The Effect of Systemic Risk on Earnings Quality of Listed Companies in Tehran Stock Exchange

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**ABSTRACT**

This is an applied research and its main purpose is to evaluate the relationship between systemic risk and earnings quality. For this purpose, we have used the information existed in the financial statements of 98 companies listed in Tehran Stock Exchange for the period of 2007 to 2013. Assessment measure of systemic risk is beta coefficient which is calculated using the capital asset pricing model. In order to measure earnings quality, three variables including stability, prediction value and gains flexibility were used. Testing the hypothesis of the research is done using analysis of Panel and the combination of time-series and cross-sectional data. Results show that the systematic risk has a positive correlation with variables of earnings stability and dividends and it has a negative correlation with the variability of the gain productivity.

**INTRODUCTION**

Earnings is one of the most important measures in decision making about investment. It reflects the corporate performance. Measuring earnings is done based on some elements including sale rate, earnings, pricing etc. This process is full of estimations, rough calculations, coordination, various methods and different judgments and separates real and reported earnings. Therefore, accounting earnings is not a good criterion for investment decisions. Accordingly, the concept of earnings quality is introduced to help investors to make decisions. Another factor affecting investment decisions are attention paid to risk by investors and investment return. Investors try to invest on something to gain maximum return with minimum risk. According to importance of investors existence in Stock market, the most important tools for providing the most appropriate environment to attract investors are identifying earnings sensitivity and economic tools. With respect to various restraints in using economic tools, it is obvious that these tools are used by investors in stock market. Therefore, precise identification of the effects of important macro-economic variables including systematic risk is useful for investors to make fruitful decisions. The role systematic risk plays in earnings quality shows that if systematic risk is high, then corporate nominal earnings will increase after awhile without increase of earningsability. If nominal earnings increases, then nominal price of share increases leading to reduction of share value. Therefore, increase of systematic risk reduces the corporate real value. On the other hand, increase of systematic risk increases interest rate expected by investors. Consequently, cash depreciation and monetary expenditures increase. High systematic risk leads to slower economic growth and lower institutional earningsability. Systematic risk reduces the saving rate and increases investment expenditure. In this way, total expenditure of production will increase too.

2-Theoretical Principles:
2-1- Earnings quality:

There is no definite definition for earnings quality. Sigal claimed that earnings quality is not easy to define. Buish introduced multiple definitions for earnings quality. According to Catherine and Vinsent, earnings quality is somehow close to Hiks’ definition of earnings meaning that the earnings close to Hiks earnings is of high quality. It is worth nothing that according to Hiks, earnings is a consumption value in company so that corporate economic value in the first period is the same as economic value in the last period. This measure is
indicating variability of economic assets. The concept of earnings quality is defined based on relation between earnings, liabilities and cash. In this definition, high-quality earnings is the predictable earnings close to cash. Accordingly, liabilities reduce earnings quality. There are numerous measures for earnings quality. Earnings stability includes current earnings. More earnings stability is a reflection of corporate power to keep current earnings. In this way, it is assumed that company has higher earnings quality. Predictability, variability, relation between earnings and liabilities and cash flows are the criteria to investigate earnings quality.

2-2- Risk:
Generally, risk is defined as a possibility of an action or reaction leading to loss or outputs and undesired and unwanted consequences. All human attempts include some degrees of risk. Anyway, some processes have higher level of risk. According to financial literature, risk is defined as unexpected events which are emerged as changes in assets or debts value. Institutions face different versions of risk. Risks are divided into two groups: commercial risk and non-commercial risks. Market risk is classified into two groups: systematic risk and non-systematic risk. Non-systematic risk is a kind of risk incurred by certain corporate features including investment structure. Systematic risk is due to market and economic revolution. It is not company-specified. On the other hand, systematic risk is emerged following market movements. According to portfolio theories, non-systematic risk can be eliminated by diversifying portfolio while systematic risk could not be eliminated. Beta is a measure to investigate coordination of corporate movement at the same pace of market and economic movements. It is not company-specified. As a matter of fact, systematic risk is emerged following market movements. Beta is a measure to investigate coordination of corporate movement at the same pace of market and economic movements.

2-3- Beta explanation:
If beta coefficient of a share is one, it is proved that covariance of that share return and market portfolio equal one. Beta coefficient is useful to predict earnings variability of share with respect to market. If beta coefficient of corporate share is bigger than one, then variability of share price is more than of market. If beta is 2, then covariance of that share is twice bigger than variance portfolio return. It is obvious that coordination of share return is twice bigger than variance of market index. Consequently, if share price index changes, it is expected that that share return undergoes severe changes and fluctuations. Additionally, beta coefficient determines changes. There is no cause-and-effect relation. Beta coefficient only indicates the variability of share return with regard to variability of market index [1].

3-Literature:
Namazi and Khajavi [2] investigated the effects of accounting variables on systematic risk prediction of companies listed in Tehran stock market. Results show that at simple regression level, there is a meaningful relation between 12 research variables and systematic risk. Additionally, in model planning stage, it can be seen that 8 research variables including net earnings to sale rate ratio, operational leverage, financial leverage, sale growth, sixing, earnings coordination index and earnings variability index are able to predict systematic risk variability up to 85%. Rezazadeh and Zaheri [6] investigated the relation between systematic risk, non-obligatory liabilities and financial inabilities of companies listed in Tehran stock market. They concluded that:

In Iran stock market, share price is a factor to predict future earnings. To predict future profitability, current profitability to share price ratio is full of extra information. To predict future profitability, liability items to current profitability ratio is full of extra information.

There is a relation between liability items and systematic risk and corporate financial inability. Consequently, liability items affect market investigation of corporate risk. Alok [7] investigated the earnings quality and response coefficient in the case in which increase of earnings stability is parallel to increase in outcome stability. Results have shown that companies with higher earnings growth and outcome increase have higher-quality earnings. Companies with earnings increase have higher future operational outcome. Research results show that companies with outcome growth have bigger earnings response coefficient. Kim and Give [10] investigated earnings quality and share return using macro-economic variables. They used liability items as the measures for investigating earnings quality. They concluded that quality of liabilities changes with macro-economic variables. As a matter of fact, companies with lower liabilities are vulnerable to macro-economic movements and shocks. Protty and Vigenhofer investigated the earnings quality and extra return. Their results have shown that abnormal liabilities and higher coordination reduce earnings quality.

4- Methodology:
This research is an applied one. Based on correlation and methodology, this paper is of semi-experimental type in accounting proved research domain. It is conducted by real information of financial statements.
4-1- statistical population and sample:
In this research, financial statements of companies listed in Tehran stock market for the period of 2007 to 2013 are scrutinized. Among statistical population, companies with the following features are selected as statistical sample:
They should not be among banks, financial institutions, investment institutions, holding and leasing institutions because according to their specific operation, the relation between under-study components are quite different or the mentioned institutions. This relation is not able to be generalized.
Companies should be accepted in Tehran stock market before the end of the year (2006). They had not to be exiled from Tehran stock market during 2007-2013.
To follow comparability, fiscal year of companies must be 29th of Esfand of each year. Companies should not have financial changes.
Financial statements and corporate information should be available Accordingly, 98 companies have met these requirements for the years of 2007-2013.

4-2- Hypotheses:
Hypothesis 1- there is a meaningful relation between systematic risk and earnings stability
Hypothesis 2- there is a meaningful relation between systematic risk and predictability value
Hypothesis 3- there is a meaningful relation between systematic risk and earnings variability

4-3- How to calculate the variables:
Independent variable:
In this research, independent variable is beta (β) which is calculated as the following. Beta represents systematic risk. To calculate beta, corporate share return and market portfolio return are used:

\[
\beta = \frac{\text{Cov}(R_i, R_m)}{\sigma^2 R_m}
\]

B is beta, COV represents covariance and Ri is corporate return. Rm is market return and \( \sigma^2 \) represents variance.

Dependent variable:
In this research, dependent variable is corporate earnings quality. To investigate earnings quality, evaluation measures including earnings quality based on time-series of earnings features (such as earnings stability, earnings predictability value, and earnings variability) are used. Dependent variable is calculated as:

Earnings stability:
Liability items are indices of earnings stability to valuate earnings quality. Dicho and Daicho [9] model is used:

\[
\frac{\text{WCA}_{i,t}}{\text{AA}_{i,t}} = \beta_0 + \beta_1 \frac{\text{CFO}_{i,t-1}}{\text{AA}_{i,t}} + \beta_2 \frac{\text{CFO}_{i,t}}{\text{AA}_{i,t}} + \beta_3 \frac{\text{CFO}_{i,t+1}}{\text{AA}_{i,t}} + \beta_4 \frac{\Delta \text{REVENUE}_{i,t}}{\text{AA}_{i,t}} + \beta_5 \frac{\text{PPE}_{i,t}}{\text{AA}_{i,t}} + \epsilon_{i,t}
\]

Where WCAi,t is liability items of company i during the year t. it is current asset variability subtracting cash variability.
CFO: cash flow gained from transactions done by company i during the years of t-1, t and t+1
\( \Delta \text{REVENUE} \): variability of revenues
PPE: possessions, facilities and machineries
AAi,t: average asset of company i during the year t
\( \epsilon_{i,t} \): remnant of regression

Earning predictability value:
Predicting following-year cash based on current-year earnings is considered as earnings predictability criterion:

\[
\text{CFO}_{i,t+1} = \beta_0 + \beta_1 \text{OPIN}_{i,t} + \epsilon_{i,t}
\]

Where CFOi,t is cash flow of the year t+1 which is made by continuous business operations of commercial unit. OPINI,t represents operational earnings at the end of the year t which is calculated based on the differences between earnings and expenditures of operations of commercial unit.
3-2-3-4- Earnings variability:
In this method, variability is focused. According to Francois et al., earnings variability is measured based on standard deviation before unexpected items:

$$\text{Earn Var} = \delta (\text{EBEI}_{i,t})$$

EBEI$_{i,t}$ is earnings before unexpected items divided by corporate average assets.

control variable: control variables used in this research are corporate size and financial leverage

4-4- Research Model:
The following models are used to test hypotheses:
The first hypothesis testing model

$$(\text{WAC})_{i,t} = \alpha + \beta_1 \text{SR}_{i,t} + \beta_2 \text{Size}_{i,t} + \beta_3 \text{FL}_{i,t} + \epsilon_{i,t}$$

The second hypothesis testing model

$$\text{CF}_{i,t} = \alpha + \beta_1 \text{SR}_{i,t} + \beta_2 \text{Size}_{i,t} + \beta_3 \text{FL}_{i,t} + \epsilon_{i,t}$$

The third hypothesis testing model

$$\text{EARN}_{i,t} = \alpha + \beta_1 \text{SR}_{i,t} + \beta_2 \text{Size}_{i,t} + \beta_3 \text{FL}_{i,t} + \epsilon_{i,t}$$

When, WAC is evaluation of earnings stability criterion for the company $i$ during the year $t$. CF represents earnings predictability measure for the company $i$ during the year $t$. Then, SR$it$ is systematic risk for the company $i$ for the year $t$. Sizeit represent corporate size for the company $i$ for the year $t$ and FLit indicates financial leverage. $\epsilon_{i,t}$ is error for the company $i$ for the year $t$.

5- Results Investigation:
5-1- Descriptive Statistics:

<table>
<thead>
<tr>
<th>variable</th>
<th>symbol</th>
<th>minimum</th>
<th>maximum</th>
<th>mean</th>
<th>Standard deviation</th>
<th>minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta risk</td>
<td>SR</td>
<td>-3.86</td>
<td>3.820</td>
<td>0.380</td>
<td>3.240</td>
<td>0.9411</td>
</tr>
<tr>
<td>Earnings stability</td>
<td>WAC</td>
<td>-0.445</td>
<td>0.594</td>
<td>0.013</td>
<td>0.104</td>
<td>-0.445</td>
</tr>
<tr>
<td>Earnings predictability</td>
<td>CF</td>
<td>-0.690</td>
<td>0.755</td>
<td>0.177</td>
<td>0.149</td>
<td>-0.690</td>
</tr>
<tr>
<td>Earnings variability</td>
<td>EARN</td>
<td>-0.110</td>
<td>0.782</td>
<td>0.183</td>
<td>0.141</td>
<td>-0.110</td>
</tr>
<tr>
<td>Corporate size</td>
<td>Size</td>
<td>10.670</td>
<td>18.492</td>
<td>13.365</td>
<td>1.332</td>
<td>10.670</td>
</tr>
<tr>
<td>Financial leverage</td>
<td>FL</td>
<td>0.096</td>
<td>0.952</td>
<td>0.601</td>
<td>0.157</td>
<td>0.096</td>
</tr>
</tbody>
</table>

5-2- The static test:
The first hypothesis testing model using random effects method.

<table>
<thead>
<tr>
<th>symbol</th>
<th>Coefficient</th>
<th>Independen t variable</th>
<th>p-value</th>
<th>R2</th>
<th>D.W</th>
<th>Calculativ e F in white method</th>
<th>Calculati ve F in LM test</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Intercept</td>
<td>0.18</td>
<td>4.17</td>
<td>0.00</td>
<td>0.63</td>
<td>1.83</td>
<td>1.11</td>
<td>1.68</td>
</tr>
<tr>
<td>SR</td>
<td>Beta</td>
<td>-0.125</td>
<td>-4.97</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>Corporate size</td>
<td>0.96</td>
<td>2.91</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FL</td>
<td>Financial leverage</td>
<td>-0.69</td>
<td>-2.93</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dorbin-Watson variable is 1.83 indicating that there is no auto-correlation in models. LM variable is 1.68 which is smaller than $F$ variable being 4.86 at the level of 5%. Therefore, using the mentioned test confirms that there is no auto-correlation in model. White variable is 1.111 which is smaller than $F$ variable. Consequently, $H_0$ is confirmed. t, beta risk coefficient and earnings stability are 2.91 which are bigger that what is given in table. Therefore, it can be accepted that there is a meaningful relation between beta risk and earnings stability. So, the first hypothesis is verified. Additionally, results have shown that there is a positive relation between dependent variable and corporate size while there is a negative relation between dependent variable and financial leverage.
5-3- The second hypothesis testing using finite effects method:

Table 3: Results of regression of earnings predictability value via finite effects method.

<table>
<thead>
<tr>
<th>symbol</th>
<th>coefficient</th>
<th>dependent variable</th>
<th>t</th>
<th>p-value</th>
<th>R2</th>
<th>D.W</th>
<th>Calculative F in white method</th>
<th>Calculative F in LM test</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Intercept</td>
<td></td>
<td>1.21</td>
<td>2.45</td>
<td>0.0000</td>
<td>0.71</td>
<td>1.878</td>
<td>2.1</td>
<td>2.25</td>
</tr>
<tr>
<td>SR</td>
<td>Beta</td>
<td></td>
<td>-0.63</td>
<td>-4.9</td>
<td>0.0000</td>
<td>1.878</td>
<td>2.1</td>
<td>2.25</td>
<td>4.86</td>
</tr>
<tr>
<td>Size</td>
<td>Corporate size</td>
<td></td>
<td>0.37</td>
<td>2.98</td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FL</td>
<td>Financial leverage</td>
<td></td>
<td>-0.39</td>
<td>-2.91</td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

According to research results, it is explained that if beta risk increases, then earnings predictability value reduces by 0.63%. According to results, t, beta coefficient and earnings predictability value are 4.9 which are bigger than what is given in table. Therefore, beta risk negatively and meaningfully affects earnings predictability value.

Table 4: Results of regression of earnings variability via finite effects method.

<table>
<thead>
<tr>
<th>symbol</th>
<th>coefficient</th>
<th>dependent variable</th>
<th>t</th>
<th>p-value</th>
<th>R2</th>
<th>D.W</th>
<th>Calculative F in white method</th>
<th>Calculative F in LM test</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Intercept</td>
<td></td>
<td>1.38</td>
<td>3.93</td>
<td>0.0000</td>
<td>0.83</td>
<td>1.856</td>
<td>0.78</td>
<td>0.93</td>
</tr>
<tr>
<td>SR</td>
<td>Beta</td>
<td></td>
<td>0.020</td>
<td>4.359</td>
<td>0.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>Corporate size</td>
<td></td>
<td>0.28</td>
<td>2.95</td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FL</td>
<td>Financial leverage</td>
<td></td>
<td>-0.48</td>
<td>-4.21</td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

According to research results, if beta risk increases by 1%, then earnings variability increases by 0.020%. Therefore, beta risk positively and meaningfully affects earnings variability. It is concluded that there is a relation between t, beta risk and earnings variability. Consequently, the third hypothesis is verified.

Conclusion:
The role systematic risk plays on earnings quality is explained in the way that high possibility of systematic risk increases nominal earnings without real increase of profitability. If nominal earnings increase, then stock price also increases leading to reduction of stock value. Therefore, if systematic risk increases, then real stock quality reduces. On the other hand, if systematic risk increases, interest rate expected by investors increases. Consequently, depreciation rate of cash flows increases. High systematic risk leads to slow economic growth and reduces profitability of economical institutions. According to the fact that systematic risk reduces savings rate, then investment price increases. In this way, production cost increases. Accordingly, systematic risk should be focused when evaluating earnings quality. Results show that there is a negative relation between systematic risk, earnings stability and earnings predictability value. Additionally, there is a positive relation between systematic risk and earnings variability. These results are in agreement with the results of Namazi and Khajavi [2], Etemadi and Imani Barandagh, Rezazadeh and Zaheri [6], and Eshmail and Kim. In terms of impressibility of earnings quality, there is conflict between findings of Mashayekh and Ismaeili, Ramsi and Modavar and Hashemi and Dowi.

According to the effect of systematic risk on earnings quality, investors are recommended to pay attention to systematic risk in time of making economic decisions.

According to the effect of systematic risk on earnings stability, earnings predictability value and earnings quality, investors and those who deal with stock market are recommended to invest in companies with little systematic risk in order to gain higher earnings.

Stock organization is recommended to pay attention to systematic risk and to record corporate systematic risk on-line.

REFERENCES


