The Relationship between Financial Ratios and Systematic Risk in Cement Industry in Tehran Stock Exchange

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Abstract: The main aim of the research is studying the relationship of financial ratio and systematic risk in a case study of Cement Company listed in Tehran Stock Exchange. The data of a seven-year period (from 2007 to 2013) was gathered of audited financial statements and Rahavard Novin software. The case study of 25 companies has been selected by random method and applying conditions on statistical population. To achieve the goal of the research, six hypotheses were proposed. Data analysis and hypotheses testing were done by Panel Data method in Eview software. Lymr, Chow, and Breusch-Pagan tests were used to analyze the combined data. Before processing each model, a regression of Hausman test was taken to study the model of stable and random effects. In each processed model, the model and its infrastructures have been evaluated by Jarque-Bera, White, and Hardy test. Based on the gathered data of financial statements and analysis in statistical software using multivariate regression model, the obtained results of hypothesis in five percent error level showed that there is no significant relationship between quick ratio and systematic risk in the cement industry. There is no significant relationship between the revenue of stockholders' salary and systematic risk. There is a significant relationship between revenue of assets and systematic risk in the cement industry. There is no significant relationship between inventories turn over and systematic risk in the cement industry. There is a systematic risk between growth rate of earnings before interest and taxes and systematic risks in the cement industry.

Keywords: Systematic Risk– Financial Ratios- Quick Ratio- Return on Asset - Return on equity.

Introduction

Today, for attracting investors, companies try to maximize their value. Increasing income and growth are ways they consider for this purpose. In Tehran stock market, companies try to encourage investors by raising their annual interest. On the other hand, investors try to move their resources toward maximum efficiency. If they fail to achieve their intended interest, they take out their capital from stock market and invest in other activities leading to reduction of transaction in stock market and decline of stock markets. Therefore, being aware of the level of risk in companies can play a pivotal role in people's decision making (Breen & Lerner, 1973). Other side of the issue is the evaluation of management and company's performance; that is, people either inside or outside of the company can measure the performance or make relevant decisions (within organization: awarding management and so on, outside organization: one of the effective factors in decision about investment). Hence, the concept of risk, efficiency of risk and systematic risk, due to being uncontrollable, can contribute to decision made by managers and investors.

Various researches are performed over the relationship between traditional accounting variables and systematic risk. However, in present paper, it is attempted to survey the relationship between accounting variables and systematic risk of shares of cement companies admitted to Tehran stock market according to

which managers of the companies can moderate their relations, decisions and plans and investors can decide whether invest on the shares of the company or concentrate on other parts.

Theoretical basics

Concept of risk: In modern society, roughly all people are familiar with this concept and acknowledge that their life faces risk in any aspect. Traditionally, risk consists of a danger resulted from an event in the future and the higher the uncertainty, the higher the risk will be. In other words, risk gets us to situations combined of threats and opportunities. Maybe this definition can be considered as the most comprehensive definition for the risk since not only the capital world, but also natural world puts threats and opportunities together and creatures utilize the opportunities besides recognizing the threats according to their awareness and perception. There are two viewpoints regarding risk definition: first one takes all fluctuations into account and defines risk as any phenomenon which deviates the consequence expected by the investor (Gilb, 2002). Second viewpoint considers negative aspects of the fluctuations in definition of risk and defines it as the probability of reduction of income or loss of capital. In other words, this viewpoint considers the risk are probable negative fluctuation of economic efficiency in the future. Due to economic system and continuous changes in environmental factors, concept of risk is of great significance in the way of managing financial and service organizations. Like any other variable, risk can affect company's profit. Companies which can manage issues corresponding to risk, can overwhelm environmental factors. By the advance of scientific researches, risk has changes as well. At the beginning of 1900s, financial analyzers took balance sheet into account for evaluating the risk level. It means that higher indebtedness of a company would be considered as the higher risk of the company. In 1962, Graham, Dodd and Gottle in their book entitled analysis of exchange, defined and computed the risk level in terms of safety margin. This safety margin was determined according to difference between market price and real price of the exchanges (Khani and Mollaei, 2009). Essentially, they reasoned that an analyzer would compute the difference between current and actual value of the exchanges. The difference between these values represents the safety margin and determines the level of risk.

Systematic risk: Systematic risk includes a part of overall risk of exchanges which arises from the effect of factors contributing to the overall price of exchanges. In simpler words, these are risks not exclusive for a certain company and corresponds to whole market. These risks are resulted from factors affecting overall efficiency and are called systematic or uncontrollable risks. This component of risk cannot be reduced by diversification. In other words, systematic risk is the part of changeability of the efficiency of a property which is obtained by factors simultaneously affecting exchanges of the whole market. Systematic changes in efficiency can be observed with varying degrees in all of the exchanges. This means that the price of all exchanges change in accordance to each other and systematically. These changes are the result of those uncontrollable environmental factors which affect the price of all exchanges in the same manner (Hamada, 1972). Of factors contributing to systematic risk, changes in social environment, political and economic changes, commercial cycles, inflation and unemployment can be implied.

Literature review

He utilized factors such as operational, net and investors benefit in 1946-76 period and results revealed that R^2 obtained for investigated variables has 35-50% fluctuations and there is a significant correlation between systematic risk and implied accounting variables. Bowman (1979) studied the relationship between systematic risk and financial variables. Financial variables used by company include company lever, profit changes, growth, company size and policies of profit sharing. In his results, he demonstrated that there is a theoretical relationship between systematic risk and company lever and accounting beta and variables of profit changes, growth, company size and profit sharing cannot have a significant relationship with systematic risk. Miller and Modigliani (1985) performed a study to measure the effect of capital structure on systematic risk. To represent the structure, they used the ratio of debt (debts to properties). Results showed that since high level of debts makes company vulnerable to financial risk, therefore, there is a positive relationship between these variables.

Shahid et al (1994) studied the relationship between systematic risk and profit growth. Initially, they supposed that risk aversive investors expect the maximization of the company value. In this work, profit growth was defined as the growth rate in shared profit. Theoretically, they proved that systematic risk has a positive relationship with profit growth. Furthermore, they found empirical evidences from data corresponding to 651 companies during 1982-87 illustrating that systematic risk has a significant relationship with profit growth, net profit and operational profit. In this research, 11 companies admitted to Athens stock market in various industrial divisions were studied. Research was carried out in June 2, 1998 till December 30, 2004. Results show that there is a significant relationship between systematic risk and aforesaid variables. However, they failed to determine the type of this relationship.

Materials and Methods

Recent work is applied with respect to purpose and is descriptive – eventual from method point of view which tests the research hypothesis by means of conflict poll.

Research statistical population and sample: Statistical population of this research includes all cement companies admitted to Tehran stock market and by moderation using some limitations, statistical sample will be determined. Statistical sample of this work is selected by means of some limitations. In other words, selected sample of this research includes companies meeting the following conditions:
1.   Are admitted to Tehran stock market before 2007.
2.   Have no activity change in study period.
3.   Have continuous activity in this period and their shares are exchanged and they have no transaction stop.
4.   Their data is accessible during research.

Determination of third condition corresponds to computation of the index of systematic risk. Since the index of systematic risk is obtained based on timely regression of companies exchanges and market efficiency, presence of transaction stops causes the impossibility of measurement of companies' efficiency. Therefore, performing timely regression will not lead to suitable results. Stop period in exchanges is considered as much as 6 months since shorter periods will make calculation of systematic risk difficult (Raei and Saeidi, 2008). According to study period and application of above condition to statistical population, 25 cement companies were selected as summarized in table 1.

Table 1. Number of companies in statistical population and applying conditions for selecting sample.

Description	Number of companies	Companies removed in period
Statistical population	29	-
Sum of companies having operational stop for 6 months	-	4
Sum of companies having operational changefor in period	-	0
Number of companies lacking information in period	-	0
Number of companies in final sample	25	-

Model of testing research hypotheses: To test research hypotheses, following regression model will be used:
Model of testing 1st hypothesis:

$\beta_{i,t} = \alpha_0 + \alpha_1 CR_{it} + \alpha_2 LnTA_{i,t} + \alpha_3 LEV_{it} + \alpha_4 MB_{i,t} + \alpha_5 Prof_{i,t} + \alpha_6 CFO_{i,t} + \alpha_7 GRProf_{it} + \alpha_8 AGE_{it} + \varepsilon_t$

Model of testing 2nd hypothesis:

$\beta_{i,t} = \alpha_0 + \alpha_1 ROE_{it} + \alpha_2 LnTA_{i,t} + \alpha_3 LEV_{it} + \alpha_4 MB_{i,t} + \alpha_5 Prof_{i,t} + \alpha_6 CFO_{i,t} + \alpha_7 GRProf_{it} + \alpha_8 AGE_{it} + \varepsilon_t$

Model of testing 3rd hypothesis:

$\beta_{i,t} = \alpha_0 + \alpha_1 ROA_{it} + \alpha_2 LnTA_{i,t} + \alpha_3 LEV_{it} + \alpha_4 MB_{i,t} + \alpha_5 Prof_{i,t} + \alpha_6 CFO_{i,t} + \alpha_7 GRProf_{it} + \alpha_8 AGE_{it} + \varepsilon_t$

Model of testing 4th hypothesis:

$\beta_{i,t} = \alpha_0 + \alpha_1 ITR_{it} + \alpha_2 LnTA_{i,t} + \alpha_3 LEV_{it} + \alpha_4 MB_{i,t} + \alpha_5 Prof_{i,t} + \alpha_6 CFO_{i,t} + \alpha_7 GRProf_{it} + \alpha_8 AGE_{it} + \varepsilon_t$

model of testing 5th hypothesis:

$\beta_{i,t} = \alpha_0 + \alpha_1 GREBIT_{it} + \alpha_2 LnTA_{i,t} + \alpha_3 LEV_{it} + \alpha_4 MB_{i,t} + \alpha_5 Prof_{i,t} + \alpha_6 CFO_{i,t} + \alpha_7 GRProf_{it} + \alpha_8 AGE_{it} + \varepsilon_t$

Independent variables

Current ratio (CR): is the instantaneous ratio of properties to debts of company i in financial year t.

ROE: is the efficiency of salary of company i stockholders in financial year t.

ROA: is the efficiency of properties obtained by dividing before interest and tax profit by average of all properties of company i in financial year t.

ITR: inventory turnover ratio obtained by dividing final price of the product by average stock of the company i in financial year t.

GREBIT: rate of profit growth before interest and tax which is the ratio of profit growth before interest and tax through comparison of before interest and tax profit in the last report of the year which is compared with previous year report.

SIZE: size of company in terms of company value in market computed by the number of stockholders multiplied by price of company i in market in financial year t.

Dependent variable

In this paper, for each of the above hypotheses and models, dependent variable is defined as follows: Index of systematic risk (beta coefficient): this coefficient measures the sensitivity of shares efficiency to market changes rate. Higher systematic risk of the stocks will bring about more threats for the set of shares. In other words, systematic risk of shares shows the extent in which the efficiency of the share with that of other available shares. Systematic risk is a part of overall risk of exchanges resulting from factors contributing to the overall value of exchanges. According to model of pricing capital properties, expected efficiency rate of each share is computed as follows:

$$R_i = R_f + (R_m - R_f)\beta_i$$

Control variables

In this research, control variables are:

$Ln(TA_{it})$: natural logarithm of sum of properties of company i in financial year t.

LEV_{it}: overall vebt of the company i in financial year t divided by overall properties in that year.

MB_{it}: value of stock market for official value of stockholders of company i in financial year t.

$Prof_{it}$: net profit of company i divided by overall sales in financial year t.

CFO_{it}: operational cash flow of company i in financial year t.

$RGProf_{it}$: growth of operational profit for company i in financial year t.

AGE_{it}: age of company i at the end of financial year t.

Results

Results of testing 1st hypothesis: In testing 1st hypothesis, it was tested that whether there is a significant relationship between instantaneous ratio and systematic risk of the cement industry. Statistical expression of the hypothesis was as follows:

H_0: there is no significant relationship between instantaneous ratio and systematic risk in cement industry.

H_1: there is a significant relationship between instantaneous ratio and systematic risk in cement industry.

To test the hypothesis, first, for selection of constant or random effect model, Haussmann test is used. According to statistic of Haussmann test, and its probability which is less than 0.05, model of constant effects is considered better for testing 1st hypothesis. In other words, the model of constant effects for investigated year – companies is accepted for testing the hypothesis. For testing normality of error term, Jarco – Bra test was used. Results including the value of statistic of test as much as 1.590517 and statistical probability as much as 0.352042 show that in 5% error level, distribution of error terms for test model is normal.

In this work, to investigate the similarity of variance, White test is used. According to the value of F-statistic and Lagrange statistic and computed probability as much as 0.2410 and 0.0741, respectively, null hypothesis stating that error term variance is constant is not rejected and hence, we observe the similarity of the variance. It must be stated that variance of error terms is constant and it doesn't mean the rejection of hypothesis of variances similarity.

In testing self-correlation in this research, Hardy method is used. According to z-statistic of Hardy test and resultant probability which is higher than 5%, it can be concluded that there is no self-correlation between error terms of the model. Therefore, we find out that this hypothesis of classic regression model is not violated. After approval of model of constant effects and investigation of fundamental hypotheses of regression, required regression model is estimated. Significance of the model is approved by Fisher's statistical probability. Results in 5% error level demonstrated that instantaneous ratio (p: 0.3936) has no significant relationship with systematic risk. Therefore, 1st hypothesis of research is rejected.

Summary of research hypotheses tests: In investigating the hypotheses in separate models, results illustrated that all hypotheses are tested in 5% error level. Summary of results is presented in table 2 below:

Table 2. Summary of results of research hypotheses tests.

Hypothesis	Probability	Statistic	Dependent variable	Independent variable	Result
1	0.3936	0.855	Systematic Risk	Instantaneous ratio	Rejection
2	0.3282	-0.981		Efficiency of salary of stockholders	Rejection
3	0.0056	-0.117		Efficiency of properties	Approval
4	0.3097	-1.019		Inventory turnover list ratio	Rejection
5	0.0002	-4.5183		Ratio of profit growth before interest and tex	Approval

Conclusion

In testing 1st hypothesis, this hypothesis was tested that there is a significant relationship between instantaneous ratio and systemic risk in cement industry. Results in 5% error level showed that there is no significant relationship between instantaneous ratio and systematic risk in cement industry. Therefore, null hypothesis in 5% error level is approved and 1st hypothesis was rejected. It must be noted that instantaneous ratio is an index for evaluation of the capability of the commercial unit for paying back the creditors from their instantaneous properties which failed to represent a relationship between one variable and risk in the sample of cement companies.it means that for calculation and prediction of systematic risk in this industry, instantaneous ratio cannot be used. Results are not compatible with that of Borde (1998) and Namazi and Khajavi (2004). Results of 2nd hypothesis showed no significant relationship between efficiency of salary of stockholders and systematic risk. Therefore, null hypothesis for 5% error level is approved and research hypothesis is rejected. In addition, for testing 3rd hypothesis, results in 5% error level indicate the significant relationship between efficiency of properties and systematic risk. Therefore, null hypothesis is not approved in 5% error level and 3rd hypothesis is approved. Results are in agreement with Borde (1998).

Results of 4th hypothesis showed no significant relationship between inventory turnover ratio and systematic risk. Therefore, null hypothesis for 5% error level is approved and research 4th hypothesis is rejected. On the other hand Ahmad Pour (1998) found no significant relationship between inventory turnover and systematic risk. Results of 5th hypothesis in 5% error level showed that rate of profit growth before interest and tax, has a significant relationship with systematic risk. Therefore, null hypothesis in this error level is rejected and 5th hypothesis is approved. Negative sign resulting from the factor between profit growth rate and systematic rate illustrates the fact that profiting companies have lower risk and majority of investors intend to study the profit and loss of the commercial unit. Such view is the result of the fact that companies can supply more cash flow for extending activities and improving financial conditions if their profitability trend is appropriate and is suitably growing. Results are compatible with that of Namazi and Khajavi (2004). On the contrary, Moyer and Chatfield (1983) found a negative relationship between these variables. Moreover, Borde (1998) discovered that there is a positive relationship between growth and systematic risk.

Conflict of interest

The authors declare no conflict of interest

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