Study of factors affecting on the capital cost in Tehran Stock Exchange

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Abstract: The main objective of this study was to investigate the factors affecting the capital cost in Tehran Stock Exchange. In this regard the required information of 22 food and beverage companies listed in Tehran Stock Exchange was analyzed using panel data regression method from 2001 to 2011. Generally the results indicated that stock returns variables, company size, and ownership relationship have significant negative effects on capital cost and there was a significant effect between tax and capital cost.

Key words: Capital costs; Taxes; Debt; Stock return; Panel data; Food and beverage companies

1. Introduction

Decision- making and judgment in selecting the most appropriate method of investment with the aim of maximizing shareholders wealth are among the most important issues in financial management field (Niko Maram, et al., 2007). To this end, increasing proceeds obtained from investments and minimizing capital cost are considered two appropriate strategies. Knowing the capital cost always plays an important role in company decisions. And also access to appropriate cost rate has special importance in determining the optimal financial structure of companies and particularly in obtaining best results in the form of profit from operations and increasing stock price. Managers use capital cost in making decisions about capital budgeting, establishing optimal structure, managing capital flow and similar issues (Nasir pour, 2000). Assessing company cost has importance for mangers since they can assess investments projects and determine investing budgeting in this way.

The concept of capital cost is based on this assumption that the aim of company is to maximize shareholders wealth (Abassi, 2003). In addition since shareholders are considered companies owners, so they prefer to invest in companies which have higher efficiency. Therefore, it can be concluded that the companies which have less capital cost can easily provide requested return rate of investors. So companies that have higher capital cost and high risks demand a higher required return rate. Therefore, it can be concluded that the companies which have less capital cost can more easily provide the investors' requested return rate. Hence, the issue of capital cost is the minimum of return rate that getting it is essential to maintain the value of the company. In other words, the capital cost is the

return rate which that company must achieve regarding its investors to meet investors ' expectations and in order to provide long-term funding of the company. The lower the rate is, the value of the company would be higher and this makes the investors to invest more in the companies whereby the company's stock price would be higher (abassi, 2003). So, the importance of capital cost subject in academic issues is obvious to those who are interested in the financial field (Karimzadeh, 2004). Therefore, calculating capital cost has great importance for companies and one of the main fields of research in this regard is investigating some of effective accounting variables on capital cos. To this end, the current study is organized in five sections. Second section investigates the related research literature including theoretical foundations and previous empirical research. In the third section, the research methodology is presented in which the model employed in this study and the method of analysis are discussed. Section four discusses the empirical results of this study and the final section deals with the research conclusions and recommendations.

2. Literature review

2.1. Theoretical foundations

The traditional theory: the basis of this theory is that there always exists an optimal capital structure, and the company value can be increased by leverage. This theory suggests that the company can reduce its cost through increasing debt rate. Although investors can increase expected return rate or common stock cost, it can be neutralized by the benefits of application of cheaper debt and using more leverage. Investors will also increase the common stock cost to the extent that this increase could not be completely neutralized any more by cheaper interest debt. The

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main requirement in traditional approach is that capital cost relies on the capital structure and there is an optimal capital structure which will minimize the capital cost. This model is a combination of operating and net profit model. On the one hand based on net profit model, company value will increase by increasing the degree of financial leverage and on the other hand based on net operating profit, the company value is independent from capital structure. It is assumed that the common stock cost would increase increasingly with respect to the degree of financial leverage, while the debt cost would only increase after excessive use of leverage. As a result, the weighted average capital cost decreases because the increase in the common stock cost or the expected return rate of shareholders is not that much to compensate for using cheaper debt. Therefore, weighted average capital cost is starting to decline by reasonable use of leverage, but after a certain point shareholders' expected return rate will be more than the gains from debt, and the capital cost begin to increase and this process will continue until the debt cost increases. In traditional theory, the optimal capital structure is the point where the capital cost of that point is minimum (Hashemi & Sarkissian 2010).

According to Modigliani and Miller Theory (1958) who expressed two conditions for their theories, in their first theory which is known as no tax assumption in (1958), they argued that the company value cannot be raised by changing the capital structure, in other words, the capital cost is not affected by the lever. In their second theory which is known as considering tax assumption in (1963) they added tax to their model which in this case whatever company debt increases, it would have benefits like cheaper debt in financial resources or tax savings for company. These researchers indicated that in investigating the relation between capital structure and capital cost in conditions that there is tax, the companies which are indebted and since debt costs are among the acceptable tax cost and cause their debt cost to decrease, as a result total capital cost reduced and caused company increased.

One of the recent theories which have been proposed in relation to capital structure is trade off theory or static trade-off theory which based on it the optimal debt ratio of a company is provided by parallel costs and borrowing benefits. In other words, according to this theory the company is trying to balance among tax savings, profit, and different bankruptcy costs. However, there is still debate on the grounds that how much tax savings worth, and also which one of the related costs to financial issues is important. According to this theory, the company should adjust debt ratio and that much replace and change debt to stock and stock to debt in a way that company maximized the company value (Myers, 1994). From the overall conclusion of this theory, it can be said that this theory highlights the firm's optimal capital structure. This structure is available through a combination of different sources of financing that balances costs and obtained benefits of financing by debt. In addition in this theory, it is assumed that there is an optimal financial leverage ratio or objective, and the market would consider any deviation in this ratio as undesirable news either it is as an increase or a decrease. This optimal financial leverage can be detected through establishing balance between costs and obtained benefits of additional debt amounts. There are four general predictions such as bankruptcy costs, agency theory, tax, and financial costs in static equilibrium model. Due to the anticipated bankruptcy costs, the expected bankruptcy costs increase by declining the profitability of a company, and this increase leads companies to lower financial leverage. Furthermore, the higher profit fluctuations of a company are the more expected bankruptcy costs will be. Therefore, such companies use less debt to supply finance (Fama and French, 2002).

Based on Pecking Order theory (hierarchy), companies prefer internal financing to external financing and in the case of offering securities, prefer guaranteed debt securities to stock. In this theory, there is no specific combination of debt and capital because there are two types of capital: internal and external (foreign and domestic) that one is at the head of the hierarchy of preferences and the other is at the end (Myers, 1994). The observed debt ratio of each company reflects the total external financing needs of each company. Regarding financing companies, hierarchy theory believes that companies prefer internal financing; in addition companies regulate their desired dividend percentage based on their investment opportunities. Generally according to this theory, if the need to be financed out of the company is felt, companies will issue the safest securities. It means that at first they start with debt, and then possibly used securities with combined nature such as convertible bonds, and finally stock is the last used device. Preference theory well explains that why most profitable firms use less debt, because they meet their needs by using internal (domestic) resources and no longer need external money, but companies with lower profitability issue debt securities to finance themselves because their internal resources are inadequate, therefore, their financial needs are supplied debt. In addition according to this theory, managers have more information about financial condition and current and future performances of company compare to external investors and try not to turn to debt when the company is underperforming, because the probability of default and bankruptcy of the company is high (Chen and Rogers, 2005).

Based on a general conclusion of pecking order theory it can be said that in this model the defects of capital market are focused and it relates transaction costs, asymmetric information, and the company's ability to accept new investments with internal funds and resources. Although the preference hypothesis has always been experimentally verified, but lack of

theoretical justifications has limited its acceptance in scientific circles.

The concept of asymmetric information in determining the optimal capital structure was first introduced by Myers and Majluf (1984). They believe that executives make decision with the aim of maximizing shareholder wealth. Therefore, they avoid too much decline in stock value, unless its value transferred from old to new shareholders and become more than the net value of growth opportunity. This will lead to transacting the new shares with a lower price than the actual market value of the company. Therefore, awareness about the issue of new shares would directly be interpreted as a negative sign in such a way that current investors would own valuable stock (Myers, 1984).

According to market timing theory, it can be argued that stock return is negatively related to capital structure. Based on this theory after increasing stock price, companies turn to issuing stock because in this situation they can easily raise capital based on their own shares (Baker & Wurgler, 2002).

2.2. Research background

Omran and Pointon (2004) investigated effective factors on capital cost in Egypt Stock Exchange based on a sample of 119 companies with several models to measure the equity and capital costs. They used book and market values to present their own model and furthermore, to determine the effective factors on capital cost used the stepwise regression models. Regarding active companies in heavy industry, the private sector, commercial and financial risks was identified as one of the most important factors. Considering real estate sector and also contracting which have higher capital cost, the return rate of fixed assets was identified as a key variable. In food industry, liquidity was considered as one of the most determining factors. But ultimately no remarkable model to explain the capital cost was found in the service sector.

In another study Nikolas (2007) investigated that how company features affect the capital structure of Greek market using panel data from a sample of 19 companies in Athens market from 1977 to 2001. In his study he examined some company features such as firm size, quick ratio (or acid-test ratio), interest cost coverage ratio and market value to book value with capital structure, and found that there is a negative relationship between capital structure with an interest cost coverage ratio and expected growth and quick ratio and also the relationship between firm size and capital structure is positive.

Osmani (2002) tried to identify capital cost models and its effective factors, so that in addition to providing a reliable model for calculating the capital cost, investigated some of effective factors on capital cost including firm size, disclosing the type of industry. In this study, 86 corporations were selected as the sample from 1996 to 2011. Firstly the capital cost was calculated using five models such as average realized return rate model, capital asset pricing model, the ratio of benefit to cost model, Gordon model and the evaluation of accounting model *Edwards – bell – ohlson* (EBO), and then significant tests of the models were performed. The research results demonstrated a significant difference in calculating companies' capital cost using 5-fold models. Accounting evaluation model had higher relative credit to other models. Capital asset pricing model had the lowest credit degree and also the company size and industry type affected capital cost.

In another study which was done by JahanKhani and Yazdani (1994) the impact of effective factors on financial structure was investigated and the influence of industry type, company size, business risk, and operating leverage on the amount of using financial leverage of Tehran stock companies were evaluated. They concluded that industry type affected financial structure, but the company size, business risk, and operating leverage had no effect on financial structure.

3. Research methodology

In this study the statistical population included all active companies involved in the field of food and beverage production at Iran Stock Exchange according to the International Standard Industrial Classification (ISIC). The dependent variable or the main variable of this study is the weighted average capital cost of food industry or (WACC). The formula for calculating this variable is obtained from the sum of the average cost of common stock and debts cost:

$$WAcc = \frac{L}{L+E} kd(1-t) + \frac{E}{L+E} K_e^c \qquad (1)$$

To calculate debt cost (Kd) in this study, the rate of debt cost was considered as minimum guaranteed interest rate of Musharekaha Sukuk (bonds) in the time period of the study and this rate had almost no risk. Also according to the provisions of article 143 of direct tax act which notes that "companies whose shares are accepted for trading on the stock exchange are exempt from paying 10% of company tax if all transfers of shares have been done by a stock broker and has been registered in respective offices since the year of acceptance till the year that has been removed from the list of stock exchange. Therefore, the tax rate or t was considered 0.255 in this research with respect to the above tax exemption (Rezai, et al., 2010). Furthermore using Omran and Pointon model, the cost of common stock (K_e) was calculated as follows:

$$K_e^c = \frac{1}{P/E - \dfrac{e_0 - d_0}{e_0}}$$

Where Kec is the cost rate of common stock, P is the final price of shares during financial period; E is net profit per share at the end of financial period,

e_0 is net profit per share at the beginning of financial period, and d_0 is cash dividend per share at the beginning of the financial period.

Data presented in this study were examined from two different perspectives. These variables were selected among different companies on one hand and from the period between 2001 to 2011 on the other hand. In such cases the proposed solution is a combination of inter group and time series data and estimating the desired model on the basis of the new collection. If the sectional data extracted from different sectional units from various years set together, we will be faced with integrated data. The arrangement of data is done in two ways in this method: In the first type the data of a sectional unit are put together for T year and then this procedure will be repeated for the second sectional unit and then subsequent units. This data arrangement is called integrated data. The second type put sectional unit data together in each year in a way that this process will be repeated for the next years. Arranging data in this way is called "combined data". The arrangement of data was integrated in this study, and then the unit root test is used in order to make variables stationary.

Stationary tests are among the most important test to estimate a regression with reliable coefficients and stationary tests are used to prevent making artificial regression. There are different tests to investigate the stationary of examined variables for integrated data. To ensure that the results are not fake before estimating the model, the quality of stationary variables were investigated using IM, Pesaran and Shin (IPS) test. IM, Pesaran and Shin one unit root test is as follows:

$$\frac{\sqrt{N}\left[\bar{t}_{NT} - \mu\right]}{\sqrt{V}} \rightarrow N(0,1) \quad =_t\Gamma$$

Where Γ_t is IPS unit root test statistic. In this test null hypothesis is as follows:

$$H_0: \{\rho_i = 0 \quad i = 1, 2, 000, N$$

$$H_1: \begin{cases} \rho_i < 0 & i = 1, 2, 000, N\ 1 \\ \rho_i = 0 & i = N\ 1 + i, \ldots, N \quad ,0 < N\ 1 < N \end{cases}$$

Based on these assumptions, some sections can have a unit root. There is a possibility of getting spurious regression if the model variables are non-stationary. In this case if there is co-integration between examined variables, regression models can be estimated based on the variables level without any fear of being false (Khodadad Kashani, et al., 2013).

Then after examining the stationary of variables, it is determined that there is no need to consider the panel data structure or in other words considering the differences or special effects of companies or integrate data of different companies and then use it to estimate the model. Therefore, Lymr test is used to estimate an appropriate model to make decision about rejection and acceptance of equality of the firm-specific fixed effects and finally about selecting classic method or panel data approach. According to this test, if the calculated statistic value of significant level were smaller than 5%, then H_0 hypothesis will be rejected and rejection of the null hypothesis means that intercepts are different for sections or companies and using pooling method in this condition is incompatible and would not have any efficiency, therefore attention should be paid to the results of panel model. If the panel model is selected, to determine that whether the fixed effects or random effects method should be used to estimate the model, the Hausman test is used. Lymr test examines the following assumptions:

$$H_0: \delta_\alpha^2 = 0 \rightarrow Pool$$
$$H_1: \delta_\alpha^2 > 0 \rightarrow Random\ Effect$$

In this case the approval of null hypothesis means that the intercepts for sections (companies) are not different and using pooling method will be consistent and will have efficiency, therefore attention should be paid to pooling model results and finally the last estimates of the model will be done.

4. The analysis of the experimental results

The results of stationary test demonstrated that the examined variables based on IPS test were smaller than 5% for all variables of significance level both for fixed value and fixed value and trend. Therefore, none of the variables have a unit root, in other words the results based on the absence of a unit root variables indicated that variables are stationary or static. In this case, there can be no worries about the possibility of spurious regression to estimate the relationships between variables. The stationary variables are given in the following table:

Table 1: IPS unit root test results for variables related to the food industry

Statistic value t		Statistic value in level (*IPS*)		variable
Fix value and trend	Fix value	Fix value and trend	Fix value	
-6/92721	-9/20724	0/0000	0/0000	Capital cost
-9/21388	-8/89508	0/0000	0/0000	stock Return
-5/45816	-6/07026	0/0000	0/0000	Company size
-7/56692	-7/99684	0/0000	0/0000	tax
-6/54639	-9/18542	0/0000	0/0000	Equity ratio

Source: research result

After indicating stationary variables using Lymr f test, it is determined that whether special effects of companies are suitable or not? The results are given in the following Lymr f table:

Table 2: Lymr f test results for selecting combined approach

Test results(dependent variable of capital cost)	p-value	Null hypothesis (H_0)	model
H_0 is confirmed so combined or pooling method will be selected	17670/	Especial effects of company are not significant(pooling method is suitable)	Food and beverage industry

Source: research results

Since the calculated statistic of significance level (0/1767) is greater than 5%, H_0 hypothesis cannot be rejected. In this case confirming the null hypothesis means that the intercepts for sections (companies) are not different and then pooling method will be consistent and have efficiency; therefore attention should be paid to the results of pooling model. Finally the last estimate of the model which is given in the following table should be done.

Table 3: last estimation of regression model of panel data (minimized compiled square method

	coefficient	Standard error	Statistic t	Significance (Sig)
Intercept	185105/0	002408/0	87309/76	0000/0
Stock return	05-43e/-2	06-93e/6	505959/3-	0005/0
Firm size	005804/0-	000450/0	90214/12-	0000/0
Tax	08-48e/3	08-18e/1	938389/2	0033/0
Equity ratio	144126/0-	001161/0	1093/124-	0000/0
Determined coefficient	778566/0	**Adjusted determined coefficient**	778383/0	
Statistic F	983/4249	**Watson camera**	982205/1	

Source: research results

The above table demonstrates the results of estimating the model about the research model hypothesis for all years. In this table the determined coefficient is a criterion that shows the strength of the relationship between independent variable and dependent variable. The value of this coefficient indicates that how many percentages of the dependent variable changes are explained by the independent variable. In this model the adjusted determined coefficient is almost 77 %. It means that 77 % of the dependent variable changes are explainable by the independent variable. In addition, the related number of Watson camera model is equal to 1/982205 which indicates the absence of autocorrelation error in the model, and also shows a significant amount of (0.000) that the aforementioned regression model is correct with 99 % confidence and all regression is significant. According to the obtained results, it is observed that the obtained coefficients for stock return variables, firm size, tax, and equity ratio with 99 % confidence have significant relationship with capital cost dependent variable or in other words, significant level is smaller than 1% and absolute value is greater than 2. Also regarding the coefficient β, stock return variables, equity ratio, and firm size have negative and reverse relationship with capital cost dependent variable and on the other hand, tax variable has a direct and positive relationship with dependent variable.

5. Conclusion

In terms of financial management, the relationship between capital cost, capital structure, and total value of company is really important; because using capital structure can affect the company's total value. Given the particular assumptions and specifying the method of inference or assumption of investors and their reaction to the degree change of financial risk, optimal capital structure of the company can be determined. The most important result of this study can be summarized as follows:

According to the findings of this study and regarding to the first hypothesis, the result of study indicated that there is a significant relationship between the capital cost and stock return at the level of 99% which is negative and reversed. Since the stock return is the expected weighted return therefore, it is expected that capital cost decreases as the stock return increases. In this case when the expected return of the company increases, the company needs to issue common stock, bonds, or preferred stock. These are also part of the capital cost. According to the market timing theory, it can be argued that stock return is negatively related to capital structure. Based on this theory, companies turn to issue stock after the increase in stock prices, because in this situation they can easily raise the capital based on their stock. On the other hand, no

matter how high the numbers of issued stocks are, the interest rate given to the shareholders will decrease. The results of Jamshid Lak's study in investigating the relationship between stock returns ratio and capital cost indicated that there is no relationship between stock returns ratio and capital cost, therefore, and for this purpose the financial institutions and banks should take the utmost care about the subject of supplying finance to ensure the profitability of companies activities. But the results of this hypothesis are in agreement with Baker and Wulgar theory (2002). In the second hypothesis, the results indicated that there is a negative and reverse relationship between company size and capital cost at 99% confidence level. According to the static trade-off theory and considering the direct relationship between the assets and company size, companies that their assets are suitable bail for loan, and the majority of their assets are tangible assets such as: moveable assets, properties and equipments, use more loan and debt compare to the companies that their assets are intangible such as: royalties, goodwill, research and development expenses, establishment costs, etc., because at the times of financial difficulties intangible assets decrease value of the company more than tangible assets due to the repositioning and changing the condition. So it is expected that companies which have more fixed tangible assets and higher collateral value prefer borrowing to issuing stock in supplying their required finance. The results of this test are unlike the static trade-off theory. However, according to the pecking order theory, the greater the amount of tangible assets of a company is, the lower the lake of information asymmetry between management and external investors is and these companies are more willing to issue stocks. Thus, this theory predicts that there is a negative relationship between the size of the company with respect to its tangible assets and the costs of supplying finance. The results of this hypothesis are consistent with of the results of Jahankhani and Yazdani (1994) research and do not match with Nichols (2007) and Fama and French (2002) research results.

According to the third hypothesis, the results demonstrated that there is a significant relationship at a 99% confidence level between the capital cost and equity ratio which is the indicator of the amount of ownership of stockholders to all assets of the company; it means that how much of the total capital of the company is provided by company's owners. Thus, the debts ratio value is higher than 1 in this hypothesis which with respect to equation (1- debt ratio) = proportion of equity, the value of this variable is negative. In addition in this relationship with regard to debt ratio (total debts / total assets), total debts are measured to total assets. When this ratio is higher, it means that the greater use of debt in the capital structure would not be desirable for the company, and this means a reduction in the power of paying debts. Creditors usually prefer low debt ratio, because the high ratio means high

financial risk (left balance sheet risk) of the company and when company's financial risk is high, the probability of bankruptcy and loss on debt payments also increased, and this is why that creditors prefer lower ratio. So whatever the gains of the shareholders or owners of company are higher, capital cost will be lower, but since debts are used more in these companies, so the capital costs have increased. The results of this hypothesis are consistent with traditional theory and pecking order theory. However, the results are contrary to exchange theory or static trade-off theory and representation theory in which firms use less debt because increasing debt leads to possibility of bankruptcy at each level of debt. And also according to agency theory, there is a conflict of interest (Etemadi and Montazeri, 2013). No research has yet been done regarding the impact of equity ratio on the capital cost. Finally in the fourth hypothesis, the results indicated that there is a significant relationship between the capital cost and the tax ratio at 99% confidence level. Since the growth of the tax has the best effect on the capital cost, in the tax independent variable, debt has much higher increase, which is said capital in the companies would grow by increasing debt. Also according to the theory of Modigliani and Miller and assuming tax, it can be concluded that tax creates a tax shield for the company, and the more financial leverage is, the more additional tax shield will be provided for the company. Creating a tax shield means reducing the capital cost of the company against the firms that do not use loan. As a result, stock buyers prefer to buy the shares of companies that have lower capital costs and higher yields than non-leveraged companies. So the lever increases company value. Omran and Pointon believe that there is an inverse relationship between capital costs with tax to net profit before deducting tax, because the tax reduces investment rate and debt cost can also be reduced through the ability to deduct tax. In addition the results of March (1982) showed that there is no significant relationship between tax and capital structure.

Based on the research findings, the following suggestions are presented in order to improve and promote the relative advantage of Iran food and beverage industry.

1. Since supplying finance is one of the important issues for any company, therefore, it is suggested to the companies to improve the company's liquidity by improving their ownership structure and increasing concentration of ownership, because the positive effect that make on informing prices and efficiency of market potentially improve investors decision and also managers in order to reduce the costs of finance.

2. In this study regarding the negative relationship between stock return and capital cost, it is proposed that stockbrokers and financial consultants who have the responsibility of analyzing the financial condition of the companies in stock exchange and describing the company's future financial position to buy and sell the stock, consider the effects of other variables such as profit

fluctuations, growth opportunities, and the effect of companies value on financing costs and stock return to take better decisions about financial affairs of stock applicants on stock purchase and sale in securities market.

3 In this study, the effect of ownership variable on capital cost was examined. The results indicated that the excessive use of debt in the capital structure has increased the cost of capital. Therefore, it is recommended that companies' managers make decisions to use more from the properties of shareholders or owners of the company to supply finance in order to reduce companies' costs.

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