MCom

Determinants of life insurance consumption: Evidence from Zambia

A Dissertation

presented to

The **Development Finance Centre (DEFIC)**
Graduate School of Business
University of Cape Town

In partial fulfilment
of the requirements for the Degree of
Master of Commerce in Development Finance

by

Ben, Mulenga

(MLNBEN004)

December 2019

***Supervisor*: Abdul Latif Alhassan, PhD.**

TABLE OF CONTENTS

PLAGIARISM DECLARATION

1. I know that plagiarism is wrong. Plagiarism is to use another's work and pretend that it is one's own.

2. I have used the APA convention for citation and referencing. Each contribution to, and quotation in, this dissertation from the work(s) of other people has been attributed, and has been cited and referenced.

3. This dissertation is my own work.

4. I have not allowed, and will not allow, anyone to copy my work with the intention of passing it off as his or her own work.

5. I acknowledge that copying someone else's assignment or essay, or part of it, is wrong, and declare that this is my own work.

Signature Signed by candidate

Ben Mulenga

DEDICATION

I dedicate this dissertation, to my late mum, Felistas Bwembya, who went to be with the Lord in December 2016. I also dedicate this dissertation to my father, Francis Benny Mulenga, for his never-ending support and encouragement on the need to strive for academic and professional excellence. Lastly, I dedicate this dissertation to my wife, Katongo, who has been so supportive and extremely understanding throughout this challenging but worthwhile journey.

ACKNOWLEDGEMENTS

I wish to thank God Almighty, for seeing me through this entire process, especially during moments when this task seemed insurmountable.

Special thanks and a glowing tribute to my supervisor, Dr. Abdul Latif Alhassan, for his unwavering support and mentorship during my dissertation journey.

I wish to thank my siblings and friends for being so understanding and supportive. To you Cathy, Brenda, Kangwa, Frank and Angela, I am eternally grateful. I also wish to thank my colleagues and study partners Kampahasa and Nonde for continuously encouraging me to soldier on. Furthermore, I am equally thankful to my other course mates from Zambia, Nalu, and Mea. Finally, to my friends' cum brothers, Chongo, Pachika, and George, I say thank you for your love, support and continuous encouragement.

ABSTRACT

Life insurance has over the years emerged as one of the drivers of financial sector development. The savings mobilisation and financial intermediation functions have backed the growing importance of this investment source. Low penetration levels in Zambia have pointed to a vast untapped market and a potential source of financial sector development. Life insurance growth prospects in the country remain optimistic on the back of a growing population and increasing urbanisation. This study examined the impact of selected macroeconomic variables, namely income, inflation and financial development on life insurance demand in Zambia using annual time series secondary data from the period 1995 to 2017. The study utilised the Augmented Dickey-Fuller (ADF) test, Vector Autoregressive model (VAR) Autoregressive Distributed Lag (ARDL) and the Error Correction Model (ECM) in conducting econometric investigations.

Findings from the study show that financial development negatively influences life insurance, while inflation has a positive effect at a 5% significance level. Further, the study finds no significant long-term relationship between income and life insurance. However, in the short-run, a unidirectional causal relationship between life penetration and income exist.

In conclusion, the study recommends that the Government prioritises the expansion of the financial sector through the central bank and other regulators in the industry. Policy reforms should be aimed at increasing financial inclusion and deepening the financial sector, as well as increasing access to financial services and products. The study further recommends that life insurance companies should augment Government efforts by increasing sensitisation and marketing of life insurance products and services.

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS AND ABBREVIATIONS

ADF	Augmented Dickey-Fuller (ADF)
ARDL	Auto-Regressive Distributed Lag
ECM	Error Correction Model
GFDD	Global Financial Development Database
IFRS	International Financial Reporting Standards
PIA	Pensions and Insurance Authority
VAR	Vector autoregressive
ZSIC	Zambia State Insurance Corporation

CHAPTER 1

INTRODUCTION

1.1 Background and context of the study

Life insurance is a vital link in the financial processes of a country because of the role it plays in financial intermediation, savings mobilisation, and risk transfer. The financial intermediation function is supported by the long-term nature of life insurance which facilitates borrowing. As a risk management instrument, insurance provides individuals, households, and businesses with an opportunity to mitigate the risk of financial burdens in the future by paying premiums in exchange for cover (Iyawe & Osamwonyi, 2017). The savings mobilisation function is promoted through the collection and investment of premiums for various life insurance products.

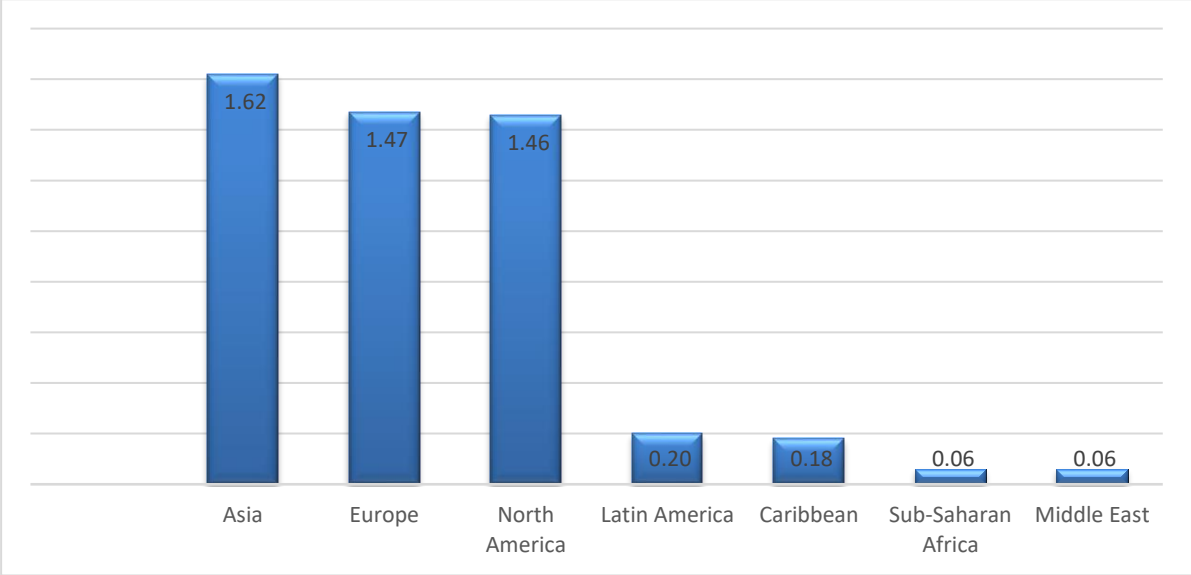
Furthermore, life insurance presents benefits to households in the form of long-term savings and financial protection, especially in a situation where the primary wage earner dies (Tyson, 2015). These functions of insurance enable the sector to offer the much-needed alternative, cheaper and local currency capital injection into the financial markets. This ultimately leads to accelerated financial systems development and economic growth (Olayungbo, 2015, Soo, 1996 and Catalan et al, 2000).

The global insurance market has been characterised by uncertainty due to lethargic macroeconomic growth. Stiff competition, technology upsets and regulatory reforms such as the introduction of International Financial Reporting Standard (IFRS) 17 influenced the insurance industry in 2017. However, the global insurance outlook remained positive as the global economy began to show signs of recovery (Pricewaterhouse Coopers (PWC), 2018). In 2017, global direct premiums grew by 1.5% compared to 2.2% in 2016 (Sigma, 2018). Global insurance penetration rates (gross written premiums as a percentage of GDP) declined to 6.2% in 2015 from 7.5% in 2006. Global insurance density (measured as gross written premiums per capita) grew to $621 in 2015 from $565 in 2006 (Ernest & Young, 2017).

In 2017, the life insurance sector suffered challenges and uncertainties. Specifically, global life insurance premiums only recorded a 0.5% growth compared to 1.4% in 2016 (Sigma, 2018). Advanced economies recorded a 2.7% reduction in life premiums in 2017 while emerging markets sustained strong growth (14%). China continued to be the engine for emerging market growth, recording an impressive 21% progression in 2017. Low-interest rates in advanced markets affected insurance companies' ability to offer attractive returns on savings.

On the brighter side, global life insurance prospects for the next few years remain optimistic with higher growth rates anticipated from emerging markets, particularly China. Ernest and Young's 2016 global insurance trends analysis publication reported that despite experiencing sharp growth in life premiums, most emerging markets continued to be dominated with low penetration rates, thereby presenting opportunities for expansion (Ernest & Young, 2017).

Figure 1:Total GWPs by region (2017 estimated value), USD trillion



Source: BMI Research (Zambia Insurance Report – Q3 2018)

Figure 1 shows that the African insurance market represents a small portion of the global insurance market ($US0.06 trillion for Africa compared to US$1.62 trillion for Asia).

South Africa dominates the insurance market on the African continent with an estimated 85% share. The South African market has, however, witnessed minimal growth due to economic

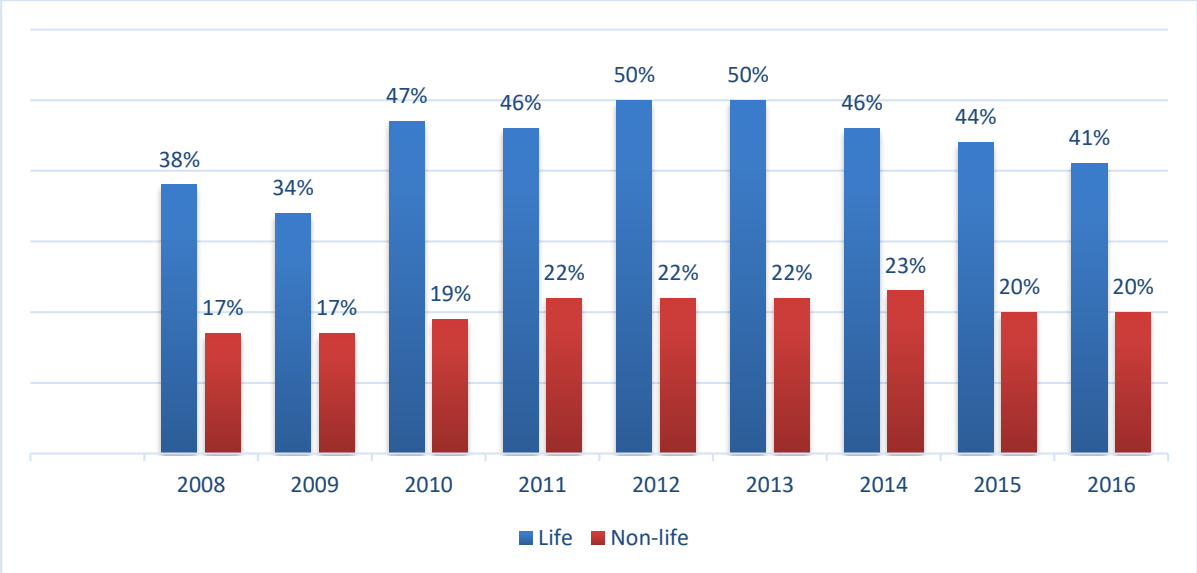
challenges. This sluggish growth experienced by the continent's most significant player hurt the overall performance of the African insurance market.

Life insurance penetration levels in Africa stood at 2.8% in 2016 compared to the emerging market and global averages of 3.2% and 6.1%, respectively. Political and economic uncertainties, coupled with limited consumer awareness, contributed to the subdued development of insurance markets on the continent. Moreover, the limited pool of skilled and experienced local staff seemed to be a mutual challenge for most African Insurance companies (African Insurance Organisation, 2018).

The continent's low penetration rates signal vast investment opportunities to both existing and new players. The markets remain buoyant and continue to present high growth prospects with increasing interest from foreign investors. Significant growth is projected in the African insurance markets on the backdrop of growing populations and increased urbanisation (PWC, 2018). Specifically, Sub-Saharan African economies have been among some of the most rapidly growing economies in the world over the past few years.

Figure 2 shows the African insurance premium growth rate for life and non-life insurance for the period 2008 to 2016. The data demonstrates that the life insurance sector has been dominant on the continent throughout the nine years.

Figure 2:Africa insurance premium growth (USD bn, 2008 – 2016)



Source: Sigma 2018

Insurance in many developing countries, Zambia inclusive, remains one of the least utilised financial services despite its immense macroeconomic benefits. For example, a 2015 Finscope survey revealed that only 5.5% of the 6.4 million adult population in Zambia had access to or utilised insurance and pension services (Financial Sector Deepening (FSD) Zambia, 2015). Zambia's insurance industry has vast potential owing to the low penetration levels, which stood at only 0.67% as of 2014 compared to the African average penetration rate of 2.8%. Interestingly, Ernest and Young's 2016 report on insurance opportunities in Sub-Saharan Africa placed Zambia at the top in terms of opportunity for growth amongst the countries in the study which also included Kenya, Malawi, Tanzania, Uganda, Ghana and Nigeria (Ernest & Young, 2016).

This country-specific research examines what factors influence life insurance consumption in the Southern African country with the view of understanding why the market remains relatively underdeveloped compared to Africa and global standards. With the view of gaining adequate insight into the market, this study will briefly discuss the history of the Zambian life insurance market and the strides that have been made to get to current levels. Finally, this research will provide an opportunity to appreciate better the Zambian market and its unique needs which may be different from other countries.

1.2 Problem definition

The desire to examine what factors contribute to the demand for life insurance in Zambia is premised on the low life insurance penetration levels in the country. In 2014, the life insurance penetration in Zambia was 0.34% of Gross Domestic Product (GDP) compared to the world average of 3.4%, whilst non-life insurance penetration stood at 0.78% in the same year. These low penetration levels are a clear indication that the insurance market is massively underdeveloped.

The increasing role of institutional investors in financial markets cannot be downplayed. Certainly, insurance companies are among the notable institutional investors that represent a potentially significant source of long-term development finance (Organisation for Economic Co-operation and Development (OECD), 2014). Consequently, enhanced access to insurance services in Zambia is expected to contribute to financial deepening, which in turn should lead to broader domestic sources of long-term financing. This type of financing is preferred for

investment and infrastructure development compared to other foreign sources of development finance which may have restrictive covenants. According to European Insurance (2018), insurance plays a vital role in economic growth, indemnification, risk management, long-term investment injection into the economy and increased sustainable savings.

With a specific bias towards life insurance, this study investigates the primary causal factors contributing to the low uptake of insurance services in the country. Furthermore, the research seeks to at understand why penetration levels remain low despite a growing population in the country. The country's population has doubled from 8 million in 1990 to 17.3 million in 2018. (World Bank Data, 2019). By identifying the factors that are specific to Zambia, this study will provide tailored recommendations for policymakers on measures that could be implemented with the view of increasing the uptake of life insurance services in the country.

Three research questions were investigated to adequately address the research problem:

I. Does the level of income influence the demand for life insurance in Zambia?
II. What effect does inflation have on life insurance consumption in Zambia?
III. Is there a relationship between financial development and life insurance consumption in Zambia?

1.3 Statement of research objectives and hypotheses

This section outlines the research objectives and presents the research hypothesis.

1.3.1 Research objectives

The study's main objective is to examine the explanatory factors of life insurance consumption in Zambia. Additionally, this research intends to interrogate the relationship between life insurance demand and selected macroeconomic variables.

The specific objectives are as follows;

I. To examine the effect of the level of income on demand for life insurance in Zambia.
II. To assess the effect of inflation on life insurance consumption in Zambia.
III. To investigate the impact of financial development on life insurance consumption in Zambia.

1.3.2 Research hypotheses

The following research hypotheses were formulated to help answer the research questions and achieve the intended research objectives;

Hypothesis 1: There is a positive relationship between income and life insurance demand in Zambia.

Hypothesis 2: Inflation negatively impacts on the demand for life insurance in Zambia.

Hypothesis 3: There is a positive relationship between financial development and the demand for life insurance in Zambia.

1.4 Justification of the study

There have been limited studies with a specific focus on what drives the demand for life insurance in Zambia although country data may have been used in previous cross-sectional and panel studies that have been carried out on Sub-Saharan Africa and Africa as a whole (Nkotsoe 2018; Alhassan & Biekpe, 2016; Guerineau & Sawadogo, 2015). Given the restricted number of country-specific studies on life insurance determinants in Zambia, this study desires to contribute to the existing literature in this regard.

The findings of this research are vital to the government, given that deliberate policy interventions can be put in place to positively influence the uptake of life insurance services in the country. For insurance companies and other industry players, the findings offer valuable insights on how to grow the life insurance business segment. Additionally, the results of this study are expected to assist the regulator, Pensions and Insurance Authority (PIA), in formulating favourable regulation that is fundamental for the expansion of the country's insurance sector.

1.5 Organisation of the study

This dissertation is organised into five (5) chapters as follows:

Chapter 1: Delivers the introduction, background, and an overview of the study. It explains the research problem and sets out the motivation and justification for undertaking the research.

Chapter 2: Provides a brief history and overview of the current state of the insurance market in Zambia. The chapter also presents a short analysis of the theoretical foundations of life insurance. Further, the chapter presents an empirical literature review on life insurance demand.

Chapter 3: Discusses the methodology and research tools used in the examination of what factors influence the demand for life insurance in Zambia.

Chapter 4: Presents and discusses the results of the study.

Chapter 5: Summarises the key findings and provides a conclusion. It further offers policy prescriptions to Government and industry regulators.

CHAPTER 2

OVERVIEW OF INSURANCE MARKET AND LITERATURE REVIEW

2.1 Introduction

This chapter provides an overview of the life insurance market in Zambia. It also presents a general review of the theoretical underpinnings of life insurance demand. Additionally, the chapter delivers insights into some of the critical empirical literature that is fundamental in the study of life insurance. The chapter is organized into the following sections; Section 2.2 presents an overview of the Zambian insurance market while section 2.3 discusses the theoretical foundations of life insurance. Thereafter Section 2.4 reviews the landmark empirical literature that is relevant to this study and lastly section 2.5 offers a conclusion to the chapter.

2.2 Overview of the insurance industry in Zambia

The Zambian economy used to be nationalised until 1991 when it underwent privatisation. As the economy unlocked, the insurance sector recorded an increase in the number of players compared to the period when the country only had one state-owned insurance company, namely, the Zambia State Insurance Corporation (ZSIC). A notable event in the growth of the Zambian insurance market relates to the amendment of the 1997 Insurance Act in 2005, which led to the introduction of life insurance services in the country (Mulenga, 2016).

The country's insurance industry is regulated by the Pensions and Insurance Authority (PIA) whose mandate includes licensing and registration of insurance companies and pension scheme providers. Furthermore, PIA is in charge of regulation, protection of insurance policyholders and the overall administration of the insurance industry. The regulator has made numerous strides in the regulation of the sector which has led to several local and international insurance companies and brokers coming on board. In 2015, the PIA announced the revision of the minimum capital requirements for insurance companies to ZMW20 million from the previous ZMW1 million. According to the regulator, the move was meant to strengthen the sector's financial base.

As for insurance companies in the country, an association called the Insurance Association of Zambia (IAZ) was formed in 1997 to provide a collective voice for the industry players while

lobbying for a conducive regulatory environment to support the growth of the market. Over the years, the association has endeavoured to advocate for the professional conduct of insurance companies while providing dispute resolution mechanisms for its members.

To increase uptake of insurance services in the country, the Zambian Government has supported initiatives such as the launch of the insurance week and financial literacy week. These annual events are aimed at increasing financial literacy through sensitising and educating consumers on the benefits of insurance and other financial products. Moreover, Zambia has favourable demographic factors including a relatively young and urbanised population, consequently offering enormous expansion opportunities for insurance companies.

The insurance market in Zambia is still in its infancy, with penetration levels remaining relatively low at 1.11% in 2017 (PWC, 2018). The industry is more tilted towards non-life insurance services with the life segment accounting for only 33.9% of Gross Written Premiums in the country in 2015 compared to the Global and Africa averages of 58.1% and 66.4%, respectively. Table 1 shows some stylised facts about the Zambian insurance market.

Table 1: Stylised facts on the insurance market in Zambia

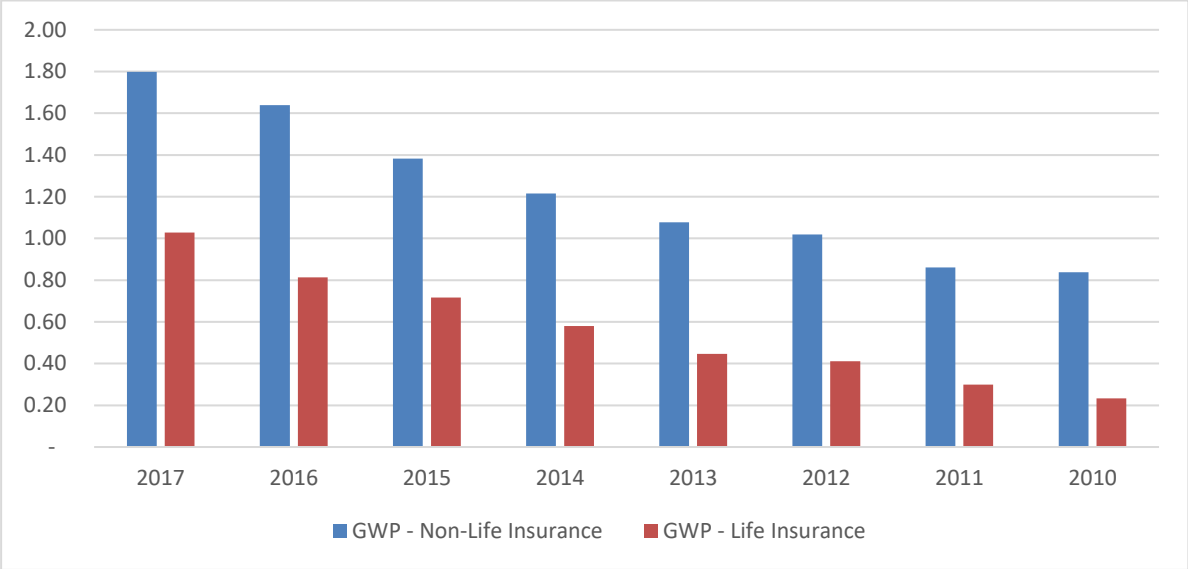
Indicator	2011	2012	2013	2014	2015
Total Population – Million	13.63	14.08	14.54	15.02	16.21
Gross Domestic Product - Million US dollars	23,732	24,940	26,821	30,512	31,872
Number of Insurance Companies	16	23	23	27	34
Total Gross Life Written Premium (US$ million)	61.61	79.80	94.40	103.81	87.38
Gross Life Written Premium/Capita (US$) Million	4.52	5.67	6.49	6.91	5.39
Gross Life Written Premium (% of GDP)	0.26	0.32	0.35	0.34	0.27
Gross Non-life Written Premium/Capita (US$ Million)	12.98	13.91	14.11	13.56	10.44
Gross Non-life Written Premium (as % of GDP)	0.75	0.78	0.76	0.67	0.53
Insurance Assets (US$ million)	269.81	311.78	338.80	340.83	294.63

Source: ***AFDB 2016***

At the close of 2017, the country had a Gross Written Premium of ZMW 2.83 billion and a GDP figure ZMW 26 billion. The non-life segment contributed ZMW 1.8 billion with the life segment underwriting a total of ZMW 1.03 billion in 2017. The domination of non-life insurance is mostly attributed to the mandatory third-party motor insurance liability. However, the life insurance segment has exhibited a positive growth trajectory with an annual average growth rate of 17% in the five years (2011-2015).

Figure 3 shows a graphical illustration of the Zambian life and non-life insurance premium growth trend for the period 2010 to 2017. The graph demonstrates that the life insurance segment has been improving over the eight years, from 22% to 36% of the total market.

Figure 3:Zambia insurance premium growth (ZMW bn, 2010 – 2017)

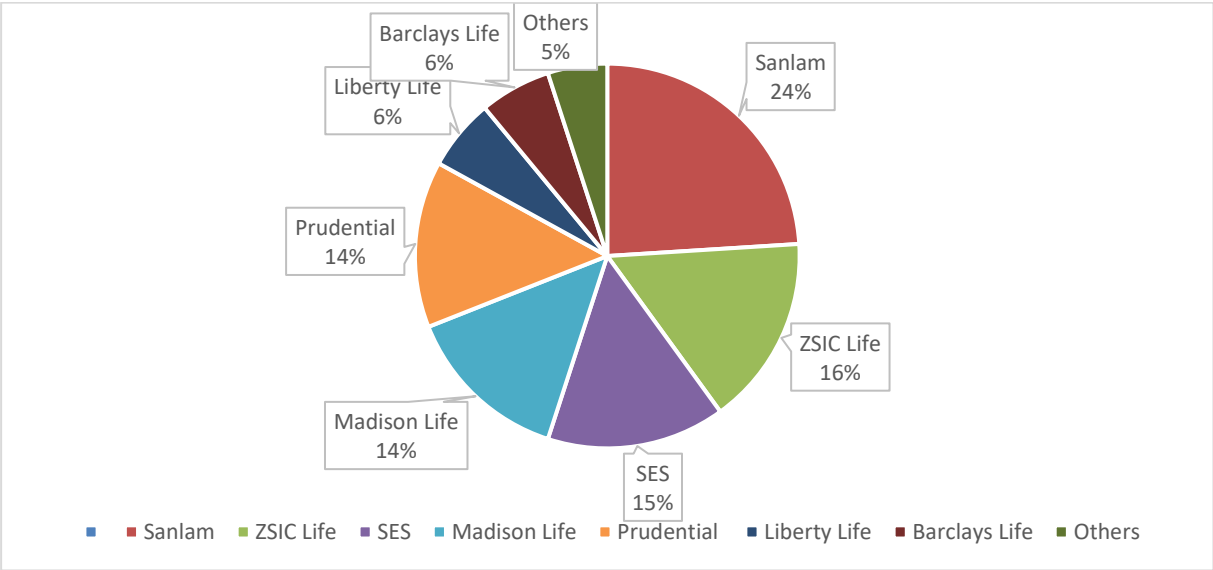


Source: Pensions and Insurance Authority (PIA)

The Zambian life insurance market has a mixture of both local and foreign companies. In 2018, the country had a total of 31 licensed insurance companies comprising 21 non-life insurance companies and 10 providing life insurance services. Further, the market had 236 insurance agents, 37 brokers, 4 reinsurance brokers and 3 reinsurance companies (PIA 2018 Third Quarter Report).

Figure 4 presents a graphical dissection of the market share for various life insurance companies in Zambia as of 2018. The industry is dominated by the top five in the sector with Sanlam, ZSIC Life, SES, Madison Life, and Prudential representing more than 83% of the market.

Figure 4: Zambian Life Insurance Market Share (GWP %) – 2018



Source: Pensions and Insurance Authority (PIA)

The life insurance market in Zambia remains weak and undeveloped, mainly due to the country's over-reliance on copper. Inadequate product offerings, limited appreciation of the benefits of life insurance and minimal disposable incomes for most of the population are among the notable reasons that have hindered the development of the country's life insurance sector (BMI Research, 2018). On the positive side, the country boasts of a well-regulated industry despite it being in the early stages of development. The market has been receptive to foreign participation with a few regional giants registering their interests through a combination of shareholding and outright entrance. The country's insurance law is currently undergoing a review with a key proposal for making health insurance compulsory. This change is expected to increase the volume of business in the insurance industry.

2.3 Theoretical underpinnings

Several investigations have been undertaken regarding the theoretical determinants of life insurance consumption. Some vital reasons for purchasing life insurance include income options in the event of the death of a breadwinner (Pauly et al, 2003 and Jung et al, 2019) and the desire for long-term savings (Arun, 2012).

The main theoretical factors on demand for life insurance are connected to the work of Yaari (1965) and the lifetime uncertainty theory. Subsequent theoretical frameworks by Hakansson (1969), Fischer (1973), Karni & Zilcha (1986) and Lewis (1989) were developed on the

foundations of Yaari's model. Zietz (2003) posits that theoretical reasons for purchasing life insurance have generally been bundled into wealth and bequest motives, risk aversion and risk appetite, deductible level, and loading, and inflation.

Most theoretical work on life insurance have a firm link to the work of Yaari (1965) on the life cycle model. The model emphasises that individuals and the household desires to maximise expected utilities of lifetime consumption as the motivation for purchasing life insurance. Consequently, the purchase of life insurance is seen as a solution to the uncertain lifetime constraint (Zietz, 2003). Yaari (1965) proposed the Marshallian model and the Fisherian model to explain the maximisation of lifetime consumption. Marshal (1920) focuses on bequest as the motivation for demanding life insurance while the model by Fisher (1930) rests on the collateral motive.

Hakansson (1969) built on Yaari's model by adding premium prices, wealth, interest rates and income as the other variables that influence life insurance demand. As a result, the demand for life insurance is derived as a function of a premium price, wealth, interest rates, expected income over the person's life and the assumed subjective discount rate for current over future consumption (Mishra, 2014).

The risk aversion factor was later implemented in the model by Karni and Zilcha (1986) with foundations from the Fisherian model as utilised by Yaari. The authors prioritised the measurement of risk and consequences of the varying degrees of risk aversion on life insurance decisions. This theory rests on the risk-averse individual's desire to seek protection against the possible effects of risk. This protection is gained through the purchase of insurance premiums which offer protection if a risk materialises. It follows, therefore, that risk-averse individuals would be more interested in life insurance compared to those with a higher risk tolerance (Eisenhauer and Halek, 2010, and Pauly et al., 2003).

The theoretical model for life insurance demand was further extended by Lewis (1989) to factor in preferences of beneficiaries and dependents in deriving a utility function. In this model, life insurance demand is calculated by maximising utility for breadwinner's spouse, beneficiaries and children. The main outcome of this model is that life insurance consumption rises with the likelihood of the insured's death. The downside of this framework is that it only considers

demand-side factors and neglects supply-side aspects which can potentially drive life insurance demand.

2.4 Empirical literature review

In this section, a review of some empirical studies in the sphere of life insurance is presented. Life insurance continues to attract the attention of many scholars worldwide because of the enormous benefits it offers to an economy. Vast literature on the determinants of life insurance consumption has generally been clustered into three main categories, namely: macroeconomic, demographic and institutional factors. Findings have been mixed with some studies highlighting inconclusive evidence while others have found positive effects on the variables that have given opposite results in other studies.

2.4.1 Macroeconomic factors

A review of the literature demonstrates that most empirical studies have utilised economic variables such as income, inflation, financial development and interest rates as potential determinants to access of life insurance. Each of the variables is discussed further below:

Income

Among the macroeconomic variables on life insurance consumption, income is considered the most significant. Some studies have suggested that a positive relationship exists between income levels and life insurance consumption. Gao & Hwang (2003) carried out a study on China using time series data and found that income has a strong positive impact on life insurance demand in the country. Zerriaa et al (2017) agree in their probe of insurance demand in Tunisia for the period 1990 to 2014 using a multiple regression log-linear model. The result confirmed income to be statistically significant and have a positive effect on life insurance consumption.

Another study by Kjosevski (2017) examined Europe for the period 1998 to 2010 utilising both life insurance penetration and life insurance density as measures for life insurance demand. The study employed GDP per capita as a measure of income level and revealed a positive influence of income on life insurance for both measures. The key arguments for income's positive effect on insurance demand rest on the need to safeguard income potential and future consumer demands for dependents.

Additionally, a panel study by Guerineau & Sawadogo (2015) on 20 African countries upholds the widely held view that income is a key factor in life insurance demand. Findings from the study further demonstrated that life insurance is considered a luxury good in Sub-Saharan Africa. In investigating the drivers of life insurance in Nigeria, Ibiwoye et al. (2010) concur that income positively and significantly affects life insurance uptake in the country.

On a different note, Enz (2000), Ward & Zurbruegg (2002) and Truett & Truett (1990) examine the income-life insurance nexus by providing insights into the S-curve function which attempts to explain income elasticity of demand. These studies further demonstrate the varying elasticities between emerging and advanced countries. They reject the notion of constant income elasticity and argue that demand is anticipated to accelerate as emerging economies grow then subdue as emerging country development begins to equal developed country levels.

Conversely, Alhassan & Biekpe (2016) find contrasting results in their study of 31 African countries using both ordinary least squares and instrumental variables. The results from the study demonstrate that increased levels of income lead to reduced life insurance consumption. Consequently, the authors contend that this negative relationship could be as a result of the perception that insurance is an inferior good whose demand drops as a consumer's income increases and vice versa.

Inflation

Inflation is another economic variable that has been investigated with regard to life insurance demand. Inflation is defined as the measurement of periodic price increases of goods and services in an economy (Investopedia, 2019). Some studies have argued that the eroded purchasing power in a country is expected to lead to reduced life insurance consumption. Sulaiman et al. (2015) investigated factors influencing the Ethiopian life insurance market over 28 years using error correction mechanism (ECM), Johansen cointegration test and the Augmented Dickey-Fuller test. The study concluded that inflation has an inverse relationship with life insurance consumption and that rising inflation caused a fall in demand for life insurance in Ethiopia.

The seminal study by Browne and Kim (1993) found consistent results in their international analysis on life insurance demand using Lewis's theoretical model. These findings are similar to those of Babbel (1981) who used a time-series multivariate regression model to assess the

impact of inflation on life insurance demand in Brazil. This study revealed that consumer behaviour in shunning life insurance surged as inflation increased.

Another study that supported the negative impact of inflation is a cross-sectional investigation of 31 European countries by Çelik & Kayali (2009) for the period 2000 to 2006. The study determined that inflationary periods tend to be associated with low levels of life insurance demand. Fortune (1973), Kjosevski (2012) and Mishra (2014) equally found evidence demonstrating the negative effects of inflation.

Finally, Gao & Hwang (2003), present alternative findings regarding the inflation variable in their study on China. The study did not find a negative correlation between life insurance and inflation despite the country having experienced high inflation in mid-1990. Correspondingly, a recent study by Nkotsoe (2018) concludes that inflation positively affects life insurance. The study employed fixed effects and general system methods of moments techniques on 15 SADC countries for the period 1995 to 2013. Likewise, Meko et al., (2019)'s study on Ethiopia found inflation to have had a positive influence.

Financial Development

A study by Iyawe & Osamwonyi (2017) utilised annual data covering 22 years and employed panel data estimation on 15 sampled countries in Sub-Saharan Africa to confirm the positive effect of financial development on the demand for life insurance. Feyen et al. (2011) investigate the drivers of life insurance premiums in 90 countries over the period 2000-2008. The authors discover that financial development positively affects life insurance consumption. Similarly, the investigation on India conducted by Debabrata & Amlan (2010) finds supporting evidence.

Turning to the research on the drivers of foreign participation in insurance markets, Ye et al. (2009) investigate 24 OCED countries. Their study reveals evidence of the positive effect of financial development on foreign participation. Alhassan & Biekpe (2016) in their investigation of the determinants of life insurance consumption in Africa find corroborating evidence on the positive impact of financial development on life insurance consumption in Africa. Munir, Khan, & Jamal (2013)'s study on Pakistan lends further support to the above findings.

Contrastingly, a panel data study on 14 Central and Eastern Europe (CEE) and the Commonwealth of Independent States (CIS) countries by Nesterova (2008) shows evidence that increased financial development resulted in reduced life insurance consumption.

Interest rates

Scholars such as Beck & Webb (2003) have argued that life insurance asset returns can be positively influenced by increasing real interest rates. Derakhshideh (2014) correlates this view in an investigation on Iran. On the other hand, some scholars argue that increased interest rates can negatively affect life insurance as substitute investment and savings vehicles become attractive compared to life insurance (Mishra, 2014 and Lenten & Rulli, 2006).

Cargil & Troxell (1979) support the notion of life insurance demand and interest rates are negatively related. Similarly, Outreville (1996) used real interest rates and lending rates to demonstrate that interest rates do not influence life insurance consumption. Correspondingly, Debabrata & Amlan (2010) found negative effects of interests on alternative investments in their post-economic reform study on India.

2.4.2 Social-Demographic factors

Widely utilised demographic determinants in the literature include dependency ratio, education, unemployment, age, religion, urbanisation and life expectancy. Each determinant is discussed in further detail below.

Dependency ratio

The desire to protect dependents has firm foundations in the theoretical incentives for seeking life insurance. Thus, the dependency ratio measures the demographic composition of a family through the number of dependents per life insurance breadwinner and the members of a household that are reliant on the breadwinner's income (Lenten & Rulli, 2006).

Empirically, a study by Lewis (1989) and a Tobit analysis by Showers & Shotick (1994) both demonstrate that the dependency ratio positively affects life insurance demand. These findings are supported by Beck & Webb (2003). However, Auerbach & Kotlikoff (1989) find a contrary relationship amongst middle-age American households.

Education

The relationship between education and life insurance demand is not a straightforward one. Studies such as Zerriaa et al. (2017) find a negative and significant correlation between life insurance demand and education. They suggest that people that have attained higher levels of education reduce life insurance uptake as they may have better risk management capacities to invest in alternatives. Others such as Beck & Webb (2003) and Sliwinski et al., (2013) find an insignificant impact of education on life insurance consumption.

In contrast, Li et al. (2007) study on the demand for life insurance in 30 OECD countries from 1993 to 2000 argues that a combined examination of both social and economic factors offers a better understanding of the determinants of life insurance demand. Their study concludes that education positively impacts life insurance demand. Similarly, Zhang & Zhu (2006) find evidence supporting the positive drive of education on life insurance.

Hwang & Greenford (2005) undertake a cross-sectional analysis of China, Hong Kong, and Taiwan to understand what factors drive the consumption of life insurance. The authors confirm that the education variable positively impacts life insurance, lending further support to the risk aversion hypothesis. Studies by Browne & Kim (1993) and Marijana, Dzaja, & Pepur (2013) confirm that education positively affects life insurance demand. These findings are further supported by Truett & Truett (1990).

Religion

Researchers have maintained that religion is a crucial factor when it comes to the attitude that an individual maintains towards life insurance. For example, Feyen et al. (2011) strongly believe that there is a lower affinity towards life insurance in most countries with dominant Muslim populations. A study by Browne & Kim (1993) finds a negative impact of the Muslim religion with regard to the demand for life insurance. The researchers attribute religion and cultural beliefs to the level of risk aversion in a country. This considerable influence has compelled market players to innovate and introduce tailor-made products like Takaful insurance which speak to the values of religious groups such as the Muslims.

Urbanisation

Meko et al. (2019) validate that urbanisation positively affects the consumption of life insurance in Ethiopia. The study further demonstrates that urbanisation is the most influential factor for

life insurance demand in the country. Beck & Webb (2003), on the other hand, contend that urbanisation does not significantly affect life insurance demand.

Life expectancy

The demographic variable life expectancy refers to the estimated number of years that one is expected to live (World Health Organisation, 2006). This statistical measure is derived as an average per country. Yilma (2014) establishes that life expectancy does affect life insurance positively in Ethiopia. The author concludes that higher life expectancies lead to increased demand for life insurance, driven mainly by higher savings. Equally, Beenstock & Dickinson (1986), Outreville (1996), Ward & Zurbruegg (2002) and Nesterova (2008) confirm the positive impact of life expectancy on the demand life insurance.

2.4.3 Institutional factors

Various researchers suggest that sound intuitional frameworks and overall political stability provide an enabling environment for insurance companies to thrive (Beck & Webb, 2003). The presence of a sound legal framework is cardinal because life insurance is firmly grounded on long-term contractual relationships.

Empirical studies have employed variables such as rule of law, institutional development, and corruption to investigate how institutional stability contributes to life insurance demand. For example, Kaufmann et al., (2002) formulated six world governance indicators to aid capture how wide-ranging individuals and institutions within and outside the country perceive the state of governance in the country. Kaufmann et al., (2002) propose that governance perceptions are influenced by the political environment, governance, peace, respect for the rules of and corruption levels.

Chang & Lee (2012) investigate the impact of sound institutions on life insurance growth in 92 countries using the threshold regression model. Their study confirms the positive influence of governance factors on life insurance development. Similarly, findings by Outreville (1996) on international insurance company decisions to set up subsidiaries justify the influence of the stable state of institutions in target countries. Countries with independent judiciaries, for example, provide comfort and assurance to potential investors who are required to commit capital in setting up subsidiary insurance companies. Ward & Zurbruegg (2002) lend further

support on the role of legal and political factors and illustrate that these variables are more significant in low-income countries as opposed to developed countries.

Respect for the rule of law equally has strong links with the protection of property rights and respect for contractual obligations. Kjosevski (2017) investigates the factors that drive the demand for life insurance consumption in 14 countries in Central and South-Eastern Europe using the fixed-effects panel model. The study demonstrates that the rule of law has a positive impact on life insurance demand.

2.5 Summary of the Empirical Studies on the determinants for Life Insurance

Table 2 presents some empirical studies on the determinants of life insurance consumption.

Table 2: Summary of the empirical literature on determinants of life Insurance consumption

Category	Variable	Positive Relation	Negative Relation	Insignificant
Macroeconomic	**Income**	Gao & Hwang (2003), Zerriaa et al (2017), Kjosevski (2017), Guerineau & Sawadogo (2015), Ibiwoye et al (2010), Enz (2000), Ward & Zurbruegg (2002), Truett & Truett (1990)	Alhassan & Biekpe (2016)	
	Inflation	Nkotsoe (2018), Meko et al., (2019)	Sulaiman et al (2015), Browne and Kim (1993), Babbel (1981), Çelik & Kayali (2009), Fortune (1973), Kjosevski (2012), Mishra (2014)	Gao & Hwang (2003)
	Financial Development	Iyawe & Osamwonyi (2017), Feyen et al., (2011), Debabrata & Amlan (2010), Ye et al. (2009), Alhassan & Biekpe (2016), Munir, Khan, & Jamal (2013)	Nesterova (2008)	
	Interest Rates	Beck & Webb (2003), Derakhshideh (2014)	Mishra, (2014), Lenten & Rulli (2006), Cargil & Troxell (1979), Outreville (1996), Debabrata & Amlan (2010)	Zerriaa et al (2017

Social-Demographic	**Dependency Ratio**	Lewis (1989), Beck & Webb (2003)	Auerbach & Kotlikoff (1989)	
	Education	Li et al (2007), Zhang & Zhu (2006), Marijana, Dzaja, & Pepur (2013), Truett & Truett (1990), Browne & Kim (1993)	Zerriaa et al (2017)	Beck & Webb (2003), Sliwinski et al. (2013)
	Religion		Feyen et al., (2011), Browne & Kim (1993),	
	Urbanisation	Meko et al (2019), Beck & Webb (2003)		
	Life Expectancy	Yilma (2014), Beenstock & Dickinson (1986), Outreville (1996), Ward & Zurbruegg (2002), Nesterova (2008)		
Institutional	**Institutional and Legal Environment**	Beck & Webb, (2003), Chang & Lee (2012), Outreville (1996), Kjosevski (2017)		

2.6 Summary of the chapter

This chapter provided a brief synopsis of the Zambian insurance market and offered insights on the key developments that the sector has undergone. It proceeded to provide theoretical and empirical reviews on the generally accepted determinants of life insurance. The empirical literature appraisal demonstrates that factors that affect the demand for life insurance vary across countries, thus affirming the need to conduct country-specific investigations. It further validates the lack of country-specific studies on what factors affect the demand for life insurance in Zambia. The present study, therefore, seeks to contribute to the body of literature by focussing on Zambia with the view of gaining valuable insight into the country-specific variables that can potentially increase the uptake of life insurance.

In the next chapter, the paper discusses the data sources as well as the research methodology utilised in the study to evaluate the determinants of life insurance consumption in Zambia.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter discusses the research methodology utilised in addressing the research questions and hypotheses outlined in chapter one. It further motivates the chosen empirical model and quantitative techniques applied in the study. The chapter proceeds as follows: Section two describes the research approach and design. It tackles explicitly the data sources, sample period and sample size in addition to stipulating the empirical models utilised in the examination of life insurance demand in Zambia. The section further describes what dependent and independent variables were used and outlines a priori expectations. Thereafter, the chapter elaborates on the estimation technique employed in the study and ultimately, the conclusion of the chapter is presented.

3.2 Research approach and design

3.2.1 Data, sample period and size

The study took a quantitative approach using secondary data. The study utilised annual time series data for the period 1995 and 2017 with the country Zambia as the unit of analysis. The period of research was selected owing to the availability of data relating to life insurance premiums which are only accessible from 1995 onwards. Before the year 1995, the country used to report insurance data on an aggregated basis without segmenting it into life and non-life statistics. Additionally, Life insurance market penetration data were collected from the World Bank's Global Financial Development Database (GFDD). Data relating to the independent variables were collected from the World Development Indicators database of the World Bank.

The use of secondary data was advantageous due to the reliability of the data sources, ease of access and cost-effectiveness. It further made it possible for the study to undertake a longitudinal approach owing to the reasonable amount of data that was available from secondary sources. On the downside, Kearey, Brooks, & Hill (2002) note that the use of secondary data in research has its limitations. The initial users of the data may have collected

it for different purposes which could be at variance with subsequent research needs. Additionally, shortcomings relating to data aggregation and presentation, data quality and measurement validity may arise.

3.2.2 Empirical model

This section expounds on the empirical model utilised in this research. The study adopted a log-linear regression model as utilised by Gao & Hwang (2003) and Mishra (2014) in the examination of life insurance consumption in Zambia. This demand specification is preferred because it allows for linearity to be attained in the data and also captures the exponential growth of the macroeconomic variables in the model (Li et al., 2007).

The mathematical relationship in the model is captured using the following log-linear equation below;

$$LnLifePen_t = \beta_0 + \beta_1 LnY_t + \beta_2 LnINF_t + \beta_3 LnFDV_t + \varepsilon_t \quad (1)$$

Where;

$LnLifePen_t$ refers to the life insurance penetration ratio,

LnY_t is the natural log of per capita Income in Zambia in period t,

$LnINF_t$ is a variable representing Inflation,

$LnFDV_t$is the level of Financial Development in Zambia,

ε_t is a random error term.

β_0 is the intercept while β_1, β_2, and $\beta_3$are the coefficients

Two models were estimated, with the first model having income and inflation as the independent variables while the second model was estimated with inflation and financial development as the independent variables.

3.2.3 Definition and measurement of variables

This section provides the definition and measurement of the variables and the empirical justifications from previous studies. Additionally, a priori expectation is provided in line with the empirical literature.

Dependent variable

In measuring life insurance consumption in an economy, researchers have used approaches such as total premium volume, life insurance penetration, life insurance in savings, life insurance in force and life insurance density (Mishra, 2014).

Total premium volume measures the aggregate life insurance premiums written in an economy for a given year. This approach has been used in studies by Ward & Zurbruegg (2002) and Zhang & Zhu (2006).

Many studies across the world, including the IMF, UNCTAD and World Bank have used the internationally accepted standard of insurance penetration to measure the demand for life insurance in an economy. Researchers such as Beck & Webb (2003) and Hwang & Greenford (2005) have used this measure in their investigations. Truett & Truett (1990) and Li et al. (2007) employed insurance density to represent life insurance consumption, measured as premiums per capita. Life insurance density represents gross written premiums as a proportion of a country's total population.

This research adopted life insurance penetration, one of the widely employed measures of life insurance consumption, as the only dependent variable. Life insurance penetration was measured as the ratio of life insurance premium volumes to GDP. The measure was used to ascertain the contribution of life insurance to the Zambian economy. Several empirical studies have used insurance penetration to measure consumption, including Zerriaa et al. (2017), Alhassan & Biekpe (2016) and Mishra (2014).

Independent variables

In line with existing theoretical literature and previous empirical investigations, this study used the following macroeconomic factors as independent variables that are likely to influence life insurance consumption in Zambia.

Income

Numerous studies have suggested that rising incomes have positively impacted life insurance demand (Zerriaa et al., 2017; Beck & Webb, 2003; Outreville, 1996). These studies argue that income can influence the demand for life insurance on two fronts. Firstly, insurance as a savings and investment financial instrument can be accessed by those with surplus funds compared to consumers that may have limited resources. Secondly, a wealthy breadwinner may desire for

dependants to maintain or live a similar lifestyle in the event of their death while less wealthy breadwinners may consider such investments as a luxury. However, Alhassan & Biekpe (2016) find inconsistent results. They hold contrasting views as they propose that income may not significantly affect life insurance demand.

Following Zerriaa et al (2017), the study adopts US Dollar GDP per capita to measure the income level in Zambia. Life insurance demand was anticipated to increase with the rise in income levels based on the rationale that insurance is a common good in Zambia in addition to the notion that people with more disposable incomes have extra capacity to access life insurance services.

Inflation rates

Inflation generally refers to the rise in prices of goods and services with a synonymous fall in the purchasing power of a currency (Investopedia, 2018). Most studies agree that inflation negatively impacts life insurance consumption (Babbel, 1981; Sulaiman et al., 2015; Brown and Kim, 1993). Rising inflation results in rising prices of insurance premiums which is therefore likely to lead to reduced consumption as a fewer number of people can afford insurance services which they may consider as a luxury good. This study expected inflation to have an inverse relationship with life insurance demand as supported by empirical studies above.

Financial development

There is a lack of consensus on the measurement of financial development. Mishra (2014) uses two proxies (M3 to GDP ratio and total Bank credit to GDP ratio) to measure financial development in India. The results of the study show a positive and significant relationship between life insurance demand and financial development. Other studies that have shown similar positive relationships include Outreville (1996) and Beck & Webb (2003). The authors suggest that "countries with well-developed banks also have higher levels of life insurance consumption".

In line with Mishra (2014), Zerriaa et al. (2017) and Alhassan & Biekpe (2016), financial development was measured using the M2 to GDP ratio. The study expects a positive relationship between life insurance demand and financial development.

Table 3 summaries the variables, their measurement as well as the data sources.

Table 3: Measurement and definition of variables

Variables	Description / Measurement	Sources
Dependent variable		
Life insurance penetration	Life insurance premiums/GDP	GFDD*
Independent variables		
Income	Natural log of GDP per capita in US $	WDI**
Inflation	Natural log of the Consumer price index	WDI**
Financial development	Natural log of M2/GDP ratio	WDI**

Source: *GFDD - Global Financial Development Database, **WDI – World Development Indicators

3.3 Estimation technique

The study adopted a time series analysis in investigating the variables that drive life insurance demand in Zambia. A multiple log-linear regression technique was adopted in estimating this relationship.

3.3.1 Unit Root Tests

All the selected variables in the time series were tested statistically to assess their univariate properties as time-series data is usually considered to be unstable (Sjö, 2018). The unit root test was carried out to check for stationarity in the variables included in the study. Time-series data that have unit roots is deemed to be non-stationary while the absence confirms the stationarity of the data (Nkoro & Uko, 2016). A stationary series is deemed to have a constant mean over time. Contrastingly, in a non-stationary series, the mean changes with time. As a result, conducting unit root tests before running the model is vital as the presence of unit roots poses a risk of obtaining spurious results (Granger & Newbold, 1974).

Nonstationary time series data can either be trend stationary (deterministic) or difference (integrated) stationary. Time series data that is trend stationary is also called deterministic because it is predictable; therefore, any variations from the mean are usually random and tend to fade away. On the other hand, difference stationary time series is unpredictable, and deviations from the mean are evident in the long-term. Differencing, therefore, is used to make nonstationary time series data stationary (Mahadeva & Robinson, 2004).

Several approaches such as the Durbin-Watson, Dickey & Fuller (1979), Augmented Dickey-Fuller (1981) and Phillips & Perron (1988) tests can be employed in testing for unit roots. Thus, this study employed the Augmented Dickey-Fuller (ADF), which is one of the most popular and widely used techniques in conducting unit root tests. The ADF addresses the subjectivity of results in the DF test which are caused by serial correlation. To free the residuals from serial correlation, the ADF augments the test by integrating lagged terms of the dependent variables. The Akaike Information Criterion (AIC) was used in selecting the ideal lag length given the limited sample period. The ADF then applies the same MacKinnon (1991,1996) critical values as used in the Dickey & Fuller (1979) test.

One of the three forms of the ADF test is illustrated in the following equation;

$$\Delta Y_t = \beta_1 + \delta\, Y_{t-1} + \sum_{i=1}^{m} \alpha_i\, \Delta Y_{t-1} + \varepsilon_t \tag{2}$$

Where Δ is the difference operator, Y is the natural log of the series, ε_t is the error term and *m* is the optimal lag length.

The test is carried out using the following hypothesis;

Null hypothesis - H_0: $\delta = 0$ (data is non-stationary)
Alternative hypothesis - H_1: $\delta < 0$ (data is stationary)

The ADF value is compared to the critical values and results that are lower than the critical values confirm the presence of unit roots and consequently, the nonstationary of the series.

3.3.2 Cointegration Test (Autoregressive Distributed Lag Approach to Cointegration)

The econometric concept of cointegration was undertaken to examine the existence of a long-run relationship between the variables in the model. Engle & Granger (1987) submitted that a series is integrated of order d, I(d), if it has been differenced d times in attaining stationarity. Additionally, time-series data is said to be stationary if it is integrated to order 0, I(0). The differencing of time series data to achieve stationarity results in the loss of some long-run properties. Cointegration helps in ensuring that long-long run equilibrium is restored in the time series data by integrating short-run dynamics with long-run equilibrium.

The study employed the Autoregressive Distributed Lag (ARDL) technique to Cointegration in determining the long-run relationships in the non-stationary time series variables. The ARDL by Pesaran & Shin (1999) and Pesaran et al., (2001) was employed on the independent variables with the view of assessing the existence and significance of their long-run effects on the demand for life insurance.

The ARDL bounds test was used to determine the order of integration of the lagged variables to check if relationships were present in the long run. The hypothesis of the existence of a long-run relationship is conducted using the F-statistic (Wald test). The test statistic from the Wald test is compared with the two sets of critical values representing lower and upper bounds (Pesaran et al., 2001). Integration to the order of 0 is represented by the lower bounds while integration to the order of 1 is assessed interpreted using the upper bounds. F-statistic results that are less than the lower bounds point to the absence of cointegration while cointegration in the long-run is confirmed if the resulting F-statistic is larger than the upper bound critical values. The results are meaningless if the resulting F-statistic lies between the upper and lower bounds.

The ARDL model is given by the following equation;

$$\begin{aligned}\Delta LnLifePen_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i}\, \Delta LnLifePen_{t-1} + \sum_{i=0}^{n} \beta_{2i}\, \Delta LnY_{t-1} + \sum_{i=0}^{n} \beta_{3i}\, \Delta LnINF_{t-1} \\ + \sum_{i=0}^{n} \beta_{4i}\, \Delta LnFDV_{t-1} + \beta_{5i} LnLifePen_{t-1} + \beta_{6i} LnY_{t-1} + \beta_{7i} LnINF_{t-1} \\ + \beta_{8i} LnFDV_{t-1} + \varepsilon_t \end{aligned} \quad (3)$$

The hypothesis testing the coefficients lag level is captured as follows;

H_0: $\beta_{5i} = \beta_{6i} = \beta_{7i} = \beta_{8i} = 0$ (long-run relationship does not exist)
H_1: $\beta_{5i} \neq \beta_{6i} \neq \beta_{7i} \neq \beta_{8i} \neq 0$ (long-run relationship exists)

The ARDL is advantageous over other approaches to cointegration because it can be used even for series with a different order of integration. Therefore variables may be integrated to order 1-I(1), order 0-I(0) or mutually cointegrated (Pesaran et al, 2001). Sesele (2018) also points out

that the ARDL is useful in researches with limited or smaller samples of data and enables the research to make reasonable inferences on long-run properties.

3.3.3 Long-run and short-run estimates

Once long-run relationships have been established through the cointegration test, it is vital to ensure that short-run dynamics are equally incorporated. The ARDL is reparametrised into the Error Correction Model (ECM), consequently providing short-run dynamics and long-run relationships of the control variables (Pesaran & Shin, 1999).

The short-run dynamics and long-run equilibrium of the control variables are captured using the following equations;

Long-run

$$LnLifePen_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i}\, LnLifePen_{t-1} + \sum_{i=0}^{n} \beta_{2i}\, LnY_{t-1} + \sum_{i=0}^{n} \beta_{3i}\, LnINF_{t-1} + \sum_{i=0}^{n} \beta_{4i}\, LnFDV_{t-1} + \varepsilon_t \quad (4)$$

Short-run

$$LnLifePen_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i}\, \Delta LnLifePen_{t-1} + \sum_{i=0}^{n} \beta_{2i}\, \Delta LnY_{t-1} + \sum_{i=0}^{n} \beta_{3i}\, \Delta LnINF_{t-1} + \sum_{i=0}^{n} \beta_{4i} \Delta\, LnFDV_{t-1} + \beta_5 ECT_{t-1} + \varepsilon_t \quad (5)$$

The Error Correction Term (ECT) captures both short-run and long-run relationships amongst the variables. β_5 represents the coefficient of the ECT and indicates how quick the model "corrects" or reverts to equilibrium following any deviation away from equilibrium (Asteriou, 2007). This deviation or error has an impact on short-run dynamics. A negative ECT suggests adjustments to equilibrium while deviation from equilibrium is represented by a positive coefficient (Nkoro & Uko, 2016).

3.3.4 Vector autoregressive and Causality Analysis

Vector autoregressive (VAR) models are employed in econometric investigations to attain the best linear unbiased estimator (BLUE) in situations where the ARDL test provides no evidence of cointegration (Greene, 2003). VAR models are short-run models comprising endogenous variables were the dependent variable is a function of its lagged values and lagged values of the other variables in the model (Sims, 1980 and Gujarati, 2011). Maximum lag length selection is a prerequisite in estimating VAR models because having too many lags in the model may result in loss of degrees of freedom while limited lags may result in misspecification. Optimal lag selection can be obtained using the Akaike information criterion (AIC).

Asteriou (2007) submits one of the critical benefits of VAR models is the investigation of the direction of causality. Causality in time series analysis can be employed using the past to predict the future. Causality typically runs from the regressor to the dependent variable. Statistical preconditions before running causality tests include ensuring that time series data is stationary at first difference. Inferences of the short-run causal effects in a VAR model can be interpreted from the F-statistics and significance of p-values of the regressors. Additionally, inferences can be made from Pairwise Granger causality tests and Wald coefficient tests by interpreting the probability value of the chi-squared statistics. Unidirectional causality is inferred if all the lagged values on the independent variable are significant in the dependent variable equation, but the lagged values of the dependent variable are insignificant in the independent variable equation. In contrast, bi-directional causality occurs if the lagged values of the independent variable are significant in the dependent variable equation and the lagged values of the dependent variable are significant in the independent variable equation.

3.4 Summary of the chapter

This chapter highlighted the data sources and data collection procedures utilised in the study. An outline of the econometric model and techniques used in testing the hypothesis of the study were also discussed. A description of the dependent variables, their measurement, and the expected signs was presented in the chapter. The chapter went on to describe the estimation technique and further elaborated on the various tests performed on the model, including unit root tests and cointegration tests. In the next chapter, the study presents the research findings as well as an in-depth discussion and analysis of these findings.

CHAPTER 4

RESEARCH FINDINGS, ANALYSIS, AND DISCUSSION

4.1 Introduction

This chapter delivers and discusses the empirical findings of the models employed in the investigation of the demand for life insurance in Zambia. It is divided into eight sections as follows; sections two and three present the descriptive statistics and the correlation matrix, respectively. Section four delivers the results for the stationarity tests while section five discusses the cointegration results. Section six discusses the long-run estimates as presented by the error correction model. Section seven presents the short-run estimates and granger causality test results from the unrestricted VAR model. The final section summarises the salient observations of the chapter.

4.2 Descriptive Statistics

Table 4 below presents the summary statistics for the four variables employed in the study, namely, life penetration (LifePen), income (Inc), inflation (Inf) and financial development (FinDev). The average life insurance penetration for the study period was 0.34 while the highest and lowest penetration rates were 0.53 and 0.16, respectively. The Nominal GDP Per Capita increased from $417 in 1995 to $1,513 in 2017. The standard deviation results show that income was the most volatile variable while market penentration had the least variability.

In terms of skewness, which assesses the presence or lack of symmetry around the mean in a given data distribution, Table 4 confirms that all variables are positively skewed with market penetration and income being very close to zero. Positive coefficients represent a distribution with a right tail while negative coefficients illustrate a left tail with a skew of zero indicating perfect symmetry around the mean.

Table 4: Descriptive Statistics

Variables	*MktPen*	*Inc*	*Inf*	*FinDev*
Mean	0.340946	949.8057	17.27765	18.77206
Median	0.34579	1030.154	17.86973	18.42964
Maximum	0.533172	1850.793	43.0731	25.77263
Minimum	0.161606	332.4616	6.429397	15.40678
Std. Deviation	0.107678	552.6255	9.835837	2.418582
Skewness	0.217222	0.214739	0.852522	0.93128
Kurtosis	2.149426	1.46081	3.227378	4.221111
Jarque -Bera	0.874208	2.44716	2.835566	4.753566
Probability	0.645904	0.294175	0.24225	0.092849
Sum	7.841747	21845.53	397.3859	431.7573
Sum Sq. Dev.	0.255082	6718688	2128.361	128.6899
Count	23	23	23	23

Source: Author's compilation from Stata

A related statistic to skewness is kurtosis which measures the "tailedness" or sharpness of the frequency distribution with higher values depicting a peak distribution as opposed to lower values which signify a flat distribution. Table 4 demonstrates that all variables except Inf have a kurtosis below the normal standard distribution value of 3.

The Jarque-Bera normality test is used to evaluate if the study's time series data matches a normal distribution. Results (Table 4) show p-values which are higher than values at 1%, 5%, and 10% hence the null hypothesis of a normal distribution for each series cannot be rejected.

4.3 Correlation Analysis

The correlation analysis for the variables employed in the study is presented in Table 5. The matrix shows the correlation coefficient of most of the underlying variables are below 0.5 with the exception of Inf and Inc, pointing to limited concerns over multicollinearity. The positive correlations of the variables range from 0.32 to 0.54 while negative correlations range from -0.33 to -0.88. As expected, the dependent variable life penetration is positively correlated with independent variables income and financial development but is negatively correlated to inflation.

Table 5: Correlation Matrix

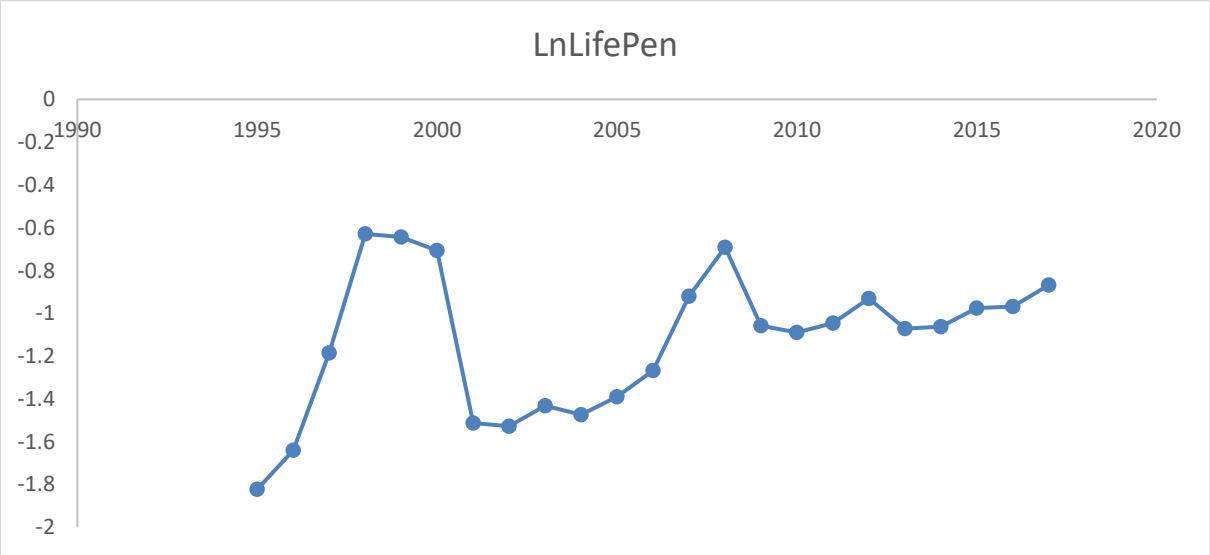
Variables	*LnLifePen*	*LnInf*	*LnInc*	*LnFinDev*
LnLifePen	1			
LnInf	-0.33603	1		
LnInc	0.32949	-0.88867	1	
LnFinDev	0.43317	-0.50642	0.54312	1

Source: Author's compilation from Stata

4.4 Stationery test - Unit Test Results

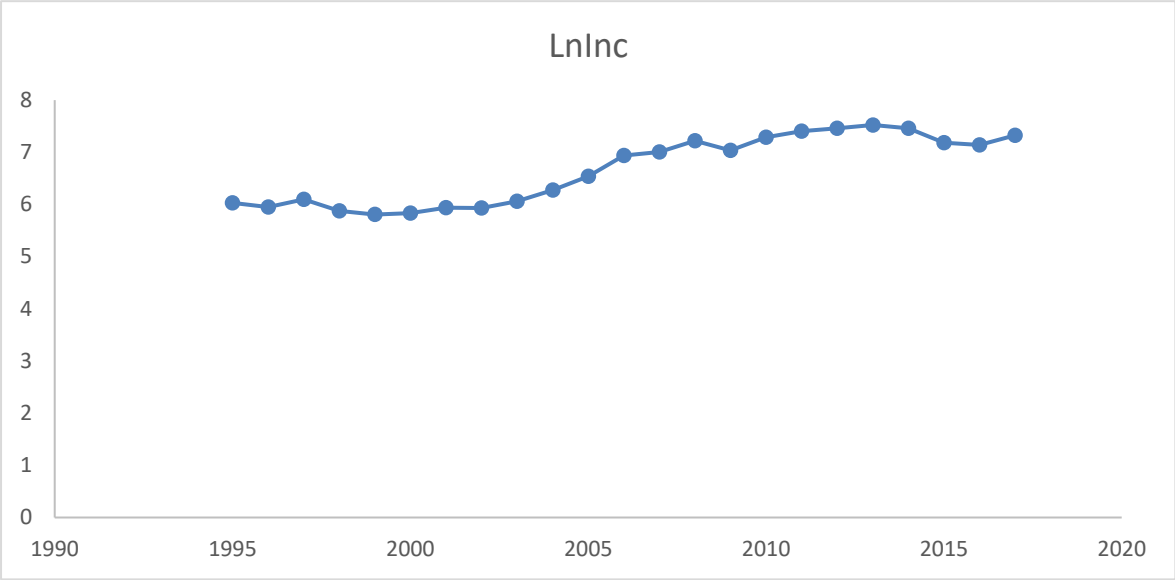
The stationarity of the data series for the variables utilised in the study was measured using the Augmented Dickey-Fuller (ADF) unit root tests. The optimal lag selection was informed by the Akaike Information criteria (AIC). In line with Gujarati (2003), a visual inspection by plotting line graphs was carried out before subjecting the variables to the ADF test. The graphs below show that the income variable exhibited a stable trend while life penetration and financial development showed an upward trend with inflation being the only variable displaying a downward trend over the period. The graphs point to a possible non-stationarity at level, for some of the variables.

Figure 5: LnLifePen Line Graph



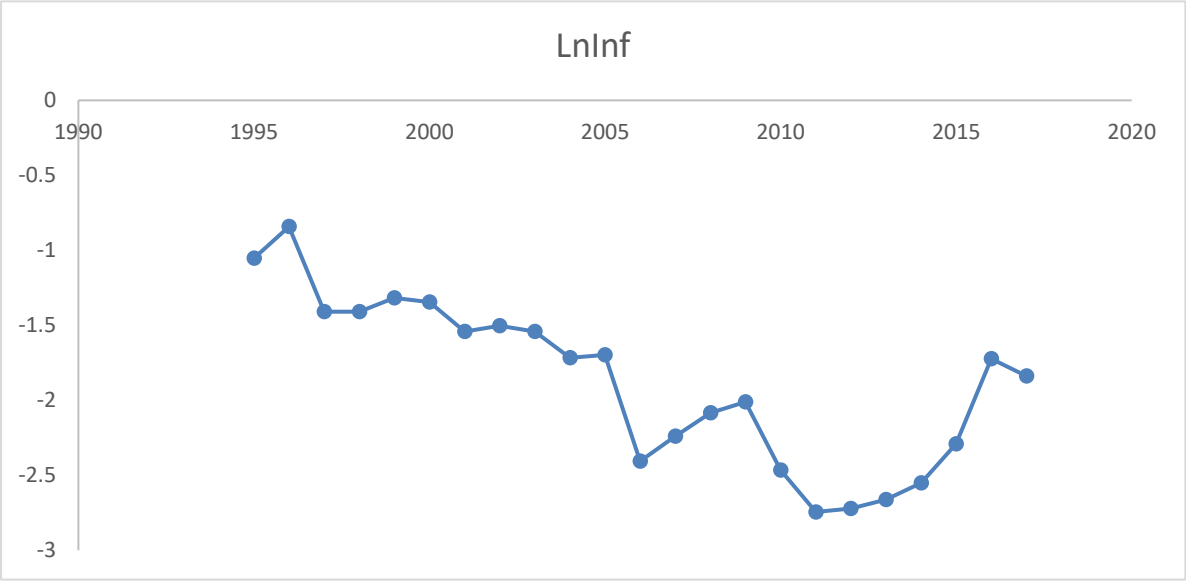
Source: Author's compilation

Figure 6:LnInc Line Graph



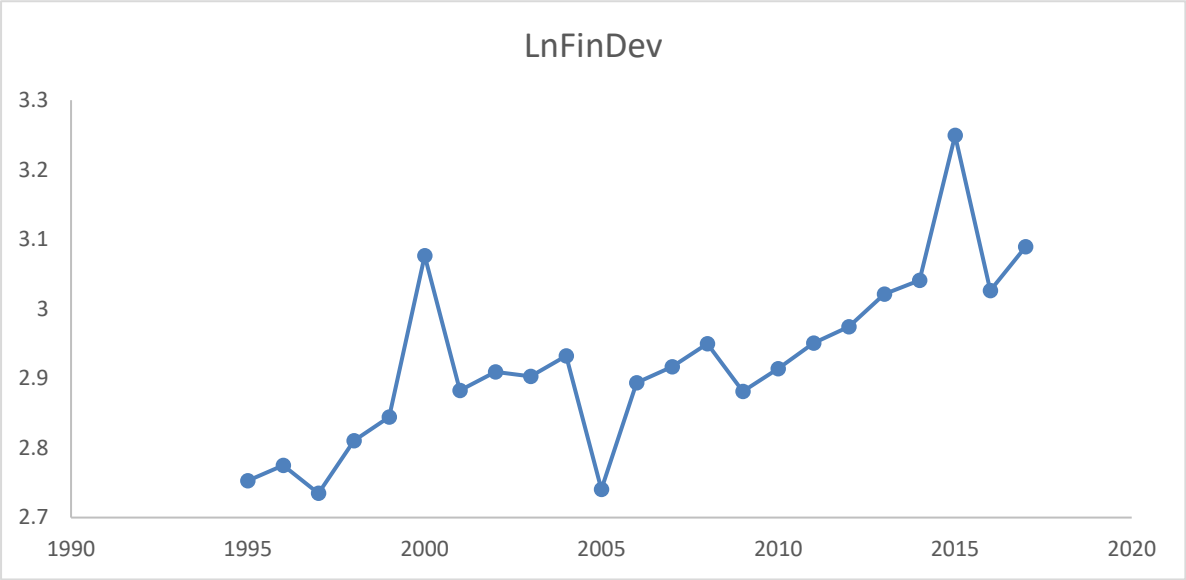
Source: Stata

Figure 7:LnInf Line Graph



Source: Author's compilation

Figure 8: LnFinDev Line Graph



Source: Author's compilation

After visual inspection of the variables, the study proceeded with the ADF unit root tests. According to the results as presented in Table 6, the variable life penetration is stationary at level while income, inflation and financial development are non-stationary at level but stationary at first difference. The tau statistics for income and financial development are lower than the 5% critical values in absolute terms. The absence of unit roots for the variables is further confirmed by the significance of the Mackinnon p-values, as presented in Table 6.

Table 6: ADF Unit Root Test Results

Variable	*Lag*	*T-Statistic*	*TCV (5%)*	*P-Value*	*Decision*
			LEVEL		
LnLifetPen	2	-3.463	-3.000	0.0090	Stationary
LnInf	1	-2.144	-3.000	0.2273	Non-Stationary
LnInc	1	-0.822	-3.000	0.8126	Non-stationary
LnFinDev	2	-1.570	-3.000	0.4984	Non-stationary
			FIRST DIFFERENCE		
LnInfd	0	-4.552	-3.000	0.0002	Stationary
LnIncd	0	-3.687	-3.000	0.0043	Stationary
FinDevd	1	-3.961	-3.000	0.0016	Stationary

Note: LnLifePen = Natural log of Life Penetration, LnInc = Natural Log of Income, LnInf = Natural Log of Inflation, LnFinDev = Natural Log of Financial Development. TCV = Test Critical Value. ADF = Augmented Dickey-Fuller; Lag length chosen was automatic - based on Akaike Information Criterion (AIC);

Source: Author's compilation from Stata

4.5 Cointegration Test Results

As highlighted in Chapter 3, the next step after carrying out unit root tests is to conduct cointegration tests to ascertain the presence of long-term relationships amongst the time series data variables. The ARDL bounds test was conducted on two models as follows; Model 1 with income and inflation as the independent variables while Model 2 had inflation and financial development as the independent variables. The results from the ARDL bounds test from the two (2) models are shown in Table 7;

Table 7: Pesaran/Shin/Smith (2001) ARDL Bounds Test

k = 4	***F-statistic***	***T***	***CV 10%***		***CV 5%***		***CV 1%***	
			I (0)	**I (1)**	**I (0)**	**I (1)**	**I (0)**	**I (1)**
Model 1	2.603	-2.777	3.17	4.14	3.79	4.85	4.41	5.52
Model 2	20.163	-3.233	3.17	4.14	3.79	4.85	4.41	5.52

Source: Author's compilation from Stata

As highlighted in chapter 3, in Pesaran, Shin and Smith (2001)'s bounds test for cointegration, the null hypothesis is rejected if the value of the F statistic is higher than the critical values of the I(1) series. Table 7 shows that the computed F-statistic of 2.603 for Model 1 is below all the lower bound critical values at 1%, 5%, and 10% significance. This means that there is no long-run relationship among the variables in Model 1 (life penetration, income, and inflation). Contrastingly, the F-Statistic of 20.163 for Model 2 is higher than the critical values of the I(1) series at all significance levels therefore the null hypothesis of no cointegration is not rejected.

4.6 Long-run estimates

After obtaining cointegration results which supported the presence of long-run convergence in model 2, the study proceeded to estimate the ECM as per Pesaran & Shin (1999). The long-run and short-run results are presented in Table 8. The output in model 2 has a negative value for the coefficient of -0.4916 and a significant p-value of 0.023. The negative coefficient sign proves that long-run convergence among the variables is present. This entails that errors relating to the previous period will be adjusted in the current period at 49.17% speed of adjustment.

In the long-run, inflation has a significant positive influence on life penetration, while financial development has a negative influence on the demand for life insurance. Both the inflation and financial development coefficient produce significant results at a 5% level. From the results, an inference can be made that a 1% increase in inflation results in a 2.7% increase in life insurance

consumption with a 1% increase in financial development resulting in a 15.6% decrease in life insurance consumption. The findings on inflation are inconsistent with a prior expectation which predicted a negative relationship between inflation and demand for life insurance and a positive correlation between financial development and life insurance. This could imply that Zambian life insurance consumers are less sensitive to the negative effects of inflation.

Empirically, the findings of Browne and Kim (1993), Sulaiman et al. (2015), Alhassan & Biekpe (2016) argue that inflation has adverse effects on life insurance while findings by Cargill and Troxel (1979) Kjosevski (2012), Nkotsoe (2018) and Meko et al., (2019) point to positive relationship. Empirical findings by Zerriaa et al. (2017) Iyawe & Osamwonyi (2017), suggest that financial development has a positive impact on life insurance while studies by Nesterova (2008) hold contrasting views.

In terms of the relationships, the ECM shows that in the short run, inflation has a negative influence on life penetration, while financial development has a positive impact.

Table 8: Error Correction Model (LnLifePen, LnInf and FinDev)

D.MktPen	Coef.	Std. Err.	t	P>|t|
	Long-Run equation			
LnInfd	2.72**	1.00	2.71	0.042
LnFinDevd	-15.56178**	5.67	-2.75	0.04
	Short-run equation			
Constant	0.1966***	0.0305	6.45	0.001
LnLifePend.LD.	-0.5521***	0.1216	-4.54	0.006
LnLifePend.L2D.	-0.2414	0.1320	-1.83	0.127
LnInfd D1.	-0.4999*	0.2198	-2.27	0.072
LnInfd LD.	-0.3982*	0.1768	-2.25	0.074
LnInfd L2D.	-0.5656**	0.1784	-3.17	0.025
LnInfd L3D.	-0.1241	0.0926	-1.34	0.238
LnFinDevd–D1.	7.6233**	1.2580	6.06	0.02
LnFinDevd LD.	4.8629***	0.9403	5.17	0.004
LnFinDevd L2D.	1.5989**	0.5528	2.89	0.034
(ADJ) ECT	-0.4917**	0.1521	-3.23	0.023
R-squared	0.9874			
Adj R-squared	0.9572			
Root MSE	0.0688			
Observations	18			

Note: LnLifePen=Life Penetration; LnInf=Inflation; LnFinDev=Financial Development; ADJ(ECT)=speed of adjustment and error correction term; Source: Author's compilation from Stata

The final step involved the assessment of the validity and goodness of fit for the model by subjecting it to diagnostic and stability tests. The stability tests were used to examine the accuracy of the model. These included Dublin Watson and Breusch-Godfrey tests for serial correlation, White's test for heteroskedasticity as well as the CUSUM and CUSUM squared tests for model stability.

The Dublin Watson test result of 2.49 shows no evidence of serial correlation. The Breusch-Godfrey test shows a chi2 statistic value of 8.836 and a low p-value of 0.0030 supporting the results from the Dublin-Watson test of no serial correlation. White's test for heteroskedasticity shows a p-value of 0.3888, confirming that the model is homoscedastic. The CUSUM test of parameter stability was used to ascertain if the regression coefficients were changing systematically over time while the CUSUM squared test checked if the variables of the regression were changing suddenly. The null hypothesis states that the coefficients are stable. Figure 9 (See Appendix 1) shows the plotted CUSUM graph for model 2 which confirms that the null hypothesis is accepted and the stability of the coefficients in the model is established since the CUSUM plot lies with the 5% critical bounds lines. On the other hand, the CUSUM squared graph points to model instability as the plot slightly deviates outside the confidence bounds for a short period before retaining to stability. This pointed to a structural break in the model parameters at the respective points that the CUSUM squared plot strayed outside the bounds.

4.7 Short-run estimates and Granger causality tests

After establishing the absence of long-run convergence in model 1, the study proceeded to run a short-run VAR model to investigate the presence of short-run causal relationships amongst life penetration, inflation, and income. The study employed the unrestricted VAR model, which further provided a basis for conducting causality tests (Table 9).

Table 9: VAR Model Results

	Coef.	*Std. Err*	*Prob.*	*RMSE*	*Prob.*
	LnLifePen			**0.197588**	**0.000**
LnLifePenL1.	0.781***	0.158	0.000		
LnLifePenL2	-0.448***	0.143	0.002		
LnInfL1	-0.174	0.189	0.356		
LnInfL2	0.504**	0.205	0.014		
LnIncL1	-0.247	0.311	0.428		
LnIncL2	0.626**	0.295	0.034		
Constant	-2.602***	0.810	0.001		
	LnInf			**0.252421**	**0.000**
LnLifePenL1.	0.257	0.202	0.202		
LnLifePenL2.	-0.179	0.183	0.327		
LnInfL1	0.343	0.242	0.156		
LnInfL2	-0.102	0.262	0.697		
LnIncL1	-0.933*	0.398	0.019		
LnIncL2	0.480	0.377	0.203		
Constant	1.622	1.034	0.117		
	LnInc			**0.17082**	**0.000**
LnLifePenL1.	-0.208	0.136	0.127		
LnLifePenL2	0.035	0.124	0.774		
LnInfL1	0.244	0.164	0.135		
LnInfL2	-0.312*	0.178	0.079		
LnIncL1	1.305***	0.269	0.000		
LnIncL2	-0.405	0.255	0.112		
Constant	0.406	0.700	0.562		

Note: LnLifePen=Life Penetration; LnInf=Inflation; LnFinDev=Financial Development; Source: Author's compilation from Stata

The optimal number of lags was set at two (2) based on the outcome of the AIC information criterion. The significance of the p-values informed the interpretation of the VAR model results. Coefficient results from the VAR model show that in the first equation when life penetration is the dependent variable, the second lag of both inflation and income have a positive significant causal effect on life penetration. In the second equation with inflation as the dependent variable, life penetration has no significant influence on inflation in both lags, but income has a significant negative impact on inflation in the first lag at a 5% significance level. The final equation with income as the dependent variable shows that life penetration has no significant influence on income in both lags while inflation has a negative influence on income in the second lag at a 10% significance.

The study proceeded with the Granger causality test which shows the direction of causality using the Wald test. The chi2 statistics from the Wald test were used to ascertain the short-run causal effects and act as a confirmation of the robustness of the VAR model results above. The causality results from the Wald tests are presented in Table 10. The null hypothesis of no Granger causality is rejected if the p-value is below the 5% significance level.

In the first equation, when life penetration is the dependent variable, we reject the null hypothesis of no causality from inflation to life penetration and income to life penetration. The results also show that when considered together, inflation and income have no causal effect on life penetration. When inflation is the dependent variable, the study fails to reject the null hypothesis of no Ganger causality from life penetration to inflation but rejects the null hypothesis of no Granger causality from income to inflation. Considering the effect of both life penetration and income on inflation, an inference of no Granger causality is made as the p-value is above the 5% significance level. Lastly, in the third equation, there is no granger causality of life penetration to income and inflation to income. Results also show that the two variables life penetration and inflation combined, do not granger cause income.

The following inferences can, therefore, be summarised from the VAR results;

- A unidirectional short-run causal relationship between inflation and life penetration exists;
- A unidirectional short-run causal relationship between income and life penetration exists; and
- A unidirectional short-run causal relationship between income and inflation exists.

Table 10: Wald Test Results

Equation	Excluded	chi2	Prob
LnLifePen	LnInf	6.0238	0.049
LnLifePen	LnInc	7.5476	0.023
LnLifePen	ALL	9.3937	0.052
LnInf	LnLifePen	1.7335	0.420
LnInf	LnInc	6.9557	0.031
LnInf	ALL	9.4033	0.052
LnInc	LnLifePen	2.7797	0.249
LnInc	LnInf	3.8081	0.149
LnInc	ALL	6.6176	0.158

Source: Author's compilation from Stata

The accuracy of the VAR model was evaluated by conducting three model stability tests. Firstly, the p-values of the autocorrelation test demonstrate that at lag order two (2), the null hypothesis of no autocorrelation cannot be rejected.

Lagrange-multiplier test			
lag	chi2	df	Prob > chi2
1	10.5665	9	0.3066
2	3.4931	9	0.94151

Secondly, the Jarque-Bera normality test results show that the null hypothesis of normality cannot be rejected for all three individual equations going by the insignificant p-values. The overall results for the entire VAR model also point to normally distributed errors, another sign of model reliability. Lastly, the Eigenvalue stability condition results all lie inside the unit circle, a confirmation that the VAR model is stable.

4.8 Summary of the chapter

This chapter presented, highlighted and interpreted the findings of the various econometric models employed in the study. The graphical inspection of the variables provided an indication on the stationarity of the variables. This was validated by the results of the ADF unit toot test, which showed that life penetration was stationary at level while inflation, income, and financial development were stationary at first difference.

The ARDL bounds tests established the existence of long-term relationships among the variables in model 2 while model 1 results showed no evidence of cointegration. After confirming the existence of long-run relationships in model 2, the study proceeded with the estimation of the ECM to capture both short-run and long-run relationships. The ECM demonstrated that in the short-run, inflation negatively affects life penetration while financial development has a positive impact. The long-run estimates point to a positive significant influence of inflation on life penetration while financial development has a negative influence on the demand for life insurance.

For model 1, the absence of cointegration led to the estimation of the VAR model to investigate the existence of short-run causal relationships between the variables. Results pointed to a

significant unidirectional short-run causal relationship between inflation and life penetration, income and life penetration, and income and inflation. The robustness of the VAR model results was confirmed by the Wald test.

The next chapter summarises the key findings of the study and offers a conclusion. The chapter further delivers policy recommendations derived from the empirical investigation of the determinants of life insurance consumption in Zambia.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter delivers a summary of the major findings, conclusions and policy recommendations arising from the empirical investigation of the determinants of life insurance consumption in Zambia. The final section of the chapter proposes possible future research areas. The study was segmented into five main chapters beginning with an introduction and background before proceeding into a literature review and a discussion of the methodology employed in the investigation. The study then progressed to chapter four which dissected the research findings from the empirical models. Lastly, this final chapter presents the conclusion and recommendations.

5.2 Summary and conclusions of the study

This study set out to investigate the determinants of life insurance consumption in Zambia with a specific bias towards selected macroeconomic variables. The low life insurance penetration levels in the country provoked this study. The study utilised time series data for the period 1995 to 2017 because of the availability of country data on life insurance penetration. The research presented theoretical and empirical literature review in the field of life insurance before proceeding to deliberate the methodology that was employed. The ADF unit root test determined the stationarity of the variables employed in the empirical investigation. The presence of long-run relationships amongst the variables in the study was investigated using the ADRL approach to cointegration. The research conducted the ARDL bounds test on two models with life insurance penetration as the dependent variable. Model 1 employed income and inflation as the independent variables while Model 2 tested inflation and financial development as the independent variables.

The ARDL bounds tests confirmed the presence of long-term relationships among the variables in model 2, while model 1 results displayed no evidence of cointegration. The findings in model 2 demonstrated the existence of long-run relationships which further led to the estimation of the ECM for both short-run and long-run relationships. Results from the ECM demonstrated that in the short-run, inflation negatively affects life penetration, while financial development

has a positive impact. The long-run estimates pointed to a significant positive influence of inflation on life penetration while financial development was observed to significantly and negatively affect the demand for life insurance. The findings concerning inflation contradict the study's hypothesis of an adverse effect of inflation on life insurance. They are, however, consistent with findings by Browne & Kim (1993), Beck & Webb (2003), Kjosevski (2012) and Nkotsoe (2018). Correspondingly, the financial development variable results contradict the study's hypothesis of a positive influence on life insurance. The results of this study are consistent with findings by Alhassan & Biekpe (2016) and Nesterova (2008).

The absence of long-run convergence in model 1 prompted the estimation of the VAR model with the view of investigating short-run causal relationships between the variables. Results demonstrated significant unidirectional short-run causal relationships between inflation and life penetration, income and life penetration, and income and inflation. The unrestricted VAR model investigation for short-run causal relationships amongst the variables in model 1 highlighted the following results;

- A unidirectional short-run causal relationship between inflation and life penetration was established, such that inflation granger causes life penetration;
- A unidirectional short-run causal relationship between income and life penetration, such that income granger causes life penetration; and
- A unidirectional short-run causal relationship between income and inflation, such that income granger causes inflation.

5.3 Policy Recommendations

The Zambian life insurance sector is highly underdeveloped, as demonstrated by the low penetration levels. The unexpected results on the effect of financial development on life insurance may suggest that the industry is in its infancy and is, therefore, yet to reach threshold levels where the impact of the expansion of the financial sector is insignificant. To this end, the Government, through regulators such as the central bank and the Pensions and Insurance Authority should implement deliberate measures aimed at developing the financial sector. Reforms should focus on increasing financial inclusion and deepening as well as promoting more extensive access to financial services and products. Governmental policy should drive the financial inclusion agenda by promoting financial literacy and encouraging the use of mobile and digital platforms. Additionally, insurance companies should upsurge sensitisation on life

insurance and its associated benefits to consumers in order to contribute to the Government mandate of improving access and utilisation of insurance services to the Zambian populous. Insurance companies should equally endeavour to provide more affordable life insurance products in order to stimulate demand.

5.4 Avenues for future research

Given the data limitations experienced in the study, future studies with a longer time series and should be explored. Furthermore, studies on Zambia should consider expanding the control variables to include social-demographic and institutional factors. Finally, future research could consider investigating non-linear relationships between income and its determinants, as many studies assume a linear relationship.

REFERENCES

African Insurance Organisation. (2018). Africa Insurance Barometer 2018.

Alhassan, A. L., & Biekpe, N. (2016). Determinants of life insurance consumption in Africa. *Research in International Business and Finance*, *37*(October), 17–27. https://doi.org/10.1016/j.ribaf.2015.10.016

Anderson, D. R., & Nevin, J. R. (1975). Determinants of Young Marrieds ' Life Insurance Purchasing Behavior : An Empirical Investigation, *42*(3), 375–387.

Arun, T. (2012). Bequest Motives and Determinants of Micro Life Insurance in Sri Lanka. *World Development*, *40*(8), 1700–1711. https://doi.org/10.1016/j.worlddev.2012.04.010

Asteriou, D. and Hall, S.G. (2007) Applied Econometrics: A Modern Approach Using Eviews and Microfit, Revised Edition. Palgrave Macmillan.

Auerbach, A. J., & Kotlikoff, L. J. (1989). How rational is the purchase of life insurance?', (3063).

Babbel, D. F. (1981). Inflation , Indexation , and Life Insurance Sales in Brazil Author (s): David F . Babbel Source : The Journal of Risk and Insurance , Vol . 48 , No . 1 (Mar ., 1981), pp . 111-135 Published by : American Risk and Insurance Association Stable URL : htt, *48*(1), 111–135.

Beck, T., & Webb, I. (2003). Economic, Demographic, and Institutional Determinants of Life Insurance Consumption across Countries. *The World Bank Economic Review*. https://doi.org/10.1093/wber/lhg011

Beenstock, M., Dickinson, G., & Khajuria, S. (1986). The determination of life premiums : An international cross-section analysis 1 . 970-1981, *5*, 261–270.

BMI Research. (2018). Zambia Insurance Report Q3 2018.

Briys, E., Dionne, G., & Eeckhoudt, L. (1989). More on insurance as a Giffen Good, *420*, 415–416.

Brook , C.(2008). *Introductory to Financial Econometrics*. Cambridge University Press, Second edition

Browne, M. J., & Kim, K. (1993). An International Analysis of Life Insurance Demand Author (s): Mark J . Browne and Kihong Kim Source : The Journal of Risk and Insurance , Vol . 60 , No . 4 (Dec ., 1993), pp . 616-634 Published by : American Risk and Insurance Association Stable URL, *60*(4), 616–634.

Cameron. A.C and Trivedi, P.K .(2010). *Microeconometrics Using Stata*. Revised Edition

Campbell, J. Y., Lo, A., Mackinlay, A. C., Ci, I., & Susanna, T. (1997). The Econometrics of Financial Markets.

Cargil, T. F., & Troxell, T. E. (1979). Modeling Life Insurance Savings : Some Methodological Issues Author (s): Thomas F . Cargill and Terrie E . Troxel Published by : American Risk and Insurance Association Stable URL : http://www.jstor.org/stable/252455 Modeling Life Insurance Savings : So, *46*(3), 391–410.

Catalan et al, M. (2000). Contractual Savings or Stock Markets Development : Which Leads ?

Çelik, S., & Kayali, M. M. (2009). Determinants of demand for life insurance in European countries. *Problems and Perspectives in Management*, *7*(3), 3–8.

Chang, C., & Lee, C. (2012). Non-Linearity Between Life Insurance and Economic Development : A Revisited Approach, (2002), 223–257. https://doi.org/10.1057/grir.2011.10

Debabrata, M., & Amlan, G. (2010). Determinants of Life Insurance Demand in India in the Post Economic Reform Determinants of Life Insurance Demand in India in the Post Economic Reform Era (1991-2008), (October).

Derakhshideh, S. (2014). Evaluating Life Insurance Demand in Iran, (3), 574–581.

Dickey, D. A., & Fuller, W. A. (1979). Distribution of the Estimators for Autoregressive

Time Series with a Unit Root.pdf.
Dickey, D.A. and Fuller, W.A. (1981) 'Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root', *Econometrica*, Vol.49, p.1063.
Eisenhauer, J. G., Halek, M., Eisenhauer, J. G., & Halek, M. (2010). Prudence , risk aversion , and the demand for life insurance Prudence , risk aversion , and the demand for life insurance, *4851*. https://doi.org/10.1080/135048599353429
Engle, R. F., & Granger, C. W. J. (1987). Co-Integration and Error Correction : Representation , Estimation , and Testing Published by : The Econometric Society Stable URL : https://www.jstor.org/stable/1913236 REFERENCES Linked references are available on JSTOR for this article : You may need to, *55*(2), 251–276.
Enz, R. (2000). The S-Curve Relation Between Per-Capita Income and Insurance Penetration, *25*(3), 396–406.
Ernest & Young. (2016). Waves Of Change: revisted Insurance Opportunities in Sub-Sahara Africa, 1–52. https://doi.org/10.1080/03124078108549694
Ernest & Young. (2017). Global insurance trends analysis 2016, (May). Retrieved from http://www.ey.com/Publication/vwLUAssets/ey-global-insurance-trends-analysis-2016/$File/ey-global-insurance-trends-analysis-2016.pdf
European Insurance, K. F. (2018). European Insurance — Key Facts October 2018, (October).
Feyen et al., E. (2011). What Drives the Development of the Insurance Sector ? An Empirical Analysis Based on a Panel of Developed and Developing Countries, (February).
Financial Sector Deepening Zambia. (2015). FinScope 2015: Top line findings. Retrieved from http://www.fsdzambia.org/wp-content/uploads/2016/05/FINSCOPE-REPORT-2015.pdf
Fischer, S. (1973). A Life Cycle Model of Life Insurance Purchases Author (s): Stanley Fischer Source : International Economic Review , Vol . 14 , No . 1 (Feb ., 1973), pp . 132-152 Published by : Wiley for the Economics Department of the University of Pennsylvania and I, *14*(1), 132–152.
Fortune, P. (1973). American Finance Association A Theory of Optimal Life Insurance : Development and Test Author (s): Peter Fortune Source : The Journal of Finance , Vol . 28 , No . 3 (Jun ., 1973), pp . 587-600 Published by : Wiley for the American Finance Association, *28*(3), 587–600.
Gao, T. H., & Hwang, T. (2003). The Determinants of the Demand for Life Insurance in an Emerging Economy -The Case of China. *Journal of Managerial Finance*, *29*(23), 82–96. https://doi.org/10.1108/03074350310768779
Granger, C.W.J. (1981) 'Some Properties of Time Series Data and Their Use in Econometric Model Specification', Journal of Econometrics, Vol.16, pp.121-130.
Granger, C.W.J. (1988) 'Some Recent Developments in the Concept of Causality', Journal of Econometrics, Vol.39, pp.199-211.
Granger, C.W.J. (2004) 'Time Series Analysis, Cointegration, and Applications', The American Economic Review, Vol.94, No.3, pp.421-425.
Granger, C. W. J., & NewboLd, P. (1974). Spurious regressions in econometrics, *2*, 111–120.
Greene, W. H. (2003). Econometric Analysis. (P. Education, Ed.), Journal of the American Statistical Association (Vol. 97). Prentice Hall. Retrieved from http://pubs.amstat.org/doi/abs/10.1198/jasa.2002.s458
Guerineau, S., & Sawadogo, R. (2015). On the determinants of life insurance development in Sub-Saharan Africa : the role of the institutions quality in the effect of economic development To cite this version : HAL Id : halshs-01178838 On the determinants of life insurance development in Sub-Saharan Africa : the role of the institutions quality in the effect of economic.

Gujarati, D.N. (2003) *Basic Econometrics*, 4th Edition, McGraw-Hill.
Gujarati, D.N. (2011) *Econometrics by Example*, 1st Edition, Palgrave Macmillan.
Hakansson, N. H. (1969). Optimal Investment and Consumption Strategies Under Risk , an Uncertain Lifetime , and Insurance Author (s): Nils H . Hakansson Source : International Economic Review , Vol . 10 , No . 3 (Oct ., 1969), pp . 443-466 Published by : Wiley for the Economi, *10*(3), 443–466.
Hoy, M., & Robson, J. A. (1981). Insurance as a Giffen good, *8*, 47–51.
Hwang, T., & Greenford, B. (2005). A C ROSS -S ECTION A NALYSIS OF THE D ETERMINANTS OF L IFE I NSURANCE C ONSUMPTION IN M AINLAND C HINA , H ONG K ONG , AND T AIWAN, *8*(1), 103–125.
Ibiwoye et al, A. (2010). THE DETERMINANTS OF LIFE INSURANCE CONSUMPTION IN NIGERIA : A CO- INTERGRATION APPROACH THE DETERMINANTS OF LIFE INSURANCE CONSUMPTION IN NIGERIA : A CO-INTERGRATION APPROACH, (January 2010).
Iyawe, O. O., & Osamwonyi, I. O. (2017). Financial Development and Life Insurance Demand in Sub-Sahara Africa. *International Journal of Financial Research*, *8*(2), 163. https://doi.org/10.5430/ijfr.v8n2p163
Jung et al. (2019). The effect of experiencing a death on life insurance ownership. *Journal of Behavioral and Experimental Finance*, *22*, 170–176. https://doi.org/10.1016/j.jbef.2019.03.003
Karni, E., & Zilcha, I. (1986). Risk Aversion in the Theory of Life Insurance : The Fisherian Model Author (s): Edi Karni and Itzhak Zilcha Source : The Journal of Risk and Insurance , Vol . 53 , No . 4 (Dec ., 1986), pp . 606-620 Published by : American Risk and Insurance Associati, *53*(4), 606–620.
Kaufmann, D., Kraay, A., & Zoido-lobatón, P. (2002). Governance Matters II Updated Indicators for 2000 / 01, (February).
Kearey, P., Brooks, M., & Hill, I. (2002). *An Introduction to Business Research Methods*. *An Introduction to Geophysical Exploration*. https://doi.org/10.2307/2552778
Kjosevski, J. (2012). The Determinants of Life Insurance Demand In Central and Southeastern Europe, (February 2012). https://doi.org/10.5539/ijef.v4n3p237
Kjosevski, J. (2017). The Determinants of Life Insurance Demand In Central and Southeastern Europe, (February 2012). https://doi.org/10.5539/ijef.v4n3p237
Lee, C., & Chiu, Y. (2012). The impact of real income on insurance premiums : Evidence from panel data. *International Review of Economics and Finance*, *21*(1), 246–260. https://doi.org/10.1016/j.iref.2011.07.003
Lenten, L., & Rulli, D. N. (2006). A Time-Series Analysis of the Demand for Life Insurance Companies in Australia : An Unobserved Components Approach, (May). https://doi.org/10.1177/031289620603100104
Lewis, F. D. (1989). Dependents and the Demand for Life Insurance Author (s): Frank D . Lewis Source : The American Economic Review , Vol . 79 , No . 3 (Jun ., 1989), pp . 452-467 Published by : American Economic Association Stable URL : http, *79*(3), 452–467.
Li et al. (2007). The Demand for Life Insurance in OECD Countries. *The Journal of RRsk and Insurance*, *74*(3), 637–652.
Mackinnon, J.G. (1994) 'Approximate Asymptotic Distribution Functions for Unit-Root and Cointegration', *Journal of Business & Economic Statistics*, Vol.12, No.2, pp.167-176.
Mackinnon, J.G. (1996) 'Numerical Distribution Functions for Unit Root and Cointegration Tests', *Journal of Applied Econometrics*, Vol.11, No.6, pp.601-618.
Mackinnon, J.G., Alfred A. Haug and Leo Michelis. (1999) 'Numerical Distribution Functions of Likelihood Ratio Tests for Cointegration', *Journal of Applied*

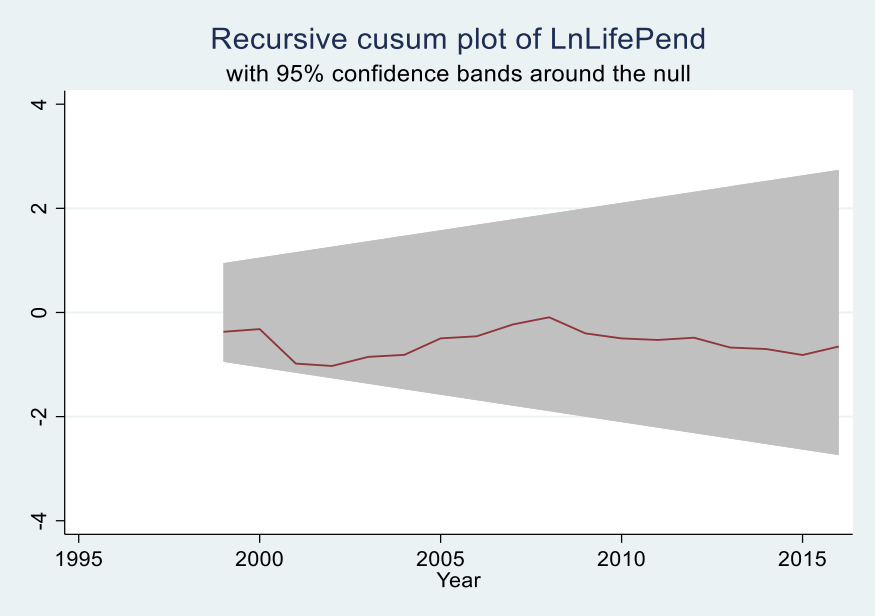
Econometrics, Vol.14, No.5, pp.563-577.
Mahadeva, L., & Robinson, P. (2004). Unit Root Testing to Help Model Building, (22).
Mantis, G., & Farmer, R. N. (1968). Demand for Life Insurance Author (s): George Mantis and Richard N . Farmer Source : The Journal of Risk and Insurance , Vol . 35 , No . 2 (Jun ., 1968), pp . 247-256 Published by : American Risk and Insurance Association Stable URL : https://www.jstor, *35*(2), 247–256.
Marijana, Ć., Dzaja, I., & Pepur, S. (2013). The Effect of Social and Demographic Factors on Life Insurance Demand in Croatia Department of Finance MA in Economics Department of Finance, *4*(9), 65–72.
Meko et al. (2019). Determinants of life insurance demand in Ethiopia, *21*(3), 293–302. https://doi.org/10.14414/jebav.v21i3.1474
Mishra, M. K. (2014). Demand Analysis for Life Insurance in India: Some Empirical Observations. *International Journal of Advanced Research Journalwww.Journalijar.Com INTERNATIONAL JOURNAL OF ADVANCED RESEARCH*, *2*(5), 704–814.
Mossin, J. (1968). Aspects of Rational Insurance Purchasing, *76*(4), 553–568.
Munir, S., Khan, A., & Jamal, A. (2013). Impact of Macroeconomic & Demographic Variables on the Demand of Life Insurance : A case study of State Life Insurance Corporation of Pakistan (1973-2010), *2*(1).
Mulenga, Ornam. INSURANCE PENETRATION AND GROWTH IN ZAMBIA: CASE OF LUSAKA PROVINCE. ABC Research Alert, [S.l.], v. 4, n. 3, p. Zambia, dec. 2016. Available at: <https://journals.abc.us.org/index.php/abcra/article/view/966>. Date accessed: 27 Apr. 2020. doi:http://dx.doi.org/10.18034/abcra.v4i3.966.
Nesterova, D. (2008). Determinant Of The Demand For Life Insurance Evidence From Selected CIS and CEE Countries, 1–49.
Nkoro, E., & Uko, A. K. (2016). Autoregressive Distributed Lag (ARDL) cointegration technique : application and interpretation, *5*(4), 63–91.
Nkotsoe, L. M. (2018). Determinants of Life Insurance Penetration in SADC.
OECD. (2014). *Development Co-operation Report 2014*.
Olayungbo, D. O. (2015). Insurance and Economic Growth Nexus in Nigeria : Asymmetric Non-Linear Relationship under Heterogeneous Agents, *27*(3), 248–261.
Outreville, J. F. (1996). Life Insurance Markets in Developing Countries Author (s): J . François Outreville Source : The Journal of Risk and Insurance , Vol . 63 , No . 2 (Jun ., 1996), pp . 263-278 Published by : American Risk and Insurance Association Stable URL : http://ww, *63*(2), 263–278.
Pauly et al. (2003). PRICE ELASTICITY OF DEMAND FOR TERM LIFE INSURANCE AND ADVERSE SELECTION Krupa Subramanian-Viswanathan Jean Lemaire Working Paper 9925 NATIONAL BUREAU OF ECONOMIC RESEARCH 1050 Massachusetts Avenue Cambridge , MA 02138 August 200.
Pesaran et al, M. H. (2001). BOUNDS TESTING APPROACHES TO THE ANALYSIS, *326*(February), 289–326. https://doi.org/10.1002/jae.616
Pesaran, M. H., & Shin, Y. (1999). An autoregressive distributed lag modelling approach to cointegration analysis. *Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium.*, (March 3-5, 1995), 1–31. https://doi.org/10.1017/CCOL521633230
Phillips, P., & Perron, P. (1988). Testing for a Unit Root in Time Series Regression.
PWC. (2018). Ready and Willing, (September).
Sesele, M. (2018). Determinants of private investment in South Africa.
Showers, V. E., & Shotick, J. A. (1994). The effects of household characteristics on demand for insurance - A Tobit analysis.pdf.

Sigma. (2018). World insurance in 2017 : solid , but mature life markets weigh on growth, (3).
Sims, C.A. (1980) 'Macroeconomics and Reality', Econometrica, Vol.48, No.1, pp.1-48.
Sjö, B. (2018). Testing for Unit Roots and Cointegration -Guide Testing for Unit Roots and Cointegration - A Guide, (May).
Sliwinski, A., Michalski, T., & Roszkiewicz, M. (2013). Demand for life insurance-an empirical analysis in the case of Poland. *Geneva Papers on Risk and Insurance: Issues and Practice*, *38*(1), 62–87. https://doi.org/10.1057/gpp.2012.21
Soo, H. H. (1996). Life Insurance and Economic Growth: Theoretical and Empirical Investigation.
Sulaiman, L. A., Africa, S., Migiro, S., Africa, S., Yeshihareg, T., & Africa, S. (2015). Investigating the factors influencing the life insurance market in Ethiopia, *13*(2).
Truett, D. B., & Truett, L. J. (1990). The Demand for Life Insurance in Mexico and the United States : A Comparative Study Author (s): Dale B . Truett and Lila J . Truett Published by : American Risk and Insurance Association Stable URL : https://www.jstor.org/stable/253306 The Demand for Li, *57*(2), 321–328.
Tyson, J. E. (n.d.). Life Insurance Market in Sub-Saharan Africa.pdf.
Ward, D., & Zurbruegg, R. (2002). Law , Politics and Life Insurance Consumption in Asia, *27*(3), 395–412.
Wooldridge, J.M. (2003) *Introductory Econometrics: A Modern Approach*, 2nd Edition, Thomson.
Yaari, M. E. (1965). Uncertain Lifetime , Life Insurance , and the Theory of the Consumer. *The Review of Economic Studies, Vol. 32, No. 2 (Apr., 1965), Pp. 137-150*, *32*(2), 137–150.
Ye et al. (2009). Foreign Participation in Life Insurance Markets : Evidence from OECD Countries, (2003), 466–482. https://doi.org/10.1057/gpp.2009.9
Yilma, A. (2014). Determinants of Life Insurance Demand in Ethiopia By : Amrot Yilma A Thesis Submitted to The Department of Accounting and Finance College of Business and Economics Presented in the Partial Fulfilment of the Requirements for the Degree of Masters of Busine.
Zerriaa, M., Amiri, M. M., Noubbigh, H., & Ã, K. N. (2017). Determinants of Life Insurance Demand in Tunisia, *29*(1), 69–80.
Zhang, C., & Zhu, N. (2006). Determinants of the Development of Insurance in China under the Globalization, (1999), 1–27.
Zheng, W., Liu, Y., & Dickinson, G. (2008). The Chinese Insurance Market : Estimating its Long-Term Growth and Size, *33*(3), 489–506. https://doi.org/10.1057/gpp.2008.19
Zietz, E. N. (2003). An Examination of the Demand for Life Insurance, *6*(2), 159–191.

APPENDICES

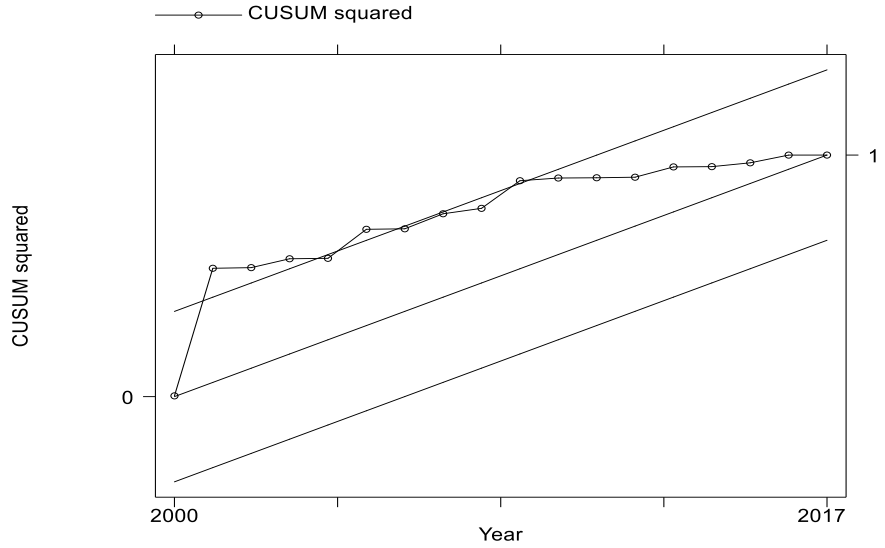
Appendix 1: Model Diagnostic Test results

Figure 9:CUSUM Graph for Model 2



Source: Author's compilation from Stata

Figure 10: CUSUM Squared Graph for Model 2



Source: Author's compilation from Stata