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How Macroeconomic Shifts Drive Insurance Returns: Evidence from OECD Countries

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Abstract Insurers play a significant role in supporting financial stability by providing essential risk management solutions. However, their financial performance is highly susceptible to macroeconomic fluctuations due to their close links with financial markets and economic activity. This study investigates how macroeconomic shifts influence the return on assets of non-life insurance companies across OECD countries. Using a comprehensive dataset covering 38 nations from 2009 to 2022, a robust panel data analysis examines the effects of key economic indicators on insurance profitability. The results reveal that gross domestic product growth, industrial production, stock prices, and short-term interest rates positively impact returns on assets, while inflation, long-term interest rates, and retail sales volume exert negative effects. These findings highlight the dual challenges faced by insurers: seizing opportunities during economic expansions and mitigating risks during periods of high inflation and financial uncertainty. The study further underscores the need for dynamic risk management strategies, diversified investment portfolios, and policy frameworks that support the industry's resilience against macroeconomic shocks. By offering empirical evidence on the complex interplay between economic dynamics and insurance returns, this research provides valuable insights for insurers, investors, and policymakers seeking to navigate the evolving financial landscape and enhance the sector's long-term sustainability.

Keywords Macroeconomic factors · insurance profitability · financial stability · non-life insurance · panel data analysis.

JEL Classification G22 · E44 · G15.

Author Note All data used in this study are publicly available and can be accessed at OECD (2023).

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How Macroeconomic Shifts Drive Insurance Returns: Evidence from OECD Countries

Over the past several years, the global economy has undergone significant shifts. The COVID-19 pandemic thoroughly impacted the global economy, disrupted the production chain, and led to a significant slowdown in economic activity (Goel et al., 2021). This resulted in the largest global recession since the Great Depression (Jomo and Chowdhury, 2020). To combat the negative effects of the pandemic on the economy, governments worldwide implemented fiscal and monetary incentives. While these monetary policies played a major role in overcoming the recession, they also caused structural issues in the following period. Additionally, trade wars between the US and China and the conflict between Russia and Ukraine intensified existing problems by increasing geopolitical instability and uncertainty (Shahzad et al., 2023). In response to persistent inflation, central banks raised interest rates rapidly, fundamentally altering investment dynamics and reshaping the profitability of the financial sector. These developments have had a profound impact on financial institutions, particularly insurers, whose profitability relies on both underwriting income and investment returns.

The insurance industry is a crucial component of the global financial system, managing risk exposure for individuals and institutions while acting as one of the largest institutional investors globally (IAIS, 2022). However, insurers' financial stability is uniquely vulnerable to macroeconomic fluctuations, as economic cycles influence both premium revenues and asset returns (Trichet, 2005). Higher interest rates, for instance, can enhance investment income but simultaneously depress the market value of insurers' fixed-income portfolios. Similarly, inflationary pressures elevate claim costs, eroding underwriting profitability (Puławska, 2021).

Numerous studies have investigated the relationship between macroeconomic indicators and insurance performance; however, most have focused on individual countries or isolated variables. For instance, Guo et al. (2009) analysed structural shocks, Christophersen and Jakubik (2014) examined national income and unemployment, and Hasan et al. (2018) studied the impact of interest rates on insurer profitability. Given the ongoing volatility in the global economy, understanding how macroeconomic shifts influence insurers' profitability has become increasingly critical for maintaining the resilience of the financial sector and ensuring broader economic stability. Despite the growing interest in this topic, the existing literature lacks a comprehensive analysis of how multiple macroeconomic forces collectively affect insurance performance across different national contexts.

This study aims to fill that gap by empirically investigating the impact of key macroeconomic variables on the return on assets (ROA) of non-life insurance companies across OECD countries. By employing a robust panel data framework, it identifies the economic drivers associated with insurer profitability and offers comparative insights across diverse regulatory and economic environments. In doing so, the study provides a broader and more actionable understanding of how macroeconomic volatility affects financial performance in the insurance sector. The main contributions of this research are as follows:

(i) This research investigates the complex relationship between macroeconomic changes and insurance returns, offering valuable insights into how the fundamental dynamics of the economy influence the industry. These insights can help industry participants and policymakers in more effectively managing systemic risks and fostering their success.

(ii) Furthermore, this study presents practical implications by demonstrating how an understanding of macroeconomic factors can enhance insurers' risk modelling, capital allocation, and investment strategies despite economic uncertainty. The findings outlined in this paper can help insurers refine their management and investment decisions in response to varying economic conditions.

(iii) Through a cross-national empirical analysis of OECD countries, this study provides one of the first comprehensive assessments of the macroeconomic impacts on non-life insurance profitability on a global scale. It enriches the existing academic literature and lays the groundwork for future comparative and policy-oriented research.

This study is organised into six main sections. Section 2 provides a comprehensive review of the literature on the internal and external factors influencing the financial performance of the insurance industry. Section 3 outlines the research methodology, including the econometric model employed. Section 4 presents the empirical findings from the panel data analysis. Section 5 offers a detailed discussion of the results in the context of the existing literature. Finally, Section 6 concludes the study and offers practical recommendations for policymakers and industry stakeholders based on the research outcomes.

Literature Review

The insurance industry is a vital component in maintaining financial stability and sustainability for all economic actors. In light of the growing uncertainties in the global financial system, it is imperative to have a precise understanding of the factors that impact the performance of the insurance industry. A large body of research has been conducted to understand the factors driving insurance company profitability and performance, typically drawing a distinction between internal (firm-specific) and external (environmental or macroeconomic) influences.

Internal factors such as operational efficiency, underwriting performance, and corporate governance are widely recognised as fundamental drivers of insurer profitability. Eling and Jia (2019) confirmed that technical efficiency significantly enhances financial outcomes. Alhassan et al. (2015) highlighted the importance of firm efficiency and competitiveness within Ghana's insurance sector, while Asare et al. (2017) identified that intellectual capital, particularly its human and structural components, play a critical role in influencing profitability among non-life insurers in emerging markets. Corporate governance has also emerged as a crucial internal determinant. Ullah et al. (2019) demonstrated that board independence and gender diversity positively impact corporate social responsibility disclosures, reflecting stronger transparency practices. In the UK context, Elamer et al. (2018) found that smaller boards and more frequent meetings are correlated with reduced risk-taking, suggesting that governance structures are vital for aligning strategic decisions with long-term financial stability.

In addition to efficiency and governance, risk management has increasingly been recognised as a strategic capability that significantly impacts insurer performance (Isayas, 2021). Camino-Mogro and Bermúdez-Barrezueta (2019) demonstrated that effective risk management practices enhance the financial stability of non-life insurers, particularly during volatile market conditions. Zainudin et al. (2018) underscored the importance of internal resource management, such as firm size, capital volume, and underwriting risk, in boosting profitability within the Asian life insurance markets. Kiptoo et al. (2021) highlighted that effective oversight of credit, market, and operational risks contributes to improved financial performance, particularly through mechanisms such as receivables management and sound investment practices. Additionally, Kuo et al. (2017) illustrated that the composition of risk management committees affects both marketing and profitability efficiency, emphasising the critical role of institutional governance frameworks.

Beyond operational, governance, and risk capabilities, financial structure and strategic growth decisions are also critical to insurer performance. Research conducted in various national contexts indicates that internal financial strategies must be customised to align with specific market conditions. For example, a study by Burca and Batrinca (2014) on insurance firms in Romania revealed that high leverage and aggressive expansion negatively impact profitability, while larger asset size and effective risk management capabilities

have a positive effect. Conversely, Killins (2020) found that for Canadian life insurers, greater asset size and a risk-seeking investment approach correlated with lower profitability, while liquidity and growth rate were positively linked to performance. These contrasting results emphasise the need for financial decisions such as capital allocation, investment strategies, and liquidity management to be adapted to both the unique characteristics of the firm and the broader economic landscape.

While internal capabilities play a crucial role in determining insurer outcomes, macro-level factors also have a significant impact. Elements such as national income, inflation, interest rates, and unemployment levels influence both the demand for insurance products and the returns on insurers' investment portfolios. Guo et al. (2009), in their examination of the U.S. market, discovered that demand and money market shocks tend to enhance premium production, whereas positive supply shocks tend to have a negative effect. Christophersen and Jakubik (2014) analysed insurance markets across 30 European countries and concluded that non-life insurance premiums are notably affected by national income growth, while life insurance production is more responsive to unemployment rates. In Bangladesh, Hasan et al. (2018) identified interest rates as the sole macroeconomic factor consistently demonstrating a positive effect on insurer profitability. More recently, Babuna et al. (2020) evaluated the initial impact of the COVID-19 pandemic on the Ghanaian insurance industry, reporting a sharp increase in claims accompanied by declining profits. The study highlighted that a macroeconomic crisis can pressure both the liability and asset sides of insurers' operations.

In addition to these findings, several studies have examined macroeconomic indicators such as GDP growth, inflation, and stock market performance in conjunction with firm-level variables. Sasidharan et al. (2023), in their analysis of Indian general insurers, discovered that the retention ratio, premium growth, and market share were positively related to ROA. In contrast, inflation showed a negative influence while GDP per capita did not exhibit a significant relationship. Similarly, Olaosebikan (2013), Alhassan (2015), Camino-Mogro and Bermúdez-Barrezueta (2019), and Killins (2020) incorporated macroeconomic variables as control variables in their profitability models. However, many of these studies tend to adopt a single-country perspective, use short time frames, or focus on narrow macroeconomic elements. As a result, the broader implications of macroeconomic volatility on insurer performance remain underexplored, especially in comparative, cross-national contexts. Overall, the literature review revealed the following key findings:

(i) The insurance industry is subject to internal and external factors that impact its profitability, making it vulnerable to systematic risks in a complex financial landscape. Insurance companies must understand these factors to improve their performance and maintain market capital adequacy.

(ii) Numerous studies on insurance company performance and profitability acknowledge the importance of this issue. However, most of them have focused solely on firm-specific factors, ignoring environmental factors.

(iii) Research on insurance market profitability tends to be limited to local or regional areas, and results may vary depending on market dynamics during different periods. This makes generalising the findings challenging.

In light of these observations, this study examines the effects of major macroeconomic indicators on the profitability of non-life insurance companies. To minimise variations in firm-specific, regional, and periodic differences, the study's sample consists of OECD insurance markets with an extensive period.

Method

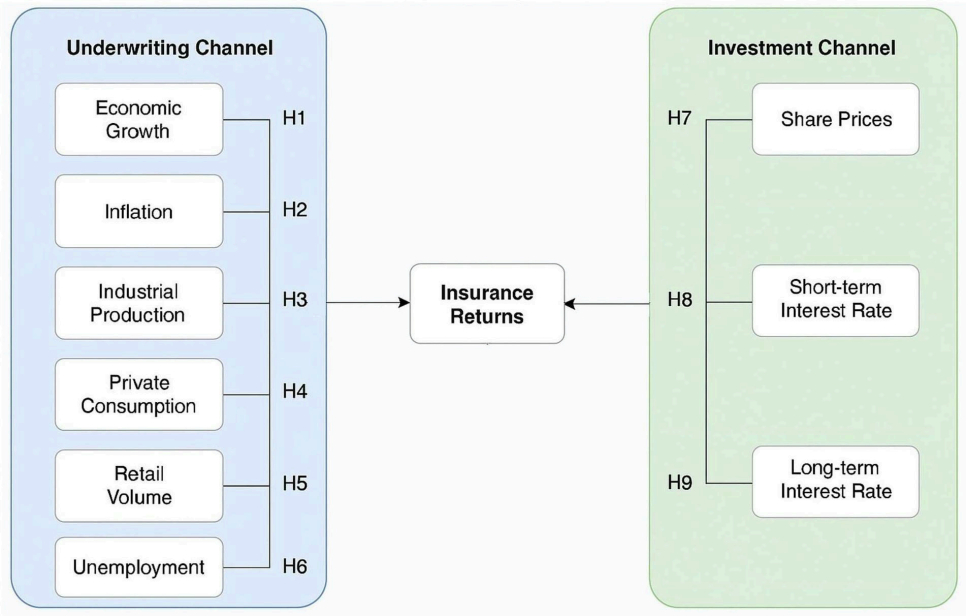
Research Design

This study investigates the impact of macroeconomic fluctuations on the profitability of non-life insurance companies across OECD nations. As financial intermediaries, non-life insurers play a critical role in stabilising economic risks while maintaining investment portfolios. Their profitability is inherently linked to macroeconomic dynamics through underwriting and investment mechanisms. Economic conditions directly affect insurance demand, pricing strategies, and claim costs. Macroeconomic indicators such as GDP growth, inflation, and unemployment rates influence premium volumes and loss ratios, thereby shaping insurers' underwriting performance. At the same time, insurers' asset portfolios are significantly impacted by interest rates, equity market fluctuations, and overall macroeconomic stability. Long- and short-term interest rates, stock market performance, and industrial production collectively determine investment income and asset valuation, influencing the financial resilience of insurers.

While prior research has established that macroeconomic conditions affect insurance profitability, there is a gap in understanding the causal mechanisms driving these relationships, particularly in a cross-country setting. Existing studies have primarily focused on single-market analyses or have not sufficiently accounted for structural differences across economies. By refining the empirical framework, this research aims to provide a more comprehensive understanding of the economic determinants of insurer performance. Figure 1 presents the conceptual model of this study, outlining the hypothesised relationships between macroeconomic indicators and insurance profitability.

Figure 1

Proposed research framework



Drawing from empirical insights in the literature, we propose the following hypotheses to capture the directional effects of macroeconomic conditions on insurance profitability:

H_1 Economic growth is positively associated with insurance returns.

H_2 Inflation has a negative impact on insurance returns.

H_3 Industrial production is positively related to insurance returns.

H_4 Private consumption influences insurance returns positively.

H_5 Retail volume positively affects insurance returns.

H_6 Unemployment negatively affects insurance returns.

H_7 Share price growth positively impacts insurance returns.

H_8 Short-term interest rates negatively affect insurance returns.

H_9 Long-term interest rates positively affect insurance returns.

Data and variables

The dataset encompasses data from 38 nations over 14 years (2009 to 2022), featuring a range of macroeconomic indicators sourced from the OECD (2023) database. The dependent variable within this dataset is the ROA. Table 1 shows the details of the independent variables.

Table 1

Details of the independent variables

Code	Variable	Reference
GDP	Gross domestic product growth	(Vojinović et al., 2022)
INF	Inflation	(Alhassan, 2015)
IPV	Industrial production volume	(Guo et al., 2009)
LTI	Long-term interest rate	(Brewer et al., 2007)
PRV	Private consumption	(Hong & Rios-Rull, 2012)
RET	Retail volume	(Guo et al., 2009)
SPG	Share price growth	(Killins, 2020)
TMI	Three-month interest rate	(Park & Paul Choi, 2011)
UNE	Unemployment rate	(Christophersen & Jakubik, 2014)

These variables were selected to investigate the variability across the countries studied. In this study, we examine the impact of continuous independent variables on insurance returns. Specifically, we investigate how changes in these economic indicators predict fluctuations in insurance returns. Each of these variables represents a key aspect of the economic environment that could influence the performance of insurance companies. To ensure the completeness and consistency of the dataset, the missing values were imputed using the mice package in R Studio by applying interpolation linear regression. This technique estimates missing values by leveraging trends within each country and the structure of the existing data, preserving cross-sectional and temporal patterns (Van Buuren & Oudshoorn, 2011). With this prepared dataset, the study examines how changes in macroeconomic conditions are associated with fluctuations in insurance returns, offering valuable insights into the drivers of profitability and financial resilience in the insurance sector.

Econometric Model

To investigate the relationship between macroeconomic indicators and the profitability of non-life insurers across OECD countries, this study employs a panel data regression framework. Panel data, which combines cross-sectional and time-series dimensions, is particularly suited for capturing dynamic economic relationships that unfold across different countries and over time (Batrancea et al., 2021). This approach enables the model to exploit both within-country variation (over time) and between-country variation (across entities), thus improving the accuracy and robustness of the estimates. The basic panel regression specification is as follows:

$$ROA_{it}=\beta_0+\beta_1 GDP_{it}+\beta_2 INF_{it}+\beta_3 IPV_{it}+\beta_4 LTI_{it}+\beta_5 PRV_{it}+\beta_6 RET_{it}+\beta_7 SPG_{it}+\beta_8 TMI_{it}+\beta_9 UNE_{it}+\alpha_i+\gamma_t+\epsilon_{it}$$

Where:

ROA_{it} denotes the return on assets of insurers in country *i* at time *t*,

β_0 is the intercept,

β_1 to β_9 are coefficients associated with the macroeconomic variables,

α_i captures country-specific effects,

γ_t accounts for the time-specific effects,

ε_{it} is the idiosyncratic error term.

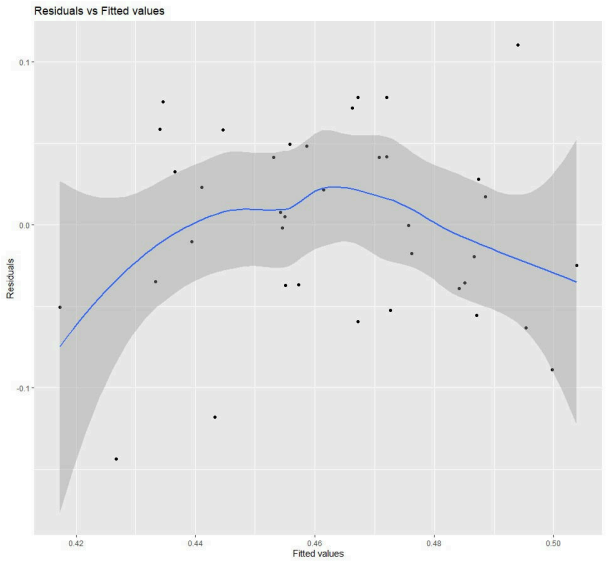
In the proposed analytical framework, we delineate the variables of interest in the following manner: the index *i* is utilised to represent the entity under study, which is a country, and the index *t* is used to denote the temporal aspect. The formulation includes an intercept, β_0, alongside coefficients for the independent variables, β_1 through β_9, to establish the relationship between these variables and the outcome of interest. To accommodate the inherent disparities across entities and temporal periods that are not directly observable, we incorporate control terms α_i for country-specific effects and γ_t for time-specific effects. These elements are pivotal in reducing potential biases caused by unobserved variability. Additionally, an error term, ϵ_{it}, is included to account for the residual variance. This comprehensive methodology facilitates the assessment of the impact of specific independent variables on ROA while adequately controlling for hidden, entity-specific, and temporal-specific factors (Hsiao, 2021).

Assumption Testing

Before conducting the panel data regression, we assessed whether the dataset satisfies the following key assumptions necessary for valid panel estimation: linearity, independence, normality, homoscedasticity, and absence of perfect multicollinearity. These diagnostic checks help ensure the robustness and reliability of the empirical findings. Initially, we address the linearity assumption. Upon scrutinising the scatterplot depicting the fitted values versus the residuals, we observed the absence of a consistent non-linear pattern. Our analysis revealed that while our data meets the linearity assumption with a satisfactory fit, it is not flawless. (Refer to Figure 2 for visualisation).

Figure 2

Residual plot of fitted values vs. residuals

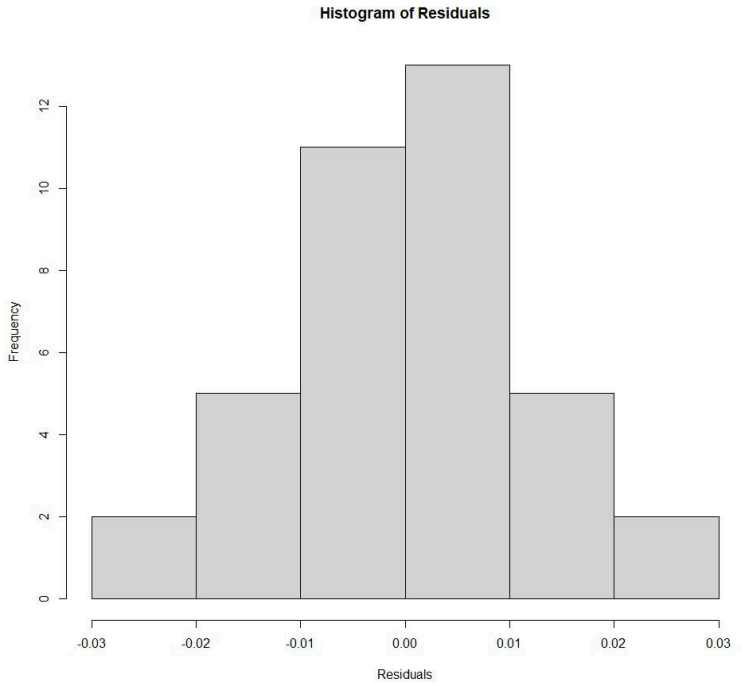


The next assumption was the independence assumption. The independence of the residuals was tested using the Durbin–Watson statistic. The result (DW = 1.557, p = 0.24) indicates a slight positive autocorrelation though not statistically significant at the 5% level. The result indicates a slight but statistically insignificant positive autocorrelation, suggesting that while some autocorrelation may exist, it does not violate the independence assumption. Therefore, further investigation or consideration may be warranted, but the overall fit of the model is reasonable. This result showed an acceptable level of independence, imperfect.

The third assumption pertains to normality. Normality was evaluated through two analytical steps: examining the histogram of the residuals and conducting the Shapiro-Wilk test. The histogram of the residuals indicated an approximately normal distribution (Refer to Figure 3). Additionally, the Shapiro-Wilk test yielded a statistic of W = 0.98145 with a corresponding p-value of 0.7684, affirming the fulfilment of the normality assumption.

Figure 3

Histogram of the residuals



Homoscedasticity was assessed using the studentized Breusch–Pagan test, which yielded a statistic of 15.978 (df = 9, p = 0.067). As the p-value exceeds 0.05, we fail to reject the null hypothesis of constant error variance, supporting the homoscedasticity assumption. Thus, the assumption of constant variance of errors across observations is not violated, supporting the validity of the homoscedasticity assumption in the study.

To assess multicollinearity, we calculated the variance inflation factor (VIF) for all independent variables (see Table 2). Generally, VIF values greater than 10 indicate high multicollinearity, while values above 5 suggest moderate multicollinearity. In this case, the VIF values were below these thresholds, indicating that the multicollinearity among the independent variables was not severe.

Table 2
VIF values of the variables

Variable	VIF	Variable	VIF
GDP	3.535	RET	2.604
INF	2.728	SPG	2.242
IPV	2.895	TMI	2.811
LTI	4.476	UNE	2.936
PRV	6.137		

Since all the key assumptions were met, the next step was to determine the most appropriate panel data model for the analysis. To this end, we applied the Hausman test (Amini et al., 2012), which compares the fixed effects (FE) and random effects (RE) estimators to assess whether the unique errors (unobserved effects) are correlated with the regressors. The test produced a chi-square statistic of 51.267 with 15 degrees of freedom and a p-value less than 0.01. This statistically significant result indicates a systematic difference between the FE and RE estimators, leading to the rejection of the null hypothesis that the RE model is consistent. Accordingly, the fixed-effects model was selected as the appropriate specification for this study.

Findings

Following the completion of the required assumptions, we generated a concise overview of the descriptive statistics employed in the panel data analysis (See Table 3):

Table 3
Descriptive statistics

Variable	n	mean	sd	median	min	max
ROA	532	0.022	0.011	0.022	−0.342	0.401
GDP	532	0.369	0.124	0.368	−0.337	0.628
INF	532	0.025	0.012	0.019	−0.040	0.72
IPV	532	0.061	0.004	0.011	−0.235	0.362
LTI	532	0.027	0.013	0.022	−0.005	0.224
PRV	532	0.018	0.021	0.021	−0.173	0.208
RET	532	0.102	0.020	0.010	−0.566	0.265
SPG	532	0.041	0.110	0.029	−0.867	0.973
TMI	532	0.013	0.004	0.005	−0.008	0.130

The dataset consists of 532 observations across 38 entities over 14 time periods, capturing key macroeconomic indicators and their relationship with return on assets (ROA) in the insurance industry. Table 3 presents the descriptive statistics, highlighting the distribution and variability of each variable. The mean ROA was 0.022, with a standard deviation of 0.011, suggesting moderate dispersion around the central value. The range spans from −0.342 to 0.401, indicating variation in profitability across insurers. GDP growth exhibits a mean of 0.369 and a higher standard deviation of 0.124, reflecting fluctuations in economic performance, with values ranging from −0.337 to 0.628. Inflation (INF) has a mean of 0.025 and a relatively narrow spread (sd = 0.012), capturing both inflationary and deflationary periods with minimum and maximum values of −0.040 and 0.72, respectively.

Industrial production volume (IPV) and long-term interest rate (LTI) show more stable trends, with means of 0.061 and 0.027, respectively. Private consumption (PRV) and retail volume (RET) reveal contrasting patterns, with PRV having a mean of 0.018, while RET exhibits greater volatility with a mean of 0.102 and a range

extending from −0.566 to 0.265. Share price growth (SPG) demonstrates the widest fluctuations among all variables, with values ranging from −0.867 to 0.973, highlighting the inherent volatility of equity markets. The three-month interest rate (TMI) remains relatively stable, with a mean of 0.013 and minimal deviation. These descriptive insights provide a foundational understanding of the macroeconomic environment affecting insurance profitability.

Following the descriptive analysis, we examine the empirical relationship between macroeconomic conditions and insurer profitability using panel data techniques. Given the structure of our dataset and the presence of both cross-sectional and temporal variation, panel data regression offers an appropriate methodological framework. Specifically, the FE model was selected because of its capacity to control for unobserved, time-invariant heterogeneity across countries, thereby mitigating omitted variable bias and improving estimate consistency. This approach is particularly well-suited for analysing contemporaneous associations between macroeconomic indicators and institutional performance measures such as ROA, where country-specific characteristics may influence outcomes (Wooldridge, 2010).

As detailed in Section 3.4, all key model assumptions, including linearity, independence, normality, homoscedasticity, and absence of multicollinearity, were verified. Furthermore, the Hausman test indicated that the FE estimator is preferable to the RE alternative, confirming that unobserved effects are correlated with the explanatory variables (Rutledge, 2020). While dynamic panel models such as GMM are advantageous in contexts involving strong lag structures or endogeneity, our primary focus on contemporaneous relationships did not warrant such complexity. Preliminary analyses using lagged independent variables yielded a reduced model fit (R-squared = 0.3200) and a loss of significance in key predictors, reinforcing the suitability of a static specification.

Additionally, to account for potential heteroskedasticity and within-panel serial correlation, we applied robust standard errors clustered at the country level. This adjustment modifies the variance-covariance matrix of the coefficient estimates to allow for arbitrary forms of heteroskedasticity and autocorrelation within each cross-sectional unit while still assuming independence across countries (Cameron & Miller, 2015). In other words, clustering permits the residuals to be correlated over time within a country, which is particularly important in macroeconomic panel data where temporal shocks often persist. These steps collectively ensure that the selected model provides a robust foundation for estimating the effect of macroeconomic variables on the profitability of the insurance sector.

To empirically examine the relationship between macroeconomic conditions and insurer profitability, we estimated a one-way (entity-specific) FE model using data from 38 countries over 14 years, resulting in 532 observations. The model yielded residuals ranging from −0.0238 to 0.0295, indicating an acceptable fit. The total sum of the squares was 0.0172, with a residual sum of the squares of 0.0053. The model explains a substantial portion of the variation in the ROA, as reflected by an R-squared value of 0.6900. Additionally, the F-statistic (6.9252; df = 9, 28) is highly significant (p = 3.39e-05), confirming the joint explanatory power of the macroeconomic variables. These findings highlight the importance of macroeconomic dynamics in influencing insurer performance and provide a solid empirical foundation for further analysis. Table 4 presents the estimated coefficients, standard errors, and significance levels, offering insights into the validity of the proposed hypotheses and revealing both anticipated and counterintuitive relationships.

Table 4

Panel data coefficients

Variable	Estimate	Std. Error	t-value	p-value
Intercept	0.01	0.01	1.59	0.12
GDP	0.66	0.30	2.19	0.04

Variable	Estimate	Std. Error	t-value	p-value
INF	−0.52	0.17	−3.14	0.00
IPV	0.26	0.11	2.29	0.03
LTI	−0.65	0.24	−2.65	0.01
PRV	0.73	0.40	1.81	0.08
RET	−0.26	0.12	−2.18	0.04
SPG	0.30	0.07	4.50	0.00
TMI	0.55	0.23	2.45	0.02

The findings confirm that GDP growth has a positive and statistically significant impact on ROA ($\beta = 0.66$, $p = 0.04$), suggesting that economic expansion enhances insurer profitability, likely through increased demand and premium growth. Inflation exhibits a strong negative effect on ROA ($\beta = -0.52$, $p < 0.01$), indicating that rising claim costs and diminished real investment returns adversely affect insurer performance. Industrial production volume is also positively associated with ROA ($\beta = 0.26$, $p = 0.03$), implying that higher production levels stimulate corporate insurance demand.

The results for private consumption suggest a positive relationship with ROA ($\beta = 0.73$, $p = 0.08$) although the effect is only marginally significant. This finding implies that higher consumer spending may contribute to insurance demand, but the relationship lacks robust statistical support. In contrast, retail volume unexpectedly exhibited a negative association with ROA ($\beta = -0.26$, $p = 0.04$), suggesting that volatility in retail markets may introduce instability in personal insurance demand, warranting further investigation. Due to multicollinearity concerns, unemployment was excluded from the final model.

Share price growth has a highly significant positive effect on ROA ($\beta = 0.30$, $p < 0.01$), confirming that equity market gains enhance insurers' investment income. However, contrary to expectations, short-term interest rates positively influence ROA ($\beta = 0.55$, $p = 0.02$), suggesting that insurers may have benefited from reinvestment opportunities in short-term assets. In contrast, long-term interest rates exert a negative effect on ROA ($\beta = -0.65$, $p = 0.01$), contrary to the hypothesis that rising bond yields improve investment income. This result suggests that insurers' existing long-duration bond portfolios may have depreciated during periods of rate hikes.

Overall, the analysis indicates that macroeconomic factors such as GDP growth, industrial production, share price growth, and short-term interest rates positively influence insurance profitability, whereas inflation, long-term interest rates, and retail volume exert negative effects. The weaker significance of private consumption suggests a less pronounced but still relevant relationship. These findings contribute to the literature by providing empirical insights into the macroeconomic determinants of insurance profitability and highlighting the complexities of economic-financial interactions in the insurance industry.

Discussion

The research explored how macroeconomic shifts impact ROA in non-life insurance markets across OECD countries. To achieve this, we used a comprehensive dataset spanning from 2009 to 2022 and covering 38 OECD nations. By conducting a panel data analysis, we investigated the effects of key macroeconomic indicators. Our findings revealed several significant relationships, including the positive impacts of GDP growth, industrial production, stock prices, and three-month interest rates on ROA, while inflation, long-term interest rates, and retail sales volume have negative effects.

The evident strong positive relationship between national income and insurance returns indicates that insurers prosper during economic expansions. Similar effects observed in industrial production and private

consumption corroborate this finding. In times of economic growth, increased consumption heightens the demand for insurance, and a reduced price sensitivity among consumers allows insurance firms to elevate their premium rates. This underlines the critical role of a robust economy for the insurance sector. Previous studies, such as those by Christophersen and Jakubik (2014) and Vojinović et al. (2022), have consistently demonstrated that a surge in national income boosts the profitability of the insurance industry, highlighting the direct connection between economic performance and insurance returns.

However, the negative relationship between inflation and insurance industry profitability reveals the vulnerability of the insurance industry to cost increases. Inflationary pressures can lead to higher claims payouts, which can reduce insurers' reserves and overall profitability. Moreover, interest rates have contrasting effects on the insurance industry. While short-term interest rates positively impact profitability by offering liquidity management and financial returns, long-term interest rates lead to structural problems that negatively impact insurance profitability. Factors such as lower asset valuations and higher borrowing costs can slow down economic activity, reducing the demand for insurance. As Olaosebikan (2013) and Alhassan (2015) suggest, inflation and interest rates play a crucial role in influencing insurance returns, particularly in emerging markets.

The increase in stock prices also supports the financial returns of insurance companies and has a positive impact on profitability. Higher stock prices boost the value of insurers' equity portfolios, directly contributing to financial performance. Rising stock prices can also signal economic growth, leading to increased consumer confidence and spending. However, stock market volatility can introduce risks, with downturns reducing the value of insurers' investments and consumer confidence. This highlights the necessity for thorough risk management strategies to mitigate potential losses from market volatility. Killins (2020) further emphasises how stock market volatility can significantly impact insurance profitability, underscoring the importance of comprehensive risk management strategies to manage potential losses.

Another valuable finding of the study is the negative relationship between retail sales volume and insurance industry profitability. This pattern implies that consumers may be allocating less of their budget towards insurance during periods of increased retail spending. Over the past two decades, the retail industry has undergone a transformation and made significant strides in enhancing customer experience, unlike traditional sectors such as insurance. This shift in consumer behaviour could result in higher spending on retail products and services over insurance products. Hence, insurers must acknowledge that they are not only competing with other insurers but also with the entire retail sector. Camino-Mogro and Bermúdez-Barrezueta (2019) also highlight that competitive dynamics can influence insurance returns, underscoring the importance of insurers adapting to evolving consumer preferences.

The findings of the study confirm that insurer profitability is not independent of external factors. Instead, overarching economic trends actively shape both underwriting and investment outcomes. Instead, it is influenced by overarching economic trends that affect both underwriting and investment results. The research indicates that insurers benefit in favourable economic environments, while adverse macroeconomic conditions can present significant challenges to their stability and returns. These insights highlight the necessity for insurers to continuously adjust to external economic forces and stress the importance of macroeconomic awareness in strategic planning, risk management, and regulatory frameworks within the insurance sector.

Conclusions

This study provides important insights into how macroeconomic fluctuations affect the profitability of non-life insurance companies in OECD countries. The findings confirm that insurers' returns are closely tied to macroeconomic conditions. Specifically, GDP growth, industrial production, share price growth, and

short-term interest rates are positively associated with ROA, indicating that favourable economic conditions support profitability. In contrast, inflation, long-term interest rates, and retail volume negatively affect ROA, suggesting that rising costs and tighter monetary policy reduce underwriting margins and investment performance.

Based on these results, several policy implications emerge. Insurance companies should consider diversifying their products and investment portfolios to better navigate different macroeconomic environments. Strategic planning that incorporates macroeconomic forecasting can help insurers adjust pricing, manage risk, and improve resilience. Policymakers and regulators also play a critical role in supporting the sector by fostering regulatory frameworks that mitigate systemic risks and encourage long-term stability. A coordinated approach between insurers and regulators is therefore essential to foster a more adaptive, forward-looking, and resilient insurance industry.

This research contributes important observations on how macroeconomic fluctuations influence returns in the insurance sector. However, it is crucial to acknowledge its limitations. Primarily, the research is restricted to non-life insurance markets within OECD countries, which may not reflect the conditions across the broader global insurance industry. Additionally, although panel data analysis provides a useful overview of the relationship between macroeconomic changes and insurance returns, the selected metrics may overlook elements such as regional variations. Future studies should consider the effects of other variables on insurance returns, aiming for enhanced precision by examining various regions or specific insurance lines.

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