BOX 4: MACROECONOMIC DRIVERS OF INSURANCE PREMIA IN MALTA[1]

Introduction

The insurance sector plays a crucial role in supporting economic growth and financial stability by mobilising savings, transferring risk, and fostering investment. By cushioning households and firms against losses, it supports output, innovation, and competitiveness. Understanding how insurance activity interacts with macroeconomic developments provides valuable insights into financial resilience and the cyclical dynamics of the sector.

In Malta, insurance density for the domestically-relevant insurance firms has risen from around €705 per capita in 2009 to roughly €1,290 in recent years.[2] This growth has been largely driven by the steady expansion in non-life business, while life insurance density increased gradually over several years before experiencing a sharp decline more recently. These divergent trends make it particularly important to understand the drivers of insurance growth and their links to macroeconomic conditions.

This study attempts to unearth the economic determinants of the demand for insurance products. To do so, it examines the relationship between key macroeconomic variables and GWP of domestically-relevant insurers in Malta, using GWP as a proxy for demand. The study focuses on how key economic determinants influence performance in both life and non-life segments separately. By doing so, it provides a framework to assess shifts in activity and trace the insurance business cycle around its fundamental determinants. It is also a first step towards a forward-looking perspective on insurance sector's resilience and growth.

The article proceeds by first giving a brief literature review and an overview of the methodology, followed by a description of the econometric framework and presentation of the results. It concludes with key implications and areas for further research.

Literature review and methodology

A number of studies have explored the drivers of growth in insurance premia across different markets and time periods. Christophersen & Jakubik (2014) analysed the relationship between insurance sector growth and key macroeconomic variables using a European panel dataset, finding that GDP is the main driver of non-life insurance growth, while unemployment has a stronger influence on life insurance.[3] Gupta et al. (2019) investigated the effects of economic policy uncertainty, showing that non-life premia tend to rise during periods of heightened uncertainty, whereas life premia decline.[4] Hodula et al. (2021) further observed that both life and non-life premia move in line with the business cycle and are positively linked to higher savings and more developed financial systems.[5]

This study contributes to the literature by providing a country-specific assessment for Malta, focusing on domestically-relevant insurers, thus excluding business written by firms that do not underwrite local risks. To capture the dynamics between insurance activity and macroeconomic conditions, it employs an Engle-Granger two-step Error Correction Model (ECM), which first estimates the long-run equilibrium relationship and then models the short-run adjustments toward that equilibrium. Separate

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[2] Insurance density is measured as total GWP per capita, reflecting the average insurance spending per person.

[3] Christophersen, C., & Jakubik, P. (2014), Insurance and the macroeconomic environment, *EIOPA Financial Stability Report – Thematic Articles*, 1, pp. 44-55. Retrieved from: https://www.eiopa.europa.eu/system/files/2020-05/insurance_and_the_macroeconomic_environment.pdf

[4] Gupta, R., Lahiani, A., Lee, C.-C., & Lee, C.-C. (2019), Asymmetric dynamics of insurance premium: the impacts of output and economic policy uncertainty, *Empirical Economics, 57*(6), pp. 1959-1978. https://doi.org/10.1007/s00181-018-1539-z

[5] Hodula, M., Janků, J., Časta, M., & Kučera, A. (2021), On the macrofinancial determinants of life and non-life insurance premiums, *The Geneva Papers on Risk and Insurance – Issues and Practice*, *46*(4), pp. 667-702. https://doi.org/10.1057/s41288-021-00249-z

models are specified for the life and non-life insurance, reflecting heterogeneity in product characteristics and behavioural dynamics, using quarterly data covering the period 2009Q4 to 2025Q2. Preliminary unit-root and cointegration tests confirm that the variables are non-stationary in levels but cointegrated, suggesting the existence of a stable long-run relationship. In both models, the dependent variable is real GWP. GWP are determined by insurance prices and the amount of coverage sold, reflecting both demand and supply-side influences (Hodula et al., 2021). To account for changes in insurance prices over time, premia are deflated using the retail price index, yielding a measure of real premia that more accurately reflects the actual level of insurance demand.

This analysis is, however, subject to some data limitations. Although the focus is on domestically-relevant insurers, it is not possible to fully distinguish between business written in Malta and that written abroad, as a consistent split between domestically and foreign-written premia is not available for the entire time series due to changes in reporting requirements over time. This limitation is particularly relevant in the non-life sector, where around 24% of GWP were underwritten internationally as of June 2025, mainly within the euro area. Furthermore, the relatively short time series, beginning in 2009, limits the sample size and may reduce the precision of parameter estimates. Finally, the study also does not account for firm-level heterogeneity, which could influence short-run dynamics and responsiveness to macroeconomic conditions.

Life insurance

Regression analysis

The long-run relationship between real life insurance GWP, economic activity, and interest rates is specified as follows:

$$\log\left(GWP_t^{L,\,real}\right) = \sigma + \beta_1 \log\left(GDP_t^{SA,\,real}\right) + \beta_2 IR_t + \varepsilon_t$$

Where:

- $GWP_t^{L,\,real}$ = real GWP for life insurance at time t
- $GDP_t^{SA,\,real}$ = real seasonally-adjusted GDP at time t
- IR_t = nominal interest rates at time t
- ϵ_t = error term

While this specification is guided by literature, drawing on studies such as Christophersen & Jakubik (2014), which use similar macroeconomic variables, it also reflects the best fit for the model given the characteristics of the data.[6] Several alternative specifications, including variables, such as unemployment and bank deposit rates, were explored but did not improve the overall model fit.

The estimated coefficients (β_1, β_2) capture the long-run elasticities of life insurance premia with respect to economic activity and interest rates.

Real GDP is included as a proxy for the business cycle and overall economic activity, providing insight into whether the life insurance sector amplifies or mitigates potential adverse shocks. Stronger economic activity is expected to raise premia, as higher demand for insurance products supports premium growth.

Interest rates, measured by the ten-year government bond yields, serve as a proxy for returns on alternative savings and investment opportunities. This is particularly relevant because insurance business lines with investment components amounted to around 87% of life insurance GWP as of June

[6] A comprehensive review of all assessed attributes, including those not found to be statistically significant, will be published in Camilleri, L. (forthcoming), Macroeconomic Drivers of Insurance Premia in Malta, *Central Bank of Malta*.

2025 (Central Bank of Malta, 2025, Chapter 4.1).[7] Empirical evidence on the relationship between interest rates and life insurance demand is mixed. Outreville (1996) finds little correlation, suggesting a negligible impact, whereas Beck and Webb (2003) detect a positive relationship using lending rates, which, however, embed country-specific credit risk premia.[8,9] In contrast, Li et al. (2007) show that higher real rates reduce life insurance demand, reflecting households' preference for current over deferred consumption.[10] Moreover, recent domestic assessments indicate a potential negative relationship, whereby higher interest rates may divert funds away from life insurance premia towards higher yielding investment alternatives (Central Bank of Malta, 2023).[11]

While most variables in the model are expressed in real terms to remove price effects, nominal interest rates were retained. Real interest rates were also considered; however, they proved less informative for the model after 2021, as the post-pandemic surge in inflation and accompanying monetary easing disrupted the long-run cointegration relationship (see Annex). This use of nominal interest rates is also consistent with behavioural evidence suggesting that individuals often exhibit money illusion, a tendency to evaluate their utility based in nominal rather than real monetary values, which influences portfolio allocation and insurance decisions, and has also been observed in stock prices, housing markets, and other economic contexts (Brunnermeier & Julliard, 2008; Miao & Xie, 2013; Li & Wei, 2025).[12,13,14]

The short-run dynamics are modelled using an ECM:

$$\Delta\log\left(GWP_t^{L,\,real}\right) = \alpha + \varnothing_1\Delta\log\left(GWP_{t-1}^{L,\,real}\right) + \varnothing_2\Delta\log\left(GDP_t^{SA,\,real}\right) + \varnothing_3\Delta IR_{t-3} + \varnothing_4\Delta\log\left(Deeds_t^{SA}\right) + \gamma ECT_{t-1} + \mu_t$$

Where:

- $\Delta\log\left(GWP_t^{L,\,real}\right)$ = quarterly change in the log of real-life insurance GWP
- $\Delta\log\left(GDP_t^{SA,\,real}\right)$ = quarterly change in the log of seasonally-adjusted real GDP
- ΔIR_{t-3} = three-quarter lagged change in the short-term interest rate
- $\Delta\log\left(Deeds_t^{SA}\right)$ = quarterly change in the log of seasonally-adjusted property transactions
- ECT_{t-1} = error correction term from the long-run equilibrium relationship
- u_t = error term

The inclusion of property transactions seeks to capture the link between housing market activity and life insurance demand, given that mortgage borrowing typically entails the purchase of life insurance cover. The coefficient γ measures the speed of adjustment toward the long-run equilibrium following short-term deviations. A negative and statistically significant value of γ confirms the existence of a stable long-run relationship, indicating that deviations from the equilibrium are gradually corrected over time.

[7] This figure includes life insurance premia from IL, UL and with-profits contracts, all of which contain investment components (Central Bank of Malta, *Interim Financial Stability Report 2025*, Chapter 4.1).

[8] Outreville, J. F. (1996), Life insurance markets in developing countries. *The Journal of Risk and Insurance*, 63(2), pp. 263-278. https://doi.org/10.2307/253745

[9] Beck, T., & Webb, I. (2003), Economic, demographic, and institutional determinants of life insurance consumption across countries, *The World Bank Economic Review*, 17(1), pp. 51-88. https://doi.org/10.1093/wber/lhg011

[10] Li, D., Moshirian, F., Nguyen, P., & Wee, T. (2007), The demand for life insurance in OECD countries, *The Journal of Risk and Insurance*, 74(3), pp. 637-652. https://doi.org/10.1111/j.1539-6975.2007.00228.x

[11] Central Bank of Malta (2023), *Interim Financial Stability Report 2023*, Central Bank of Malta.

[12] Brunnermeier, M. K. and Julliard, C. (2008), Money illusion and housing frenzies, *The Review of Financial Studies*, 21(1), pp. 135-180. https://doi.org/10.1093/rfs/hhm043

[13] Miao, J. and Xie, D. (2013), Economic growth under money illusion, *Journal of Economic Dynamics and Control*, 37(1), pp. 84-103. https://doi.org/10.1016/j.jedc.2012.06.012

[14] Li, W., & Wei, P. (2025), Optimal life insurance and annuity decisions under money illusion, *Insurance: Mathematics and Economics*, 125, 103141. https://doi.org/10.1016/j.insmatheco.2025.103141

Regression results

The estimation results highlight the interplay between long-run equilibrium factors and short-run dynamics in life insurance demand. In the long-run, life insurance premia exhibit a strong procyclical relationship with real economic activity (see Table 4a). A 1% increase in real GDP is associated with an estimated 0.26% increase in gross written life premia, suggesting that stronger macroeconomic conditions bolster insurance uptake. Conversely, long-term interest rates are negatively associated with life insurance demand, as a one percentage point increase in the ten-year Malta government bond yield is estimated to lower demand by approximately 0.13%. This inverse relationship is consistent with a substitution effect, whereby higher-yields on alternative financial instruments diminish the relative attractiveness of investment-linked insurance products (Hodula et al., 2021). It may also reflect money illusion, as individuals often evaluate returns and make portfolio decisions based on nominal rather than real values (Li & Wei, 2025).

The short-run dynamics, captured by the ECM, indicate persistence in premium growth, with roughly one-third of the previous-quarter's growth carried forward (see Table 4b). Short-term fluctuations are also shaped by macro-financial conditions in a manner consistent with long-run patterns. As

Table 4a
LIFE INSURANCE – LONG-TERM REGRESSION RESULTS

Dependent Variable: $\log(GWP_t^{L,real})$

Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	p-value
Constant	15.801	1.052	15.022	0.000
$\log(GDP_t^{SA,real})$	0.265	0.070	3.811	0.000
IR	-0.131	0.013	-9.758	0.000
R^2	0.728			
$Adjusted - R^2$	0.719			

Source: Author's calculations.

Table 4b
LIFE INSURANCE – ECM RESULTS

Dependent Variable: $\Delta\log(GWP_t^{L,real})$

Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	p-value
Constant	-0.015	0.009	-1.637	0.108
$\Delta\log(GWP_{t-1}^{L,real})$	0.343	0.109	3.149	0.003
$\Delta\log(GDP_t^{SA,real})$	0.924	0.483	1.911	0.061
ΔIR_{-3}	-0.043	0.022	-1.897	0.063
$\Delta\log(Deeds_t^{SA})$	0.167	0.046	3.647	0.001
ECT_{-1}	-0.125	0.043	-2.927	0.005
R^2	0.555			
$Adjusted - R^2$	0.513			

Source: Author's calculations.

expected, real GDP supports demand in the short run. Housing activity emerges as a strong and highly significant driver, underscoring the role of mortgage-related demand for life cover, as a channel linking real estate activity to the insurance sector. Increases in interest rates dampen life insurance uptake with an estimated lag of around three quarters, consistent with the substitution effect observed in the long-run.

The error correction term is negative and statistically significant, confirming the stability of the long-run relationship and indicating convergence towards equilibrium at a rate of roughly 12-13% per quarter.

Non-life insurance

Regression analysis

The long-run relationship between real non-life insurance premia and economic activity is defined as:

$$\log\left(GWP_t^{NL,\,real}\right) = \sigma + \beta_1 \log\left(GDP_t^{SA,\,real}\right) + \varepsilon_t$$

Where:

- $GWP_t^{NL,\,real}$ = real GWP for non-life insurance at time t
- $GDP_t^{SA,\,real}$ = real seasonally-adjusted GDP at time t
- ϵ_t = error term

Similar to the life insurance model, real GDP is included to capture the influence of the business cycle and overall macroeconomic conditions, with stronger economic activity expected to stimulate demand for non-life insurance and thereby support premium growth.

The short-run dynamics are modelled using an ECM:

$$\begin{aligned}\Delta\log\left(GWP_t^{NL,\,real}\right) &= \alpha + \varnothing_1 \Delta\log\left(GWP_{t-2}^{NL,\,real}\right) + \varnothing_2 \Delta\log\left(GDP_t^{SA,\,real}\right) + \varnothing_3 \Delta\log\left(Deeds_t^{SA}\right) \\ &+ \varnothing_4 Dummy_{NL} + \gamma ECT_{t-1} + \mu_t\end{aligned}$$

Where:

- $\Delta\log\left(GWP_t^{NL,\,real}\right)$ = two-quarter lagged change in the log of real non-life insurance GWP
- $\Delta\log\left(GDP_t^{SA,real}\right)$ = quarterly change in the log of seasonally-adjusted real GDP
- $\Delta\log\left(Deeds_t^{SA}\right)$ = quarterly change in the log of seasonally-adjusted property transactions
- $Dummy_{NL}$ = dummy variable capturing firm-specific initiatives (e.g., acquisitions, cross-border expansion)
- ECT_{-1} = error correction term from the long-run equilibrium relationship
- u_t = error term

Property transactions serve as a proxy for housing market dynamics, reflecting the link between real estate activity and insurance demand, particularly since property insurance is typically required as collateral coverage in mortgage lending.

Premium growth in the non-life sector exhibits notable quarterly volatility, often characterised by sudden increases that are then sustained. Upon further examination, these fluctuations were found to stem largely from firm-specific events, such as acquisitions, portfolio transfers, or cross-border expansion, which can significantly affect premium volumes within a given quarter. To account for these idiosyncratic

factors, a dummy variable is included to capture identifiable company-level initiatives that may temporarily distort aggregate premium growth and obscure underlying macroeconomic dynamics.

Regression results

The long-run relationship for the non-life sector is modelled using real GDP as the sole explanatory variable, since it captures the majority of the variation in non-life premia (see Table 4c) and is consistent with the literature, which identifies economic growth as the primary driver of non-life insurance (Christophersen & Jakubik, 2014). The estimated long-run elasticity of 1.24 suggests that a 1% increase in real GDP is associated with a 1.24% rise in non-life premia, indicating a strong procyclical pattern. This responsiveness reflects the close link between non-life insurance and broader economic activity, underpinned by mandatory business lines, such as motor insurance and the prevalence of property-related cover linked to mortgage lending.

The ECM results indicate moderate persistence in premium growth, as indicated by the statistically significant coefficient on the two-quarter lag (see Table 4d). Around one-fourth of the growth observed two quarters earlier is carried forward. Both real GDP and housing market activity, proxied by the number of final deeds of sale, exert positive and statistically significant effects on short-term movements in non-life premia. Additionally, the highly significant coefficient on the dummy variable confirms that firm-specific developments materially affect short-term sectoral dynamics, highlighting the importance of identifying and accounting for such developments.

Table 4c

NON-LIFE INSURANCE – LONG-TERM REGRESSION RESULTS

Dependent Variable: $\log(GWP_t^{NL,real})$

Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	p-value
Constant	0.528	0.405	1.302	0.198
$\log(GDP_t^{SA,real})$	1.236	0.027	45.616	0.000
R^2	0.972			
$Adjusted - R^2$	0.971			

Source: Author's calculations.

Table 4d

NON-LIFE INSURANCE – ECM RESULTS

Dependent Variable: $\Delta\log(GWP_t^{NL,real})$

Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	p-value
Constant	0.003	0.004	0.725	0.472
$\Delta\log(GWP_{t-2}^{NL,real})$	0.261	0.100	2.615	0.012
$\Delta\log(GDP_t^{SA,real})$	0.446	0.193	2.313	0.025
$\Delta\log(Deeds_t^{SA})$	0.040	0.018	2.200	0.032
$Dummy_{NL}$	0.034	0.008	4.446	0.000
ECT_{-1}	-0.078	0.041	-1.904	0.062
R^2	0.471			
$Adjusted - R^2$	0.422			

Source: Author's calculations.

Finally, the error correction term is negative and statistically significant, indicating that deviations from the long-term equilibrium are gradually corrected, with around 8% of any deviation closed each quarter. This adjustment is slower than in the life insurance model, where it averages 12–13% per quarter, which may reflect the more rigid nature of non-life demand, often driven by mandatory coverage, in contrast to the more flexible and discretionary nature of life insurance products.

Conclusion

This study examined the relationship between economic growth and insurance premia in Malta. Employing the Engle-Granger two-step method, the analysis confirms the existence of a stable long-run cointegrating relationship between insurance activity and key macroeconomic variables. The estimated long-run coefficients indicate that the insurance sector is closely linked to overall economic conditions.

Life insurance demand increases with real economic activity but is negatively impacted by nominal interest rates, while in the short-run, it also responds positively to housing market developments. Non-life premia demonstrate a strong long-run responsiveness to macroeconomic fundamentals, whereas short-term movements are influenced by fluctuations in GDP and housing activity, as well as company-specific initiatives.

These findings underscore the importance of macroeconomic stability and housing market dynamics in supporting the growth of the insurance sector. Life insurance is more sensitive to broader financial conditions, whereas non-life insurance is anchored to economic fundamentals, with much of its demand derived from mandatory coverage linked to other activities, such as loans. Continued monitoring of these drivers is essential to assess the resilience and future development of Malta's insurance market.

Future research could build on this study by incorporating additional observations as they become available. With a longer time series, it may also be possible to refine the distinction between domestic and foreign business, potentially using informed assumptions for earlier periods. The analysis could also be expanded to extract the insurance business cycle from the estimated long-run relationship, distinguishing cyclical fluctuations from underlying fundamentals to identify and anticipate turning points in activity. Additionally, panel techniques could be applied to account for firm-specific effects, providing a more nuanced understanding of heterogeneity across insurers.

Annex

STRUCTURAL BREAK ANALYSIS: POST-2021 INFLATION SHOCK

To assess whether the relationship between real interest rates and life insurance GWP changed materially following the post-2021 inflation shock and subsequent monetary policy tightening, the regression framework included a post-2021 dummy variable and its interaction with real interest rates. This tests for structural effects arising from the high inflation period, which was initially characterised by sharply negative real interest rates and later by rapid monetary policy tightening.

The results confirm that higher real interest rates are associated with lower life insurance demand, consistent with substitution effects observed with nominal interest rates. The post-2021 dummy indicates a significant downward shift in GWP, suggesting that the inflation shock and exceptionally low real rates had a material impact on the level of life insurance activity. However, the interaction term between post-2021 and real interest rates is not statistically significant, implying that the responsiveness of life insurance demand to interest rates remained broadly stable. The main adjustment appears to have occurred through a level effect rather than a change in the interest-rate sensitivity of life insurance demand after 2021.

Table A1
LIFE INSURANCE – LONG-RUN COINTEGRATION REGRESSION WITH STRUCTURAL SHIFT

Dependent Variable: $\log(GWP_t^{L,real})$

Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	p-value
$\log(GDP_t^{SA,real})$	0.434	0.226	1.920	0.060
IR_{real}	-0.131	0.039	-3.339	0.002
D_{2021}	-0.293	0.095	-3.085	0.003
$D_{2021} * IR_{real}$	0.074	0.048	1.518	0.135
R^2	0.635			
$Adjusted - R^2$	0.609			

Note: Includes a dummy for 2021 (D_{2021}) and its interaction with real interest rate ($D_{2021} * IR_{real}$) or a level shift in the long-run relationship.

Table A2
LIFE INSURANCE – ECM RESULTS

Dependent Variable: $\Delta\log(\mathrm{GWP}_t^{L,real})$

Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	p-value
Constant	-0.019	0.009	-1.981	0.053
$\Delta\log(GWP_{t-1}^{L,real})$	0.398	0.120	3.327	0.002
$\Delta\log(GDP_t^{SA,real})$	1.165	0.503	2.315	0.025
ΔIR_{-3}	0.196	0.047	4.164	0.000
$\Delta\log(Deeds_t^{SA})$	-0.061	0.022	-2.758	0.008
ECT_{-1}	-0.079	0.040	-2.002	0.050
R^2	0.519			
$Adjusted - R^2$	0.474			