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Article

Depth, Not Size: Rethinking the Insurance–Growth Nexus in Mature OECD Markets

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Abstract

This study examines the relationship between insurance market development and economic growth in 33 OECD countries over the period 2011–2021, with particular emphasis on life insurance markets and structural characteristics. To capture the multidimensional nature of insurance development, the analysis distinguishes between insurance depth (density), size (penetration), and structure (retention and foreign participation). Using a two-way fixed effects panel framework with country and year effects and insurance-market controls, the results reveal a differentiated pattern. Insurance density—both total and life—is positively and statistically significantly associated with GDP per capita, indicating that the intensity of insurance usage remains economically relevant in advanced economies. In contrast, life insurance penetration is negatively associated with economic growth. Life insurance retention is also negatively associated with economic growth, highlighting the role of risk allocation in mature insurance systems. Foreign insurer participation does not exhibit a statistically significant effect. The findings suggest that in OECD countries, the economic contribution of insurance markets depends more on efficiency and structure than on scale.

Keywords: insurance development; economic growth; life insurance; insurance density; insurance penetration; OECD countries

JEL Classification: G22; O40; C23; E44

1. Introduction

Insurance markets play a central role in modern economies by facilitating risk transfer, mobilising long-term savings, and enhancing financial stability. Through these channels, insurance activity can support investment and smooth consumption, thereby contributing to economic growth (Islam *et al*., 2025). Accordingly, the relationship between insurance market development and economic performance has attracted sustained attention within the broader finance–growth literature (Saleh *et al*., 2023; Mitrasević *et al*., 2022). However, empirical findings remain far from uniform, particularly when the focus shifts from emerging economies to advanced, institutionally mature countries. Early empirical studies typically report a positive association between insurance development and economic growth, interpreting insurance expansion as a complementary component of financial deepening alongside banking systems and capital markets (Loubergé and Dionne, 2024; Ward and Zurbruegg, 2000). More recent evidence, however, suggests that this relationship is context-dependent, varying with levels of economic development, institutional quality, and market maturity (Shojaei and Almansour, 2025; Blokhin, 2019). In advanced economies, where financial systems are already well-developed, further expansion of insurance markets may not translate into proportional gains in economic growth. This raises an important question: do conventional indicators of insurance development retain the same economic meaning in mature OECD markets as they do in developing contexts? The OECD setting provides a particularly relevant context to examine this issue. OECD countries are characterised by high insurance penetration,

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sophisticated regulatory frameworks, extensive reinsurance networks, and substantial foreign insurer participation (Dawd and Benlagha, 2023). In such environments, insurance markets are less likely to function primarily as drivers of financial deepening and may instead operate as mechanisms for risk redistribution, capital allocation, and efficiency optimisation (Hu and Wang, 2024). Consequently, different dimensions of insurance market development—such as market depth, relative size, retention, and ownership structure—may exert heterogeneous and potentially offsetting effects on economic growth. Despite this, much of the existing literature continues to rely on aggregate indicators and pooled samples that obscure these distinctions.

Several research gaps follow from this observation. First, insurance density and penetration are frequently used interchangeably as proxies for insurance development, despite capturing conceptually distinct dimensions of insurance activity (Hasan, *et al*., 2025). Density reflects the intensity of insurance usage, whereas penetration measures the relative scale of the sector within the economy. Their joint implications remain insufficiently explored in advanced-economy settings, where their economic effects may diverge. Second, the literature remains heavily focused on total insurance markets, with comparatively limited attention to life insurance (Horvey and Odei-Mensah, 2025), despite its distinct role in long-term savings mobilisation and capital formation. Third, structural characteristics of insurance markets—such as retention ratios and foreign insurer participation—are often overlooked, even though they are central to understanding risk-sharing mechanisms and efficiency in mature systems. Finally, there is limited OECD-focused evidence that simultaneously accounts for market structure and operational characteristics when evaluating the insurance–growth relationship. Against this backdrop, the present study re-examines the relationship between insurance market development and economic growth using a balanced panel of 33 OECD countries over the period 2011–2021. Rather than treating insurance development as a monolithic concept, the analysis distinguishes explicitly between insurance depth, size, and structural characteristics, with particular emphasis on life insurance markets. Methodologically, the study employs a two-way fixed effects panel framework with country and year fixed effects, complemented by insurance-market control variables to isolate within-country dynamics over time. The study is guided by three research questions. First, does insurance market development continue to support economic growth in OECD countries? Second, do different dimensions of insurance development—particularly density versus penetration—exert distinct effects in advanced economies? Third, how do life insurance market structure and risk-sharing mechanisms, including retention and foreign participation, shape the insurance–growth relationship? This paper makes several contributions. It provides OECD-specific evidence on the insurance–growth nexus, addressing a context that remains underexplored relative to emerging markets. It also offers a disaggregated and structurally informed analysis of insurance markets, moving beyond aggregate indicators to incorporate life insurance dynamics, retention, and foreign participation. Additionally, by adopting a controls-augmented fixed effects framework, the study enhances empirical transparency and allows for a more precise assessment of how insurance markets operate within mature financial systems. These contributions help clarify why insurance expansion does not uniformly translate into higher economic growth in advanced economies and provide a more nuanced understanding of the channels through which insurance markets matter

2. Literature Review and Hypothesis Development

2.1. Theoretical Foundations

The relationship between insurance markets and economic growth is commonly framed within theories of financial intermediation and risk management. Insurance institutions contribute to economic performance by reducing uncertainty, facilitating risk pooling, and enabling households and firms to undertake higher-return but riskier activities (Gbadebo, 2024). By transferring idiosyncratic and systemic risks away from economic agents, insurance markets support capital accumulation and long-term planning, thereby complementing banking systems and capital markets.

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From the perspective of endogenous growth theory, financial institutions enhance economic growth by mobilising savings, improving capital allocation, and supporting productivity-enhancing investment (Michael and Izedomi, 2025). Within this framework, insurance plays a distinct role by managing non-financial risks that are not efficiently absorbed by traditional financial intermediaries. Life insurance, in particular, is associated with long-term savings mobilisation and the channelling of contractual funds into capital markets and infrastructure investment (Emara *et al*., 2025). At the same time, theoretical contributions emphasise that the benefits of financial deepening may not increase indefinitely. As financial systems mature, additional expansion can introduce complexity, agency problems, and potential misallocation of resources, thereby weakening the finance–growth relationship (Arcand *et al*., 2015). This perspective is particularly relevant in advanced economies, where insurance markets are already highly developed and institutionally sophisticated.

2.2. Insurance Market Development in Advanced Economies: Empirical Evidence

Empirical research on the insurance–growth nexus provides mixed evidence (Islam *et al*., 2025; Lee *et al*., 2016). Early cross-country studies generally report a positive relationship between insurance development and economic growth, interpreting insurance expansion as a driver of financial deepening (Han *et al*., 2010; Haiss and Sümegi, 2008). However, these studies typically pool developed and developing economies, implicitly assuming homogeneous effects across institutional contexts. More recent evidence challenges this assumption. Systematic reviews indicate that the positive association between insurance activity and economic growth is stronger in emerging and developing economies than in high-income countries (Horvey and Odei-Mensah, 2025, Singhal *et al*., 2022). In OECD economies, several studies document weaker or context-dependent relationships, suggesting that insurance markets may play a different role once a high level of financial maturity is reached (Dawd and Benlagha, 2023; Apergis and Poufinas, 2020; Ward and Zurbruegg, 2000). A key limitation of the existing empirical literature is its reliance on single indicators—most commonly insurance penetration—as proxies for insurance development. In advanced economies, penetration ratios may reflect demographic ageing, regulatory structures, or slow GDP growth rather than genuine improvements in insurance usage or efficiency (Haward, 2024; Arena, 2008). Consequently, conventional measures may not adequately capture the channels through which insurance markets affect economic growth in mature systems.

2.3. Insurance Density and Economic Growth

Insurance density, measured as premiums per capita, reflects the intensity of insurance usage within an economy. Unlike penetration, density is less sensitive to fluctuations in aggregate GDP and therefore provides a more direct indication of how extensively households and firms utilise insurance services (Emara *et al*., 2025). Higher insurance density is theoretically associated with improved risk management, broader financial inclusion, and enhanced economic stability (Yap *et al*., 2024). Empirical evidence generally supports a positive relationship between insurance density and economic growth, particularly in contexts where insurance markets are expanding or becoming more sophisticated (Arena, 2008; Fernando *et al*., 2023). Even in advanced economies, increases in insurance usage may reflect qualitative improvements in coverage, product design, and risk diversification rather than simple expansion in market size (Outreville, 2013). This suggests that insurance density can remain economically meaningful in mature systems. Accordingly, the first hypothesis focuses on the depth of insurance usage:

H1: *Higher total insurance density is positively associated with economic growth.*

Given the specific role of life insurance in mobilising long-term savings and supporting capital formation, the depth of life insurance usage may exert a distinct influence on economic outcomes (Hu and Wang, 2024; Chen *et al*., 2012). Life insurance density captures the extent to which households

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engage in long-term financial planning and intertemporal consumption smoothing. Therefore, the second hypothesis is proposed as follows:

H2: *Higher life insurance density is positively associated with economic growth.*

2.4. Insurance Penetration, Market Maturity, and Diminishing Returns

Insurance penetration, defined as premiums relative to GDP, measures the size of the insurance sector in relation to the overall economy. While widely used, its interpretation in advanced economies is less straightforward. In mature markets, high penetration ratios may reflect demographic structures, regulatory requirements, or relatively slow GDP growth rather than efficiency-enhancing expansion of insurance services (Haward, 2024). This concern is particularly relevant for life insurance, where demand is strongly influenced by ageing populations, pension systems, and long-term savings behaviour. From a theoretical perspective, once insurance markets reach a high level of development, further expansion may generate administrative complexity, regulatory burdens, or allocative inefficiencies, reducing its marginal contribution to economic growth (Magbondé *et al*., 2025; Shojaei, 2024). In life insurance markets, this effect may be reinforced by long-term liabilities and conservative investment strategies that limit productive capital allocation (Haiss & Sümegi, 2008; Chen *et al*., 2012). Empirical evidence also suggests that the growth effects of life insurance weaken as markets mature (Arena, 2008). While some studies interpret this pattern as diminishing returns (Arcand *et al*., 2015), it does not necessarily imply a formally nonlinear relationship, but rather a context-dependent effect. Based on this reasoning, the following hypothesis is proposed:

H3: *Higher life insurance penetration is negatively associated with economic growth in OECD countries.*

2.5. Life Insurance Market Structure and Risk-Sharing Mechanisms

Beyond market size and usage intensity, the structural configuration of life insurance markets plays a critical role in shaping their contribution to economic growth. Life insurance contracts are inherently long-term, exposing insurers to longevity, interest rate, and systemic risks that are typically managed through reinsurance and international risk-sharing arrangements (Meier and Outreville, 2010). Structural indicators such as the retention ratio and foreign insurer participation are therefore central to understanding how life insurance markets function in advanced economies. The life insurance retention ratio, defined as the share of premiums retained domestically rather than ceded to reinsurers, reflects the extent to which risk is diversified internationally. In advanced economies with well-developed reinsurance markets, lower retention may enhance capital efficiency and financial resilience by spreading long-term risks across global markets. Conversely, higher retention may increase exposure to concentrated risks, although this may also reflect factors such as domestic reinsurance capacity, regulatory frameworks, or market preferences (Balbás *et al*., 2013). Despite its theoretical relevance, retention has received limited empirical attention in the insurance–growth literature. In mature life insurance systems, higher retention may be associated with structural constraints or institutional arrangements that influence risk allocation, rather than purely reflecting productive capacity (Wang *et al*., 2025). Given these considerations, the following hypothesis is proposed:

H4: *Higher life insurance retention is negatively associated with economic growth.*

Another important structural dimension is foreign insurer participation. Life insurance relies heavily on actuarial expertise, asset–liability management, and long-term investment strategies. Foreign insurers may enhance efficiency through technology transfer, improved governance, and increased competition (Huang *et al*., 2012; Srbinoski *et al*., 2024). However, in OECD markets, where domestic insurers already operate under advanced regulatory and supervisory frameworks (Rahma *et al*., 2025), the marginal impact of foreign participation may be limited. Accordingly, while

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theoretical arguments suggest a positive effect, the empirical impact of foreign participation in mature markets remains uncertain. The hypothesis is therefore formulated as:

H5: *Higher foreign insurers' market share in life insurance is positively associated with economic growth.*

3. Data and Methodology

3.1. Data

The empirical analysis is based on a balanced panel dataset covering 33 OECD countries over the period 2011–2021. All insurance market data and macroeconomic indicators are obtained from publicly available international databases, ensuring transparency and replicability (OECD, 2024; World Bank, 2024). Appendix A reports the list of countries included in the analysis. The sample period is primarily determined by data availability and consistency across insurance indicators. While OECD data extend further back in time, several key variables—particularly those related to life insurance structure such as retention and foreign participation—are not consistently available prior to 2011 for all countries. Restricting the sample to 2011–2021 ensures a balanced panel and avoids biases associated with missing observations. Countries with incomplete data for core variables are excluded, which may limit generalisability but improves internal consistency. All variables are measured at the country–year level. The analysis distinguishes between total insurance markets and life insurance markets, with particular emphasis on life insurance due to its role in long-term savings mobilisation and risk management in advanced economies.

3.2. Variable Definitions and Measurement

Economic growth is proxied by GDP per capita, expressed in natural logarithms. This transformation reduces skewness and allows for elasticity-based interpretation of estimated coefficients (Matusiewicz, 2025). Insurance market development is captured along multiple dimensions. Insurance density, measured as premiums per capita, reflects the intensity of insurance usage. Insurance penetration, defined as premiums relative to GDP, captures the size of the insurance sector in relation to the overall economy. For life insurance markets, two structural variables are incorporated. The retention ratio measures the proportion of life insurance premiums retained domestically rather than ceded to reinsurers and serves as an indicator of international risk-sharing. Foreign insurers' market share reflects the extent of foreign participation in domestic life insurance markets. To address within-market characteristics, the controlled specifications include explicit insurance-market control variables. These consist of: (i) the claims ratio, defined as total claims relative to premiums, capturing underwriting performance; (ii) the expense ratio, defined as operating expenses relative to premiums, capturing cost efficiency; and (iii) insurer total assets, capturing market scale and balance-sheet capacity. All control variables are obtained from OECD insurance statistics and are lagged by one period to mitigate simultaneity. All scale variables are transformed using natural logarithms. Where zero values may arise, the transformation ln(1 + x) is applied. Ratio variables, including penetration, retention, and foreign participation, are kept in levels. Because the ln(1 + x) transformation approximates ln(x) for larger values but deviates at lower values, particularly for penetration, coefficient interpretations should be understood as semi-elasticities rather than exact elasticities. The econometric analyses are conducted using R (version 4.3.2).

3.3. Econometric Model Specification

The relationship between insurance market development and economic growth is estimated using a two-way fixed effects panel regression model, which exploits within-country variation over time while controlling for unobserved heterogeneity. The baseline specification is given by:

$$\ln(\text{GDPpc}_{it}) = \alpha + \beta\, \text{Insurance}_{i,t-1} + \mu_i + \lambda_t + \varepsilon_{it} \qquad (1)$$

where $\ln(GDPpc_{it})$ denotes the natural logarithm of GDP per capita in country i and year t; $\text{Insurance}_{i,t-1}$ represents the relevant insurance market indicator lagged by one year; μ_i captures

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country fixed effects; λ_t captures year fixed effects; and $\varepsilon_{it}$is the error term. To account for within-market characteristics, the model is extended as follows:

$$\ln(\text{GDPpc}_{it}) = \alpha + \beta\,\text{Insurance}_{i,t-1} + \gamma X_{i,t-1} + \mu_i + \lambda_t + \varepsilon_{it} \quad (2)$$

where $X_{i,t-1}$ denotes a vector of insurance-market control variables, including claims ratio, expense ratio, and insurer total assets. Country fixed effects control for time-invariant characteristics such as institutional quality, regulatory frameworks, and structural economic differences. Year fixed effects capture common shocks affecting all countries, including global financial conditions and macroeconomic cycles. Standard errors are clustered at the country level to account for heteroskedasticity and serial correlation. To address potential identification concerns associated with including both density and penetration measures, additional specifications are estimated in which these variables enter separately. This allows the analysis to assess whether estimated effects are robust to alternative model structures.

3.4. Identification Strategy and Endogeneity Considerations

A central empirical concern in assessing the insurance–growth relationship is reverse causality, as higher income levels may stimulate demand for insurance products (Chang *et al.*, 2014). To mitigate this concern, all insurance variables and insurance-market controls are lagged by one year, ensuring that insurance market conditions precede observed economic outcomes. While lagging reduces contemporaneous simultaneity, it does not fully eliminate endogeneity. Additional specifications using lagged differences were therefore estimated and yield consistent results. The two-way fixed effects framework further mitigates omitted variable bias by absorbing unobserved country-specific characteristics and common time shocks. Although system-GMM estimators are frequently used in the finance–growth literature (Roodman, 2009), their application in this context is constrained by the relatively short time dimension (T = 11), which may lead to instrument proliferation and weak identification. For this reason, the analysis relies on fixed-effects estimation with clustered standard errors, complemented by sensitivity checks, to provide robust inference. Accordingly, the identification strategy is based on within-country temporal variation, combined with explicit insurance-market controls and alternative specifications, allowing for a focused examination of how insurance markets operate in mature OECD economies.

4. Empirical Results and Robustness Analysis

4.1. Descriptive Statistics and Correlation Matrix

Table 1 presents descriptive statistics for the variables used in the empirical analysis. GDP per capita is expressed in logarithmic form, while insurance density and penetration variables are transformed using ln(1 + x). In contrast, life insurance retention and foreign insurers' market share are reported in percentage terms. This distinction is important for interpretation, as the latter variables are not log-transformed. The mean value of $\ln(\text{GDP}_{pc})$ is 10.62, with a standard deviation of 0.42, indicating moderate income dispersion across OECD countries. Insurance density measures exhibit substantial variation, with total insurance density (mean = 7.98; standard deviation = 0.81) and life insurance density (mean = 7.21; standard deviation = 0.97) showing considerable cross-country heterogeneity. Life insurance penetration displays a lower dispersion (mean = 1.34; standard deviation = 0.46), consistent with the generally mature nature of OECD insurance markets. Structural indicators also vary meaningfully. The average life insurance retention ratio is 82.7%, ranging from 55.3% to 96.8%, reflecting differences in reliance on international reinsurance. Foreign insurers' market share averages 31.4%, with substantial variation across countries.

Table 1. Descriptive statistics.

Variable	Mean	Std. Dev.	Min	Max
$\ln(\text{GDP}_{pc})$	10.62	0.42	9.54	11.43

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ln(1 + Total insurance density)	7.98	0.81	6.12	9.42
ln(1 + Life insurance density)	7.21	0.97	5.04	9.01
ln(1 + Life insurance penetration)	1.34	0.46	0.21	2.58
Life insurance retention (%)	82.7	9.6	55.3	96.8
Foreign insurers' share (life, %)	31.4	18.9	2.1	78.6

Table 2 reports the correlation matrix. Pairwise correlations range from −0.31 to 0.76 and remain below the conventional multicollinearity threshold of 0.80 (Ayadi *et al.*, 2025; Shojaei, 2023). The highest correlation (0.76) occurs between total and life insurance density. Importantly, these variables are not included simultaneously in the same regression specifications, reducing concerns about collinearity. Consistent with this, variance inflation factors (VIFs) are below conventional thresholds (all < 5), confirming that multicollinearity is unlikely to bias the regression estimates.

Table 2. Correlation matrix.

Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
(1) ln(GDP_{pc})	1.00					
(2) ln(1 + Total insurance density)	0.42	1.00				
(3) ln(1 + Life insurance density)	0.39	0.76	1.00			
(4) ln(1 + Life insurance penetration)	-0.31	0.55	0.61	1.00		
(5) Life insurance retention	-0.28	-0.12	-0.18	0.22	1.00	
(6) Foreign insurers' market share (life)	0.04	0.10	0.07	-0.05	-0.09	1.00

4.2. Baseline Regression Results

Table 3 reports the fixed-effects regression results, presenting both baseline and control-augmented specifications. Column (1) includes total insurance density without additional controls, while Column (2) incorporates insurance-market control variables. Total insurance density is positively and statistically significant across both specifications ($\beta = 0.038$ and 0.034, respectively, $p < 0.01$), providing consistent support for H1. The stability of the coefficient across Columns (1) and (2) indicates that the relationship is not driven by omitted within-market characteristics. The coefficient should be interpreted as a semi-elasticity due to the ln(1 + x) transformation. For the observed range of values, the transformation closely approximates a logarithmic form, although the interpretation is less precise at lower values.

4.3. Life Insurance Market Decomposition

Column (3) introduces life insurance–specific variables, allowing for a decomposition of insurance effects across different dimensions. Life insurance density remains positively and statistically significant ($\beta = 0.091$, $p < 0.01$), supporting H2 and reinforcing the role of life insurance in long-term savings mobilisation and capital formation. In contrast, life insurance penetration enters with a negative and statistically significant coefficient ($\beta = -0.252$, $p < 0.01$), supporting H3. However, this result requires careful interpretation. Because penetration is defined relative to GDP, it may partially capture inverse variation linked to the dependent variable. In addition, life insurance density and penetration are moderately correlated ($r = 0.61$), raising potential concerns regarding joint inclusion. To address these issues, Columns (4) and (5) report specifications in which density and penetration are entered separately. When life insurance density is included alone (Column 4), the positive effect remains robust ($\beta = 0.084$, $p < 0.01$). When penetration is included without density (Column 5), the coefficient remains negative and statistically significant ($\beta = -0.187$, $p < 0.05$), although its magnitude decreases. This indicates that the negative relationship is not purely mechanical but partly reflects underlying economic patterns in mature markets. Variance inflation factors remain

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below conventional thresholds (all < 5), confirming that multicollinearity does not drive the results. Life insurance retention is consistently negative and statistically significant across all specifications ($\beta \approx -0.0015$, $p < 0.01$), supporting H4. This suggests that higher domestic retention is associated with lower economic growth. However, this relationship should not be interpreted solely as inefficiency. Retention may also reflect domestic reinsurance capacity, regulatory structures, or market preferences that are not directly observable in the model.

4.4. Foreign Insurer Participation

Foreign insurer participation is included to capture the role of market openness and competitive dynamics. Across all specifications, the coefficient remains positive but statistically insignificant ($\beta \approx 0.0001$, $p > 0.10$), leading to the rejection of H5. Given the small magnitude of the coefficient and the associated standard error (≈ 0.0004), the model has limited power to detect economically small effects. Therefore, this result should be interpreted as inconclusive rather than definitive evidence of no impact. In mature OECD markets, where institutional quality and regulatory standards are already high, the marginal contribution of foreign participation may be attenuated.

4.5. Robustness and Sensitivity Checks

Columns (4) and (5) provide specification-based robustness checks addressing the potential identification issue associated with jointly including density and penetration. The persistence of coefficient signs and statistical significance across these models confirms that the main findings are not driven by model specification. In addition, re-estimating the models without control variables (Column 1) yields consistent results, and alternative lag structures produce similar coefficient patterns. Excluding the pandemic period also does not materially affect the results.

Table 3. Fixed-effects regression results.

Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
ln(1 + Total insurance density)	0.038*** (0.011)	0.034*** (0.012)	—	—	—
ln(1 + Life insurance density)	—	—	0.091*** (0.019)	0.084*** (0.021)	—
ln(1 + Life insurance penetration)	—	—	-0.252*** (0.076)	—	-0.187** (0.082)
Life insurance retention (%)	—	—	-0.0015*** (0.0004)	-0.0014*** (0.0004)	-0.0013*** (0.0004)
Foreign insurers' share (%)	—	—	0.0001 (0.0004)	0.0002 (0.0004)	0.0001 (0.0004)
Claims ratio	—	0.012 (0.009)	0.010 (0.009)	0.011 (0.009)	0.010 (0.009)
Expense ratio	—	-0.008 (0.010)	-0.007 (0.010)	-0.007 (0.010)	-0.006 (0.010)
Insurer total assets	—	0.021** (0.010)	0.018** (0.009)	0.019** (0.009)	0.018** (0.009)
Constant	8.214***	7.982***	8.105***	8.077***	8.121***
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

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Observations	363	363	363	363	363
Countries	33	33	33	33	33
R^2 (within)	0.41	0.46	0.52	0.50	0.48

Notes: *Clustered standard errors (country level) in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.*

5. Discussion

The results indicate that insurance markets remain economically relevant in advanced economies; however, their contribution depends critically on how insurance development is measured. The positive and statistically significant association between total insurance density and GDP per capita is consistent with recent findings suggesting that density captures qualitative improvements in insurance usage, including more effective risk management and broader coverage, rather than simple market expansion in mature economies (Islam *et al.*, 2025; Dawd and Benlagha, 2023). In OECD countries, higher insurance density likely reflects more intensive utilisation of insurance services by households and firms, contributing to income stability and investment resilience. Given the ln(1 + x) transformation, the estimated coefficient should be interpreted as an approximate semi-elasticity; nevertheless, the results indicate that increases in insurance usage per capita are associated with higher levels of economic growth after controlling for market structure and fixed effects. Disaggregating the analysis to life insurance markets reveals a more differentiated pattern. Life insurance density is positively and statistically significant, consistent with the theoretical role of life insurance in mobilising long-term savings and supporting capital formation (Emara *et al.*, 2025; Hu and Wang, 2024). In advanced economies, this effect is likely to operate through efficiency and asset allocation channels rather than through financial inclusion, supporting the view that the growth contribution of insurance in high-income countries depends more on quality than on scale. In contrast, life insurance penetration is negatively associated with economic growth. This result should be interpreted with caution. First, penetration is defined as premiums relative to GDP, and therefore mechanically incorporates the dependent variable in its construction. Second, when included alongside density measures, part of the estimated effect may reflect this denominator relationship rather than purely economic behaviour. Although additional specifications indicate that the negative coefficient persists when penetration is entered separately, its magnitude declines, suggesting that the relationship is not entirely mechanical but should not be interpreted as definitive evidence of adverse effects. More broadly, the result is consistent with the view that in mature economies, higher penetration may reflect structural characteristics—such as demographic ageing, regulatory frameworks, or slower GDP growth—rather than productivity-enhancing expansion (Haward, 2024; Magbondé *et al.*, 2025). While this pattern is often interpreted as indicative of diminishing returns, the present analysis does not formally test nonlinearities, and the findings should therefore be understood as context-specific rather than structural.

The negative and statistically significant association between life insurance retention and GDP per capita highlights the role of risk allocation in mature insurance systems. In OECD countries with access to global reinsurance markets, lower retention may be associated with broader international risk-sharing and improved capital efficiency (Balbás *et al.*, 2013; Meier and Outreville, 2010). However, this relationship should not be interpreted exclusively as evidence of inefficiency. Higher retention may also reflect domestic reinsurance capacity, regulatory preferences, or market structure, which are not directly observed in the model (Wang *et al.*, 2025). Accordingly, the result should be viewed as indicative of differences in risk allocation rather than a definitive assessment of market performance. Finally, the absence of a statistically significant effect of foreign insurer participation suggests that foreign ownership does not exert a measurable independent influence on economic growth in OECD life insurance markets. While foreign insurers are often associated with technology transfer and governance improvements, these benefits may already be internalised in highly regulated and institutionally mature systems (Huang *et al.*, 2012; Rahma *et al.*, 2025). In addition, the estimated standard errors indicate limited statistical power to detect small effects. This finding is

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therefore more appropriately interpreted as inconclusive rather than as evidence of no impact, consistent with recent OECD-focused studies (Dawd and Benlagha, 2023; Srbinoski *et al.*, 2024).

6. Conclusions

This study examines the relationship between insurance market development and economic growth in 33 OECD countries over the period 2011–2021, with particular emphasis on life insurance markets and structural characteristics. Using a two-way fixed effects framework with insurance-market controls, the analysis yields several key findings. First, insurance depth, measured by density, is positively and statistically significantly associated with economic growth. Both total insurance density and life insurance density remain economically relevant in advanced economies, suggesting that the intensity of insurance usage—rather than its aggregate scale—continues to support financial stability and capital allocation. Second, insurance size, captured by life insurance penetration, is negatively associated with economic growth. While the negative coefficient is consistent with patterns often interpreted as diminishing returns in mature markets, the present analysis does not formally test nonlinearities, and the finding should therefore be understood as context-specific rather than structural. Third, structural characteristics of life insurance markets play an important role. Higher domestic retention is associated with lower levels of economic growth, indicating that differences in risk allocation may matter in advanced insurance systems. However, this relationship does not imply inefficiency per se, as retention levels may also reflect domestic reinsurance capacity, regulatory frameworks, or market preferences. Finally, foreign insurer participation does not exhibit a statistically significant effect on economic growth once market structure and fixed effects are accounted for. From a policy perspective, the findings suggest that in OECD countries, strategies aimed at expanding insurance markets in terms of size may yield limited benefits. Greater economic gains are more likely to arise from improving the efficiency, sophistication, and allocation of risk within insurance systems. Policies that support effective reinsurance usage, sound asset–liability management, and high-quality insurance provision appear more consistent with long-term economic growth than further increases in penetration ratios. This study is subject to several limitations. The analysis is conducted at the aggregate market level and does not capture firm-level heterogeneity in underwriting behaviour, investment strategies, or governance structures. In addition, although lagged variables and fixed effects mitigate endogeneity concerns, causal interpretation remains constrained by data limitations. Future research could extend this framework by incorporating firm-level data, explicitly testing nonlinear relationships, or examining the interaction between insurance markets and demographic dynamics in ageing OECD economies. The study contributes to the literature by demonstrating that in advanced economies, the economic role of insurance markets is nuanced and depends critically on how insurance development is measured. By distinguishing between depth, size, and structure, the paper provides a more refined understanding of how insurance markets influence economic growth beyond simple expansion narratives.

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Appendix A: Selected OECD Country List

Table A1: OECD Countries Included in the Sample (2011–2021)

Country

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Australia	Belgium	Chile
Colombia	Costa Rica	Czech Republic
Denmark	Finland	France
Germany	Greece	Hungary
Iceland	Ireland	Italy
Japan	Korea	Latvia
Lithuania	Luxembourg	Mexico
Netherlands	Norway	Poland
Portugal	Slovak Republic	Slovenia
Spain	Sweden	Switzerland
Türkiye	United Kingdom	United States