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Research Paper

Investigating the effect of risk on the return on insurance industry in the Iranian economy using the application of ARIMA-GARCH/TARCH models and beta coefficient.

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ABSTRACT

A study of the movement of returns in the insurance industry reveals that income returns exhibited lower volatility compared to the overall movement of the industry. The lower income returns, relative to the movements of paid losses in the insurance industry, can be attributed to various variables, including insurance industry management, particularly risk recognition. Risk recognition assists managers in the insurance industry in assessing tolerable and intolerable risks when accepting or rejecting various insurance risks. Effective risk management plays a significant role in marketing, increasing the demand for insurance, and promoting the optimal growth of the insurance industry. This study evaluates the impact of risk on the return of the insurance industry in the Iranian economy from 1971 to 2019, utilizing generalized conditional autoregression models, ARIMA-GARCH/TARCH models, and the beta coefficient. The results indicate a significant relationship between the study of risk impact and the return of the insurance industry. Additionally, systematic risk is investigated using the beta coefficient method. The obtained beta coefficient, which is less than one but greater than zero, indicates that the income of the insurance industry is smaller than the general market movement trend, implying that risk aversion negatively affects the income return of the insurance industry.

1 Introduction

Today, the insurance industry holds a crucial and inevitable role and position in the modern economy. It serves as an integral part of the financial system in every country and stands as one of the significant institutions in the capital market. Alongside other financial institutions, it facilitates capital preparation and allocation, supporting the financing of economic units [4]. The insurance industry plays a fundamental role in strengthening the economic foundation of society. Moreover, by creating security and instilling confidence, it establishes a favorable environment for the expansion of productive activities [11]. One of the primary objectives of insurance is to maintain a healthy economic cycle within society

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by safeguarding national assets and providing a secure environment for individuals. This response addresses the primary need of insurers, which is security against risks that jeopardize their lives and property. To protect insurers and ensure the stability and positive financial future of insurance companies, insurance regulators have implemented regulations for the financial supervision of insurance companies. The high turnover, substantial insurance policies, and the considerable volume of associated liabilities (liabilities connected to the future, with unknown amounts, and benefiting a wide range of individuals) highlight the necessity for an efficient system to monitor such activities [17]. Risk assessment in financial management represents a central issue, making it essential to study this crucial phenomenon. Risk is defined as a potential investment loss that can be calculated, both in investment culture and vocabulary. Harry Markowitz [27] was the first to introduce a numerical index for risk based on quantitative definitions. He defined risk as the multivariate standard deviation of a variable. [20] also considers risk as any fluctuations in return. Essentially, any potential changes in the future, positive or negative, are considered risks that can lead to benefits or losses [21]. Risk is defined as a phenomenon that can distort the expected outcome for an investor. According to Article 1 of the Insurance Law established in 1937, the insurance industry is a contract in which one party undertakes to compensate or pay a specific amount of money in the event of an accident.

The obligor is referred to as the insurer, the party to whom the obligation is owed is the insured, the amount paid to the insurer is called the premium, and the item being insured is called the subject of insurance. Given the direct relationship between risk and profitability of the insurance industry, a low risk corresponds to a low return on the insurance industry, while a higher risk corresponds to a higher return. By identifying and managing risk in a timely and appropriate manner, risk aversion and its negative impact can be avoided. The movement trend of compensation for paid damages should at least be equivalent to ensure an upward trend in the profit return of the insurance industry. Various economic, political, financial, cultural, and social factors, both direct and indirect, contribute to establishing an optimal investment infrastructure in the insurance industry, aiming to reduce or increase risk while supporting the business cycle of the Iranian economy. Therefore, this study aims to address the question of the extent to which risk impacts the return of the insurance industry in the Iranian economy during the years 1971 to 2019. Given the significant importance of elucidating the impact of risk on the insurance industry's return and the importance of risk recognition, risk aversion prevention, and effective risk management for optimal goals in the Iranian economy, this study is conducted to reach the hypothesis that a significant relationship exists between the impact of risk and the return of the insurance industry. The subsequent sections of this article are organized as follows: a review of the research background and typological aspects, introduction of definitions and introductory concepts, presentation of the research methodology including the research model and estimation method, explanation of data collection and the statistical population, modeling of the proposed model and discussion of the estimated beta coefficient and results, and finally, the suggestions derived from the generalized conditional autoregressive outcomes.

2 Review of the Research Background

Asayesh and Jalili Kamjoo [1]The effect of political, economic and financial risk regimes on life insurance demand Objective: This study aims to evaluate the effect of different macro political, economic and financial risk regimes as transfer variables based on the index. International Country Risk Index's effect on the variables of GDP, life expectancy, unemployment, inflation, enrollment rate (literacy) and degree of urbanization on life insurance demand in selected Middle Eastern countries during the period 1990-2017. Methodology: the regression model of a threshold smooth transfer panel with a logit transfer function to investigate the issue. Achieving the goal of research Has been used. Results: The threshold

in the model with political, economic and financial risk was estimated to be 73.72, 30.00 and 29.2, respectively. The transfer rate between the two regimes was estimated in all three models: 60.07, 0.3685 and 0.049. Therefore, the highest transfer rate is related to the political risk transfer function, which led to the failure of the transfer logit curve and the three-dimensional procedure.

The lowest transfer rate is also related to financial risk, which led to a very low curvature of the logit transfer function. Conclusion: The estimation results of the three research models showed that the real interest rate has no threshold and significant effect, which can be due to lack of financial development of financial markets, interference in the money market and banking system and orderly determination of interest rates in selected countries. In a regime with less financial risk, life insurance demand is less sensitive to inflation and life insurance is recognized as an asset with long-term returns. GDP and life expectancy also have a threshold effect in all three models. Nobhar et al [18]Investigating the risk of skewness in the Iranian health insurance industry. Objective: Information asymm try and its problems is one of the most important issues in the insurance industry. Information asymmetry between insurance companies and the insured can severely affect the profits of insurance companies and expose insurance companies to significant risks. One of the most important risks associated with asymmetric information is the risk of selection. In this regard, the main purpose of this study is to investigate the risk of selection in the Iranian health insurance industry. Methodology: In this study, the data extracted from the cost and income statistics of urban and rural households in Iran in 2016 have been used. To investigate the risk of selection in the Iranian health insurance industry, first the latent health variable of each household was calculated by estimating the health service demand function using the nonlinear least squares (NLS) method and then using Kolmogorov-Smirnov test with two samples and also comparison. The hidden health distribution of insured and uninsured households was tested for the risk of seizures. Results: The results of Kolmogorov-Smirnov test of two samples show that the distribution of latent health variable in two groups of insured and uninsured households with Is not equal. In other words, there is a significant difference in the health status of insured and uninsured households. Also, the comparison of the distribution of latent health variables shows that the level of latent health of insured households is lower than that of uninsured households.

Therefore, the existence of distortion risk in the Iranian health insurance industry is confirmed. Also, according to the results, the risk aversion parameter of households for the consumption of health services is equal to 0.1109 and for the consumption of other goods is equal to 0.0262. Conclusion: The results of this study indicate the risk of selection in the Iranian health insurance industry Is. Also, according to the results, people show more risk aversion in consuming health services than consuming other goods and services. Shahbazi and Saleki [9]The nonlinear effect of life and non-life insurance penetration coefficient on Iran's economic growth with data on life and non-life insurance penetration coefficient data, active population and gross fixed capital formation, from the gentle transfer regression model (STR)) During the period (1974-2013), which confirmed the results of nonlinear effect of nonlinear insurance penetration coefficients of life and non-life insurance penetration variables on the country's economic growth, and the logistic transfer function with double regime change ((LSTR2) for two variables, and selects the life insurance penetration coefficient as the appropriate transfer variable. The nonlinearity of the model at a significance level of 1% was -0.13 and -0.39, respectively, and the effect of non-life insurance penetration coefficient in the linear part of the model with a significant level of 10% and in the nonlinear part with a significance level of 1% and 0.08 and 0.52, respectively. In fact, since 2009, when the second change in the regime of the entire insurance industry took place, the negative impact of life insurance penetration has almost decreased 3 times and is improving, and the trend, the impact of non-life insurance penetration has decreased 6 times and is declining as a result, the plans of the Iranian insurance industry are improving towards the average global performance of this industry,

ie more use of life insurance. Estimated 0.24. Raghfar et al[6] the effect of inflation on the financial wealth of insurance companies in Iran during the period 2012-2015 has ben studied, the results show that inflation, relatively current and ownership ratio have a positive and significant effect on financial wealth; While the loss ratio, the ratio of reserves have a negative impact on financial wealth.

Dehghani and Sheikh Rezaei [5] National Risk Index on Commercial Insurance Demand (Case Study of Mena Countries) In this study on the effect of national risk index (political, economic and financial) on commercial insurance demand for 16 countries in the region Mena, during the period (2000-2014) the survey was conducted. For this purpose, the effect of macroeconomic risk variables on commercial insurance has been investigated using panel data. In this study, commercial insurance demand variable as a dependent variable and independent variables, GDP per capita, transfer function Risk, real interest rate, literacy level and degree of urbanization are estimated in the form of a logarithmic model. The results of the model estimate show that political risk has no effect on commercial insurance demand, while economic and financial risk have a positive effect. Lotfi [14] studied the effect of macroeconomic variables on the insurance demand of individuals through analysis of variance during the period 1982-2012. The role of this study is more effective with other fields of insurance. Peykarjoo and Hosseinpour [2]) measured the value at risk in insurance companies using the GARCH model. In that study, the risk value was first calculated using the ARMA and GARCH models and then by predicting the model for the year. In the future, provided that the company's decision-making process on how to select insurance risks, it was determined that the company is in good condition and will not be threatened by an unusual risk. External studies related to the subject include the following:

Zheng et al. [30] Using an endogenous consumer demand model for healthcare consumption and using the semi-parametric method of generalized moments, they have investigated the existence of deviation and deviation risks in Croatian health insurance. For this purpose, invisible heterogeneity has been used in the distribution of the latent state of health of individuals. The results confirmed the existence of both perversion and perversion risks. Hui and Zain [22]examined the dynamic relationship between development and economic growth in 11 Chinese coastal cities. The results show that the growth of insurance certainly has a positive effect on the economic development of the coastal region and the law of declining final returns is in place in most cases. Olayungo [28] examined the nonlinear asymmetric relationship between insurance and economic growth in Nigeria, and the results indicate the existence of asymmetric effects in the Nigerian insurance market. The results of the instantaneous reaction and analysis of variance functions show that in the long run there is a strong significant relationship between high GDP and low premium. Conruth and Pauli [24] in an article, examined the effect of emotion of rejecting public decisions in risky situations on insurance demand, which shows that increasing emotional relationships leads to a decrease in insurance demand, although this effect has a limit. It is low and from one point onwards, these relationships do not affect the demand for insurance. Lee et al[25] examined the effect of countries' risk on the elasticity of insurance demand revenues using panel data method during the period 1979-2007.

The results showed that the elasticity of insurance demand decreases with increasing country risk. And a sample analysis based on the level of income, legal origin and restrictions on banks' participation in insurance activities, insurance revenue elasticity is reduced. In an empirical article, Kozski [23] examined the impact of insurance on Macedonia's economic growth over the period 1995-2010, and measured insurance development by insurance penetration (total, life and non-life). The results of the conventional least squares method in this study show that insurance development has a positive and significant effect on economic growth. It also indicates a positive and significant relationship between non-life insurance and total insurance with economic growth and the effect of life insurance on negative economic growth has been estimated. Finn et al [19] examined the development factors of the insurance

industry using the adaptive model method during the period 2000-2008. Income, size of the public pension system, ownership status of state-owned insurance companies, availability of private sector credit, and religion are affected. Previous research can be divided into three categories. First, studies that examine the impact of macroeconomic variables on the types of demand in the insurance industry (life and non-life insurance, health insurance, commercial insurance and in-demand demand for health services); second, studies that examine the type of impact relationship Insurance (dynamic relationship, nonlinear asymmetric relationship and nonlinear effect of penetration coefficient) on economic growth or economic growth on insurance have been examined, thirdly, the impact of other factors on the insurance industry (inflation on financial wealth, economic growth, effect Have examined the emotion of rejecting public decisions).

As a result of all three categories of the above-mentioned studies, the relationship between the impact of risk on the demands of the insurance industry (life insurance, non-life insurance) In terms of the quality of the effect, they show the connection between them. Therefore, the present study tried to apply ARIMA, GARCH / TARCH and beta coefficient through general conditional autoregression applied models. Through conditional autoregression applied models, the study of the impact of risk on the return of the insurance industry in the Iranian economy, which is obtained through the relationship between the impact of risk on the return of the quality insurance industry, and through the beta coefficient, the trend of insurance industry income on the trend We obtained the claims paid by the insurance industry in terms of percentage of quantity, to identify the risk and manage it to prevent risk aversion and its negative impact on the income return of the insurance industry.

3 Theoretical Foundations

3.1 Insurance Industry

Economic activities take place in both financial and real sectors. Variables such as consumption, investment and GDP indicate the activities that take place in the real sector of the economy. On the other hand, the financial sector, as a complement to the real sector, refers to a set of financial instruments such as securities and securities, as well as financial institutions such as insurance, banks, stock exchanges and capital companies, which play an important and pivotal role in Resource equipment and guidance have the optimal allocation of these resources to productive activities [16]. By equipping and directing household savings to investment activities, financial markets can increase private investment and economic growth, so the proper development of these markets can pave the way for further economic growth. Most empirical and theoretical studies show a positive relationship between financial market development, economic growth and private sector investment [3].

Insurance, banking and capital markets are the three classic financial markets in which equipment and financial resources are allocated. More precisely, the financial market consisting of insurance, stock exchange and bank can be called a triangle of financial development, which will be pale and inefficient without insurance. In the financial development triangle, the bank is the base of money, the stock exchange and insurance is the base of confidence, which contributes to financial development through two-way communication [12]. Today, regulators use a new method of financial oversight of the financial wealth of insurance companies to assess the financial situation and measure the risk of insurance companies.The Central Insurance of the Islamic Republic of Iran has been supervising insurance companies since 2012, as a supervisory body, considering the criterion of financial wealth ratio.Insurance, this new method of financial supervision, ie financial wealth, has become doubly important;Therefore,it is necessary to examine the steps affecting the financial wealth of insurance companies. Among the factors affecting financial wealth, we can mention credit risks, liquidity, insurance, etc., as well as economic variables [6].

3.2 Risk

Among financial intermediaries, insurance companies play an important role in the financial system and are the main risk management tools for individuals and companies. These companies collect funds by issuing insurance policies and transfer them to deficient entities to finance the investment. But ensuring the return of these invested funds is possible only as a result of the activity of the insurance sector, as the most important financial sector in economic security ([8]. The insurance industry penetration index in Iran compared to its global average penetration index in the years (2015, 2016 and 2017) in Iran in 2.20, 2.05 and 2.33, respectively, and their global average of 6.29, 6.13 and 6.24, although on a general scale The insurance industry is on the rise, while on the global average the insurance industry is on the decline. But in comparison with the global average, it is far and wide. Although different definitions are used in the definition of risk, the content of all these definitions is the same. For example, the International Project Management Institute (PMI) defines risk as an uncertain fact or event that affects one or more of the project's objectives. In another definition, Kendrick calls any uncertain factor associated with work a risk and expresses it as the product of two factors: the expected results of an event and the chance of that event occurring [13].

Risk: But at the macro level, it is the risk of a country that refers to factors that affect the ability and willingness of a country to fulfill its obligations to others, including investors, lenders, traders. Country risk is defined as the general level of political and economic uncertainty in a country that affects the value of facilities or investments in that country. Thus, country risk analysis involves assessing the political, economic and financial factors of the borrower or host country of foreign direct investment, which may interrupt the timely payment of principal and interest on the loan or adversely affect the return on foreign investment[26]. Although in the beginning only factors such as foreign wars, civil conflicts, bureaucratic and political problems or severe financial and economic turmoil and crises in a country made a particular sensitivity to the country's risk and risk, especially economic risk. Time has shown that: firstly, for all countries, there is always a percentage of this risk, and secondly, to prevent and manage this type of risk, there must always be a basis and criteria for monitoring and measurement. After the second oil shock between 1980 and 1979, many countries with foreign debts had difficulty repaying. Whether the level of risk of countries is calculated politically, economically or socially lower, the possibility of trade, foreign investment and in general fruitful and useful economic activities that create jobs It is easy, and it affects GDP.

Since then, risk analysis of the country has been in the form of other important components including "political risk", "economic risk" and "financial risk". Political risk is a non-commercial risk of political events and situations in a country that can cause trade losses between Be international, it emerges. Political events and situations such as war, internal and external conflicts, change of government and terrorist attacks may seriously affect the profitability of international trade. Political risk is relatively comprehensive with the risk of sovereignty. "Economic risk" and "financial risk" are components that are related to the conditions and overall performance of the economic and financial system. These components can not be completely separate from the political system or political process of the country. The economic and financial factors that affect risk are the result of the government's economic policies. For example, monetary and fiscal policies that lead to low inflation, low unemployment, and low budget deficits, and policies that help stabilize the financial system, have a positive effect on the country's risk assessment. [5]. In general, risks can be divided into two general categories.

1- Systematic risks, which include, market risk, interest rate risk, purchasing power risk, currency parity risk.

2- Non-systematic risks, which include commercial risk, financial risk [15].

One of the most important topics in financial science is risk measurement. In these sciences, there are

three main methods for measuring risk, which are: standard deviation, coefficient of variation and value at risk. Risk value, which has been used in financial markets since 1980 and is used by the Wing Committee in the United States to measure the economic capital of financial and investment companies(capital adequacy),estimates adverse risk [10]. Typically, methods for estimating value at risk are:
Parametric method (variance-covariance) or delta-normal;
- Historical simulation method;
- Monte Carlo simulation method;
-Limit value theory methods;
-Risk metric method;
-Hybrid hybrid method;
- Procedure for estimating the value at risk using the weighted moving average method;
The ARCH and GARCH methods identified in the studies,due to the existence of variance heterogeneity in the study portfolio to estimate the value at risk of the study company,the best method is the GARCH method and the conditional autoregressive model of variance[2]Value at risk can be defined as the amount of uncertainty about the net future returns. Increasing volatility (standard deviation) of financial markets over the past century has led to the development of advanced financial risk management tools. The basic premise of all Var estimation methods is The risk of a specific portfolio with a fixed time horizon is implicit in its profit and loss function. If we know the profit and loss distribution, Var can be calculated directly with the appropriate percentile value of this distribution. In other words, value at risk is a probabilistic term that expresses the probable change in the value of a portfolio due to changes in market factors over a period of time. It does not explain how much the actual loss will be more than the probable amount, but sums up the portfolio risk in a single number called Var, and this simple nature and summary of the value at risk that makes it attractive is its most important limitation. goes. According to a review of the literature, what can be deduced is the effectiveness of the risk-value model for determining the 1isk of investing in a financial portfolio, and for example [29] .

4 Methodology

4.1 ARIMA-GARCH/TARACH

The data of this article are extracted from the Central Insurance site of the Islamic Republic of Iran, the time series statistics of different years, the data from 1971 to 2019, the insurance industry production premiums according to Table 2-7, and the insurance industry claims paid according to Table 9-2, and Data from 2012 to 2018 are extracted from the statistical yearbook of 2018 and 2019 data are extracted from the statistical yearbook of 2019 insurance industry. Due to the dramatic effect of variability in financial markets, many theoretical studies have been conducted in this field and various models have been developed. Variability is one of the important topics in economic and financial studies. Variability is often defined as standard deviation or variance.
The easiest way to deal with variability is to use historical estimates. Historical variability requires calculation of variance(Standard deviation) is the variable in question during the period under review, which is used as a measure of future variability. Historical variance, on the other hand, is a useful way to compare models' predictive ability. All models designed for pricing financial assets need to estimate and predict volatility, because both forecasting returns and future fluctuations in returns are important. It is generally impossible to set a criterion for the forecast that is generally acceptable. This is especially acute in the linear sense. The weakness of linear methods in long-term prediction and detection of patterns in nonlinear time series data and the instability of linear methods against real-world noise have led economists to look for nonlinear methods. One of the most important nonlinear models used to explain the behavior of fluctuations in financial markets is the GARCH model. In this research, we use

the GARCH model to predict the variability of risk fluctuations in the insurance industry market, and to obtain risk, we use the risk-value method. Familiarity with GARCH models requires familiarity with its literature history and evolution Host models. In this regard, first the ARCH and GARCH models, then the model research methods and their predictions are explained in detail. The GARCH model was founded by Blesser in 1986, and was completely completed by Engel in 1986 and Nelson in 1991. This model was created by considering the changing turbulence feature. Along with this model, many models were created for the long-term memory feature of turbulence in time series; Bailey, Blesser, and Mickelson, for example, provided models to describe this phenomenon. Many models have been developed with GARCH in mind to estimate the value of risk data in different markets with this feature in mind. This method is a model based on variance change over time. The conditional term expresses dependence on past observations and autocorrelation indicates a feedback mechanism that contributes past observations to the present. GARCH is a mechanism that uses past variances to explain current variance. Uses, or more specifically, a time series modeling technique that uses past variances and estimates of past variances to predict future variances. One of the problems with ARCH models is that large qs, unrestricted estimation of its parameters often lead to violations of the non-negative constraints of α_i, which are always required for the conditional variance $\sigma_t^2 2$ to be positive. In many applications of this model, a relatively optional interrupt reduction structure is applied to the $\alpha_i$to ensure that these constraints are met. To achieve more flexibility, another generalization is proposed as the Generalized ARCH (GARCH) process. The simple mode of this model is:

$$\sigma_t^2 = \alpha_0 + \alpha_1 u_{t-1}^2 + \beta\sigma_{t-1}^2 \quad (1)$$

In the above model, because the errors are entered with an interval and the variance is entered with an interval, it is represented by (1,1) GARCH. Obviously, if we write (1) with an interval and replace σ_t^2, we will have:

$$\sigma_t^2 = \alpha_0 + \alpha_1 u_{t-1}^2 + \beta(\alpha_0 + \alpha_1 u_{t-2}^2 + \beta\sigma_t^2) = \alpha_0(1+\beta) + \alpha_1 u_{t-1}^2 + \beta\alpha_1 u_{t-2}^2 + \beta^2\sigma_{t-2}^2 \quad (2)$$

If we repeat these placements, the following result is obtained:

$$\sigma_t^2 = \alpha_0(1 + \beta + \beta^2 + \cdots) + \alpha_1(u_{t-1}^2 + \beta u_{t-2}^2 + \beta^2 u_{t-3}^2 + \cdots) \quad (3)$$

$$= \alpha_0' + \alpha_1' u_{t-1}^2 + \alpha_2' u_{t-2}^2 \alpha_3' u_{t-3+\cdots}^2$$

$$\alpha_0' = \alpha_0 \sum_{i=}^{n} \beta^i \qquad , \qquad \alpha_i' = \alpha_i \beta^i$$

Therefore, the above model is equivalent to ARCH (∞). In general, (ρ, q) GARCH is:

$$\sigma_t^2 = \alpha_0 + \alpha_1 u_{t-1}^2 + \cdots + \alpha_q u_{t-q}^2 + \beta_1 \sigma_{t-1}^2 \sigma_{t-\rho}^2 \quad (4)$$

Thus, in general, the conditional variance u_t is described by Equation (4), but usually (1,1) GARCH is sufficient. Obviously, the conditional variance u_t changes over time, but the unconditional variance is constant. To calculate the unconditional variance, we must calculate the mathematical expectation of Equation (1). In this case $E(\sigma_t^2) = E(\sigma_{t-1}^2) = E(u_{t-1}^2) = \sigma^2$and therefore according to Equation (1-3) the unconditional variance is equal Is with:

$$\text{var } var(u_t) = \sigma^2 = \frac{\alpha_0}{1-(\alpha_1+\beta)} \quad (5)$$

The above expression can be defined if $\alpha_1 + \beta < 1$. If $\alpha_1 + \beta >$ then the unconditional variance u cannot be defined. But if $\alpha_1 + \beta = 1$, it is said that there is a single root and it is denoted by IGARCH[7].

4.2 Beta Coefficient Calculation Method

The beta coefficient in financial knowledge is an indicator of systematic risk, a financial asset or a set of assets relative to market risk. In other words, beta is a means of evaluating the performance of a

particular stock or group of stocks during the general movement of the market so that: If the beta of a share is equal to one, the increase or decrease in share price (insurance income) is exactly in line with market movement. If the beta share is greater than one, the increase or decrease in the share price (insurance income) is greater than the increase or decrease in the market. And this so-called share (income) is called aggressive share (income), like stocks (prices) of the automotive industry. If the beta is less than one and greater than zero, the increase or decrease in the share price (income) is smaller than the general market trend. This share (income) is called the defensive share (income), like the shares of the food industry. If the beta of the stock is equal to zero, the movement of the share price (income) has no correlation with the movement of the market. If the beta is less than zero, the movement of the share price (income) is in the opposite direction of the general market trend, such as the gold mining industry and the sugar industry. Beta factor; The slope of the equation is the linear regression equation of the return on the market return, which indicates the price fluctuations of the asset, compared to the market or the total cost active in it.

$r_i=\alpha+\beta_m^r$

Where r_i is the return on insurance and r_m is the return on claims paid, the beta coefficient is obtained by dividing the covariance between the return on assets (insurance) and the market return (insurance claims) on the variance of the market.

$\beta=\frac{cov(r_i,r_m\ b)}{var(_m\ x)}$

The beta coefficient is obtained in three steps.

Step 1: Data Extraction: In this step, we extract the data related to the income return of the insurance industry and the return of claims paid by the insurance industry from the desired location and record the date, return of income and return of claims in the form of a sheet, respectively.

Step 2: Calculate the returnTo calculate the eleventh profit from the formula $r_t=\frac{pt-1pt_{-1}}{pt-1}$

which r_t is the market return (insurance) and pt is the return on assets (insurance or index). And pt is related to the stock price

(Insurance or index) is in a previous period (daily, monthly, seasonal or annual).

Step 3: Calculate the beta coefficient by calculating the opposite formula.

$\beta=\frac{cov(r_i,r_m\ b)}{var(_m\ x)}$

If the beta share is equal to one, the increase or decrease in the share price of the asset (insurance or index) is exactly in line with market movement. If it is greater than one, this share increase is greater than the market increase, the decrease in share is smaller than the general market trend, and if it is equal to zero, the movement of the share price has no correlation with the market movement, and if it is less than zero, the movement of the share price is contrary to the general market trend. If the beta share is equal to one, the increase or decrease in the share price of the asset (insurance or index) is exactly in line with market movement. If it is greater than one, this share increase is greater than the market increase, the decrease in share is smaller than the general market trend, and if it is equal to zero, the movement of the share price has no correlation with the market movement, and if it is less than zero, the movement of the share price is contrary to the general market trend.

4.3 Descriptive statistics

The return on production premiums and the return on damages paid by the insurance industry during the years 1971-2019 extracted from the tables of the Central Insurance site of Iran have been prepared.

β=67% Insurance industry beta = $\beta=\frac{cov(r_i,r_m\ b)}{var(_m\ x)}$

Or is calculated using the SLOPE formula, which showed a result of 67% for both methods.

Table 1: Return on production premiums and returns on damages paid by the insurance industry

Row	Year	Production efficiency of the insurance industry	Insurance industry losses	Row	Year	Production efficiency of the insurance in-	Insurance industry losses	Row	Year	Production efficiency of the insurance in-	Insurance industry losses
1	1971	0/00	0/00	18	1988	0/07	-0/04	35	2005	0/24	0/45
2	1972	0/25	0/20	19	1989	0/47	0/69	36	2006	0/23	0/13
3	1973	0/51	0/38	20	1990	0/59	0/27	37	2007	0/27	0/26
4	1974	1/00	0/70	21	1991	0/47	0/24	38	2008	0/20	0/19
5	1975	0/11	0/39	22	1992	0/44	0/62	39	2009	0/14	0/24
6	1976	0/35	0/50	23	1993	0/68	0/78	40	2010	0/27	0/28
7	1977	0/06	0/26	24	1994	0/36	0/65	41	2011	0/46	0/37
8	1978	0/03	-0/16	25	1995	0/72	0/90	42	2012	0/53	0/46
9	1979	-0/21	-0/22	26	1996	0/43	0/74	43	2013	0/23	0/34
10	1980	0/27	-0/14	27	1997	0/22	0/30	44	2014	0/29	0/18
11	1981	0/00	0/33	28	1998	0/31	0/26	45	2015	0/09	0/19
12	1982	0/51	0/32	29	1999	0/49	0/40	46	216	0/27	0/25
13	1983	0/10	-0/15	30	2000	0/35	0/40	47	2017	0/21	0/19
14	1984	-0/12	0/33	31	2001	0/41	0/51	48	2018	0/33	0/32
15	1985	0/04	0/05	32	2002	0/60	0/50	49	2019	0/32	0/19
16	1986	-0/10	0/04	33	2003	0/39	0/38				
17	1987	0/16	0/07	34	2004	0/36	0/32				

4.4 Inferential Statistics

In this study, Eviews and Excel software have been used. The purpose of this study is to investigate the effect of risk on the return of the insurance industry in the Iranian economy using the ARIMA-GARCH / TARCH model and beta coefficient. The variable studied in the study is the effect of risk on the return of financial insurance operations of the insurance industry in the Iranian economy using annual estimated data over a period of time (1971-2019), ie 49 observations. In this study, the insurance industry variable is equal to Y, estimating the extent and impact of risk on the return of the insurance industry in the Iranian economy will help insurance industry managers to identify the boundary between tolerable and unbearable risks in accepting different risks. And with timely and correct management to prevent risk aversion from having a negative impact on the return on income of the insurance industry.

4.4.1 Unit Root Test

this research; To investigate the effect of risk on the return on profits of the insurance industry on the Iranian economy, which is obtained from the difference between the return on income and the return on claims paid. The steps are as follows: through the generalized Dickey-Fuller test, and the Philips Peron test, we examined the static variability. Which is based on generalized Dickey-Fuller statistics, and Phillips Peron calculated for the variable under study should be greater than the critical values at the desired confidence levels. In this case, we can accept that the variable has roots in the conditions under study. It is not a unit and the estimated regression is not false and unreliable.

In this study, by examining the studied variable, it was found that the mentioned variable was mana at

the "level" - that is, variable (1) 0 remained at critical values of the variable at the level of 1%, 5% and 10%. Thus, the result shows that due to the smaller generalized Dickey-Fuller statistic, and the Philips Peron critical value, the H_0 hypothesis of variable anonymity at 99% levels cannot be rejected. And so this variable stays on the level and Dick Fuller's statistics are generalized and Phillips Peron is greater than the critical values and the null hypothesis that this variable is named is rejected at 99% levels and therefore the variable (1) is 0.

Table 2: Generalized Dickey-Fuller test, Phillips Prone test with width from origin

Test	Variables	Calculated number	Critical values 1%	Critical values 5%	Critical values 10%
Dickey Fuller Gener-alized	Y	6.678701-	3.574446-	2.923780-	2.599925 -
Philips Peron	Y	6.678334-	3.574446-	2.923780-	2.699925 -

Source: Researcher Findings

4.4.2 Estimation of ARMA (ARIMA) models

In this paper, GARCH / TARCH and ARIMA methods have been used to estimate generalized conditional autoregressive models and to extract risk variables. In order to model, first using the approach of Box and Jenkins (1976), they were the first to propose a method for estimating ARMA models. Their method is a practical method that has three stages of diagnosis, estimation and review. This method mainly uses the behavior of autocorrelation coefficients and partial autocorrelation coefficients. The greatest advantage of these models is their use for forecasting; Because in these models only dependent and residual variable interrupts are used. For this reason, ARMA models are sometimes called non-theoretical models; Because economic theories are usually derived based on simultaneous equation models, ARMA models are not derived from economic theories.

After determining the status of the root test of the studied variable unit, considering the assumption that the efficiency of each period can be modeled in the form of an autoregressive equation, different modes identify the main model by examining the autocorrelation and partial correlation functions. According to the first-order differentiation, it was observed that PAC (partial correlation) in the observations of (7,1) AC, and (autocorrelation) in the observations of (1) AR are out of the mean, which is why AR (1) and (1) , 7) MA were obtained. For this purpose, in each estimate, after examining the whiteness of the waste sentence in the estimates that are considered appropriate, we examined the values of AIC and SC.

Table 3: Estimation of ARIMA life Insurance Model

MA(7)	MAMA(1،7)	MA(1)	AR(1)	ARMA(1,7)	ARMA(1،1)	Process (model)
0000	0000	0000	00000	00000	0000	Prob
0.516469	0.555754	0.526087	0.526017	0.555475	0.565817	AIC
0.593686	0.671580	0.603304	0.603234	0.671300	0.681642	SBIC

Source: Researcher Findings

According to the results obtained; The evaluation criterion, in addition to the fact that prob is less than 0.05, was based on the minimum value of AIC and SBC criteria, and also based on smaller statistics with less than one root, and MA (7) with prob = 0000, AIC = 0.516469 And SBIC = 0.593686 is more appropriate than other statistics. At this stage, the result was that the optimal model was estimated based on the following process.

$$Y=PROFITR=0/\ 30214\ -0/22122\ PROFITR(-7) \quad (5)$$
$$t\rightarrow \qquad ./09203 \qquad -./\ 077826$$

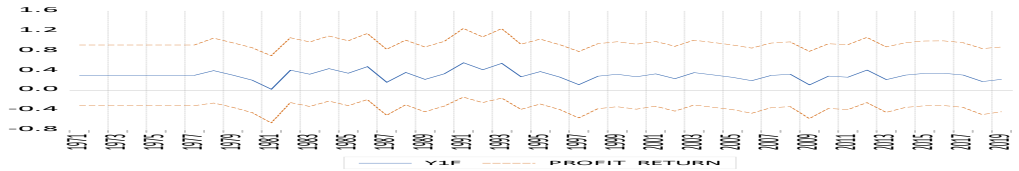

Fig. 1: Predicting the return on annual changes in the insurance industry using the static method (real values).

4.4.3 Analysis of Variance Test ARCH-LM

After estimating the ARIMA model, we measured the return of the insurance industry using the conditional heterogeneity variance autoregression model and the generalized conditional heterogeneity variance autoregression model. Under these conditions, it was found that the model under study has heterogeneity of variance. Therefore, it is not possible to use the ordinary least squares (OLS) estimation and we have to use the general least squares (GLS) method in the case of heterogeneity variance (maximum likelihood method).

Table 4: Results obtained from GARCH / TARCH model estimation

ARCH(1) GARCH(2)	ARCH(2 GARCH(2)	ARCH)2) GARCH(1)	ARCH(2) GARCH(0)	ARCH(1) GARCH(0)	ARCH(0) GARCH(2)	ARCH(0) GARCH(1)	ARCH(1) GARCH(1)	Interruptions (Model)
0.4014	0.2683	.00001	00000	0.0127	0.74616	0.5031	0.0000	Prob
0.421325	0.460833	0.449601	0.291137	0.533462	2.959324	0.479358	0.387563	AC1
0.652976	0.731093	.0681252	0.484180	.0736505	3.152367	0.633792	0.580606	SBC

Table 5: Result of GARCH / TARCH heterogeneity test matched with interval 1

F-statistic	0.420148	Prob. F(2,44)		0.6596
Obs*R-squared	0.880768	Prob. Chi-Square(2)		0.6438
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.915176	0.305197	2.998643	0.0044
WGT_RESID^2(-1)	-0.020171	0.149122	-0.135266	0.893
WGT_RESID^2(-2)	0.135084	0.14995	0.900862	0.3726

4.4.4 GARCH / TARCH Model Estimation

After estimating the appropriate ARIMA model, by examining the autocorrelation and partial correlation functions, we entered the conditional standard deviation or variance as an explanatory variable into the conditional mean equation (principal equation) to measure the insurance industry return variable. Step We were looking for a combination of ARCH models with different ARIMA intervals with width from the origin, which has the minimum value for ACI and SBIC criteria, we were looking for the GARCH / TARCH model estimate, which with GARCH / ARCH interrupts (1.1) Estimate the appropriate pattern according to the GARCH / TARCH test result obtained.

$$Y=GARCH/TARCH=0.05524+0.15000*RESID(-1)^2+0.60000*GARCH(1) \quad (6)$$

t→ 0.05524 -0.02243 0.32099

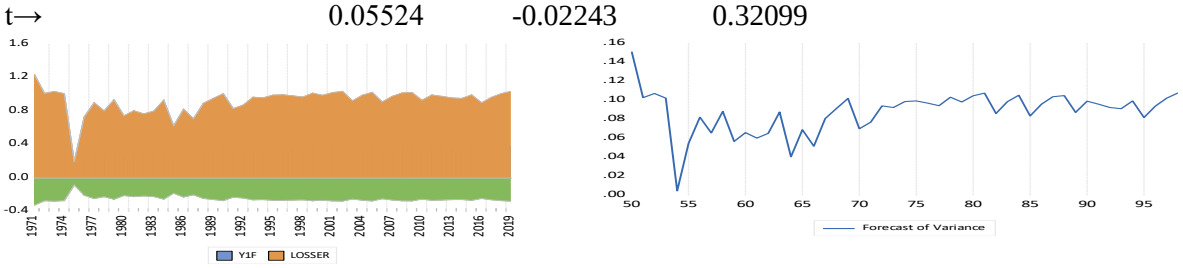

Fig. 2: Estimation of variability resulting from model output

4.4.5 Estimation of variability

In this study, using the estimated GARCH / TARCH model, we estimated the variability in the return on operations of the insurance industry.

4.4.6 Calculating the value-at-risk (VaR) threshold in examining the impact of risk on the return of the insurance industry in the Iranian economy

In this situation, according to the formula for assessing the amount of risk from the value-at-risk method expressed on the return of the insurance industry in the Iranian economy, using the variability of the forecast model, exposed to absolute and medium risk compared to profit returns, according to Figure 3 is obtained.

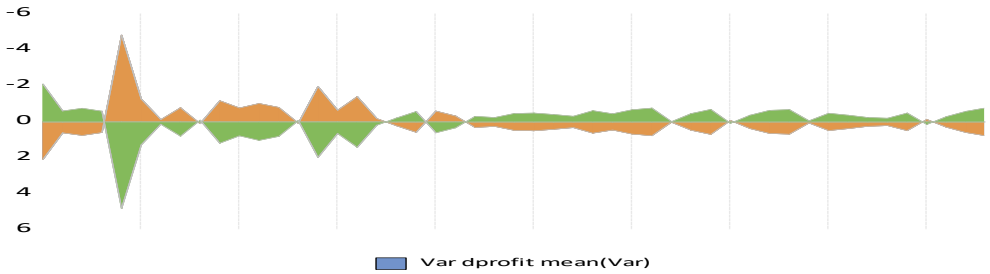

Fig. 3: Calculating the impact of risk on the return of the insurance industry in the Iranian economy

According to the upper line from zero in the chart above, which represents the average of the desired level of risk impact on the return of the insurance industry in the Iranian economy, these fluctuations indicate the impact of systematic risk (direct and indirect) on the return of the insurance industry. It is in the Iranian economy, so in the years when the level of risk was high, the return of the insurance industry also increased, and in the years when the level of risk was low, the return of the insurance industry also decreased, and in the years when the level of risk The average is the median return on the insurance industry, although there is a direct relationship between risk and return. Due to the lack of complete and accurate knowledge of people about the risk and return of the insurance industry, risk aversion has had a negative impact on the return of the insurance industry. The result of this study in response to the hypothesis, shows that there is a significant relationship between the impact of risk on the return of the insurance industry in the Iranian economy.

5 Discussion and Conclusion

the main purpose was to investigate the effect of risk on the return of the insurance industry in the Iranian economy during the period 1971-2019 using generalized autoregressive conditional models ARIMA-GARCH / TARCH and beta coefficient. In this study, Eviews and Excel software have been used .The limitation of human knowledge in recognizing and predicting phenomena has caused all activities and decision-making situations to be associated with a variety of types of risks. Risk can be defined as the probability of a negative deviation from what is intended. Therefore, the risk is a future phenomenon that can not be accurately predicted and is accompanied by uncertainty. And the more uncertainty there is, the greater the risk. Increasing fluctuations (standard deviations) in financial markets over the past century have led to the development of advanced financial risk management tools. The insurance industry affects economic growth both as a means of risk transfer and compensation and as institutional investors, on the other hand, the growth of this industry depends on the demand of this industry; Therefore, finding the factors affecting the demand of the insurance industry has an important role in marketing and increasing the demand of the insurance industry and in general in the direction of

growth of the insurance industry. On the other hand, the insurance industry, due to its main feature, namely risk transfer, can have undeniable effects on the development of domestic and international markets, and the expansion of this sector will be the basis for the development of other sectors. Therefore, identifying tolerable and unbearable risks and managing them in the demand of the insurance industry plays an important role in marketing and increasing the demand for insurance and, in general, in the direction of growth of the insurance industry. To this end, in the last decade, in societies and developed countries, extensive research has been done on how the insurance industry market develops, and according to them, what affects the insurance industry is not only economic variables, but also cultural and social variables. Political and legal also affect it. Therefore, in this study. During this research process and the hypothesis stated, it was found that there is a direct and significant relationship between the impact of risk on the return of the insurance industry in the Iranian economy. This is consistent with the results of the studies of Peykarjoo and Hosseinpour [2]. That is, the higher the impact of risk, the higher the return of the insurance industry, and vice versa, the lower the impact of risk, the lower the return of the insurance industry in the Iranian economy. Have not been significant, and also in this study, systematic risk has been calculated using the beta coefficient method so that the return on insurance industry income relative to the return on claims paid by the insurance industry, the effect of risk on the return on insurance industry income. It is 67%.

Because the beta coefficient obtained is less than one and greater than zero, it indicates lower movements in the insurance industry's revenue-return than in claims-paid movements, and the insurance industry's revenue is smaller than the general market movement. Defensively, risk aversion has a negative effect on the insurance industry's income return. If the beta coefficient was equal to 1, the insurance industry's income returns were higher than the claims compensation movements, and the insurance industry's income was in line with the general market movement. According to previous observations, which are consistent with the results of Nobahar et al. [18] studies, risk aversion to health services. Due to the lack of full knowledge of the risk and its proper management by the managers of the insurance industry, and the lack of its principles among the people (consumers of the insurance industry) in times when the risk was high. Use insurance in the Iranian economy, unfortunately, we have risk aversion and this risk aversion has a negative impact on the positive return of the insurance industry in the Iranian economy. The insurance industry penetration index in Iran compared to The global average penetration coefficient in the years (2015, 2016 and 2017) in Iran the years 2.20, 2.05, and 2.33, and their global average of 6.29, 6.13 and 6.24, respectively, although on the general scale of the insurance industry shows an upward trend, in If the global average of the insurance industry shows a downward trend. But in comparison with the world average, it is far and wide. The insurance industry, like any other industry (market) is composed of two aspects of supply and demand.

And considering that the trend of income return is less than the return of damages paid by the insurance industry in the Iranian economy. This shows that the country's insurance industry has fundamental and structural problems in both supply and demand. Therefore, it is suggested that in terms of market supply of the country's insurance industry, general investment be made in the education and training of educated people in order to obtain higher specializations related to insurance, by sending talented graduates to obtain knowledge in higher education such as a doctorate. Continuous dispatch of managers and experts of the insurance industry to professional insurance centers in developed countries in order to pass professional courses and gain experience. In terms of market demand of the country's industry, appropriate advertising should be done for the products of the country's insurance industry, which raises awareness and knowledge of people about the services of the insurance industry, which promotes the consumption culture of the insurance industry and increases the level of foresight. And plan in the eyes of the people, so that the insurance industry is in the consumption basket of Iranian households.

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