

ANALYSIS AND IDENTIFICATION OF THE PUBLIC AND PRIVATE MARKET SHARE OF INSURANCE PREMIUM CHARGEABLE AND PAYABLE AND FORECASTING OF THIS FINANCIAL MARKET

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Abstract

Abstract text, By delivering service to and establish reasonable relationships with other industrial, manufacturing, agricultural and service sectors through collecting small insurance premiums from insureds, and indemnifying timely, the insurance industry as a non-banking financial institution can raise public and private capitals, efficiently direct and invest such financial resources, secure production by entrepreneurs, business owners, and professionals, reduce imports from and dependence upon global markets, and hence lead to economic development. Therefore, identification of the public and private shares of this financial market can have a substantial effect on saving financial resources. Moreover, forecasting of this financial market in respect to insurance premiums chargeable and payable and controlling and directing such financial resources can help different economic sectors make investments and implement their monetary and financial policies in order to reach their long term economic goals. Therefore, this study has attempted to analyze and forecast insurance market by ARIMA model and stability test.

Keywords: Public and private market share, insurance premium chargeable and payable, forecasting

Introduction

Cummins and Griepentrog (1984) Automobile insurance companies in the United States currently utilize simple exponential trend models to forecast paid claim costs, an important variable in ratemaking. This paper tests the performance of econometric and ARIMA models, as well as the

current insurance industry method, in forecasting two paid claim cost series. The experiments encompass eight forecast periods ranging from 1974 through early 1983. The results indicate that automobile insurers could significantly improve their forecasts of property damage liability claim costs by adopting econometric models. For bodily injury liability claim costs, the accuracy of the econometric and insurance industry methods is approximately the same, and both outperform the ARIMA models. Overall, a net gain in accuracy could be achieved by adopting econometric models.

William R. Bell, 1984, The use of ARIMA time series models in forecasting is reviewed. In connection with this, some important points about forecasting are discussed, including: (1) difficulties in forecasting by fitting and extrapolating a deterministic function of time; (2) the importance of providing reasonable measures of forecast accuracy; and (3) the need to incorporate subject matter knowledge with time series models when forecasting.

Chou-Wen Wang, Hong-Chih Huang, De-Chuan Hong, 2013, To offer a means for insurance companies to deal with longevity risk, this article investigates a natural hedging strategy and attempts to find an optimal allocation of insurance products. Unlike prior research, this proposed natural hedging model can account for both the variance and mispricing effects of longevity risk at the same time. In addition, this study employs experience mortality rates, obtained from life insurance companies, rather than population mortality data for life insurance and annuity products.

Donghui Li, Fariborz Moshirian, Timothy Wee, Eliza Wu, 2009, We study the foreign exchange exposure of U.S. insurers. The evidence shows that no systematic difference exists in the currency risk profiles of life and non-life segments within the insurance industry. This suggests that life and non-life insurers have similar risk exposure management strategies arising from similar risk pooling and financial intermediary functions. The empirical results reveal that a sizable proportion of U.S. insurers are exposed to foreign exchange movements against the seven largest U.S. trade partners in insurance services (U.K., Japan, Switzerland, Netherlands, France, Germany and Canada). Significant operational and size effects are also documented and we find that the frequency of foreign exchange exposure increases with time horizon.

Victor M. Guerrero, 1991, Some time series models, which account for a structural change either in the deterministic or in the stochastic part of an ARIMA model are presented. The structural change is assumed to occur during the forecast horizon of the series and the only available information about this change, besides the time point of its occurrence, is provided by only one or two linear restrictions imposed on the forecasts. Formulas for calculating the variance of the restricted forecasts as well as some other

statistics are derived. The methods here suggested are illustrated by means of empirical examples.

M.Y. El-Bassiouni., M.H. El-Habashi,1991, This paper is concerned with the forecasting of monthly compulsory motor insurance claims in Kuwait, based on Box-Jenkins methodology.

Willem H. Buiter, Urjit R. Patel, 1992, The paper studies the solvency of the Indian public sector and the eventual monetization and inflation that would be implied by stabilization of the debt-GNP ratio in the absence of changes in the primary deficit. The nonstationarity of the discounted public debt suggests that indefinite continuation of the pattern of behavior reflected in the historical time-series process is inconsistent with the maintenance of solvency. This message is reinforced by the recent behavior of the debt-GNP ratio and of the ratio to GNP of the sum of the primary budget surplus and seigniorage. Our estimates of the base money demand function suggests that even maximal use of the inflation tax would not be sufficient to restore solvency. Measures to reduce the primary deficit are therefore unavoidable.

Denis Kessler,2008,The expansion of the State-as-insurer has played a major role in the long-term growth of the public sector, but we are probably reaching the turning point. Because of its manifold failures, the State-as-insurer is facing crisis all around the world, with exploding expenditures. This will probably induce a shift in the private–public frontier, which makes it much more important than in the past to regulate the insurance industry efficiently. Coming back to the failures of the State-as-insurer, we should underline the role played by this flawed hypothesis that sets market logic and private interest against public interest.

Paul Gertler ,Roland Sturm 1997,Many governments who have large public health care systems are looking for means to reduce the public's financial burden. One approach is to increase reliance on private health care delivery through expanded private insurance coverage. Using data from Jamaica, we estimate models of the demand for medical care. We find that insurance does induce individuals to opt out of the public sector in favor of the higher-quality private sector, thereby reducing total public expenditures on health care. Moreover, since insurance is concentrated among the upper income groups, expanded insurance coverage better targets public expenditures to the poor.

Selden 1997, Blomqvist and Johansson (1996) criticize my results regarding Besley's (Besley, 1989) analysis of public catastrophic coverage. They concede that my analysis was correct under the assumptions I made, but they argue that a more general model than Besley or I used might yield different results. Unfortunately, Blomqvist and Johansson's analysis of the more general case is flawed. Whereas they claim to have provided a more

general argument against the sort of public intervention Besley proposed, they have unwittingly discovered an example in which his original conjecture holds.

Izadi and Izadi (2012) today, a substantial part of every economy is concerned with the delivery of services in different areas. The service sector in Iran as one of the largest economic sectors of the country contributes considerably to the country's Gross National Product (GNP). And the insurance industry serves as the financial and psychological supporter in this sector. While insurance practices in Iran date back to about a century ago, and there have been many ups and downs in this period, it has not been able to achieve its true status among the people and has not satisfied expectations in the country's economy.

Izadi and Izadi and Khandani (2012) Insurance as an essential guarantee serves to secure investments, but it has not been able to do it so successfully in Iran. Government's general goal of reducing the need for imports of consumer products, on the one hand, and the increase in non-oil exports, on the other hand, necessitates that all professionals in the manufacturing and service sectors work in a secure environment and receive essential backup against serious financial risks.

Dahmardeh and Izadi (2011) the main function and mission of insurance is to reduce uncertainty. This function applies for any social group generally and the national economy specifically, which leads to job security, continuity of future incomes, increase in the social welfare, preservation of national wealth, increase in investments, and creation of credits. Security and indemnity lead to a boost in the national production and finally in the economic growth and in that insurance institutions themselves attempt to invest money collected from premiums. Life insurance, for example, increases levels of personal savings as compared to an optional savings collection system. Then it collects all the money received from insurance premiums and invests it in the financial market, which in return contributes to the economic growth.

Headen and Lee (1974) an article analyzed the development of India's insurance sector at a time when there were legal constraints. India's insurance sector was first a state's monopoly, hence there was no competitiveness, and price barriers prevented households from accessing insurance services. Financial measures such as breaking the state's monopoly of the insurance industry, fostering competitiveness and establishing a legal framework were then taken.

Fischer (1973) another article investigated the relationship between the increase in savings and better allocation of assets and economic growth. The results indicate that: (1) financial services accessed by households

should increase allocation of resources, and (2) the increased competition in the insurance sector increases efficiency.

Campbell(1980) another article explores most new financial indices for insurance companies based on experiences of financial evaluation programs and reviews of the failures in this area to identify property insurance functions. Here insurance is viewed to reduce risks, allocate resources, increase insureds' ability to change customers' behaviors, and finally contribute to economic growth. The results are as follows:

1. Financial deregulation that can facilitate banking activities,
2. Serious economic fluctuations in products and their prices,
3. Close relationships between banks and insureds that can be the main indicator of the contingent failure of insurance with economic consequences.

Effects of Insurance Industry Development

1. Increasing in the Financial Stability

By indemnifying the losses of those who have suffered, insurance helps bring financial stability to households and organizations. Those companies which bear great losses unprotected under insurance policies may undergo bankruptcy and dissolution. In this case, such companies not only depreciate in value but also no longer can contribute to economic growth. Such losses also include the unemployment of employees and employers, loss of chances of customer purchases, and loss of the government's income tax. Therefore, stability provided by insurance companies (industry) help individuals and organizations create wealth being secured by insurance against risks.

2. A Substitute for the Government's Social Security Programs

Insurance, especially life insurance, can be a good substitute for the government's social security programs. Therefore, individual life insurance policies can remove the burden from social security programs and also allow individuals adapt their security programs to their preferences. Studies show that higher individual life insurance expenses are assumed to reduce the government's social security programs expenses. Moreover, with a view to the ever-increasing financial challenges of social security programs in every country, this substitutive function of insurance industry becomes so valuable. Kazerouni (2003)

3. Facilitation of Trade

Most products and services are sold and delivered when they are covered under some appropriate insurance policy. In other words, insurance coverage is a prerequisite for engaging in such activities. Investors put their money in those projects with high risks only when they are protected under

some appropriate insurance coverage. In other words, if entrepreneurs enjoy some appropriate insurance coverage, they expand the scope of their transactions. As a result, insurance is said to provide a basis for entrepreneurship and the global trade, without which the trade volume decreases. Izadi and Muhammadinia (2012)

4. Mobilization of Savings

Insurance industry can increase the financial system efficiency in four ways:

- a) Insurers can reduce the transaction costs of savers and loan lenders so that thousands of insureds pay their insurance premiums and then insurers lend this money as loans to investing companies and institutions. Insurers unlike insureds can gather necessary information for sound and high efficiency investments. Therefore, insureds can indirectly enjoy the benefits of high return investments through the reduction of insurance premiums payable in the future insurance policies.
- b) Insurers can allocate funds raised from insureds' premiums to long term loans and other investments. In other words, insurers provide liquidity and reduce non-liquidity by lending loans.
- c) Insurers can make investments more economical because most large investment projects need a great deal of financial resources which can be pooled from insureds' premiums. As a result, insurers can contribute to the growth of the national economy by expanding investment projects and fostering economic efficiency. They can indirectly increase the productivity of all the production factors as well.
- d) Insurance can facilitate risk management. Financial agents and systems can price, transfer, and reduce risks. Muhammadkhan (1997). Insurance allows individuals and companies to transfer their risks to counterparties to satisfy their needs. Risks of loss of property, liability risks, risks of loss of income and other risks can be transferred to insurers for pricing. Moreover, life insurers can help individuals limit their risks associated with their savings to a favorable condition.

5. Reduction of Losses

Insurance companies make use of economic incentives to help insureds reduce or prevent losses. In addition, the comprehensive knowledge of every insurance company about incidents and activities involving loss enable it to compete with other insurance companies to control and assess losses. Since the reduction of losses lead to an increase in the expected

profits and a decrease in insurance premiums, controlling and preventing losses is essential for insurance companies. This function of insurance can influence the productivity of all the production factors and hence contribute to financial growth. Ehsani(2005).

6. Efficient Allocation of Capital

Insurers collect essential information about companies and projects for the purposes of insurance pricing assessments and loans and investments. Individual savers and investors may not have the necessary time, resources, and capabilities to handle, collect, and process such information, but insurers are better able to do so and can act better in the allocation of financial resources and controlling of insurance risks. Insurers select the most sound and efficient companies, projects, and managers and provide them with insurance coverage and financial resources. Insurers are generally inclined towards companies, projects, and managers and finance those companies that act in the best interests of their shareholders. Izadpanah(2007).

7. Social and Economic Role and Effects of Insurance and its Effects on Services

Insurance industry provides peace of mind so that it alleviates public concerns about unpredictable incidents. In this way, it makes life easy and helps individuals and the society perform their economic activities. Compensating for the losses caused by the risks covered under the insurance policy makes possible the continuance of production and individual and social activities. It further fosters cooperation among different insurers in indemnifying their losses and removes the burden from the government to support the loss sufferers and indemnifying their losses. Insurance premiums chargeable and payable are illustrated diagrammatically below.

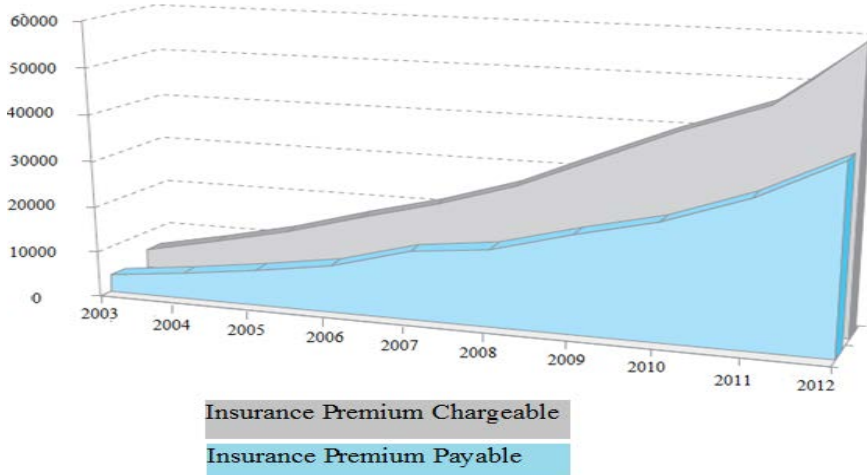


Fig. 1 Insurance Premium Chargeable and Payable/Billion Rials

Investing funds and resources pooled from insurance premiums and involving insureds in the earned profits can contribute to the insurance market development and the independence of insureds. Insurance as an investing institution in the capital market can also mobilize funds in the national economy. The great deal of insurance premiums paid by insureds to insurance companies every year not only indemnifies losses but also is used in the following ways: (1) some part of it is saved in bank accounts as compensation funds, and (2) some part of it is allocated for administrative and executive expenses (salaries and wages, commissions, advertisements, supplies, marketing...). The insurance premium chargeable in several selected countries is illustrated diagrammatically below.

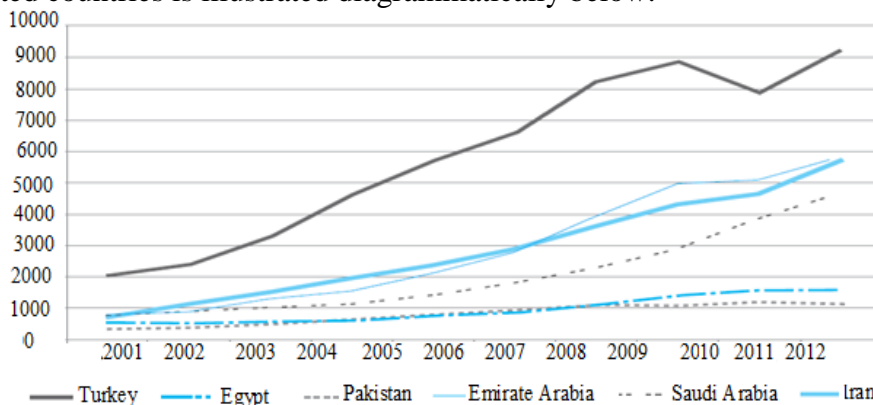


Fig. 2 the insurance premiums chargeable in several selected countries/million Dollars

With a view to the insurance industry’s mission of reducing uncertainty in agricultural, industrial, and service sectors and in the lives of citizens and households, of minimizing prices and maximizing quality in a thorough and sustainable manner, and with a view to its presence in different economic sectors, its investments, and the way and the extent to which it uses different factors of production, it can contribute to higher productivity and efficiency. But it is important to identify the public and private shares of this market. By comparing performances of public and private insurance organizations and the role of each one in creating employment, increasing social welfare levels, raising standards, compensating for the loss of life and property, it can be said that any of the sectors can substitute for the other. Therefore, this study aims to explore public and private insurance market shares and their respective roles. Public and private market share of insurance premium chargeable is illustrated diagrammatically below.

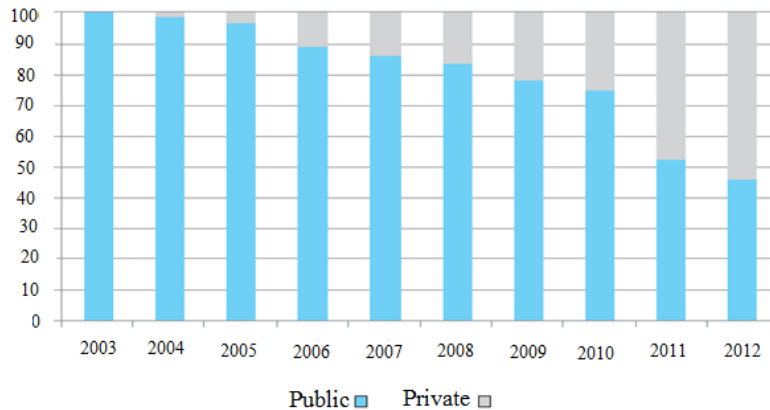


Fig. 3 Public and Private market share of insurance premium chargeable/percentage

8. Model Variables

Total insurance premium and total compensation were taken as dependent variables. And public sector’s insurance premium, private sector’s insurance premium, public sector’s compensation, and private sector’s compensation were also taken as explanatory variables.

Logarithm of total insurance premium (LTIP)

Logarithm of total compensation (LTRP)

Logarithm of public sector’s insurance premium (LIRG)

Logarithm of private sector’s insurance premium (LIRP)

Logarithm of private sector’s compensation (LIPP)

The first model deals with public and private sectors’ total compensation. The relationships are presented in tabulated format.

Table 1: function estimation

variable	Coefficient	Standard Deviation	t-test
LIPP	0.10473	0.046167	2.2686(0.053)
LIPG	0.74420	0.31999	2.3257(0.048)
C	1.9949	2.7580	0.72332(0.490)
R-Squared	R-Bar-Squared	DW-statistic	F-stat
0.93330	0.91663	1.951	55.972(0.000)

The results of the analysis show that public sector’s total compensation is 0.74. The estimated coefficient of public sector’s compensation in comparison to that of private sector’s compensation indicates that public share of insurance market is higher than private share of insurance market. Public sector’s resources accounts for this. It is important to note that in order to reduce the public share of the insurance market, the private sector should be supported financially. Since private sector is more innovative and outperforms in investing, which leads to the economic

growth, then under article 44 of the Constitution the public sector should be limited and the private sector expanded. Under the same article, the insurance industry should be transferred to the private sector as a long term goal. Indeed, the public sector insurance should complement the private sector insurance rather compete against it.

Table 2: diagnostic tests and statistics

Serial Correlation	Functional Form	Normality	Heteroscedasticity
0.07	0.58	0.60	0.23

According to diagnostic tests and statistics, it can be concluded that the model has the best status in terms of classic assumptions and structural break statistics and is confronted with no problem.

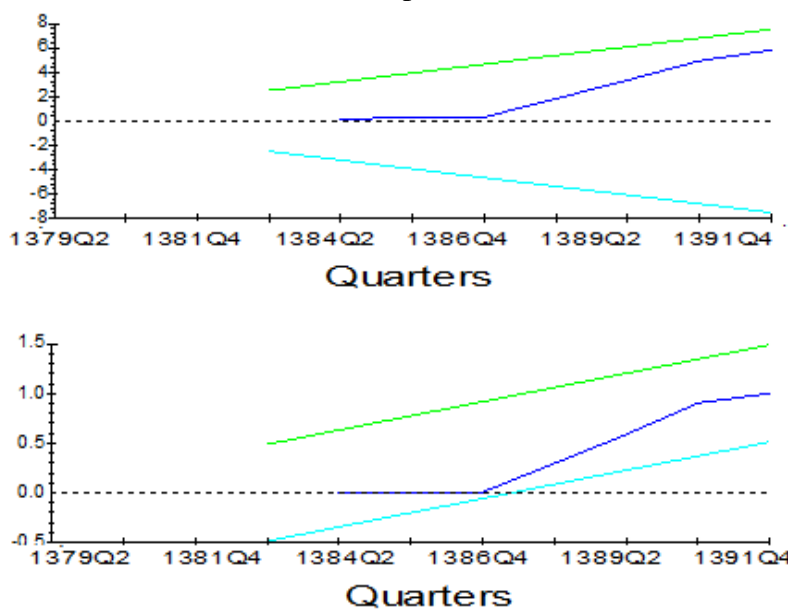


Fig. 4 plot of CUSUM and CUSUMSQ Tests

According to cumulative sum of recursive residuals (CUSUM) and Cumulative sum of squares of recursive residuals (CUSUMSQ) and also above plots, zero hypothesis around structural stability existing is accepted and its lack is rejected, actually we can say that structural stability existing is approved.

9. Estimation of Forecasting Model

In order to forecast the total compensation, ARIMA model and ARMA model were used. Having reviewed and compared models with different time intervals, ARMA (1,2) model was selected. The total compensation variable forecast is presented in the table below.

Table 3. The Total Compensation Variable Forecast

2013Q4	11.1187
2012Q1	11.1562
2013Q2	11.1929
2013Q3	11.2290
2013Q4	11.2644
2014Q1	11.2992
2014Q2	11.3334
2014Q3	11.3669
2014Q4	11.3998

The variable forecast for the real values is illustrated diagrammatically below.

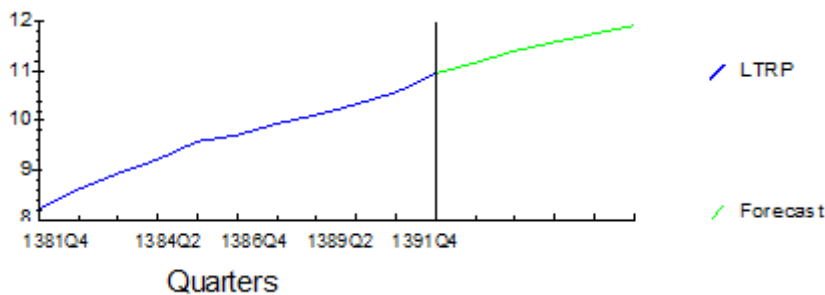


Fig. 5 Plot of Actual Dynamic Forecast

The total compensation forecast table and diagram indicate that the increasing trend of this variable is as expected. Therefore, it is suggested that policy makers consider this trend in their work and base their decision making upon the increase in the compensation amounts paid under insurance policies.

The second model deals with the public and private shares of the total insurance premiums. The relationships are presented in tabulated format.

Table 4 function estimation

variable	Coefficient	Standard	t-test
LIRP	0.45547	0.41067	1.8086(0.030)
LIRG	-0.50578	1.8807	-0.26893(0.795)
C	11.2701	15.4668	0.7286(0.487)
R-Squared	R-Bar-Squared	DW-statistic	F-stat
0.83330	0.81663	2.0704	35.972(0.030)

The results of the analysis show that private sector’s total insurance premium is 0.45. The estimated coefficient of public sector’s insurance premiums in comparison to that of private sector’s insurance premium indicates that public share of insurance market is higher than private share of insurance market. The private sector can commercialize the insurance

industry, make it competitive and professional. It can further lead to the economic security by effectively providing appropriate insurance coverage suitable for the local needs and activities, and finally generate a lot of income for the country. It can also identify active service sectors by determining their insurance needs, pave the way for the rapid development of economic and service activities in its effective interaction with them, and finally reduce the public share of the country’s insurance market.

Table 5 diagnostic tests and statistics

Serial Correlation	Functional Form	Normality	Heteroscedasticity
0.85	0.15	0.60	0.86

According to diagnostic tests and statistics, it can be concluded that the model has the best status in terms of classic assumptions and structural break statistics and is confronted with no problem.

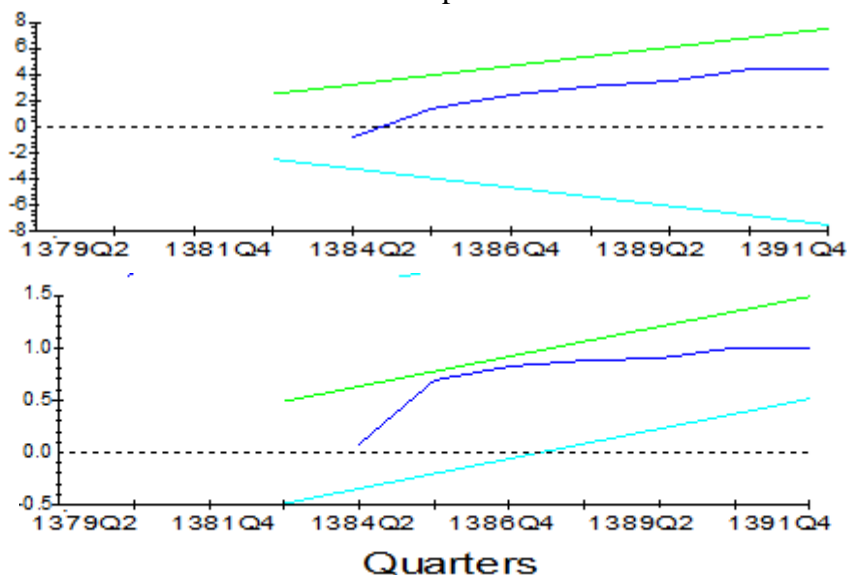


Fig. 6 plot of CUSUM and CUSUMSQ Tests

According to cumulative sum of recursive residuals (CUSUM) and Cumulative sum of squares of recursive residuals (CUSUMSQ) and also above plots, zero hypothesis around structural stability existing is accepted and its lack is rejected, actually we can say that structural stability existing is approved.

In order to forecast the total insurance premiums, ARIMA and ARMA models were used. Having reviewed and compared models with different time intervals, ARMA (1,2) model was selected. The total insurance premiums variable forecast is presented in the table below.

Table 6 the Total Insurance Premiums Variable Forecast

2012Q4	10.9012
2013Q1	10.8146
2013Q2	10.7394
2013Q3	10.6739
2013Q4	10.6169
2014Q1	10.5673
2014Q2	10.5241
2014Q3	10.4866
2014Q4	10.4539

The variable forecast for the real values is illustrated diagrammatically below.

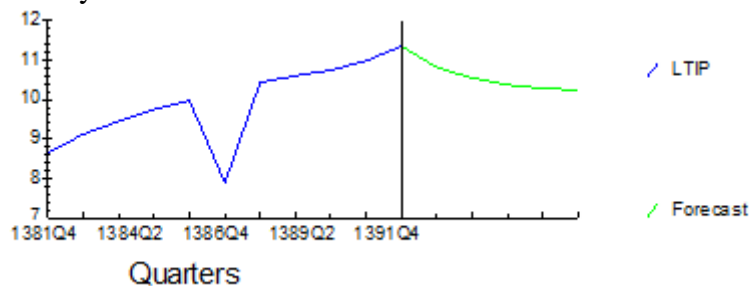


Fig. 7 Plot of Actual Dynamic Forecast

The total insurance premiums forecast table and diagram indicate that the decreasing trend of this variable is as expected. Therefore, it is suggested that policy makers consider this trend in their work and base their decision making upon the insurance industry's financial resources.

Conclusion:

Regarding the development of the insurance industry as a non-banking financial institution, any factor that can contribute to an increase in or pooling of the financial resources of insurance companies can be said to influence the economic growth as a capital (material, human, technological) accumulation factor. According to the symbols and coefficient values identifies here, it seems that the public sector outperforms the private sector in indemnifying losses, and maintaining financial security in the society. Access to sufficient financial resources has contributed to the increase in the public share of this market.

On the other hand, the private sector is better at charging insurance premiums. It can further lead to the economic security by effectively providing appropriate insurance coverage suitable for the local needs and activities, and finally generate a lot of income for the country. It can also identify active service sectors by determining their insurance needs, pave the way for the rapid development of economic and service activities in its

effective interaction with them, and finally reduce the public share of the country's insurance market.

The most important factor contributing to the success of any industry is its competitiveness. But the insurance industry is public in Iran, and as long as real privatization does not actually happen, the savings collected from insurance premiums constitute smaller part of the capital market.

The privatization of the insurance industry under the article 44 of the Constitution and the warm reception of this industry by the people as shown by the estimated coefficients indicate that private insurance companies are making good progress and can bear more risks. On the other hand, insurance companies can invest their funds in different areas by employing specialists and educated people, developing and adapting calculation and accounting methods, and using the best and most efficient software.

In order for the insurance industry to succeed in achieving its vision and implementing its change program, and with a view to the fact that compensation amounts paid exceed insurance premiums and expenses exceed incomes, the government should formulate and direct its general policies and strategies accordingly

Optimum use of financial resources (funds collected from insurance premiums chargeable), increasing the diversity of insurance coverage, reducing the government responsibility for indemnifying losses, efficient confrontation of primary challenges of the insurance industry under the country's insurance rules and regulations and based on principles of manufacturing activities, the future crisis can be eased. Therefore, the following suggestions are made:

1. To reduce the public sector's share of the country's insurance market,
2. To commercialize the insurance industry, and make it competitive and professional,
3. To foster work ethics and reliability among customers and insurance regulatory agencies,
4. To diversify and decentralize insurance portfolios,
5. To establish an intelligent self-regulatory system at the governmental level,
6. To provide smaller insurance coverage at lower prices for households,
7. To provide larger insurance coverage at lower competitive prices for agencies,
8. To privatize the country's insurance industry and make it competitive,
9. To facilitate insurance coverage for new goods on the part of the government,
10. To develop life insurance programs,

11. To reduce smaller insurance policies prices and render high quality, full service to the public,
12. To actively interact with potential and actual insurers in order to strike a balance between outsourcing insurance coverage activities and increasing such activities,
13. To increase the productivity of the insurance industry's investment resources and focusing the earned profits on managing insurance companies,
14. To interact on the part of the insurance industry with the capital market,
15. To exchange know-how with other countries in the region,
16. To train specialists for regulatory purposes,
17. To invest on the part of the government in insurance R&D,
18. To invest on the part of the government in propagating insurance culture,

To invest on the part of the government in training specialist employees in the insurance industry.

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