International Journal of Life science & Pharma Research

# INVESTIGATE THE RELATIONSHIP BETWEEN RISK AND SIZE OF THE PORTFOLIO IN IRANIAN INSURANCE COMPANIES

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## ABSTRACT

The aim of this study was to investigate the relationship between insurance risk portfolio and the portfolio is located in Tehran Stock Exchange. The population of this research firms with the insurance activity is located in the Stock Exchange that its financial statements have been audited and the time period is from 2006 to 2015.To test the hypothesis of linear regression models were used to evaluate the method for mixed data (panel data). The results show that the risk of increased portfolio size and the range includes 24 to 36 of the basket good portfolio.

**KEYWORDS:** *Risk, portfolio, stock number, insurance*

## INTRODUCTION

Insurance companies with Depository, in the thought of raising financial credit for providing better services to the people and insured. In this circumstances pay for losses to the damaged caused to the Permanent attention of managers to identify suitable Depository. This issue when the importance and necessity that obligations toward policyholders in the new conditions, put more financial burden on insurance companies. In Overall investment is done in order to make a profit and has a two-dimensional process of return and risk. Investors to reduce risk and increase return keeping various types of assets with different risk and return. So that we can say that the aim of Investor is achieving to maximum returns with minimum risk.

### *STATEMENT OF THE PROBLEM*

Insurance companies can be set in a row of financial institutions because the premium mainly has received at the beginning of a year, but the losses or obligation was happened in during the period or year. So Insurance companies has the opportunity to invest their reserves and premium. Efficient use of resources insurance helps insurance companies to being bigger and stronger and led to activity development of them. Investment decisions are strongly influenced by variations and to reduce the risk of these variations must determine an optimal portfolio so that these variations led to the least Losses. Traders in the capital markets uses of different models to determine the value at risk of their portfolios, that each of the models for determining the amount of their portfolio value at risk uses the certain assumptions (Kupiec,2001). Past financial crises show that the implications of risk management should be taken seriously, Risk management can be defined as the process by which managers identify, measure and make decisions about the risks and monitor them, so they can control the risk. Why, for example, the consequences of financial losses were reached in 2008 amounted to 40 billion Euros. The risk management process where managers to identify, measure and make decisions about the risks and monitor risks pay to risk management. With more complex environment and investment climate, investors should pay attention to all markets and all assets. Get the best combination of investment and the return on investment preferences towards risk will depend investor dissatisfaction. If a variety of investment strategies to understand and compare, we will discover that risk and return are aligned with each other move (ibid). According to material presented in this study seeks to answer the question

of what impact the performance of a basket of portfolio risk management insurance companies in Iran? Period of this study, ten years after that from 1/1/84 to 12/30/93 in sanctioned. These reasons range encompassing a full course of capital market activities. Since mid 2005 started a new recession in the market has been detected so far have continued. All samples the ten-year period has been collected on a monthly basis. Since the calculation of risk should be studied validity period is 30 to 36 (Hakimi, 2000). In this study, with the help of about 120 periods for each company in the sample of the problems relating to the validity of the study is significantly reduced. Territory where research all insurance companies listed on the Stock Exchange in Tehran. Eviews software for data analysis were used.

## *RESEARCH THEORETICAL BASES*

Insurer products to different fields, but with similar characteristics and risk cash flows, are classified. Insurers must select portfolio of assets that incoming cash flows with respect to time, risk and return with the obligations arising from the sale of products to be compatible. In fact, incoming cash flows from the asset must terms of time (maturity), risk, yield and size (the amount) with the outflow of insurance liabilities are matched. One method of segmentation of investments, creation of investment funds of life insurance and non-life insurance. As shown below, funds for investment from life and non-life insurance premiums (which have been fund), provided the corresponding assets are invested. A large part of the premium from the insurance company, the insurer's liability and must be saved as a safety net for these commitments. The reserves technical aspects. Most insurance companies from technical reserves in more profitable activities with appropriate risk (or less) investing.

## *RISK MANAGEMENT MODELS*

Risk management is the process through which an organization or an investor to the risks of their optimal way to react. The Risk Manager should identify risks and then measure and assess its effects on the financial situation of the organization or institution, and the means to be used to reduce or eliminate risk. Three strategies to deal with situations of risk can eliminate risk, diversify risk, or hedge to use, but the first two requirements do not apply to specific requirements, and in some cases actually more common but hedging strategy. Risk Management by hedging needs of derivative financial instruments that are stated, and include futures, options, and futures are valuable consideration. Futures form is self-organized and because of historical, high liquidity and negligible credit risk are most widely used. (Ibrahimi and Ghanbari, 2006) Markowitz model: According to this model risk and volatility of returns and volatility is measured by the variance of returns. Among the advantages of this model is that it makes heavy use, namely two parameters to calculate the various ratios and performance are presented. This model also has disadvantages including high complexity in solving the non-linear, logical problems increase the risk of low growth figures, the lack of understanding of the variance in front of other risk factors and also sees the same variance to positive and negative changes can be named. Model and measure of value at risk: the statistical criterion, the maximum potential loss on the portfolio a certain period of time with little expression in a number of states. In other words, the value of the portfolio's value at risk amount is expected within a specified time period and with a certain probability (1% -α) lost specifies. VaR calculation methods include parametric approach (variance-covariance), historical simulation and Monte Carlo simulation, which is based on historical information and the latter method based on heuristic methods and scenario calculation and not a specific formula. Value at Risk model and criteria: Artzner with the introduction of Value at Risk measure, a measure introduced by failure to cover the value at risk. The model and measure the risk that the expected variance is also known comet, is the average of the risks are greater than the value at risk. In other words, α% of the average distribution yield output random variable is the value at risk. (Clerical, et al., 1390). One indicator model: The model determines the sensitivity factor beta (β) as a risk, in 1961 by "Sharp" was presented. One significant advantage of the sharp, simplicity and reduction of data is required. The basic concept of the single indicator is that all of the securities, general market fluctuations affected. Because in this study we sought to evaluate systemic risk and systemic risk indicator is a beta, so we will use this model. Capital asset pricing model and arbitrage pricing model (Eskandari and Hosseini, 2002).

## *THEORETICAL CRITERIA FOR MEASURING RISK*

There are several ways to measure risk. Each of these methods has its own advantages and disadvantages. The interpretation of computational

results is a measure of risk, to issue and depends on the application.

Tsankas (2007), says there are three main applications for risk measurement criteria:

1. The risk measure as an indicator of risk aversion in asset pricing models such as the variance in the Modern portfolio theory of Harry Markotinz (1952).
2. Measures as a means to determine the risk premium commensurate with the risk in this case, the criteria for measuring risk called the premium calculation principles.
3. The measure of risk as the economic capital of the insurance company that is required is to support financial activities.

There is another division that Albrecht (2004) has done:

1. A measure of risk as a deviation from the target, such as variance;
2. The measure of economic risk capital or premium as required (risk premium), such as VaR.

## *RISK MEASUREMENT STANDARDS IN USE*

### *THE SIMPLE RISK MODEL*

The simplest method of measuring risk, multiplied by the risk in the investment or the amount of risk (initial cost) is obtained. The indicators such as expected losses Variance or standard deviation and coefficient of variation possibilities can be used to measure risk.

### *THE VALUE AT RISK (VAR)*

Value at risk families is unfavorable risk metrics. This risk measure, first introduced in 1980 Till Guldimann and then in the late 1980s, the Institute expanded JP Morgan. This indicator ((maximum probable loss (MPL) a portfolio (or worst losses possible) for a specified time horizon due to a certain confidence interval)) states. In fact, the VaR, the maximum possible loss on a portfolio due to the damage we measure the probability distribution function.

### *THE POSSIBILITY OF RUIN*

This approach to traditional actuarial solvency of insurance companies. Solvency models with probability of bankruptcy (or default) given to calculate the maximum possible loss (VaR). In this approach, we have to calculate the probability of bankruptcy. The probability of bankruptcy and VaR, two sides of the coin.

## *LITERATURE REVIEW*

Hashemi et al (2011), in his study to assess the solvency margins of insurance companies in Iran. In this study, monitor insurance companies (monitoring tariff) by the insurance industry facing the country, liberalization and deregulation of its main components are not compatible. Solvency margin is a tool that in many countries insurance companies are used for financial monitoring. In this method, rather than the direct supervision of solvency margin, which reflects the financial strength of insurance companies to fulfill their obligations assumed in the valuation. In this study, index insurance companies, public and private non-life insurance solvency is calculated using the mean comparison test, the solvency of these companies was compared with each other. Meet the commitments they have accepted. Samimi et al. (2005), a study to examine the relationship between the size of the portfolio and idiosyncratic risk in their equity. The relationship between the number of shares in the portfolio and its risk by diversifying Evans and Archer in the period August 1996 to September 2004 monthly in the Tehran Stock Exchange were examined. The results show that the inverse relationship between the size of the portfolio and that there is a significant risk. The research also found that to eliminate unsystematic risk, to what extent can be increased portfolio size. Portfolio risk by increasing the number of shares with an asymptote asymptote in the basket of 36 shares declined and this is close to the average market risk. In other words, the risk of the portfolio by increasing the number of shares immediately declined and the number of securities of 36 shares, the diversification effect is negligible or non-systematic risk virtually disappears. Abbasi E. et al (2014) in their study entitled “optimal investment portfolios of risky assets and non-risk insurance companies using the Markowitz model" to determine the optimal portfolio of Markowitz model was used. The results of 39% and 61% investment are without risk. The study population consisted of all documents and financial resources and the financial statements were issued by the insurance company and also the reports of the independent auditors, inspectors are legal and information exchange organization. Peikarju et al in their study to measure asset risk and financial institutions began using value at risk. Parametric VaR methodology described methods, such as variance-covariance method is simple and based on GARCH and ARCH to measure VaR and economic capital related to its stock portfolio assets in an investment company in the stock market country.

And assuming that investors in the stock Thirty-three companies participated in the Tehran Stock Exchange has invested, various test unit root ARIMA, AR and was Conditional Volatility and finally using the model GARCH variance and covariance value at risk as measured under the company's stock. Based on the information extracted from the VaR model indicated that the asset portfolio VaR of 6/17 and 2/13 respectively of the two methods, respectively. Arrested and partners to evaluate the efficacy portfolio) portfolio (insurance Central Iran. Given the nature of insurance operations which insurers are doing, the institutions of significant funds in the intervals between premium and compensation are received. Hence, one of the major activities of insurers, investment funds is concerned. There are many different options for investment firms and financial institutions can invest in options. One of these options, investing in the stock exchange. But for an investment requires a sound management investment. Their investment in the Tehran Stock Exchange Iran Central Insurance Company, examined and of the various aspects (efficiency, risk and performance indicators) was discussed. After calculating the variables and hypotheses, portfolio performance) portfolio (Central Insurance of Iran was approved. Edrising et al (2008), in a study entitled "Portfolio Selection criteria based on company financial strength and correlation with real stock returns", were used. Financial ratios used in this study are located in 6 categories, which incorporates elements profitability Measures (include return on equity, return on assets, net profit margin and earnings per share), measures of leverage (including the current ratio, the future, the ratio of debt to total equity) measures growth prospects (including revenue growth rate, the rate Summary profit and growth rate of earnings per share), respectively. Li et al (2008), in a study entitled "The combination of multi-criteria decision-making methods (MCDM) for stock options based on the Gordon model study" measures affecting the share price. They identified three key elements in this study factors affecting the Gordon Model (profit stock expected, the discount rate and growth rate), including industry prospects, revenues, operating cash flow, the ratio of interest payments, market structure, risk-free return, the rate of earnings growth and dividend growth rates were. Evans and Archer (1968) reduce the variance of portfolio returns that are randomly selected, were studied. They variance relationship baskets that have been randomly selected, were studied. They relation variance portfolios and the number of shares available, as well as the effect of increasing the number of shares to reduce the variance of the portfolio for the simulation and generated randomly selected stock portfolios, the founder of the method is simple diversification. Evans and Archer concluded that the addition of a share basket 2 a shared, a decrease in the average standard deviation of the portfolio. Baskets and baskets for 8 share increased 5 shares 16 shares 19 shares increase is necessary to reduce the average standard deviation of the portfolio. The stock increased by more than 19 shares will have no effect on reducing the standard deviation of the portfolio.

### *MODEL ANALYSIS*

According to the literature, this study examines the relationship between risk management and portfolio and the model portfolio Evans and Archer paid. And how to measure the variables listed in Table 1.

**Table 1**
***Way to calculate the variables***

| Calculation and data collection | Symbol | |
|---|---|---|
| Standard deviation of portfolio returns | Risk | Variables |
| $=\frac{(Baseprice price)+DPS+priorityright+bonusshares}{\text{Base Price}+1000\times(\text{given the location of the capital increase})}$ *100return | Returns Cart | |
| Portfolios of a share to 40 shares | Lightbox Cart | |

Data analysis: estimation model, based on pooled data (panel) is. These combinations of time series data and cross-sectional data for insurance companies listed in Tehran Stock Exchange during the years 2006 to 2014 on a monthly basis for 16 insurance companies are active in the Tehran Stock Exchange. The situation is the statistical variables in Table 4-1.

**Table 4.1**
***Descriptive statistics for variables***

| Slenderness ratio | Coefficient of skewness | Standard deviation | Mean | Average | Variables |
|---|---|---|---|---|---|
| 3.059 | 1.883 | 2.64607 | 7.30179 | 7.2300 | Risk |
| -0.343 | -0.589 | 0.90855 | 7.70357 | 7.72055 | Returns Cart |
| -1.200 | 0.000 | 8,803 | 20.5 | 20 | Portfolio Cart |

Levine test was used to evaluate the stability variables that the results in Table 4-3. The results showed that the levels are static variables.

**Table 4.3**
***Viability test (static) variables***

| level of significance | statistical probability of cauliflower | Lone statistics | Statistics Variables |
|---|---|---|---|
| 0.01 | 0.0032 | -2.72945 | Returns Cart |
| 0.01 | 0.0001 | -3.61950 | Risk |
| 0.01 | 0.0000 | -15.9616 | Portfolio Cart |

After ensuring the mana of variables, then it's time to estimate the model. The results in Table 4-4 and confirming that the fixed effects model the random effects model is preferable.

**Table 4.4**
***Hausman test***

| probability | Degrees of freedom | Statistics | Hausman test |
|---|---|---|---|
| 0.6401 | 1 | 1.685936 | research model |

The results of the model are shown in Table 4-5 shows a significant relationship between risk portfolio and the portfolio is negative. According to the statistic regression equation F = 4.4046 sig = 0.000 characterized in that the whole equation is significant at a confidence level of 99%. Both Durbin Watson DW and camera 1.600 and 0.800 h values indicates the absence of autocorrelation problem row in the model. The coefficient of determination (R2 = 0.2499), indicating strength in explaining the dependent variable model portfolio risk-return portfolio of shares may be increased or decreased by 25% effective in changing the size of the basket portfolio.

**Table 4.5**
***Regression between risk and portfolio***

| Dependent variables: the size of the basket portfolio | | | |
|---|---|---|---|
| **Statistical probability t (prop)** | **T-statistics** | **Coefficients** | **Variables** |
| 0.0000 | 70.72494 | 16.48763 | BL principle display (c) |
| 0.0000 | -4.894396 | -0.147477 | Risk (standard deviation of portfolio returns) |
| | | 0.24988 | Coefficient of determination (R2) |
| | | 0.193230 | Adjusted coefficient |
| | | 4.40460 | F statistic |
| | | 0.0000 | Probability of F statistics |
| | | 1,600 | Durbin Watson |
| | | 0.800 | H statistic camera |

After estimating the model are then examined the relationship between the number of shares and risk. To determine the optimal number of stocks in the portfolio, the average difference test was conducted. The standard deviation of the mean of a parabola with two parts, two parts and three parts, three-parts and four-parts were compared. The results of this research suggest that the increase in the contribution of a basket of shares, the share and three share a significant decrease in the portfolio standard deviation occurs, and it will continue to cart 16 a share. The basket of 16 shares and 23 shares portfolio standard deviation increase, but this increase was not statistically significant. As results are shown in Table 4-6.

**Table 4.6**
***Comparison of the mean and standard deviation of portfolios using independent T-***

| | **Amount test** | **significant level of T** |
|---|---|---|
| Basket 16 a share - a basket of 17 shares | 0.050 | 0.960 |
| Basket 16 a share - a basket of 18 shares | -0.527 | 0.598 |
| Basket 16 a share - a basket of 19 shares | 1.947 | 0.053 |
| Basket 16 a share - a basket of 20 shares | 0.242 | 0.809 |
| Basket 16 a share - a basket of 21 shares | -0.205 | 0.838 |
| Basket 16 a share - a basket of 22 shares | 1.676 | 0.095 |
| Basket 16 a share - a basket of 23 shares | 0.567 | 0.452 |

Therefore, baskets with a basket of 24 shares 16 shares are tested. The mean difference test basket with a basket of 24 shares 16 shares according to the amount of statistics T, the calculation is greater than the value of T is critical, therefore, there are no significant differences between them. To achieve a significant reduction in the standard deviation of a basket of 16 shares of the basket should be added eight. Therefore, baskets with a basket of 24 shares 16 shares are tested. The mean difference test basket with a basket of 24 shares 16 shares according to the amount of statistics T, the calculation is greater than the value of T is critical, therefore, there are no significant differences between them. To achieve a significant reduction in the standard deviation of a basket of 16 shares of the basket should be added eight.

**Table 4.7**
***Comparing the average standard deviation of portfolios using T-independent***

| | **amount test** | **significant level of T** |
|---|---|---|
| Basket 16 a share - a basket of 24 shares | -7.203 | 0.000 |

The basket to a basket of 35 shares 24 shares significant difference in standard deviation not occurs. The optimal portfolio in terms of risk, the portfolio is a combination of 16 to 24 share in it.

# CONCLUSION

Portfolio risk and portfolio size relationship between the size of the insurance company which was statistically significant. As offset by a decrease in portfolio yield can be increased basket size. In analyzing the data, it was found that the total risk (standard deviation) equal to 26.36% of the share portfolios of approximately 5% of the amount of market risk (systematic risk) is. Therefore, the amount of non-systematic risk as the risk management index in this study is intended to 21.36 percent. By an increasing the number of shares to 5 shares in the portfolio was observed that the idiosyncratic risk is reduced to 5.14 percent. 70% of non-systematic risk of the portfolio by increasing the number of shares to 7 share of unsystematic risk is reduced to 3.09 percent, the 82 percent is lost idiosyncratic risk. Increasing the number of shares portfolio to 10 shares, 15 shares, 20 shares, 32 shares, the amount of unsystematic risk, respectively, 2.29, 1.63, 0.64 and 0.15 percent decrease, 86, 90, 99 percent of idiosyncratic risk disappears. By increasing the number of shares it

was observed that the basket of 32 shares 40 shares declined 0.03 percent to idiosyncratic risk. In order to study a significant reduction in the mean risk portfolios, the test was used to compared the mean difference between the two communities. The difference between a share and the share of risk portfolios, two-part and three-part and three-part and four-part, and five shares were tested, resulting in a significant difference showed two baskets. To achieve a significant reduction in the mean risk portfolios a share, the share to four shares of a stock only needs to be added to the basket. Then for a significant reduction in the mean risk basket and six part was observed that the addition of two stocks is necessary. The average risk for a significant reduction in the share basket, eight, twelve and sixteen contribute a share to the addition of four and eight contributions is required. For a significant reduction in the average portfolio risk twenty-four shares, adding twelve idiosyncratic risk is necessary in reducing the share, followed by no significant reduction in the risk portfolio was not within the scope of this study. This means that the increased diversification of the portfolio, reducing the risk of higher levels of diversification in the portfolio decreased. Therefore, a well-diversified portfolio should be 24 to 36 share. To remove the bulk of idiosyncratic risk.

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