

ANALYSIS OF THE DEPENDENT VARIABLE INSURANCE PREMIUM IN RELATION TO THE INDEPENDENT VARIABLES IN THE ROMANIAN INSURANCE MARKET

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Abstract: *In this paper, the authors seek to carry out a quantitative and qualitative analysis of how the insurance market is influenced by certain factors. This market in Romania is characterized by numerous challenges generated by financial flows, regulations, contractions and contradictions. The study follows and analyzes the specific financial flows and the manner in which written premiums are influenced by gross domestic product, the inflation rate and the reference interest rate.*

Keywords: *insurance market, written premiums, gross domestic product, inflation rate, interest rate.*

JEL Classification: G22, G23, G28.

1. Introduction

The specialized literature presents several definitions or concepts regarding what insurance is, as well as its purpose and role. All of them emphasize that insurance seeks to provide protection to the insured person or to an asset or service, depending on the type of insurance.

According to Professor Iulian Vacarel, “Insurance represents a system of economic and social relations through which, in exchange for a premium, the insurer establishes an insurance fund from which losses suffered by insured persons as a result of insured risks are compensated” (Vacarel, 2007).

Gheorghe Bistriceanu views insurance as “a form of financial protection based on the principle of mutuality, whereby individual losses are borne from a common fund established from the premiums paid by insured persons” (Bistriceanu Gheorghe, 2006).

In another formulation, “insurance constitutes an economic category that expresses the relationships of allocation and redistribution of losses among the members of a community exposed to the same risks” (Constantinescu Danut, 2000).

Violeta Ciurel considers insurance to be “the financial operation through which risk is transferred from a natural or legal person to the insurer in exchange for an insurance premium” (Ciurel Violeta, 2000).

Foreign authors also conceptualize insurance through the fundamental elements that comprise it.

“Insurance is an economic device whereby the individual substitutes a small certain cost (the premium) for a large uncertain financial loss (the contingency insured against).” (Vaughan & Vaughan, 2008).

For Rejda G.E., “insurance is the pooling of fortuitous losses by transfer of such risks to insurers, who agree to indemnify insureds for such losses, provide other pecuniary benefits, or render services connected with the risk” (Rejda George E., 2011).

Mehr and Cammack consider insurance “a social device for reducing risk by combining a sufficient number of exposure units to make their individual losses collectively predictable” (Mehr & Cammack, 1980).

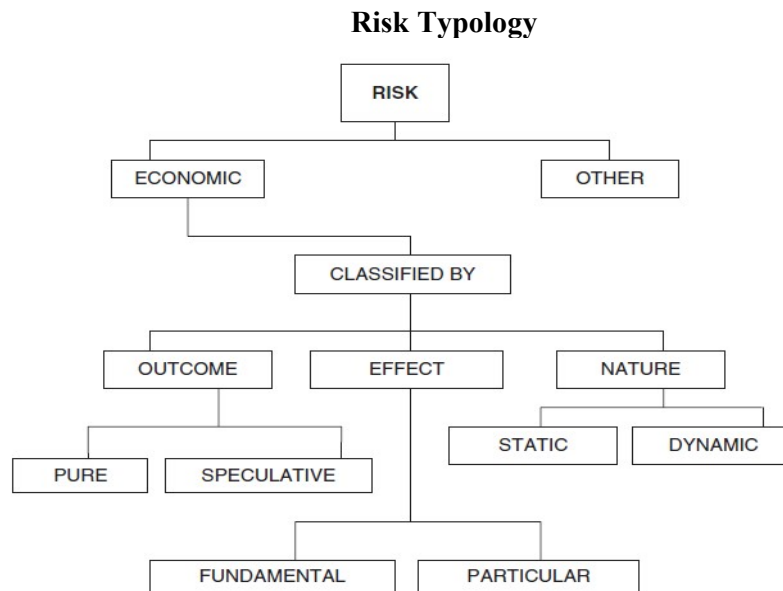
For Outreville J.F., “Insurance is a mechanism for risk transfer and risk sharing, combining the functions of protection, savings and financial intermediation” (Outreville J. François, 1998).

Romanian legislation defines insurance as “the operation whereby the insurer, in exchange for the insurance premium, assumes the obligation to pay an indemnity upon the occurrence of an insured risk” (Law No. 237/2015 on the authorization and supervision of insurance and reinsurance activity – Official Gazette of Romania, Art. 2).

All the definitions presented above highlight the relationship among the three fundamental elements: the existence of an insurable risk, the existence of a risk community, and mutuality.

By taking out insurance, the risk is transferred from a natural or legal person to an insurance company, which assumes the payment of compensation if the respective risk occurs. The risk is assumed by the insurance company, is quantifiable, and can be managed.

Figure No. 1



Source: Rob Thoyts - *Insurance Theory and Practice* – Routledge, 2010, p. 6

The mechanism for concluding and operating an insurance policy involves the following stages: 1. Risk identification and assessment - the insurer analyzes the probability of the risk occurring and its financial impact using statistical methods and actuarial calculations; 2. Conclusion of the insurance contract - the insurance contract governs the legal relationships between the insured and the insurer and establishes the rights and obligations of the parties; 3. Establishment of the insurance fund - insurance premiums are centralized in a common fund used to pay claims, establish technical provisions, and cover administrative expenses; 4. Payment of claims - compensation is granted in accordance with the principle of indemnity, without exceeding the value of the loss in property insurance; 5. Technical provisions - technical provisions ensure the insurer’s solvency and its ability to meet future

obligations. This mechanism is based on the fundamental principles of mutuality, actuarial equivalence, good faith, and insurable interest.

In addition to the primary role of the insurance system, namely to provide protection, the insurance mechanism mobilizes financial resources that are used for financial investments and for financing the economy. Premiums collected by insurance institutions are used and mobilized within the economy.

From a strictly technical perspective, insurance premiums have the following allocation and hierarchy:

1. Payment of claims and insured amounts - the fundamental purpose of premiums is to pay compensation and benefits to insured persons (Harrington & Niehaus, 2004).

2. Establishment of technical provisions - technical provisions reflect the insurer's future obligations and may be assessed under Solvency II as Best Estimate and Risk Margin (Directive 2009/138/EC, Art. 77; EIOPA, 2015).

3. Payment of reinsurance premiums - reinsurance helps reduce the volatility of results and provides protection against catastrophic risks (Outreville, 2013).

4. Coverage of acquisition and administrative expenses - premiums are used to finance acquisition and administrative expenses (Rejda & McNamara, 2017).

5. Establishment of own funds and compliance with solvency requirements - capital serves to absorb unexpected losses and protect insured persons against insolvency risk (The Geneva Association, 2011).

6. Investment of funds derived from premiums - investments are made in accordance with the ALM principle in order to ensure liquidity and the security of funds (Skipper & Kwon, 2007).

Market risk management is one of the main concerns of insurance companies. The most widely used method is diversification, which primarily seeks to reduce systemic risk.

The analysis conducted and published by EIOPA in July 2025 highlights the structure of risks in the insurance market as well as the outlook for their development.

Table No. 1

Risk Dashboard for the EUROPEAN Insurance Market			
Risks	Level	Trend (last 3 months)	Outlook (next 12 months)
Macroeconomic risks			
Credit risks			
Market risks			
Liquidity and funding risks			
Profitability and solvency risks			
Interconnections and imbalances			
Insurance risks (underwriting)			
Market perceptions			
ESG-related risks			
Cyber and digitalization risks			

Source: adapted from ASF – Report on the Stability of Non-Bank Financial Markets 2/2025, p. 24

Each of these risks influences the performance of insurance and reinsurance companies, and especially the level of premiums charged. The higher the risks at the macroeconomic level and at the level of the applicant (insured), the higher the insurance premiums, indicating a direct relationship in the same direction.

2. Variables Influencing the Insurance Market (Insurance Premiums)

The Romanian insurance market is undergoing continuous change, readjustment, and repositioning. It is a market seeking to consolidate, with insurance companies that inspire confidence, but also with well-known bankruptcies and insolvencies.

The Romanian market is not yet a mature market such as those in Western Europe or the United States.

Nevertheless, in recent years the Romanian capital market has experienced favorable development, both as a result of legislative changes and due to a better understanding among natural and legal persons of the role of insurance.

The analysis of how the Romanian insurance market has evolved must be viewed within the macroeconomic context that characterized the respective period.

The evolution of gross domestic product, the inflation rate, interest rates, and the manner in which natural and legal persons understand the importance of protection directly influence the insurance market, the premiums paid, and the products purchased.

During 2020–2025, Romania's gross domestic product followed an uneven trajectory, recording a 3.7% decline in 2020 as a result of the pandemic, followed by 5.7% growth in 2021. Growth continued in 2022 (+4%); in 2023 it increased by 2.4%, while in 2024 and 2025 it slowed considerably, to +0.8% and 1%, respectively (estimated data).

As regards the inflation rate, it evolved as follows: in 2020 inflation stood at 2.6%, after which it increased steadily in the following years, reaching 13.8% in 2022, compared with 5.1% one year earlier.

After 2022, the inflation rate declined slightly, reaching 10.45% in 2023 and 5.6% in 2024. The year 2025 ended with an inflation rate of 7.3%.

With a high inflation rate, monetary policy was also affected, with interest rates increasing. In this situation, combined with the associated risks, the premiums required for concluding various types of insurance also increased.

The table below presents the premiums collected and the macroeconomic indicators mentioned above.

Table No. 2

Written Premiums (Dependent Variable) and Macroeconomic Indicators (Independent Variables)

Year	GDP %	Inflation rate %	Reference rate (December) %	Written premiums (bn)
2020	-3.7	2.6	1.25	11.5
2021	5.7	5.1	1.75	14.2
2022	4	13.8	6.75	16.51
2023	2.4	10.45	7.00	15.20
2024	0.8	5.6	6.5	19.8
2025 (estimated)	1	7.3	6.5	18.7 (9 months)

Source: Prepared by the author based on the statistical reports of INS, BNR, and ASF for the respective years

The relationship and analysis of correlations between written premiums at national level and the main macroeconomic indicators can be examined using a regression equation in which the dependent variable is the written premium, while the influencing factors are the gross domestic product growth rate, the inflation rate, and the interest rate.

3. Econometric Model

In this context, we have: dependent variable (Y) - written premiums (bn), independent variables: GDP (%), inflation rate (%), reference interest rate (%).

The econometric model is as follows: $Y = \beta_0 + \beta_1 \cdot GDP + \beta_2 \cdot INF + \beta_3 \cdot INT + \varepsilon$

Estimated equation:

Gross written premiums (GWP) = 12.840 + (0.389 · GDP) + (-0.661 · Inflation) + (1.497 · Interest Rate).

The hypotheses and hypothesis testing are performed at the level of each coefficient (t-test) and at the level of the entire model (F-test).

3.1. Testing the Significance of the Coefficients (t-test)

Hypotheses for each coefficient β_i :

H0: $\beta_i = 0$ (the variable has no statistically significant effect on Y)

H1: $\beta_i \neq 0$ (the variable has a statistically significant effect on Y)

Results (coefficients, standard errors, t-statistic, p-value, 95% confidence intervals):

Table No. 3

Correlation Analysis						
Parameter	Coef.	Std. Err.	t	p	CI 2.5%	CI 97.5%
Constant (β_0)	12.8399	1.7986	7.139	0.0191	5.1013	20.5785
GDP (β_1)	0.3890	0.3109	1.251	0.3373	-0.9485	1.7265
Inflation (β_2)	-0.6608	0.3555	-1.859	0.2042	-2.1905	0.8689
Interest rate (β_3)	1.4971	0.4633	3.231	0.0839	-0.4963	3.4905

Source: calculations performed by the author using EViews

Interpretation: coefficients with p-value < 0.05 are considered statistically significant at the 5% level. With only 6 observations, statistical power is low and the conclusions must be treated with caution. For a more complete and complex analysis, the model should be extended over a longer period of time.

Testing the Overall Significance of the Model (F-test)

Hypotheses:

H0: $\beta_1 = \beta_2 = \beta_3 = 0$ (the model does not explain Y)

H1: there is at least one $\beta_i \neq 0$ (the model explains Y)

F-statistic = 3.992, p-value = 0.2068 (df_model=3, df_resid=2).

Goodness of Fit

R (multiple correlation coefficient) = 0.926

R² (coefficient of determination) = 0.857

Adjusted R² = 0.642

Interpretation: R² shows the proportion of the variation in written premiums explained by the independent variables. R (multiple correlation) is the square root of R² and indicates the strength of the overall linear relationship between Y and the set of X variables.

Diagnosis and validation of the OLS assumptions involve the analysis of multicollinearity, heteroscedasticity, residual normality, and autocorrelation.

Multicollinearity (VIF)

VIF > 5 (or > 10) suggests substantial multicollinearity, which may destabilize the coefficients.

Variable	VIF
GDP %	1.530
Inflation rate %	3.134
Reference rate (December) %	2.353

Heteroscedasticity (Breusch-Pagan)

The Breusch-Pagan test checks whether the variance of the errors is constant. H0: homoscedasticity (constant variance).

LM p-value = 0.5262; F p-value = 0.7735

Residual Normality (Anderson–Darling)

H0: the residuals are normally distributed.

AD statistic = 0.501; p-value = 0.1206

Autocorrelation (Durbin–Watson)

Durbin–Watson ~ 2 suggests the absence of first-order autocorrelation.

Durbin–Watson = 3.017

4. Interpretation of Results

The independent variable GDP ($\beta_1 = 0.389$) has a positive influence on insurance premiums. An increase in gross domestic product will lead to an increase in insurance premiums. Disposable incomes are higher, and insured persons will more readily turn to products that provide them with protection. An increase of 1 percentage point leads to an increase in premiums of 0.389 billion.

The inflation rate ($\beta_2 = -0.661$) has an inverse effect. An increase in inflation will lead to a decrease in insurance premiums. Inflation erodes the willingness to save because purchasing power is reduced. A 1 percentage point increase in the inflation rate leads to a decrease in premiums of 0.661 billion.

The interest rate ($\beta_3 = 1.497$) indicates a positive correlation with the insurance premium. An increase in the interest rate makes insurance more expensive and consequently leads to an increase in insurance premiums. A 1 percentage point increase in the interest rate leads to an increase in premiums of 1.497 billion.

An important aspect is that the sample is small ($n=6$); the estimates are sensitive to extreme values and to the inclusion of the 2025 observation (estimated). For a more in-depth analysis, the model should be extended over at least 10–15 years.

5. Conclusions

Written premiums, which can also be interpreted as the volume of insurance policies concluded, are influenced by objective factors such as gross domestic product. An increase in gross domestic product can be perceived at the individual level as an increase in income. With higher incomes, citizens can more readily consider the need for protection.

This awareness of the protection provided by taking out insurance also depends, subjectively, on the individual's financial education.

The inflation rate and, implicitly, the interest rate directly influence the size of premiums. The erosion of purchasing power and the increase in financing costs are two factors with a direct impact on the insurance premium.

The study should be continued by extending the database over a period of 12–15 years in order to achieve greater relevance. Possible independent variables with an impact on the dependent variable, the insurance premium, should also be identified.

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