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Investigating the effect of risk on life insurance return in the Iranian economy

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Abstract

Examining the movement trend of life insurance returns shows, That the movement of income return has been less than the movement of return of life insurance claims. Fewer movements of income return than movements of life insurance claims in the economy arise from various variables, including life insurance management, Part of which is due to risk recognition. This helps life insurance industry executives, To the extent of the boundary between tolerable and intolerable risks in accepting or not accepting various swimming risks, And by managing them, they can play an important role in marketing and increasing the demand for insurance and, in general, for the optimal growth of life insurance. Hence the purpose of the article; Investigating the effect of risk on life insurance return during the period 1971-2019 using the ARIMA-GARCH / TARCH model and beta coefficient. The results show; There is a significant relationship between examining the impact of risk on life insurance return. Also in this research, systematic risk has been investigated using the beta coefficient method. Because the beta coefficient obtained is 17% and is less than one and greater than zero. This result indicates that life insurance income is smaller than the general trend of market movement and risk aversion has a negative impact on the return on life insurance income.

Keywords: Risk, Life insurance, The movement process of efficiency, Beta coefficient
2020 MSC: 97M30

1 Introduction

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. Due to the privatization and structural change of the insurance industry in Iran, as well as the bankruptcies of insurance companies, this new method of financial supervision, namely financial wealth, has become doubly important; Therefore, it is necessary to examine the steps affecting the financial wealth of insurance companies.

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Among the factors affecting financial wealth, we can mention credit risks, liquidity, insurance, etc., as well as economic variables [13].

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 [8].

According to Article of the Insurance Law adopted in 1997, the insurance industry is a contract under which one party undertakes to compensate or pay a certain amount of damages in the event of an accident or occurrence in return for payment of funds or funds by the other party. In this regard, the obligor is called the insurer, the party to the obligation is the insurer, and the amount that the insurer pays to the insurer is called the premium, and what is insured is called the subject of insurance. And since there is a direct relationship between risk and return on life insurance. That is, if the risk is low, life insurance returns are expected, and if the risk is higher, life insurance returns are expected to be high. Insurance companies offer many products that are divided into two general groups life insurance and non-life insurance. Life insurance in its general form means guaranteeing the payment of a certain amount to a beneficiary due to the death of the insured, or payment to the insured who continues to live beyond a certain age. In contrast, non-life insurance includes all types of insurance; Such as property and liability insurance, motor vehicle insurance, marine insurance, etc. [11]. Therefore, this study seeks to express the question, what is the extent of the impact of risk on life insurance return in the Iranian economy during the years 1971 to 2019? Due to the great importance of showing the impact of risk on the return of life insurance in the Iranian economy, this study has been done. Therefore, the present article is organized into five sections. The first part, the introduction and problem statement, in the second part, the theoretical foundations and literature and research background. In the third section, the methodology and introduction of research variables are stated. In the fourth part of the research estimate and in the fifth and final part, the obtained results are presented and discussed and analyzed.

2 Research history

2.1 Fundamentals and theoretical literature

Life insurance penetration index in Iran compared to the global average penetration index in 2016, 2017 and 2018 in Iran, respectively, year, 0.35, 0.31, 0.30 and their global average, 3.37, 3.43 and 3.31, although increasing the penetration of life insurance It has shown an upward trend, but it is far from the global average, and the life insurance penetration rate in Iran is lower than its non-life value, while on the global average, the insurance penetration rate is Life is longer than non-life insurance, and shows a downward trend, and non-life insurance shows an almost constant fluctuation, and the insurance industry as a whole in the Iranian economy shows a decline.

The purpose of buying life insurance is to provide employees with family members from relatives against the loss of human capital, ie; Protect the present value of the future income of the workforce in the event of pre-retirement death [4]. Despite the widespread development of life insurance in developed countries and even in many developing countries, life insurance, which is an urgent need of life today, remains unknown in most developing countries and its role in the economy These countries are insignificant [10]. The most important task of life insurance companies is to move people's savings (especially the lower and middle classes) towards investment. Compensation in life insurance disciplines and the funds received from these disciplines allow for more and longer-term investment, hence the high share of insurance activities in countries that have a competitive and efficient insurance market. It is life insurance and this has led to the active and wide participation of insurance companies in the capital market and the provision of funds for investment. Life insurance, especially life insurance, not only provides peace of mind for the insurer, but also constitutes Capital also becomes. Because the variety and breadth of insurance activities can cover all sectors Include the economy and the entire population of the country and lead to the accumulation of large funds. In addition to providing security in the set of economic activities, it can be transformed into one of the important channels for analyzing investable resources and directing them to productive economic activities [9].

2.2 Internal studies

Dehghani and Sheikh Rezaei [3], 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, the survey was conducted during the period 2000-2014. 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.

Asadi Gharagouz et al. [1], Effective Factors Financial Development's Emphasis on Life Insurance (Comparative Study of Iran and Developed Countries) Objective: Financial development is one of the most important requirements for high and sustainable economic growth in development in insurance, banking and market Capital is obtained. Having an efficient system for consolidating micro-capital at the banking sector and insurance and turning them into financial resources for investment and financing has a very important role in the path of economic growth in the turnover required by firms. In developed countries, life insurance is one of the most important mechanisms for attracting stagnant liquidity in addition to securing the future of insurers. Unfortunately, in emerging markets, the share of this financial institution is very small. The main purpose of this study is to identify and investigate the macroeconomic factors affecting financial development with emphasis on the development of life insurance. Pays financial development between developed countries and Iran. Findings: The findings show that the development of life insurance in developed countries, unlike Iran, has a significant impact on financial development, which indicates the underdevelopment of life insurance in the Iranian insurance industry. The impact of government spending on fiscal development in Iran, unlike in developed countries, is positive, and the impact of inflation on fiscal development in Iran, unlike in developed countries, is significant. Among the variables studied for developed countries, respectively, trade volume, government consumption expenditure, per capita income and the development of life insurance have the most impact on financial development. However, in Iran, respectively, government spending, inflation and life insurance have the greatest impact on financial development. Conclusion: The results also show that the impact of life insurance on financial development is greater than non-life insurance. In the present study, life insurance, due to its low share in the portfolio of insurance companies, unlike developed countries, has a significant weak impact on financial development in the banking sector. The final results show that the first hypothesis of the research, "Development of life insurance has a significant impact on financial development in developed countries", is confirmed, but the second hypothesis of the research, "Development of life insurance has a significant impact on financial development," Low significance is confirmed.

Khadivar et al. [6], Risk Assessment and Compliance with Business Rules in Insurance Using Mining Process Case Study Case Study: Third Party Insurance Loss Process, Objective: Today, organizations have resorted to process-based approaches to improve their activities. Recognizing and modifying processes in organizations is essential because of time savings and cost savings. Process management and firm risk management and compliance are the main challenges of today's process-oriented organizations, especially insurance companies. Today, insurance has made tremendous progress in our society. In the meantime, process mining technique helps insurance companies to identify the existing process and timely understanding of the non-compliance of operational processes with the rules of the organization. Methodology: This research aims to use process mining techniques through a structured methodology of implementing process mining projects. (PMPM) [2] to identify the existing process and timely understanding of the extent of non-compliance with the rules of the organization. This study has been implemented in one of the active insurance companies of the country for the selected processes of that group. Results: In this research, using the events diagram [1] recorded in the information systems of the organization, an overview of the process has been obtained. Then, using Pram software, organizational processes are analyzed, the sequence of activities related to the process, considering the rules of the selected business, are examined, and finally, suggestions for improving the processes are presented. Conclusion: In this case study, insights A new approach that can be useful to other professionals in the application of process research in the field of finance has been presented. This approach can be used in conjunction with control layer approaches to monitor and improve information system performance and reduce operational risk. Because it can provide useful insights for the organization by providing timely process analysis based on rules.

Asayesh and Jalili Kamjoo [2], 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 The impact of the variables on GDP, life expectancy, unemployment, inflation, enrollment rate (literacy) and degree of urbanization on the demand for life insurance in selected Middle Eastern countries during the period 1990-2017. Methodology: According to the theory of expected desirability in the uncertainty of Voniumen and Morgenstern (1947) developed by Yari (1965) and then Lewis (1989), in this study, the regression model of a threshold smooth transfer panel with a logit transfer function is investigated. And achieve the purpose of research use. Has been. 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. In a regime with less political and financial risk, the demand for life insurance is more sensitive to urbanization. The literacy rate in a regime with less financial risk has a more minor effect on the demand for life insurance.

2.3 Foreign studies

In an article, Kunreuther and Pauly [7] examined the effect of rejection of public decisions in risky situations on insurance demand, which shows that increasing emotional relationships leads to a decrease in insurance demand. The impact has a low margin and from one point onwards, these relationships have no effect on insurance demand.

Hui and Xin [5] have examined the dynamic relationship between development and economic growth in 11 coastal cities of China. 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.

Zheng et al. [16] using an endogenous consumer demand model for healthcare consumption and the use of semi-parametric generalized torque method, have investigated the risks of skewness and skewness in health insurance in Croatia. 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.

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

3 Theoretical foundations of risk assessment in the insurance industry using the TARCH / GARCH method

The data of this article have been extracted from the Central Insurance website of the Islamic Republic of Iran, time series statistics of different years of data from 1971 to 2011, life insurance production fee and life insurance claims paid and data from 2011 to 2018 from the statistical yearbook 97 and data from 2019 from the statistical yearbook 89 The insurance industry has extracted.

Due to the very significant effect of variability in financial markets, many theoretical studies have been conducted in this field and various models have been developed. 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 life insurance industry market, and to obtain risk, we use the value-at-risk method. Obviously, familiarity with GARCH models requires familiarity with its literature history and evolution. These are the 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 specifically is 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 σ_t^2 to be positive. In many applications of this model, a relatively optional interrupt reduction structure is applied to the α_i to ensure that these constraints are met. To achieve more flexibility, another generalization has been proposed as the Generalized ARCH (GARCH) process [12].

The simple mode of this model is:

$$\sigma_t^2 = \alpha_0 + \alpha_1 u_{t-1}^2 + \beta\sigma_{t-1}^2 \tag{3.1}$$

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 (3.1) with a pause and replace it with σ_t^2, we will have:

$$\sigma_t^2 = \alpha_0 + \alpha_1 u_{t-1}^2 + \beta(\alpha_0 + \alpha_1 u_{t-2}^2 + \beta\sigma_t^2) = \alpha_0(1+\beta) + \alpha_1 u_{t-1}^2 + \beta\alpha_1 u_{t-2}^2 + \beta^2\sigma_{t-2}^2 \tag{3.2}$$

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

$$\begin{aligned}\sigma_t^2 &= \alpha_0(1+\beta+\beta^2+...) + \alpha_1(u_{t-1}^2 + \beta u_{t-2}^2 + \beta^2 u_{t-3}^2 + ...)\\ &= \alpha_0' + \alpha_1' u_{t-1}^2 + \alpha_2' u_{t-2}^2 + \alpha_3' u_{t-3}^2 + ...\\ \alpha_0' &= \alpha_0 \sum_{i=1}^{n} \beta^i, \quad \alpha_i' = \alpha_i \beta^i\end{aligned} \tag{3.3}$$

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

$$\sigma_t^2 = \alpha_0 + \alpha_1 u_{t-1}^2 + ... + \alpha_q u_{t-q}^2 + \beta_1 \sigma_{t-1}^2 \sigma_{t-\rho}^2 \tag{3.4}$$

Thus, in general, the conditional variance u_t is described by Equation (3.4), but usually GARCH (1,1) 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 (3.1). In this case $E(\sigma_t^2) = E(\sigma_{t-1}^2) = E(u_{t-1}^2) = \sigma^2$ and therefore according to Equation (3.1) the unconditional variance is equals with:

$$var(u_t) = \sigma^2 = \frac{\alpha_0}{1-(\alpha_1+\beta)} \tag{3.5}$$

The above expression can be defined if $\alpha_1 + \beta < 1$. If $\alpha_1 + \beta > 1$ 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 indicated by IGARCH [14].

4 Method of calculating the beta coefficient

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 tool to evaluate 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 contrary

to the general trend of the market, such as the gold mining industry and the sugar industry. This way, stocks with higher beta will have higher risk and, of course, higher potential for return. 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.

$$\frac{cov(r_i, r_m^b)}{var(m^x)}\beta = \alpha + \beta_m^r \tag{4.1}$$

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 (claims on insurance) on market variance.

The beta coefficient is obtained in three steps

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

Step 2: Calculate the return: To calculate the eleventh profit from the formula

$$\frac{cov(r_i, r_m^b)}{var(m^x)}\beta = \frac{pt - 1pt - 1}{pt - 1}r_t \tag{4.2}$$

where r_t is the market return (insurance) and pt is the return on assets (insurance or index). And $pt - 1$ is 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.

If the beta share is 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;

If it is less than zero, the share price movement is against the general trend of the market [15].

$$\frac{cov(r_i, r_m^b)}{var(m^x)}\beta = \text{Life insurance beta} = 17\%\beta \tag{4.3}$$

Or is calculated using the SLOPE formula, which showed a result of 17% for both methods.

Table 1: Return on production insurance life insurance and return on damages paid during the years 1971-2019

Row	Year	Repayment of life insurance claims	Reimbursement of life insurance claims
1	1971	0.00	0.00
2	1972	0.00	0.00
3	1973	0.50	1.00
4	1974	0.67	0.00
5	1975	0.40	0.00
6	1976	0.14	0.50
7	1977	0.13	−0.67
8	1978	0.11	0.00
9	1979	0.00	3.00
10	1980	0.40	1.03
11	1981	0.57	−0.01
12	1982	−0.09	0.13
13	1983	0.80	0.78
14	1984	−0.19	0.19
15	1985	−0.21	0.00
16	1986	0.35	0.29
17	1987	0.10	0.22
18	1988	0.21	0.10
19	1989	1.17	1.55
20	1990	0.28	0.33
21	1991	0.33	0.14
22	1992	0.33	0.14
23	1993	0.24	0.26

24	1994	0.58	0.59
25	1995	0.56	0.35
26	1996	0.21	0.34
27	1997	0.94	0.54
28	1998	0.57	0.19
29	1999	0.35	0.75
30	2000	0.96	3.62
31	2001	−0.05	−0.57
32	2002	0.56	0.31
33	2003	0.17	0.14
34	2004	0.02	0.21
35	2005	0.33	0.12
36	2006	0.18	0.06
37	2007	0.13	0.01
38	2008	0.12	0.30
39	2009	0.52	0.41
40	2010	0.46	0.26
41	2011	0.47	0.26
42	2012	0.49	0.52
43	2013	0.44	0.32
44	2014	0.53	0.49
45	2015	0.23	0.30
46	2016	0.36	0.34
47	2017	0.22	0.27
48	2018	0.42	0.56
49	2019	0.31	0.11

5 Research results, estimation and model estimation

In this study, Eviews and Excel software have been used.

The purpose of this study is to investigate the effect of risk on life insurance returns 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 life insurance operations in the Iranian economy using annual estimated data over a period of time (1971-2019), i.e. 49 observations.

Estimating the extent and impact of risk on life insurance returns in the Iranian economy will help managers of the life insurance industry to identify the boundary between tolerable and unbearable risks in accepting different risks, and with timely and correct management of Prevent risk aversion from having a negative impact on the return on life insurance income.

5.1 Unit Root Test

To investigate the impact of risk on the return of life insurance on the Iranian economy, which is obtained from the difference between the return on income and the return on damages 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 Perone critical value, the H_0 hypothesis of variable anonymity at 99% levels cannot be rejected.

Therefore, this variable is maintained at the level, and Dickey-Fuller statistics are generalized, and Phillips Peron is larger than the critical values, and the null hypothesis that this variable is nominal is rejected at (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 Generalized	Y	−6.579644	−3.574446	−2.923780	−2.599925
Philips Peron	Y	−6.579894	−3.574446	−2.923780	−2.599925

5.2 ARMA Model Estimation (ARIMA)

In this paper, GARCH / TARCH, ARIMA method is used to estimate the TARCH / GARCH pattern and extract the risk variable.

In order to model, first, using the approach of Box and Jenkins (1976), ARIMA is estimated and the /TARCH.GARCH model is based on the disruption sentences of the ARIMA model.

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, ARIMA models are sometimes called non-theoretical models.

Because economic theories are usually derived based on simultaneous equation models, ARIMA 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 observations (1,2) AC, and (autocorrelation) in observations (1) AR are out of the mean, which is why AR (1) and (1,2) MA were obtained. For this purpose, in each estimate, after checking the whit noise, we examined the values of AIC and SC in the estimates that were considered appropriate accordingly.

Table 3: Estimation of ARIMA life insurance model

MA(2)	MAMA (1,2)	MA(1)	AR(1)	ARMA (1,2)	ARMA (1,1)	Process Model
0.0331	0.0431	0.0665	0.0644	0.0417	0.0000	Prob
3.975661	4.014710	3.984667	3.984904	4.014995	3.981841	AIC
4.052878	4.130536	4.061884	4.062121	4.130820	4.097667	SBIC

According to the results obtained; In addition to being less than 0.05, the evaluation criterion was based on the minimum value of AIC and SBC criteria, and also based on the smaller statistics with a single root less than one, and MA (2) with 1 prob=0.033, AIC=3.975665 and SBIC=4.052878 is more appropriate than other statistics. At this stage, the result was that the optimal model was estimated based on the following process.

$$Y1 = DPROFIT = 0.45810 - 0.12479DPROFIT$$

$$t \rightarrow \qquad 0.2365 \quad 0.0133$$

Figure 1: Annual changes of static insurance (real values)

5.3 ARCH-LM heterogeneity analysis of variance

After estimating the ARIMA model, we measured the life insurance return variable 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: Result of ARCH-LM heterogeneity test with ARCH interval 2

F-statistic	0.015049	Prob. F(2.44)		0.9851
Obs ∗ R-squared	0.032129	Prob. Chi-Square (2)		0.9841
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.096802	2.439416	1.269485	0.2109
$RESID^2$(-1)	−0.015987	0.150731	−0.106066	0.916
$RESID^2$(-2)	−0.020945	0.150739	−0.138946	0.8901
R-squared	0.000684	Mean dependent var		2.986242
Adjusted R-squared	−0.04474	S.D. dependent var		15.78298
S.E. of regression	16.13218	Akaike info criterion		8.461211
Sum squared resid	11450.88	Schwarz criterion		8.579305
Log likelihood	−195.8384	Hannan-Quinn criter.		8.50565
F-statistic	0.015049	Durbin-Watson stat		2.001215
Prob(F-statistic)	0.985068			

5.4 Estimation of GARCH / TARCH model

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 life insurance 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 (0,1) Estimate the appropriate pattern according to the GARCH/TARCH result obtained.

Table 5: 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
0.9343	0.9673	0.9799	0.0001	0.0189	0.7836	0.8657	0.4500	Prob
3.895346	3.790645	3.856099	3.315792	2.869650	2.959324	3.975556	3.877575	AC 1
4.126997	4.060905	4.087751	3.518834	3.024085	3.152367	4.129990	4.070618	SBC

Table 6: Result of GARCH / TARCH heterogeneity test matched with interval 2

F-statistic	0.371213	Prob. F(2.44)		0.692
Obs ∗ R-squared	0.779886	Prob. Chi-Square (2)		0.6771
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.224864	0.471675	2.596842	0.0127
WGT_$RESID^2$(-1)	−0.120325	0.150335	−0.800383	0.4278
WGT_$RESID^2$(-2)	−0.061204	0.15036	−0.407051	0.6859

$$Y = GARCH/TARCH = 1.90974 + 0.17153 * RESID^2(-1)$$

$$t \rightarrow \qquad 1.90974 \qquad 1.092720$$

5.5 Estimation of variability

In this study, using the estimated GARCH/TARCH model, we estimated the variability in the return on life insurance operations (Figure 2).

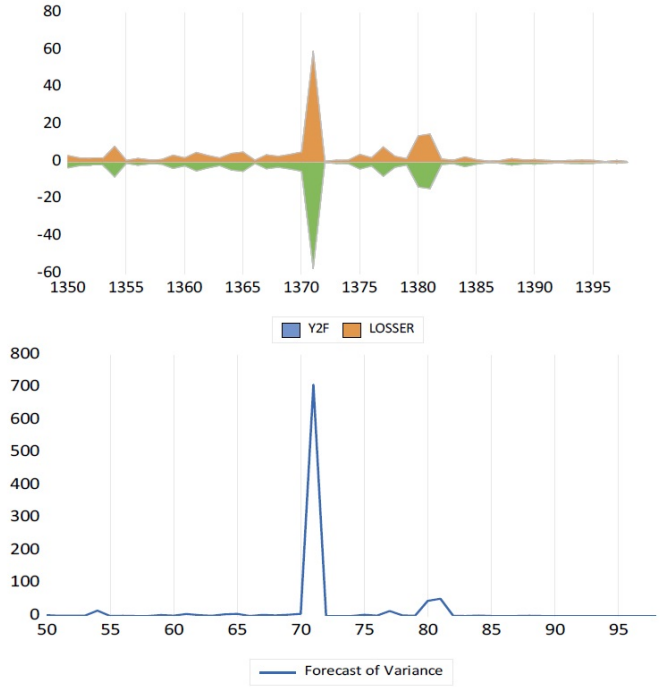

Figure 2: Estimation of life insurance return variability resulting from model output

5.6 Calculating the Threshold of Value at Risk (VaR), in Examining the Impact of Risk on Life Insurance Return in Iran's Economy

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

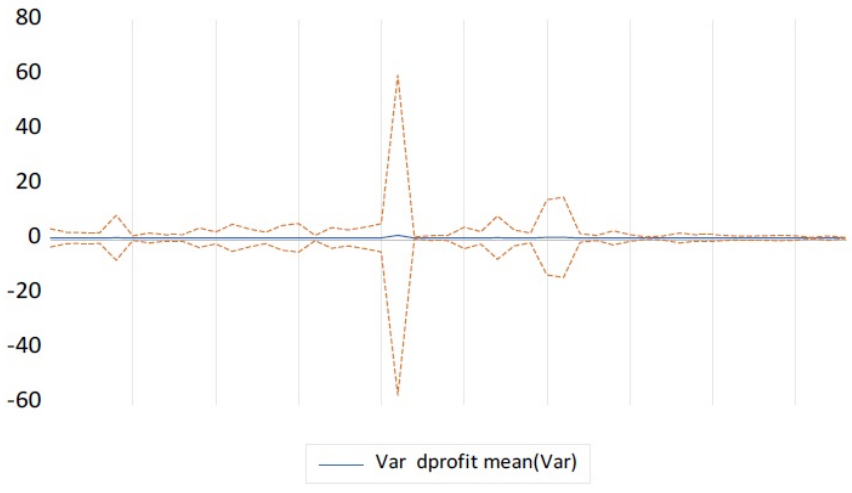

Figure 3: Calculation of the effect of risk on life insurance return in the Iranian economy.

According to the upper line from zero in the chart above, which represents the average of the desired level of risk impact on life insurance returns in the Iranian economy, these fluctuations indicate the impact of systematic risk (direct and indirect) on life insurance returns. It is in the Iranian economy, so in the years when the level of risk was high, the return on life insurance also increased, and in the years when the level of risk was low, the return on life insurance also decreased, and in the years when the level of risk was limited. Life insurance returns are average, 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 life insurance, risk aversion has a negative impact on the return of life insurance.

There was a significant relationship between the study of the impact of risk on life insurance returns in the Iranian economy.

6 Conclusions and suggestions

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. Life insurance affects economic growth both as a means of risk transfer and compensation and as an institutional investor, and on the other hand, the growth of this industry depends on the demand of this industry; Therefore, finding factors affecting the demand for life insurance has an important role in marketing and increasing the demand for life insurance and in general for the growth of the insurance industry. On the other hand, life insurance, due to its main property, 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 on the demand of the insurance industry plays an important role in marketing and increasing the demand for insurance and, in general, for the growth of life insurance.

In this study, Eviews and Excel software have been used. Examination of the trend of life insurance return shows that the trend of income return has been less than the trend of return of life insurance claims. Fewer returns on income returns than movements on life insurance claims in the economy are due to various variables, including the management of the life insurance industry, part of which is due to risk recognition and the impact on life insurance returns. This helps the managers of the insurance industry, including life insurance, to the extent of the border between tolerable and intolerable risks in accepting or not accepting various Shansali risks and by managing the risk, plays an important role in marketing and increasing the demand for insurance. In general, increase the growth and efficiency of life insurance. In this study, we first obtained the root mean variability of the unit, after determining the root of the variable unit, we performed the ARMA model (ARIMA) test in three steps: estimation, estimation and review, and obtained the appropriate ARIMA model, and After estimating the variability: we obtained the estimation and prediction from the appropriate ARIMA combination and the ARCH regression model, the GARCH / TARCH regression model. During this research process, it was identified; Although there is a direct relationship between the impact of risk on life insurance return, there is a significant relationship between the study of the impact of risk on life insurance return in the Iranian economy.

That is, the higher the impact of risk, the higher the return on life insurance, and vice versa, the lower the impact of risk, the lower the return on life insurance 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 life insurance income relative to the compensation paid, the impact of risk on the return on life insurance income is 17%. Because the obtained beta coefficient is less than one and greater than zero, it indicates lower movements in life insurance revenue return than movements in compensation for paid claims, and life insurance revenue is smaller than the general market movement. In defensive mode, risk aversion had a negative effect on the return on life insurance income. If the obtained beta coefficient was equal to 1, the movements of life insurance return were higher than the movements of paid claims, and life insurance income was in line with the general market movement. According to past observations. If on the global average it has a higher life insurance penetration rate than non-life insurance and shows a declining trend, and life insurance shows almost constant fluctuations, it indicates that the life insurance industry is in both aspects. Supply and demand have fundamental and structural problems.

Therefore, it is suggested that in terms of supplying the country's life insurance market, a 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 doctorates. Continuous dispatch of managers and experts of the insurance industry to professional insurance centres in developed countries in order to pass professional courses and gain experience. In addition, professional and intermittent training of managers, experts and employees of the insurance industry that updates their information. To be in the country, to be able to meet the real needs of customers in the field of various insurable risks with the help of up-to-date insurance knowledge and with appropriate insurance services. In terms of the demand of the country's life insurance market, appropriate

advertisements should be made for life insurance products, which should raise public awareness and knowledge about life insurance services, to increase the promotion of life insurance consumption culture, increase the level of foresight and Plan in the eyes of the people, so that life insurance is in the consumer basket of Iranian households, and by properly managing risk in the life insurance industry can reduce risk aversion and cause it to have less negative impact on the return of income movement compared to Compensation for paid damages, and the trend of life insurance revenue returns to be more than the moving trend of paid damages, to increase the efficiency of life insurance in the Iranian economy, which can have undeniable effects on economic development and can expand the sectors They should be a good complement to the cultural and social variables in the Iranian economy, and they can save the economy from the production of a single oil product (Dutch disease)

References

[1] S. Asadi Gharagouz, A. Daqiqi Asl, G. Mahdavi and M. Daman Keshideh, *Factors affecting financial development emphasis on life insurance (comparative study of Iran and developed countries)*, Sci. J. Insurance Res. **34** (2018), no. 4, 9–45.

[2] H. Asayesh and S.P. Jalili Kamjoo, *Investigating the effect of political, economic and financial risk regimes on life insurance demand*, Insurance Res. Paper **10** (2019), no. 1, 9–38.

[3] A. Dehghani and N. Sheikh Rezaei, *National risk index on commercial insurance demand (case study of the countries of the Mena Basin)*, J. Econ. Bus. **8** (2017), no. 16, 15–31.

[4] N.W. Han and M.W. Hung, *Optimal consumption, portfolio, and life insurance policies under interest rate and inflation risks*, Insurance: Math. Econ. **73** (2017), 54–67.

[5] Z. Hui and Z. Xin, *The dynamic relationship between insurance development and economic growth: New evidence from China's coastal areas*, Afr. J. Bus. Manag. **11** (2017), no. 5, 102–109.

[6] A. Khadivar, F. Firoozi and L. Niakan, *Risk assessment and compliance with business rules in insurance Case study with the help of process mining technique: The process of third party insurance damages*, Sci. J. Insurance Res. **35** (2021), no. 2.

[7] H. Kunreuther and M. Pauly, *Insurance decision-making for rare events: The role of emotions*, National Bureau of Economic Research, Working paper 20886, 2015.

[8] A. Mirzaei, M. Hassani and S.A. Noureddini, *The effect of important insurance indicators on economic growth in OPEC member countries*, Quart. Insurance Ind. **1** (2014), 1–22.

[9] F. Mohagheghzadeh, S. Shirinbakhsh, A. Najafizadeh and A. Daqiqi Asl, *The impact of economic growth from life and non-life insurance*, J. Appl. Econ. Stud. Iran **6** (2017), no. 23.

[10] T. Nouraie Motlagh, *Study of complementary insurance demand behavior in urban areas of the country's provinces based on the level of development finding using two models of logit and classification trees*, Faculty of Medical Sciences and Health Services of Iran, Ph.D. Thesis, 2015.

[11] Office of Planning and Development, *Statistical yearbook of insurance industry in 2005*, Statistical Analysis Office, Central Insurance of the Islamic Republic of Iran, 2005.

[12] K. Peykarjoo and B. Hosseinpour, *Measuring value at risk in insurance companies using GARCH Model*, Quart. J. Insurance Ind. **25** (2010), no. 4, 33–58.

[13] H. Raghfar, I. Safarzadeh and M. Ghafouri Boroujerdi, *The effect of inflation on financial wealth of insurance companies in Iran*, Quart. J. Econ. Model. **12** (2018), no. 42, 23–47.

[14] A. Souri, *Econometrics (advanced) with the application of Eviews 8 and Stata 12 (volume 2)*, Philology, 2013.

[15] A. Torusian, *What is the beta coefficient and how is it calculated?*, http://www.ershan.ir/pst/feed, 2016.

[16] Y. Zheng, T. Vukina and X. Zheng, *Estimating asymmetric information effects in health care accounting for the transactions costs*, North Carolina State University, Department of Agricultural and Resource Economics, (2016), no. 1181-2017-4209.