

Analysis of influence of financial leverage on returns and risks of companies listed in the Tehran Stock Exchange during 2009 to 2014

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Abstract: The aim of this study is to analyze the impact of financial leverage on returns and risk of companies listed in the Tehran Stock Exchange. Much research has been done on capital structure, but little information is available on financing methods of companies and how financial leverage affects returns and risk. The research was conducted using the correlation studies method and research data have been collected during the period 2009-2014 with the financial statements of 77 sample companies and panel data method. The results shows, by increasing financial leverage, systematic risk and annual returns of stocks in the surveyed companies were increased. Also, with increase of systematic risk, annual returns of stocks in the companies studied were increased.

Key words: *Financial leverage; Systemic risk; Annual returns of stocks; Companies of Tehran Stock Exchange*

1. Introduction

Investment is an important economic variable in economy and it leads to improvement of all economic variables including employment and production. Increase of production which is one of the first steps in development process requires investment and there is most theory in economics which see the lack of development of some countries result of lack of capital and investment. Financing and investment are two sides of the same coin. Funds acquired through financial resources are invested. There is a fixed principle in investment which says capital is elusive of risk and danger and is inclined toward return and profit. Because of this risk, elusive investors do not commit their capital to risky opportunities or unknown horizons facing their profit or capital. Investors expect profit and returns in accordance with the level of risk and danger. Investors usually seek returns proportional to the relevant risk using financial analysis. In a standard market where market factors are entitled to information, high return is always followed by high risk. This situation always forces decision making for investment to be based on the relationship between risk and return and an investor always considers the two factors of risk and return in his analysis and management of investment basket. On the other hand however further investment return of an item is changed the particular investment is more risky. In a general definition it can be stated that "the volatility of investment returns is called investment risk" (Neveu, 2011). Financing of investments in firms is created through the owners, as well as from debt and

creation of financial leverage. Considering the above subjects, the effect of financial leverage on risk and return of firms is reviewed in this research. This article is compiled in eight sections. In section 2 the theoretical basis is reviewed. The research background is dealt with in section 3. Research methodology is in the next section. After descriptive statistic in section 5, model estimation are reviewed in section six. Section seven includes the conclusion.

2. Theoretical basis

2.1. Stock returns and their components

The most important criterion for assessing institutional performance is stock return rate. This criterion alone contains information for investors and is used for performance assessment. BY reduced stock return rate it is a warning bell for the firm and does not show firm performance properly. This standard bears high information content because performance assessment based on market value, reflects investors' data well.

Return is the driving force in investors' process which is motivating and is considered a reward for the investors. Return includes the total sum of benefits which stock earns during the financial year.

2.2. Capital structure and financial leverage

Capital structure is a combination of debt and dividends through which companies finance their assets.

Capital structure is combination of long-term source of funds used by company and alteration of this combination leads to firm's capital cost. The main aim of capital structure decisions is to create a

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suitable combination of long-term source of funds, to minimize firm's capital costs and maximize firm value via that. This combination is called optimum capital structure.

One of the most complicated issues facing present financial managers is the relation between components of capital structure and that is a mixture of bonds and shares for company financing and share prices. The main question is which is the optimum mixture?

A company needs capital in order to be established and needs even more capital to develop. The required funds are secured through various sources and forms but we can place all capital in two main groups of loan and shares. Two initial advantages of using financial leverage include enhancement of return on assets and tax advantages.

If the level of financial leverage in company increases, it is possible that unconventional changes occur in profitability which can lead to melting of share prices and volatility of stock market prices.

2.3. Investment risk

There is a fixed principle in the investment culture which states that capital is elusive of risk and danger and is inclined toward return and profit. Because of this risk, elusive investors do not commit their capitals to risky opportunities or unknown horizons facing their profit or capitals. Investors expect profit and returns in accordance with the level of the risk and the danger involved. Investors usually seek returns proportional to the relevant risk involved by using financial analysis. In a standard market where market factors are entitled to information, high return is always followed by even higher risk. In a standard market where market factors are entitled to information, high return is always followed by higher risk. Logical investors prefer trust to lack of trust and naturally in this situation it can be said that investors do not favor risk. More accurately, investors are risk evasive. A risk evasive investor expects appropriate return instead of accepting risk. We must note that accepting risk in such a situation is not illogical even if the risk is too high, because in this situation high return is also expected. In fact, investors cannot logically expect high return without accepting high risk in return (Pirsalehi, 1993). We can generally classify the risk constituting factors, which cause price change in the market, as the following categories political risk, commercial risk, interest rate risk, inflation risk, financial risk, liquidity risk and exchange rate risk (Rae and Talanghee, 2004).

3. Research background

Barbuta Misu and Rusu (2014) conducted a study to review the effect of financial leverage on dividend using a sample of eight Romanian companies mentioned in section on production of dairy products by the financial leverage method for a 3 years period (2010-2012). Financial leverage

reflects effect of dept. policy on corporate return in dividends which is not obtained by using accounting information. Results of this research indicate that financial leverage is a key factor influencing dividends which in turn is itself influenced by debt degree and the correlation between asset returns and the rate of interest. However, many other factors other than dividends exist which are influenced by the financial leverage.

AL- Qudah and Laham (2013) conducted their study aimed at reviewing the correlation between dividend in industrial companies of the Amman Stock Exchange (ASE) and systematic risk and financial leverage. Information on study subjects for 48 industrial companies was collected for a period between. This is done to determine the relation between dividend as a dependent variable and each one of systematic risk and financial leverage is as an independent variable. Results indicate that there is a significant statistical correlation between dependent variables and independent variables, independent variables explain 44% of the dividend changes in industrial companies of ASE.

Panayiotis and Georgia (2011) conducted a study entitled "leverage and return in 3 S. European countries" in order to review the effect of leverage on dividend in the 3 countries, Euro Zone members, Greece, Italy and Portugal during 2000 to 2010. The main aim of this research is to enhance the study background on effect of capital structure on return where index is reviewed on the basis of leverage. Analysis of results showed that leverage only positively and significantly effects return in hygiene products in Italy and its effect on return is almost insignificant in industrial section in Portugal and Greece.

Yang, Hailin and Kim (2009) in a study entitled "review of relation between abnormal returns with hospital composition and also relation of excess returns with financing methods and size" concluded that the composition of China's hospitals during 2000 to 2008 leads to earning positive abnormal returns in the 12 months following the compound. Muradoglu and Sivaprasad (2008) in a study entitled "review of relation between financial leverage and risk factors in stock returns in London" concluded that portfolio financial leverage can explain stock return variables better than asset pricing model.

Afshari et al. (2012) conducted a research entitled "Effect of Financial Leverage on Investment Decisions in the Tehran Stock Exchange Companies". In this study, to measure the effect of financial leverage on investment decision making and with the presence of control variables including Tobin q, sales, operational cash flow, asset returns, current ratio and accumulated profit was used. Two criteria were used for financial leverage in this research, ratio of debt and ratio of long-term debt to total assets. Also, companies were classified as small, medium and large according to market value and in each group, effect of leverage on investment was reviewed. Results of research show no linear

correlation between financial leverage and companies' investment in any condition.

Darabi and Ali Farahi (2010) in a study entitled "Macroeconomic Variables influence on Risk & Total Stock Return with emphasis on Inflation Stock Return Model" stated: identifying effective factors on bond returns, has major effect in deeper analysis and more suitable decision taking on behalf of investors. On this basis, this research reviewed effect of fluctuations of 5 important macroeconomic variables on risk and total stock return of TSE companies in cement, petrochemicals and automobile industries during 1998 to 2010. This research tested seven major theories using convergent and inflation stock return model aiming to identify the equilibrium relation between macroeconomic variables and their effect on total stock return. Results suggest a lack of link between risk and total stock return and macroeconomic variables in the TSE companies.

4. Methodology and data definition

This research was conducted using panel data and correlation research. The scope of this research is companies listed at the Tehran Stock Exchange. Statistical community includes all companies listed

at the TSE which number 449 for the period between 2009 and 2014 and this statistical community has all the companies, during this 6 years period in various industries and groupings and the hypothesis were studied and tested with regards to this statistical community.

Companies of the statistical community must not include banks, financial institutions (investment firms, financial intermediation, mother companies, leasing) and be listed in the TSE by end of Esfand (20 Mar) 2009 and their fiscal year also ends in Esfand month. Firms must not alter their fiscal year during research period. Sampling was 77 companies were selected using the systematic elimination process from among the companies listed at the Tehran Stock.

5. Descriptive statistics

Descriptive statistics of variables used have been presented as in Table 1. Several control variables were also used in regression model (firm size, ratio of book value to market value, free cash flow, firm growth opportunities, stock trading volume & ratio of profit to price) and their descriptive statistics were also presented.

Table 1: Results of descriptive statistics of research variable

Minimum	Maximum	Standard Deviation	Median	Average	symbol	variable
-6.03	9.74	1.104	0.38	0.532	Bet	systematic risk
-1.72	2.36	0.44	0.17	0.231	Sre	annual share return
0.156	1.56	0.207	0.673	0.699	FL	financial leverage
10.086	18.45	1.471	13.63	13.8	Size	firm size
-0.033	0.25	0.016	0.003	0.006	B/M	book value to market value
0.566	1.78	0.665	0.62	0.633	CF	free cash flow
-98005.67	62704.32	6757.119	282.41	1000.18	G	growth opportunities
0.112	1.44	0.708	0.423	0.23	TV	share dealing volume
-7.0759	0.6322	0.4182	0.1407	0.0734	E/P	ratio of profit to price

Source: Researcher's calculations

(3)

6. Model estimation

6.1. Diagnostic test in panel data

The number of observation at each section in this research were 77 (companies) for a 6 year time period. In other words, on the one hand, relation of dependent and independent variables was reviewed among 77 firms during the period between 2009 and 2014. On this basis, panel data process was used for the purpose of analysis.

To test the research hypothesis and review the link between research variables, the following regression models were employed:

$$Bet_{it} = \alpha_0 + \beta_1 FL_{it} + \beta_2 Size_{it} + \beta_3 B_{it}/M_{it} + \beta_4 G_{it} + \beta_5 TV_{it} + \beta_6 E_{it}/P_{it} + \beta_7 CF_{it} + \epsilon_{it} \tag{1}$$

$$Sre_{it} = \alpha_0 + \beta_1 FL_{it} + \beta_2 Size_{it} + \beta_3 B_{it}/M_{it} + \beta_4 G_{it} + \beta_5 TV_{it} + \beta_6 E_{it}/P_{it} + \beta_7 CF_{it} + \epsilon_{it} \tag{2}$$

$$Sre_{it} = \alpha_0 + \beta_1 Bet_{it} + \beta_2 Size_{it} + \beta_3 B_{it}/M_{it} + \beta_4 G_{it} + \beta_5 TV_{it} + \beta_6 E_{it}/P_{it} + \beta_7 CF_{it} + \epsilon_{it}$$

Bet_{it} is systematic risk, Sre_{it} annual share return, FL_{it} financial leverage, $Size_{it}$ firm size, B_{it}/M_{it} ratio of book value to market value, G_{it} growth opportunities, TV_{it} share dealing volume, E_{it}/P_{it} ratio of profit to price and CF_{it} free cash flow. Used the F (Chow) and Hausman test to select an appropriate estimation method. ADF stationary test show data was I(0). Results of F (Chow) and Hausman test are presented in Table 2 and 3.

According to results of Tables 2 and Table 3, the method used for estimation of our functions, is the fixed effect method. The link between dependent and independent variables is reviewed by fixed effect method via 1st, 2nd and 3rd models.

6.2. Models estimation

The model (1) reviews the link between financial leverage and systematic risk. Statistical hypothesis related to this hypothesis are thus:

Table 2: Chi test results

Model	Test	Test statistic (p-value)	Result of test
Model (1)	Chi test	(0.0000)14.397	Panel data
Model (2)	Chi test	(0.0000)25.128	Panel data
Model (3)	Chi test	(0.0000)36.782	Panel data

Source: Researcher's calculations

Table 3: Hausman test results

Model	Test	Test statistic (p-value)	Result of test
Model (1)	Hausman test	43.197 (0.0000)	fixed effects
Model (2)	Hausman test	(0.0000) 58.724	fixed effects
Model (3)	Hausman test	(0.0000) 84.128	fixed effects

Source: Researcher's calculations

H₀: There is no positive significant correlation between financial leverage and systematic risk.

H₁: there is positive significant correlation between financial leverage and systematic risk.

In this hypothesis, dependent variable is systematic risk & independent variable is financial leverage. Estimation Results of model (1) are presented in Table 3.

Table 3: Results estimation of model (1) step 1

Variables								1.
Constant	CF	E/P	TV	G	B/M	Size	FL	
0.177	0.64	-0.002	-0.04	5.74 E-8	15.04	-0.018	0.96	Coefficient
0.62	3.70	-0.04	-5.78	0.19	6.83	-1.03	5.50	t- static
0.53	0.0000	0.968	0.0000	0.848	0.0000	0.305	0.0000	p-value

Source: Researcher's calculations

Results estimation of model (1) show, firm size variables, growth opportunities, ratio of profit to price was not significant and was eliminated from

the model. Results of final estimate are presented in Table 4.

Table 4: Final Results estimation of model (1)

Variables					1.
Constant	CF	TV	B/M	FL	
0.177	0.64	-0.04	15.04	0.96	Coefficient
0.62	3.70	-5.78	6.83	5.50	t- static
0.53	0.0000	0.0000	0.0000	0.0000	p-value
R2Within= 0.44 , F=42.66, F(Pvalue)=0.000					

Source: Researcher's calculations

As can be seen in the Table 4, F statistic is significant at 0.99% confidence level. Therefore, we can conclude that the 1st research model is generally significant.

Results of the 1st hypothesis test according to information in Table 4, state confirmation of the 1st hypothesis. In reviewing results of this hypothesis' test, t statistic of model test at 5% error level, is significant and has a direct relation. Therefore, results of research state confirmation of the 1st hypothesis. In other words, the more financial leverage of sample firms increases, systematic risk in those firms increases too.

In H₂ hypothesis, the link between financial leverage and annual stock returns was reviewed. Statistical assumptions related to this hypothesis are thus:

H₀: there is no significant positive link between financial leverage and annual stock returns.

H₁: there is significant positive between financial leverage and annual stock returns.

In this hypothesis, dependent variable, annual returns and independent variable are leverage. Results of model estimate of H₂ are presented in Table 5.

Table 5: Results of second hypothesis test using panel data method

Variables								1.
Constant	CF	E/P	TV	G	B/M	Size	FL	
0.242	0.034	0.002	-0.009	E-8 2.15	1.037	0.001	-0.017	Coefficient
6.06	1.41	0.25	-8.60	0.05	3.35	0.41	0.73	t- static
0.000	0.159	0.805	0.000	0.959	0.001	0.680	0.468	p-value
R2Within= 0.36, R2between=0.41, F=31.55, F(Pvalue)=0.000								

Source: Researcher's calculations

Variance heterogeneity test was conducted because coefficients were not significant.

Table 6: Results of variance heterogeneity test

Result of test	P-value	Test statistic	Test
variance heterogeneity	0.0000	194.52	variance heterogeneity test(LR)

Source: Researcher's calculations

According to results of this test, variance heterogeneity exists among data. Therefore and with probability of heterogeneity in firms, firms were segregated according to negative and positive

returns and then estimation was done. Results of estimation are in Table 7.

Table 7: Results of second hypothesis test using combined data method

Variables					1.
Constant	CF	TV	B/M	FL	Coefficient
0.326	0.11	-0.00006	0.70	0.14	t- static
11.19	4.05	-6.59	3.32	3.79	p-value
0.0000	0.0000	0.0000	0.01	0.0000	
R2Within= 0.63, R2between=0.43 F=122.65, F(Pvalue)=0.000					

Source: Researcher's calculations

According to results in Table 7, F statistic is significant at 0.9 confidence level. Therefore, it is concluded that the research second model is generally significant.

Results of 2nd hypothesis test according to information in Table 4V, verifies the 2nd hypothesis. Reviewing results of this test, model test's t statistics at 5% error level, is significant and directly related (positive sign is independent variable's coefficient). Therefore, research results verify the 2nd hypothesis. In other words, the more financial leverage in sample companies increases, annual stock returns in the sample companies increases too.

Results of H₂ show that financial leverage has significant effect on stock returns of companies in various industries active in the Tehran Stock Exchange.

The link between systematic risk and annual stock returns was reviewed in the 3rd hypothesis of the research. Statistical assumptions relating to this hypothesis are as follow:

H₀: There is no positive significant link between annual stock returns and systematic risk.

H₁: There is positive significant link between annual stock returns and systematic risk.

Table 8: Results of third hypothesis test using combined data method

Variables								1.
Constant	CF	BET	G	EP	SIZ	B/M	TV	Coefficient
0.242	1.88E-10	0.004	1.077	0.002	0.002	1.037	0.009-	t- static
5.55	8.12	0.59	0.04-	0.25	0.72	3.35	8.60-	p-value
0.0000	0.0000	0.558	0.971	0.802	0.472	0.001	0.0000	
R2Within= 0.20, R2between=0.41, F=19.04, F(Pvalue)=0.0000								

Source: Researcher's calculations

Due to coefficients not being significant, variance heterogeneity test was conducted.

Table 9: Results of variance heterogeneity test

Result of test	P-value	Test statistic	Test
variance heterogeneity	0.0000	234.15	variance heterogeneity test(LR)

Source: Researcher's calculations

According to this test, there is variance heterogeneity between data. On this basis and with probability of heterogeneity in firms, the firms were segregated on the basis of negative and positive returns and then estimation was done. Results of estimation are in Table 10.

Systematic risk in this hypothesis includes dependent variable, annual stock return and independent variable. Results of H₃ model estimate are in Table 10. According to model 3, if systematic risk's independent variable coefficient is positive, it

has direct link with annual stock return and if coefficient sign is negative, systematic risk has inverse correlation with annual stock return.

According to Table 10, F statistic is significant at 0.99 confidence level. In other words, there was a significant link between sample companies' systematic risk and annual stock returns in companies under study. Therefore, the 3rd model was generally significant. In addition, adjusted coefficient of determination from 1st model test includes infraclass coefficient 0.96 and intragroup

coefficient 0.95. In other words, .95% of dependent variables are explained by independent variables.

Table 10: Results of third hypothesis test using combined data method

Variables					1.
Constant	BM	TV	CF	BET	
0.14	-3.219	0.00005-	0.430-	0.272	Coefficient
23.29	-31.04	-16.19	-29.41	49.87	t- static
0.0000	0.0000	0.0000	0.0000	0.0000	p-value
R2Within= 0.96, R2between=0.95, F=1751.17, F(Pvalue)= 0.0000					

Source: Researcher's calculations

Results of the 3rd hypothesis test reveal that systematic risk has positive and significant effect on stock returns. In this regard, it is expected that with increase of firms' risk, their stock return also increases. This result matches that of Hourmozi (2011) research which is concerned with "review of systematic risk relation and P/E ratio with stock returns of companies listed in the Tehran Stock Exchange". He concluded that there is a positive link between systematic risk and expected returns at the individual stock level and at portfolio level. This relation is significant from statistical view and the correlation between these two is also linear.

7. Conclusion

To test the research hypothesis, panel data estimate method was employed using a sample of 77 firms listed at the Tehran Stock Exchange between 2009 and 2014. The fixed effects model was employed to test the significance of the research hypothesis.

Results of 1st hypothesis test for the six year period of research showed that model test t statistic at 1% error level, is significant and the link between leverage and systematic risk is direct. Research results via panel data analysis, verify the first hypothesis. Therefore, results of research have shown that the more financial leverage with ratio of book value to market price, free cash flow increases among companies listed at the TSE, systematic risk increases in the said companies. With the increase of stock dealing volume, systematic risk decreases. This result is in line with theoretical basis and initial expectations of the researcher.

Results relating to test of 2nd hypothesis for the 6 year period show that model test t statistic at 1% error level, is significant. Results of the research by panel data analysis, verify the second hypothesis. Therefore, results of the research have shown that financial leverage with control of firm size, ratio of book value to market price, firm growth opportunities, free cash flow, ratio of profit to price and volume of share dealings among companies listed at the TSE, have a significant link with stock returns. This result is in line with theoretical basis and initial expectations of the researcher.

Results relating to test of 3rd hypothesis for the 6 year period show that model test t statistic at 1% error level is significant and type of relation between systematic risk and stock return is direct. Research

results via panel data analysis method, verifies the 3rd hypothesis. Therefore, results of research have shown that more systematic risk with firm size control, ratio of book value to market price, firm's growth opportunities, free cash flow, ratio of profit to price and stock dealing volume among companies listed at the TSE increases, stock returns in the said companies also increases accordingly. This result is in line with theoretical basis and initial expectations of the researcher.

References

- Afshari A., Saeedi A., Reshadi E. (2012). Influence of Financial Leverage on Investment Decisions in Companies Listed at the Tehran Stock Exchange. *Management Accounting*, summer 2012, term 5, no. 13, pp. 17-29.
- AL- Qudah, A. and Laham, M. (2013). The Effect of Financial Leverage and Systematic Risk on Stock Returns in the Amman Stock Exchange.
- Barbuta- Misu, N. and Rusu, A. (2014). Financial Leverage Impact on Return on Equity for Romanian Listed Companies" *International Conference of Risk in Contemporary Economy*, 2014.
- Darabi, R. and A., Farahi maliheh (2010). Influence of Macroeconomic Variables on Risk and Total Stock Returns with Emphasis on Inflation-Stock Returns Model. *Financial Accounting and Audit Researches (Financial Accounting & Audit bulletin)*, Autumn 2010, term 2, no. 7, pp. 141-169.
- Hourmozi, H. (2001). Review of Systematic Risk Relation and P/E Ratio with Stock Returns of TSE Companies, Masters' thesis, College of Administrative Sciences, Shahid Beheshti University
- Muradoglu, G. and Sivaprasad, SH (2008), Leverage and Common Risk Factors in stock Returns. available at:<http://ssrn.com/abstract=1101504>.
- Neveu, R. P. (2011), *Fundamentals of Managerial Finance*, Translated by Jahankhani, Ali Parsaeyan, Samt pub – Second volume
- Panayiotis, G. and Georgia, N. (2011). "Leverage and Returns in Three Countries of Southern European Region", *European Research Studies*, Volume 6(4).

Pirsalehi, M. (1993). Review of Risk Relation and Investment Returns in the Tehran Stock Exchange. Commercial Management Masters' thesis, Esphahan University.

Raee, R. and Talanghee A. (2004). Advanced Investment Management. Samt pub Chapavel.

Yang, J. ,Hailin ,Q. and Kim, W. (2009), Merger Abnormal Returns and Payment Methods of Hospitality Firms. International Journal of Hospitality Management 28,pp:579-285.