, the employed financial resources involve little Cost of Capital and a greater rate of return. Hence, acceptance or rejection of proposed investment projects is a matter of the choice made for the best discount rate or the very Cost of Capital. In the meantime, firm Cost of Capital is a function of its capital structure. Thus, a change in combination of financial resources (capital structure) is expected to affect company's Cost of Capital and subsequently its value (due to acceptance or rejection of investment projects with positive or negative present value) (Izadinia and Rasaeeyan, 2009).

In the Iranian capital market, policymaking regarding financing methods lacks the necessary stability and the listed companies on TSE for different economic reasons have access to limited financial resources, yet new investment for development is the only way for survival of these companies and continuation of their operation and new investment requires adjustment or change of capital structure. Therefore, investment behavior and financing policies of these companies have to be investigated in light of the above mentioned limitations (Kaviani, 2011).

2. Capital Structure Theories

In regard to capital structure, different theories and models have been proposed, the most important of which are the Traditional Approach, the Net Income (NI) approach, the Net Operating Income (NOI) approach, Modigliani-Miller Theorem, the Tradeoff Theory, and Pecking Order Theory, of which the last two ones are among the modern theories of capital structure. According to the traditional model, there is an optimum capital structure and firm value increases

by an increase of financial leverage, implying a lower Cost of Capital for the firm with an increase of the debt portion in its capital structure (Kanani Amiri, 2005).

The Net Income (NI) approach, proposed by David Durand, states capital structure decisions are relevant to firm value and a change in its capital structure (through financial leverage) will have consequences for its total Cost of Capital and total market value. The other capital structure theory which is also proposed by David Durand, known as Net Operating Income (NOI) approach, suggests the degree of financial leverage has no effect on company capital structure decisions and any change in leverage would not affect company value and its equity market value. According to this approach, the company's Cost of Capital does not depend on leverage and firm value is not a function of its capital structure.

Franco Modigliani and Merton Miller by their famous article in 1958, while refuting the traditional approach, suggested that in the absence of taxes, bankruptcy costs, agency costs, and asymmetric information, and in an efficient market the value of a firm is unaffected by how it is financed. Thus company Cost of Capital is indifferent at any given degree of financial leverage. However, in the second theorem (1963), they stated that a firm Cost of Capital in presence of taxes would no longer remain invariable because with increase of debt ratio and as a result of the increased tax shield, its total value increases. Thus, with an increase of the firm debt ratio, its total Cost of Capital is reduced.

The Tradeoff Theory was developed following appearance of Modigliani-Miller second theorem and was focused on the benefits of debt financing due to the associated tax savings. A higher debt involves greater interest costs which are exempt from taxes, so as by a higher leverage, a greater tax saving is realized, resulting in a proportionally greater firm value (Kaviani, 2011).

And finally, the Pecking Order Theory proposed by two financial scholars named Brealey and Myers states that in light of wise decisions on investment (and not in light of wise decisions on financing) one can make a lot of money. Undoubtedly, this theory by no means denies the important role of "financing" but gives priority to investment. According to this theory, financing decisions should be made in accordance with the firm investment strategy and not vice versa (Mokhtari, 2001). Myers and Majluf (1984) maintain that the Pecking Order Theory explains decisions of companies in prioritization of their financing sources in a hierarchical order. From perspective of this theory, companies tend to finance their projects first from internal sources, then from the risk-free and secure debt, and lastly by issuance of risky equity as the external sources of

financing. This theory assumes the companies that face deficit in their financing will have to follow a pecking order of financing in the future (Shyam-Sunder and Myers, 1999).

3. Research Background

In their study, Zeinali and mohammadShilan (2011) report lack of significance in the relationship of capital structure with investment rate of return and earnings per share. The results of Panahiyan and Mojtahedi (2008) absence of a significance in the relationship of debt ratio with Cost of Capital and return on equity (ROE) meanwhile percent changes in net profit and business risk were demonstrated to be inversely correlated to debt ratio and per case dependent on (independent of) each other..

Izadinia and Rahimi Dastjerdi (2009) find debt-to-equity ratio is positively associated return on equity and positively and significantly correlated to Earnings per Share (EPS).

Lak (2006) profiting from a linear regression model investigates the impact of Cost of Capital on stock return, finds no significant relationship between the two variables. The findings of Kashefi (2011) suggest stronger correlation of changes in financial leverage with stock return for more heavily levered companies.

In the study of the relationship between capital structure and firm performance on the Egyptian stock exchange by Eldomaity (2005) divides capital structure of the firms into three categories of high, medium, and low debt level. The performance measures used in this study included Market Value Added (MVA), market to book value (M/B), and price to earnings (P/E). The results indicated that in companies with low debt, the short-term debt ratio was positively related to P/E. In addition, strong relationship was found between total debt ratio (short- and long-term debt ratio) and performance measures M/B and MVA, respectively. Ibrahim (2009) using three accounting performance indicators of return on equity (ROE), return on asset (ROA), and gross margin in the non-financial Egyptian firms finds a weak association between capital structure decision making and firm performance. The findings of Ghosh (2009) suggested the non-linear relationship of financial leverage with profitability and eventual increase in future value of the company. Majumdar and Chhibber (1999) in study of the relationship between capital structure and performance of the Indian corporations documented a negative relationship between debt level and company performance. Abor (2005) showed ratio of short-term debt to total asset (STD) and total debt to total asset (TTD) were positively correlated to the company profitability, whereas a

negative relationship was found between ratio of long-term debt to total asset (LTD) and profitability. Zeitun and Tian (2007) investigated the effect of capital structure on performance of the Jordanian firms and reported a negative relationship between debt level and performance of the firms Kuben Rayan (2008) in study of the assumed connection between financial leverage and firm value on a sample of 113 companies in Johannesburg of South Africa, using firm valuation measures ROE, ROA, EPS, operating profit margin (OPM), and Economic Value Added (EVA), documents a significant association between financial leverage and firm valuation measures (except EVA) in all the understudy corporations (except a few companies from certain industries, including hygiene care companies). Sanjay (2009) investigated the effect of financial leverage on Cost of Capital and valuation of 9 Indian cement manufacturing companies. He used Cost of Capital, P/E, and total market value (market value of debt and equity) as the dependent variables. His findings indicated absence of a linear relationship between financial leverage and Cost of Capital and presence of a positive correlation between heavily and slightly levered companies and their Cost of Capital. In addition, the results signified a weak correlation between financial leverage and P/E and no correlation between financial leverage and total market value of the understudy firms, implying that financial leverage was not likely to affect market value of companies in the Indian cement industry. Adekunle and Sunday (2010) report negative relationship of capital structure with financial performance measures ROA and ROE. Kaviani et al. (2012) in the study of the relationship between financial leverage and modern performance indicators SVA, CVA, EVA, MVA, and REVA of the firms from the Iranian automobile industry on TSE documented inverse and significant relationship of financial leverage with Eva and SVA, and no significant association between financial leverage and indicators MVA, REVA, and CVA in the understudy industry.

4. Research Hypotheses

First Hypothesis: there is a significant relationship between capital structure and Cost of Capital.

Second Hypothesis: there is a significant relationship between capital structure and Earnings to Price (E/P).

Third Hypothesis: there is a significant relationship between capital structure and free cash flow yield (FCF/P).

Fourth Hypothesis: there is a significant relationship between Cost of Capital and Earnings to Price (E/P).

Fifth Hypothesis: there is a significant relationship between Cost of Capital and free cash flow yield (FCF/P)

5. Methodology

5.1 Sampling And Data Collection

Using biased, non-random sampling, of the total population of the listed companies on TSE, 75 companies that met the following qualification criteria were selected as the research sample:

- a. Throughout the research period (i.e. between 2007 and 2011) the company shares have been actively traded on the stock exchange;
- b. The company's line of activity was not financial and investment;
- c. The company has been making profit during the understudy period;

The required data for the research literature and composition of the research theoretical background were gathered through a library research by consulting a variety of available sources both at library and in the Internet, such as books, dissertations, and published articles in scientific journals. The actual data for the research variables were gathered and processed using the information processing software and different Internet sites of the Iranian Securities and Exchange Organization (SEO). It should be noted that part of the research data was not presented in the body text of the financial statements and had to be retrieved from the notes to the financial statements of the companies.

5.2. Measurement of Variables

5.2.1 Yield Based Measures: the three Yield measures used in this study as the measurement criteria of the firm value are:

Earnings-price ratio (E/P) is obtained from dividing Earnings per Share by share market price and incorporates all the unknown factors (risk factors) associated to Stock Return. The shares with a higher earnings-price ratio create a greater expected return.

Free cash flow yield (FCF/P) which is obtained from dividing the company's free cash flow by its share price at the beginning of the period. Free cash flow yield in essence is the same as the Stock Return and is usually calculated by dividing per-share cash dividend by share price.

5.2.2 Financial Leverage: is the quotient of the firm's total debt divided by the firm's total asset. Debt ratio indicates the amount of the firm's asset acquired by debt financing. Financial leverage for each company is calculated based on book values of debts and assets. The theory of capital structure suggests market value to be used in calculation of financial leverage, yet most studies have used book value rather than market value, because book value is argued to be more objective. Stonehill et al. (1974) maintain that in financial management when it comes to deal with the issue of financial leverage, one should make more use of book value than market value.

5.2.3 Cost of Capital: includes Cost of Capital constituents which together make up the firm capital structure. Major components of capital structure are interest-bearing debt, preferred shares, retained earnings, and ordinary shares. Considering that each of the resources has its own expected rate of return and imposes a different cost, different calculation methods are applied to their associated Cost of Capital. Therefore, to find the company total Cost of Capital, first, the cost of each component is separately calculated and given the share of each element in the total capital structure, a weighted Average Cost of Capital (WACC) is calculated.

$$WACC = \left(\frac{D}{D+E} \right) k_d + \left(\frac{E}{D+E} \right) k_e$$

Where, D is total debt, E equity, K_e cost of equity, and K_d cost of debt.

5.2.4 Control Variable: prior research suggests a likely firm size effect on firm's performance, because larger companies due to possession of diversified resources can enjoy economy of scale and influence the results (Jermias, 2008). Hence, in this study, firm size likewise is held as the control variable calculated as the natural logarithm of Equity Market Value (EMV).

5.3 The Model

To investigate relationship of capital structure and Cost of Capital with Yield based valuation of firm, the following models are tested.

$$\text{Model 1: } WACC_{it} = \beta_0 + \beta_1 LEV_{it} + \beta_2 SIZE_{it} + \varepsilon_{it}$$

$$\text{Model 2: } E/P_{it} = \beta_0 + \beta_1 LEV_{it} + \beta_2 SIZE_{it} + \varepsilon_{it}$$

$$\text{Model 3: } FCF/P_{it} = \beta_0 + \beta_1 LEV_{it} + \beta_2 SIZE_{it} + \varepsilon_{it}$$

$$\text{Model 4: } E/P_{it} = \beta_0 + \beta_1 WACC_{it} + \beta_2 SIZE_{it} + \varepsilon_{it}$$

$$\text{Model 5: } FCF/P_{it} = \beta_0 + \beta_1 WACC_{it} + \beta_2 SIZE_{it} + \varepsilon_{it}$$

Where, E/P, FCF/P are the variables indicating value of firm i in year t , β_0 is the constant factor, LEV represents financial leverage (the independent variable) and the indicator of capital structure in firm i in year t , $WACC$ denotes weighted average Cost of Capital (independent variable) of firm i in year t , $SIZE$ represent firm size calculated from natural logarithm of the firm's EMV, and ε_{it} denotes random error coefficient. Note that for test of the first model, $WACC$ is held as a dependent variable.

6. Data Analysis

6.1 Test Of Correlation Between Variables

Table 1 represents the matrix of correlation between variables obtained from Pearson Correlation test at .01 and .05 significance levels.

Variables		E/P	FCF/P	LEV	WACC	SIZE
E/P	Correlation Coefficient	1				
	Sig. (2-tailed)	.				
FCF/P	Correlation Coefficient	.294**	1			
	Sig. (2-tailed)	(.000)	.			
LEV	Correlation Coefficient	-.133**	-.193**	1		
	Sig. (2-tailed)	(.010)	(.001)	.		
WACC	Correlation Coefficient	.009	.032	.009	1	
	Sig. (2-tailed)	(.864)	(.543)	(.864)	.	
SIZE	Correlation Coefficient	.094	.081	-.253**	.014	1
	Sig. (2-tailed)	(.070)	(.117)	(.000)	(.780)	.

** . Correlation is significant at the .01 level (2-tailed).
 * . Correlation is significant at the .05 level (2-tailed).

Table 1: The Results Of Correlations Matrix For Dependent And Independent Variables

The obtained results from Pearson correlation coefficient indicate a significant association between financial leverage and the Yield based value measures and absence of a significant relationship between Cost of Capital and the Yield based value. As is seen, firm size is not significantly correlated to the Yield based value measures. In addition, the results indicate a slightly inverse correlation between measures of Yields based value and financial leverage.

6.2. Test Of The Research Model

The first model using Durbin-Watson test examines the first hypothesis of a significant relationship between capital structure and Cost of Capital, the results of which are presented in table 2. Given the test statistic value (2.043) which lies between 1.5 and 2.5, the null hypothesis

suggesting absence of auto-correlation between errors (residuals) is confirmed, implying that a regression equation, if there is any, can be applied. In addition, using analysis of variance (ANOVA) it is made ensure of the model reliability. Considering that the obtained F (Sig.) value is greater than 0.05, the assumption of linear relationship between the variables is not confirmed. That is to say, the model is not reliable, implying lack of a significant association between capital structure and Cost of Capital.

Variable	B	Std. Error	t-Statistic	Sig.	Durbin-Watson
Consent	.173	.178	.976	.330	2.043
LEV	.026	.106	.250	.803	
SIZE	.009	.027	.333	.746	
R ² (Adj. -R ²)	.019 (.000)				
F (Sig.)	.070 (.932)				
Predictors: (Constant), LEV, SIZE					
Dependent variable: WACC					

Table 2: The Results Of The Analysis For Model 1

Table 3 presents the test results for presence of a significant relationship between financial leverage and *E/P*. Given the obtained F-value (Sig.) which is smaller than .05, the assumption of a linear relationship between the variables is confirmed. Thus, the model is reliable, and there is a significant relationship between capital structure and *E/P*.

Variable	B	Std. Error	t-Statistic	Sig.	Durbin-Watson
Consent	.184	.054	3.418	.010	1.968
LEV	-.071	.032	-2.199	.028	
SIZE	.010	.008	1.212	.226	
R ² (Adj. -R ²)	.21 (.016)				
F (Sig.)	4.086 (.018)				
Predictors: (Constant), LEV, SIZE					
Dependent variable: E/P					

Table 3: The Results Of The Analysis For Model 2

The below relationship suggests that one unit increase in the independent variable *LEV* results in .071 reduction in the response variable (i.e. *E/P*).

$$E/P = .184 - .071LEV$$

The obtained results from statistical test of the assumed relationship between financial leverage and FCF/P are presented in table 4. Considering the F-value (Sig.) which is smaller than .05, the assumption of a linear relationship between the variables is confirmed, i.e. the model is reliable and there is a significant relationship between capital structure and free cash flow yield. The correlation coefficient of -1.966 in the relation below indicates a significant inverse correlation between the two variables so that one unit increase in the independent variable *LEV* results in 1.966 units decline in free cash flow yield.

Variable	B	Std. Error	t-Statistic	Sig.	Durbin-Watson
Consent	.982	.938	4.641	.296	1.847
LEV	-1.966	.559	-3.809	.028	
SIZE	.093	.142	.654	.513	
R ² (Adj. -R ²)	.039 (.033)				
F (Sig.)	7.457 (.001)				
Predictors: (Constant), LEV, SIZE					
Dependent variable: FCF/P					

Table 4: The Results Of The Analysis For Model 3

$$FCF/P = -1.966LEV$$

Table 5 presents the obtained results from statistical test of the assumed relationship between WACC and E/P. Given the calculated F-value (Sig.) which is greater than the predefined .05 significance level, the assumption of a linear relationship between the variables is not confirmed. That is to say, the model is not reliable and there is no significant association between WACC and E/P.

Variable	B	Std. Error	t-Statistic	Sig.	Durbin-Watson
Consent	.116	.045	2.601	.296	1.832
WACC	.002	.016	.146	.228	
SIZE	.014	.008	1.212	1.813	
R ² (Adj. -R ²)	.009 (.004)				
F (Sig.)	1.1658 (.192)				
Predictors: (Constant), WACC, SIZE					
Dependent variable: E/P					

Table 5: The Results Of The Analysis For Model 4

Finally, the obtained results from statistical test of the relationship between WACC and FCF/P presented in table 6 indicate an F-value (Sig.) greater than the predefined .05 significance level.

Thus, the assumption of a linear correlation between the variables is not confirmed, i.e. the model is not reliable, implying absence of a significant association between *WACC* and *FCF/P*.

Variable	B	Std. Error	t-Statistic	Sig.	Durbin-Watson
Constant	-.929	.786	-1.183	.238	1.861
WACC	.163	.278	.588	.557	
SIZE	.218	.140	1.560	.119	
R ² (Adj. -R ²)	.007 (.002)				
F (Sig.)	1.404 (.247)				
Predictors: (Constant), WACC, SIZE					
Dependent variable: FCF/P					

Table 6: The Results Of The Analysis For Model 4

7. Conclusion And Suggestions

Assessing the relationship between Cost of Capital and capital structure on valuation of the firm is very crucial to a financial manager. A financially desirable capital structure can be assessed under specific assumptions and by understanding investors' perception and interpretation as well as their reactions to certain degree of changes in the financial risk.

In the current study, the obtained results from test of hypotheses, in the first place, indicate inverse and significant correlation of capital structure to the Yield based measures (i.e. E/P and FCF/P) and absence of a significant relationship between Cost of Capital and the mentioned measures. These findings contradict the Net Income approach according to which capital structure decisions do not lead to a change in Cost of Capital, because there is no evidence of a significant association between Cost of Capital and financial leverage, whereas in our case, Yield based value of the firm is reduced without a change in Cost of Capital. On the other hand, the results of the present research are consistent with the Net Operating Income approach which holds Cost of Capital independent of capital structure. And this is what we found in this study. However, contrary to this theory, in present study, changes of capital structure led to mutation of the firm valuation. In addition, comparison of our results with basic assumptions of the Modigliani-Miller Theorem (in presence of taxes) and the Tradeoff Theory reveals discrepancies.

Compared to actual findings from prior research, our results are consistent with those found by Panahian and Mojtahedi and found by Lak (2006), but inconsistent with the study results of Izadinia and Rahimi. Finally, the results of the present research, in view of the found inverse relationship between Cost of Capital and Stock Return, are consistent and in line with those reported by Majumdar and Chhibber (1999), Zeitun and Tian (2007), Sanjay (2009), Kuben Rayan (2008), Ibrahim (2009), Adekunle and Sunday (2010), and Kaviani (2012).

Based on the obtained results from test of hypotheses, the inverse relationship between capital structure and earnings-based valuation of the companies in the Iranian capital market can be ascribed to the recent privatization of the firms, since a large number of these firms are still struggling with issues associated to the public sector such as increased number of fixed assets and presence of the used-up and depreciated assets incorporated into the total asset, inadequate managerial skills, and superfluous employees which might negatively affect their value and performance. Another reason can be the high interest rate of bank loans in our country which has made debt an expensive source of financing.

In sum, the found negative relationship between capital structure and earnings-based value of the understudy firms is perhaps due to lack of an effective cost management, considering that financial leverage which helps optimum use of fixed financial assets for increase of profitability has not been fully taken advantage of, because no comprehensive cost analysis is adopted in these firms, so proportion of variable and fixed costs is not clear to the management, and the management due to lack of knowledge on cost behavior is not able to make use of financial leverage for increase of the firm value.

7.1. Suggestions For Managers

The managers of the production and manufacturing sector are recommended to profit from the suggestions of the Pecking Order Theory in decision making on their capital structure based on their own preferences, so as the firms would in the first place prefer to use the internally generated funds (and dividend) to finance their projects in order to avoid the problems caused by risky debts in investment, and the information asymmetry between managers and securities markets. Our suggestion to profit making companies is that, given their ability in generating sufficient proceeds, they had better finance their projects from the retained earnings and only when the internal funds fall short of financing their investments, they may then consider issuance of debt as recommended

by the Tradeoff Theory, i.e. these companies require having a target debt ratio, lest the company is not gradually deviated from its objectives, though occasionally, in use of financial leverage, and for an optimum financing, they are recommended to strictly follow the Matching Principle, by financing current assets with short-term debt and fixed asset with long-term debt.

7.2. Suggestions For Future Research

Finally, we expect future research to be specifically focused on the relationship of between Economic and accounting measures with Capital Structure and Cost of Capital in the stock exchange.

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