

Analysis of the Relationships between Financing and Value of Companies in Tehran Stock Exchange

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Abstract

One of the duties in trading department is to improve the efficiency of the property structure, the debts and salary of the stockholders in order to maximize their wealth. Managers of trading department carry out this duty by making right decisions in respect to investment, financing and the profit sharing. On the other hand, the investment decisions and financing are connected to financial and operational risks. Therefore, managers should proceed the way that they can both maximize the value of the company and avoid the adverse results of taking risks. To investigate the effect of investing decisions and financing of managers on the value of the company, the information of 75 companies have been gathered during the time span of five years (1386 to 1391). To analyze the information, Spearman correlation coefficient and regression statistical method of panel data (4) are used to determine the relations between the variables. The findings are indicative of the fact that there is statistical significance and the inverse relationship between financial leverage and the ratio of book value to market capitalization. In other words, increase in financial leverage raise the value of the company. In addition, there is no statistical significance and inverse relationship between book value and market capitalization and financial decisions of managers cannot influence the value of company.

Key words

Operational risk, financial risk, ratio of book value to stock market capitalization

DOI: 10.6007/IJARAFMS/v7-i3/3099

URL: <http://dx.doi.org/10.6007/IJARAFMS/v7-i3/3099>

1. Introduction

In growing and competitive markets, companies are confronting various factors to survive both in national and international level, and to compete with these factors they have to expand their activities with new investments. Investment needs necessary financial sources. In this respect, financial sources and its use in good investment should be made in a way that it is profitable for the company and its final goal that is maximizing the value of the company can be achieved.

All these needs actually render this challenge into a hummock. The insufficiency of available external capital (Hsu, 2004); paired with information asymmetries between these businesses and lenders (Carpenter and Petersen, 2002), difficulties of collateralization due to low value of their intangible assets (Rammer *et al.*, 2009), and uncertainties related to innovations' success (O'Sullivan, 2006).

In new financial theories, duties of financial managers in trade departments are to make decision in respect to investment, financing and sharing profits; this pursues the goal of maximizing the value of the company and to achieve this, decision have to be made in connection to the best investment, its combination and how to finance them. Financing decisions and investment of companies are those made by the benefit of foresight. Basically, the investing decisions and financing can create operational and financial risks, therefore, managers must act the way both to maximize the value of company and to avoid the adverse results of the risk. This study aims to find out the statistical significance between these decisions and the value of company.

2. Statement of problem

It is necessary that individuals to invest in addition to their salaries in order to have economic growth in any country. Therefore, each investor needs necessary information for that share in order to get the share with high efficiency and low risk. Information that exists for each company's share is based on the internal and external information. Internal information of a company like profit or loss reflected in financial bills or balance sheets. External information exists in stock market. Investors must conduct vast investigations using this information when investing in common shares. In others words, they have to consider different factors unless good results will not be achieved. In this study, the relationship between operational and financial risk and the ratio of book value to market capitalization of shares in Tehran Stock Exchange will be investigated. The growth stocks signify companies in which the ratio of book value to market capitalization is very low. The value stocks signify companies in which the ratio of book value to market capitalization is very high. In this research, the efforts will be made to investigate the relationships between operational and financial risks and the ratio of book value to market capitalization from this respect that how operational and financial risks of growth and value stocks will be and the fact that whether there is statistical significance between investors' decisions and financing (leading to operational risks and financial risks) and the ratio of book value to market capitalization of stock markets (as factor for the value of the company) or not. Measurement factor of operational risk in this research is operational leverage and measurement factor of operational risk is financial risk.

3. Literature review

Fama and French (1998) stated that debts do not have particular tax advantages after analyzing the tax effects on the company values. Therefore, they stated that high leverage and increase in leverage and debt is bad news for the companies and this sort of news will reduce the company value.

Hamed Soltani Nezhad (2006), in a research named "comparative study of selling borrowing stock according to Islamic contracts", has reviewed stock sale in the form of borrowing as a financing method for companies. This research which is performed to support MA thesis, has argued about issues such as mechanism of borrowing transactions, mechanism of capital borrowing market, borrowing transactions and use of future contracts, borrowing sales limitations, and pricing.

The findings of Havakimian and Tehranian in 2004 showed that companies with high ratio of market capitalization to book value have lower debts. Mahajan and Tartaroglou in 2006 with expanding their researches have achieved the same results as Havakimian and Tehranian. They investigated ratio of market capitalization to book value in countries like Japan, Canada, America, France, Germany and Italy in 2006. They showed that there is direct relationship between ratio of market capitalization to book value and the financial leverage. In other words, the lower ratio of market capitalization to book value, the lower debts will be used by companies to finance. Lauroa Lio in 2008 investigated ratio of book value to past market capitalization and the ratio of return on stocks to current financial leverage. He concluded that ratio of book value to past market capitalization and past return on stock has enormous effect on financial leverage. Peter Kort and Nielsen (2005) has conducted a research to investigate the question of whether the ratio of book value to market capitalization can be a substitute variable to the risk using leverage approach and in the end they came to this conclusion that the ratio of book value to market capitalization with market leverage and its decrease with book leverage is good reason indicating that the ratio of book value to market capitalization can act as the substitute variable to the risk and its return. Valso and Egzing (2004) show that the ratio of book value to market capitalization can act the substitute to the default risk. Findings show that the default risk is systematic and it has been valued and measured by the ratio of book value to market capitalization. Gunt (2003) in comparing the model CAPM and three factors that Fama and French has reached this conclusion that three model used by Fama and French act much better for calculating the return than CAPM and the role of the ratio of book value to market capitalization is very impressive. Gholamrez Gholami in his M.Sc. investigated this issue in 1382 under the title of analysis of the relationship between changes in operational and financial and mixed leverages with changes in return on stocks of companies in Tehran Stock Exchange and he came to this conclusion that there is no statistical significance between operational, financial and mixed leverages and changes in return on stocks.

In 1382, a research dealing with the relationship capital structure (financial leverage) with current cash flow of food industries in Tehran Stock Exchange has been conducted by Fatima Jamali. The findings are indicative of the fact that using financial leverage and changes in financial leverage with low percentage can influence the cash flow which is positive. In other words, increase in financial leverage will raise cash flow of the company and afterwards, cash flow of operational activities and financing will increase but no relationship between financial leverage and cash flow has not been observed. In another research under the title of analysis of relationships between capital structure and changes in companies in Tehran Stock Exchange that has been conducted by Davoud Hossein Pour Behabadi in his M.sc.in Tehran university these results have been achieved that there is no statistical significance between changes in ratio of debts to the salaries of stockholders and changes in company values in selected industries. Industries under research are car industry and manufacturing parts, non-metallic materials, pharmaceutical and foods. The effect of capital structure on return on stocks was the topic of another research by Mehdi Freydouni at Alame Tabatabaee University in 1386. The main hypothesis of the researcher is that there is statistical significance between capital structure and return on stocks of companies in Tehran Stock Exchange. The findings showed that there is no statistical significance between the ratios of debt based on book value to return on stocks but there is weak relationship between market capitalization and return on stocks.

4. Research hypotheses

In total, there are four hypotheses (including 2 main hypotheses and two subsidiary hypotheses) are as follows:

The first main hypothesis: there is statistical significance between operational leverage and the ratio of book value to stock market capitalization of companies.

The second main hypothesis: there is statistical hypothesis between financial leverage and the ratio of book value to stock market capitalization of companies.

The first subsidiary hypothesis: there is significant difference between operational leverage and ratio of book value to stock market capitalization of companies in various industries.

The second subsidiary hypothesis: there is significant difference between financial leverage and the ratio of book value to the stock market capitalization.

5. Methodology of research

This research is semi experimental one that has been carried out by taking gradual steps such as statement of the problem, hypothesis, collection and classification of data, analysis of data, test of hypothesis and in the end, reporting. In this research, the necessary information to test the hypothesis has been gathered from the data in Tehran Stock Exchange. Besides, this research is practical. To analyze and to investigate the existence or lack of correlation between variables, and to answer this question that whether there is logical relationship and correlation between two dependent and independent variables or not, the researcher will use Spearman test. Regarding the model of this research having both temporal and space dimension, methods of econometrics in this research is regression panel data. In this research, at first, Measures of *Central* Tendency and dispersion will be investigated and whether the relationship between dependent and independent variable is linear or nonlinear will be investigated by using scatter plot. Using Spearman correlation coefficient test and analytical panel data test, the researcher will investigate the variables that have linear relation to dependent variables.

5.1. Statistical population

All companies in Tehran Stock Exchange between the years 1386 and 1391 is the statistical population of the current research. The hypotheses will be investigated in connection to this statistical population. Due to vast volume of statistical population and lack of coordination between members of the population, the following condition have been chosen for the selection of statistical sampling, and therefore this sample has been chosen using systematic. These conditions are:

1. Companies that has been admitted up to 1382/12/29 in Tehran Stock Exchange
2. The last financial year of companies must be Esfand.
3. The company must not be investor.

4. The necessary information of companies, in particular, accompanying notes of financial balance sheet should be accessible.

Regarding all these conditions among 329 companies in ones working Tehran Stock Exchange in 1391, the statistical population of this research consists of 75 companies or 375 (company- year) has been chosen. Considering the fact that the hypotheses of this research has been tested in various industries, the selected companies are based and categorized on 5 industries of chemical, plastic and cellulose (10 companies) in food and medicine industries (20 companies), in non-metallic ore and cement industries (13 companies), in metallic ore and basic metals (11 companies) in machinery, car and parts (21 industries).

5.2. Research variables and Measurement Method of Variables

The necessary data for this research has been extracted from financial balance sheets and its accompanying notes of companies, the published information by Tehran Stock Exchange between the years 1386 to 1391 and Tadbirpardaz softwares and Rahavard Novin. To determine the price of each share and turnover of stocks, the researcher has used the companies that Tehran Stock Exchange has analyzed officially their daily and annual trades. The necessary data to calculate the financial and operational leverage for each profit of share, the final price of sold goods and the operational profit has been extracted from financial balance sheets.

5.3. Calculating the financial leverage and its interpretation

The financial leverage is factor of financial risk and is caused by stable financial expenditure. To calculate the amount of financial leverage, ESP or percentage of shift in each profit of share is divided by percentage of shift in gross profit (EBIT).

Example: assume that the profit for each share in companies in 1386 and 1387 is 100 and 120 Rials respectively. In addition, the operational profit before any tax subtraction for the aforementioned companies is 160 and 180 million Rial. Therefore, the financial leverage is 1.6:

$$FL = \frac{\frac{120 - 100}{100}}{\frac{180.000.000 - 160.000.000}{160.000.000}} = 1/6$$

The above number indicates that if the profit decreases before interest and tax by 10 percent, it means that 180 million Rial has been subtracted from 162 million and the profit for each share will be reduced by 16 percent; that is to say, 100/8 million Rial will be taken away.

5.4. The operational leverage and its interpretation

The relationship between income out of selling and the gross profit shows that the operational leverage is factor of operational risks and is caused by constant expenditure. Determining the fixed operational expenditure in selling and plan the budget like betterment and long-term properties, bureaucratic constant expenditure, advertisement and marketing, toll and insurance and so forth are considered to be in operational leverage. These expenditures give rise to this fact that if one department increase its sale, the profit will rise gradually because at constant level of sale, the fixed expenditure will be covered. Increase in sale does not change the expenditure and namely, it is not dependent on volume of sale. In other words, if there is change in one percent of sale, operational profit will change more than one percent. These factors that measure the changes are called degree of operating leverage 5 and it is obtained by dividing change percentage by gross profit by percentage of shift in production amount. In this respect, at first the volume of production must be homogenized in order to calculate the production level, but homogenizing the production level in company is less reliable as well as the complication and the calculation difficulties involved in the task. To tackle the problem, the final price namely the rial equivalence of production level has been used.

Example: assume the final price of sold product in one selected company in 1386 and 1387 is 400 and 500 million rials. Furthermore, the operational profit before tax has been taken away for the aforementioned companies for the above years is 160 and 180 million rial respectively. Therefore, the operating leverage is 0/5.

$$OL = \frac{\frac{180.000.000 - 160.000.000}{160.000.000}}{\frac{500.000.000 - 400.000.000}{400.000.000}} = 0.5$$

This number shows that if the final price of sold product increases by 10 percent, i.e. 500 million rial adds to the total 550 millions, the gross profit will be increased by 5 percent, that is to say, 180 million rials will be added to 189 millions.

5.5. The ratio of the book value to the market capitalization

This ratio indicates that percentage of book value of company stocks to the market capitalization.

The book value of stock is total of salaries of stockholders when preferred stocks have been taken away. The market capitalization is sale price of one property if a security of one company has been dealing in stock exchange. The transaction price confirms the market capitalization.

5.6. The descriptive statistics

In this section, the analysis of data has been conducted using the central indicators like average and median and dispersion indicators like the standard deviation, Skewness and Kurtosis.

Table 1. Description of research variable values

Kind of industry	Mea	Median	Std.	Skewness	Kurtosis
<i>Chemical industry, plastic and cellulose</i>					
Operational leverage	2.254	1.099	5.5247	1.67	8.024
Financial leverage	.616	1.003	1.3796	-.632	1.36
Ratio of book value to market cap	257	.215	.4326	.55	.21
<i>Food and medicines</i>					
Operational leverage	1.259	1.044	4.2742	2.20	16.07
Financial leverage	.670	.938	2.3983	-.432	10.65
Ratio of book value to market cap	.223	.150	.4999	.94	1.17
<i>Non-metallic and cement</i>					
Operational leverage	1.795	.527	6.9007	2.53	12.44
Financial leverage	.572	.986	2.9881	-1.706	11.76
Ratio of book value to market cap	.588	.330	.7938	1.18	1.17
<i>Metallic ore and basic metals</i>					
Operational leverage	.939	.785	2.8362	-.034	2.45
Financial leverage	1.467	1.064	3.9035	.69	3.68
Ratio of book value to market cap	.317	.140	.6821	1.06	.91
<i>Machinery, cars and parts</i>					
Operational leverage	1.024	.566	3.0805	.48	7.84
Financial leverage	.691	.871	3.0796	-.137	5.18
Ratio of book value to market cap	.393	.240	.6858	1.06	1.12

The average shows the middle amount of data. The median indicates that 50 percent of data is less than the average and 50 percent is more than the average. Proximity of average and median shows the symmetry of data. Standard deviation shows the dispersion. The Skewness is indicator for the symmetry of data. If the Skewness of variable is more than the numerical value of 1.96, distribution of data is asymmetrical. Positive Skewness shows that numbers far from the average are on the right side of scope and negative Skewness shows that the numbers far from average are on the left side of scope. In the end, kurtosis is the peak or acme of probable distribution. If kurtosis of variables is more than the numerical value of 1/96, the distribution of variables around average is dense and the height of diagram to the normal distribution is more.

6. Test of hypotheses

The first subsidiary hypothesis: there is significant difference between operational leverage and ratio of book value to stock market capitalization of companies in various industries.

To investigate the relationship in ratio of book value to the market capitalization and operating leverage and in case these two variables are normal, the simplest method for analysis of simple correlation is the use of Pearson analytical correlation. Pearson correlation coefficient shows the linear relationship between two variables and if hypotheses are valid, the test of spearman correlation is stronger.

Table 2. Results of Spearman correlation coefficient between two dependent and independent variables in selected industries

The ratio of book value to market cap			Kind of Industry
PSC	Sig	N	
-.063	.666	50	Chemical industry
-.121	.234	99	Food and medicines
-.088	.524	55	Non-metallic and cement
-.287*	.037	53	Metallic ore and basic metals
-.317**	.001	103	Machinery, cars and parts

- *Correlation is significant at the 0.05 level
- ** Correlation is significant at the 0.01 level

Pearson correlation value for metallic ore and basic metals industries and also machinery, car and its parts is significant because the level of significance for these are 0/037 and 0/001 and both numbers are less than 0/05. The relationship is negative and inverse, i.e. increase in one reduces another. With regard to lack of statistical significance between operating leverage and the ratio of book value and market capitalization in chemical, plastic and cellulose industries, food and medicine industries and non-metallic ore and cement industries while there is statistical significance in metallic ore, basic metals, machinery car and its parts industries, the hypothesis stating there is no statistical significance between operating leverage and the ratio of book value to market capitalization of company stocks will be rejected and the hypothesis will be valid. To analyze the relationship between the ratio of book value to market capitalization and operating leverage using panel analysis, the following model is involved;

$$y_i = \alpha + \beta_1 X_1 + \varepsilon_i \quad (1)$$

Where:

y_i is the ratio of book value to the market capitalization, X_1 is the operating leverage, ε_i is random error and α, β_1 are the model parameters that show the slope and width from the origin. The hypothesis is shown in the following model:

$$\begin{cases} H_0 : \beta_1 = 0 \\ H_1 : \beta_1 \neq 0 \end{cases} \quad (2)$$

In the following tables the results are shown:

Table 3. Results of panel data test in food and medicine industry- first subsidiary hypothesis

Dependent variable: ratio of book value to market capitalization				
Variable	Coefficients	SD	T value	P value
Constant value	0.236	0.085	2.784	0.007
Operational leverage	-0.014	0.009	-1.550	0.124
Coefficient of Determination	0.015	Average of dependent variable		0.218
Coefficient of Determination of adjusted	0.004	SD of dependent variable		0.499

Regression standard deviation	0.498	Akaike criterion	1.463
sum of squares of residual	24.054	Schwartz criterion	1.516
Likelihood Ratio Test	-70.441	F value	1.435
Durbin Watson Statistics	2.176	Probability value	0.234

Table 4. Results of panel data in metallic ore and basic metals industry – first subsidiary hypothesis

Dependent variable: ratio of book value to market capitalization				
Variable	Coefficients	SD	T value	P value
Constant value	0.5783	0.130	4.409	0.000
Operational leverage	-0.010	0.009	-1.137	0.261
Coefficient of Determination	0.008	Average of dependent variable		0.551
Coefficient of Determination of adjusted	-0.011	SD of dependent variable		0.751
Regression standard deviation	0.755	Akaike criterion		2.311
sum of squares of residual	30.188	Schwartz criterion		2.384
Likelihood Ratio Test	-61.545	F value		0.410
Durbin Watson Statistics	2.231	Probability value		0.525

Table 5. Results of panel data in non-metallic ore and cement industry – first subsidiary hypothesis

Dependent variable: ratio of book value to market capitalization				
Variable	Coefficients	SD	T value	P value
Constant value	0.399	0.043	9.247	0.000
Operational leverage	-0.070	0.023	-3.020	0.004
Coefficient of Determination	0.083	Average of dependent variable		0.334
Coefficient of Determination of adjusted	0.065	SD of dependent variable		0.688
Regression standard deviation	0.666	Akaike criterion		2.061
sum of squares of residual	22.590	Schwartz criterion		2.135
Likelihood Ratio Test	-52.604	F value		4.592
Durbin Watson Statistics	1.617	Probability value		0.037

Table 6. Results of panel data in machinery, cars and parts industry – first subsidiary hypothesis

Dependent variable: ratio of book value to market capitalization				
Variable	Coefficients	SD	T value	P value
Constant value	0.463	0.078	5.916	0.000
Operational leverage	-0.071	0.027	-2.663	0.009
Coefficient of Determination	0.101	Average of dependent variable		0.391
Coefficient of Determination of adjusted	0.092	SD of dependent variable		0.689
Regression standard deviation	0.656	Akaike criterion		2.015
sum of squares of residual	43.524	Schwartz criterion		2.066
Likelihood Ratio Test	-1010787	F value		11.287
Durbin Watson Statistics	2.325	Probability value		0.001

P value or sig level F for metallic and basic metals and also for machinery, car and part is 0/037 and 0/001 respectively. These amounts are less than 0/05. Therefore, the null hypothesis at the level of confidence of 95 percent will be rejected, i.e. at the confidence level of 95 percent there is significant model. But the value of sig level of F indicates lack of significant model or lack of relationship between two variables in industries because the level sig in these industries is more than 0/05. The null hypothesis, i.e. lack of relationship in these industries at the confidence level of 95 percent will not be rejected. The value of coefficient of determination is noticeable in metallic ore and basic metals industries and also machinery, car and its part and these values are 0/08 and 0/10. In other words, in these industries nearly 8 and 10 percent of changes in dependent variable can be indicated by independent variable. Although this value show lack of strong relationship but in practice this value is considerable. This indicator shows the intensity

of relationship between variables. In other industries, this value is under 2 percent. These values of Durbin Watson Statistics are slightly different from value 2. Values close to two indicates lack of self-correlation of remaining which is the presupposition of models.

Akaike and Schwarts criteria are criteria that are used for comparison other models. The less these two values are, the more suitable the model is. Likelihood Ratio Test has different interpretations. Other indicators of the above table are to determine the value F and t and they have no use alone.

To estimate the coefficients, these presuppositions can be conducted using of statistic value t. null hypothesis and the following hypothesis is to test these and is as follows:

$$\begin{cases} H_0 : \alpha = 0 \\ H_1 : \alpha \neq 0 \\ H_0 : \beta_1 = 0 \\ H_1 : \beta_1 \neq 0 \end{cases} \quad (3)$$

To facilitate the task at hand, some amount of sig level can be used to reject or to accept the null hypothesis. As it can be seen in the above tables the t value for metallic ore and basic metal industries and machinery, cars and its parts is -3/020 and -2/663 respectively that are placed in area of rejecting the null hypothesis. In other words, the line slope is significant in these two industries. Moreover, t value can be placed in the area of null hypothesis width at the origin that shows constant significance in all industries. Because the only model for these two industries in significant, the model in these two industries is as follows:

For metallic ore and basic metal:

$$\text{Model 1 } Y_i = 0/399 - 0/07X_{1i} \quad (4)$$

For machinery, cars and its part:

$$\text{Model 2 } Y_i = 0/463 - 0/071X_{1i} \quad (5)$$

The relationship between the operating leverage and the ratio of book value to market capitalization is negative, i.e. there will be reduction by 0/07 in dependent variable per one unit increase.

The second subsidiary hypothesis: there is significant difference between financial leverage and the ratio of book value to the stock market capitalization. To investigate the relationship between ratio of book value to the market capitalization and operating leverage and in case these two variables are normal, the simplest method for analysis of simple correlation is the use of Pearson analytical correlation. Pearson correlation coefficient shows the linear relationship between two variables.

Table 7. Results of correlation coefficient between two variables of dependent and independent in selected industries- the second subsidiary hypothesis

The ratio of book value to market cap			Kind of Industry
PSC	Sig	N	
-.038	.792	50	Chemical industry financial leverage
.141	.164	99	Food and medicines
-.104	.435	59	Non-metallic and cement
.235	.085	55	Metallic ore and basic metals
.030	.769	98	Machinery, cars and parts

The value of Pearson correlation is not significant for all the industries at the confidence level of 95 percent because the value of significant level is more than 0/05. Regarding the fact that the null hypothesis based on the relationship between the financial leverage and the ratio of book value to market capitalization of company stocks, where there is no significant difference in various industries, cannot be rejected. Analysis of the relationship between the ratio of book value to market capitalization and financial

leverage using the panel analysis. This section deal with the analysis and estimation of model by means of I panel analysis:

$$y_i = \alpha + \beta_1 X_2 + \varepsilon_i \quad (6)$$

y_i is the ratio of book value to the market capitalization, X_1 is the operating leverage, ε_i is random error and α, β_1 are the model parameters that show the slope and width from the origin. The hypothesis is shown in the following model:

$$\begin{cases} H_0 : \beta_1 = 0 \\ H_1 : \beta_1 \neq 0 \end{cases} \quad (7)$$

Table 8. The results of panel analysis in chemical, plastic and cellulose industries- the second subsidiary hypothesis

Dependent variable: ratio of book value to market capitalization				
Variable	Coefficients	SD	T value	P value
Constant value	0.264	0.070	3.799	0.000
Operational leverage	-0.012	0.315	-0.315	0.754
Coefficient of Determination	0.001	Average of dependent variable		0.257
Coefficient of Determination of adjusted	-0.019	SD of dependent variable		0.433
Regression standard deviation	0.437	Akaike criterion		1.221
sum of squares of residual	9.160	Schwartz criterion		1.297
Likelihood Ratio Test	-28.517	F value		0.070
Durbin Watson Statistics	1.915	Probability value		0.793

Table 9. The results of panel analysis in Food and medicine industries- the second subsidiary hypothesis

Dependent variable: ratio of book value to market capitalization				
Variable	Coefficients	SD	T value	P value
Constant value	0.188	0.086	2.178	0.032
Operational leverage	0.028	0.005	5.784	0.000
Coefficient of Determination	0.020	Average of dependent variable		0.207
Coefficient of Determination of adjusted	0.010	SD of dependent variable		0.474
Regression standard deviation	0.472	Akaike criterion		1.356
sum of squares of residual	21.602	Schwartz criterion		1.408
Likelihood Ratio Test	-65.119	F value		1.968
Durbin Watson Statistics	2.270	Probability value		0.164

Table 10. The results of panel analysis in non-metallic and cement industries- the second subsidiary hypothesis

Dependent variable: ratio of book value to market capitalization				
Variable	Coefficients	SD	T value	P value
Constant value	0.616	0.132	4.676	0.000
Operational leverage	-0.027	0.017	-1.572	0.122
Coefficient of Determination	0.011	Average of dependent variable		0.600
Coefficient of Determination of adjusted	-0.007	SD of dependent variable		0.804
Regression standard deviation	0.806	Akaike criterion		2.440
sum of squares of residual	37.044	Schwartz criterion		2.511
Likelihood Ratio Test	-69.587	F value		0.619
Durbin Watson Statistics	2.501	Probability value		0.435

Table 11. The results of panel analysis in metallic ore and basic metals industries- the second subsidiary hypothesis

Dependent variable: ratio of book value to market capitalization				
Variable	Coefficients	SD	T value	P value
Constant value	0.257	0.067	3.854	0.000
Operational leverage	0.041	0.029	1.417	0.162
Coefficient of Determination	0.055	Average of dependent variable		0.317
Coefficient of Determination of adjusted	0.037	SD of dependent variable		0.682
Regression standard deviation	0.669	Akaike criterion		2.069
sum of squares of residual	23.717	Schwartz criterion		2.142
Likelihood Ratio Test	-54.910	F value		3.085
Durbin Watson Statistics	0.085	Probability value		2.256

Table 12. The results of panel analysis in machinery, cars and parts industries-the second subsidiary hypothesis

Dependent variable: ratio of book value to market capitalization				
Variable	Coefficients	SD	T value	P value
Constant value	0.369	0.047	7.789	0.000
Operational leverage	0.007	0.018	0.360	0.720
Coefficient of Determination	0.001	Average of dependent variable		0.374
Coefficient of Determination of adjusted	-0.010	SD of dependent variable		0.661
Regression standard deviation	0.664	Akaike criterion		2.039
sum of squares of residual	42.319	Schwartz criterion		2.092
Likelihood Ratio Test	-97.909	F value		0.086
Durbin Watson Statistics	2.065	Probability value		0.770

F values of significance level show the lack of significance of model or lack of relationship between two variables in all industries because the values of sig level in these industries is more than 0/05. The null hypothesis, i.e. lack of relationship for these industries will not be rejected at the confidence level of 95.

The first main hypothesis: there is statistical significance between operational leverage and the ratio of book value to stock market capitalization of companies.

Table 13. The results of Pearson correlation test between two dependent and independent variable- the first main hypothesis

		Ratio of book value to market cap	Financial leverage
The ratio of book value to market cap	Pearson Correlation	1	-.148**
	Sig. (2-tailed)		.005
	N	370	360
Financial leverage	Pearson Correlation	-.148**	1
	Sig. (2-tailed)	.005	
	N	360	365

** Correlation is significant at the 0.01 level (2-tailed).

The value of sig level is 0/005 and because it is less than 0/05 this is significant and the relationship is negative and its value is -0/15 that is slightly small. That is to say, the relationship between two variables is slightly weak but it is significant. This section deal with the analysis and estimation of model by means of I panel analysis:

$$y_i = \alpha + \beta_1 X_2 + \varepsilon_i \quad (8)$$

y_i is the ratio of book value to the market capitalization, X_1 is the operating leverage, ϵ_i is random error and α, β_1 are the model parameters that show the slope and width from the origin. The hypothesis is shown in the following model:

$$\begin{cases} H_0 : \beta_1 = 0 \\ H_1 : \beta_1 \neq 0 \end{cases} \quad (9)$$

Table 14. The results of panel analysis between two dependent and independent variables-first main hypotheses

Dependent variable: ratio of book value to market capitalization				
variable	Coefficients	SD	T value	P value
Constant value	0.370	0.065	10.764	0.000
Operational leverage	-0.021	0.012	-2.83	0.005
Coefficient of Determination	0.022	Average of dependent variable		0.341
Coefficient of Determination of adjusted	0.019	SD of dependent variable		0.628
Regression standard deviation	0.622	Akaike criterion		1.893
sum of squares of residual	138.463	Schwartz criterion		19.15
Likelihood Ratio Test	-338.827	F value		8.016
Durbin Watson Statistics	2.054	Probability value		0.005

P value of F is 0/005 for the model. Therefore, there is statistical significance between operating leverage and the ratio of book value to market capitalization. The value of coefficient of determination is 0/022 for this model showing weak relationship for this model. The values of Durbin Watson Statistics is 2/054 that indicates lack of self-correlation between remaining. The value of t is -2/83 for the slope that is placed in the null hypothesis. That is to say, the relationship between the operating leverage and the ratio of book value to market capitalization is significant. The width from origin or constant value is significant.

$$Y_i = 0/370 - 0/021X_{li} \text{ Model 3} \quad (10)$$

The relationship between the operating value and the ratio of book value to the market capitalization is negative, i.e. dependent variable reduces by 0/021 for one unit increase.

The second main hypothesis: there is statistical hypothesis between financial leverage and the ratio of book value to stock market capitalization of companies.

Table 15. The results Pearson coefficient test between two dependent and independent variables-the first main hypothesis

		Ratio of book value to market cap	Financial leverage
The ratio of book value to market cap	Pearson Correlation	1	-.058**
	Sig. (2-tailed)		.005
	N	370	360
Financial leverage	Pearson Correlation	.058**	1
	Sig. (2-tailed)	.005	
	N	360	365

** Correlation is significant at the 0.01 level (2-tailed).

The value of sig level is 0/247 and because it is not less than 0/05 the correlation value is not significant and there is no significant relationship between two variables. This section deal with the analysis and estimation of model by means of I panel analysis:

$$y_i = \alpha + \beta_1 X_2 + \varepsilon_i \quad (11)$$

y_i is the ratio of book value to the market capitalization, X_1 is the operating leverage, ε_i is random error and α , β_1 are the model parameters that show the slope and width from the origin. The following table shows the results of panel data:

Table 16. The results of panel analysis test between two dependent and independent variables- the second main hypothesis

Dependent variable: ratio of book value to market capitalization				
Variable	Coefficients	SD	T value	P value
Constant value	0.330	0.062	53.67	0.000
Operational leverage	0.013	0.010	1.285	0.200
Coefficient of Determination	0.003	Average of dependent variable		0.340
Coefficient of Determination of adjusted	0.001	SD of dependent variable		0.629
Regression standard deviation	0.629	Akaike criterion		1.915
sum of squares of residual	141.89/69	Schwartz criterion		1.937
Likelihood Ratio Test	-343.654	F value		1.199
Durbin Watson Statistics	2.164	Probability value		0.274

p value of F is 0/247 for the model. Therefore, there is no statistical relationship between financial leverage and the ratio of book value to market capitalization. The value of coefficient of determination is 0/003 for the model showing weak relationship for this model. The values of Durbin Watson Statistics is 2/164 that indicates lack of self-correlation between remaining. t statistic for the slope is 1/285 that is placed in acceptance of null hypothesis. That is to say, there is no statistical relationship between financial leverage and the ratio of book value to market capitalization. The width from the origin is constant and it is significant for the model.

First main hypothesis	Operating leverage	Acceptance of research hypothesis	✗	✓	✗	✓
Second main hypothesis	Financial leverage	Rejection of research hypothesis	✓	✗	✓	✗
The first subsidiary hypothesis	Operating leverage	Acceptance of research hypothesis	✗	✓	✗	✓
The second subsidiary hypothesis	Financial leverage	Rejection of research hypothesis	✓	✗	✓	✗

The dependent variable of ratio of book value to market cap				Acceptance or rejection of research hypothesis	Dependent variable	Hypothesis
Regression analysis		Pearson correlation				
$\beta \neq 0$	$\beta = 0$	$\rho \neq 0$	$\rho = 0$			

7. Conclusions

Regarding the negative relationship between operating leverage and the ratio of book value to market capitalization signifying the effect of investors' decisions and effect of change in ratios and combination of constant expenditure and the operational variables on company values, it might be suggested that managers of companies take heed of investors' reactions and market when deciding and managers can help investors to make the right and meaningful decision by providing them with correct and on-the-dot information. Moreover, managers of companies must pay attention to this point that although some of their decisions can increase the operation risks, if these are logical, correct and efficient, the feedback of investor and market capital will be positive and will increase the company value.

The findings of this research show using the debt in changing the value of companies is not very effective and sometimes it has inverse effect and companies could be successful in taxing advantage. Therefore, it might be suggested that managers pay close attention to debt and keep it at good level by

using financial investigations because it is possible that high debts can have negative effect on the price of company stocks. Furthermore, the findings show changes in company value is dependent on other factors and stockholders notice them most. For example, political factors and psychological pressures can be effective. So, the researcher suggests providing information and clarification in market capital in order to reduce the effects, and these must be the basis of making right decision for investors.

One of the strategies of investment is to have stock portfolio on the basis of ratio of book value to market capitalization. Considering the findings and result of this research, it is possible to be aware of the operating risks if stock portfolio is created on the basis the aforementioned strategy. For example, if portfolio is made out of stocks with the ratio of book value to low market capitalization (growth portfolio), there is more operating risk in comparison to portfolio made out of stocks with the ratio of book value to market capitalization (value portfolio).

8. Suggestion for further research

The findings of this research is indicative of the fact that there is weak relationship between operating leverage and the ratio of book value to market capitalization and only two percent if these changes in value can affect the changes in operating leverage and the company value is mainly influenced by factors not investigated in this study. These factors can be effective in making decisions and evaluating the beneficiaries of company. So other similar researcher might be suggested to expand this topic; for example the effect of political events on company value.

As it was said before one of the usage of ratio of book value to market capitalization is the use of this as the risk indicator in research. It might be suggested that in future research, capability of risks such as profit risk, inflation rate risk, inability –to–pay risk, exchange rate risk, interest rate risk and so on) should be analyzed using the ratio of book value to market capitalization.

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