

A STUDY ON THE INSURANCE DENSITY DETERMINANTS IN ROMANIA

Maria Letiția ANDRONIC (BRĂTULESCU)¹

Abstract: *The objective of this study is to establish the extent to which several specific social and financial macroeconomic variables influence the density of the insurance market in Romania. By using multiple regression and ANOVA instruments within a period of 21 years (1997-2017), the results show a strong correlation between the average net salary, the unemployment rate, the enrolment ratio in education and the birth rate, on the one hand, and, on the other hand, the density of the whole insurance market (life and non-life components). Results also reveal that the inflation rate does not seem to have a major impact on the analysed indicator.*

Key words: *insurance density, insurance market, insurance penetration degree, gross written premiums, multiple regression.*

1. Introduction

Insurance plays a central role in the financial wellbeing of each individual, company or public institution. Although most of the insurance contracts concern the assets held by the natural persons and legal entities, during the last decades the importance of insurance in a long term plan increased as people realized that life and the ability to make a living are the matters which really count. This is more visible on the insurance markets of the more developed countries. However, there are also several less economically developed states which record an increase in the total number of life insurance policies or in the value of the life insurance gross written premiums (LIGWP). It is the case of Romania, where the share of LIGWP in the total gross premiums written by the insurance companies authorized and supervised by the Financial Supervisory Authority (FSA) was of about 21% in 2018.

Not only the gross written premiums (GWP) for the life and non-life sectors are relevant in analysing the insurance market, but also indicators like the insurance penetration degree (IPD), the insurance density (ID) and many other general macroeconomic indicators that might have a certain impact on the evolution of this market in Romania. In the context of these multiple influences and as a consequence of

¹ *Transilvania* University of Braşov, letitia.andronic@unitbv.ro

being a European Union (EU) member, FSA has to offer stability, predictability, and harmonisation with European practices in the field, no matter which component is analysed: life insurance demand, non-life insurance or the insurance industry as a whole.

The purpose of this paper is to establish whether the annual values of the insurance density per inhabitant in Romania during the period 1997 - 2017 are influenced by different social and economic determinants. For a general interpretation, all the closed insurance contracts were captured in the analysis as all these contracts express the interest citizens and companies have in buying an insurance contract.

The paper has the following structure: the second part of the paper describes the general evolution of the Romanian insurance market, underlying some of the most relevant papers found in the literature, the following part introduces the variables and describes the method used to establish the correlation between ID and several socio-economic measures, chapter 4 deals with data processing, while the last section presents the conclusion of the study.

2. The Romanian Insurance Market - Presentation and Literature Overview

In 1990, the state monopoly on the insurance market became unstable and was finally eliminated after 40 years. As a result, the Romanian insurance market re-launched itself in 1991. The number of companies operating on the market has changed as follows: in 1997 there were 47 companies, in 2000 - 73 companies, in 2007 - 42 and in 2018 there were only 29 insurance companies, out of which 16 practiced only general insurance activity, 7 only life insurance, and the remaining 6 practiced a composite activity (FSA Report, 2018).

Broadly speaking, the Romanian insurance market has undergone a permanent growth process during the last three decades. In 2004, it successfully reached over one billion Euros. Badea and Novac (2008) suggest that the process of globalization of financial markets started even before Romania became a EU member. Globalization has brought benefits (especially in the form of improving the quality of the services offered to customers), but also disadvantages for local companies (significant costs in logistics and training in order to cope with international groups).

According to Dina (2018, p.311), the EU accession of Romania in 2007 led to the internalization of the insurance activity, increase of competition and substantial modifications in supervisory and legal frameworks. For instance, the new regulation regime Solvency II that was implemented in 2016 seemed to be a real stimulator for the consolidation of the insurance companies' activities. Nevertheless, the insurance sector in Romania continued to face changes such as mergers, acquisitions, and bankruptcies, so that most of the companies active on the market are now owned by large financial groups throughout Europe. In spite of facing the risks of high levels of concentration and competition, the Romanian insurance market is still attractive for foreign investors.

Insurance companies are important players on the financial market, serving a range of economic functions, allowing risk transfer, helping companies and people save and invest. In order to describe the Romanian insurance sector evolution, the volume of gross written premiums, the density of insurance and the degree of insurance

penetration were characterized in the following subchapters for the 1997-2017 period or even until 2018 where data was available.

2.1. Gross Written Premium

According to Law no. 32/2000 regarding insurance companies and insurance supervision, GWP represent the premiums received, including the reinsurance premiums collected, related to all insurance and reinsurance contracts, which enter into force during the reference period, before deducting any other amounts.

Figure 1 shows the evolution of the GWP both for life insurance (red bar) and for non-life insurance (blue bar) over the last 22 years. The values are expressed in million lei.

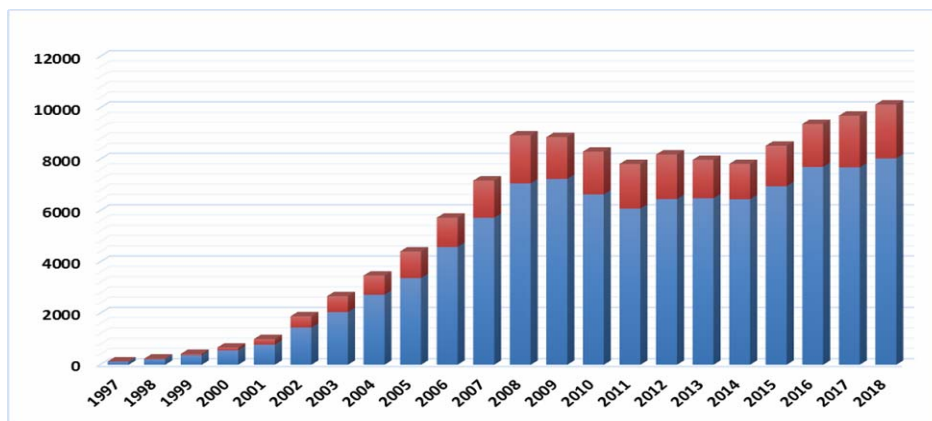


Fig. 1. *The evolution of LIGWP and NLIGWP (million lei) in Romania, 1997-2018*

The volume of GWP increased continuously until 2008. The non-life insurance gross written premiums (NLIGWP) have the highest weight in the total GWP, with an average share for the twenty-two-year analysis of about 81%. This highlights the fact that Romanians focus more on general insurance, in particular, on land transportation, fire insurance and natural calamities.

Even though at the beginning of 2007 new legislative changes were implemented and allowed European insurers to enter the Romanian insurance market, the GWP evolution recorded an upward trend. In 2008, the global financial crisis broke out and, inevitably, made its mark on the Romanian economy. However, in 2008, the crisis had no significant effects on the insurance market itself. This is proven by the figures recorded from the subscription activity, the premiums increasing in absolute size by 1760 million lei. The share of general insurance premiums in the total underwritten premiums decreased, reaching a weight of 79.10%. Life insurance activity developed much faster, eroding the share of the non-life insurance contracts in the total value. The first four companies that concentrated most of the total volume of LIGWP, according to the annual Insurance Supervisory Commission (ISC)² report were: AIG LIFE INSURANCE (285.81 million lei),

² ISC was the supervisory authority of the Romanian insurance market until 2013 when it was replaced by FSA

ALLIANZ-TIRIAC INSURANCE (105.58 million lei), ASIBAN (108.29 million lei) and ASIROM VIENNA INSURANCE GROUP (93.06 million lei).

The impact of the economic crisis on the insurance market was noticed starting from 2009 until 2014 when GWP recorded low values. Only in 2015 the market recovered so that in 2018 the GWP reached almost 10 billion lei.

2.2. Insurance Penetration Degree

The degree of insurance penetration in the economy is a synthetic indicator that shows the contribution of the insurance sector to the creation of the gross domestic product (GDP). It is calculated as a ratio between the volume of the gross written insurance premiums and GDP. Figure 2 presents the 1997-2017 evolution of IPD.

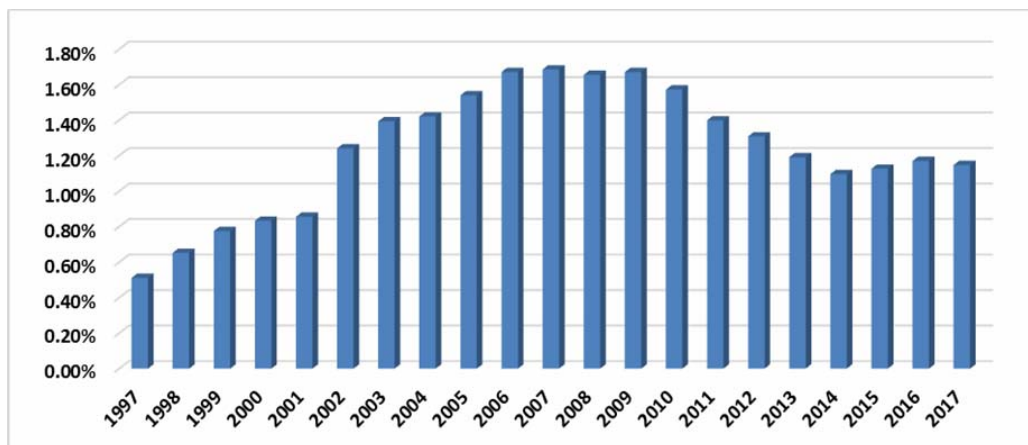


Fig. 2. *The evolution of IPD in Romania (% GDP), 1997-2017*

An increase in the IPD value shows the existence of a much stronger insurance sector in the national economy. According to Figure 2, the 1997 IPD value of 0.51% tripled by 2009, reaching a value of 1.67%, due to the more accelerated increase in the volume of GWP as compared to the GDP rhythm of growth. In 2002, the penetration rate increased by 0.38 percentage points as compared to the previous year. Between 2006 and 2009, IPD remained at about the same level, as the growth rate of GWP was similar to that of GDP. This period was characterized by the highest IPD values ever reached in Romania until now. After 2009, IPD had a downward evolution due to the economic crisis and the reduced financial strength of the population and companies. By 2014, this indicator decreased continuously, a trend which was common to several EU countries as a result of their economic environment and the international financial situation. During the last three years, the insurance penetration degree oscillated between 1% and 1.20%.

The fact that Romania is among the countries with a low level of insurance penetration, as well as Estonia, Bulgaria, Turkey, Latvia, Croatia or Greece should not be overlooked. These states have an IPD level below 3%. In countries such as Germany or the Netherlands, IPD is over 10%.

2.3. Insurance Density

The insurance density is expressed as the ratio of premium underwritten in a given year to the total number of inhabitants of the respective country, thus expressing the average premium per capita.

In order to have a more rigorous image on the real evolution of the insurance density indicator, the values in Figure 3 are expressed in United States dollars per inhabitant.

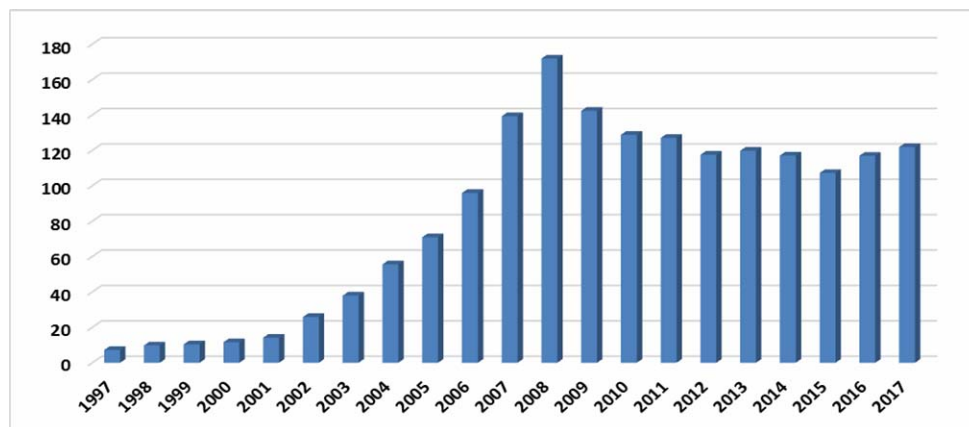


Fig. 3. *The evolution of ID in Romania (USD/inhabitant), 1997-2017*

According to Figure 3, the insurance density was in a continuous rise until 2008. During the first 11 years, ID increased 24 times, from \$ 7.2 / inhabitant to \$ 171.88 / inhabitant. This reinforces the need people have to avoid potential dangers. This remarkable evolution is stopped by the global financial crisis in 2009. As a consequence, between 2009 and 2012 the indicator went down, not only in our country, but also in the other EU member states.

The amount spent by a Romanian for insurance in 2009 was \$ 142.31 / inhabitant. In 2013, the value of density increased by 1.96% as compared to 2012. The following year, the value decreased to approximately the same level as in 2012 and continued to go down also in 2015. These decreases may be caused by the effects of the crisis on the consumption of individuals. Moreover, the insufficient financial education in this area is also a significant factor which leads to the spending of low amounts of money by the companies and households which want to be protected against risks, other than the risks required by law to be insured.

The next two years recorded a slight upward trend. In 2016 as compared to 2015, the density of insurance policies grew by 9.1%, while in 2017, the level was of \$ 122 / inhabitant, which represented an increase by 4.2%.

Similar analyses with respect to the evolution of the insurance market performances are also found in the research papers of Alvarez and Makunin (2018), Florea Ianc (2016), Dhiab and Jouili (2015), Podoabă (2015), Timuș and Ungur (2013), Florea Ianc and Bușan (2013), Kjosevski (2012), Matei and Mihart (2012) etc. Most of these papers agree that the crisis significantly influenced the global insurance market and its evolution.

In addition, some of the aforementioned research papers proved the strong bound between the insurance indicators and the national economic growth. For instance, when they analysed the Tunisian insurance market by using an econometric approach for a period of 16 years (1998-2013), Dhiab and Jouili (2015) came to the conclusion that the insurance sector positively and significantly influences economic growth. The insurance variables were measured through the insurance penetration and density and the result was that GDP is affected by both indicators in all three perspectives: life insurance, non-life insurance, and total insurance.

Other papers considered just the dimension of life insurance (Kjosevski, 2012; Beck and Webb, 2003). For example, Kjosevski's study aimed to identify the determinants of the demand of life insurance in 14 states belonging to the Central and Eastern part of Europe. By using fixed-effects panel model for 13 years (1998-2010) and two life insurance measures (penetration and density), the results showed that, on the one hand, "higher GDP per capita, inflation, health expenditure, level of education and rule of law are the most robust predictors of the use of life insurance", while, on the other hand, the real interest rates, the dependency ratio control of corruption and government effectiveness do not seem to be strongly associated with life insurance demand.

With respect to the papers analysing Romania and other Central and Eastern European states, the conclusion is that, in general, these countries have lower insurance density values, gross written premiums and penetration degrees than the Western ones. Things could improve if people and companies would become more aware of the importance of insurance in covering the risks that might occur. In such circumstances, both the public and the private sectors play a key role. They should invest in educating citizens (and even legal entities) not to neglect potential risks concerning their health status, the goods they possess, their wealth or the damage they might produce to their peers.

3. Data and Methodology

As presented before, the objective of this research paper is to measure the correlation between the insurance density (expressed in USD per inhabitant) for the whole insurance market and several economic indicators. Following the study of Kjosevski to a certain extent, the economic and social measures introduced as exogenous variables are: the average net salary - ANS (USD per inhabitant), the unemployment rate - UR (%), the inflation rate - IR (%), the enrolment ratio in education - ERE (%) and the birth rate - BR (number of life births per 1000 inhabitants). In order to measure the potential influences on the density of insurance in Romania, a multiple linear regression model with 21 observations was applied covering the 1997-2017 period, on a yearly basis. The time period considered was subject to data availability. Except for ID, whose values were collected from FSA reports, all the other indicators were obtained from the Romanian National Institute of Statistics' website.

For estimating the five parameters of the multiple regression, the least-squares method was used. It makes an estimation of the original parameters so that the sum of

squares of the residuals is as small as possible. The least-squares estimates are the values that minimize the quantity known as the square sum of residuals or error.

4. Data Results

The research referred first to some regression statistics. Table 1 shows the summary output, including the correlation coefficient R^2 which shows the intensity and the direction of correlation.

Summary output of data analysis Table 1

Indicator	Results
Multiple R	0.993084207
R square	0.986216242
Adjusted R square	0.981621656
Standard error	7.310450242
Observations	21

As multiple R overestimates the association between the dependent and the independent variables, R square is preferred. It represents the square of the multiple correlation coefficient and expresses how much of the variance of the dependent variable is explained by the estimated equation. Therefore, the independent variables explain about 98.62% of the variability of ID, the difference of 1.38% being caused by the residual factors not included in the model. The higher the number of variables added in the model, the higher the risk of an overestimation of this indicator. One solution is to adjust it. Adjusted R-squared (98.16%) takes into account the number of observations (21) and the number of the initial exogenous variables (5).

In order to establish the validity of the model, several decision tests were conducted. The analysis of variance is a statistical technique used to verify that the means of two or more groups are significantly different from each other. Table 2 presents the ANOVA results, including the Fisher test (F). This validation test takes into consideration the variance, the sum square, and the degrees of freedom of the regression itself.

Analysis of variance results Table 2

ANOVA	Square sum (SS)	Degrees of freedom (df)	Square average (MS)	Fisher test (F)	Significance F
Regression (SSR)	57356.68	k = 5	11471.34	214.65	$2.11943 \cdot 10^{-13}$
Residuals (SSE)	801.64	n-k-1 = 15	53.44		
Total (SST)	58158.32	n-1 = 20			

By dividing SSR and SSE to their degrees of freedom, the square average for the regression (MSR) and, respectively, for the residuals (MSE) were obtained. The Fisher test, which is 214.65, was established from the ratio between MSR and MSE.

In order to understand the meaning of the result, the two alternatives for the Fisher-test were analysed for the overall fit of the model. The two hypotheses are: H_0 : all β_i

coefficients are 0 and H_1 : not all β_i equal 0. According to the theoretical value of the Fisher-test, for a 5% significance level, $F(0.05; 5; 15)$ is 2.90, a value lower than 214.65. Since the null alternative is rejected, at least one parameter is different from 0 and the model is valid.

Even though the model seems to be a relevant one regarding the study of the response variable, the insurance density, each independent variable has to be analysed to see whether it influences in a significant way the insurance density. "t Statistic" analysis, "P-value" and the "lower" and "upper" intervals offer important details with respect to the econometric model and the significance of each parameter included.

The t Student statistic is highlighted in Table 3. At a 95% level of confidence, four out of five explanatory variables are statistical relevant. This can be noticed taking into account both the P-value which is below 0.05 for most variables, except for the inflation rate (IR), but also from the last two columns where the interval between "low" and "up" does not contain the null value in the case of ANS, UR, ERE and BR.

Analysis of variance results

Table 3

Variable	Coefficients	Standard error	t Statistic	P-value	Lower 95%	Upper 95%
Intercept	- 316.58	53.34	- 5.935	0.00003	- 430.278	- 202.883
ANS	0.19	0.019	9.793	0.00000	0.148	0.230
UR	- 4.99	1.464	- 3.409	0.00388	- 8.111	- 1.871
IR	- 0.04	0.070	- 0.596	0.56032	- 0.190	0.107
ERE	2.60	0.327	7.972	0.00000	1.908	3.301
BR	18.45	5.425	3.401	0.00395	6.886	30.014

As IR seems to be insignificant for the ID evolution, the model is rebuilt by using only the four relevant variables. In this new case, R square became 0.98589, while F test increased to the value of 279.492. The two-tailed inverse of the Student's t-distribution for a 5% level of significance and 16 degrees of freedom is 2.12, a value lower than any $|t_{Stat}|$ obtained in the new model.

The new equation is: $ID = - 310.52 + 0.19 ANS - 5.00 UR + 2.65 ERE + 17.27 BR$

Except for the unemployment rate, all the other variables have a direct positive effect of ID. The high value of the free term, $|- 310.52|$, shows that the influence of the factors not included in the model is significant. Although the model is well built, it can be developed and improved by adding other variables as well.

In the regression model, we assumed that the error terms are independent, so uncorrelated as they are normally distributed $N(0, \sigma^2)$. Still, sometimes, in economic analysis the autocorrelation of errors can appear. The hypotheses tested in the Durbin-Watson (DW) analysis are: $H_0: \rho = 0$ and $H_1: \rho > 0$.

The DW statistic refers to the residuals of the model and is defined as:

$$DW = \frac{\sum_{i=2}^{29} (e_i - e_{i-1})^2}{\sum_{i=1}^{29} e_i^2}, \text{ where: } e_i = y_i - \hat{y}_i = \text{the residual for time period "i"}$$

The DW result for the model is 1.9384 and the decision rule is: if $DW > dU$, do not reject H_0 ; if $DW < dL$, reject H_0 and if $dL \leq DW \leq dU$, the test is inconclusive.

The critical upper (dU) and lower (dL) bound can be found in the DW table. For a significance level of 0.05, a number of 4 independent parameters and a sample size of 21 observations, the DW statistics regarding dL and dU is 0.927 and, respectively, 1.812. Since DW of 1.9384 is higher than dU (1.812) and below $4 - dU$ (2.188), there is no serial correlation of the residuals and the null hypothesis is rejected.

5. Conclusion

The insurance market evolution presented in the paper proved that in Romania there is a greater effect of the non-life insurance policies than that of the life insurance, as the latter form of insurance is not that widespread among citizens. Moreover, the profile of the potential insured in Romania or from another developing country is defined and forged by these countries' society, by the factors which are in close connection with the income of the population, their way of life, their knowledge, the degree of civilization and culture. The results indicate the need to implement incentives for insurance development and its structure both on life insurance and on non-life insurance.

Based on the cause-effect relationship analysed through multiple regression and by verifying several basic tests for the validation of the econometric model, the main result of the research is that the insurance density is strongly influenced by different socio-financial indicators. The value of the square of the multi-correlation coefficients R^2 of 0.9859 certifies that the net average salary, the unemployment rate, the enrolment ratio in education and the birth rate explain in a great proportion the insurance density of the whole Romanian insurance market.

Moreover, the results obtained in this research paper are consistent with reality and with previous studies which evaluated similar correlations related to life insurance, non-life insurance or the global insurance market. However, new variables may be added to the model as the performance of the insurance market seems to depend significantly on the citizens' and firms' financial resources used for protecting their "goods" (life, health, assets). In addition, insurance also reflects the civil liability component which pinpoints the social responsibility feature that citizens and corporations have to protect.

Romania has an insurance market with great potential. Unfortunately, most of the efficiency indicators did not record very good results, especially during the 1990s and after the last crisis. Nevertheless, the monetary and fiscal-budgetary policies implemented by the Government in the last years enabled and will continue to enable the increase of the insurance density and insurance penetration degree. It is a desired objective because the insurance sector has a positive impact for the improvement of life quality and, eventually, has a major role in the economic growth. One step forward was seen at the end of 2018, when all insurance companies met both the Solvency Capital Requirement and the Minimum Capital Requirements. A lot of companies disappeared in the last years so that the market now covers a smaller number of entities. The ones that managed to survive responded better to the EU rules and to the supervision of FSA.

All in all, it is imperative that relevant institutions should implement institutional

improvements that would contribute to the strengthening of competition, to the implementation of advanced techniques for risk management, to the development of new innovative products and new distribution channels available for this sector.

References

- Alvarez, H. and Makunin, I., 2018. *Central and Eastern Europe Industry Research - Insurance*. [pdf] Frankfurt am Main: Rating-Agentur Expert Research Report. Available at: <https://raexpert.eu/files/Industry_report_Insurance_CEE_07.06.2018.pdf> [accessed 2 October 2019].
- Badea, D.G. and Novac, L.E., 2008. Romanian Insurance Market Facing Globalization Process. *Theoretical and Applied Economics*, 9(526), pp.61-68.
- Beck, T. and Webb, I., 2003. Economic, Demographic, and Institutional Determinants of Life Insurance Consumption across countries. *The World Bank Economic Review*, 17(1), pp.51-88. doi: 10.1093/wber/lhg011.
- Dhiab, L.B. and Jouili, T., 2015. Insurance and Economic Growth in Tunisia: A Theoretical and Empirical Analysis. *Journal of Economics and Sustainable Development*, 6(8), pp. 101-107.
- Dina (Manolache), A.E., 2018. Globalization on the Romanian insurance market in terms of competition. *Proceedings of the International Conference on Business Excellence*, 12(1), pp.311-323. <https://doi.org/10.2478/picbe-2018-0028>.
- Financial Supervisory Authority Report, 2018. The Insurance Market Evolution, year 2018. [pdf] Financial Supervisory Authority. Available at: <https://asfromania.ro/files/analize/Evolutia%20pietei%20asigurarilor%20-%20reasigurarilor%202018_20032019.pdf> [Accessed 30 September 2019].
- Florea Ianc, M.M., 2016. Penetration and Insurance Density Market in Romania Compared to other Countries in the European Union. *Annals of "Dunărea de Jos" University of Galati*, Fascicle I. Economics and Applied Informatics, pp.96-100.
- Florea Ianc, M.M. and Buşan, G., 2013. The Evolution of Insurance Market in Romania. *Annals of the "Constantin Brâncuşi" University of Târgu Jiu*, Economy Series, 2, pp.148-154.
- Kjosevski, J., 2012. The Determinants of Life Insurance Demand In Central and Southeastern Europe. *International Journal of Economics and Finance*, 4(3), pp.237-247. doi:10.5539/ijef.v4n3p237.
- Matei, G. and Mihart, B., 2012. The analysis of the penetration degree and density of private health insurance in Romania. *Finanţe - provocările viitorului (Finance - Challenges of the Future)*, University of Craiova, Faculty of Economics and Business Administration, 1(14), pp.69-73.
- National Institute of Statistics of Romania, tempo-online database. Available at: <<http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table>> [Accessed September-October 2019].
- Podoabă, L., 2015. An empirical research regarding density and penetration insurance on accident & health premiums in future implementation of Solvency II. *Procedia Economics and Finance*, 32, pp.1517-1524.
- Timuş, A. and Ungur, C., 2013. The Insurance Market of the Republic of Moldova in Terms of Investment Potential. *Financial Studies*, 2, pp.31-43.