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### Investigating the Relationship between Accounting Information and Systematic Risk of Common Stock of Listed Companies in Tehran Stock Exchange

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#### ABSTRACT

The difference of systematic risks among companies may be due to company's financial decision makings, additionally, accounting information and consequently financial ratios are also affected by financial decision makings. Therefore, the relationship between systematic risk of common stock and financial ratios can be perceived. The main purpose of this paper is investigating the relationship between accounting information and systematic risk of common stock of listed companies in Tehran Stock Exchange. In terms of goal, this research is applied one and in terms of data collection method is descriptive and correlation type. Statistical population involves all listed companies in the stock exchange and the minimum number of samples to test hypotheses is 90 companies within 2008 to 2012. In order to analyze the data of present study, first exploratory factor analysis is used for identifying general factors and then using multiple regression analysis, the effect of identified factors on dependent variable of systematic risk of common stock will be investigated. The significance test of patterns is conducted from statistics. The results illustrate that there is a significant relationship between two factors of leverage ratios and dividend policy.

**Keywords:** Systematic risk, financial ratios, financial data, exploratory factor analysis method.

#### 1. INTRODUCTION

Risk and return have a pivotal role in investment. In the occasions that future events aren't predictable profoundly and some events are referent compared to the other ones, there is a risk factor. [1]

There are two types of risk: systematic and non-systematic risk

Non-systematic risk can be eliminated through diversifying but systematic one cannot be eliminated through diversifying and copying to such risk, the investors ask the risk. Systematic risk indicator is the basis for the market of a share which demonstrates the rate of stock sensitivity of a company or particular assets related to market risk causing factors.

This issue can be raised that the difference of systematic risks among companies may be due to company's financial decision makings [2], additionally, accounting information and consequently financial ratios are also affected by financial decision makings. Therefore, this question is raised if there is a relationship between systematic risk of common stock and financial ratios.

In another word:

Are financial ratios capable of explaining systematic risk of common stock?

The questions and hypotheses of research:

**Research questions:** Is there a significant relationship between systematic risk of common stock and financial ratios?

**Research hypotheses:** There is a significant relationship between systematic risk of common stock and financial ratios.

## 2. THE THEORETICAL PRINCIPLES AND RESEARCH LITERATURE

### 2.1. Theoretical Foundations of Research:

**Rate of return:** it is a rate which is calculated considering stock dividend and changes of stock price as well as the effects caused by increasing the asset and share profit.

**Systematic risk (beta):** It is known as a part of risk that cannot be reduced through diversifying stock. Measuring criterion of systematic risk is beta that measures the proximity of return rate volatility s of a type of securities compared to return rates of all available securities in market and it is calculated through the equation below:

$$\beta = \frac{\text{Cov}(R_m, R_i)}{\delta^2_{rm}} \quad (1)$$

**Accounting beta:** It is regression coefficient of accounting profits of a company with market profit index, stock price index (rate of market return), stock price index, total index of Tehran stock exchange. Considering the volatility of index and returns will be calculated in cash.

**Accounting information:** The accounting information which has been used in this paper includes 10 financial ratios which involve the ratio of total debt to equity, net working capital to total assets, the ratio of operational profit to total assets, the ratio of cost of sold good to total assets, the ratio of cash dividend to available profit for common stockholders, the ratio of current asset to current debt, the ratio of total debt to whole assets, the ratio of long-term debt to equity, net working capital to the sale, the ratio of the cost of sold good to the good inventory.

## **2.2. Research literature**

Beaver Keller and Scholes (1970), based on common sense, they chose seven variables including the percentage of cash profit payment (cash profit to dividend), the growth of the assets, financial leverage, liquidity, the size of company, variability of profit and accounting beta which seemed to be in relation with risk. The relationship of these variables with beta at company level as well as portfolios consisting of 5 companies were investigated. The result indicated that 4 variables including the percentage of profit sharing, financial leverage, variability of profit and accounting beta within both two periods and for both two companies and portfolios had statistically significant relationship at probability level 1% [3].

Hamada (1972) tested the effect of capital structure on systematic risk of common stock. He concluded that systematic risk of the company which has debt is more than average beta of company without debt [4].

William Breen and Lerner (1973) investigated the effect of a number of financial variables (such as the ratio of debt to equity, the size of company, the ratio of paid profit and the number of exchanged stocks) on beta in their research. Obtained results of this research indicated that although some of financial variables weren't statistically significant, the indicators of estimated coefficients all were consistent with financial theories. For example, there was a negative relationship between the size of company and the ratio of paid profit with systematic risk and the relationship between the number of exchanged stock with risk was positive [5].

Lev (1974) conducted a study namely the relationship between operational leverage and risk. First, theoretically he proved that risk (general and systematic) has a positive relationship with operational leverage and negative relationship with variable expenses. The obtained results all agreed the hypotheses of the study that is variable expenses have negative relationship with both two types of risk (general and systematic) and operational leverage had positive relationship with both two types of risk [6].

Benzion and Shalit (1975) conducted a research about the relationship with determining factors of companies' stock risk. They investigated the effect of financial leverage, the size of the company and paid profit on systematic risk (beta). The results illustrated that beta has positive relationship with financial leverage and negative relationship with paid profit and the size of the company. Belcoei (1978) selected 15 financial ratios and based on factor analysis method, tested the relationship of 4 ratios of the cost of sold good, the sum of assets, cash profit to the profit of each share, current asset to current debt and long-term debt to equity with systematic risk. The results of this study showed that there is a significant relationship between systematic risk of common stock and the above mentioned ratios. Study area was Canada, the number of sample companies included 55 companies and the study was conducted within time period of 1971 to 1974 [7].

Jahankhani and Ling (1980) conducted a research about the effect of the policies of commercial banks on the risk. Their purpose of doing such a research was finding out the effect of financial policies of banks' management which is stated in financial statement of accounting ratios (financial) on the process of creating risk (systematic and total risk). The used financial ratios in this study included the ratio of paid profit, financial leverage, the coefficient of variation amount of the deposit, the coefficient of variation earnings per share, the ratio of loan to the deposit, the rate of burned loans, the rate of liquidity. The results indicate that about 25% of beta variations and 43% of variations in total risk can be justified by selected financial ratios [8].

Salmi, Virtanen, Olli and Kallunki (1997) investigated the relationship between the financial ratios and a set of market variables (return rate, total risk and systematic risk). Independent variables included 20 financial ratios and dependent variables included return rate, total risk and systematic risk. Time period of this research was within 1976 to 1993 which had been divided into three periods of five years 1976-1981, 1982-1987 and 1988 and 1993. The results showed that there is an instable relationship between financial ratios and market variables. In another word the relationship between financial ratios and market variables changed within time. In another section of this research, financial ratios reduced from 20 ratios to 6 key ratios. Fast ratio, debt to capital, return of equity, total assets turnover, the flow of cash to the sale. The result showed that there is a significant relationship between above-mentioned financial ratios and market variables [9].

In Iran, Mr. Mohammadpur (1999) developed and tested a model for predicting systematic risk using accounting information. Using one-variable regression, the relationship of financial leverage, the degree of operational leverage, the size of the company and sale with systematic risk (beta) was investigated. The results showed that financial leverage has a direct relationship with risk and the size of company has a reverse relationship with risk but operational leverage didn't have significant relationship with risk [10].

Mr. Ghalibaf (1999) investigated and tested the relationship between financial leverage, systematic risk and non-systematic risk. The result of his research illustrated that there is no significant relationship between financial leverage and systematic risk as well as financial leverage and non-systematic risk [11].

### **Development of Hypotheses and Conceptual Model**

Based on mentioned information, the following conceptual model is presented. In designing such a model, causal order and priority and posteriority of factors should be considered and this relationship is developed based on inference and deduction of researcher from the subject.

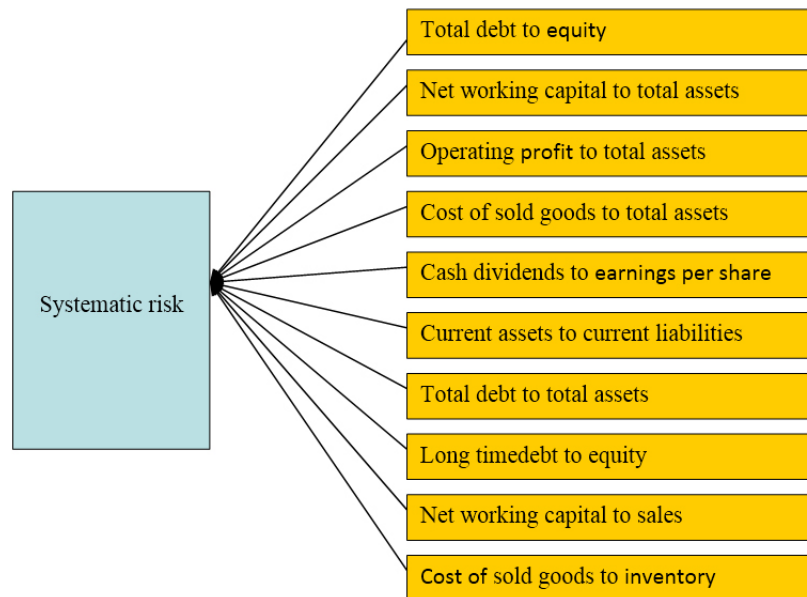
Designing such as model is of a great importance due to three reasons:

1. Most of conducted research in the past represented separated and uncoordinated attempts for research and test on limited aspects of general models while the current one investigates these factors in relations with each other and simultaneously.
2. The attempts of previous researches have been conducted in various sections of time in different textures and different statistical population. It has been tried in the current study to have simultaneous attempts and in relation with united statistical sample and population.
3. The plan of research for this type of studies in the past sometimes opposed with each other. In some cases, the expressions and definitions as well as making variable functional are inconsistent with each other in these studies. [12]

### **3. METHODOLOGY**

Required information in this study have been extracted out of the text of financial statements, the announcements of companies' assemblies and monthly and annual reports of Tehran Stock Exchange. After collecting data through the above mentioned method, research variables will be calculated using excel spreadsheet software. In fact, the data has been collected from secondary reference that is organizational

documents published in CD of Stock Exchange information company. In this research, statistical population includes all listed companies in Tehran Stock Exchange which have the following features:



**Figure 1: Research conceptual model**

- They have to be accepted in Tehran Stock Exchange at least till the end of 2007.
- Its stock has been changed commonly in Tehran Stock Exchange within 2008 to 2012.
- The end of their fiscal year should be April.
- It shouldn't be investment company.

Considering the three above mentioned limitations, 90 companies were investigated as the statistical population of this research that all were selected as sample.

The beta of Tehran Stock Exchange will be calculated through the formula below.

$$\frac{\text{Cov}(R_i, R_m)}{\sigma_m^2} \quad (2)$$

Using factor analysis method, required financial ratios will be selected to use in regression. Using multi-variable regression, the relationship between the beta of Tehran Stock Exchange companies and financial ratios (which have been identified in level 2) will be tested.

Dependent variable in this study is systematic risk of common stock. Systematic risk depends on the rate of stock return and market portfolio's return. Therefore, the measuring method of stock return rate and market portfolio's return rate will be stated and then the way of calculating the systematic risk will be explained.

### **(a) Stock Return Rate**

The factors which are effective on return rate of whole stock are:

The stock price at the beginning of period, the stock price at the end of the period, cash profit of each share, the number of stock at the beginning of period and the number of stock at the end of the period.

The number of increased stock include stock of cash deposits and stock of reserves or retained earnings. Therefore, the comprehensive formula below will be used for calculating return rate of stock in the study companies:

$$R_i = \frac{(P_t - P_{t-1}) + (D_t) + \frac{(P_t - P_n) \times N_C}{N_t} + \frac{N_e \times P_t}{N_t}}{P_{t-1}} \quad (3)$$

In which:

$R_i$ : stock monthly total return rate compared to the price of first period

$P_{t-1}$ : the price of stock at the beginning of the month

$P_t$ : the price of stock at the end of each month

$P_n$ : nominal value of each share

$D_t$ : cash profit of each share

$N_c$ : the number of increased stock from cash deposit

$N_e$ : the number of increased stock of reserves or retained earnings

$N_t$ : the number of stock before increasing the capital

### (b) Rate of Return on the Market Portfolio

To calculate rate of return on the market portfolio, the following formula will be used:

$$R_m = \frac{I_t - I_{t-1}}{I_{t-1}} \quad (4)$$

In which:

$R_m$ : monthly rate returns of the market portfolio

$I_{t-1}$ : Tehran Stock Exchange stock price index at the beginning of each month

$I_t$ : Tehran Stock Exchange stock price index at the end of each month

$\beta$ : Systematic risk of common stock

to calculate systematic risk  $\beta$ , the following formula is used.

$$\beta = \frac{\text{Cov}(R_i, R_m)}{\sigma^2(R_m)} \quad (5)$$

In which

$\beta$ : systematic risk of common stock

$R_i$ : return rate of common stock of company  $i$

$R_m$ : market portfolio return rate

Systematic risk of study companies in this research will be calculated based on 5-year return rates within 1997 to 2001 (60 monthly observations).

Independent variable is a feature or characteristic which after selection will be intervened or manipulated by the researcher and gets some values due to its effect on dependent variable can be observed.

Independent variables which have been used in this study include 10 financial ratios which have been calculated based on 5-year average within 2008 to 2012.

To calculate beta, monthly stock return of sample companies  $R_i$  and market portfolio monthly return  $R_m$  have been used.  $R_i$  and  $R_m$  have been calculated using Excel spreadsheet software. Systematic risk of each share has been calculated through the formula below:

$$\beta = \frac{\text{Cov}(R_i, R_m)}{\sigma_m^2} \quad (6)$$

Independent variables include 10 variables with the acronym of  $x_1$  to  $x_{10}$  and dependent variable is systematic risk of each share with the acronym of  $b$ . acronym and complete name of research variables have been shown in Table 1. Descriptive indicators of variables, the results of relationship and the correlation of study variables with each other have been also mentioned in Tables 2 and 3 respectively based on Pearson index.

**Table 1**  
**Acronym and complete name of research variables**

<i>The full name of research variables</i>	<i>Variable</i>
Risk	B
Total debt to equity	$x_1$
Net working capital to total assets	$x_2$
Operating profit to total assets	$x_3$
Cost of sold goods to total assets	$x_4$
Cash dividends to earnings per share	$x_5$
Current assets to current liabilities	$x_6$
Total debt to total assets	$x_7$
Long time debt to equity	$x_8$
Net working capital to sales	$x_9$
Cost of sold goods to inventory	$x_{10}$

The results of multi regression of independent and dependent variables show that among 10 independent variables, only two variables have significant partial coefficient and coefficient of determination with the value of 0.31 shows that 0.31 of changes in dependent variable can be justified using dependent variables. Moreover, tolerance values show that there is a collinearity relationship between independent.



**Table 2**  
**Descriptive indexes of variables**

<i>Variable</i>	<i>Count</i>	<i>Average</i>	<i>Standard deviation</i>	<i>Variance</i>	<i>Skewness</i>	<i>Kurtosis</i>
Risk	90	.5686	.39918	.159	.510	-.020
Total debt to equity	90	3.1143	1.79847	3.235	1.601	3.246
Net working capital to total assets	90	.0589	.14497	.021	-1.077	1.869
Operating profit to total assets	90	.2204	.09893	.010	-.094	.027
Cost of sold goods to total assets	90	.6224	.24372	.059	.949	2.333
Cash dividends to earnings per share	90	.7660	.17328	.030	-1.974	6.767
Current assets to current liabilities	90	1.1083	.31283	.098	-.621	1.861
Total debt to total assets	90	.7133	.09285	.009	-.345	-.141
Long time debt to equity	90	.3646	.44437	.197	3.351	12.992
Net working capital to sales	90	.0420	.32037	.103	-4.976	36.164
Cost of sold goods to inventory	90	1.9097	.89654	.804	2.564	12.101

**Table 3**  
**The results of relationship and correlation of study variables with each other based on Pearson index**

<i>Variable</i>	<i>Index</i>	$\beta$	<i>x1</i>	<i>x2</i>	<i>x3</i>	<i>x4</i>	<i>x5</i>	<i>x6</i>	<i>x7</i>	<i>x8</i>	<i>x9</i>	<i>x10</i>
$\beta$	Pearson correlation	1	.185	-.164	.221	.032	.113	-.235	.390	.104	.000	.114
	Error level		.081	.123	.036	.762	.291	.026	.000	.330	.998	.283
	Count	90	90	90	90	90	90	90	90	90	90	90
<i>x1</i>	Pearson correlation	.185	1	-.293	-.401	.145	.036	-.366	.770	.686	-.141	.013
	Error level	.081		.005	.000	.174	.733	.000	.000	.000	.186	.907
	Count	90	90	90	90	90	90	90	90	90	90	90
<i>x2</i>	Pearson correlation	-.164	-.293	1	.110	.223	-.039	.793	-.333	-.134	.828	-.228
	Error level	.123	.005		.304	.035	.718	.000	.001	.209	.000	.031
	Count	90	90	90	90	90	90	90	90	90	90	90
<i>x3</i>	Pearson correlation	.221	-.401	.110	1	.017	.424	.110	-.150	-.440	.235	.100
	Error level	.036	.000	.304		.870	.000	.303	.159	.000	.026	.351
	Count	90	90	90	90	90	90	90	90	90	90	90
<i>x4</i>	Pearson correlation	.032	.145	.223	.017	1	.254	.073	.243	-.149	.208	.702
	Error level	.762	.174	.035	.870		.016	.495	.021	.162	.049	.000
	Count	90	90	90	90	90	90	90	90	90	90	90
<i>x5</i>	Pearson correlation	.113	.036	-.039	.424	.254	1	-.112	.240	-.105	.235	.142
	Error level	.291	.733	.718	.000	.016		.292	.022	.323	.026	.181
	Count	90	90	90	90	90	90	90	90	90	90	90
<i>x6</i>	Pearson correlation	-.235	-.366	.793	.110	.073	-.112	1	-.451	-.134	.649	-.193
	Error level	.026	.000	.000	.303	.495	.292		.000	.207	.000	.068
	Count	90	90	90	90	90	90	90	90	90	90	90
<i>x7</i>	Pearson correlation	.390	.770	-.333	-.150	.243	.240	-.451	1	.395	-.151	.136
	Error level	.000	.000	.001	.159	.021	.022	.000		.000	.155	.200
	Count	90	90	90	90	90	90	90	90	90	90	90



<i>Variable</i>	<i>Index</i>	$\beta$	$x1$	$x2$	$x3$	$x4$	$x5$	$x6$	$x7$	$x8$	$x9$	$x10$
x8	Pearson correlation	.104	.686	-.134	-.440	-.149	-.105	-.134	.395	1	-.055	-.109
	Error level	.330	.000	.209	.000	.162	.323	.207	.000		.605	.305
	Count	90	90	90	90	90	90	90	90	90	90	90
x9	Pearson correlation	.000	-.141	.828	.235	.208	.235	.649	-.151	-.055	1	-.171
	Error level	.998	.186	.000	.026	.049	.026	.000	.155	.605		.108
	Count	90	90	90	90	90	90	90	90	90	90	90
x10	Pearson correlation	.114	.013	-.228	.100	.702	.142	-.193	.136	-.109	-.171	1
	Error level	.283	.907	.031	.351	.000	.181	.068	.200	.305	.108	
	Count	90	90	90	90	90	90	90	90	90	90	90

variables. The presence of collinearity relationship among independent variables violates one of assumption of linear model (multiple collinearity). The results of this test have been shown in table 4. Tolerance shows the power of collinearity relationship among independent variables and whatever it is closer to 1 means a small part of its distribution in an independent variable can be justify by other independent variables and the value near to zero shows that a variable is almost a linear combination of other independent variables. The values close to zero show tolerance of most of independent variables that in the following model, collinearity relationship of model is serious and obtained results cannot be relied. To solve this problem, factor analysis has been used.

**Table 4**  
**t-test for the significance of independent variables**

<i>Significant</i>	<i>T</i>	<i>Standard coefficients</i>		<i>Non-standard coefficients</i>	<i>Variables</i>
		<i>BETA</i>	<i>Standard error</i>	<i>B</i>	
0.222	-1.230		0.541	-0.066	Fixed
0.185	-1.336	-0.298	0.049	-0.066	X1
0.511	-0.661	-0.181	0.754	-0.498	X2
0.015	2.484	0.314	0.510	1.267	X3
0.813	-0.238	-0.054	0.367	-0.087	X4
0.082	-1.759	-0.225	0.295	-0.519	X5
0.314	-1.014	-0.167	0.210	-0.213	X6
0.001	3.371	0.568	0.724	2.440	X7
0.289	1.067	0.169	0.142	0.152	X8
0.125	1.549	0.315	0.253	0.392	X9
0.693	0.396	0.078	0.087	0.035	X10

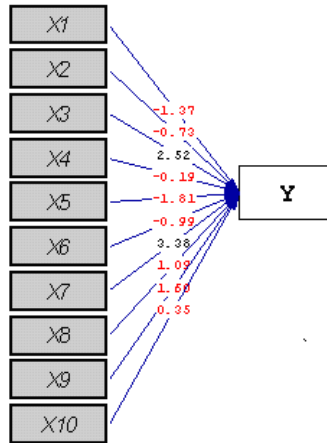
**Table 5**  
**The results of analyzing regression of 10 independent variables with dependent variable of systematic risk**

<i>Research variables</i>	<i>Coefficients</i>		<i>T statistic</i>	<i>Error level</i>	<i>Tolerance</i>
	<i>Not standardized</i>	<i>Standardized</i>			
Constant coefficients	-.666		-1.230	.222	
Total debt to equity	-.066	-.298	-1.336	.185	.178
Net working capital to total assets	-.498	-.181	-.661	.511	.118

Research variables	Coefficients		T statistic	Error level	Tolerance
	Not standardized	Standardized			
Operating profit to total assets	1.267	.314	2.484	.015	.551
Cost of sold goods to total assets	-.087	-.053	-.238	.813	.176
Cash dividends to earnings per share	-.519	-.225	-1.759	.082	.536
Current assets to current liabilities	-.213	-.167	-1.014	.314	.324
Total debt to total assets	2.440	.568	3.371	.001	.311
Long time debt to equity	.152	.169	1.067	.289	.351
Net working capital to sales	.392	.315	1.549	.125	.213
Cost of sold goods to inventory	.035	.078	.396	.693	.230

#### 4. DATA ANALYSIS

The diagram of relationship between independent variables with dependent one has been shown below based on *t* statistics:



**Figure 2: The relationship between independent variables with dependent one based on *t*-statistic**

Among 10 input variables of financial ratios in the analysis, three variables in first factor, three variables in second factor, two variables in third factor and two variables have been inserted in fourth factor. These results have been shown in Tables 6 and 7.

Considering the weight of each one of financial ratios in each factor as well as the type and nature of financial ratios which have been embedded in each one of factors, the similarity of variables of each factor and their common features, four factors respectively, first one relates to liquidity ratios, second one relates to leverage ratios, third factor relates to activity ratios and fourth one relates to dividend policy. Identified factors and their relevant variables have been shown in Table 8.

**Table 6**  
**Bartlett and KMO test result for the financial ratios variables**

KMO scale statistic		0.527
Bartlett's test	Chi-square	578.136
	Degrees of freedom	45
	Significance level	0.000

**Table 7**

**The results of factor analysis based on a specific value, percentage explained variance and cumulative**

<i>Nick name</i>	<i>Variable names</i>	<i>Factor 1</i>	<i>Factor 2</i>	<i>Factor 3</i>	<i>Factor 4</i>
$x_2$	Net working capital to total assets	.952			
$x_9$	Net working capital to sales	.903			
$x_6$	Current assets to current liabilities	.855			
$x_1$	Total debt to equity		.933		
$x_0$	Total debt to total assets		.803		
$x_8$	Long time debt to equity		.789		
$x_4$	Cost of sold goods to total assets			.926	
$x_{10}$	Cost of sold goods to inventory			.903	
$x_5$	Cash dividends to earnings per share				.870
$x_3$	Operating profit to total assets				.758
Equity		3.277	2.038	1.886	1.249
The percentage of explained variance by each factor		26.507	24.532	17.737	15.718
The percentage of explained cumulative variance by each factor		26.507	51.040	68.777	84.495

**Table 8**

**The values of load factors after Varimax rotation**

<i>Independent variables of research</i>	<i>Obtained factors and loaded factors</i>			
	<i>First factor</i>	<i>Second factor</i>	<i>Third factor</i>	<i>Fourth factor</i>
Total debt to equity	-.160	.933	.069	-.065
Net working capital to total assets	.952	-.147	.015	-.024
Operating profit to total assets	.064	-.423	-.010	.758
Cost of sold goods to total assets	.222	.121	.926	.110
Cash dividends to earnings per share	.027	.146	.140	.870
Current assets to current liabilities	.855	-.270	-.048	-.128
Total debt to total assets	-.255	.803	.193	.242
Long time debt to equity	.007	.789	-.187	-.270
Net working capital to sales	.903	.030	.001	.273
Cost of sold goods to inventory	-.232	-.074	.903	.040

Load factors in Table 8 show that the variables of net turnover capital to total assets and sale and current asset to current debt in factor number 1, the variables of total debt to the equity and total assets and long-term debt to the equity in factor number 2, the variable of the cost of sold good to total asset and to good inventory in factor number 3 and the variables of cash stock profit to the profit of each share and operational profit to total assets are inserted in factor number four.

**Table 9**

**The name of identified factors based on the similarity among variables of each factor**

<i>Nick name</i>	<i>Factor Name</i>	<i>Financial ratio</i>
X1	Liquidity ratios	Net working capital to total assets and sales and current assets to current liabilities
X2	Leverage Ratios	Total debt to equity and total assets and longtimedebt to equity
X3	Activity ratios	Cost of sold goods to total assets and inventory
X4	Dividend policy	Cash dividends to earnings per share and operating profit to total assets

The results have shown that about 85% of changes can be explained by four obtained factors. Considering that the relationship among these factors with dependent variable of systematic risk of common stock using multi regression analysis is considered, therefore, each one of factors is required to be regarded as a variable and inserted in regression equation as independent variable with dependent variable of systematic risk of common stock. Thus, the data of each factor which is the scale of factor and obtained using software as standard values with factor mean of zero, have been used. Descriptive indicators of factors' scale show that first factor has 90 observed values which has mean of zero, 0.1789 as median, 1 as standard deviation and variance, skewness of -1.736 and kurtosis of 6.652. Second factor has 90 observed values which has mean of zero, -0.1344 as median, 1 as standard deviation and variance, skewness of 1.314 and kurtosis of 3.610. Third factor has 90 observed values which has mean of zero, -0.1446 as median, 1 as standard deviation and variance, skewness of 1.956 and kurtosis of 7.635. Fourth factor has 90 observed values which has mean of zero, 0.0053 as median, 1 as standard deviation and variance, skewness of -1.554 and kurtosis of 5.530.

**Table 10**  
**Descriptive indexes of extracted factors with standard scores**

	<i>Count</i>	<i>Average</i>	<i>Standard Deviation</i>	<i>Variance</i>	<i>Skewness</i>	<i>Kurtosis</i>	<i>Count</i>
First factor	90	0	.1789420	1	1	-1.736	6.652
Second factor	90	0	-.1344888	1	1	1.314	3.610
Third factor	90	0	-.1446386	1	1	1.957	7.635
Fourth factor	90	0	.0053238	1	1	-1.554	5.530

## 5. DISCUSSION AND CONCLUSION

The effect of four factors of financial ratios as independent and predictor variables has been tested on dependent variable of systematic risk of common stock using multi regression analysis of least Squares. Calculated *f* statistic with the value of  $f = 3.390$  is bigger than critical one in confident level of 95 percent and in another word calculated significance level is less than 0.05. as the result null hypothesis on the basis that “there isn’t a significance relationship between systematic risk of common stock and financial ratios” will be rejected with 95% confident level and the opposite hypothesis has been confirmed as correct hypothesis. This test shows that among independent variables, at least one variable has a linear relationship with dependent one. This test is a general one and cannot show the details of results. The result of general tests has been shown in Table 11. To investigate and test the coefficients of each one of independent variables, partial coefficients test has been used. Statistical function of analysis model is as below:

$$y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + e \quad (7)$$

In which:

*a*: fixed value

$x_1$ : liquidity ratios

$x_2$ : leverage ratios

$x_3$ : activity ratios

$x_4$ : dividend policy

Partial coefficients test shows that the coefficients of two factors of leverage ratios and dividend are significant and the coefficients of two factors of liquidity ratios and activity ratios aren't significant. The results have been shown in Table 12. Therefore, dependent variable of systematic risk of commons stock will be significantly affected by leverage ratios and dividend policy. The value of multi correlation 0.371 and coefficient of determination 0.138 and moderated coefficient of determination is 0.097. As the result, considering general coefficient test, null hypothesis is rejected and the research hypothesis is confirmed and considering the results of partial coefficients, among four factors of financial ratios, two factors have significant relationship with systematic risk of common stock. As the result, null hypothesis indicative of "lack of significant relationship between systematic risk of common stock and financial ratios" has been rejected. Therefore, there is a significant relationship between systematic risk of common stock and financial ratios.

The fitted model of four factors on dependent variable of risk is as below using non-standard coefficients:

**Formula 8:**

$$\text{Systematic risk of common stock} = 0/569 - /057 \times \mathbf{X}_1 + 0/086 \times \mathbf{X}_2 + 0/020 \times \mathbf{X}_3 + 0/105 \times \mathbf{X}_4$$

According to the standardized coefficients, fitted model is as below:

**Formula 9:**

$$\text{Systematic risk of common stock} = -0/142 \times \mathbf{X}_1 + 0/215 \times \mathbf{X}_2 + 0/049 \times \mathbf{X}_3 + 0/262 \times \mathbf{X}_4$$

**Table 11**  
**The result of general test of regression of identified factors on risk variable**

<i>Model</i>	<i>Average of squares</i>	<i>F statistic</i>	<i>Significance level</i>	<i>Test result</i>
Regression	0.488	3.390	0.013	At least one of the factors is effective

**Table 12**  
**The results of partial coefficient test of regression of identified factors on risk variable**

<i>Model parameters</i>	<i>Not standardized coefficients</i>	<i>Standardized coefficients</i>	<i>Amount of t</i>	<i>Significance level</i>
Constant coefficients	.569		14.219	.000
Liquidity ratios	-.057	-.142	-1.415	.161
Leverage ratios	.086	.215	2.133	.036
Activity ratios	.020	.049	.486	.628
Dividend policy	.105	.262	2.603	.011

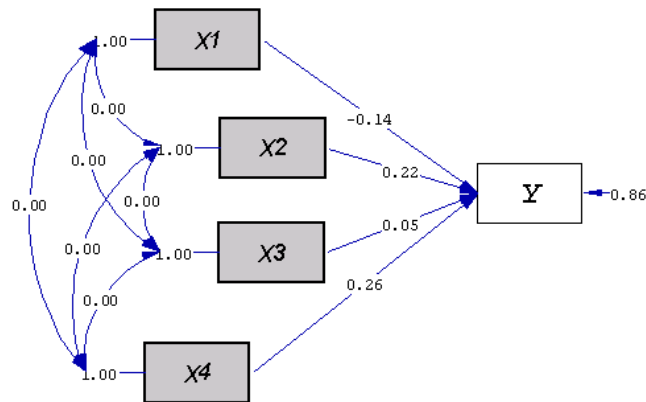
The results of correlation of identified factors with the variable of systematic risk of common stock before regression show that the correlation between dependent variable of risk with first factor is negative but not significant. The correlation of second and fourth factors with dependent variable of systematic risk of common stock is positive and significant. The correlation of third factor with systematic risk of common stock is positive but not significant. The correlation among extracted factors with each other is zero. The results of Pearson correlation test of identified factors with dependent variable have been shown in Table 13. The results of correlation and covariance among extracted factors have been shown in Table 14. The results show that there is no correlation among four extracted factors and changes between them is zero.

**Table 13**  
The results of correlation coefficient test among identified factors with dependent variable

Variable	Index names	Risk	First factor	Second factor	Third factor	Fourth factor
Risk	Pearson correlation	1	-.142	.215	.049	.262
	Significance level		.180	.042	.647	.013
	Count	90	90	90	90	90
First factor	Pearson correlation	-.142	1	.000	.000	.000
	Significance level	.180		1.000	1.000	1.000
	Count	90	90	90	90	90
Second factor	Pearson correlation	.215	.000	1	.000	.000
	Significance level	.042	1.000		1.000	1.000
	Count	90	90	90	90	90
Third factor	Pearson correlation	.049	.000	.000	1	.000
	Significance level	.647	1.000	1.000		1.000
	Count	90	90	90	90	90
Fourth factor	Pearson correlation	.262	.000	.000	.000	1
	Significance level	.013	1.000	1.000	1.000	
	Count	90	90	90	90	90

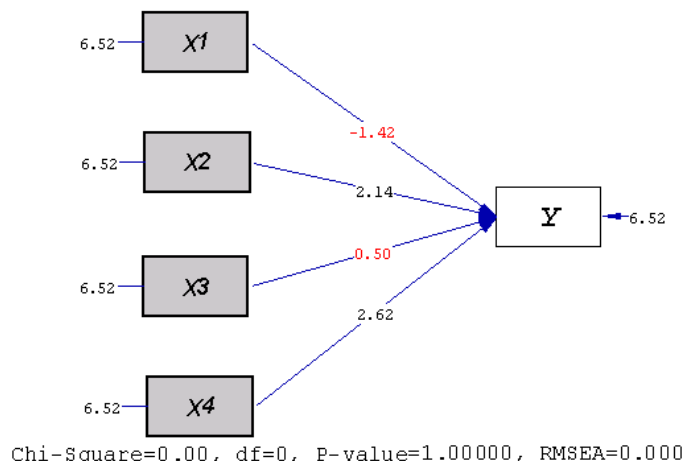
**Table 14**  
Correlation coefficient and changes among extracted identified factors with each other

Index	Factors	Fourth factor	Third factor	Second factor	First factor
Correlation	Fourth factor	1.000	.000	.000	.000
	Third factor	.000	1.000	.000	.000
	Second factor	.000	.000	1.000	.000
	First factor	.000	.000	.000	1.000
Covariance	Fourth factor	.002	.000	.000	.000
	Third factor	.000	.002	.000	.000
	Second factor	.000	.000	.002	.000
	First factor	.000	.000	.000	.002



Chi-Square=0.00, df=0, P-value=1.00000, RMSEA=0.000

**Figure 3: The standardized beta coefficients of extracted factors based on dependent variable**



**Figure 4: The values and t-statistics of extracted factors in relation with dependent variable**

The diagrams above show that the effect of first factor relates to financial statements which means liquidity ratios on systematic risk of common stock with standardized value 0.14 is negative. T-statistic with the value of  $-1.42$  show that the effect of this factor isn't significant. The effect of third factor on financial statements that is activity ratios on systematic risk of common stock with standardized value 0.05 is positive but t-statistic with the value of 0.50 shows that the effect of this factor isn't significant. The effect of second factor related to financial statements that is leverage ratios on systematic risk of common stock with standardized value 0.22 is positive. T-statistic with the value of 2.14 shows that the effect of this factor is positive and significant. Also The effect of fourth factor related to financial statements that is dividend ratios on systematic risk of common stock with standardized value 0.26 is positive. T-statistic with the value of 2.62 shows that the effect of this factor is positive and significant. Generally, and simultaneously, the effect of fourth factor that is dividend policy has the most effect on dependent variable of systematic risk of common stock. The results of investigation illustrate that there is a significant relationship between financial ratios and systematic risk of common stock.

## 6. RECOMMENDATIONS

Risk has been always in front of investors as a prohibiting barrier. Successful investors have had discretionary management on risk. Risk management requires technical knowledge and wide informational facilities and processing it which isn't obviously available for all investors so Tehran Stock Exchange is required to give necessary facilities about consulting and cooperation and information such as the rate of systematic and non-systematic risk of listed companies in Stock Exchange to the potential and current investors taking advantage of financial experts and analysts.

Since determining the best financial supply or in another word capital structure is on managers of the companies and considering the results which showed systematic risk and financial leverage are in accordance with each other, so the managers are recommended to pay particular attention to financial leverage and risk index while they are providing short-term and long-term supply.

Tehran Stock Exchange as an organized center of trading in Iran should calculate the index of systematic risk of common stock  $\beta$  of listed companies in the Stock Exchange and give it to the investors to enable them select their desired securities based on their degree of risk taking.



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