“Life insurance demand in OECD economies: New insights into economic, demographic, and social drivers”

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LIFE INSURANCE DEMAND IN OECD ECONOMIES: NEW INSIGHTS INTO ECONOMIC, DEMOGRAPHIC, AND SOCIAL DRIVERS

Abstract

This study investigates the determinants influencing life insurance demand across 38 OECD countries over the period 2009 to 2022, with the data sourced from OECD Insurance Statistics, the World Bank, and the World Development Indicators (WDI). The purpose is to identify and analyze the determinants that shape life insurance penetration (premiums as a percentage of GDP) and density (premiums per capita), providing a comprehensive understanding of market dynamics. Using panel data, the study employs a dynamic regression model with Panel-Corrected Standard Errors (PCSE) to ensure accuracy and reliability, complemented by Pooled Ordinary Least Squares (OLS) for robustness. The findings indicate that economic, demographic, and social factors significantly impact life insurance demand. GDP per capita, poverty rates, and healthcare expenditure to GDP significantly stimulate life insurance demand. Life expectancy positively correlates with insurance penetration, whereas a higher dependency ratio adversely affects it. In contrast, inflation and education expenditure to GDP are found to reduce demand. However, urbanization is found to have no significant influence. The study provides actionable insights for policymakers to design strategies that safeguard consumer interests while promoting market expansion. Furthermore, OECD countries stand out as appealing investment destinations within the stable insurance sector. These findings highlight opportunities for insurance companies to adapt offerings to evolving consumer needs, boosting competitiveness and profitability.

Keywords life insurance demand, insurance penetration, insurance density, economic, demographic, social factors, OECD countries

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INTRODUCTION

Insurance has been a fundamental component of societal organization for centuries, evolving into sophisticated systems to address financial risks (Gârbo, 2016). By pooling contributions, insurance provides compensation for losses arising from accidents, disasters, and other unforeseen events. Among its forms, life insurance safeguards the most valuable asset, "Human Life," by providing financial protection during uncertain times, promoting savings, and offering security for individuals and their families (Yadav & Tiwari, 2012). It also reduces the financial burden by covering insured individuals and encouraging more responsible financial behaviors (Mapharing et al., 2015). A well-developed insurance industry supports economic development by mobilizing long-term funds for infrastructure development, allowing firms to sustain production despite unforeseen events (Srinivasan & Mitra, 2024). Life insurance contributes significantly to the sustainability of economies by safeguarding governments and consumers from financial liabilities (Segodi & Sibindi, 2022).

Globally, the demand for life insurance has increased substantially over recent decades, yet this growth exhibits significant disparities across countries and regions (Zerriaa & Noubbigh, 2016). For instance, between 2005 and 2017, average life insurance density reached USD 4,369 in the UK, compared with USD 1,575 in the Netherlands and USD 993 in Finland, but in OECD countries, which share similar levels of economic development, life insurance density varies widely (Dragotă et al., 2022). These trends highlight both the continuing importance of life insurance and the uneven distribution of demand across high-income economies. The life insurance industry is expected to face increasing pressure in the coming years, with heightened sensitivity to macroeconomic conditions. Moreover, demographic and social characteristics also critically influence the evolution of the life insurance industry across different economies. Previous studies on OECD countries by Li et al. (2007) and Srinivasan and Mitra (2024) focus on socio-economic and demographic variables but rely solely on life insurance density. While insurance density captures individual consumption behavior, it fails to reflect the broader macroeconomic role of the life insurance sector. In contrast, insurance penetration, defined as life insurance premiums as a percentage of GDP, provides a complementary perspective by capturing the sector's overall economic significance. This limitation offers an opportunity to examine a more comprehensive set of determinants by integrating economic, social, and demographic factors and employing a broader indicator to evaluate the role of life insurance in overall economic development.

1. LITERATURE REVIEW AND HYPOTHESES

Life insurance is a combination of savings and insurance that provides protection and a savings vehicle. It offers financial security by mitigating the potential loss and hardship for an individual's family or business in the event of their premature death (Cohen & Sebstad, 2005). Ward and Zurbruegg (2000) confirm that life insurance markets contribute positively to economic growth by facilitating long-term savings, supporting investments, and enhancing financial stability. Beck and Webb (2003) emphasize the significant role of life insurance in the broader economic landscape and its vital role in national and economic welfare as well as in individual well-being by protecting from damage in the event of any type of unwanted circumstances.

Several theoretical models have been developed to explain the demand for life insurance, highlighting the economic, demographic, and behavioral factors that shape individual decision-making. The life-cycle hypothesis, proposed by Ando and Modigliani (1963) and further extended by Yaari (1965), is one of the earliest and most influential models. This framework posits that individuals aim to smooth consumption over their lifetime by relying on savings and insurance to offset income fluctuations during their youth, working years, and retirement. Yaari's model identifies key determinants of life insurance demand, including wealth, expected lifetime income, interest rates, policy costs, and the subjective discount rate that individuals apply to future consumption (Kjosevski, 2012). By providing an annual income stream, life insurance enhances financial security and overall utility, making it an essential tool for long-term economic stability (Zerriaa et al., 2017).

Building on this, Lewis (1989) introduced an important refinement by incorporating the preferences of beneficiaries into the decision-making process. Unlike Yaari's model, which centers on the policyholder's financial goals, Lewis (1989) argues that life insurance demand is driven by the needs of dependents. This approach shifted the focus to survivors' utility, highlighting the critical role of dependents' needs in shaping insurance decisions (Kjosevski, 2012). Demographic transition theory further illuminates life insurance demand by showing how shifts in population age, urban-industrial societies, and longer life expectancy systematically influence household risk exposure and precautionary behavior (Dyson, 2011; Eggleston & Fuchs, 2012). Another foundational theory, Friedman's (1957) permanent income hypothesis, provides insights into how long-term income expectations influence life insurance demand. According to this theory, individuals base their financial decisions not on current income alone but on projected lifetime earnings or "permanent income." Life insurance, therefore, serves

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as a tool to protect future consumption and ensure financial security for dependents in the event of an untimely death (Zerriaa & Noubbigh, 2016).

In addition to income-related theories, risk-aversion models by Smith (1968) and Mossin (1968) offer a behavioral perspective on life insurance demand. These models suggest that individuals with higher levels of risk aversion are more likely to purchase insurance to mitigate potential financial losses. Smith (1968) emphasizes the cost-benefit analysis that policyholders undertake to determine the optimal level of coverage, considering premiums, potential losses, and risk preferences. Consistent with this view, expected utility theory argues that risk-averse individuals purchase insurance to convert uncertain and potentially large losses into smaller, certain costs, thereby increasing welfare under diminishing marginal utility of wealth (Nyman, 2001). Mossin (1968) expands on this by identifying how rational individuals maximize their expected utility through insurance purchases, balancing costs against the perceived value of risk reduction. Later, Szpiro and Outreville (1988) link risk aversion to education levels, arguing that higher education enhances individuals' awareness of risks and the benefits of life insurance. Browne and Kim (1993) and Browne et al. (2000) corroborate this, finding that education increases both risk aversion and the likelihood of purchasing life insurance.

Furthermore, the theory of insurance demand proposes that the decision to purchase insurance is influenced by various factors (Showers & Shotick, 1994). Hwang and Gao (2003) examined the factors driving life insurance demand, emphasizing how economic reforms, rising education levels, and changes in social structure contribute to this growth. Mapharing et al. (2015) identified education, social security, interest rates, and financial development as factors with a long-term equilibrium relationship with life insurance demand. Additionally, Alhassan and Biekpe (2016) analyzed 31 African countries and found that higher income, dependency ratios, and life expectancy suppressed life insurance consumption, while health expenditure and institutional quality boosted demand. Zerriaa et al. (2017) explored the dynamics of life insurance demand in Tunisia from 1990 to 2014. Their findings underscored that demand is bolstered by sociodemographic factors like life expectancy and urbanization, as well as by increasing income and financial development.

Moreover, Li et al. (2007) analyzed cross-sectional data spanning 1993 to 2000 across 30 OECD countries, focusing on life insurance density. Their study revealed that a variety of characteristics, including life expectancy, educational attainment, number of dependents, and social security spending, affect consumption. Similarly, Srinivasan and Mitra (2024) used insurance density as a proxy to look at life insurance consumption in 30 OECD nations between 1996 and 2020. The study emphasized that life expectancy, GDP per capita, school education levels, urbanization rates, and health expenditures are important factors that affect life insurance demand. Following the existing literature (Beck & Webb, 2003; Mapharing et al., 2015; Alhassan & Biekpe, 2016; Hasan et al., 2025c), this study investigates the most significant social, economic, and demographic factors named GDP per capita, inflation, dependency ratio, life expectancy, urbanization rate, education spending to GDP and health expenditure to GDP and introduce one supplementary variables poverty rate to offer a comprehensive perspective on the factors influencing life insurance demand in OECD.

Inflation rates are expected to negatively impact the demand for life insurance policies due to the associated monetary instability, which reduces the expected returns on investment products like savings plans (Satrovıc & Muslıja, 2018). Lenten and Rulli (2006), Li et al. (2007), and Ward and Zurbruegg (2002) have found a negative correlation between inflation and life insurance demand. Conversely, Hasan et al. (2025c) report a positive influence of inflation on demand. Meanwhile, Outreville (2015) and Zerriaa et al. (2017) suggest that inflation does not have a statistically significant effect on life insurance demand. Similarly, GDP per capita is a key economic factor influencing life insurance demand, as higher income levels enable individuals to afford premiums and increase their need for financial protection and planning (Kjosevski, 2012). Lewis (1989), Browne and Kim (1993), Beck and Webb (2002), and Srinivasan and Mitra (2024) have consistently shown a significant positive correlation between GDP per capita and life insurance demand. Additionally, Segodi and

Sibindi (2022) observed a negative relationship between GDP per capita and life insurance demand.

As countries develop and poverty rates decrease, the demand for life insurance tends to rise. Beck and Webb (2003) find an inverse relationship between poverty rates and life insurance demand. This relationship is attributed to the limited financial resources of individuals living in poverty, who prioritize immediate needs over long-term financial planning and insurance. Conversely, in emerging economies, it is driven by government initiatives and the availability of micro-insurance offerings, even in high-poverty contexts (Hwang & Gao, 2003). Dragos (2014) highlighted that in some developing regions of Europe and Asia, targeted efforts to make insurance accessible to economically disadvantaged populations can significantly boost life insurance demand, as individuals seek financial security and protection for their future. Another important demographic factor is the dependency ratio, which reflects the number of people dependent on the primary income earner in a household. Browne and Kim (1993) and Zerriaa et al. (2017) found that the dependency ratio is statistically significant and positively correlated with life insurance demand. Lewis (1989) also found that the demand for life insurance increases with the number of dependents in a household. Increased dependency often leads to greater demand for life insurance, as individuals seek to ensure that dependents receive financial support in such circumstances (Zerriaa et al., 2017).

Economies with a significant urban population are expected to exhibit higher awareness and income levels, facilitating the ability to purchase life insurance products. which in turn increases life insurance consumption (Outreville, 2015; Beck & Webb, 2003; Zerriaa et al., 2017). Beck and Webb (2003) argue that as populations urbanize and a higher proportion reside in cities and metropolitan areas, there is a decreased reliance on informal insurance arrangements, such as risk-sharing pools within extended families or communities. In addition, life expectancy serves as a determinant of life insurance demand, as it reflects the average lifespan of individuals in a given country. Studies by Haiss and Sumegi (2008), Zerriaa and Noubbigh (2016), and Zerriaa et al. (2017) suggest that longer life expectancy is typically associated with greater capital accumulation through savings, which could lead to increased demand for life insurance products.

Social factors also play a significant role in shaping life insurance demand. Healthcare expenditure reflects a country's commitment to public health and can influence individuals' financial planning decisions. Early studies by Kleiman (1974) and Newhouse (1977) demonstrated a direct correlation between per capita healthcare spending and income per capita in industrialized nations, a finding later confirmed by Gerdtham et al. (1992) for OECD countries. Kjosevski (2012) and Hasan et al. (2025c) found that higher healthcare spending to GDP positively contributes to life insurance demand, while Srinivasan and Mitra (2024) reported no significant correlation between the two. Similarly, education spending is often used as an indicator of a country's commitment to education. Hasan et al. (2025c) demonstrated that higher education expenditure to GDP significantly influences life insurance demand. According to Browne et al. (2000) and Hwang and Gao (2003), higher levels of education tend to increase risk aversion and awareness of the importance of insurance, thus positively influencing life insurance demand (Li et al., 2007; Browne & Kim, 1993). However, Outreville (2015) contradicts this by suggesting that higher education levels may reduce risk aversion, encouraging individuals to engage in more risk-taking behaviors and thus decreasing their propensity to purchase insurance.

Numerous studies have investigated the factors influencing life insurance demand, examining impacts across both developing and developed countries, such as China (Hwang & Gao, 2003), Canada (Mapharing et al., 2015), and Tunisia (Zerriaa et al., 2017). Few studies have explored and identified the factors driving life insurance demand specifically in OECD countries. While significant contributions have been made by Li et al. (2007) and Srinivasan and Mitra (2024) in this area, several critical gaps still exist in the literature. Both studies focus on a sample of only 30 OECD countries, including the exclusion of eight OECD member countries and reliance on outdated data (1993–2000 and 1996–2020). Most notably, both studies rely exclusively on life insurance density as the sole proxy for demand,

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neglecting insurance penetration, an equally important variable that reflects the proportion of the population covered by insurance. In addition, the scope of explanatory variables in these studies is relatively limited. These gaps necessitate a more inclusive and comprehensive approach to analyzing life insurance demand. To address these gaps, this study examines all 38 OECD countries and employs both insurance penetration and insurance density as demand indicators to identify the key factors influencing life insurance demand.

Accordingly, the purpose of this study is to investigate how economic, demographic, and social factors determine life insurance demand in OECD countries. The theoretical framework for life insurance demand is presented in Figure 1, and the following hypotheses are proposed below:

H1: There is a statistically significant relationship between the inflation rate and the demand for life insurance in OECD countries.

H2: There is a statistically significant relationship between GDP per capita and the demand for life insurance in OECD countries.

H3: There is a statistically significant relationship between the poverty rate and the demand for life insurance in OECD countries.

H4: There is a statistically significant relationship between the dependency ratio and the demand for life insurance in OECD countries.

H5: There is a statistically significant relationship between urbanization rates and the demand for life insurance in OECD countries.

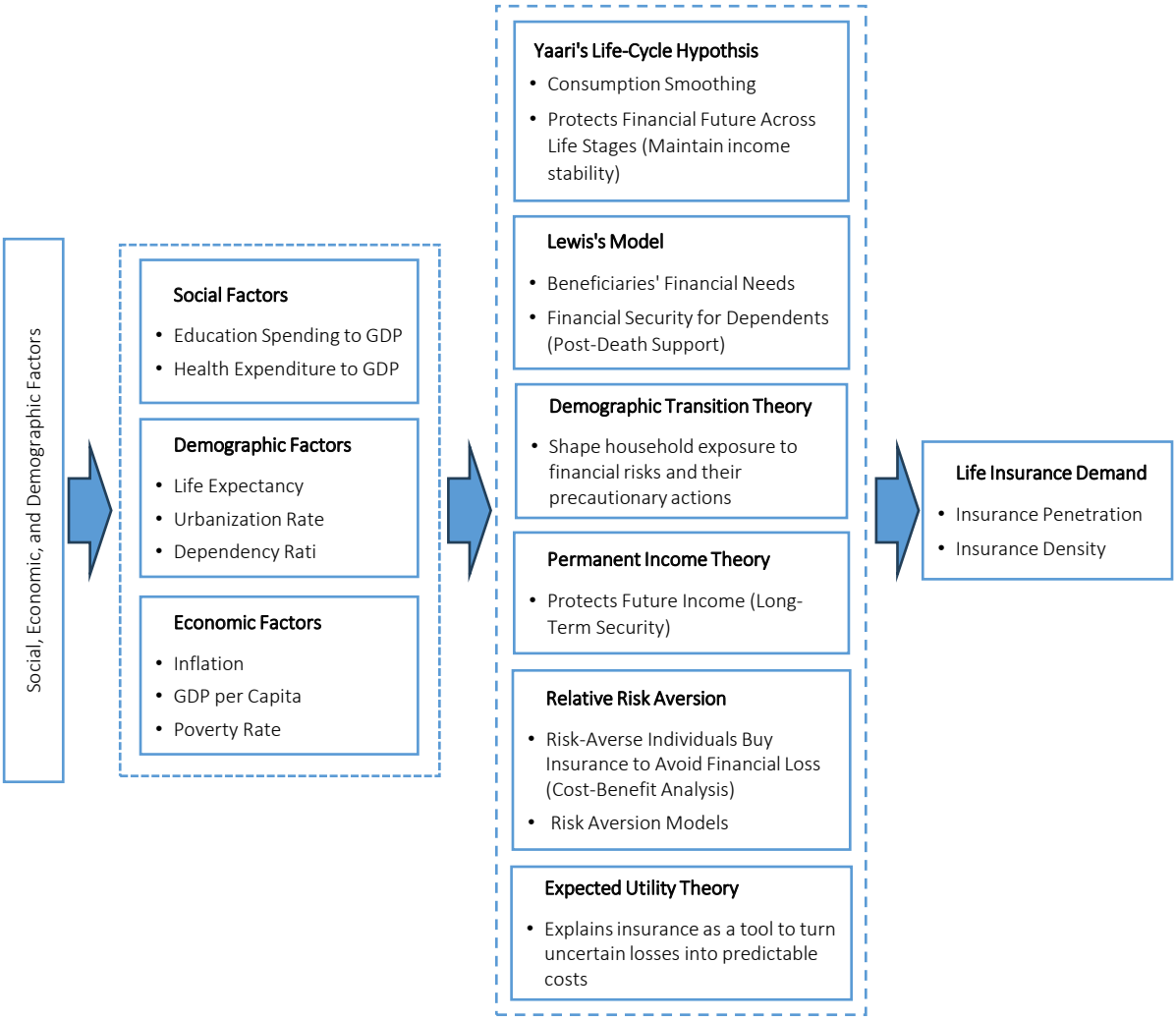

Figure 1. Theoretical framework for life insurance demand

H6: There is a statistically significant relationship between life expectancy and the demand for life insurance in OECD countries.

H7: There is a statistically significant relationship between healthcare spending to GDP and the demand for life insurance in OECD countries.

H8: There is a statistically significant relationship between education spending to GDP and the demand for life insurance in OECD countries.

2. METHODS

The study covers the period from 2009 to 2022, incorporating the most recent data to provide a balanced dataset that reflects each country's insurance demand based on availability and relevance. Annual aggregate data have been gathered from multiple sources, including OECD insurance statistics (OECD, n.d.), the World Bank (World Bank, n.d.), and the World Development Indicators (WDI) (World Bank Group, n.d.). Life insurance density and penetration figures are derived from the OECD insurance statistics, consistent with Donni and Fecher (1997), Dragotă et al. (2022), and Li et al. (2007). Economic, demographic, and social indicators are sourced from the World Bank database, as per Kjosevski (2012) and Zerriaa et al. (2017). The dependency ratio is obtained from the World Development Indicators (WDI) database following Kjosevski (2012).

Life insurance demand is measured using two key indicators: life insurance penetration (premiums as a percentage of GDP) and life insurance density (premiums per capita), following Kjosevski (2012), Zerriaa et al. (2017), Satrovıc and Muslıja (2018), and Segodi and Sibindi (2022). Penetration reflects the macroeconomic importance of life insurance, indicating its contribution to economic output, while density captures individual-level consumption patterns (Hwang & Gao, 2003; Mapharing et al., 2015). Independent variables are examined across three dimensions, namely economic, demographic, and social factors of life insurance demand. Economic variables, including GDP per capita, inflation, and poverty rate, are selected in line with Beck and Webb (2003), Hwang and Gao (2003), and Kjosevski (2012). These factors reflect individuals' financial capacity and the overall economic conditions that influence insurance demand. Following Kjosevski (2012) and Zerriaa and Noubbigh (2016), this study identifies key demographic variables such as dependency ratio, urbanization rates, and life expectancy that shape insurance demand across populations. In addition, healthcare expenditure to GDP and education expenditure to GDP are employed as social determinants based on prior studies by Kjosevski (2012) and Hasan et al. (2025c). Table 1 summarizes the variables included in the study, outlining their definitions and sources.

The data for this analysis were collected over various time-periods and encompass a diverse set of countries, resulting in a comprehensive panel data set, following Kjosevski (2012), Zerriaa and Noubbigh (2016), Saha and Khan (2024), and Srinivasan and Mitra (2024). Due to deviations from normality in the dataset, a two-step normalization model is applied following Templeton (2011) to address non-normality in the raw data. The equation for the panel data regression model is presented as follows:

$$PEN_{i,t} = \beta_0 + \beta_1 INF_{i,t} + \beta_2 GDP_{i,t} + \beta_3 PVR_{i,t} + \beta_4 DEP_{i,t} + \beta_5 URB_{i,t} + \beta_6 LIFEX_{i,t} + \beta_7 HCSG_{i,t} + \beta_8 EDUSG_{i,t} + \varepsilon_{i,t}, \quad (1)$$

$$DEN_{i,t} = \beta_0 + \beta_1 INF_{i,t} + \beta_2 GDP_{i,t} + \beta_3 PVR_{i,t} + \beta_4 DEP_{i,t} + \beta_5 URB_{i,t} + \beta_6 LIFEX_{i,t} + \beta_7 HCSG_{i,t} + \beta_8 EDUSG_{i,t} + \varepsilon_{i,t}. \quad (2)$$

Equations (1) and (2) are used to assess how economic, demographic, and social factors influence life insurance demand across different countries and time periods, using insurance penetration (PEN) and insurance density (DEN) as alternative proxies. Here, INF states the inflation rate, GDP denotes GDP per capita, and PVR is the poverty rate. DEP represents the dependency ratio, URB denotes the urbanization rate, LIFEX represents life expectancy, HCSG refers to healthcare spending to GDP, and EDUSG indicates education spending to GDP. Finally, ε_{it} is the error term that captures unobserved factors varying across countries and over time.

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Table 1. Description of variables

SL. No	Variable Name	Variable Definition	Sources
		Demand Measure Variables	
1.	Insurance Penetration	The proportion of premium volume in relation to the Gross Domestic Product (GDP) (Segodi & Sibindi, 2022; Hasan et al., 2025c)	OECD Insurance Statistics
2.	Insurance Density	The average premium paid per person within a specific population or demographic group (Li et al., 2007; Srinivasan & Mitra, 2024)	OECD Insurance Statistics
		Economic Variables	
3.	Inflation Rate	The percentage change in the price level of goods and services over a period of time, measured annually (Satrovic & Muslija, 2018)	World Bank
4.	GDP Per Capita	The average economic output per person is calculated by dividing a country's total GDP by its population (Zerriaa et al., 2017; Srinivasan & Mitra, 2024)	World Bank
5.	Poverty Rate	The percentage of the population living on less than USD 5.50 a day	World Bank
		Demographic Variables	
6.	Dependency ratio	The proportion of dependents, defined as people under 15 or over 64 years old, to the working-age population (ages 15-64) (Kjosevski, 2012)	World Development Indicators (WDI)
7.	Urbanization Rate	The proportion of people residing in urban areas relative to the total population (Zerriaa & Noubbigh, 2016; Zerriaa et al., 2017)	World Bank
8.	Life Expectancy	The average number of years a person is expected to live, based on the current mortality rates within a specific population (Beck & Webb, 2003; Zerriaa et al., 2017)	World Bank
		Social Variables	
9.	Healthcare Spending to GDP	The proportion of a country's total expenditure on healthcare relative to its Gross Domestic Product (Srinivasan & Mitra, 2024)	World Bank
10.	Education Spending to GDP	The ratio of a country's total expenditure on education to its Gross Domestic Product (Hasan et al., 2025c)	World Bank

Note: This table presents the definitions and data sources of all variables employed in the study.

3. RESULTS

Table 2 presents the descriptive statistics for key variables across 38 OECD countries from 2009 to 2022. The mean life insurance penetration is 3.89 with a standard deviation of 5.71, which is lower compared to the mean and standard deviation observed in China since its economic reforms in 1978, as reported by Hwang and Gao (2003). Life insurance density has a mean of 2,417.95 and a standard deviation of 6,402.93, indicating considerable variability, contrasting with the lower mean and standard deviation reported by Li et al. (2007) for 30 OECD countries.

For inflation, the mean of 2.66 suggests stable price increases, with a standard deviation of 4.27, notably lower than inflation rates observed in the MENA[1] region (Zerriaa & Noubbigh, 2016). GDP per capita averages 37,987.10 million, significantly higher than the mean reported for BRICS[2] countries (Segodi & Sibindi, 2022), while the average poverty rate is 4.33% with a standard deviation of 8.20. The dependency ratio's average of 51.61 indicates a relatively balanced ratio. The urbanization rate averages 75.72%, with a standard deviation of 16.65, aligning with findings from Zerriaa and Noubbigh (2016). Life expectancy averages 79.61 years, consistent with findings by Li et al. (2007). Healthcare spending averages 8.95% of GDP, above the OECD mean (Srinivasan & Mitra, 2024), and education spending averages 17.20%, with a standard deviation of 19.03%.

Table 3 presents the correlation matrix, illustrating the relationships between variables. Inflation rate, education spending as a percentage of GDP, and the poverty rate demonstrate a statistically significant negative relationship with life insurance penetration and density. Higher inflation, greater education spending as a percentage of GDP, and increased poverty rates are linked to lower levels

1 Middle East and North Africa (MENA).

2 BRICS countries are Brazil, Russia, India, China and South Africa.

Table 2. Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Penetration (%)	532	3.89	5.71	0.16	45.73
Density (million)	532	2417.95	6402.93	13.87	51212.00
Inflation Rate (%)	532	2.66	4.27	–4.48	72.31
GDP Per Capita (million)	532	37,987.10	24,478.05	5,246.00	133,712.00
Poverty Rate (%)	532	4.33	8.20	0.10	47.30
Dependency Ratio (%)	532	51.61	5.94	36.48	71.12
Urbanization Rate (%)	532	75.72	16.65	0.06	98.15
Life expectancy (Year)	532	79.61	7.36	0.77	84.91
Healthcare spending to GDP (%)	532	8.95	2.34	4.12	19.48
Education spending to GDP (%)	532	17.20	19.03	7.11	98.59

Notes: The table presents descriptive statistics for examined variables, including the number of observations, mean, standard deviation, minimum, and maximum values across 38 OECD countries from 2009 to 2022.

of insurance penetration and density, consistent with studies by Lenten and Rulli (2006), Outreville (2015), and Beck and Webb (2003), respectively.

Conversely, GDP per capita, dependency ratio, urbanization rate, healthcare spending to GDP, and life expectancy exhibit statistically significant positive correlations with insurance penetration and density. Improved economic conditions, a lower dependency ratio, increased urbanization, and longer life expectancy are associated with greater life insurance penetration and density, as observed by Zerriaa et al. (2017). Moreover, higher healthcare spending as a percentage of GDP further strengthens this positive correlation, similar to Kjosevski (2012). It is also evident that multicollinearity is not a concern, as all variance inflation factor (VIF) values are below 3 (Hasan, 2024).

Table 3 presents the pairwise correlation matrix for variables, including insurance penetration (PEN), insurance density (DEN), GDP per capita (GDP), inflation (INF), poverty rate (PVR), education spending to GDP (EDUS), urbanization rate (URB), healthcare spending to GDP (HEAS), life expectancy (LIFEX), and dependency ratio (DEP) across 38 OECD countries from 2009 to 2022.

Before conducting the regression analysis, key assumptions of the panel data analysis are validated through several diagnostic tests. These include checking normality using the Shapiro-Wilk test, assessing multicollinearity with the variance inflation factor (VIF), and conducting the Breusch-Pagan test to detect heteroscedasticity in the data (Hasan et al., 2024). Additionally, the Wooldridge test is utilized to identify autocorrelation, while Pesaran's test evaluates cross-sectional dependence (Hasan et al., 2025a). The results confirm that the data follows a normal distribution and indicate no multicollinearity and cross-sectional dependence. However, the data exhibits heteroscedasticity and first-level autocorrelation. Based on these diagnostic results, a robust estimation meth-

Table 3. Correlation matrix

Variables	(1) PEN	(2) DEN	(3) INF	(4) GDP	(5) DEP	(6) URB	(7) EDUS	(8) HEAS	(9) LIFEX	(10) PVR	VIF
(1) PEN	1										
(2) DEN	0.932***	1									
(3) INF	–0.322***	–0.330***	1								1.13
(4) GDP	0.527***	0.759***	–0.225***	1							2.58
(5) DEP	0.107***	0.203***	–0.116***	0.197***	1						1.39
(6) URB	0.183***	0.252***	0.031	0.374***	0.274***	1					1.54
(7) EDUS	–0.306***	–0.326***	0.204****	–0.235***	–0.282***	0.164***	1				1.34
(8) HEAS	0.361***	0.476***	–0.188***	0.465***	0.381***	0.246***	–0.298***	1			1.55
(9) LIFEX	0.397***	0.517***	–0.241***	0.610***	0.392***	0.450***	–0.183***	0.497***	1		2.07
(10) PVR	–0.222***	–0.442***	0.121***	–0.646***	–0.184***	–0.165***	0.231***	–0.355***	–0.399***	1	1.77
Mean VIF											1.67

Notes: Statistically significant * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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od, particularly the dynamic regression model with Panel-Corrected Standard Errors (PCSE), is employed to provide more accurate results in the panel data analysis (Halilbegović et al., 2023). PCSE model ensures that the standard errors, such as heteroscedasticity and serial correlation issues, are adjusted accurately to reflect the true uncertainty in the estimated coefficients in panel data models (Hasan et al., 2025b). The results of the regression analysis are summarized in Table 4.

Table 4. Regression results of determinants of insurance demand in OECD countries using the Panel-Corrected Standard Errors (PCSE) model

Variables	Model 1	Model 2
	Insurance Penetration	Insurance Density
Inflation Rate	−0.0743***	−56.03***
	(−4.35)	(−3.78)
GDP Per Capita	0.0000620***	0.143***
	(4.62)	(11.49)
Poverty Rate	0.0124*	5.228*
	(2.32)	(2.23)
Dependency Ratio	−0.116**	−43.72
	(−2.58)	(−1.13)
Urbanization Rate	0.0323	12.48
	(1.69)	(0.79)
Life expectancy	0.0628*	36.02
	(2.18)	(1.16)
Healthcare spending to GDP	0.270*	244.8*
	(2.27)	(2.27)
Education spending to GDP	−0.0322**	−26.91**
	(−3.01)	(−3.03)
Constant	−1.723*	−6222.4*
	(−2.10)	(−2.56)
No. Observations	532	532
Chi2	104.06**	330.94**
R-squared	0.3706	0.4206

Notes: Statistically significant * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; Standard errors are enclosed in parentheses.

Table 4 presents the results of the PCSE model for panel data analysis, examining the determinants of life insurance demand across 38 OECD countries from 2009 to 2022. The two-step data transformation method was applied to all variables to enhance the data's normal distribution (Templeton, 2011).

Based on Table 4, both Model 1 and Model 2 indicate that the coefficient of inflation rate shows a statistically significant negative relationship with both insurance penetration and density. Therefore, the study fails to reject hypothesis H_1, confirming that higher inflation diminishes the demand for life insurance in OECD countries. The coefficients of GDP per capita and the poverty rate demonstrate positive and significant relationships with insurance penetration and density, consistent with hypotheses H_2 and H_3. This suggests that as GDP per capita rises, there is an increase in life insurance demand due to enhanced financial capabilities, while elevated poverty rates also correlate with greater demand, highlighting the need for financial security among vulnerable groups.

Additionally, the coefficient of dependency ratio reveals a statistically significant negative relationship with insurance penetration, while showing no significant effect on insurance density. This provides partial support for hypothesis H_4, suggesting that a higher dependency ratio may restrict the growth of insurance penetration. The coefficient of urbanization rate shows an insignificant impact on life insurance demand, leading to a failure to accept hypothesis H_5. The coefficients for life expectancy exhibit a positive and significant relationship with insurance penetration, while showing an insignificant relationship with insurance density. These findings also imply a limited validation for hypothesis H_6, showing that life expectancy is associated with increased insurance penetration, but not with significant changes in insurance density. Furthermore, the coefficient of healthcare spending as a percentage of GDP shows a statistically significant positive relationship with both insurance penetration and density, while education spending as a percentage of GDP reveals a statistically significant negative relationship with these metrics. These results align with hypotheses H_7 and H_8, indicating that increased healthcare spending enhances the demand for life insurance, whereas higher education spending adversely influences insurance penetration and density.

To verify the robustness of the regression results, the Hausman test and Breusch-Pagan Lagrange Multiplier (LM) test support the use of the Pooled Ordinary Least Squares (OLS) model. Given the heteroscedasticity and first-level autocorrelation detected by the Breusch-Pagan and Wooldridge tests, the clustered standard error condition is applied to the Pooled OLS model to correct for these issues (Dieleman & Templin, 2014). The re-

sults from the OLS regression validate the findings from the Panel Corrected Standard Errors (PCSE) model, revealing consistent relationships between the demand factors and life insurance demand. The agreement between these two models enhances the reliability and robustness of the identified determinants of life insurance demand.

Table 5. Regression results of determinants of insurance demand in OECD countries using the Pooled Ordinary Least Squares (OLS) model

Variables	Model 1	Model 2
	Insurance Penetration	Insurance Density
Inflation Rate	−0.232***	−198.9***
	(−4.78)	(−4.73)
GDP Per Capita	0.000214***	0.183***
	(8.27)	(15.58)
Poverty Rate	0.152***	81.01***
	(5.47)	(3.37)
Dependency Ratio	−0.103**	−22.31
	(−2.81)	(−0.71)
Urbanization Rate	0.0141	−2.098
	(0.98)	(−0.18)
Life expectancy	0.0578*	23.87
	(2.03)	(0.94)
Healthcare spending to GDP	0.279**	332.3***
	(2.64)	(3.59)
Education spending to GDP	−0.0585***	−40.95***
	(−5.98)	(−5.29)
Constant	−2.312*	−7224.2***
	(−2.05)	(−4.01)
No. Observations	532	532
R-squared	0.3916	0.6357
F-stat	73.74***	184.28***

Notes: Statistically significant * p < 0.05, ** p < 0.01, *** p < 0.001; Standard errors are enclosed in parentheses.

Table 5 shows the results of the OLS model of panel data analysis, examining two demand measures (penetration and density) for life insurance across 38 OECD countries from 2009 to 2022. A two-step data transformation method was applied to enhance the data's normal distribution (Templeton, 2011).

4. DISCUSSION

The study tested eight hypotheses based on a range of economic, demographic, and social variables. The analysis reveals that economic variables have a statistically significant impact on the demand for life insurance. The inflation rate significantly and negatively affects the demand for life insurance. Higher inflation erodes purchasing power, reducing the affordability of life insurance policies, which aligns with the findings of Kjosevski (2012). As inflation increases, the value of life insurance policies decreases, diminishing their attractiveness and resulting in lower penetration and density. This relationship has been consistently found in previous studies, such as those by Lenten and Rulli (2006) and Li et al. (2007), which showed that inflation curtails the demand for long-term insurance products. There are significant positive relationships between GDP per capita and the poverty rate, with the demand for life insurance. Higher GDP per capita enhances disposable income, thereby improving the affordability of insurance, as highlighted by Zerriaa and Noubbigh (2016). The result is also supported by theories, including Yaari's life-cycle hypothesis (1965) and Lewis (1989), which suggest that higher GDP per capita enables individuals to better smooth consumption, while also improving financial security and the affordability of insurance, thereby boosting demand. The findings for inflation and GDP per capita differ from those of Hasan et al. (2025c), reflecting differences in market maturity and the functional role of insurance between developed and developing economies. In developing countries such as Bangladesh, inflation may increase insurance demand as a precautionary response to economic uncertainty, while income growth does not necessarily translate into higher uptake due to institutional constraints and alternative saving preferences. Furthermore, an increase in the poverty rate drives up the demand for life insurance. Although lower-income households generally have limited financial resources, targeted government initiatives and the availability of micro-insurance products make insurance more accessible to economically disadvantaged populations (Hwang & Gao, 2003).

Additionally, demographic variables, including the dependency ratio and life expectancy, exhibit statistically significant influence on life insurance demand. This suggests that a higher dependency ratio strains financial resources, leaving fewer discretionary funds for insurance premiums. This finding aligns with Li et al. (2007), who found that higher dependency ratios reduce the ability to invest in life insurance. In contrast, longer life expectancy is associated with higher savings and

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capital accumulation, contributing to increased demand for life insurance products, and the result aligns with Haiss and Sumegi (2008) and verifies the accuracy of the life-cycle hypothesis (Yaari, 1965). Lewis (1989) also indicates that the future consumption needs of a family are influenced by the survival of the primary income earner, which suggests that the dependency ratio and life expectancy may affect the demand for life insurance, as also highlighted by Brown and Kim (1993). In contrast, the urbanization rate does not significantly affect life insurance demand. This suggests that increased urbanization does not necessarily lead to a corresponding increase in the purchase of life insurance policies, consistent with Zerriaa and Noubbigh (2016).

Moreover, social variables indicate that healthcare spending to GDP shows a significant positive correlation with life insurance demand, while education spending to GDP reveals a negative correlation. This suggests that better health infrastructure, facilitated by increased healthcare spending, encourages individuals to invest in life insurance for additional financial security, particularly for health-related risks. This is consistent with the findings of Browne and Kim (1993), who highlighted the importance of health systems in driving insurance market growth. Conversely, increased spending on higher education enhances student achievement but tends to decrease risk aversion and promotes more risk-taking behavior, potentially reducing life insurance demand, similar to Outreville (2015). The findings contradict the traditional risk aversion theory that higher education increases risk aversion, leading to higher insurance demand (Hwang & Gao, 2003), indicating a shift towards more alternative forms of wealth management.

CONCLUSION

This study examines the determinants of life insurance demand across 38 OECD countries from 2009 to 2022, using life insurance penetration and density as key indicators. By incorporating economic, demographic, and social factors, the analysis offers a broader perspective on the structural drivers shaping life insurance demand within advanced insurance markets. The findings indicate that higher GDP per capita, greater healthcare expenditure to GDP, and higher poverty rates are associated with increased life insurance demand, reflecting the role of insurance as both a financial planning and risk-mitigation tool. Conversely, inflation and education expenditure to GDP are found to exert a negative effect on life insurance demand, indicating that macroeconomic instability and competing long-term expenditures may constrain households' ability or willingness to purchase life insurance products. Additionally, life expectancy positively influences insurance penetration, whereas the dependency ratio negatively affects it, with no significant effect on insurance density. Urbanization does not exhibit a significant influence on life insurance demand.

These findings carry important implications for policymakers, regulators, and insurance providers. Policymakers may leverage these insights to foster stable macroeconomic conditions and strengthen healthcare systems, thereby supporting sustainable growth in life insurance markets. Regulatory authorities can utilize the evidence to design policies that encourage insurance uptake while safeguarding consumer interests, particularly in inflationary environments. For insurance companies, the results highlight opportunities in economically stable markets with rising life expectancy, where demand for long-term and retirement-oriented products is likely to expand. Investors and other financial stakeholders may also view OECD insurance markets as attractive, given their relatively stable economic foundations and evolving demand dynamics.

Despite these contributions, the study is subject to certain limitations that open avenues for future research. The analysis does not incorporate cultural factors, financial literacy, or institutional and regulatory differences, which may also shape life insurance demand. Future studies could extend the model by including such variables to deepen the understanding of behavioral and institutional influences.

Additionally, the study employs two proxies to measure insurance demand, and future research may introduce alternative perspectives by using additional measures. Moreover, expanding the scope beyond OECD countries to include developing and emerging economies could offer valuable insights into different economic contexts and insurance markets.

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