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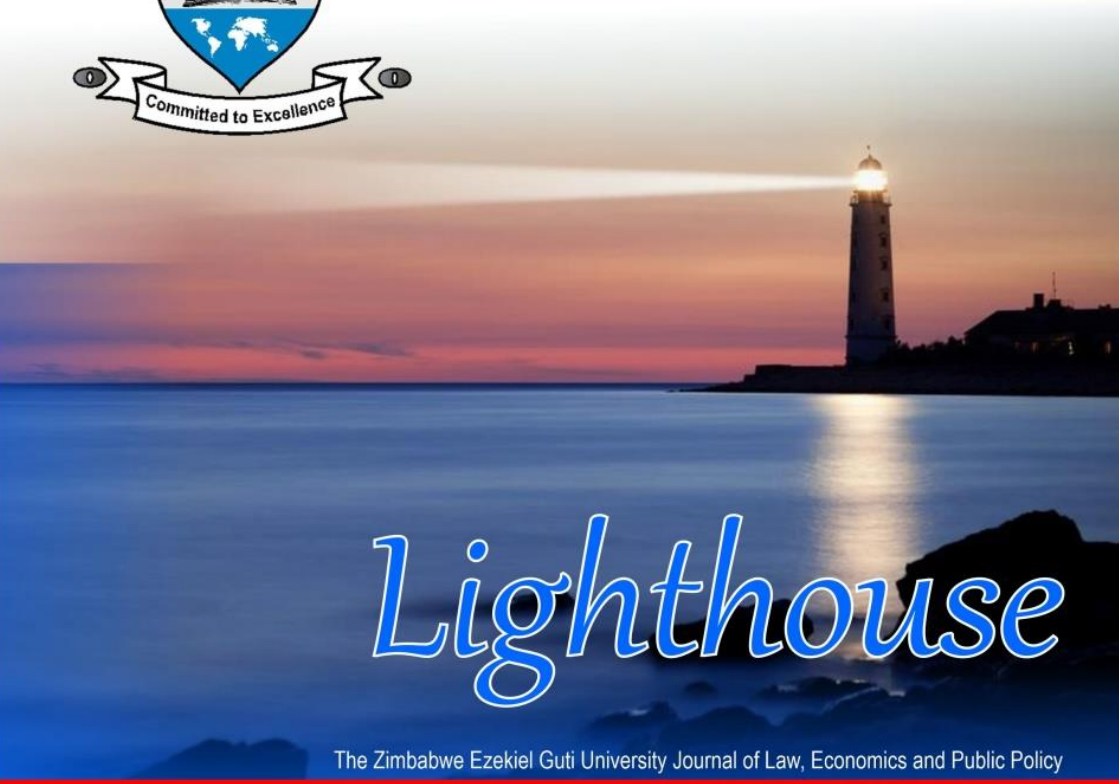

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Life Insurance Uptake in Zimbabwe's Predominantly Informal Economy

PASCAL GUBWE[1], TENDAI JOSEPH MABVURE[2] AND RANGARIRAI MBIZI[3]

Abstract

The study examines the factors influencing life insurance uptake in Zimbabwe's largely informal economy, addressing structural barriers often overlooked in conventional models. The study is relevant to Zimbabwe's current economic context as it highlights the structural barriers to life insurance uptake in a predominantly informal economy, offering policy insights on financial inclusion, microinsurance, and economic resilience amid high unemployment and financial instability. By integrating informal sector dynamics with economic, demographic, and institutional variables, it provides a comprehensive analysis of insurance adoption in a financially excluded environment. Using the Life Cycle Hypothesis, an autoregressive distributed lag (ARDL) model is applied to macroeconomic data from 1990 to 2022. Key determinants include informal sector size, inflation, central bank independence, per capita income, financial development, insurance literacy, age dependency, life expectancy, and unemployment, capturing both short-term fluctuations and long-term equilibrium dynamics. Findings show that larger informal sector size, higher age dependency, and increased insurance literacy reduce long-term insurance uptake, while short-term demand rises with temporary income gains and economic

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uncertainty. Inflation and central bank independence have minimal impact, highlighting the need for policies tailored to informal sector dynamics.

Keywords: *insurance density, informal sector, lag model, premium, life cycle.*

INTRODUCTION

The insurance sector plays a vital role in driving economic growth, improving household financial stability, and promoting social security through risk-sharing (Asongu & Odhiambo, 2021). Life insurance enhances savings, investments, and trade, collectively strengthening economic resilience (Sibindi, 2022). Life insurance density, measured as per capita premiums, is a key indicator of financial security, although it varies significantly across regions, reflecting the discrepancies in economic and structural factors. The global life insurance market is characterised by significant disparities. In 2023, North America, Western Europe, Emerging Asia, and Developed Asia accounted for 83% (USD 2.4 trillion) of global premiums, with an average density of USD 1,951 (Swiss Re, 2024b). By contrast, Africa contributed just 1.48% (USD 42.9 billion), with an average density of USD 33. Zimbabwe's share of Africa's premiums was 0.45% (USD 155 million), yielding a critically low density of USD 10 (IPEC 2024; Swiss Re 2024b).

Africa's life insurance market is uneven. By 2023, Africa's average life insurance penetration rate of 2.4% was largely driven by South Africa's 9.2%, the world's second highest after Hong Kong (Swiss Re 2024b). South Africa accounted for 81.2% of Africa's total premiums with a density of USD 562. Other major contributors included Morocco (USD 2.6 billion), Egypt (USD 1.2 billion), Kenya (USD 1.1 billion), and Namibia (USD 733 million) (African Insurance Organisation, 2024). Namibia's high penetration (6%) and density

(USD 288) place it ninth globally. These disparities reflect the differences in income, employment, and product availability.

Zimbabwe's life insurance sector faces challenges due to its informal economy that comprises over 60% of GDP and limits access to formal insurance (World Bank 2024c). Informal workers often lack stable employment, and are thus excluded from insurance products designed for formal employees. Over the past three decades, the density of life insurance in Zimbabwe has steadily declined, whereas the informal sector has remained dominant (Figure 1). Limited research exists on life insurance adoption in Zimbabwe, necessitating targeted interventions. The study is relevant to Zimbabwe's current economic situation as it offers policy insights on financial inclusion, microinsurance, and economic resilience in the face of high unemployment and financial instability.

Previous studies, including Nkotsoe (2018) on SADC countries and Towo *et al*. (2021) on Zimbabwe, have limitations. They fail to fully consider the informal economy and other critical demographic factors. Notably, to the best of our knowledge, no research has explicitly examined the impact of informality on life insurance adoption in Zimbabwe despite the sector's importance in shaping economic outcomes. Although the informal sector has been studied in areas such as health insurance (Afriyie *et al.*, 2023) and pensions (Asiamah, 2023), its influence on life insurance remains unexplored. Expanding life insurance in the informal sector can bridge the gap in social protection systems and enhance the financial security of vulnerable workers (Guven *et al.*, 2020). Integrating life insurance into informal economies also promotes household resilience and reduces reliance on government support, thus contributing to economic stability. The study addresses these gaps by examining the barriers to and opportunities for life insurance uptake in Zimbabwe's informal economy, thus contributing to the discourse on financial inclusion and economic resilience.

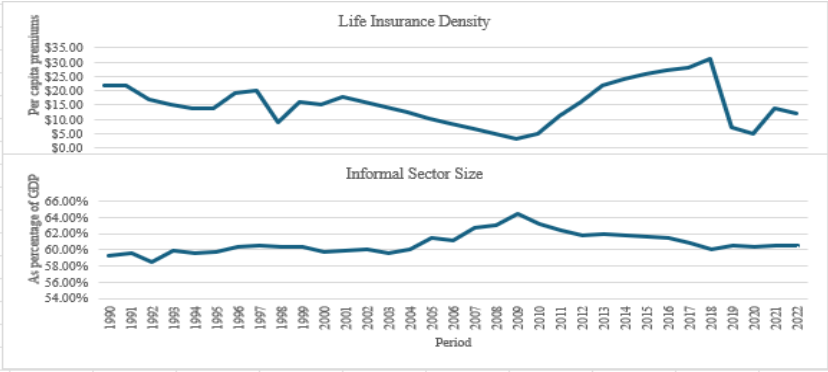

Figure 1: Zimbabwe Life Insurance Density and Informal Sector Trends (Swiss Re, 2024a); World Bank, 2024b)

Figure 2 underscores Zimbabwe's distinctive position, with the largest informal sector and the lowest life insurance density among the selected countries, offering critical insights into the barriers and potential opportunities for growth in this underdeveloped market.

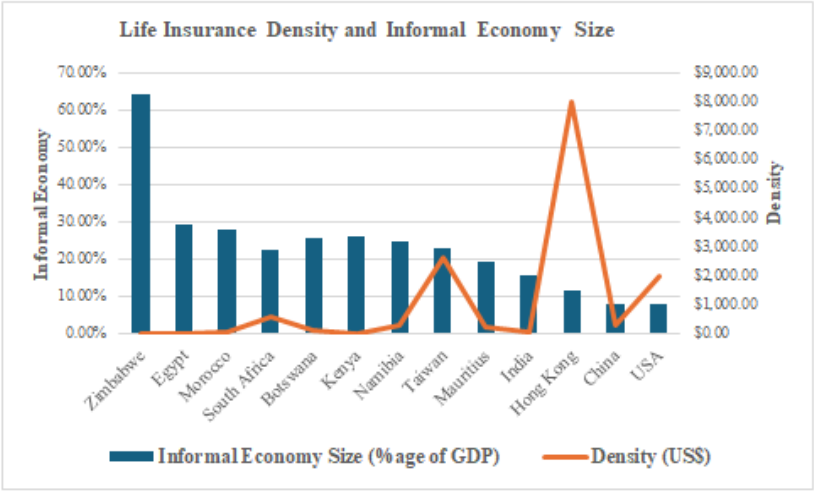

Figure 2: Life Insurance Density and Informal Economy Size for Selected Countries as of 2023.f (World Bank, 2024b; Swiss Re, 2024a)

Life insurance density in Zimbabwe is declining, with persistently low adoption rates constraining its economic contributions through risk management, savings mobilisation, and capital provision. Current adoption levels remain significantly below both the global and African averages. This limited uptake diminishes the sector's overall economic impact (Asongu & Odhiambo, 2020), thereby restricting its potential benefits to citizens. The industry must address this uptake gap and implement strategies to boost adoption. Regulators should develop policies to stimulate demand and enhance market uptake.

The study aims to evaluate the influence of the informal sector and other economic, demographic, and institutional factors on life insurance density in Zimbabwe. Specifically, it investigates (a) the informal sector's impact, (b) the effect of inflation, (c) the role of Central Bank Independence, (d) the influence of per capita income, (e) the impact of financial development, (f) the role of insurance literacy, (g) the effect of the age-dependency ratio, (h) the impact of life expectancy, and (i) the influence of unemployment. The study uniquely examines the impact of informality on life insurance adoption in Zimbabwe, filling a critical gap in existing research. The study extends the Life Cycle Hypothesis by demonstrating how financial instability, informal networks, and economic uncertainty shape insurance demand, challenging traditional macroeconomic assumptions. Practical implications include the need for customised microinsurance, flexible premiums, and financial literacy programmes to enhance accessibility. Strengthening financial inclusion policies can improve insurance penetration and economic resilience in informal economies. These findings suggest that policymakers should focus on developing microinsurance products tailored to the needs of the informal sector.

The adoption of financial services, including life insurance, is driven fundamentally by economic, demographic, and institutional factors. Economic conditions such as income levels, inflation, and financial

development directly determine affordability and participation in financial markets (Iyawe & Osamwonyi, 2021; Schanz, 2020). A higher per capita income facilitates long-term financial security, whereas inflation erodes purchasing power and discourages financial commitment (Segodi & Sibindi, 2022). Demographic factors, particularly age dependency and life expectancy, had a significant effect. A high dependency ratio constrains disposable income and limits financial planning, whereas a longer life expectancy heightens the need for risk mitigation (Olarewaju & Msomi, 2021). Institutional factors, notably, regulatory frameworks and trust in financial institutions, are equally critical. Strong regulatory oversight enhances consumer confidence, whereas weak institutions and low financial literacy deter engagement with financial products (Kiwanuka & Sibindi, 2023b, 2023c). These challenges are exacerbated in economies with dominant informal sectors where economic volatility and institutional deficiencies restrict financial inclusion.

The article is structured as follows: Section 2 presents a comprehensive literature review and hypothesis development; Section 3 outlines the research methodology; Section 4 analyses and discusses the findings; and Section 5 presents the conclusions, policy implications, and directions for future research.

THEORIES UNDERPINNING THE STUDY

Life insurance adoption is explained through economic and behavioural theories, particularly the Life Cycle Hypothesis (LCH), Theory of Planned Behaviour (TPB), and Diffusion of Innovations (DOI) Model. The LCH (Ando & Modigliani, 1963) posits that individuals manage consumption and savings for financial stability, with life insurance as a risk management tool (Banyár, 2021). Demand is driven by mortality risk and income uncertainty (Chen & Zhao, 2024), while household consumption patterns influence coverage (Tian & Dong, 2022). However, in informal economies, unstable incomes prioritise immediate consumption over long-term planning,

constraining insurance uptake (Nwadeyi, 2022). The TPB (Ajzen, 1991) states that financial decisions are shaped by attitudes, social influence, and perceived control (Hidayati & Destiana, 2023). Positive perceptions and social norms enhance adoption (Sanjay & Tewari, 2024), but financial illiteracy and distrust in insurers serve as major barriers (Kiwanuka & Sibindi, 2023c). The DOI Model (Rogers, 1962) explains financial service adoption through relative advantage, compatibility, complexity, trialability, and observability (Shaw *et al.*, 2022). In developing economies, financial illiteracy and scepticism hinder diffusion, slowing adoption rates (Kiwanuka & Sibindi, 2023a). These theories highlight structural, behavioural, and informational barriers to life insurance adoption. Addressing these issues requires targeted policies that enhance affordability, financial literacy, and trust in insurers, particularly in informal economies.

LITERATURE REVIEW

Empirical evidence highlights the informal sector's impact on life insurance density in developing economies. Asiamah (2023) links a larger informal sector to reduced financial participation, limiting insurance adoption. Gubwe *et al.* (2024) show that irregular incomes hinder consistent premium payments, restricting market growth. Berg (2018) confirms that individuals with stable formal employment are significantly more likely to invest in life insurance than those with unpredictable earnings.

Macroeconomic factors, such as inflation and income levels, have also been found to exert a significant influence on life insurance uptake. Empirical evidence from Haushofer *et al.* (2020) demonstrates that inflation can drive demand for insurance during economic uncertainty. However, Schanz and Treccani (2023) confirm that inflation simultaneously erodes purchasing power, making long-term financial commitments less attractive. Research conducted by Abel and Marire (2021) note that chronic inflation in Zimbabwe has consistently diverted household expenditures away from discretionary

financial products, including life insurance. Moreover, Iyawe and Osamwonyi (2021) and Kura and Legass (2021) established that per capita income positively correlates with life insurance adoption because higher earnings enable individuals to invest in long-term financial security. Despite this, the persistent economic instability in Zimbabwe continues to undermine the potential benefits of rising incomes.

Institutional factors, particularly Central Bank Independence (CBI), have also been shown to influence life insurance density. Romelli (2024) confirmed that greater CBI can help stabilise inflation through strict monetary policies but may also constrain liquidity, limiting disposable income for non-essential expenditures such as life insurance. Empirical research by Chowa *et al*. (2014) finds that Zimbabwe's history of hyperinflation and financial crises has led to central bank interventions that eroded public trust in financial institutions and products. Pasara and Garidzirai (2020) further demonstrate that, while CBI offers prospects for economic stability, restoring confidence in financial markets remains a long-term challenge.

Beyond the economic and institutional determinants, demographic factors have been found to play a crucial role in shaping life insurance adoption. Empirical studies by Srbinoski *et al*. (2021) demonstrate that financial sector development fosters trust in insurance products by improving accessibility and efficiency. Kiwanuka and Sibindi (2023b) confirm that insurance literacy significantly enhances uptake by equipping individuals with the necessary knowledge to effectively understand and utilise life insurance. Olarewaju and Msomi (2021) find that a high age-dependency ratio reduces disposable household income, thereby limiting the ability to allocate funds to life insurance. Conversely, empirical evidence from Leightner (2023) demonstrates that longer life expectancy encourages future-oriented financial planning,

leading to greater life insurance uptake. Additionally, Segodi and Sibindi (2022) confirmed that unemployment negatively impacts life insurance density because financial instability restricts households' ability to sustain premium payments.

These findings collectively underscore the significant barriers to expanding life insurance adoption in Zimbabwe's informal economy. Addressing these challenges requires targeted policy interventions to strengthen financial inclusion, enhance public trust in financial institutions, and promote macroeconomic stability, to support broader economic resilience.

The dominance of the informal economy significantly restricts financial inclusion and participation in the formal insurance markets. Individuals with stable labour income are more likely to purchase life insurance than those relying on irregular earnings that is a characteristic of informal employment (Heo, 2020; Schanz, 2020). Given Zimbabwe's high level of informality, this effect warrants further research. Thus, we hypothesise H_1: Informal sector size negatively affects life insurance density.

The impact of inflation on demand for life insurance remains controversial. While economic uncertainty can drive insurance uptake (Haushofer *et al.*, 2020), inflation also erodes the real value of policies, discouraging long-term commitment (Schanz & Treccani, 2023). Zimbabwe's history of hyperinflation has further undermined its confidence in its financial products (Abel & Marire, 2021). Therefore, we hypothesise H_2: Inflation negatively affects life insurance density.

Although Central Bank Independence (CBI) aims to stabilise inflation, stringent monetary policies can constrain liquidity and limit disposable income for non-essential expenditures, including life

insurance (Romelli, 2024). Zimbabwe's monetary instability has further eroded trust in financial institutions (Pasara & Garidzirai, 2020). Hence, we hypothesise H_3: Central Bank Independence negatively affects life insurance density.

Higher per capita income enhances financial planning and increases the ability to afford insurance (Iyawe & Osamwonyi, 2021; Schanz, 2020). Accordingly, we hypothesise H_4: Per capita income positively affects life insurance density.

Financial development fosters trust in insurance products and enhances accessibility, thus encouraging greater adoption (Iyawe & Osamwonyi, 2017). Given Zimbabwe's financial constraints, this relationship is critical for understanding barriers to insurance penetration. Thus, we hypothesise H_5: Financial development positively influences life insurance density. Insurance literacy is crucial in shaping financial behaviour, as greater awareness of insurance benefits increases adoption (Kiwanuka & Sibindi, 2023b). Given Zimbabwe's low level of insurance awareness. We therefore hypothesise H_6: Insurance literacy positively influences life insurance density. A high age dependency ratio limits disposable income, restricting financial commitments to long-term products such as life insurance (Oteng *et al.*, 2023). Hence, we hypothesise H_7: Age dependency negatively influences life insurance density.

Life expectancy affects financial planning, with longer life spans increasing the need for insurance (Leightner, 2023). Given Zimbabwe's fluctuating life expectancy trends, we hypothesise H_8: Life expectancy positively influences life insurance density. Unemployment reduces financial stability, makes insurance unaffordable, and increases policy lapses (Segodi & Sibindi, 2022). Given Zimbabwe's high unemployment rate, we hypothesise H_9: Unemployment negatively affects life insurance density. These

hypotheses provide a structured framework for examining the economic, institutional, and demographic factors influencing life insurance uptake in Zimbabwe's informal economy.

STUDY DESIGN AND METHODOLOGY

The study employs a correlational research design to examine the macroeconomic factors influencing life insurance uptake in Zimbabwe's informal economy from 1990 to 2022. The time-series data capture long-term trends, similar to Kolapo *et al.*'s (2022) study of Nigeria's insurance sector over a period of 33 years. The key variables include informal economy size, per capita income, inflation, central bank independence, financial development, insurance literacy, dependency ratios, life expectancy, and unemployment. The data are sourced from Swiss Re (2024a), the World Bank (2024a, b), IPEC (2024), and Medina and Schneider (2019), providing a comprehensive basis for understanding life insurance adoption in Zimbabwe's unique economic environment. The study's model is based on the Life Cycle Hypothesis (LCH) that posits that consumers use financial instruments to stabilise lifetime consumption and maximise utility (Heo, 2020). Life insurance enables wealth transfer, income replacement, and consumption smoothing (Cherry & Asebedo, 2022). Financial decisions are influenced by anticipated lifetime earnings and retirement (Heo, 2020). Life-cycle savings or debt help finance planned expenses such as retirement and education (Zehra & Singh, 2023). Liquidity constraints and long-term wealth accumulation also affect life insurance uptake (Armantier *et al.*, 2023).

The LCH consumption function is:

$$C = \frac{W+RY}{T} \quad \text{..... (1)}$$

where C is household consumption; W (wealth) reflects financial capacity, often lower in informal economies; RY (years until

retirement × income) represents expected lifetime earnings; and T (remaining years of life) aligns with life expectancy (LEXP), shaping financial decisions.

Since life insurance is a financial good, its demand reflects consumption smoothing:

$LIDENS = \alpha W + \beta Y$..... (2)

where LIDENS is life insurance density, W is wealth, Y is labor income, and $\alpha, \beta,$ and are marginal propensities. By substituting W with per capita income (INC) and incorporating the LEXP while accounting for macroeconomic factors (X), the model extends to

$LIDENS = \alpha INC + \beta LEXP + \gamma X$ ..... (3)

where γ represents estimated elasticities.

Other macroeconomic variables considered include.

(i) Informal sector size (INF).
(ii) Inflation (CPI).
(iii) Central Bank Independence (CBI).
(iv) Financial development (FIND).
(v) Insurance literacy (EDU).
(vi) The dependency ratio (DEP).
(vii)Unemployment (UNEMP).

Incorporating these variables, the final model is:

$LIDENS_t = \beta_0 + \beta_1 INC_t + \beta_2 FIND_t + \beta_3 DEP_t + \beta_4 LEXP_t + \beta_5 INF_t + \beta_6 CPI_t + \beta_7 CBI_t + \beta_{18} EDU_t + \beta_9 UNEMP_t + \varepsilon_t$ ..... (4)

This model extends the LCH model to Zimbabwe's informal economy by incorporating macroeconomic variables to analyse life insurance

demand under conditions of income instability and limited financial access.

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The study uses an autoregressive distributed lag (ARDL) model to examine the relationship between macroeconomic variables and life insurance density in Zimbabwe's informal economy. The ARDL model accommodates variables integrated at different orders (I(0) and I(1)) without unit root pretests, thereby reducing integration bias (Pesaran *et al.*, 2001). It captures short- and long-term dynamics and enhances temporal analysis (Sharma *et al.*, 2024). Given the delayed effects of independent variables and autocorrelation in economic indicators, ARDL bound testing is appropriate (Sunge & Makamba, 2020). Studies on insurance adoption (Kolapo *et al.*, 2022; Kura & Legass, 2021) affirm its relevance across diverse contexts.

The general form of the ARDL (p, q) model is:

$$y_t = a_0 + \sum_{i=1}^{P} \beta_i \Delta y_{t-i} + \sum_{j=0}^{q} \sigma_j \Delta x_{t-j} + \delta_i y_{t-1} + \partial_j x_{t-1} + \varepsilon_t \quad \text{---------- (5)}$$

Where:

y_t is the dependent variable.

x_{t-j} are explanatory variables.

a_0 is the intercept.

β_i and σ_j are the short-run coefficients of lagged dependent and independent variables, respectively.

δ_i and ∂_j are the long-run coefficients of lagged dependent and independent variables, respectively.

ε_t is the error term.

t is time in years

p and q are the orders or lag lengths

This model captures both the autoregressive nature of the dependent variable and distributed lag effects of the independent variables.

This leads to the following ARDL model specification:

$$LIDENS_t = \beta_0 + \Sigma_{j=1}^{p}\beta_1 \Delta LIDENS_{t-j} + \Sigma_{j=0}^{q}\beta_2 \Delta INF_{t-j} + \Sigma_{j=0}^{q}\beta_3 \Delta CPI_{t-j} + \Sigma_{j=0}^{q}\beta_4 \Delta CBI_{t-j} + \Sigma_{j=0}^{q}\beta_5 \Delta INC_{t-j} + \Sigma_{j=0}^{q}\beta_6 \Delta FIND_{t-j} + \Sigma_{j=0}^{q}\beta_7 \Delta EDU_{t-j} + \Sigma_{j=0}^{q}\beta_8 \Delta DEP_{t-j} + \Sigma_{j=0}^{q}\beta_9 \Delta LEXP_{t-j} + \Sigma_{j=0}^{q}\beta_{10} \Delta UNEMP_{t-j} + \beta_{11} LIDENS_{t-1} + \beta_{12} INF_{t-1} + \beta_{13} CPI_{t-1} + \beta_{14} CBI_{t-1} + \beta_{15} INC_{t-1} + \beta_{16} FIND_{t-1} + \beta_{17} EDU_{t-1} + \beta_{18} DEP_{t-1} + \beta_{19} LEXP_{t-1} + \beta_{20} UNEMP_{t-1} + \beta_{21} EC_{t-1} + \varepsilon_t \quad \text{..... (6)}$$

where:

$LIDENS_t$ represents life insurance density.
INF_t denotes the informal economy measure.
INC_t indicates income per capita.
CPI_t stands for inflation.
CBI_t is the Central Bank Independence.
$FIND_t$ reflects the level of financial development.
EDU_t denotes insurance literacy.
DEP_t denotes the dependency ratio.
$LEXP_t$ is life expectancy.
$UNEMP_t$ represents the unemployment rate.
t signifies time in years.
$\beta_1 \; to \; \beta_{10}$ = are short-run coefficients.
$\beta_{13} \; to \; \beta_{22}$ = are the long-run coefficients.
β_{23} is the error-correction term.
ε_t is the error term.
p and q are the orders or lag lengths

The ARDL model accounts for autoregressive properties and distributed lag effects. It handles mixed integration orders (I(0) and I(1)), capturing short-term impacts and long-run equilibrium (Ghouse *et al.*, 2018; Bahubal, 2024). This flexibility makes it ideal for analysing Zimbabwe's informal economy (Nkoro & Uko, 2016). Table 1 details variables, expected signs, and data sources.

Ethical considerations were rigorously upheld throughout the research. Using publicly available secondary data mitigated consent issues (Tripathy, 2013). Legal frameworks were assessed to prevent violations (Rojas-Avila & Reynaldos-Grandón, 2023). Ethical standards ensured confidentiality and integrity across all research stages (Whiting & Pritchard, 2018).

FINDINGS

Unit root tests confirm that FIND and DEP are stationary at levels (I(0)), whereas LIDENS, INF, INC, CPI, CBI, UNEMP, LEXP, and EDU require first differencing (I(1)), validating the ARDL approach. The lag-length selection reveals that INF, INC, UNEMP, LEXP, and EDU exhibit lagged effects, whereas CPI, CBI, FIND, and DEP exert immediate influence. The significant adjustment term (-1.0392, $p < 0.001$) indicates a rapid equilibrium correction of 103.92% within one period (Table 1-6). The model demonstrates strong predictive power, with an R-squared value of 0.8664, explaining 86.64% of the variations in life insurance density. The adjusted R-squared value (0.7411) remained robust, whereas the root mean squared error (2.9554) confirmed a minimal deviation between the observed and predicted values (Table 5).

The Breusch-Pagan/Cook-Weisberg test ($p = 0.0976$) confirmed homoscedasticity, whereas the Breusch-Godfrey LM test ($p = 0.2324$) ruled out serial correlation. The ARDL Bounds Test ($F = 6.058$) verifies cointegration, and the Error Correction Term (-1.0008, $p = 0.003$) confirms a significant long-run adjustment.

The pre- and post-estimation tests establish the robustness, validity, and reliability of the ARDL model, reinforcing its suitability for analysing life insurance determinants in Zimbabwe. The ARDL model rigorously examines the determinants of life insurance density in Zimbabwe from 1991 to 2022, capturing both long-run equilibrium relationships and short run adjustments. Life insurance density,

measured as the average premium per capita, provides critical insights into the structural forces that shape Zimbabwe's insurance market. The analysis evaluates the effects of independent variables, tests hypothesis validity (H_1–H_9), and assesses statistical significance, all within the framework of the Life Cycle Hypothesis (LCH) (Tables 1; 2).

The ARDL model highlights complex long-run dynamics, revealing mixed hypothesis outcomes shaped by the structural challenges in Zimbabwe's informal economy.

Table 1: Long-Run (LR) Estimates (Authors' Calculations in Stata 14.2, 2024)

Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*P-value*	*95% Confidence Interval*	*Significance*
LIDENS (L1)	-1.0392	0.2299	-4.52	0.000	[-1.5264, -0.5519]	***
INF	-5.6708	1.8690	-3.03	0.008	[-9.6329, -1.7087]	***
CPI	0.0058	0.0099	0.58	0.570	[-0.0153, 0.0268]	
CBI	0.0079	0.1056	0.07	0.942	[-0.2159, 0.2316]	
INC	-0.0025	0.0013	-1.84	0.084	[-0.0053, 0.0004]	*
FIND	0.1035	0.0637	1.62	0.124	[-0.0316, 0.2385]	
EDU	-4.3779	1.2795	-3.42	0.003	[-7.0903, -1.6655]	***
DEP	-1.6683	0.4015	-4.16	0.001	[-2.5194, -0.8172]	***
LEXP	2.7209	0.5709	4.77	0.000	[1.5107, 3.9311]	***
UNEMP	3.4025	1.9613	1.73	0.102	[-0.7553, 7.5603]	*

****, **, ***, denotes 10%, 5%, and 1% level of significance***

The long-run results in Table 4.1 provide compelling evidence that the informal sector exerts a significant negative impact on life insurance density. The significant negative impact of the informal sector on life insurance density **(-5.6708, p = 0.008)** supports H_1, indicating that income instability and economic vulnerability severely constrain participation in formal insurance services. A one-unit increase in informal sector size precipitates a 5.6708-unit decline in life insurance uptake, reinforcing the conclusion that income instability, economic vulnerability, and financial unpredictability severely constrain participation in formal insurance services. This finding aligns with Afriyie *et al.* (2023) and Indimuli *et al.* (2023) and is consistent with the Life Cycle Hypothesis (Ando & Modigliani, 1963) that asserts that individuals prioritise immediate consumption under uncertain income conditions (Guven *et al.*, 2020). The structural exclusion of informal sector workers underscores the urgent need for targeted policy interventions to bridge the gap between informal employment and formal financial systems (Cama *et al.*, 2024).

The anticipated negative relationship between inflation and life insurance (H_2) is unequivocally rejected because inflation has a statistically insignificant positive effect (0.0058, p = 0.570). This finding confirms that insurers effectively neutralise inflationary pressure through premium adjustments and preserve insurance demand (Ehiogu *et al.*, 2018). Similarly, H_3 is invalidated, because central bank independence exerts no significant long-term influence on life insurance uptake (0.0079, p = 0.942). These results provide limited support for prior research suggesting that CBI promotes financial stability, a key factor in life insurance uptake (Romelli, 2024).

The hypothesis that rising per capita income fosters life insurance adoption (H_4) is decisively refuted. The observed negative coefficient (-0.0025, p = 0.084) indicates no meaningful relationship between income growth and insurance uptake. This unexpected result suggests

that higher-income individuals in Zimbabwe prioritise alternative investments, such as real estate and offshore financial products, over life insurance, diverging from established findings (Kura & Legass, 2021).

The assertion that financial development stimulates life insurance participation (H_5) is also rejected, because the coefficient is positive but statistically insignificant (0.1035, p = 0.124). This suggests that despite theoretical expectations, financial development alone is insufficient to drive insurance uptake in Zimbabwe. Structural impediments, such as financial illiteracy and deep-seated mistrust in financial institutions, continue to undermine insurance adoption (Kiwanuka & Sibindi, 2023a). Srbinoski *et al*. (2021) highlighted that financial development can inadvertently reduce households' precautionary savings needs, thereby diminishing the demand for life insurance products.

Strikingly, H_6 is contradicted, as insurance literacy exerts a significant negative long-term effect on life insurance uptake. The significant negative impact of insurance literacy **(-4.3779, p = 0.003)** contradicts H_6, indicating that rather than increasing demand, greater financial awareness appears to deter Zimbabwean consumers from life insurance, likely due to chronic currency volatility and the erosion of policy values over time (Gubwe *et al.*, 2024). This aligns with Kiwanuka and Sibindi (2023c), who argue that financial literacy does not always translate into greater insurance inclusion, and Ramij (2021), who finds that greater policy awareness discourages participation.

Conversely, H_7 is strongly validated, as the age-dependency ratio exerts a significant negative long-term impact on life insurance density. The significant negative impact of age-dependency **(-1.6683, p = 0.001)**. indicates that households with high dependency burdens prioritise immediate consumption over long-term financial

security, a trend consistently observed in previous studies (Fang, 2022; Li *et al.*, 2021). In contrast, H_8 is confirmed, with life expectancy exhibiting a highly significant positive effect on life insurance uptake. The significant positive impact of life expectancy **(2.7209, p = 0.000)**, substantiates the argument that longer lifespans enhance the perceived necessity of life insurance as a financial stability mechanism, thus reinforcing the findings of Reddy *et al.* (2019).

Finally, H_9 is decisively rejected because unemployment demonstrates an insignificant positive effect on life insurance density (3.4025, p = 0.102). This finding challenges conventional assumptions, suggesting that Zimbabwe's robust informal sector provides alternative income sources that mitigate the adverse effects of unemployment on financial planning (Mujeyi & Sadomba, 2019). This is in stark contrast to Segodi and Sibindi (2022), who identified a strong negative relationship between unemployment and insurance uptake. The ARDL model identifies informal sector participation, age dependency, and life expectancy as key drivers of life insurance density in Zimbabwe's informal economy, while inflation and financial development show minimal effects. Findings highlight complex financial behaviours and the need for policies improving stability, financial literacy, and insurance access. Tables 2–6 present detailed analyses.

Table 2: Short-Run (SR) Estimates (Authors' Calculations in Stata 14.2, 2024)

Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*P-value*	*95% Confidence Interval*	*Significance*
LIDENS (L1)	-1.0392	0.2299	-4.52	0.000	[-1.5264 - 0.5519]	***

INF (D1)	2.5913	1.2090	2.14	0.048	[0.0284, 5.1542]	**
CPI	Nil	n/a	n/a	n/a	n/a	n/a
CBI	Nil	n/a	n/a	n/a	n/a	n/a
INC (D1)	0.0034	0.0013	2.53	0.022	[0.0006, 0.0062]	**
FIND	Nil	n/a	n/a	n/a	n/a	n/a
EDU (D1)	3.6424	1.1212	3.25	0.005	[1.2657, 6.0192]	***
DEP	Nil	n/a	n/a	n/a	n/a	n/a
LEXP (D1)	-2.0184	0.7040	-2.87	0.011	[-3.5108, -0.5260]	**
UNEMP (D1)	3.6200	1.8081	2.00	0.063	[-0.2130, 7.4530]	*
_cons	385.6357	99.1734	3.89	0.001	[175.3975, 595.8739]	***

****, **, ***, denotes 10%, 5%, and 1% level of significance***

From Table 2, Hypothesis H_1 is decisively rejected, as the informal sector size exerts a significant positive short-term impact on life insurance density. The significant positive impact of the informal sector on life insurance density **(2.5913, p = 0.048)** supports the conclusion that informal sector expansion stimulates insurance uptake as a short-term risk management strategy as, corroborated by Hans (2023).

Table 3: Dickey-Fuller Test Results for Unit Roots (Authors' Calculations in Stata 14.2, 2024)

Variable	Test Statistic (Z(t))	Critical Value (5%)	P-Value	Stationarity/ Conclusion	Order of Integration
Life insurance density	-2.452	-2.980	0.1275	Non-Stationary (Fail to Reject null hypothesis)	I(0)

(LIDENS)	-5.558	-2.983	0.0000	Stationary (Reject null hypothesis)	I(1)
Informal sector size (INF)	-1.754	-2.980	0.4037	Non-Stationary (Fail to Reject null hypothesis)	I(0)
	-6.219	-2.983	0.0000	Stationary (Reject null hypothesis)	I(1)
Per capita income (INC)	-1.312	-2.980	0.6238	Non-Stationary (Fail to Reject null hypothesis)	I(0)
	-3.981	-2.983	0.0015	Stationary (Reject null hypothesis)	I(1)
Inflation (CPI)	-2.893	-2.980	0.0661	Stationary (Fail to Reject null hypothesis)	I(0)
	-10.061	-2.983	0.0000	Stationary (Reject null hypothesis)	I(1)
Central Bank Independence (CBI)	-2.497	-2.980	0.1163	Non-Stationary (Fail to Reject null hypothesis)	I(0)
	-6.068	-2.983	0.0000	Stationary (Reject null hypothesis)	I(1)
Financial development (FIND)	-2.860	-1.697	0.0038	Stationary (Reject null hypothesis)	I(0)
Unemployment (UNEMP)	0.900	-2.980	0.9931	Non-Stationary (Fail to Reject null hypothesis)	I(0)
	-3.005	-2.983	0.0345	Stationary (Reject null hypothesis)	I(1)
Dependency (DEP)	-3.711	-2.980	0.0040	Stationary (Reject null hypothesis)	I(0)
Life expectancy (LEXP)	-0.745	-2.980	0.8347	Non-Stationary (Fail to Reject null hypothesis)	I(0)
	-3.646	-2.983	0.0049	Stationary (Reject null hypothesis)	I(1)
Insurance literacy (EDU)	1.090	-2.980	0.9951	Non-Stationary (Fail to Reject null hypothesis)	I(0)
	-3.173	-2.983	0.0216	Stationary (Reject null hypothesis)	I(1)

Table 4: Lag Length Selection (Authors' Calculations in Stata 14.2, 2024)

Variable	Selected Lag	Coefficient	Std. Error	t-Statistic	P-value	95% Confidence Interval
LIDENS	L1	-0.0392	0.2299	-0.17	0.867	[-0.5264, 0.4481]
INF	L1	-2.5913	1.2090	-2.14	0.048	[-5.1542, -0.0284]
INC	L1	-0.0034	0.0013	-2.53	0.022	[-0.0062, -0.0006]
CPI	L0	0.0060	0.0100	0.60	0.559	[-0.0153, 0.0273]
CBI	L0	0.0082	0.1105	0.07	0.942	[-0.2262, 0.2425]
FIND	L0	0.1075	0.0599	1.79	0.092	[-0.0195, 0.2346]
UNEMP	L1	-3.6200	1.8081	-2.00	0.063	[-7.4530, 0.2130]
DEP	L0	-1.7337	0.2613	-6.63	0.000	[-2.2876, -1.1797]
LEXP	L1	2.0184	0.7040	2.87	0.011	[0.5260, 3.5108]
EDU	L1	-3.6424	1.1212	-3.25	0.005	[-6.0192, -1.2657]
_cons	-	385.6357	99.1734	3.89	0.001	[175.3975, 595.8739]

Table 5: Adjustment Term (Speed of Adjustment) (Authors' Calculations in Stata 14.2, 2024)

Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*P-value*	*95% Confidence Interval*	*Significance*
LIDENS (L1)	-1.0392	0.2299	-4.52	0.000	[-1.5264, -0.5519]	***

****, **, ***, denotes 10%, 5%, and 1% level of significance***

Table 6: Model Fit (R-Squared Results) (Authors' Calculations in Stata 14.2, 2024)

Metric	Value
R-squared	0.8664
Adj R-squared	0.7411
Root MSE	2.9554

Table 7: Diagnostic and Cointegration Tests (Authors' Calculations in Stata 14.2, 2024)

Test	Null Hypothesis (H_0)	Statistic	p-value	Critical Bounds (5%)	Decision	Commentary
Breusch-Pagan / Cook-Weisberg Test	Constant variance (Homoskedasticity)	$Chi^2 = 2.74$	0.0976	-	Fail to reject H_0	Evidence supports homoscedasticity
Breusch-Godfrey LM Test for Autocorrelation	No serial correlation in residuals	$Chi^2 = 1.426$ (df = 1)	0.2324	-	Fail to reject H_0	No evidence of serial correlation
ARDL Bounds Test (F-statistic)	No long-run relationship (no cointegration)	F = 6.058	-	I(0) = 2.45, I(1) = 3.61	Reject H_0 (Cointegration exists)	Evidence of cointegration
Error Correction Term (ECT)	No long-run equilibrium adjustment	Coefficient = -1.0008, p = 0.003	0.003	-	Significant	Long-run adjustment confirmed

Hypothesis H_2 is rejected, because inflation has no significant short-run impact on life insurance density. The absence of lag effects suggests that insurers may adjust premiums to offset the influence of inflation, thus preserving the insurance's appeal in Zimbabwe's informal economy. Hypothesis H_3 is refuted, as central bank independence fails to exert any meaningful short-term influence on life insurance density. The absence of lagged impacts confirms a contemporaneous relationship with no delayed influence from past levels of central bank independence.

Hypothesis H_4 is supported by a positive short-term effect of per capita income on life insurance. The significant impact of per capita income on life insurance density **(0.0034, p = 0.022)**, indicates that income gains prompt increased insurance investment as a protective measure. This aligns with the long-term findings of Kura and Legass (2021) and Ramij (2021), who link rising income to life insurance uptake.

Thus, Hypothesis H_5 is rejected. The findings indicate that financial development has an immediate impact on life insurance density with no delayed effects, suggesting a direct relationship without lasting influence from past financial development levels. The positive and significant short-term impact of insurance literacy on life insurance density **(3.6424, p = 0.005),** demonstrates its direct influence on insurance uptake. Consistent with Kiwanuka and Sibindi (2023a) and Ramij (2021), this underscores the role of basic literacy in stimulating insurance demand, as individuals recognise its protective value.

Hypothesis H_7 is rejected because age dependency directly affects life insurance density. As past age dependency levels have no lasting impact, this confirms an immediate relationship with no influence on future periods. Hypothesis H_8 is contradicted, as life expectancy exhibits a negative short-term effect. The significant negative short-term impact of life expectancy on life insurance density **(-2.0184, p = 0.011)**, suggests that households reallocate resources towards more flexible investments or display anti-selection tendencies. This finding diverges from Reddy *et al*. (2019) and Sianipar and Hutagalung (2021) and contrasts with the long-term effects.

Hypothesis H_9 that posits that unemployment reduces life insurance density, is rejected due to its insignificant positive coefficient (3.6200, p = 0.063). Zimbabwe's informal sector provides alternative income sources to mitigate the impact of unemployment. This differs

from the findings of Segodi and Sibindi (2022), and Simionescu (2022).

In summary, the ARDL analysis provides compelling evidence that informal sector participation, rising income, and insurance literacy drive life insurance uptake in the short-term. Conversely, inflation, central bank independence, financial development, dependency, life expectancy, and unemployment exhibit negligible or counterintuitive effects, underscoring Zimbabwe's dynamic financial adaptability.

CONCLUSIONS AND RECOMMENDATIONS

The study examines the factors influencing life insurance uptake in Zimbabwe's informal economy by addressing barriers overlooked by conventional models. The ARDL framework highlights the short- and long-term effects of the economic, demographic, and institutional factors. The informal sector, age dependency, and unemployment negatively impact long-term uptake, whereas short-term income fluctuations and economic uncertainty temporarily increase the demand. These findings emphasise the need for microinsurance products and financial literacy initiatives to improve accessibility. Life insurance uptake is shaped by economic variables, with the Life Cycle Hypothesis explaining the long-term decline due to informal sector employment, dependency, and unemployment. Short-term dynamics reflect immediate responses to income gain or uncertainty. Factors such as life expectancy and financial development challenge traditional assumptions, showing how informal income patterns and reliance on informal networks influence financial behaviour.

These findings contribute to the literature on life insurance in informal economies and support the lifecycle hypothesis. While age dependency aligns with expectations, variables such as central bank independence and inflation show minimal influence, suggesting that informal structures weaken macroeconomic effects. Future research should explore informal income patterns and financial uncertainty in household decision making. Given the negative impact of the

informal sector, age dependency, and unemployment on long-term uptake, policymakers should focus on expanding financial inclusion through microinsurance and literacy programmes. Insurers can develop flexible products by leveraging community networks, such as savings groups, and providing short-term benefits tailored to the needs of informal sector workers.

Collaboration between governments and NGOs can enhance awareness and adoption of life insurance products. Joint initiatives can focus on education and outreach to build trust and understanding. The study's reliance on aggregate data limits behavioral insights. Future studies should incorporate household-level data to gain a deeper understanding of financial behavior in informal economies.

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