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Determinants of Life Insurance Demand: Empirical Evidence from BRICS Countries

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Abstract: The life insurance industry has experienced phenomenal growth over the years. The broad aim of this study was to establish the variables that influence the demand for life insurance in the BRICS countries (Brazil, Russia, India, China and South Africa). Although many studies have investigated the determinants of life insurance demand, little research has considered the supply-side factors such as financial regulation. Therefore, this study also contemplated the effect of the financial regulation variable on life insurance demand. The inquiry employed a panel of the BRICS bloc of countries as a unit of analysis for 1999–2020 and applied panel data econometric techniques. The study found that the life insurance demand variable (proxied by life insurance density and alternatively by life insurance penetration) was negatively affected by income, unemployment, interest rates and inflation variables. Furthermore, the study documented a positive relationship between life insurance demand and the economic growth and financial freedom variables. This study implies that regulatory authorities should deregulate the life insurance sector to foster financial freedom.

Keywords: life insurance demand; life insurance density; life insurance penetration; financial freedom; interest rates; inflation; BRICS

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1. Introduction

The role of life insurance in society is multifaceted. First, insurance offers protection against any loss arising from an unexpected event that may cause financial distress. This coverage is implemented when insurance companies collect premiums from the insured in exchange for security (Hussein and Alam 2019). Second, life insurance reduces the amount of capital needed by the state to cover those individuals who are not insured and contributes to a change in the lifestyle of those who are insured. Third, insurance plays a crucial role in supporting a sustainable economy by protecting governments and consumers from losses (Eling et al. 2014).

The demand for life insurance has increased rapidly over the past few decades, significantly outpacing worldwide income growth. In addition, waves of globalisation and privatisation have profoundly influenced the insurance market worldwide, increasing direct trade and portfolio investment (Chaudhury and Das 2014). As a result, there has been a growing demand for insurance services, particularly in emerging markets. While research on the need for life insurance has attracted much attention since the 1960s, most studies have focused on cross-country studies or well-established markets in developed countries (Kakar and Shukla 2010).

Accordingly, Dragos (2014) argued that life insurance is attractive to the middle classes but may be unaffordable in lower-income countries. Moreover, life insurance demand is influenced differently by institutional indicators from the worldwide governance indicator database in emerging and transitioning markets than in developing ones (Dragos et al. 2017). Dragos (2014) further argued that even though literature has been devoted to explaining the determinants of life insurance, there is still a vast difference between

underdeveloped and developed countries. For example, China's life insurance market has seen significant growth, although income level remains relatively low compared to other developed countries. This offers an attractive incentive to examine several key factors affecting the demand for life insurance in China (Hwang and Gao 2003).

As such, the broad aim of this study is to establish the determinants of life insurance demand. More specifically, the objective of this study is to determine whether the level of income, unemployment, interest rate, inflation, financial freedom and economic growth impact life insurance demand in BRICS countries. Identifying the explanatory factors of life insurance penetration in BRICS would help inform policy decisions in improving the low life insurance penetration in BRICS, taking into account the unique characteristics of those countries.

Few studies have been conducted to unravel the determinants of life insurance demand. While extensive research has been dedicated to understanding the need for life insurance in developed countries, understanding this need in developing markets in the academic literature remains underdeveloped. This leaves the topic under-researched, calling for more work in the context of developing countries.

The remainder of this article is arranged as follows: the next section reviews the theoretical and empirical literature about the determinants of life insurance demand in BRICS countries. Then we describe the research design and methodology, sample description, data sources and model specification. Next, we present the findings, results and the discussion, after which we conclude the article.

2. Review of Related Literature

2.1. Background to Life Insurance

Life insurance can be used to replace income upon a wage earner's death (Campbell 1980). To offset the fear of the sudden loss of wage earners in families due to premature death, life insurance provides coverage against such loss and relieves families of the financial burden.Benjamin Franklin, known as the father of insurance, developed fire insurance in 1752. He extended and provided insurance on crops, life insurance and insurance for widows and orphans (Thomas and McSharry 2015). Sen (2008) defined insurance policies as financial products that offer two main services: income replacement for premature death and a long-term service instrument. It is an arrangement between the insurer and the insured to provide security in case of the death of the insured.

According to Koller (2016, p. 3), life insurance is an agreement between the insurer and the insured that yields a payout to the heirs no matter how old the insured is at the time of death. In cases where the insured does not die but becomes permanently disabled due to an accident, life insurance pays out a portion of the coverage (Boyer et al. 2017). Life insurance can be obtained by individuals or by groups. This kind of insurance is generally offered to employees by the employer. The coverage is referred to as group life insurance (Norberg 1989).

Akhter et al. (2017, p. 1406) contended that an important motive in purchasing insurance is the protection of family members from financial difficulties due to the premature death of wage earners, in which case life insurance serves as income replacement. Furthermore, those endowments with a maturity date can form part of long-term savings (Pradhan et al. 2017). Such unforeseen circumstances would lead to an increase in demand for life insurance. According to Feyen et al. (2011), people primarily buy life insurance to protect their dependents against loss of income if the wage earner dies. Therefore, it is argued that if the government provides substantial benefits for the families of prematurely deceased wage earners, there should be less demand for life insurance products (Beck and Webb 2003).

Consumers purchase life insurance for various reasons, enumerated in extant studies. For instance, Lee et al. (2010) explained the motive for buying life insurance as uncertainty regarding human capital and the possibility of a wage earner's death. The purchase of life insurance plays a vital role in providing risk coverage, investment and tax planning

for individuals. Rao et al. (2014) saw life insurance as a function of institutional investors providing capital to infrastructure. The person's desire to bequeath funds to dependents and provide income at retirement also influences their decision to purchase life insurance (Beck and Webb 2003). The payout supports families who have lost their prime income earner and guarantees income continuity despite the loss (Liedtke 2007, p. 219).

Extant studies have examined the causal relationship between insurance sector development and economic growth and documented mixed results. In the main, a positive causal relationship was established between life insurance and economic growth. This strand of studies includes amongst others: Ward and Zurbruegg (2000), Beck and Webb (2003), Kugler and Ofoghi (2005), Arena (2008), Haiss and Sümegi (2008), Sibindi (2014) and Sibindi and Godi (2014).

2.2. Life Insurance from a Variety of Contexts

Yadav and Sudhakar (2018) examined the determinants for life insurance demand in India using 170 customers and found that income had a significant impact. In their studies, Dragos et al. (2017) employed a sample of 32 European countries and documented that income distribution was an insignificant factor in the demand for life insurance products.

Kjosevski (2012) conducted a study in 14 countries in central and southeastern Europe and found that variables such as GDP per capita, inflation, health expenditure, level of education and the rule of law are the most robust predictors of life insurance demand. Beenstock et al. (1986), using a dataset of 10 developed countries, concluded that income, life expectancy and the dependency ratio positively impact life insurance demand. Finally, Lin and Grace (2007) examined the variables of life insurance demand and discovered a relationship between households' financial vulnerability and the need for life insurance. Their study deconstructed the market for life insurance into the demand for whole life insurance and took into account economic exposure to loss of labour income for both spouses.

Beck and Webb (2003) reported that fewer customers might purchase life insurance in developing countries with a large middle class. Zerriaa et al. (2017) examined the phenomenon within the context of Tunisia and found that life insurance demand increases with financial development.

Sherif and Shaairi (2013) unearthed that income, Islamic banking development, education and Muslim population factors had a positive association with life insurance demand. Furthermore, Sen and Madheswaran (2013) examined life insurance demand in 12 Asian economies and established that income, financial depth, inflation, the real interest rate and the youth dependency ratio affected life insurance consumption.

Alhassan and Biekpe (2016) employed a sample of 31 African countries from 1996 to 2010 and documented that financial development, health expenditure and institutional quality were positively related to the insurance market in Africa.

Burnett and Palmer (1984), in their study performed in a midsized southwestern city with approximately 400 participants showed that education, income and religion are key determinants of the demand for life insurance. Hwang and Gao (2003) conducted a study in China in the mid-1990s and found that education influenced the purchase of life insurance.

The BRICS countries comprise Brazil, the Russian Federation, India, China and South Africa and represent some of the fastest-growing large economies and nearly 40% of the world population (Rao et al. 2014). Moreover, the BRICS insurance market is one of the largest investors in the world, concentrating around 12% of all financial assets, or USD 24 trillion (Bassanini and Reviglio 2011).

Although there has been a practical explanation for the determinants of life insurance demand in other European and African countries, some regions have not been examined. Therefore, this paper focuses on Brazil, Russia, India, China and South Africa (BRICS) to fill the gap. The research conducted in all those countries indicates more or less the same variables as the determinants of life insurance demand. Even though some variables affect

the market negatively and some positively, it is imperative to expand the study to different states and regions and compare the results.

3. Research Methodology

This section unpacks the research methodology for this study. First, the section unpacks the research design adopted for the study. Second, the section identifies and describes the target population. Data sources and the variables employed in the study are described. Third, the section identifies studies that applied the same methodology as the present study, after which the models are specified and the variables defined. Last, specification tests are explained and discussed in detail to justify the researchers' choice of the most appropriate panel model for the study.

3.1. Research Design

Creswell (2002) explained that a research design refers to selecting subjects, research sites and data collection procedures to answer the research question. Previous research shows that the research field paradigm is a comprehensive belief system that guides research in a study (Wahyuni 2012, p. 69). A positivist paradigm asserts that actual events can be observed empirically and explained logically (Kaboub 2008). The research paradigm is acknowledged as the logical thinking or common ethics that edify the data analysis (Mackenzie and Knipe 2006). This paper follows a positivist paradigm, making the quantitative approach more appropriate (Dawson 2002).

3.2. Target Population and Data Sources

The target population for the study was the BRICS countries, and the census approach was employed. The study employed the entire population of BRICS countries as a unit of analysis. These are characterized in Table 1.

Table 1. Population of the study.

Country	Level of Development
Brazil	Developing
Russia	Developing (economies in transition)
India	Developing
China	Developing
South Africa	Developing

Source: World Economic Situation and Prospects 2020.

- Data and variables

The data for this study was sourced from several data sources. Life insurance proxies were sourced from the AXCO database, whereas macroeconomic variables were accessed from the World Bank Global Financial Development (WBGFD). The data on financial freedom was sourced from the Heritage Foundation database. The data and data sources are described in Table 2.

Table 2. Variable definition and data sources.

Variables	Definition	Data Source
Life insurance penetration (LIP)	LIP = (Life Insurance Premium Volume)/(Gross Domestic Product) × 100%	AXCO
Life Insurance density (LID)	$\text{LID} = \frac{\text{Gross written premiun per capita}}{\text{Population per country}} \times 100\%$	AXCO
Inflation (INF)	$\text{INF} = \frac{\text{CPI}_{x+1} - \text{CPI}_X}{\text{CPI}_X}$	World Bank Global Finance Development (WBGFD)
Unemployment (UNEMPL)	$\text{UNEMPL} = \frac{\text{Unemployed people}}{\text{Total Labor Force}} \times 100\%$	WBGFD
Economic growth (RGDP)	$\text{RGDP} = \frac{\text{Real GDP}}{\text{Population}}$	Organisation for Economic Cooperation and Development (OECD)
Financial freedom (FINFREE)	FINFREE = score taking a value between 0 and 100	Heritage Foundation
Interest rate (RINT)	$\text{RINT} = \frac{1 + \text{Nominal Interest rate}}{1 + \text{Inflation rate}} - 1$	WBGFD
GDP per capita (INCOME)	$\text{INCOME} = \frac{\text{GDP}}{\text{Total population}}$	AXCO

3.3. Model Specification

This study examined the factors that influence life insurance penetration and consumption in BRICS countries. The main objective of the study was to identify the determinants of life insurance demand in BRICS countries.

The study employed econometrics models that are based on previous studies on the determinants of life insurance demand (see for instance: Beck and Webb 2003; Kjosevski 2012; Sen and Madheswaran 2013; Dragos 2014). These studies specified static models and applied the ordinary least squares (OLS), fixed effects model (FEM) and the random effects model (REM) as well as the feasible generalised least squares (FGLS) techniques. In the same vein, the previous studies guided the current study on which variables to employ and which to exclude.

As such, consistent with previous studies, this studies adopted a static model and applied the FEM, REM and FGLS techniques to estimate the models. The panel regression models are specified as follows:

$$\boldsymbol{LID_{i,t} = \beta_1 UNEMPL_{i,t} + \beta_2 RGDP_{i,t} + \beta_3 INF_{i.t} + \beta_4 RINT_{i.t} + \beta_5 INCOME_{i.t} + \beta_6 FINFREE_{i.t} + \varepsilon_{i.t}} \quad (1)$$

$$\boldsymbol{PENET_{i,t} = \beta_1 UNEMPL_{i,t} + \beta_2 RGDP_{i,t} + \beta_3 INF_{i.t} + \beta_4 RINT_{i.t} + \beta_5 INCOME_{i.t} + \beta_6 FINFREE_{i.t} + \varepsilon_{i.t}} \quad (2)$$

where:

$LID_{i,t}$ = life insurance density for country i
$PENET_{i,t}$ = life insurance penetration for country i
$UNEMPL$ = unemployment
$RINT$ = real interest rates
INF = Inflation
$RGDP$ = Per capita real GDP
$FINFREE$ = Financial Freedom
B_i = slope parameter i
$\varepsilon_{i.t}$ = error term decomposed into time variant error ($u_{i.t}$) and cross-sectional variant error ($\alpha_{i.t}$).

Furthermore, this study used life insurance penetration as the indicator for life insurance consumption for robustness checks.

3.4. Formal Tests of Specification

Several tests were conducted on the pooled OLS, FEM and REM. We took cue from previous studies such as Sibindi and Makina (2018) and Sibindi (2018). These included the tests for joint validity of individual cross-sectional effects (Breusch and Pagan 1980, p. 239), the Lagrange multiplier (LM) test for random effects (Hausman 1978, p. 1251), the specification test for heteroscedasticity and the multicollinearity test. The first test sought to test the joint validity of cross-sectional results by performing an applied Chow test or a F-test to test for the probability or personal effects and the validity of the cross-sectional effects.

The second test was the Breusch and Pagan (1980, p. 239) LM test, which tested for homoscedasticity or serial correlation. The third applied test was Hausman's (1978, p. 1251) test, which selected the FEM or the REM. The null hypothesis for this test was that the preferred model was the REM, and the alternative hypothesis was that the FEM was the preferred model. The FEM with Driscoll and Kraay standard errors estimator solved heteroscedasticity problems.

The fourth test conducted tested for multicolinearity by conducting correlational analysis. It was found to be absent as none of the correlation coefficients were greater than 0.70.

4. Empirical Findings and Discussion

4.1. Descriptive Statistics

Table 3 presents the key descriptive statistics for all variables employed in the study from 1999 to 2020. The descriptive summary statistics interpret the measures used in the analysis. The following measures were used: mean and median, minimum and maximum, standard deviation, skewness, the Jargue–Bera test, probability and observation for the sample of all BRICS countries.

Table 3. Summary statistics.

Variables	DENSIT	FINFREE	INCOME	PENET	RGDP	RINT	UNEMPL
Mean	1846.09	41%	12,277.11	3.00%	4800.00	11%	28%
Median	741.85	40%	12,467.08	2.00%	3180.00	5.00%	28%
Maximum	9056.31	70%	27,043.94	15%	22,500.00	67%	51%
Minimum	19.21	20%	2522.86	0%	435	0	5%
Standard deviation	2254.62	12%	6715.79	4%	4910.00	14%	11%
Skewness	1.52	0.37	0.56	1.43	1.99	1.76	17
Kurtosis	4.49	2.14	2.73	3.62	6.58	5.22	2.43
Jargue–Bera	52.58	5.87	6.14	39.23	131.52	75.44	2.05
Probability	0	0.05	0.05	0	0	0	0.36
Observation	110	110	110	110	110	110	110

The mean life insurance density reported in BRICS countries for the sample period was USD 1846.09 with a median of USD 741.85. The maximum value of insurance density was USD 9056.31 and a minimum of USD 19.21, signifying a range of USD 9037.10. This indicates a vast difference in life insurance density for the countries under consideration. This wide range was supported by a high standard deviation of USD 2254.62. The life insurance density variable was normally distributed with a Jargue–Bera of 52.58% and was significant at the 1% level. The kurtosis of the variables under analysis was above one. Therefore, the distribution of these variables was too peaked. Life insurance density was positively skewed with a skewness of 1.52, which indicates that insurance density was relatively low within the countries under consideration. However, South Africa had a high insurance density.

Life insurance penetration in BRICS countries had a mean of 3% with a median of 2%. The maximum value for the life insurance penetration was 15%, and the minimum value was 0%, signifying a range of 15%. This indicates a narrow difference in penetration for

the countries under consideration. The limited range was supported by a minor standard deviation of 4%. The penetration variable was usually distributed with the Jargue–Bera at 39.23 and was significant at 1%. The kurtosis was 3.62 and therefore was too peaked. As a result, life insurance penetration was positively skewed with a skewness of 1.43.

The income variable for the BRICS countries assumed a mean of USD 12,277.11 and a median of USD 12,467.08 for the sample period. The maximum value for the income variable was USD 27,043.94 and the minimum USD 6715.79, signifying a range of USD 24,521.08. This indicated a wide disparity in income among the countries under consideration. The more comprehensive range was supported by a higher standard deviation of USD 6715.79. Furthermore, the income variable was normally distributed with a Jargue–Bera of 6.14 and was significant at 1%. For all the variables under analysis, the kurtosis was above 1%. Therefore, the distribution of these variables was too peaked. Income had a kurtosis of 2.73, which was also too peaked. Thus, income was negatively skewed at 0.56.

A previous study that used an instrumental variable technique found that higher income per capita increases life insurance premiums (Guerineau and Sawadogo 2015). In addition, Sen and Madheswaran (2013) suggested that income is a significant determinant of life insurance consumption.

Economic growth assumed a mean of USD 4800.00 per capita, with a median of USD 3180.00. The maximum value of per capita economic growth for our sample of countries was USD 22,500.00 and the minimum was USD 435.00, signifying a range of USD 22,065.00. This indicated a vast difference in economic growth for the countries under consideration. The wide range was supported by a higher standard deviation of USD 4910.00. The economic growth was generally distributed with a Jargue–Bera of 131.52 and was significant at the 1% level. The kurtosis of 6.58 was above 1%. Therefore the distribution of this variable was too peaked. Economic growth was positively skewed since the skewness was 1.99. This means that economic growth was high for the countries under consideration. Kjosevski (2012) stated that higher GDP per capita is the most robust predictor of the use of life insurance.

The results of the study document that the interest rate variable for our sample of countries was on average 11% with a median of 5%. The maximum interest rate was USD 0.67 and the minimum 0%, signifying a range of 67%. This indicated a narrow difference in interest rates for the countries under consideration. This limited range was supported by a smaller standard deviation of 14%. Interest rates were normally distributed with a Jargue–Bera of 75.44 and were significant at the 1% level. The interest rate had a kurtosis of 5.02, implying that the variable was too peaked. The skewness of 1.76 was positive since it was greater than 1%. Actual interest rates did not appear robustly associated with life insurance demand (Kjosevski 2011).

The unemployment rate for the sample of countries under investigation had a mean and a median of 28%. The maximum unemployment rate was 51%, while the minimum rate was 5%, signifying a range of 46%. This indicated no range in unemployment for the countries under consideration. The unemployment rate was not normally distributed, with a Jargue–Bera of 2.05. However, it was insignificant. Unemployment was negatively skewed at 0.1, and kurtosis was above 1% at 2.43, signifying that the variable was too peaked.

The results of the study documented in Table 3 indicate that financial freedom was 41% on average, with a median of 40%. The maximum level of financial freedom was 70% with a minimum of 20%, signifying a range of 1%. This indicated a narrow difference in economic freedom for the countries under consideration. The limited coverage was supported by the slight standard deviation of 0.12, while the kurtosis of 2.14 was greater than 1%. Therefore, the distribution of this variable was too peaked. Financial freedom was normally distributed with a Jaurge–Bera of 5.87 and was significant at 1%. Financial freedom was neither positively nor negatively skewed since the skewness was 0.37.

4.2. Panel Regression Results

The results based on the various diagnostic checks indicated significant cross-sectional individual effects concerning both life insurance penetration and life insurance density as proxies for life insurance demand across the BRICS market (Refer to Appendix A). These could be time-invariant effects common across the countries or heterogeneous country effects that vary over time. As a result, these cross-sectional variations are better captured by panel regression models than techniques that aggregate the data, such as pooled and time series regression analyses. Concerning the choice of the most appropriate panel regression model, the various diagnostic checks favoured the fixed effects regression over random and pooled regressions. Although the following subsection presents the results obtained from estimating each of the three main panel regression models (pooled regression, fixed effects and random effects), the discussion will focus only on the fixed effects regression model output as this is the preferred model for the data at hand.

This section presents the panel regression results with life insurance penetration employed as the dependent variable. The regression results are presented in Table 4.

Table 4. Panel regression results with life insurance density as the dependent variable.

	Pooled Effects	**Fixed Effects**	**Random Effects**	**FGLS**
FINFREE	7519.0 ***	2499.0 *	7519.0 ***	7519.0 ***
	(1888.5)	(1073.3)	(1888.5)	(1827.4)
LINCOME	484.3	−40,228.8 ***	484.3	484.3
	(674.3)	(3348.2)	(674.3)	(652.5)
LRGDP	−1723.4 ***	39,841.0 ***	−1723.4 ***	−1723.4 ***
	(497.7)	(2978.0)	(497.7)	(481.6)
RINT	−8858.7 ***	3424.4 *	−8858.7 ***	−8858.7 ***
	(1193.2)	(1403.9)	(1193.2)	(1154.6)
UNEMPL	136.9	−1712.4	136.9	136.9
	(1800.1)	(1176.5)	(1800.1)	(1741.9)
INFL	−4841.6 **	−1398.9 *	−4841.6 **	−4841.6 **
	(1742.6)	(929.5)	(1742.6)	(1686.2)
_cons	19,596.8 **	−332,939.5 ***	19,596.8 **	19,596.8 **
	(7260.1)	(23,866.7)	(7260.1)	(7025.3)
N	110	110	110	110
R^2	0.5798	0.732	0.5798	
F-Stats/Wald chi2	142.11 ***	44.99 ***	142.11 ***	151.76 ***

Standard errors in parentheses: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

As reported in Table 4, the results indicate a positive and highly statistically significant relationship between the level of income and life insurance density. A higher income level leads to a higher demand for life insurance products. The estimation results indicate that unemployment is negatively related to insurance demand as measured by life insurance density. Though this is in line with theory, unfortunately, the relationship is not statistically significant. Since the association was insignificant, implying that the coefficient was not significantly different from zero, no further analysis was performed.

As reported in Table 4, the results of the study document that actual interest rates are negatively and significantly related to life insurance density. Furthermore, the fixed effect estimator results indicate that inflation is positively related to life insurance density, and the relationship is statistically significant. The study results reveal that RGDP is negatively associated with insurance demand, statistically significant. This indicates that perhaps there is reverse causality, with an increase in life insurance demand leading to increased economic growth.

For robustness, life insurance demand was also proxied by insurance penetration. The results are documented in Table 5.

Table 5. Determinants of life insurance demand as measured by insurance penetration.

	Pooled Effects	Fixed Effects	Random Effects	FGLS
FINFREE	0.102 ***	−0.0331 *	0.102 ***	0.102 ***
	0.0255	0.0134	0.0255	0.0247
LINCOME	−0.00230	0.203 ***	−0.00230	−0.00230
	0.00911	0.0418	0.00911	0.00881
LRGDP	−0.0560 ***	−0.179 ***	−0.0560 ***	−0.0560 ***
	0.00672	0.0372	0.00672	0.00650
RINT	−0.122 ***	−0.0503 **	−0.122 ***	−0.122 ***
	0.0161	0.0175	0.0161	0.0156
UNEMPL	−0.0547 *	−0.00818	−0.0547 *	−0.0547 *
	0.0243	0.0147	0.0243	0.0235
INFL	−0.0857 ***	0.0489 ***	−0.0857 ***	−0.0857 ***
	0.0235	0.0116	0.0235	0.0228
_cons	0.735 ***	1.472 ***	0.735 ***	0.735 ***
	0.0981	0.298	0.0981	0.0949
N	110	110	110	110
R^2	0.7656	0.310	0.7656	
F-Stats/Wald chi2	336.38 ***	7.42 ***	336.38 ***	395.24 ***

Standard errors in parentheses: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

First, the results as reported in Table 5 indicate a positive and highly statistically significant relationship between the level of income and life insurance penetration. This means that a higher level of income leads to a higher demand for life insurance products.

Second, the estimation results indicated that unemployment is negatively related to insurance demand as measured by insurance penetration. Though this is in line with theory, unfortunately the relationship is not statistically significant. Since the relationship was not significant, implying that the coefficient was not significantly different from zero, no further analysis was performed. Third, the results of the study as reported in Table 5 indicate a positive relationship between financial freedom and life insurance penetration. This is consistent with a priori expectations. However, the relationship was significant only at the 10% level, suggesting that, from a statistical point of view, financial freedom is a less important determinant of life insurance demand among BRICS countries. Fourth, the results of the study, as reported in Table 5, document that real interest rates are negatively and significantly related to life insurance penetration. This finding is similar to when life insurance density was employed as a proxy for life insurance demand. Furthermore, the results of the fixed effect estimator indicate that inflation is positively related to insurance penetration, and the relationship is statistically significant. Finally, the results of the study reveal that RGDP is negatively related to insurance penetration, and the result is statistically significant.

5. Discussion of Findings

The study results indicate a negative yet significant relationship between income and life insurance density. On the other hand, a positive and meaningful relationship between income and insurance penetration was established. This positive relationship implies that higher income levels lead to higher insurance penetration. Therefore, income has an impact on life insurance demand. Similarly, Beck and Webb (2003) found that income is positively related to income. Burnett and Palmer (1984) found that income is a determinant for life insurance demand, and specifically, income has a positive impact on life insurance demand.

This study indicates that unemployment is negatively related to insurance penetration. This is consistent with a priori expectations. Furthermore, it was established that the relationship between insurance density and the unemployment variable is insignificant.

Furthermore, it was established that inflation is positively related to life insurance penetration. It was also established that the real interest variable is negatively associated with the life insurance penetration variable. Similarly, it was found that real interest

rates are positively and significantly related to life insurance density. This implies that macroeconomic variables influence life insurance demand.

An abundance of studies also found similar results. Among others, Feyen et al. (2011) found that inflation was negatively related to life insurance demand. Haiss and Sümegi (2008) and Redzuan et al. (2009) also found a significant positive relationship between demand for life insurance and interest rates. Li et al. (2007) similarly found that a negative relationship exists between interest rates and life insurance demand. This finding was also corroborated by Sherif and Shaairi (2013) who reported that inflation and the real interest rate appear to have a significant negative relationship with life insurance demand. Moreover, Sen and Madheswaran (2013) reported that interest rates and inflation are the significant determinants of life insurance demand.

The results showed that a positive relationship between insurance density and financial freedom exist. This finding was robust when life insurance penetration was employed as the proxy. This implies that the higher the financial independence, the higher the insurance penetration. This was in line with the a priori expectations.

The results of the study reveal that economic growth is positively and significantly related to insurance density in BRICS countries. However, it was also found that economic growth negatively correlated to insurance penetration in BRICS countries.

Overall, the study found unemployment to be the only variable that has an unambiguously negative relationship with both proxies of life insurance demand (penetration and density). An increase in unemployment was associated with a decrease in both life insurance density and penetration during the analysis period. In summary, the study concludes that the relationship between life insurance demand and certain key macroeconomic variables depends on which measure is used to proxy life insurance demand.

6. Conclusions

The broad aim of the study was to establish the determinants of life insurance demand. The study tested several variables to find the determinants of life insurance demand in the BRICS countries. The primary dependent variable employed in this study was life insurance demand proxied by life insurance density and life insurance penetration. The independent variables were income, unemployment, financial freedom, inflation, interest rate and RGDP.

The results of the study documented several noteworthy findings. First, the estimation results confirmed that a higher income level leads to higher life insurance penetration and a lower level implies lower life insurance consumption. Second, inflation was found to positively relate to life insurance demand when insurance penetration is employed as the proxy. Third, interest rates were found to be negatively associated with life insurance demand when using life insurance. Fourth, the results of the study revealed that economic growth is positively and significantly related to life insurance density in BRICS countries. Fifth, the study found that life insurance demand is positively related to financial freedom.

There are two main policy implications that flow from this study. First, since there is a positive relationship between economic growth and life insurance demand, governments in BRICS countries should pursue progrowth policies to nurture and grow their life insurance sectors. Second, regulators of the life insurance industries in the BRICS bloc of countries are advised to deregulate their markets to stimulate innovation and demand for life insurance products.

The original contribution of this study is that it is the first study (to the best knowledge of the researchers) that has examined the effect of financial freedom on the demand for life insurance products. This study has opened areas for future research in several ways. First, this study was limited to a sample of BRICS countries. The study was limited to five countries and covered a period of 21 years from 1999 to 2020. The analysis could be extended to consider a longer period and a larger sample size. The other limitation of the study is that it did not measure the impact of business cycles on life insurance demand. As such, further studies could investigate the impact of business cycles on life insurance

demand. Moreover, in the era of the COVID-19 pandemic, future studies could ascertain the effect of the pandemic on life insurance demand. Finally, further studies could include more variables and social factors, as this study only focused on five variables which may not provide the full effect of the determinants of life insurance demand.

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Appendix A

Table A1. Diagnostic tests with insurance penetration employed as the dependent variable.

Test	Test Statistic	*p*-Value	Inference
Joint validity of cross-sectional individual effects *H0*: $\boldsymbol{\alpha_1 = \alpha_2 = \ldots\ \alpha_{N-1} = 0}$ *HA*: $\boldsymbol{\alpha_1 \neq \alpha_2 \neq \ldots\ \alpha_{N-1} \neq 0}$	F = 156.06	0.0000	Cross-sectional individual effects are valid.
Breusch and Pagan (1980) LM test for random effects *H0*: $\boldsymbol{\delta_\mu{}^2 = 0}$ *HA*: $\boldsymbol{\delta_\mu{}^2 \neq 0}$	LM = 0.00	0.8957	Random effects are not present. The random-effects model is not preferred.
Hausman (1978) specification test *H0*: $\boldsymbol{E(\mu_{it} \mid X_{it}) = 0}$ *HA*: $\boldsymbol{E(\mu_{it} \mid X_{it}) \neq 0}$	Chi2 = 15.44	0.0014	Regressors are not exogenous. Hence, the fixed effects specification is valid.
Heteroscedasticity *H0:* $\boldsymbol{\delta_i{}^2 = \delta}$ *for all i* *H0:* $\boldsymbol{\delta_i{}^2 \neq \delta}$ *for all i*	Chi2 = 17.56	0.00125	The variance of the error term is not constant. Heteroscedasticity is present.
Cross-sectional dependence tests *H0*: $\boldsymbol{\rho_{ij} = \rho_{ji} = cor(\mu_{it}, \mu_{jt}) = 0}$ *HA*: $\boldsymbol{\rho_{ij} \neq \rho_{ji} = 0}$ CD test CD test	CD = 1.599 F = 0.099	0.8901 α = 0.10: 0.1174 α = 0.05: 0.1537 α = 0.01: 0.2225	Cross-sections are interdependent. Cross-sections are interdependent.

Table A2. Diagnostic tests with life insurance density employed as the dependent variable.

Test	Test Statistic	*p*-Value	Inference
Joint validity of cross-sectional individual effects *H0*: $\alpha_1 = \alpha_2 = \ldots \alpha_{N-1} = 0$ *HA*: $\alpha_1 \neq \alpha_2 \neq \ldots \alpha_{N-1} \neq 0$	F = 129.97	0.0000	Cross-sectional individual effects are valid.
Breusch and Pagan (1980) LM test for random effects *H0*: $\delta_\mu{}^2 = 0$ *HA*: $\delta_\mu{}^2 \neq 0$	LM = 0.00	0.9872	Random effects are not present. The REM is not preferred.
Hausman (1978) specification test *H0*: $E(\mu_{it} \mid X_{it}) = 0$ *HA*: $E(\mu_{it} \mid X_{it}) \neq 0$	Chi2 = 17.44	0.0040	Regressors not exogenous. Hence the fixed effects specification is valid.
Heteroscedasticity *H0*: $\delta_i{}^2 = \delta$ *for all i* *H0*: $\delta_i{}^2 \neq \delta$ *for all i*	Chi2 = 28.59	0.0000	The variance of the error term is not constant.
Cross-sectional dependence tests *H0*: $\rho_{ij} = \rho_{ji} = cor(\mu_{it}, \mu_{jt}) = 0$ *HA*: $\rho_{ij} \neq \rho_{ji} = 0$ CD test CD test	CD = 4.001 F = 1.960	0.0001 α = 0.10: 0.1174 α = 0.05: 0.1537 α = 0.01: 0.2225	Cross-sections are interdependent. Cross-sections are interdependent.

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