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Examination of relation between value at risk and risk of stock price reduction in companies listed in Tehran Stock Exchange

Parvin Rahmati *, Elmira Emsia, Elahe Sarfi

Accounting Department, Damghan Branch, Islamic Azad University, Damghan, Iran

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ABSTRACT

Risk of stock prices falling in the market is one of the main concerns of investors and models that can predict this matter have great importance in the capital market. Value at Risk generally measures risk and is as one of the key tools for risk management. VAR measures worst loss expected under normal market conditions during a specified period. The aim of this study was to investigate the relationship between the value at risk and reducing the risk of stock price falling from the perspective of the usefulness of information accounting and risk management. This research is a functional and a descriptive correlation (non-experimental) research. Results of this study reflect the significance of the relationship between the value at risk and reducing risk of stock price falling of listed companies in Tehran Stock Exchange between years 2006-2014.

1. Introduction

The most important concepts in making investment decisions (within portfolio) are efficiency and risk. We say there is a risk whenever future events (Realization of Expected Return rate) are not entirely predictable and there is a difference between the rates of “Expected Returns” and “real return”. The existence of risk means that there is more than one result for predicting future and none of the results (achieved outcomes) are certain (Raie and Telongy, 2004). The relationship between return and risk a “positive” relationship, it means that the higher the expected return is desired, the risk will be higher (Raie and Telongy, 2004). So investors will be in a dilemma, because they should incur more risk in return for greater efficiency, on the other hand index of risk aversion is particularly evident among investors. In fact, investors are looking for investment with minimum risk and maximum efficiency (Raie and Telongy, 2004). And hence the portfolio selection models and various risk measurement criteria have been provided by financial experts that by having details of portfolio efficacy and risk are in search of the best available and efficient combination of efficiency and risk. These optimum points are placed on a curve called "efficient frontier" (Tehrani, 2007).

Thus the term "risk management" is propounded. Risk management is the goodness through which an organization or investor respond to a variety of risks with optimal method. Risk management helps investors in terms of "uncertainty". Nowadays organizations are successful that overcome the circumstances and these circumstances do not lead to their downfall. Accordingly, risk management initially identifies different types of risks and then specifies its control method (Raie and Telongy, 2004).

According to the economic system and continues changes in environmental factors, Risk management have achieved great importance in method of financial and service institutions management. Risk management can be like any other variables that affect company profits. Companies that are able to manage risk issues in better ways can dominate environmental factors (Parsaiean, 1999). And because the decisions related to risk management have a direct impact on corporate value and shareholders' asset, thus it has great importance for shareholders and all stakeholders in the wider dimensions (Parsaiean, 1999).

Stock Exchange has a major role in the country's production increase as a place for shaping the flow of finance and investment and in this way is vital in development of country. But the important matter in this context is proper shaping of this goodness by available forces in the market which itself is subject to the matter that projects with maximum efficiency be recognized by investors. Decision making to identify such projects always requires the use of reliable information and is related to desired purpose in decision making models.

Historic bankruptcies, collapse of financial markets, and the financial crisis have occurred

* Corresponding Author.
Email Address: salmaghasedak@gmail.com

following events that were not commonly observed meaning they didn't repeat much to play role in empirical distribution of price changes, interval, or the value of financial portfolios and have effect on their average or perhaps change their standard deviation, among extremely important criteria in risk management is calculation of value at risk of financial portfolios (Zamani et al., 2013).

Value at Risk, quantitatively measures risk and is discussed as one of the key tools used in risk management. By definition, the value at risk is the maximum loss that the devaluation of the portfolio for a certain period in the future with a certain confidence level, will not be higher than that. In other words, VAR measures loss expected under normal market conditions and over a specified time period and at a certain confidence level (quoted by Zamani et al., 2013).

The value at risk model was introduced by Jay. Pi. Morgan Institute (1993). This criterion that summarized all kinds of risk in a number was very attractive to users. Nowadays the value at risk is considered as new knowledge of risk management to the extent that measurement of market risk in recent years has been synonymous with the Value at Risk. Due to the simultaneous presence of risk and efficiency in business and investment activities, investors simultaneously consider risks and efficiency obtained from different options (quoted by Zamani et al., 2013).

Risks in project, is approaching unknown events or circumstances may which have negative or positive impacts on project objectives in the event of happening. Negative and extreme swing (below average) of stock price is called the risk of stock price falling that this volatility is measured based on average market price. Generally shareholders for valuation of company in addition to predicting stock returns (Including dividends and capital gains) are interested in estimating the risk on their preferred shares. This risk is important in two ways for shareholders: First, how reliable is the company's cash flow benefit and on the other hand, what types of uncertainty will the trend of price growth of the company face and meanwhile to what extent it is possible that the stock will experience price crash in future (Lotfi, 2011). The risk of stock price falling on the market is one of the main concerns of investors, increased stock price falling leads to pessimism of investors about investing in the stock exchange. As a result, models that can predict this matter have great importance in the capital market (quoted by Lotfi, 2011).

In this study, we tried to examine and investigate the relationship between conservatism and the risk of stock price falling while the describing definitions, theories and research conducted on the value at risk and the risk of stock price falling. In this chapter, initially object under study is described and then target and reason for choosing subject will be cited. Ultimately, the scope of research, research hypotheses and operational definition of variables will be examined.

Piery and colleagues (2014) examined Portfolio Optimization consists of eight asset using Mean-Conditional value at risk model. They used 50-month efficiency of desired assets to calculate Conditional Value at Risk of assets and calculated efficient investment border in different state. The results showed lack of strength and performance weakness of M-CVaR model. Andrew (2013) reviewed the relationship between corporate governance and the collapse of stock prices of companies and examined whether system of corporate governance is able to predict their tendency to experience price falling of company's stock or not. The findings indicate regulatory measures which have surrendered the ownership structure of the company, uncertainties of accounting, structure of Board of Directors and goodness related to upcoming falls. These sometimes asymmetrical relations are for increasing and decreasing regulatory measures and are more powerful for companies with bigger representation problems (quoted by Lotfi, 2011).

Dias (2013) in a study as investment market and value at risk believes that capacity of economic variables to measure financial risk is a wide area for researches. The aim of this study is determining the role of the investment market in estimating the value at risk. Cullen and Fang (2013) have investigated the relation between institutional investors and stock price falling. The study examines two opposing views of institutional investors: monitoring view against expropriation. The results of this study suggest that there are strong evidence of an inverse relation between Institutional owners and stock price falling in the future. Lee and Kava (2013) have carried out studies about dynamic optimization in relation to average value model at risk of the condition and value at risk. In this study, they tested a variety of models with one and two restrictions and concluded that if upper restriction is not considered for risk, there will be no optimal portfolio (quoted by sanaei et al., 2013).

The main objective of this research is examination of relation between value at risk and risk of stock price falling reduction in companies listed in Tehran Stock Exchange.

In this research statistical population consists of all public companies listed in Tehran Stock Exchange and is carried out in eight-year period.

This research includes all companies listed on Tehran Stock Exchange that statistical population is determined by modulating the community with provisions that are listed below. There are limitations in doing any research that may affect the result of research. Limitations of this research are as follows:

1. The financial information of company to be available for the period of research meaning years 2006 to 2014.
2. Their fiscal year end be in March
3. Companies that are accepted in Tehran Stock Exchange t up to date March 21, 2006.
4. Not have financial period change in the period of under review.

5. The exclusion of financial institutions, banks and investment companies due to specific nature of their activities.

After applying restrictions 137 companies had the above conditions in the period from 2006 to 2014 and given that the number of population is finite, Sampling is done using Morgan table. In this study, 101 companies are chosen as samples. In this study following regression model was used to test research hypotheses (Eq. 1 and Table 1):

$$W = \beta_0+\beta_1 VAR_{it} + \beta_2 RISK_{it}+\beta_3 SIZE_{it} +\beta_4 E01_{it}+\beta_5 Beta_{it} +\beta_6 LogAsset_{it}+\varepsilon_{i,t} \quad (1)$$

Table 1: Results of the regression equation goodness

Name of variable	Variable factor	Coefficient value	T statistics	significance level	
VAR	B_1	-4.215189	-2.007619	0.0409	effective
SIZE	B_2	-0.254863	-1.806262	0.0713	Not effective
RISK	B_3	1.253644	7.652183	0.0000	effective
E01	B_4	0.442926	2.005817	0.0452	effective
C	B_0	-0.642551	-0.696806	0.4861	Not effective
determination Coefficient	17%	F statistic		***1.46***	
Adjusted determination Coefficient	5.4%	significance (*P-Value*)		***0.0023***	
		Durbin-Watson statistic		***2.40***	

According to the t-statistic and obtained a significant level, if the significantly level is less than 0.05, independent variable factor will be significant in a way that if the absolute value of the t-statistic calculated by statistical software is greater than values of t table with freedom degrees in a significance level of 5 percent, H_0 hypothesis is rejected. H_0 hypothesis rejection means that effect of independent variable on the dependent variable is significant.

1. VAR variable is effective on stock price falling because significant level for this variable was obtained to be 0.04 and this amount is smaller than 0.05. On the other hand sign of coefficient of this variable in the same table was negative which reflects the inverse relation between these two variables.

2. SIZE variable is not effective on stock price falling because significant level for this variable was obtained to be 0.07and this amount is bigger than 0.05.

3. RISK variable is effective on stock price falling because significant level for this variable was obtained to be 0.000 and this amount is smaller than 0.05. On the other hand sign of coefficient of this variable in the same table was positive which reflects the direct relation between these two variables.

4. E01 variable is effective on stock price falling because significant level for this variable was obtained to be 0.04 and this amount is smaller than 0.05. On the other hand sign of coefficient of this variable in the same table was positive which reflects the direct relation between these two variables (Table 2).

Table 2: Jarque-bera test

variable		W
Number of Views		***909***
Normal Parameters	mean	***0.55***
	Median	***0.42***
	Standard deviation	***0.49***
jarque-bera statistics		***901.03***
P-Value(sig)		***0.000***

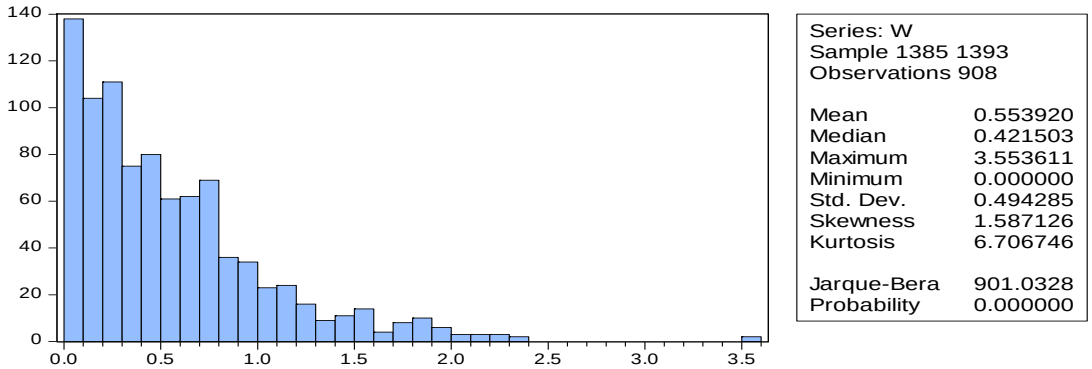

Fig. 1: Variable W not being normal

In this test the zero hypotheses is homogeneity of observations distribution with specific theoretical observations (with a certain parameters) which is determined by conjecture and opposite hypothesis is desired distribution for variable not being suitable:

H_0: data follow a normal distribution
H_1: data do not follow a normal distribution

Judgment method: If significant level is higher than 0.05, it shows that observed distribution is related to theoretical distribution. In research Hypothesis H_0 is rejected and H_1 is accepted, Means data do not follow a normal distribution.

In order to normalize dependent variable, Johnson transformations with following formula were used in which λ is constant and by substituting it in formula, it determined converter type on variables for normalization (Eq. 2).

$$z = \gamma + \eta\tau(x;\epsilon,\lambda); -\infty < \gamma < \infty, -\infty < \epsilon < \infty, \eta > 0, \lambda > 0 \quad (2)$$

In this study different λ were used in Minitab software such as 0.1 for this variable (Fig. 2 and Table 3).

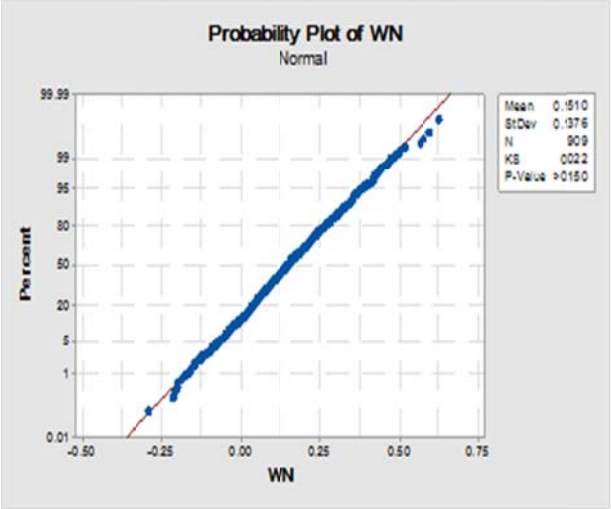

Fig. 2: Normalization of WN variable using Johnson transformations in Minitab

Table 3: Jarque-bera test after applying Johnson transformations

variable		W
Number of Views		***909***
Normal Parameters	mean	***0.55***
	Median	***0.42***
	Standard deviation	***0.49***
jarque-bera statistics		***901.03***
P-Value(sig)		***0.000***

Judgment method: If significant level is higher than 0.05, it shows that observed distribution is related to theoretical distribution. In research Hypothesis H_1 is rejected and H_0 is accepted, Means data follow a normal distribution.

2. Reasons for choosing statistical method

In other words, to study the effect of independent variables on dependent variables panel regressions according to significance level of Limer test (Chow) was used. In this test when significant level is less than 0.05, Regression Panel is selected for the model goodness. Self-goodness of panel is in two methods of random and fixed effect. According to Hausman test two methods of random and fixed goodness are used. In this test, whether the significance level gets greater than 0.1, random goodness in used.

Assumptions of regression model goodness:
1. Testing Model's suitability
2. Testing lack of correlation between variables (Durbin Watson test)
3. Testing Stationary of variables
4. Testing to determine Regression panel (Chow test)
5. Testing to determine Regression panel with random or fixed effect (Hausman test)

3. Testing first model's suitability

Table 4 shows analysis of regression variance to determine the linear correlation between independent variables and the dependent variable and total significance of regression model.
H_0: regression model is not significant
H_1: regression model is significant

Judgment method: If in confidence level of 95% (Error of α=5%) F statistic calculated from the regression equation was smaller than the F value obtained from chart H_0 Hypothesis cannot be rejected and otherwise H_1 is rejected. It is clear that in case of H_0 rejection, regression equation will be a significant.

Table 4: Output of analysis of regression model's variance

Significance level	F statistic	Total squared error
0.0023	***1.46***	***183.73***

According to above chart, since significance level of F statistic of 1.46 was obtained to be 0.0023 which is lower than 5% thus H_0 hypothesis is rejected and H_1 Hypothesis based on total significance of regression model is confirmed.

Research hypothesis: there is a relation between value at risk and risk of stock price falling reduction in companies listed in Tehran Stock Exchange.

Regarding Research hypothesis, zero hypothesis and opposite hypothesis are as follows:

H_0: there is no relation between value at risk and risk of stock price falling reduction in companies listed in Tehran Stock Exchange.

H_1: there is a relation between value at risk and risk of stock price falling reduction in companies listed in Tehran Stock Exchange.

According to Table 1, the significant level (sig) between the two variables is equal to 0.04 which is smaller than the significance level considered in this study (5 percent). Also absolute value of t which is equal to 2.007 is bigger than 1.96 which is equal to standard normal distribution of 0.95, so in this confidence level, zero hypotheses stating that there is no relation between value at risk and risk of stock price falling reduction in companies listed in Tehran

Stock Exchange is rejected and main hypothesis is accepted.

4. Conclusion

In this study, at first introduction and main objective of this study were expressed and then results and research proposals (Based on the results of the study and in the field of future researches) and then restrictions of this study were presented. This study was trying to answer the question that is there a relation between value at risk and risk of stock price falling reduction in companies listed in Tehran Stock Exchange or not. Generally, using a sample of companies in Stock Exchange from years 2006 to 2014 indicates this result that there is a relation between value at risk and risk of stock price falling reduction in companies listed in Tehran Stock Exchange. In other words, the obtained results indicate that at 95 percent of confidence level, zero hypotheses stating that there is no relation between value at risk and risk of stock price falling reduction in companies listed in Tehran Stock Exchange is rejected and main hypothesis is accepted. Also the effect of VAR and RISC and profitability index variables were observed significantly in which the relation between VAR variable on stock price falling has been reversed and the relation between two other variables with stock price falling have been direct. But SIZE variable did not have significant effect on stock price falling. Therefore, it is suggested that the effect of value at risk and risk on stock price falling reduction in companies listed in Tehran Stock Exchange be calculated and the quarterly Information be used in order to determine changes of stock price falling risk in different seasons or periods.

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