Reviewing the Relationship between Risk Management and Capital Structure in the Entire Accepted Companies in Tehran's Stock Exchange

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Abstract

The aim of this research is reviewing the relationship between risk management and capital structure in the entire accepted companies in Tehran's stock exchange. For this matter 239 companies from 33 different industries were chosen as statistical sample. Research method is descriptive-measurement and the relationship between measures of capital structure and risk management was calculated by Spearman correlation and analyzing the variance of Croskal-Wallis for the sample companies in the period of 6 years (2005 till 2010). Systematic and non-systematic risks were used as measures for risk management. The results of research obtained from Spearman correlation test shows that there's a meaningful positive relation between systematic and none systematic risk and the capital structure of the companies. Also the statistical analysis using analytical variance of Croskal- Wallis shows a meaningful difference between high and medium average crow-bar (lever) and companies with low average crow-bars (levers) in the systematic and none systematic risk situations.
Keywords: *Systematic Risks, None Systematic (Non- Systematic) Risks, Risk Management, Capital Structure*

1. Introduction

Financial theories assist in choosing a combination method for effective financial providence for the company's value (Eriotis; 321, 2007). Modigliani and Miller (1958) are pioneer theoreticians in the field of capital structure. Their theory was the basis of scientific debates related to capital structure and their composition (Mayers; 81, 2001). After Modigliani and Miller's theory which did not clarify the

relationship between company's value and effects of capital providence in some limiting conditions, capital structure was extended by some theories and practical assistances (Viviani; 2008, 172). Literature regarding the capital construction is defined in three theories; parallel static theory, pyramidal (hierarchy) and free cash flow each of which have different description for company's financial providence (Tarek:; 25,2007).

Based on parallel statistical theory, companies choose desirable capital structure by comparing taxes, profits, debts, litigation fees, costs of representations and debts and normal shares. In reality debts have less information than normal shares. This has been stated by Modigliani and Miller (1976), Jensen and Meckling (1976) and Mayers (1984). So the financial crow-bar of costs of investing becomes minimum and the value of the company becomes maximum. In hierarchy theory due to the asymmetric information of people inside the organization who have confidential data's and the outsiders the companies prefer to use internal sources first and in the later stage use debts and finally the normal shares of investors. The ratio of debt to time is related to the degree of information asymmetry on the capacity of financing and on various limitations of companies for sourcing finance. So in hierarchy theory the financial lever, previous profit and investing opportunities of the company are reflected (Viviani; 172, 2008). In free cash flow theory it's assumed that the debt has static obligation (interest of the debt and its original amount) which will be paid by the company in the future. These obligations are assumption opposite to owning free cash flow (if available), so it will restrict the usage of the financial sources for the managers (Tarek: 25, 2007). Each three defined theory has a known meaning that has its own suggestions and theories (Mayer; 83, 2001). In reality the three theories cannot provide a clear description of the repetition of capital structure, this means that the companies can choose strategies of capital structure that has good conditions. When situation changes in a commercial unit the financial sourcing decisions and strategies can change by another theory (Tarek: 25, 2007). Although some other theories such as representation theory (agency theory) has been considered. The literature of the companies regarding the changes due to capital construction may increase the degree of their risks. Based on representation theory, the shareholders prefer projects with higher risk levels which are in contradiction with the likes of providers by the method of debt (Tarek: 7, 2008). Using short term debt will decrease this attitude towards representation. So this decrease depends on the degree of the risk. This refer to times of insecurity of risks for companies which need definite permanent changes in their capital structure for opposing issues of representation (Leland and Toft; 990,1996). The representation issues refer to the need of having knowledge by investors and managers regarding the effects of change of capital construction on the degree of systematic risk (Hamada; 436, 1972). If the information's are asymmetric the companies may prefer to source finance by debt instead of sales of shares (Mayers and Majluf; 189, 1984).

This research inspects the relationship between capital structure and systematic and non-systematic risks. Indeed the question of this research is: what's the relationship between systematic and non-systematic risks and the capital construction.

2. Theoretical Literature and Research History

The relationship between yield and risk has been confirmed by researches of different researches. Risk is one of the specifications of yield. In the modern financial management logical balance between yield and risk is a main basis.

Quantifying the risks was done first by Marquitz. Marquitz portfolio theory tries to define the behavior of investors based on two parameter of average and variance of distribution of yield (as measures of yield and

risk) In this framework, the behavior of investors have maximized the desirability function which is related to the average and variance of yield portfolio.

If the theory of portfolio and its assumptions is accepted the relationship between risk and yield of various assets are defined by risk balance pattern and yield the most famous of which is pricing the capital assets. Theory of pricing capital assets were described by Sharp (1964) and Lintner (1965). Sharp provided a new balance model for pricing capital assets with which the assets with higher beta has more yield. Sharp model is a one factor pattern for the market yield factor which tries to ease the calculations for defining the risk and yield of assets.

The relationship between the capital structure and the company's value has been subject of debates noticeably and in the previous decades have caught the attention of a lot of researchers (Abor; 2006). Modigliani and Miller were two of these researchers who were pioneers in theoretical science of effectiveness of capital construction on value of companies. They stated in their first theory that if taxes did not exist the markets are efficient. So the capital construction and the decisions of sourcing finance do not have any effect on cost of investment and market value. In their second suggestion they claimed that the interest payable for debts decreases the tax so the cost of debt is less than the cost of investment (Karadeniz and et al: 2009). After the theory of Modigliani and Miller more profound researches were performed for the content of capital structure and several theories were founded (Eriotis; 2007). For example the first period of development of hierarchy theory was followed by research of Donaldson (1961). He studied big companies as samples and showed that mangers severely rely on internal income and restrict external deposits unless they need increase of cash flow. For external finance the managers avoid issuance of new shares. The results of Donaldson research were described by hierarchy method of choosing financial sourcing by Mayers and Majluf (1984). In this hierarchy method companies prefer to use their internal cash at first stage (such as undivided profit) and then use debts and at the final stage publish normal shares for the remaining investment needed (Vesalius and et al; 2009). With static parallel theory which is based on litigation and representation costs the increase in the debt level increases the litigation costs and representation costs and in result decreases the value of the company. In whole several studies have taken place in empirical content in which capital construction of companies are related to factors and elements such as development opportunities, share of immovable assets (obvious), rate of effective taxes, coverage of taxes for other matters but debt, company's size, profitability and free cash flow (Karadeniz and et al; 596, 2009).

Lara and Mesquita (2003) have inspected the relationship between the measures of capital structure such as: short term debts, long term debts and rights of shareholders of companies and its profit in a research titled Relationship between Capital Construction and Profitability. Their sample consisted of 70 Brazilian companies in years between 1995 till 2001. They finding by using multi variables regression showed a positive relationship between profitability and rate of short term debt and right of shareholders also a negative profitability for long term debts.

In Abor's research (2005) titled the Effects of Capital Construction on Profitability the relationship between measures of capital construction and profitability in a groups of sample companies in Ghana in years 1998 till 2002 were studied. The result of this research shows the relationship between short term debt on assets and profitability of companies and also the relationship between total debt to capital and profit which is positive. But between long term debt on assets and profitability of companies have a negative relationship.

Wu and Yue (2007) have inspected the subject of the capital construction in response to increase of rate of tax companies accepted in stock market of china in their research. They inspected the increase of rate of

tax on capital construction of companies who had tax discounts by China's government previously. The results obtained from this research shows that the financial lever of these companies increases with the rate of tax. Witnesses show that the highest increase in the lever is related to companies which have high access to bank loans.

Nikolas (2007) in a research titled "How specifications of companies affected the Greek capital construction?" used assessing economy methods such as methodology in 19 Greek companies in Athens market in 1977-2001. Specifications of company were analyzed as indexes of effectiveness on capital construction. In this research relationship between specifications of company such as size of the company, Annie's coefficient, coverage of interest cost and expected development with capital construction were inspected. The result was negative relationship between capital construction and the interest coverage and company's development and Annie's coefficient and positive relationship between the size of the company and capital construction.

Karadeniz and et al (2009), Modigliani and Miller were some of the pioneer researchers in theoretical science of effectiveness of capital construction on value of companies. They stated in their first theory stated that when there's no tax the markets are completely efficient. So the capital construction and the financial sourcing decisions do not have any effect on assets and market value. In the next suggestion they claimed that payment of debt interest decreases tax so the cost of debt is less than the cost of capital.

Tarek and et al (2007) in a research related to elements of capital construction and asymmetric levels of systematic risks in Egypt companies were categorized into three groups of companies based on average tolerances of systematic risks; high, medium and low risk. They obtained this result that long term debt is a financial source for all levels of systematic risks and also companies with medium risk adapt their long term debts to industrial index and are affiliated with financial sourcing with long term debts. Also these companies are relatively under the influence of free cash flow and the companies with high risk are under the influence of hierarchy theory.

3. Research Method

The present research is based on descriptive-measurement method. In reality the descriptive-measurement researches studies the specifications and qualities of individuals of society and inspect the actual situation of the statistical society in a matrix of specifications or variables. In this research for obtaining theoretical literature and history of research the library method was used.

The statistical method of this research is a correlation kind and by using Spearman correlation the relationship between dependant and independent variables are inspected.

3.1   Statistical Society

The present research society is the companies accepted in Tehran Stock Exchange base on declaration of Tehran stock exchange official site. The entire accepted companies till 2009 included 457 companies in 37 industrial groups which due to aggregation of some levels this levels were decreased to 33 groups and 239 companies were defined and were declared in the Tehran stock exchange site. For defining the statistical sample no special relationship was used for estimating the volume of sample and sample gathering but elimination method was used. In other words that group of companies in the statistical society which had the following conditions was chosen as statistical sample and the rest was deleted.

- Their annul fiscal year ended at 21 of April and the companies had not changed their fiscal year.
- The companies were profitable.

- Companies have continuous activities
- The shares of the considered companies must have had transactions in the stock market
- Due to the limitations above 239 companies were chosen as samples from Tehran stock exchange market in a period of five years and from 2005 till 2009

4. Theories and Variables of Research

4.1   The theories of this research includes one main theory and two subsidiary theories:

Main Theory- There's a meaningful relationship between risk management and capital construction

Subsidiary Theory 1- There's a meaningful relationship between systematic risk and capital construction

Subsidiary Theory 2- There's a meaningful relationship between non-systematic risk and capital construction.

4.2   Research Variables

In the present research there are two independent variables. Variable one, systematic risk which has share yield sensitivity (r_i) i on market yield index (r_m) i on the inspection period and is calculated from function (1) (Modarres and Abdullahzadeh, 1999)

$$\beta_i = \frac{Cov(r_i, r_m)}{Var(r_m)}$$

Function (1)

And the second variable is the non-systematic risk is standard deviation of yield rate which explains the probability distribution which is used for measuring (Modarres and Abdullahzadeh, 1999). In addition to the management risk index includes systematic and non systematic risk (Jones, 2004).

Dependent variable of research is related to the company's capital structure and it's adjusted by the rate of entire debts to total capital. This shows the rate of debts used for sourcing capital of the company.

5. Method of Analyzing Data

Test of theories is performed in secure level of 95%. For inspecting the meaningful linear union and defining the effects of independent variables variance analysis test (statistics F) is used. If the area of meaningfulness of F is less than 5% the assumption zero is declined and if it's more than 5% the zero assumption is not declined. Since the independent variables are discrete and qualitative so the best method of assessment is assessing the effects of independent variables on dependent variables using the analysis method of variance. In the inspection level the effects of independent variable on a dependent variable is analyzed by one sided or one element variance. Since all the theories of this research are similar the analytical technique of Spearman correlation and variance analysis were used for testing the theories and for comparing the two by two averages Croskal-Wallis test was used.

By using the variance analysis test the result of different or not different average capital construction in various groups can be obtained. If this difference is meaningful the effectiveness of the capital construction is effective but the highest and lowest effective group on capital construction cannot be resulted. For this reason and for inspecting the effectiveness Duncan two by two test is used. Duncan two by two test is one of the most powerful comparison two by two tests that in addition to comparing two by two classify them based on ranking. In this test if two or more statistical groups do not have any statistical difference they will be categorized in subsidiary congenial group.

6. Data Normality Test

For reviewing the normality of variables and balances Kolmogrov-Smirnov normality test was used. If the related probability amount is bigger than 0.05 and the security level is 95% the distribution of normality of variables is confirmed or vice versa. The results of this tests show that none of the variables (dependent and independent) have abnormal distribution. As shown in table 1 the probability of the amount of variables (dependent or independent) equals 0.000 or in other words less than 0.05. So these data's cannot be tested by parametric method. So the test of relationship of dependent variables with independent variables was non-parametric tests.

Table 1: Kolmogrov-Smirnov Normality Test Data's

	Systematic Risk	Non-Systematic Risk	Capital Construction
Z Kolmogrov-Smirnov	3.72	4.59	3.67
Meaningful Area	0.00	0.00	0.00

7. Testing the Assumption of Research

In this section we test the assumptions of research by Spearman correlation and two by two Duncan test.

Theory (Assumption) 1: There's a meaningful relationship between systematic risk and capital construction

A) Spearman Correlation

$$H0: \rho = 0$$
$$H1: \rho \neq 0$$

Table 2: Spearman Correlation between Systematic Risks and Lever

Variable	Spearman Correlation	Defining Coefficient	Error Level	Meaningful Level
Systematic Risk and Lever	45.2%	20.4%	1%	0.00

From table 2 we can reach this result that there's a relationship between systematic risk and lever. So since:
sig <0.05 , r=.204
With 99% security there's a relationship between variables. In other words H0 is declined and H1 is confirmed. Also the relationship intensity of these two variables is powerful. Because the correlation coefficient of these two variables is direct and positive which means increase (decrease) of systematic risk of company the lever increase (decrease).

B) Variance Analysis

The average lever in different levels of systematic risk is equal.

$$H0: \mu1=\mu2=\mu3$$

Minimum one pair of averages is not equal

$$H1: \mu1\neq\mu2=\mu3$$

Table3: Croskal-Wallis Variance Analysis in between Systematic Risk of Companies and Lever

	Low	Medium	High
Number of Companies	75	54	110
Lever	1.63	2	2.04
Average lever	97.39	132	129.53
K2 Rate			13.31
Amount of F			6.93
Sig			0.001

Based on the statistical results obtained from Croskal-Wallis variance and considering table 3 the following results can be reached:
Company's systematic risk and lever have meaningful relationship. The two by two comparisons of average lever companies show that:

- The difference of average lever in high and medium systematic risk with average lever of lower systematic risk are meaningful
- Companies with high systematic risk have highest lever and the companies with lower systematic risk have lower lever

Theory 2- There's a meaningful relationship between non-systematic risk and capital construction

$$H0: \rho = 0$$
$$H1: \rho \neq 0$$

Table 4: Spearman Correlation between Systematic Risks and Lever

Variable	Spearman Correlation	Defining Coefficient	Error Level	Meaningful Level
Non-Systematic Risk and Lever	48.4%	23.4%	1%	0.00

From table 4 we can reach this result that there's a relationship between non-systematic risk and lever. So since:

sig <0.05 , r=.234

With 99% security there's a relationship between variables. In other words H0 is declined and H1 is confirmed. Also the relationship intensity of these two variables is powerful. Because the correlation coefficient of these two variables is direct and positive which means increase (decrease) of systematic risk of company the lever increase (decrease).

B) Variance Analysis
The average lever in different levels of systematic risk is equal.

$$H0: \mu 1 = \mu 2 = \mu 3$$

Minimum one pair of averages is not equal

$$H1: \mu 1 \neq \mu 2 = \mu 3$$

Table 5: Croskal-Wallis Variance Analysis in between Non-Systematic Risk of Companies and Lever

	Low	Medium	High
Number of Companies	75	54	110
Lever	1.43	2	2.21
Average lever	80.45	129.81	143.15
K2 Rate			41.72
Amount of F			25.9
Sig			0.00

Based on the statistical results obtained from Croskal-Wallis variance and considering table 5 following results can be reached:
Company's systematic risk and lever have meaningful relationship. The two by two comparisons of average lever companies show that:

- The difference of average lever in high and medium non-systematic risk with average lever of lower non-systematic risk are meaningful

Companies with high non-systematic risk have highest lever and the companies with lower non-systematic risk have lower lever

8. Results and Discussions
Results of First Assumption (Theory) - Since it was claimed that there's a meaningful relationship between the systematic risk and capital construction the results obtained between two variables is confirmed. The relationship between two variables is direct and positive meaning that by increase (decrease) of systematic risk the lever of the company will increase (decrease). Also because of the two sided relationship it can

claim that the increase of lever of company increase the systematic risk of company. Moussavi and Keshavarz (2011) have inspected the relationship between the systematic risk level and the factors of capital construction and they have reached the result that there's a meaningful relationship between short term and long term debts.

Results of Second Theory- Since it was claimed that there's a meaningful relationship between the non-systematic risk and capital construction the results obtained between two variables is confirmed. The relationship between two variables is direct and positive meaning that by increase (decrease) of non-systematic risk the lever of the company will increase (decrease). Also because of the two sided relationship it can claim that the increase of lever of company increase the non-systematic risk of company.

For complete results of testing the theories, summaries of the results related to the research assumptions are provided in table 5:

Table 5: Summary of Results of the Tests of Research Assumptions

Assumption (Theory)	sig	Declined or Confirmed	Result
There's a meaningful relationship between systematic risk and capital construction	0.001	Confirmed	There's a meaningful relationship between systematic risk and capital construction
There's a meaningful relationship between non-systematic risk and capital construction	0.000	Confirmed	There's a meaningful relationship between non-systematic risk and capital construction

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