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## **ANALYSIS OF THE LIFE INSURANCE MARKET IN THE REPUBLIC OF MACEDONIA**

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**ABSTRACT:** *Life insurance in the Republic of Macedonia has a short history, if we do not count the experience of ZOIL Makedonija before the independence of Republic of Macedonia. The recent history of life insurance covers the last seven years and the segment of life insurance comprises about 6% of the total insurance market in the Republic of Macedonia. In this paper we analyse the development of life insurance in the Republic of Macedonia in recent history, taking the gross premiums of two of*

*the best companies that are working in the segment of life insurance. Besides analysing the influence of the basic determinants of the development of life insurance (GDP, monetary stability, social insurance, etc.) we analyse the model of time series, with the purpose of making a model and forecasting future values of the series.*

**KEY WORDS:** *Life insurance, development, analysis, series*

**JEL CLASSIFICATION:** G22

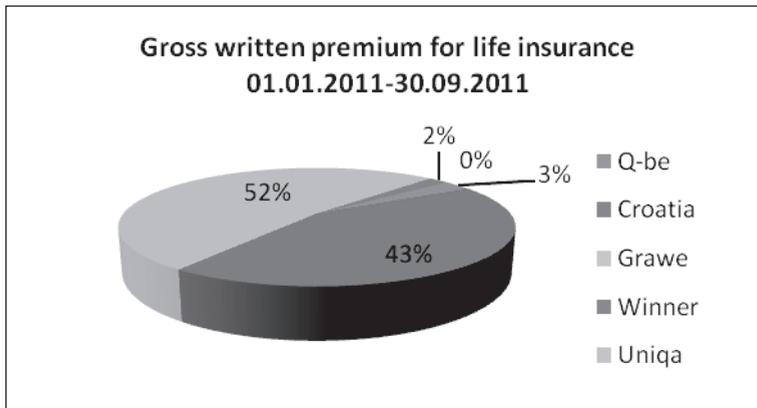
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## 1. INTRODUCTION

Life insurance is of special importance for any country because of the quantity of accumulation of assets and the long-term durability of the insurance (Milošević, 2008; Njegomir, 2011). It is well known that the development of life insurance is influenced by a certain number of determinants which result in the structure of this kind of insurance. Primarily there are economic-social determinants, such as gross domestic product (GDP), the monetary conditions in the country, and the level of development of social insurance (e.g. Petrović&Petrović, 2003; Milošević, 2008). This is why in this paper, when analyze the development of life insurance in recent history, we look at the influence of the analysed determinants, as well as the creation of the non-structural model of life insurance development series.

There are four active companies in the Republic of Macedonia that are certified to sell life insurance products (see Figure 1). Croatia Life is the most experienced of the four. It started to provide life insurance services in 2005, and has recorded significant progress between then and 2011. According to the value of the declared gross written premium, it holds second place in the life insurance market, right behind GraweLife Austria. These two companies have more than 90% of the whole life insurance market in the Republic of Macedonia [Insurance Supervision Agency, 2012).

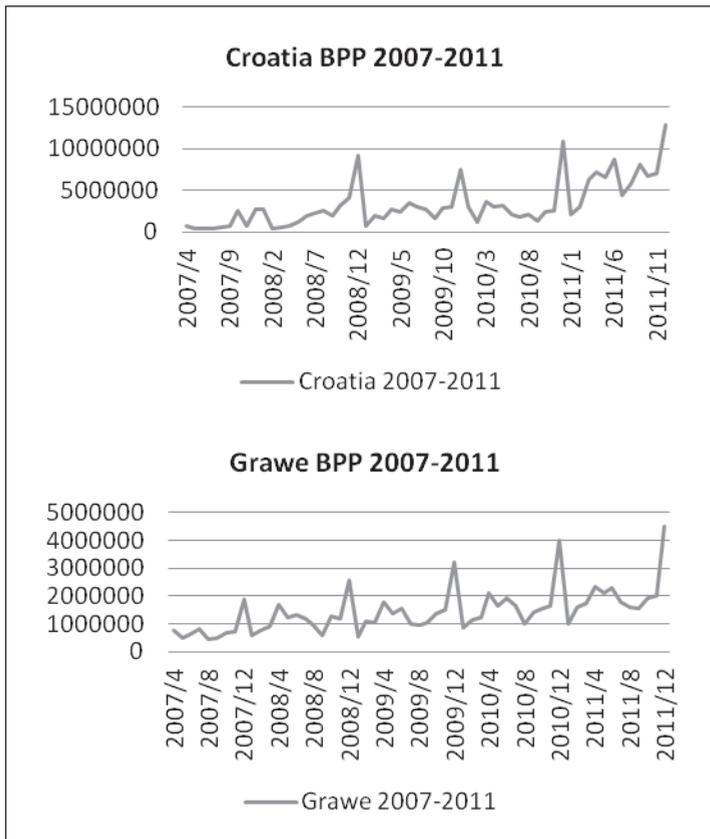
**Figure 1.** Structure of gross life insurance premiums in the period 1 January 2011-30 September 2011



**Source:** Data obtained from Insurance Supervision Agency

For the analysis we use the time series of the gross written premium on a monthly basis for the period January 2007 – December 2011. The amount of data is enough to fulfil the criteria for time series analysis (more than the necessary 50). These series are presented in Figure 2.

**Figure 2.** Gross written premium – Croatia and Grawe Life 2007-2011 (monthly data)



**Source:** Data obtained from Croatia and Grawe Life insurance companies

For the structural analysis we have taken data from the State Department of Statistics and the National Bank of the Republic of Macedonia. As possible dependent variables we have taken series for gross domestic product and the index of life expenditure according to recent prices. We assume that social security does not greatly impact on the development of life insurance in the Republic of Macedonia. These series are given in quarterly data; there is no

record of monthly data for these series. In addition we have taken quarterly series from the State Department of Statistics and the National Bank of the Republic of Macedonia concerning net salary and the number of employed people in the Republic of Macedonia.

Further in the paper we give the institutional structure of life insurance in the Republic of Macedonia, development of life insurance in the Republic of Macedonia and Structural analysis of the influence of determinants on its development of life insurance in the Republic of Macedonia.

## **2. INSTITUTIONAL STRUCTURE OF LIFE INSURANCE IN THE REPUBLIC OF MACEDONIA**

From its beginnings until now, life insurance in the Republic of Macedonia has undergone several developmental periods:

- first period until World War II;
- second period in the former Yugoslavia;
- third period from the Independence of the Republic of Macedonia.

When the Parliament of the Republic of Macedonia passed the Law on Property and Persons Insurance in 1993, a new era began in the development of life insurance in the Republic of Macedonia as an independent and sovereign country with a national economy. This law regulates a number of important issues in the field of life insurance in the Republic of Macedonia. In order to further regulate this activity and to further develop the national economy, in the following years the Parliament of the Republic of Macedonia passed other laws such as the Insurance Law in 2001 and the Insurance Supervision Law in 2002 (and an amendment in 2007).

Since Independence, the insurance market in the Republic of Macedonia has been gradually liberalizing. Insurance activities are supervised by the Insurance Supervision Agency of Macedonia. Legal norms enable a domestic or a foreign factor and a legal or natural person to establish an insurance company.

In the Republic of Macedonia an insurance company is a joint stock company which has obtained a license from the Insurance Supervision Agency for conducting insurance. The Insurance Company may carry out insurance activities in one or more classes of insurance within an insurance group:

- Non-life Insurance, which covers classes of paragraphs 1-18 of Article 5 of this Law and,
  - Life Insurance, which covers the classes of paragraphs 19-23 of Article 5 of this Law:
19. Life insurance (other than that referred to in paragraphs 20-23 of this Article) covers insurance in case of living till certain age, insurance in case of death, mixed life insurance, car insurance, and life insurance with return of premiums.
  20. Marriage or birth insurance.
  21. Life insurance related to shares in investment funds when the insured undertakes investment risk in terms of the change in value of investment coupons or other securities of investment funds.
  22. Tontine Insurance (Association of Renters), is an insurance of persons united in order to capitalize on deposits and accordingly to distribute the accumulated funds among the people who have reached a certain age, or among insurance users of deceased persons.
  23. Insurance of funds for payment is based on actuary calculations whereby, in exchange for a single or periodic payment, insured persons receive claims with the specified duration and amount.

Notwithstanding the provisions of paragraph 1 of this Article, an insurance company which carries out insurance in the group life insurance can also carry out insurance activities in the classes of insurance which include health insurance and accident insurance, referred to in Article 5, paragraphs 1 and 2 of the Law on Insurance Supervision.

An insurance company which carries out life insurance can also manage pension funds according to the Law of Fully Funded Pension Insurance, if it fulfils the conditions laid down by the mentioned law.

The Insurance Supervision Agency (ISA) of Macedonia monitors insurance activities, including life insurance.

The Insurance Supervision Agency was established in 2009. The Insurance Supervision Law sets the legal grounds for the establishment and performance of the authorizations of the ISA. The Insurance Supervision Agency was set up as an independent regulatory authority to promote the fair and efficient functioning of the insurance market, with the objective of protecting the rights of insurance policyholders and beneficiaries. It conducts training and examinations for

insurance brokers and insurance agents according to the Law on Insurance Supervision, as well as issuing licenses to insurance companies.

The ISA is authorized to supervise insurance undertakings, insurance brokerage companies, insurance agencies, insurance brokers and agents, and all the related parties defined by the Insurance Supervision Law, as well as the activities of the National Insurance Bureau. The ISA is also authorized to issue and withdraw licenses and consents, to issue measures and sanctions, to adopt secondary insurance regulation, and to propose amendments to the primary insurance regulation. The ISA initiates procedures for full membership of the relevant European and international insurance supervision associations and cooperation with counterparts from the region, with the objective of further development of sound and stable insurance markets. The managing body of the ISA comprises the President and four other members of the Council of Experts.

### **3. LIFE INSURANCE IN THE REPUBLIC OF MACEDONIA**

Like all other financial markets, the insurance market as for a long period been under the influence of financial deregulation and liberalization, as a result of the imperative of globalization in modern work and living conditions, which determines nearly all the national economies in the world. The effects of this trend, boosted by the explosive development of information technology, can be seen in the growing offer of a wide range of modern financial products responding to the demand of consumers, both individuals and companies.

In developed countries it is common to have life insurance, while in the Republic of Macedonia it is still a luxury, which hardly anyone considers. It is not commonly known that a life insurance policy is a kind of savings and investment of savings, because if the risk is not realized the money can be used by the insured or some other person at the end of the insured period.

Experience in other countries shows that the increase in savings generated through life insurance and the development of the domestic capital market are firmly bonded.

Insurance penetration, density, and the share of life insurance premiums in gross written premiums in the Republic of Macedonia are the lowest in the region. However since 2005 there has been a continuous growth in life insurance premiums, and during 2007 and 2008 it outpaced growth in all other ex-

Yugoslavia countries. Such developments have attracted foreign investors to the industry, with the consequence that the majority of insurance companies in Macedonia are foreign owned (Njegomir, Marović and Maksimović, 2010). In the Republic of Macedonia, as in every other economy, life insurance has its own development dynamics, specificity in different periods, and institutions of insurance (Jovanovski, 2005).

The Macedonian life insurance market began to function in April 2005. On 31 December 2011 there were eleven non-life insurance companies and four (five if we include “QBE Macedonia” which only updates the life insurance agreements which were already signed) life insurance companies.

The institutional progress was followed by a 4.6% annual rise in employment (total number of employees in the sector was 1,423 at the end of 2011), and a higher level of insurance industry development measured by an increase in gross written premiums.

The records show an undisputable continuum in the growth of life insurance premiums (40.2% in 2011) and the growth in the total share of gross written premiums in the Republic of Macedonia.

The life insurance company Grawe dominates the life insurance market in the Republic of Macedonia with a 49.2% market share in 2011 (see Table 1).

**Table 1.** Gross written life insurance premium for the period 2007-2011 in ,000 euros

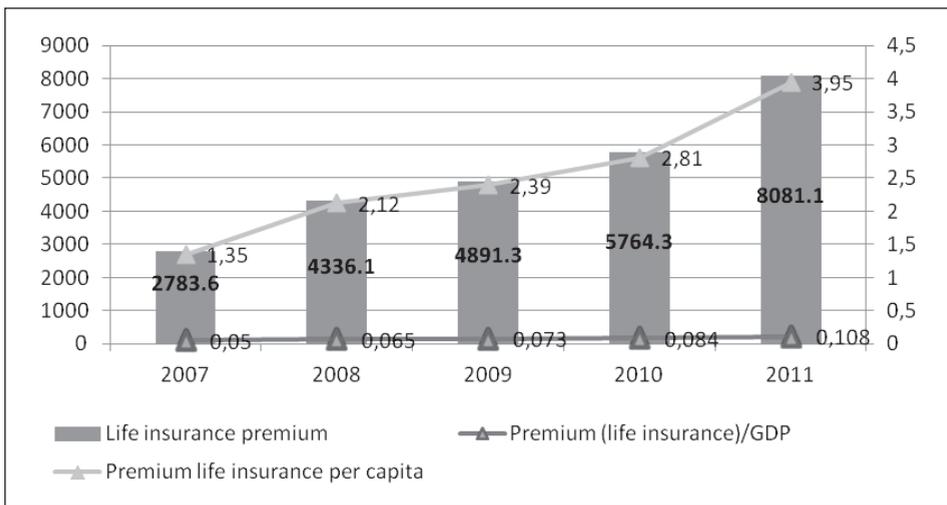
Insurance company	2007	2008	Index 2008/2007	2009	Index 2009/2008	2010	Index 2010/2009	2011	Index 2011/2010
QBE Macedonia	855,7	534,1	/	358,5	/	241,9	/	186,2	/
Croatia Insurance	799,1	1.483,5	185,63%	1.844,5	24,33%	2.229,2	120,86%	3.268,0	146,60%
Grawe Insurance	1.128,8	2.318,4	205,00%	2.688,3	115,95%	3.293,2	122,50%	3.973,5	120,66%
Winner Insurance	/	/	/	/	/	/	/	434,5	/
Unica Insurance	/	/	/	/	/	/	/	218,9	/
Total	2.783,6	4.336,1	155,76%	4.891,3	112,8%	5.764,3	117,84%	8.081,1	140,19%

**Source:** Insurance Bulletin of the Republic of Macedonia, National Insurance Bureau, 2007, and Report on the amount and content of insurance companies, Insurance Supervision Agency, 2009, 2010, 2011, and 2012, Skopje.

The development level of life insurance, measured through level of density (gross written premium) has increased by 40.3%, in 2011 while the index of insurance penetration (impact from gross written premium in GDP), of 2011 in comparison with 2010 has not shown any bigger change.

The index of insurance penetration in the Republic of Macedonia (0.108%) for 2011 year, was slightly lower than in neighbouring countries. The density degree was 242.73 denars (3.95 euros) from gross written premium on life insurance per capita, which still indicates the low level of life insurance in the Republic of Macedonia. According to per capita life insurance, Macedonia is still last among countries in the region. These records show Macedonia's great potential for growth and development in this sector of the financial system. The development of the insurance market in Macedonia is presented in Figure 3.

**Figure 3.** Development of insurance market in the Republic of Macedonia, 2007-2011



**Source:** authors' calculations based on data from Annual Report for Insurance Market Developments in the Republic of Macedonia in 2010, 2011; Skopje

For the year 2011, in contrast to the developments in some countries in the region, where stagnation and a down trend in life insurance development can be measured, in Macedonia the number of gross written premiums records drastic increase. That is the case in 2012 also. Gross written premium in life insurance for 2011 year, has reached a higher growing relative rate in compare with 2010 (40.2% or 2.3 million euros), coming from a low starting point in the life-insurance

sector. The life insurance sector has the biggest potential for future development, especially because of new selling strategies connecting life insurance with credit offers from the banks, and the appearance of new subjects (broker companies, life-insurance companies and intermediaries) in life insurance services.

#### **4. STRUCTURAL ANALYSIS OF THE INFLUENCE OF THE DETERMINANTS ON DEVELOPMENT OF LIFE INSURANCE IN THE REPUBLIC OF MACEDONIA**

In Table 2, correlation coefficients of the analyzed variables are presented. It is evident that the value of the gross written premium (GWP) has the highest degree of positive correlation with the dependent variable, GDP. A high level of correlation is also evident for the net salary and the number of employees, but these series are also in high correlation with the GDP series, and at the same time they have a lower value of correlation than the GDP. That is why the series for net salary and the number of employees are not taken for further analysis.

**Table 2.** Table of correlation coefficients

	GWP	GDP	Net salary	Employees
GWP	1	0.8199	0.7345	0.6906
GDP	0.8198	1	0.6722	0.753
Net salary	0.7345	0.6722	1	0.826
Employees	0.6906	0.7530	0.826	1

**Source:** authors' calculations

By involving the GDP and intercept, we have created regression analysis of the series of Gross Written Premium. Results are given in Table 3.

**Table 3.** Regression analysis of GWP

Dependent Variable: BPP

Method: Least Squares

Date: 04/07/12 Time: 15:42

Sample: 2007:1 2011:4

Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-548114	11351950	-4.8286	0.0001
BDP	666.24	109.6601	6.0750	0.0000
R-squared	0.6722	Mean dependent var		137879
Adjusted R-squared	0.6539	S.D. dependent var		89201.
S.E. of regression	52470.	Akaike info criterion		33.879
Sum squared resid	4.96E+14	Schwarz criterion		33.978
Log likelihood	-336.789	F-statistic		36.912
Durbin-Watson stat	1.2569	Prob(F-statistic)		0.00001

**Source:** authors' calculations

By the value of t-statistics and appropriate p-values, we can conclude that there is a low probability of rejecting the two coefficients of regression. Parameter R2 presents that the model fits well on the original time series. There are some problems about serial correlation of the residuals. The Q-statistics of the residuals show that there is a serial correlation among lags of the residuals. There should be more independent variables that describe the development of life insurance in the Republic of Macedonia. However, from the known determinants (GDP, monetary conditions, social insurance, etc.) we could not find other significant variables which improve the regression model. The other determinants for developing life insurance, such as saving tendencies, motives for insurance, degree of education, etc., could not be interpreted as quantitative determinants and have a subjective nature. On the other hand those determinants do not follow the dynamics of the development of life insurance. That is why we cannot further enhance the structural analysis of the development of life insurance. In the following section we have created a time series model of life insurance development in the Republic of Macedonia.

## 5. TIME SERIES MODEL OF LIFE INSURANCE DEVELOPMENT IN THE REPUBLIC OF MACEDONIA

Both series have an increasing trend, as is expected after entering a new market. Both series have an evident seasonal component with an interval of appearance of 12 months. By the values of both series we have created one common series for the period January 2007–December 2011, which represents the gross written premium in the Republic of Macedonia by more than 90% (about 95% according to the ASO report). This series forms the basis for the modelling in the following text. Besides the fact that series has changes of the values, we cannot be certain that the series can be best fit with the auto regression model.

In Table 4 values of the undertaken unit root test are presented (Augmented Dickey Fuller test - ADF). Values are calculated for the differenced series, because the original series is not stationary; and a significant seasonal component. By the values of the unit root test we can conclude that the differenced series is stationary and can be further used for the time series analysis.

**Table 4.** Results of the Unit Root Test

ADF Test Statistic 6 lags	-8.30178
1% Critical Value*	-3.5478
5% Critical Value	-2.9127
10% Critical Value	-2.5937

**Source:** authors' calculations

We have created the matrix of autocorrelation and partial autocorrelation. Values of autocorrelation and partial autocorrelation analysis are given in Table 4. By the values given in Table 5 and appropriate p-values, we can conclude that the first has the most significant values and 12 lag as a basis for the seasonal component of the series. The autocorrelation and partial autocorrelation values are given for 24 lags in order to detect the seasonal components. The further modelling of the series is based on the method of least squares and corresponding statistical tests.

**Table 5.** Correlogram

	AC	PAC	Q-Stat	Prob
1	-0.420	-0.420	10.937	0.001
2	-0.041	-0.264	11.045	0.004
3	-0.034	-0.218	11.120	0.011
4	0.086	-0.057	11.605	0.021
5	-0.144	-0.192	12.978	0.024
6	0.226	0.111	16.447	0.012
7	-0.148	-0.019	17.954	0.012
8	0.044	0.022	18.090	0.021
9	0.032	0.095	18.166	0.033
10	-0.055	-0.029	18.390	0.049
11	-0.306	-0.424	25.407	0.008
12	0.586	0.312	51.708	0.000
13	-0.220	0.142	55.483	0.000
14	0.008	0.138	55.488	0.000
15	-0.078	0.037	55.992	0.000
16	0.039	-0.061	56.122	0.000
17	-0.018	0.135	56.149	0.000
18	0.116	-0.016	57.332	0.000
19	-0.133	-0.051	58.929	0.000
20	0.055	0.013	59.203	0.000
21	-0.020	-0.142	59.242	0.000
22	-0.001	-0.027	59.242	0.000
23	-0.270	-0.185	66.542	0.000
24	0.431	0.047	85.659	0.000

**Source:** authors' calculations

By analysing values of autocorrelation and partial autocorrelation, we have proposed two competitive models for identification of the time series. The first model is Integrated Moving Average (IMA), because the series is differenced. The second model is the combined Autoregressive Integrated Moving Average (ARIMA) model (it has autoregressive and moving average coefficients) with parameters MA(1) and AR(12). Both models are assessed according to corresponding statistics and statistical tests. All the statistics suggest that the combined ARIMA model is more appropriate than the concurrent IMA model. The R2 parameter shows that the ARIMA model fits better on the values of the original series. This parameter cannot be crucial for deciding on the model. The

F parameter shows that the combined ARIMA model fits better on the original series than the IMA model. P-values for both models on the F-statistics are 0. Also, the values of the Akaike information criterion shows that the ARIMA model gives better fit than the IMA model. Finally, we analysed the Q statistics of the residuals of the model. It is evident that both models have uncorrelated residuals. There is not any serial correlation on the residuals, which is obvious from the values of the corresponding Durbin Watson statistics. Even for the residual analysis the ARIMA model gives better performance than the IMA model. Values of Q-statistics of the residuals for 20 lags are given for both models.

Both models have the same complexity, according to the number of parameters involved in the modelling. Therefore complexity is not crucial in deciding on the better model.

$$O_x = b_1 \varepsilon_{x-1} + \varepsilon_{x-12} + e_x \quad [1]$$

$$O_x = b_1 \varepsilon_{x-1} + O_{x-12} + e_x \quad [2]$$

Parameters of the models and corresponding statistics are presented in Table 6.

**Table 6.** Parameters of the models and corresponding statistics

Regressor	model2	model 1
MA(1)	-0.68975 (0.1083) [0.000] <sup>a</sup>	-0.7008(0.0555) [0.000]
AR(12)	0.9289 (0.1076) [0.000]	
MA(12)		0.6165 (0.0873) [0.000]
R <sup>2</sup>	0,7463	0.5786
S.E.	1906738	2217788
F-stat	132,377 [0.000]	78,3696 [0.000]
AIC <sup>b</sup>	1.00[31,8013]	0.059 [32.0952]
Q-test <sup>c</sup>	14.888 [0.670]	19.465 [0.364]
D-W	2.1875	2.2976

Source: authors' calculations

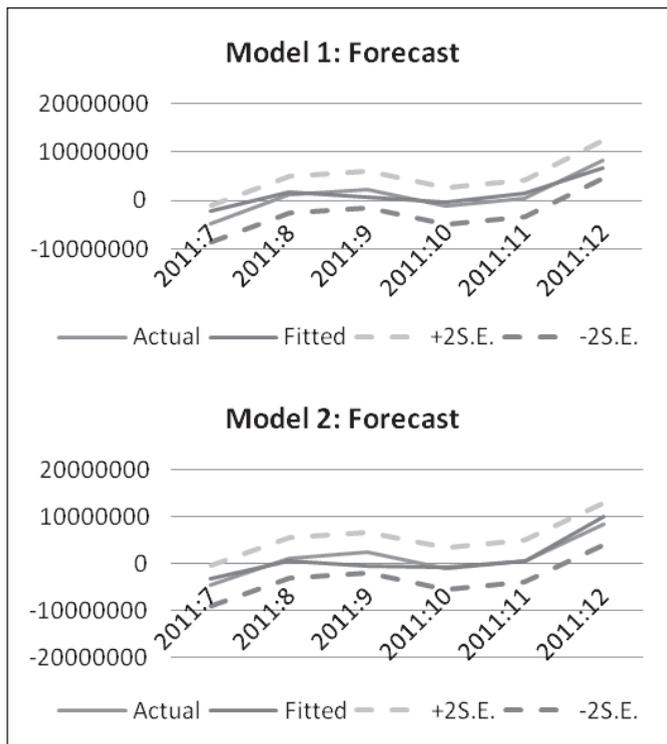
Remark: Parameter values of the time series analysis are calculated by using Eviews software.

- a) Parameter values, standard error, and p-values
- b) Akaike information criterion for both models
- c) Test of serial correlation of the residuals

In the end the final decision should be made according to the performances of both models in forecasting future values. Models with better forecasting should be preferred.

Figure 4 graphically presents the original series of the differenced series, as well as forecasting for the last six months of the series. We made so-called out of sample forecasting for the following six months of the series. In the graph are presented the original series, the model forecast, and the range of confidence  $\pm 2S.E.$

**Figure 4.** Forecasting future values with both models



Source: authors' calculations

From the Figure 4 forecast of future values we can conclude that there are not significant differences between the models. For both models forecasting is between intervals of confidence  $\pm 2S.E.$ . So the decision should be made based on the values of the corresponding statistics. From Table 6 and all the analyzed statistics we can conclude that the ARIMA model has better performance than the concurrent IMA model. But both models can be used for modelling time series of gross written life insurance premium in the Republic of Macedonia.

The time series of gross written premium in the Republic of Macedonia shows a permanent increase from 2005 to 2012. In this period the contribution of life insurance in the total insurance market in the Republic of Macedonia is greater than 6%, and it is expected that this contribution will increase. There is also a new life insurance company since 2011 – Uniqa Life. In several years another modelling of life insurance time series should be made, because of the changing situation in the market.

## **6. CONCLUSION**

In this paper we have analysed the influence of gross domestic product on the development of life insurance in the Republic of Macedonia. As expected, GDP is the most influential determinant of the development of life insurance. Structural analysis–regression is not complete because we donot have enough quantitative parameters for the model. It is evident that residuals are correlated and the regression model could not be valid. The other determinants (parameters) structural or intrinsic that should be involved are subjective and cannot be presented quantitatively.

For the time series analysis we have proposed two competent models, one based on the MA model and the other the combined ARIMA model. All corresponding statistics shows that the combined ARIMA model is a better choice to fit the original series, and it is a better choice according to the analysis of the residuals of the model. We have made residual analysis using Q-statistics and information criterion. Both models could be used for forecasting future values.

In the paper we have analysed the time series of life insurance in the Republic of Macedonia for the period 2007-2011. Data are taken from the life insurance companies Croatia and Grawe Life. There are two more companies in the Republic of Macedonia that are certified to work in the life insurance market. In a few years the development of life insurance should be researched again.

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