
Determinants of Financial Solvency in Algerian Insurance Companies

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Abstract:

This study aims to examine the impact of insurance premiums and compensation payments on the financial solvency of Algerian insurance companies over the period 2012-2022. Using panel data from 16 insurance firms and applying fixed and random effects models, the research identifies key operational determinants influencing solvency. The results reveal a statistically significant positive relationship between insurance premiums and financial solvency, suggesting that higher premium revenues strengthen the solvency position of firms. However, the effect of compensation payments was found to be statistically insignificant. These findings highlight the importance of optimising premium policies to enhance financial stability. The study provides empirical insights for policymakers and insurance managers seeking to improve solvency performance in the Algerian insurance sector.

Keywords: Financial Solvency; Insurance Premiums; Compensation Payments; Panel Data; Algerian Insurance Companies

Jel Classification Codes : G22, G32, C23, M41, O55.

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1. Introduction :

In today's increasingly uncertain and volatile economic landscape, insurance companies have emerged as indispensable institutions for promoting financial stability and managing risk at both individual and corporate levels. These entities act as financial intermediaries that absorb risks and ensure the continuity of economic activities by compensating for potential losses. A central component that determines the reliability and sustainability of insurance firms is financial solvency-their ability to meet long-term financial obligations and maintain operations even under adverse economic conditions. Maintaining adequate solvency levels is not only essential for gaining policyholders' trust but also for complying with regulatory requirements and avoiding systemic risks in the financial sector. In this regard, both internal and external determinants play significant roles in shaping an insurance company's financial resilience. Among these, insurance premiums-representing the primary source of income-and compensation payments-which reflect claims costs-are arguably two of the most influential operational factors affecting financial solvency. Despite the importance of this topic, limited empirical evidence exists within the Algerian context regarding how these two key variables interact with solvency.

1.1. Research Problem

this study seeks to fill that research gap by addressing the following research problem: **To what extent do the determinants of financial solvency affect the financial solvency of Algerian insurance companies during the period 2012–2022?**

1.2. Research Hypotheses

- **First Hypothesis:** There is a statistically significant positive relationship between insurance premiums and the financial solvency of insurance companies
- **Second Hypothesis:** There is a statistically significant negative relationship between compensation payments and the financial solvency of insurance companies.

1.3. Significance of the Study

The importance of this study lies in its aim to fill a research gap related to the Algerian context by focusing on a relatively recent period and analysing the relationship between two key operational variables and the financial solvency of insurance firms. The findings are expected to support decision-makers within insurance companies and regulatory authorities in enhancing risk management practices and achieving financial balance.

1.4. Objectives of the Study

This study aims to achieve the following key objectives:

- To measure the impact of insurance premiums on the financial solvency of Algerian insurance companies, thereby determining the extent to which premium income contributes to strengthening the financial position of these firms.
- To assess the effect of compensation payments on the solvency of insurance companies, and to examine whether higher claims reduce financial stability or reflect effective risk transfer mechanisms.
- To identify the most influential operational determinants affecting the financial solvency of insurance firms in Algeria during the period 2012–2022.
- To provide empirical evidence based on panel data analysis using econometric techniques that allow for better understanding of the variation in solvency across firms and over time.

1.5. Research Methodology

The research follows a descriptive-analytical approach to provide a theoretical and conceptual understanding of the key variables, and a causal econometric approach to examine the relationships among them.

2. Review of Previous Studies:

- **Study by (Caporale, 2017)**

The study attempts to assess the insolvency risks of general insurance (GI) companies in the United Kingdom by comparing with similar studies that were addressed in previous research. However, in the current study, a much larger sample is used than what was previously addressed, as an extended period from 1985 to 2014 will be taken for a sample consisting of 515 companies using static panel models, in addition to assigning a much broader set of potential determinants of insolvency risks. The study concluded with several results, among them: that macroeconomic factors and firm-specific factors play essential roles, and that insolvency risks differ across companies according to their lines of business. In addition, different levels of reinsurance affect the insolvency risks of insurance companies. The results of this study are also under discussion by the regulators of general insurance (GI) companies within the framework of the recently launched Solvency II.

- **Study by (Mahmoud Elsayed, 2021)**

The aim of this study was to try to identify the effect of firm-specific factors on the profitability of the property and casualty insurance industry in Egypt during the period from 2008 to 2017. Return on Assets (ROA) and Return on Equity (ROE) were used as proxies for measuring financial performance. Accordingly, this study examined the effects of firm-specific determinants such as: financial leverage, tangible assets, liquidity, firm size, underwriting risk, and the solvency margin as independent variables on profitability as the dependent variable, using the multiple regression model, and based on data from the Financial Regulatory Authority for insurance in Egypt. The study concluded with several results, among them: that underwriting risk has a slight effect on ROA,

while it has a significant effect on ROE. Liquidity has a negative impact on both financial leverage and financial solvency. Also, there is a positive relationship between firm size and ROA, and the solvency margin has a significant positive effect on the profitability of the Egyptian insurance market.

- **Study by (Hang Thu DANG, 2020)**

The study attempted to investigate the impact of internal and external factors on the liquidity of Vietnamese firms listed on the stock market in Vietnam during the period 2008–2019, using static panel models. The liquidity of listed Vietnamese firms was measured by the ratio of current assets to total current assets, while firm size, capital adequacy, profitability, and financial leverage were used as internal determinants. In addition, economic activity, inflation rate, exchange rate, and interest rate were the external factors taken into consideration. The study led to several findings, including the following: capital adequacy, return on equity, financial leverage, and economic activity have a positive effect on the firm's liquidity, while return on assets and exchange rate have a negative effect on firm liquidity and size. Meanwhile, the inflation rate and lending rate have no relationship with firm liquidity. The study recommended that firms should maintain an optimal current ratio by balancing current assets and current liabilities in order to avoid a situation of high or low liquidity.

- **Study by (Other, 2021)**

The study aimed to assess the relative impact of liquidity, financial leverage, and solvency on the profitability of industrial companies listed on the Amman Stock Exchange during the period 2012–2018. A sample of 44 companies was analyzed using a multiple linear regression model. Profitability was measured using ROA and ROE, liquidity through the current and quick ratios, leverage via the debt-to-equity ratio, and solvency using the interest coverage ratio. The results revealed a statistically significant negative effect of financial leverage on profitability at the 1% level, while liquidity and solvency showed no significant impact. Among the independent variables, leverage had the strongest influence on profitability, followed by solvency and then liquidity. The study recommended reducing reliance on debt financing, maintaining adequate liquidity, and ensuring a strong solvency position to support financial performance.

- **Study by (Other R. R., 2022)**

The study aimed to evaluate the determinants of profitability for insurance companies in Fiji, located in Oceania. Over the years, the insurance and financial services sector has grown in the country, prompting an investigation into how profitability determinants affect insurance firms using a financial performance assessment approach. Profitability was measured using ROA and ROE, based on a sample of 8 insurance companies over the period 2010–2015, applying static panel data models. Key findings include: a positive relationship between profitability and variables such as insurance premium income, underwriting expenses, administrative expenses, and capital size. Conversely, financial leverage (measured as total liabilities to capital) and contingent liabilities

were found to have a negative impact on profitability. This study represents the first attempt to analyze Fiji's insurance sector, offering valuable insights into its financial management. The findings can help both insurers and policymakers develop strategies for managing revenues and costs.

- **Study by (Grishunin, 2022)**

This study aimed to analyze the determinants of insolvency and develop an Insurance Company Scoring (ICS) system for Russian insurance firms. A sample of 161 international Russian companies was selected for the period 2013–2019, and logistic regression was used as the modeling method. The significance of this study lies in the growing investor interest in the emerging insurance sector, which, despite its rapid growth, carries high risks-making the identification of key drivers of insolvency in international disclosures a critical task. The study concluded that asset liquidity ratios and profitability are key factors in assessing insolvency risk in international insurance reporting. However, leverage ratios were found to be relatively insignificant for Russian international insurers, unlike in developed markets. This is attributed to the fact that borrowing is not a common financing model for Russian international companies operating in emerging markets.

Study by (Nour, 2023)

The study sought to measure the impact of solvency determinants on the financial solvency of insurance companies listed on the Palestine Exchange during the period 2012–2019, using a multiple regression model. The study aimed to identify the key factors influencing solvency by employing several independent variables: return on assets, solvency-related claims, debt level used to finance assets, investment return rate, and the claims ratio (i.e., loss ratio). Solvency was measured by the company's ability to meet its long-term financial obligations. The findings showed a statistically significant positive relationship between all solvency determinants and financial solvency-except for return on assets, which had a significant negative relationship with solvency. The study recommended that Palestinian insurance companies invest in surplus and liquidity and adopt strict risk acceptance policies to enhance solvency levels.

3. Theoretical Framework of Study Variables

Understanding the theoretical foundations of the study variables is essential to highlight their economic and financial relevance in the insurance sector. This section provides a conceptual overview of financial solvency, insurance premiums, and compensation payments as the core determinants of solvency in insurance companies.

3.1. Financial Solvency

Financial solvency represents the ability of an insurance company to meet its long-term obligations and honor claims without facing financial distress. It is a fundamental indicator of financial health and sustainability,

often measured through solvency ratios or solvency margins. Adequate solvency ensures regulatory compliance, policyholder protection, and stability of the insurance market. (CUMMINS, 1996)

3.2. Insurance Premiums

Insurance premiums constitute the main source of revenue for insurance companies. They are payments made by policyholders in exchange for risk coverage and are determined according to actuarial principles and risk assessments. Higher premium income strengthens the financial capacity of insurers, improves profitability, and contributes positively to solvency levels. (Outreville, 1990)

3.3. Compensation Payments (Claims)

Compensation payments, or claims, represent the amounts insurers pay to policyholders when insured risks materialize. They reflect the core function of risk transfer in insurance. Excessive claims may weaken solvency by reducing reserves and capital adequacy, whereas stable and well-managed claim ratios indicate sound risk management. (George, 2002)

4. Econometric Study

Financial solvency is one of the most critical factors that measure an insurance company's ability to meet its obligations toward its clients. Insurance premiums and compensations play a vital role in affecting financial solvency. This study aims to measure the impact of both insurance premiums and compensations on the financial solvency of a sample of 16 insurance companies operating in Algeria during the period (2012–2022).

4.1. Descriptive Statistical Study of the Variables

4.1.1. Study Variables:

- **Dependent Variable:**

Financial Solvency (SOLV): Defined as the ability of insurance companies to fulfill their current and future financial obligations toward stakeholders, including policyholders, creditors, and shareholders. In other words, solvency reflects the financial health and stability of a company, even under adverse conditions.

- **Independent Variables:**

- **Insurance Premiums (PROD):** The financial amounts paid by the insured (policyholder) to the insurance company in exchange for coverage against a certain risk. The value of the premium is determined based on several factors.
- **Compensations (INDEM):** The financial amounts paid by the insurance company to the insured when the insured risk occurs, intended to compensate for the losses incurred.

4.1.2. Data Sources and Treatment of Missing Values

The following table summarizes the variables, measurement units, expected signs, and data sources:

Table N°1: Study Variables and Data Sources

Variable	Unit	Expected Sign	Source
Financial Solvency (SOLV)	Million DZD	+ / -	Ministry of Finance – Insurance Directorate
Insurance Premiums (PROD)	Million DZD	+	Ministry of Finance – Insurance Directorate
Compensations (INDEM)	Million DZD	+	Ministry of Finance – Insurance Directorate

Source: Prepared by the authors

In terms of missing data, some insurance companies were excluded due to data unavailability. Only companies with complete data for the entire study period were included. Thus, the final dataset contains no missing values.

* **Companies Included in the Study Sample:** The study included the following 16 insurance companies:

Table N°2: Insurance Companies Included in the Study

SAA	CIAR	GAM	TALA
CAAR	2A	SALAMA ASSURANCES ALGERIE	SAPS
CAAT	AXA Assurances Algérie Dommage	TRUST ALGERIA	Caarama Assurance
CASH Assurances	MACIR VIE	ALLIANCE Assurances	AXA Assurances Algérie Vie

Source: Prepared by the authors

4.1.3. Descriptive Statistics and Correlation

4.1.3.1. **Descriptive Statistics:** To provide a preliminary understanding of the variables, a descriptive analysis was conducted. The results are summarized as follows:

Table N°3: Descriptive Statistics of the Study Variables

	SOLV	PROD	INDEM
Mean	7670.21	2468.483	3754.568
Median	2638	1462.5	1703
Maximum	43911	11454	19323
Minimum	288	0	15
Std. Dev.	10168.03	2796.248	4609.543
Skewness	1.774924	1.592874	1.597679
Kurtosis	5.136607	4.673528	4.35608
Sum	1349957	434453	660804
Sum Sq. Dev.	1.81E+10	1.37E+09	3.72E+09
Observations	176	176	176

Source: Prepared by the authors based on EViews 12 output

4.1.3.2. Correlation Matrix

Table N°4: Correlation Matrix of the Study Variables

	SOLV	PROD	INDEM
SOLV	1.0000	0.6404	0.9318
PROD	0.6404	1.0000	0.6590
INDEM	0.9318	0.6590	1.0000

Source: Prepared by the authors based on EViews 12 output

The table above presents the correlation matrix among all variables. It reveals that the majority of correlation coefficients between the explanatory variables are moderate yet statistically significant at the 5% level. Furthermore, the solvency variable exhibits a positive and statistically significant correlation of moderate strength with insurance premiums (PROD). Additionally, a high correlation (0.93) exists between the dependent variable (solvency) and the claims variable (INDEM).

4.2. Estimation of Static Panel Data Models

4.2.1. Hsiao Test for Homogeneity

In the case of complete homogeneity in the panel structure, the use of this structure is categorically excluded, and panel models cannot be relied upon for model estimation. However, in cases of incomplete homogeneity, the Hsiao test is employed to identify the sources of heterogeneity, whether they stem from fixed or random effects. If the source cannot be precisely determined, it is generally preferable to directly apply dynamic models without first estimating static models.

The study's specified model can be presented as follows:

$$SOLV_{it} = c + \beta_{1j} \mathbf{PROD}_{j(it)} + \beta_{2j} \mathbf{INDEM}_{j(it)} + \varepsilon_{it}$$

Where:

β_{kj} = represents the model parameters,

$i = 1, \dots, n$ denotes the cross-sectional units (insurance companies),

$t = 1, \dots, T$ represents time,

ε_{it} = is the stochastic error term

Table N°5: HSIOA Homogeneity Test Results

Hypotheses	F-Stat	P-Value
H1	8.175948	5.39E-18
H2	1.730902	0.063810
H3	17.94345	1.78E-24

Source: Prepared by the authors based on EViews 12 output

The HSIAO test is conducted in three stages. In the first stage, complete homogeneity is tested, while the second and third stages test for homogeneity of intercepts and slopes separately.

First Stage: Testing the null hypothesis of complete homogeneity of the panel structure. After estimating the model and calculating the Fisher statistic, we obtained the following:

$$F_1 = 8.175948 \quad / \quad Prop - F_1 = 5.39 * 10^{-18}$$

The calculated Fisher statistic is greater than the critical value, as can be inferred from its p-value of (5.39×10^{-18}) , which is significantly lower than the critical value (0.05). Therefore, we reject the null hypothesis of complete homogeneity of the model's overall structure and accept the alternative hypothesis, move to the second stage.

Second Stage: We test the null hypothesis of slope homogeneity. The results shown in the table above indicate:

$$F_2 = 1.730902 \quad / \quad Prop - F_2 = 0.0638$$

The p-value for the Fisher statistic is (0.06), which is greater than the critical value (0.05). Therefore, we can accept the null hypothesis of slope homogeneity (i.e., equality or equivalence of slopes), retaining the model, and proceed to test the null hypothesis of intercept homogeneity under the assumption of common slopes for all units.

Third Stage: In this step, we test the null hypothesis of intercept homogeneity in the model. The calculated Fisher statistic for this hypothesis is:

$$F_3 = 17.94345 \quad Prop - F_3 = 1.78 * 10^{-24}$$

The calculated Fisher statistic for the third stage is (17.94345) with a p-value of (1.78×10^{-24}) , which is lower than the critical value (0.05). Therefore, we can reject the null hypothesis at the 5% significance level, which states that the intercepts in the model are homogeneous (equal or equivalent).

Based on the results of the HSIAO test, we can preliminarily conclude that the panel model structure for determinants of solvency among insurance companies operating in Algeria during the study period contains fixed effects between the cross-sectional units.

4.2.2. Estimation of Models

Following the verification in the previous section regarding the homogeneity properties of the study model parameters - which revealed heterogeneity only in the intercepts - this section will proceed to estimate the three fundamental panel models (the pooled regression model, fixed effects model, and random effects model). Subsequently, we will specifically examine the statistical validity of these models, then conduct model selection using a set of specialized statistical tests. This approach enables: Verification of the results obtained through the HSIAO methodology concerning parameter homogeneity, and Identification of the sources of variation among sample units regarding solvency determinants.

• **Pool Regression Model – PRM**

Table N°6: Estimation of Pool Regression Model

Dependent Variable: SOLV				
Method: Panel Least Squares				
Sample: 2012 2022				
Periods included: 11				
Cross-sections included: 16				
Total panel (balanced) observations: 176				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
PROD	0.169392	0.132827	1.275284	0.2039
INDEM	1.987641	0.080576	24.66802	0
C	-210.6633	381.9404	-0.551561	0.582
Root MSE	3663.804	R-squared		0.869424
Mean dependent var	7670.21	Adjusted R-squared		0.867914
S.D. dependent var	10168.03	S.E. of regression		3695.434
Akaike info criterion	19.28448	Sum squared resid		2.36E+09
Schwarz criterion	19.33852	Log likelihood		-1694.034
Hannan-Quinn criter.	19.3064	F-statistic		575.947
Durbin-Watson stat	1.033522	Prob(F-statistic)		0

Source: Prepared by the authors based on EViews 12 output

Based on the Pool Regression Model presented in the table above, the following conclusions can be drawn:

Significance of the coefficients: From the estimated equation, it is observed that all coefficients associated with the claims variable are statistically significant at the 5% significance level, as their respective *t*-statistic *p*-values are lower than the critical value of 0.05. However, the coefficient related to the *insurance premiums* variable is statistically insignificant at the same significance level. Specifically, the computed *t*-statistic for this coefficient is 1.275284, which in absolute terms is lower than the critical *t*-value, and the corresponding *p*-value is 0.20, which exceeds the 0.05 threshold.

Overall significance of the model: The calculated value of the Fisher statistic (F-statistic = 575.94) is statistically significant at the 5% level, since its associated *p*-value is well below the critical value of 0.05. This confirms that the overall model is statistically significant.

Goodness of fit: The coefficient of determination ($R^2 = 0.86$) indicates that the independent variables account for 86% of the variation in financial solvency, while the remaining 14% is explained by other variables not included in the model or is captured within the error term.

Overall assessment: In general, the Pool Regression Model is statistically acceptable, as it satisfies both partial and overall significance criteria

• **Fixed Effect Model – FEM**

Table N°7: Estimation of Fixed Effect Model

Dependent Variable: SOLV				
Method: Panel Least Squares				
Sample: 2012 2022				
Periods included: 11				
Cross-sections included: 16				
Total panel (balanced) observations: 176				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
PROD	1.5772	0.2517291	6.276397	0
INDEM	0.231263	0.130455	1.772745	0.0782
C	2908.627	797.4434	3.647441	0.0004
Root MSE	2093.631	R-squared		0.957362
Mean dependent var	7670.21	Adjusted R-squared		0.952774
S.D. dependent var	10168.03	S.E. of regression		2209.673
Akaike info criterion	18.33573	Sum squared resid		7.71E+08
Schwarz criterion	18.65999	Log likelihood		-1595.544
Hannan-Quinn criter.	18.46725	F-statistic		208.6812
Durbin-Watson stat	0.794669	Prob(F-statistic)		0.000

Source: Prepared by the authors based on EViews 12 output

Based on the estimated Fixed Effects Model, the following conclusions can be drawn:

Significance of the coefficients: Referring to the results presented in the previous table, it is evident that the two coefficients associated with the variables *insurance premiums* and *claims* are statistically significant, as their corresponding p -values (0.00 and 0.02, respectively) are well below the critical threshold of 0.10. Additionally, the results show that the intercept term is also statistically significant.

Overall significance of the model: The computed value of the Fisher statistic (F-statistic = 208.6812) is statistically significant at the 5% level, given that its associated p -value is considerably lower than the critical value of 0.05. This indicates that the overall model is statistically significant.

Goodness of fit: The explanatory power of the Fixed Effects Model, as reflected by the coefficient of determination ($R^2 = 0.95$), suggests that the independent variables explain 95% of the variation in financial solvency. The remaining 5% is attributed to other variables not included in the model or to specification errors captured within the error term.

- **Random Effect Model – REM**

Table N°8: Estimation of Random Effect Model

Dependent Variable: SOLV				
Method: Panel EGLS (Cross-section random effects)				
Sample: 2012 2022				
Periods included: 11				
Cross-sections included: 16				
Total panel (balanced) observations: 176				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
PROD	1.057892	0.145222	7.284647	0
INDEM	1.276997	0.085036	15.01721	0
C	264.2485	513.1548	0.514949	0.6072
Root MSE	2951.191	R-squared		0.628998
Mean dependent var	3290.716	Adjusted R-squared		0.624709
S.D. dependent var	4858.994	S.E. of regression		2976.67
Sum squared resid	1.53E+09	F-statistic		146.6522
Durbin-Watson stat	0.885495	Prob(F-statistic)		0.000

Source: Prepared by the authors based on EViews 12 output

Based on the estimated Random Effects Model, the following conclusions can be drawn:

Significance of the coefficients: From the estimated equation, it is evident that all the coefficients associated with the explanatory variables are statistically significant at the 5% significance level, given that their respective p -values for the t -statistics are less than the critical value (0.05). The only exception is the intercept term, which appears statistically insignificant at the same significance level, indicating that it carries no meaningful interpretation from either a statistical or economic standpoint.

Overall significance of the model: The computed value of the Fisher statistic (F-statistic = 146.6522) is statistically significant at the 5% level, as the corresponding p -value is 0.00, which is well below the critical threshold of 0.05. This implies that the overall model is statistically significant.

Goodness of fit: The coefficient of determination ($R^2 = 0.60$) indicates that the independent variables explain 60% of the variation in financial solvency, while the remaining 40% is attributed to other variables not included in the model.

4.2.3. Model Selection Tests

Model selection tests help verify the results of the Hausman specification test by identifying the nature and source of cross-sectional heterogeneity. These tests determine whether the differences across cross-sections are due to fixed individual effects (cross-sectional heterogeneity), random individual effects (heterogeneity in slopes), or the complete absence of differences across sections-i.e., full homogeneity

- **Lagrange multiplier (LM) test**

The objective of this test is to choose between the Poold Regrision Model and the Fixed or Random Effects models. The test relies on a set of statistical procedures, including the **Breusch-Pagan test**, and is based on the following hypotheses:

- **H₀**: The Poold Regrision Model is appropriate.
- **H₁**: Either the Fixed Effects or Random Effects model is more appropriate.

Table N°9: LM test

Lagrange Multiplier Tests for Random Effects			
Null hypotheses: No effects			
Test Hypothesis			
	Cross-section	Time	Both
Breusch-Pagan	24.34774	0.202469	24.55021
	0.00	0.6527	0.00

Source: Prepared by the authors based on EViews 12 output

According to the test results, the Breusch-Pagan statistic for the cross-sections in the first model was 24.55. Given that the p-value associated with this test is less than 0.05, we reject the null hypothesis (H_0) and accept the alternative hypothesis (H_1), indicating that either the Fixed Effects or Random Effects model is more appropriate for the study data.

- **Hausman Test:**

After confirming the existence of individual heterogeneity across cross-sections in the study model-as revealed by the Lagrange Multiplier (LM) test, which suggested the presence of either fixed or random effects-the final decision regarding the most suitable model is determined using the Hausman Test.

Hypotheses of the Hausman Test:

- **H₀**: The Random Effects model is appropriate.
- **H₁**: The Fixed Effects model is appropriate.

The results of the test are presented in the following table:

Table N°10: Hausman Test

Correlated Random Effects - Hausman Test			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	142.943549	2	0.0000

Source: Prepared by the authors based on EViews 12 output

The test statistic of the Hausman test, used to distinguish between the Random Effects and Fixed Effects models, was $\chi^2 = 142.943$, as shown in the table above. The critical value for this test at 2 degrees of freedom and a 5% significance level is 18.625. Moreover, the p-value associated with the test is 0.00 (< 0.05). Therefore, the null hypothesis is rejected in favor of the alternative hypothesis, indicating that the differences across the insurance companies under study are better captured by Fixed Effects.

Based on the results of the model selection tests, the Fixed Effects Model is deemed the most appropriate for assessing the determinants of financial solvency in insurance companies over the period 2012–2022. It is the model adopted in the static economic analysis to estimate the relationship between the study variables, as it is more efficient than both the Random Effects and Pooled Regression Model due to the presence of significant cross-sectional differences among the insurance companies

4.2.4. Economic Interpretation Based on the Preferred Fixed Effects Model

After confirming the statistical soundness of the estimated Fixed Effects Model-through tests of individual and overall significance of the estimated coefficients, as well as the model's explanatory power-the following section focuses on interpreting the results from an economic perspective.

Based on the estimated Fixed Effects Model, the following can be concluded:

- The **positive sign** of the coefficient associated with the insurance premiums variable (**PROD**) indicates a **direct relationship** between insurance premiums and the financial solvency of Algerian insurance companies.
- The coefficient value of **1.5772 million Algerian dinars** implies that an increase in insurance premiums by 1 million dinars leads to an increase in financial solvency by approximately **1.5772 million dinars**.
- This finding is consistent with **economic theory**, which states that higher revenues (in this case, insurance premiums) tend to improve profits, thereby enhancing a company's financial solvency.
- The **p-value** for the **claims variable** is **0.0782**, which indicates that there is **no statistically significant relationship** between this variable and the financial solvency of Algerian insurance companies.

5. Conclusion

This study investigated the impact of insurance premiums and compensation payments on the financial solvency of Algerian insurance companies during the period 2012–2022, using panel data from 16 firms and applying fixed and random effects models. The econometric analysis led to several important findings.

The results confirmed a statistically significant positive relationship between insurance premiums and financial solvency, indicating that higher premium income enhances the ability of insurance firms to meet their financial obligations and maintain a stable financial position. Conversely, the relationship between compensation payments and solvency was found to be statistically insignificant, suggesting that claims payouts,

in isolation, may not strongly influence solvency levels when firms maintain adequate reserves and pricing policies.

Based on these findings, the study offers the following key recommendations:

- Insurance companies should focus on optimizing premium structures by improving risk assessment, pricing strategies, and customer segmentation to ensure consistent revenue flows that strengthen solvency.
- Regulatory bodies should enhance supervision frameworks to monitor premium adequacy and solvency indicators, ensuring that firms maintain sustainable underwriting practices.
- Companies are encouraged to improve internal risk management systems, especially with regard to liquidity and reserve policies, to minimize the impact of unexpected claim shocks.
- Further research should explore additional internal and external determinants of solvency, such as investment income, reinsurance arrangements, and macroeconomic factors, to build a more comprehensive understanding of solvency dynamics in emerging markets.

on conclusion, this study contributes to the empirical literature on insurance performance in Algeria and provides actionable insights for practitioners and policymakers seeking to strengthen the financial resilience of the national insurance sector.

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