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The relationship between the capital cost and book value of assets and its net profit growth in companies listed in Tehran stock exchange

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A R T I C L E I N F O

A B S T R A C T

The purpose of this study is to investigate the effects of two factors: book value of assets and net profit growth on the capital cost of listed companies in Tehran Stock Exchange. Therefore, the companies' book value of assets was considered as a measure of the size and the geometric mean of net income growth in sample companies was used to assess the relationship between net profit and capital expenditures. 50 companies were selected randomly among 4 industries. The study period was from 2005 to 2011 and the research methods used in the study are library study and using historical data that were extracted from Tadbirpardaz software. Two hypotheses were tested in this study include: 1. the company's cost of capital and the book value of its assets are related. 2 - The company's cost of capital and the net profit growth are related. To test these hypotheses, the data of independent variables were collected from various sources and were classified, then the capital cost of the sample companies were calculated using the pattern of capital assets pricing model (CAPM). Using factor analysis, correlation coefficient and linear regression the relationship between the independent variables (book value of

assets and net profit growth) and the dependent variable (cost of capital) has been studied. The results show a significant direct and positive relationship between the independent variable capital costs of research.

1. Introduction

Financial executives have several tasks in order to maximize their profits and shareholder wealth and should be terminated to this important matter. Because cash flow is critical in an economic unit, therefore the most important duties of financial managers is financing. Two important sources of financing include investors and lenders that are each expected to have different interests (Kamal Abadi, 1997).

Investors expect to make a profit by investing in companies and having the right to vote as well as increased wealth through rising stock prices, on the lenders expect to gain profit regardless of the profitability of their company. So given that each of these two groups have different expected rates of return, identifying these rates and conditions that affect them for better capital structure is necessary and causes companies to move toward the goals of the acquisition of wealth (Ross et al, 1991).

In this paper an attempt to verify the two major factors affecting the expected rate of return of the different groups of financing, namely the capital cost.

1.1. Necessity and importance of research

Resources required to perform activities are provided in two ways: 1 - borrowing 2 – Equity. Therefore the investor is someone who invests his funds in one of two ways to achieve a rate of return subjective (expected). (Nezarat, 2011).

Now the important question is how long the investor is willing to continue investing? In other words, from an investor's point of view (which is assumed to always act in terms of economic logic and rational behavior) what are the most important variables affecting the decision regarding continuation or discontinuation of investment? The answer is that as long as investors are willing to invest their funds in companies that the investment rate is equal to the rate of return. Clearly, if the rate of return is less than the expected rate of return, he will extract his sources. (Kamal Abadi, 1997).

This study tries to identify the capital costs (the costs of financing needed for the company to incur) in a range of companies in Tehran Stock Exchange. Also in this research, the relationship between two independent variables described above, and the cost of capital is determined using the historical data.

The basic objective of the research is to explain the elationship between capital cost and book value of assets and net profit growth of listed companies in Tehran Stock Exchange.

2. Review of literature

2.1. Definition of capital cost

Capital costs have been considered from different perspectives with the same sense; these concepts are closely related to the expected rate of return. Expected rate of return is defined as a minimum rate of return that encourages investors to purchase a property. The cost of capital is the minimum rate of return expected by investors, owners and shareholders to compensate for the risk being incurred. The cost of capital is the opportunity that the management should expect in the location of each new investment (Nezarat, 1390). Cost of capital is the market expected rate of return for the release of funds for a specific investment (Pratt, 2002).

2.2. Determining the cost of financing

The cost of capital used by the firms is divided into two parts (the obvious cost) and expenditure (non-obvious). Obviously cost is a cost or rate of return that is paid to the company's financing providers.

The cost depends on the amount of funds used by the company and goes up with the increasing funds. But non-obvious costs do not increase until the funds are not invested or applied yet. These costs are independent of the funding source. So t can be said that the non-obvious cost is the opportunity cost to use the funds. Knowledge of how to estimate the rates of each type of financing sources is needed to calculate and determine the cost of financing. (Kamal Abadi, 1997).

2.3. Financial policy and cost of capital

It is clear that a particular combination of debt and equity used in a company, or its capital structure, is a variable of management. It is assumed that the company has a constant ratio of debt to equity (D / E). The ratio D / E shows the capital structure of the company. The total capital cost of a company shows the required rate of return of the total assets. Assuming that a firm uses debt capital and equity capital, the total costs of combinational capital will be from the rates of return required to compensate for the cost of capital (expected rate) of creditors and shareholders. In other words, the cost of debt capital and the cost of capital of a company reflect its cost of equity capital (Ross et al, 1991).

Capital cost and its components

The estimated cost of capital depends on the company and its capital structure. If a company has debt and preferred stock in its capital structure, its cost of capital will be equal to the weighted average cost of capital components.

wacc = wdebt. (1 - tc) rdebt + wpreperred. rpf + w common stok. r stoks

Where:

Wdebt = d / v Ratio of debt to total value of company

Tc = company tax rate

The cost of capital is the cost of equity capital for a company that has not debt and preferred stock in its capital structures (i.e., through common stock of financing). (Kashefi, 2003).

2.4. Unadjusted weighted average of capital cost

In this study, E (the stock) is the company's stock market value. Market value is achieved by multiplying the number of shares of company stock at a price per share. Similarly, the D is used instead of the company's debt market value. To calculate the long-term debt of market price, a bond is multiplied by the number of bonds issued. If there are debt securities for the company that that are not traded in the market (i.e. has been purchased by an insurance company), the return of similar bonds that are traded in the market must be used to calculate the market value. In the case of short-term debt, it is necessary to note that the book value and market value are almost the same; therefore the book can be used as an estimate of its market value.

V = E + D

If we divide both sides of the equation to V, the percentage of capital from each component debt and equity can be calculated: % 100 = E / V + D / V. These percentages are known as the capital structure weights. Now the weights of constituents of capital (percentage of equity and debt) and the expected rates of return (cost of debt and equity) are available, thus the total cost of capital can be calculated using these data. Rates of return on equity and debt are multiplied by the weights of each, and the results are added together.

Wacc unadjusted = {E / V} × RE + {D / V} × RD

Where RE and RD are respectively the rates of return on equity and debt.

The investment rate of return of the company must be to the extent that provides the specific cost of total capital resources (Jahankhany and Parsaeian, 1995).

2.5. Company size

One of the structural and internal factors of companies which affect the financial structure and profitability is the book value of assets. The greater is the book value of assets in a company, the more obvious are the instructions, procedures and organizational procedures. Budgeting is considered formally and discussed as a necessity and an independent unit in the organization undertakes the responsibility for drafting the final budget because the company is large enough to permit the establishment of such a unit. In addition, the budgeting unit experts are skilled enough to predict the realities according to the

company's facilities and the formulation of the organization's structure. On the contrary, the smaller are the companies, the more difficult is the access the capital markets and the markets consider lower credits with high interests for these companies. Due to the high cost of forming independent units for planning, budgeting, monitoring and correcting deviations is almost impossible and companies' facilities do not employ the experts with the required facilities. One reason that companies with smaller market values earn greater returns is that they have higher discount rate than larger companies. In other words, they are more risky and because of the higher risk-taking than larger companies, they have greater efficiency or returns and also pay more benefits. Book value of assets from content variables that are within the organization and environment are separated from the external factors. Size of book value of assets determines the amount of work the company does and some factors such as sales levels, the amount of assets, number of personnel, etc. are used as the indicators of the size of the book value of assets (Zamanzadeh, 2002).

2.6. The amount of assets

In most studies which the researchers conducted on the company size, such as Martin (1997), the amount of assets is used as an indicator of size, because determining the size of assets is an important tool to understand the company's size. Based on accounting standards, the valuation of assets is possible in various ways such as the method of replacement value, fair value, book value (historical cost). Obviously, the use of each method has its own advantages and disadvantages; therefore we must seek a method that has the most advantages and the least disadvantages. Based on traditional accounting, the use of historical cost method (book value) is common due to the high degree of objectivity and authority over other methods. However, using this method has less relevance degree because the book value is related to previous years, since the other methods of valuation of assets are not considered in Iran only the method of book value of assets can be used. Martin, in his research, used the book value of assets s an indicator of company size. (Nezarat, 2011).

3. Research background

The previous studies in Iran related to the subject of research include:

"Identification of the capital cost model and its influencing factors": The study was conducted by Qasim Osmani (2002) with the supervision of Hossein Asadi at Tabatabai University to defend the Ph.D. accounting thesis. In this study, the performance of different models of capital cost has been compared to each other using statistical methods to choose the best model. The models examined in this study include

Rates of return achieved, adjusted rate of return achieved, dividend growth, capital asset pricing and evaluation based on accounting numbers. In addition, using correlation analysis and regression, the relationship of four factors of company size, debt ratio, the level of disclosure, type of industry and the cost of capital calculated by above models has been measured.

"Estimating the cost of capital for companies listed in Tehran Stock Exchange": The study was conducted by Nasrollahi (2000) with the supervision of Morteza Gharehbaghian at Tarbiat Modares University to defend the Ph.D. economy thesis. The results of this study indicate that the relationship between cost of capital and financial leverage for firms listed in Tehran Stock Exchange is a linear inverse relationship.

"The effect of capital structure on the cost of capital and return on equity in capital market in Iran": The study was conducted by Mohseni Dimna (1998) with the supervision of Jahankhani at Imam Sadiq University to defend the Master's thesis. The purpose of this study was to clarify the relationship between cost of capital and expected returns on equity with debt of listed companies in Tehran Stock Exchange and predict the behavior of investors in the market to meet the rising debt of listed companies.

"Increased investment and its impact on cost of capital and rate of return of listed companies in Tehran Stock Exchange": The study was conducted by Kardan (1995) with the supervision of Noroush at Tehran University to defend the Master's economy thesis. He seeks to answer whether this escalation increase of shareholder wealth is due to the capital increase of positive changes in the company's profits or is the result of speculation and misconceptions and lack of knowledge of investors from the data content of raising capital.

The previous studies abroad related to the subject of research include:

The study of Moore and College entitled "explaining the effect of capital assets pricing model size" (CAPM) that is widely accepted has been developed by Sharpe (1964), Lenitz (1965) and mucin (1966). It suggests a simple linear relationship between expected return and its risk, but the recent evidences suggest that other factors have an important and lasting impact on stock returns. Basu (1977) found that the ratio of price to earnings (P / E) and adjusted returns are associated with each other based on risk. The main focus of this study is the relationship between the size of a company and its stock return. The findings of Banz (1981) showed that the size and return of a company's common stock are inversely associated with each other. While it seems that the results of Banz are accurate and his models can meet the possible econometric problems. He failed to provide a theoretical basis for this relationship. Banz stated that size may represent other factors that have not been tested but are correlated with the size. This is because the second test is also done in this study and the first test is done to determine the effect of the sample. Then the artificial interacting variables were used to control the differences in how large big and small companies got influenced by other factors. If artificial variables have significant differences in the influenced small companies by certain factors compared with large companies, so one step will taken toward explaining the anomaly.

Effect size has special meanings for both the CAPM model and the efficient market hypothesis. It is assumed that the expected return of an asset is a function of price variance. This figure is commonly referred to as beta and is the synonym of risk. This relationship is linear and positive. Thus it is said that high risk has high efficiency. In this case, some hypotheses were offered when Sharp (1964) and Lenitz (1965) developed CAPM, First, they assumed that there will be a constant composition of risky and without risk assets in a investment portfolio, the second assumption is that all investors can borrow or lend money at the risk-free rate.

Banz's findings are inconsistent with the efficient market hypothesis. A market is called efficient capital when it fully and correctly reflects all the information related to the prices of bonds. Therefore, gaining economic profit by trading based on such information is impossible. This implies a common sense of mankind. A sign of exceptionally high profits will attract investors and it will increase the demand for securities, and securities' prices will increase, resulting in additional profits will destroy. Since the size of a company is considered as the public information, buying stocks based on company size should not lead to higher profits.

"Valuable stock versus growth stock: The International Evidence": The study of Fama and French (1999) showed that in the world markets, the stocks which have the ratio of book value to market value (B / M), the ratio of earnings to price (E / P) or the ratio of cash flow to price (C / P) (these stocks are called VALU STOKS) have a higher growth stocks. The two researchers studying data from 1975 to 1995 in exchanges of America found that the difference between the average yield ratios of book value to market value of the portfolio is up or down 7.68 percent and it were true in twelve of thirteen major markets under study. They believed that the CAPM model could not justify that such performance is due to the aforementioned ratios.

Studies conducted by the two researchers in the emerging markets have confirmed the results of developed markets. Thus, the stocks of small companies had higher average returns than stocks in large companies. Fama and French argued these excess returns are due to the high ratios and is the compensation of the risk that the CAPM model has ignored.

Penman (2010) described how the fundamental risk (risk that an investor may incur as a result lead company) can be solved in some parts of the economy. Two essential components of fundamental risk (the risk of not obtaining the expected return and risk of not gaining the expected profits remaining). Thus activities of companies (operational and financial) are those which make the cost of equity and risk of capital. Based on this reasoning, he developed a conceptual analysis of the risk factors which are in line with the traditional analysis of accounting return on equity.

Gebhart Lee and Swamnisan (2001) in a study entitled "The implied cost of capital" showed that the market beta alone cannot show the sectional differences in risk, also the financial leverage is positively related to the risk premium and investors show more risks for companies with higher financial leverage.

The study of Omran and Jay Pointon "determinants of capital expenditure by industry in an emerging market: Evidence from Egypt": This study was conducted in The Egyptian market based on a sample of

119 firms. To measure the cost of equity capital and total capital costs, a number of models have been used as well. The cost of capital has been calculated based on the book value and the market value. In this study, the cost of equity capital is calculated about 12.5 % and the total cost of capital is calculated about 12 %. To identify the determinants of capital costs, multiple regression models were used. In conclusion, this study found that the overall growth and size are important in determining the cost of capital. In the case of companies that are actively traded, and the companies that are active in heavy industries business and financial risks are determinants. In the part of real estate sectors that have high capital costs, placing fixed assets is another key variable. In the food sector liquidity is one of the important determinants but in the service sector, there is no satisfactory model to describe the cost of capital.

In this study, like most studies the cost of capital is calculated into two components of equity capital and the cost of debt. In spite of these two researchers, the simplest model that can be used to calculate the cost of capital is the (inverse price-to-earnings ratio) and this is usually when the company has fixed incomes that can be distributed as profits and dividends. That part of reinvest that comes from stock issuance should have the rate of return equal to the cost of equity capital and all the details have to be transferred to shareholders. These cases form the basis of the first model and are only used as a starting point, although there is no reason for the constant future revenues, especially for companies that have growth opportunities.

The two researchers, although know the CAPM model as a good model for calculating the cost of equity capital but have ignored the application of this model since there was no historical information as time series in the Egyptian Exchange to calculate the beta .

4. Research hypotheses

Hypotheses can be stated as follows:
The cost of capital and the book value of its assets are related.
The cost of capital and its net profit growth are related.

5. Materials and methods

The purpose of applied research is the development of practical knowledge in a particular field. In other words, the applied researches are directed towards the practical application of knowledge and its results will be used by the Stock Exchange, commercial banks, credit institutions, potential investors, all teachers and students in related disciplines, companies and organizations.

This study is descriptive based on data collected from surveys. Descriptive studies can run solely for identification of the situation in order to assist the decision making process. In terms of different categories of descriptive studies, the present study is correlation. In correlation studies, the relationship between different variables is determined using a correlation coefficient. The purpose of correlation research is the study of changes in one or more variable, with some changes in one or more other variables. The collected data were classified using Microsoft Excel based on variables under study. The final analysis was performed using SPSS 18 software and Eviews 7.

5.1. Statistical population

The population of this research is the listed companies in Tehran Stock Exchange, with the exception of the following items:

They should have been accepted on Tehran Stock Exchange before 2005 and they should have not been removed from the listed companies.

According to the different nature and classification of items in the financial statements of investment and financial intermediation companies compared to manufacturing firms, the investment and financial intermediation firms were not considered. The items in the financial statements in investment companies may be affected by the investee companies. Due to the necessary calculation of research variables and testing hypotheses about the companies, the required information must be available.

6. Data analysis

According to this model that has both the temporal and spatial dimensions, the econometric method of this study is panel data regression which is described below. Various tests can be used to detect the presence of autocorrelation. In this investigation, Durbin- Watson test is widely used in the investigation. This test is based on the assumption that the errors of the regression were produced with a auto regression process that have been observed at equal intervals. If the test statistic values are between 1.5 and 2.5, it will indicate the lack of correlation between the independent variables.

Normality of variables is important so that the statistical methods are ranked with the establishment or non-establishment of this assumption. Thus under normal conditions, parametric test are used and otherwise non-parametric tests are used for data analysis. Regression was used in this study and one of the main assumptions of regression is that he dependent variable is normally distributed. In other words, if it is normal the regression can be used and if it is not normal the regression cannot be used. So start using the Kolmogorov – Smirnov test, the normality of the dependent variable was analyzed. Then, according to test results, the appropriate statistic test was selected to test the hypotheses.

7. Results

One of the main advantages of using descriptive statistics is o summarize large amounts of information. Using descriptive statistics and indicators used including the central and dispersion parameters, an appropriate information obtained from the used variables through which the distribution of that variable can be determined.

In the following, based on the values of t-statistics and significance level, the rejection of approval of any of the research hypotheses was tested. For better understanding, the research hypotheses were stated along with the statistical hypotheses and questions. Finally, the summary and interpretation of the test results were presented.

Table 1
The first hypothesis test results.

Is there a relationship between the capital cost and the book value of assets of a company?		question
There is not a relationship between the capital cost and the book value of assets of a company.	Null hypothesis	The first hypothesis
There is a relationship between the capital cost and the book value of assets of a company	Hypothesis one	
H0: $\rho=0$	Null hypothesis	Statistical hypotheses
H1: $\rho\neq0$	Hypothesis one	

According to Table 1, the calculated significance level is less than 0.05 (Equal to 0.0178), the null hypothesis is rejected. In other words, the t-statistic is equal to 1.318426 that the null hypothesis is rejected. Since the value of this test and the coefficient of the independent variable is positive, the size of the company at the confidence level of 95%is positively related to the capital cost of manufacturing firms. Thus the book value of assets in the regression model is significant. So one of the independent variables in the regression model is the book value of assets and its coefficient is 0.013 819.

According to Table 2, the calculated significance level is less than 0.05 (Equal to 0.0409), the null hypothesis is rejected. Since the coefficient value of the independent variable is positive, the net profit growth at the confidence level of 95% is positively related to the capital cost of manufacturing firms and the research hypothesis is confirmed. Thus the net profit growth in the regression model is significant. The test result shows that the t-statistic is equal to 1.189356 at 95% confidence level, the null hypothesis is placed the area of null hypothesis rejection. Due to these issues, the growth in net profit is significant as independent variables in the regression model and the coefficient of the independent variable is equal to 0.021419.

Table 2
The second hypothesis test results.

Is there a relationship between the capital cost and the the net profit growth of a company?		question
There is not a relationship between the capital cost and the the net profit growth of a company.	Null hypothesis	The first hypothesis
There is a relationship between the capital cost and the net profit growth of a company	Hypothesis one	
H0: ρ=0	Null hypothesis	Statistical hypotheses
H1: ρ≠0	Hypothesis one	

The final model for this hypothesis is as follows:

WACC = β0 + β1LGASSETit + INCOMEit

Estimation Command:

LS (CX = F, COV = CXWHITE) WACC C LGASSET INCOME

Estimation Equation:

WACC = C (1) + C (2) × LGASSET + C (3) × INCOME + [CX = F]

Substituted Coefficients

WACC = 0.233642 + 0.014729 × LGASSET + 0.022518 × INCOME + [CX = F]

8. Findings

The purpose of this study was to investigate the relationship between the cost of capital and the book value of assets and net profit growth. To calculate the cost of common stock through the CAPM model, the companies' beta was calculated based on the information on prices and yields of sample companies and market in 84 months. Tax rates were identical for all firms. With respect to the issue, the debt ratio in the capital structure of firms makes a difference in the overall cost of capital.

The results showed that there is a direct positive relationship the cost of capital of firms with the book value of assets and net profit growth. Since the data are as panel, the panel regression results show that correlation coefficient model is 85%. Also, because the F-statistic is greater than its value at the critical point, namely since the significance level of the statistic is less than 5%, we can conclude that the model is significant.

Coefficients of these variables in the regression model is respectively 0.014 729 and 0.022 518. These numbers indicate that the capital costsis changed to 0.014 729 for every one-unit change in the log of the book value of assets and is changed to 0.022 518 for every one-unit change in mount of net profit growth (this is the ratio obtained by dividing profits by total assets).

According to the calculated t value for the logarithm of book value of assets equal to 1.318426 or significance level calculated for this variable equal to 0.0178, we can conclude that there is a significant relationship between capital cost and book value of assets. Coefficient of the logarithm of book value of assets is not equal to zero in the model. Therefore, the null hypothesis is rejected. In other words, the hypothesis is confirmed and there is a significant relationship between the cost of capital and the book value of assets. The next step is to determine the positive or negative relationship and consider the coefficient of correlation between the variables in the model due to the t sign. Since this is a positive sign, so we can say that there is a direct significant positive relationship between the cost of capital and the book value of its assets.

The second variable of e regression model is net profit growth. The calculated t value for this variable is 1.189356, and the significance level is 0.0409. Given these results, we can say that there is a direct relationship between the company's cost of capital and net profit growth and the net profit growth coefficient is non-zero in the regression model. As mentioned above, to infer a positive or negative relationship, the t sign in the regression model should be considered. Since the sign of the net profit growth coefficient in the regression model and t sign are positive, so we can conclude that there is a direct significant positive relationship between the cost of capital and net profit growth. Thus, the results

indicate that both hypotheses are confirmed in this study and there is a significant and positive relationship between the capital cost of the book value of assets and net profit growth.

9. Conclusion

As stated above, the hypotheses test results indicated the existence of a direct relationship between the two variables of book value of assets and net profit growth with capital costs. This relationship is direct and positive. Accordingly, we achieved the following results:

Calculation of the data related to the years 1995 to 2011 show that the bigger is the size of the company in Tehran Stock Exchange, the more is the rates of return expected by shareholders of the company.

The results based on data for years 1995 to 2001 shows that the more is the profits of listed companies in Tehran Stock Exchange, the more is the rate of return expected by shareholders.

Fama and French in their study concluded that smaller firms have a higher cost of capital and this especially applies to the companies whose shares are actively traded on the Stock Exchange.

However, the research conducted in Tehran Stock Exchange shows that larger firms have a higher cost of capital. The results of three international researches suggest there is a direct correlation between the growth in net income and capital costs in the companies, although the coefficient of determination for this relationship was low.

By comparing the results obtained in this study with findings in the above we find that the relationship between the capital cost and book value of assets of the companies in Tehran Stock Exchange, is on the contrary of results of the studies on the Stock Exchange of other countries. However, these findings are consistent with other research conducted in Tehran Stock Exchange. Perhaps this difference is due to the difference in the book value of assets. According to the inflation rate in Iran, the book value of assets in the companies is very different from the fair value of the market. In other words, if firms re-evaluate their assets in these economic conditions, the book value of assets for companies will increase especially in large companies. In that case, the results may be different.

About the net profit growth and its relation to capital costs, the results of this study correspond with the findings of Fama and French and the capital cost of the company will increase with the net profit growth.

10. Suggestions

It should be useful for those involved in financial matters that the growth in net profit will be in line with the increase of rate of return expected by investors. Moreover, it seems that the o increase or decrease of the company's size will not change the cost of capital or at least according to the calculations in this study and based on data related to the 7-year period (2005 to 2011) in Tehran Stock Exchange, the existing relationship is on the opposite of the relationships found in other foreign studies and based on reducing the cost of capital in the case of the company's increased size.

Knowledge of such relationships will be helpful to investors and market participants to choose the appropriate portfolios. The remarkable matter is the low rate debt. If we do a comparison between the rates obtained from computing research, we will see that the receiving loans rates of companies are generally much lower than the common stock cost. Therefore, the capital costs can be reduced by additional financing through loans with low interest rates. The financing should be in such a way that the capital structure be optimized, in other words the rate of financing through debt and the rate of financing through equity must be balanced in order to optimize the financial structure and minimize the cost of capital.

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