UNIVERSITY OF CAPE TOWN
GSB DEFIC DEVELOPMENT FINANCE CENTRE
MASTER OF COMMERCE IN DEVELOPMENT FINANCE

EQUIS ACCREDITED  ASSOCIATION OF MBAS ACCREDITED  AACSB ACCREDITED

# Investigating the Insurance – Growth Nexus from a Low-Income Country: Perspective of Malawi

A Dissertation

Submitted to

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

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

By


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**October 2024**

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*Financing Equitable, Ethical, Sustainable & Collaborative Development*

## Declaration

I, Chikondi Jenala, student number JNLCHI001, hereby declare that the work on which this thesis is based on my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university. I authorise the University to reproduce for the purpose of research either the whole or any portion of the contents in any manner whatsoever.

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**Abstract**

Malawi is a low-income small country whose financial market is not fully developed, and it is prone to disasters due to adverse weather conditions. The economy depends on subsistence agriculture from small-scale farmers who rely on rainfall for their productivity, and they do not have insurance to mitigate against exposure to adverse weather conditions. The impacts of climate change will heavily exacerbate their exposure and consequently impact the economy of Malawi. However, the undercurrents of the interaction between insurance and economic expansion in Malawi have hardly been explored in the literature. This study investigated the long run and short run causal relationship between insurance industry activities and economic growth in Malawi using time series data from 1983 to 2019. The study employed the linear and nonlinear augmented Auto Regressive Distributed Lag (ARDL) model to study the relationship between insurance market activities and economic growth using insurance penetration to stand for insurance activities in Malawi.

The results showed that there was neither a linear nor non-linear long run relationship or asymmetric connection between insurance and expansion of the economy in Malawi. Furthermore, the short run relationship was not found to be significant too. To test the direction of causality between insurance and economic growth, the Granger causality test was performed using the Vector Autoregressive (VAR) model, and the results proved the neutrality hypothesis for Malawi, with no causality existing between insurance and Malawi's economic expansion. This demonstrated that the insurance market in Malawi is operating at a low threshold that does not influence economic growth. The study recommends that the Government should put in place policies that will help to improve financial development and deepening, and increase participation of the majority of subsistence farmers so that they reduce their vulnerability and also raise the insurance thresholds to make it positively affect economic development.

**Acknowledgements**

To Almighty and Everliving God be all the thanks, glory and honour for sustaining my life and enriching it with all blessings that make everything hold in its place. It is a blessing to start this journey and finish it in good health and sound mind due to God's invaluable and unmeasurable love and grace.

Special appreciation should go to my supervisor, Professor Abdul Latif Alhassan, for his untiring effort in pushing me to the finish line. The journey was long, with so many challenges. Latif guided me from the beginning with baby steps and challenged me to believe that it would be possible to carry out any type of academic study as long as there was a willingness to do so. May you continue to guide others on similar paths to realise their dreams.

To the wonderful team at the Graduate School of Business who rendered their untiring support, I owe you a word of gratitude, and I will not be able to mention all of you by name since there were many of you. A special mention should go to Samantha Van de Rose, Modie Sempu and Mary Lister for their support whenever I needed something throughout this journey.

All the effort that I was able to invest in this work would not have been possible without the support of the special person and love of my life, Fainess. Your resilience, love, patience and understanding on this journey helped to envigorate and encourage me to hope for the best. To my lovely children, Ororomelha, Noorhiya and Mukumi, I thank you for your patience and resilience when I was pretty much absent. Now, I will be available and participate in many activities which I could not in the past few years due to the demands of my studies.

To the friendly and wonderful class of MCom. Dev. Fin 2022, you all are my rockstars, and you will always remain in my heart wherever I go. You taught me many lessons that will improve my understanding of the world.

Finally, I take responsibility for all the contents of this study. The errors and omissions in this paper should be attributed to me rather than the wonderful people who supported me untiringly.

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## List of Acronyms and Abbreviations

| | |
|---|---|
| AIC | Akaike Information Criteria |
| ARDL | Autoregressive Distributed Lag |
| CFRI | Centre for Financial Regulation and Inclusion |
| EU | European Union |
| FDI | Foreign Direct Investment |
| GDP | Gross Domestic Product |
| GFDD | Global Financial Development Database of the World Bank Group |
| GMM | Generalized Method of Moments |
| GNI | Gross National Income |
| GNP | Gross National Product |
| HCAP | Human Capital Development |
| HIPC | Heavily Indebted Poor Countries |
| IMF | International Monetary Fund |
| INF | Annual Inflation Rate |
| IP | Insurance Penetration |
| LIP | Life Insurance Penetration |
| MDRI | Multilateral Debt Relief Initiative |
| MGDS | Malawi Growth and Development Strategy |
| MSE | Malawi Stock Exchange |
| NARDL | Nonlinear Autoregressive Distributed Lag |
| NLIP | Nonlife Insurance Penetration |
| OECD | The Organization for Economic Cooperation and Development |
| OLS | Ordinary Least Squares |
| RBM | Reserve Bank of Malawi |
| SDGs | Sustainable Development Goals |
| SMEs | Small and Medium Enterprises |
| SSA | Sub-Saharan Africa |
| TRAD | Trade Openness |
| UNCDF | United Nations Capital Development Fund |
| UNCTAD | United Nations Conference on Trade and Development |
| UNDP | United Nations Development Programme |
| VAR | Vector Autoregressive |
| VECM | Vector Error Correction Model |

| | |
|---|---|
| WBG | World Bank Group |
| WDI | World Development Index |

# Chapter 1: Introduction

## 1.1 Introduction

Economic growth is vital in moving people from poverty to prosperity, and there are always worries when the pace of expansion of the economy declines owing to financial downturns (Ravallion, 2010). Other factors being equal, the rate at which an economy grows should create economic opportunities for individuals and firms in that economy to prosper while also attracting foreign investors to bring in foreign direct investment (FDI) since the growth economy creates confidence in investors that they will earn a high return on their investment (Helpman, 2004). Central to economic growth is the existence of a functioning financial services industry that performs intermediary roles that create an enabling environment for production and trade and efficiently promote the allocation of resources for the generation of returns on investments.

The role of a functioning financial services industry in promoting economic growth of the economy has been a subject of academic discourse since early authors theorised about this relationship. The early pioneers of the interaction between the expansion of the economy and the financial services industry include Bagehot (1873), who postulated that the financial system of England was pivotal in helping England achieve enormous economic growth through its ability to generate credit efficiently. In addition, Schumpeter (1912) theorised the invaluable role that the financial services market plays in helping the economy to grow by intimating that the role of the banker is beyond that of the middleman in the innovative process that creates growth as he is a “phenomenon of development”. Subsequent researchers posited that the development of the industry that provides financial services is a determinate ingredient in the growth of an economy (Gurley & Shaw, 1955). Furthermore, the function of the financial sector in credit generation for the mercantilist economic system was ably highlighted to be vital in the growth of the economy (Hicks, 1969). From the early researchers, one would conclude that an association connecting a viable financial market and economic growth was ably theorised or identified. What followed were several empirical studies that would establish the causal connection between the growth of the economy and the development of the financial market, as well as ascertain the direction of the link and factors that cause this link.

There seems to be no consensus that a positive association exists between the expansion of the economy and financial market development as predicted by theories of the pioneers of the finance-growth connection, despite several experimental studies on the finance–growth nexus. In addition, empirical research has shown mixed results on the direction of the correlation between economic expansion and the development of the financial industry, with some showing a unidirectional relationship while others show a bidirectional relationship. As such, there is a need for further studies, especially in low-income countries whose financial services industries are not highly developed, to establish if the growth–finance nexus holds.

The financial sector in Malawi is one of the smallest in terms of volume of trade and participants (World Bank Group, 2008). Prior to the financial reforms which started in 1990, the financial sector in Malawi had two commercial banks, two leasing finance institutions, one savings bank, and one building society, and it was characterised as a grossly underdeveloped one which was impeding economic growth and development (Chirwa & Mlachila, 2004). Since then, reforms that were implemented opened up the financial sector of the economy, and by 2021, there were eight banks, three development finance institutions, one discount house, two credit reference bureaus, eight general insurance companies, six life insurance companies, one reinsurance company, one reinsurance broker, twenty-three insurance brokers, five bancassurance providers, one insurance agent claim settlement agent, seven pension services companies, and four pension brokers among many other players in the industry (RBM, 2021). In addition to these players, the Malawi Stock Exchange (MSE) was introduced in 1994 to provide a platform for trading stocks and bonds for larger and well-established companies, together with small and medium enterprises (SMEs) (MSE, n.d.). As of 31 May 2023, 16 companies, with a total market capitalisation of US$5.4 billion, which was equivalent to 37.82% of the GDP of Malawi, were trading on the Malawi Stock Exchange. The total value of trade to GDP stood at 0.08% as of 31 May 2023 (MSE, 2023). In comparison to the Sub-Saharan Africa (SSA) nations, Malawi's stock market value of trade to GDP lagged behind that of South Africa (87%), Kenya (0.5%), Cote d'Ivoire (0.3%), Namibia (0.3%), Nigeria (0.6%) and the average for SSA at 27.8% as of 31 May 2023 (World Bank Group, 2023).

Although the financial services industry had improved since reforms were implemented, the stability and efficiency of Malawi's financial sector were not at the level of other SSA countries as the financial services industry still experienced high levels of inefficiencies evidenced by the low level of private credit, high levels of interest margins and a low number of deposits per capita (World Bank Group, 2008). With a market that is small and of this level of development, the question remains as to whether it exerts a meaningful impact on economic growth, considering that credit was very expensive and 45% of the population had not achieved financial inclusion (UNCDF et al., 2015) and (FinMark Trust, 2020).

### 1.2 Research Problem and Research Questions

The inaugural conference of the UNCTAD considered a sound insurance industry as a vital component of economic growth, and the conference recommended the need for technical support to developing countries to develop and strengthen their insurance markets (UNCTAD, 1964). Although this consideration was in terms of trade and its development, the insurance industry plays many other roles that go beyond international trade. According to Liedtke (2007), the insurance industry plays both financial or economic and non-financial roles in the economy. The financial roles range from direct and indirect employment to compensation of victims, to capitalisation of the economy through the pooling of resources, to providing buffers to sudden rises in financial needs which would ordinarily bankrupt the economy, to spreading the risk over time, to improving savings rate. On the other hand, the non-financial roles include increasing people's ability to cope with adverse events as it increases their capacity for self-reliance, providing information, and facilitating training to people to improve their awareness about risks and prevention (Liedtke, 2007). In addition, Ricci (2014) added the signalling effect of the existence of risk, its magnitude and its frequency as among the main functions of the insurance industry.

In addition to the roles explained already, Skipper (2006) outlined the roles that the insurance business plays in economic growth, and they include (1) promoting financial calmness and lowering worries; (2) replacing some social programs of government; (3) enabling commerce and trade; (4) savings mobilisation; (5) facilitating efficient handling of risk; (6) fostering mitigation of loss; and (7) promoting capital allocation in a more efficient manner. This underscores the insurance industry's importance to the country's economic and social growth, as its impact ranges from economic outcomes to social outcomes.

Except for South Africa, the magnitude of the insurance market in Africa, from the standpoint of premiums, remains the smallest in comparison to other regions despite having a higher population. SSA population was approximately 13% of the world, but it contributed only 1.08% of total global gross insurance premiums with an insurance penetration of 2.78%, while the global average was 7.23% (Swiss Re Institute, 2017, 2020). This indicated that the African insurance market was very small, and the region may not be able to manage risk events when they fall, considering that it is prone to various unmanaged risks. Within Africa, the comparison of insurance market penetration was varied, with South Africa leading the way at 13.68% gross premiums to GDP. This was followed by Namibia at 8.04% and then Mauritius at 3.24%. Malawi's insurance market penetration was at 1.52%, which was below the level of emerging markets but higher than other SSA countries such as Uganda, Tanzania, Burkina Faso and Mozambique (World Bank Group, 2022). As institutional investors who would affect economic development and play a role in providing finance to other institutions in the financial market, the insurance assets to GDP were similar in pattern to that of penetration, whereby South Africa's insurance market had 58.43% of assets invested in the market followed by Namibia at 36.90% and Mauritius at 21.08% (World Bank Group, 2022). Malawi's insurance market had 9.72% of its assets invested in the market, signifying the limited role that the insurance industry played in fostering economic development (World Bank Group, 2022). Table 1 compares insurance market penetration and insurance asset usage in the financial markets of selected African nations in 2019, as reported by the World Bank's Global Financial Development Database of September 2022.

**Table 1:** *Insurance Penetration and Asset Investment in African Countries in 2019*

| Country | Gross Premium to GDP (%) | Insurance Assets to GDP (%) |
|---|---|---|
| **South Africa** | 13.68 | 58.43 |
| **Zambia** | 1.25 | 1.31 |
| **Uganda** | 0.51 | 1.23 |
| **Tanzania** | 0.49 | 0.75 |
| **Rwanda** | 1.63 | 5.89 |
| **Namibia** | 8.04 | 36.9 |
| **Malawi** | 1.52 | 9.72 |
| **Mauritius** | 3.24 | 21.08 |
| **Mozambique** | 1.22 | 3.98 |
| **Kenya** | 1.89 | 6.64 |
| **Burkina Faso** | 0.9 | 2.9 |

Source: *Author's Computation based on the GFDD report of September 2022*

Malawi is a predominantly subsistence agriculture-based economy that depends on rainfed farming which is prone to adverse weather changes (Makaudze, 2018). For a long time, the main foreign exchange-earning crop has been tobacco which lately has lost its value due to health-related hazards that it brings to its consumers (Smith & Fang, 2020). Although there is a huge potential for horticultural farming, the underdevelopment of transport infrastructure and secondary markets to preserve, transport, and market the products from rural areas to urban and semi-urban markets make it difficult for the majority of subsistence farmers, who constitute over 80% of the population of Malawi, to benefit (World Bank Group, 2008; World Bank Group & IMF, 2008). According to Churchill (2007), despite being the least in having the ability to cope with risks when they occur, low-income families, predominantly in developing countries like Malawi, survive in perilous environments and they are exposed to various threats that include lack of proper markets, accidental death and disability, agricultural losses due to adverse weather, loss of property due to theft or fire and illnesses, and disasters of both natural and man-made varieties (UNCTAD, 2007). Since low-income families in developing countries do not have access to insurance services to help them manage the risks they face, developing microinsurance products that target them would present an opportunity to the insurance industry while also aiding poor families to improve their economic well-being. The development of inclusive financial markets and insurance products that would target such sectors of society would help improve their incomes through the reduction of risks. It would allow them to participate in the financial system. This would, in turn, help the countries to reduce poverty in line with SDG 1, reduce hunger in line with SDG 2, improve people's well-being and good health in line with SDG 3, achieve economic growth and respectable work environment in line with SDG 8, and have improved infrastructure and industry in line with SDG 9. As it stands, rural farmers are at a loss all the time when there are adverse weather conditions or when their agricultural products cannot be sold on time because they do not have any means of preserving or processing them. In addition, they do not have access to financing for their businesses because they are considered unbankable and risky, as there are no insurance products that would mitigate the risk of financiers (World Bank Group & IMF, 2008).

This research wants to establish the degree to which the economic growth of Malawi is impacted by the insurance industry and the transmission mechanisms through which this relationship flows. The analysis will establish if economic growth is influenced by the advancement of the insurance market in a supply-led way, whether demand for insurance products is induced by growth of the economy in a demand-following way, if they affect each other in a bidirectional relationship or there is no impact on each other. Knowing that economic growth is pivotal in transitioning individuals and households out of poverty, the mechanisms through which the insurance-growth nexus plays would help policymakers formulate appropriate policies that bring about increases in inclusive participation of individuals and firms in the insurance market, which would help them mitigate risks and maintain safety nets for prosperity.

Many studies have experimentally studied the interaction between financial market development and economic growth, and they have established either a supply-led relationship (Adusei, 2013; Ahmed & Ansari, 1998; Bist, 2018; Bittencourt, 2012; Durusu-Ciftci et al., 2017; Guru & Yadav, 2019; King & Levine, 1993; Levine, 1999; Levine & Zervos, 1998; Pradhan et al., 2016; Rioja & Valev, 2004; Sulemana & Dramani, 2022; Uddin et al., 2013) or a demand-following outcome (Ang & McKibbin, 2007; Christopoulos & Tsionas, 2004; Colle, 2011; Simwaka et al., 2012; Zang & Kim, 2007) or a negative, bi-directional or uncertain correlation (Adusei, 2013; Chiwira et al., 2016; Ram, 1999; Vazakidis & Adamopoulos, 2010). There has been enough literature on the finance-growth connection, and one would conclude with reasonable certainty that the theorisations of early authors such as Robinson (1952) and Schumpeter (1912) have been proven.

On the other hand, there have been several attempts to experimentally prove the presence of a causal connection between the expansion of the economy and the insurance industry, which have not drawn conclusive results as there are those who found a supply-leading causality link while others found a demand-following causality. Furthermore, others discovered a bidirectional causation link, while a few were unable to demonstrate any causal interaction between the expansion of the economy and the insurance industry. The insurance industry, being one sector of the financial services market, performs an invaluable function in managing the risk of the whole economy while also providing opportunities for savings and investments that directly foster the expansion of the economy. Some studies have remained inconclusive on the causality link of insurance and the expansion of the economy (Cristea et al., 2014) while others have established a supply-led causality outcome in which insurance market development helps to grow the economy (Alhassan & Biekpe, 2016; Alhassan & Fiador, 2014; Arena, 2008; Azman-Saini & Smith, 2011; Chang et al., 2014; Chen et al., 2012; Cheng & Hou, 2022; Ghosh, 2013; Haiss & Sümegi, 2008; Han et al., 2010; Pradhan et al., 2017; Ward & Zurbruegg, 2000). There has been a demand-following causality in the following studies: (Ching et al., 2010; Horng et al., 2012; Ward & Zurbruegg, 2000). Other studies have established a bidirectional causality that proves the feedback hypothesis (Alhassan & Biekpe, 2016; Anwer et al., 2019; Balcilar et al., 2018, 2020; Dash et al., 2020; Din et al., 2020; Lee, 2011).

Developed economies constitute a large share of the empirical studies that have been undertaken, where financial markets and insurance markets may not be comparable to Malawi's scenario. In addition, some of these studies were focused on cross-country analysis of data that was not specific to a single country. Although there are similar studies that were conducted at a macro level, like the studies in Ghana and Botswana, the market development levels, the macroeconomic fundamentals and the risk exposure of these countries are different from Malawi, and it would not be proper to assume that results would be similar until an empirical study is undertaken. Furthermore, although the Autoregressive Distributed Lag (ARDL) model by Pesaran (1999) and Pesaran et al. (2001) has been employed in some earlier studies, there is a possibility that if the Augmented ARDL by McNown et al. (2016, 2018) and Sam et al. (2019) were used, the results would have been different from the ones that were found in earlier studies utilising the original ARDL by Pesaran (1999) and Pesaran et al. (2001) which assumed that the dependent variable's order of integration was one, I(1), for F-statistic bounds test on the lagged level variables to hold (McNown et al., 2016, 2018; Sam et al., 2019). Therefore, a study that uses a robust model, Augmented ARDL by McNown et al. (2016, 2018) and Sam et al. (2019), would address this potential shortfall in earlier empirical research to contribute positively to the extant body of literature. As such, there is a need to carry out empirical research on Malawi to establish the possible interaction between the insurance market development and economic expansion, as well as determine the direction in which causality flows, which would inform authorities to develop policies that would boost economic development through focusing on either the insurance market or other channels that facilitate economic growth depending on the established causality link.

Therefore, the primary research question that the study aims to address is:

i. Is there a relationship between insurance industry activities and economic growth in Malawi?
ii. What is the direction of causality between insurance industry activities and economic growth in Malawi?

## 1.3 Research Objectives

The study's objectives that will help in resolving the problem statement and addressing the research questions that have been identified in the preceding section are as follows:

a) To examine the relationship between the expansion of the economy and insurance business activities in Malawi;

b) To ascertain the direction of causality between the expansion of the economy and insurance business activities in Malawi.

## 1.4 Scope and Justification of the Study

Considering that Malawi is weather disaster-prone and relies on rainfed agriculture for its economic growth, Makaudze (2018) suggests the use of weather index insurance to help farmers mitigate against the risk of drought and heavy rains. However, there are challenges with institutions, infrastructure and consumers that need to be addressed for this to be successful (Makaudze, 2018). Apart from the weather index insurance, the general knowledge of the large part of the population about insurance and its impact on risk management and capital accumulation needs to be enhanced so that both penetration and density are significantly improved (Hess & Syroka, 2005). As a result, this study will assist policymakers in determining where they should focus their efforts to use the insurance market as a weapon for promoting economic growth. Furthermore, the study will shed light on how economic development is impacted by activities of the insurance industry in a low-income country, which until now is missing in the literature for various international stakeholders to consider when making policy decisions.

## 1.5 Organisation of the Study

This study is divided into chapters, each of which explains the contents that are being covered. Chapter 1, which is the introduction of the study, includes the study's background history, definition of the research problem and objectives. The Chapter also contains an outline of appropriate research questions whose answers will help in addressing the research problems and achieving the objectives before closing with the justification of the study. To appreciate the studies that have been undertaken on the subject matter in different contexts, a synthesis of the empirical literature is done in Chapter 2, together with the definition of terms and a discussion of finance-growth theories. To be able to answer the research questions, the appropriate proposed research methodology is discussed in Chapter 3, together with detailed highlights of data sources, sample size, the analytical model to be used for data analysis and its justification of use that includes the priori expectation of each variable that is used in the data analysis. Chapter 4 highlights the findings of the study from the analysis, which is done after using the appropriate model which is proposed in Chapter 3, and these results are interpreted with reference to the research objectives. Chapter 5 concludes the study and provides its recommendations together with its highlighted limitations. The study ends with a section of references that have been used in the study.

# Chapter 2: Literature Review

## 2.1 Introduction

The chapter justifies doing an empirical investigation on the connection between the expansion of the economy and insurance market activity in Malawi following the review of extant literature. It starts with defining the key concepts that are used in the study and goes on to provide a broad overview of the insurance market in Malawi from both historical and financial perspectives. Thereafter, theories that underpin the subject matter under review are explained before delving into a detailed synthesis of existing empirical literature that has been written on the subject under study. The chapter ends with a justification for carrying out the study upon identifying the gap that exists in the extant empirical literature.

## 2.2 Definition of Terms and Concepts

In this study, the terms "insurance market" and "insurance industry" are used interchangeably to mean a sector of the financial services market where business entities offer risk management products through contracts in which one party, the insured, pays a small sum of money called premium and in turn, the other party, the insurer, undertakes to cover the risk of a loss due to some uncertain events within an agreed future period. Life insurance and nonlife or property liability insurance are two main forms of insurance. Life insurance focuses on providing coverage against the loss of life of the individuals who hold the insurance policy. Nonlife insurance policies indemnify their policyholders when there is a loss or damage to their property. In this study, the insurance market activities are measured by the use of insurance penetration, which shows the yearly percentage of gross insurance premiums to the GDP. It gauges insurance market activities' relative importance in the economy (Outreville, 2013). In this study, "economic growth" means the expansion in Gross Domestic Product (GDP), a yardstick that measures economic value placed upon all market products and services that have been produced in a country over a year. The term "low-income country" means a country whose per capita Gross National Income (GNI) is less than US$1,086, according to the World Bank Atlas method (World Bank, n.d.). The World Bank groups nations into three income categories: high, higher, medium and lower-middle income.

## 2.3 Overview of the Insurance Sector in Malawi

Malawi's insurance industry goes back to 1930 when Old Mutual began issuing life assurance products from their headquarters in Zimbabwe. Later, in 1954, Old Mutual opened an office in Blantyre (Institute of Developing Economies & Japan External Trade Organization, 2009). In 1959, the Royal Insurance Company of Malawi opened its office and started offering products in general insurance (Wikipedia, 2023). Subsequently, many other life and general insurance companies, such as United General Insurance and NICO, entered the market. As new entrants were entering the industry, other insurance service providers, such as insurance brokers and reinsurance players, were increasing in number in the market.

The insurance industry in Malawi is broadly categorised into general (or nonlife) and life insurance segments. The general insurance industry was worth MK50 billion (US$50.5 million) in gross premiums in 2021. The industry was predominantly dominated by motor vehicle insurance, which constituted 50.3% of the gross premiums, and it was mandatory by law that all motor vehicle owners should have insurance. The remaining balance covered fire, personal accidents and other miscellaneous insurance. The category was profitable, although it was having liquidity challenges due to the build-up of receivables. As such, the sector was operating below the prudential liquidity level of 100% as it was operating at 85.8% (RBM, 2021).

The life insurance sub-sector had assets worth MK1 trillion (US$952 billion) as of 31 December 2021, and it had a solvency ratio of 170.9%, which was above the prudential requirement of 120%. The sector was dominated by two companies, NICO Life and Old Mutual, that owned 86.4% of gross premiums and 97.6% of industry assets. This monopolistic character created barriers to entry and reduced competition in the sub-sector, which in turn reduced innovation and increased operating costs (RBM, 2021).

A summary of the growth in premiums for general and life insurance is shown in Table 2 below. From 2013 to 2021, there was growth in gross premiums in Malawi's insurance sector. The growth percentage is based on local currency changes since the conversion to US dollars is influenced by exchange rate fluctuations.

**Table 2:** *Growth in Insurance Premiums from 2013 to 2021*

| | General Insurance | | | Life Insurance | | |
|---|---|---|---|---|---|---|
| **Year** | **Gross Premium (MKW' billion)** | **Gross Premium (US$' million)** | **% growth** | **Gross Premium (MKW' billion)** | **Gross Premium (US$' million)** | **% growth** |
| 2013 | 20.2 | 49.3 | | 7.5 | 18.3 | |
| 2014 | 26.4 | 53.7 | 30.7% | 10.2 | 20.7 | 36.0% |
| 2015 | 30.2 | 50.4 | 14.4% | 18.6 | 31.0 | 82.4% |
| 2016 | 35.5 | 49.6 | 17.5% | 19.3 | 26.9 | 3.8% |
| 2017 | 41.7 | 57.5 | 17.5% | 23.4 | 32.3 | 21.2% |
| 2018 | 48.1 | 65.7 | 15.3% | 29.7 | 40.6 | 26.9% |
| 2019 | 54.6 | 74.4 | 13.5% | 35.8 | 48.8 | 20.5% |
| 2020 | 59.8 | 78.4 | 9.5% | 46.1 | 60.4 | 28.8% |
| 2021 | 65.0 | 79.6 | 8.7% | 55.3 | 67.7 | 20.0% |

Source*: Author's Computation based on Reserve Bank of Malawi's Registrar of Financial Institutions' Annual Reports from 2014 to 2021*

With all the challenges that have been outlined above, this study would like to establish if the activities in the insurance industry have some ability to influence the growth of the economy despite being marred by all these limitations.

## 2.4 Theoretical Framework: Economic Growth and Financial Market Development

Numerous authors postulated the connection between the financial market and the expansion of the economy in previous times, and empirical research has been done to demonstrate the degree to which these theories are supported. The theories consist of:

### 2.4.1 The Supply-Leading Hypothesis

Also known as the finance-led growth hypothesis, the supply-leading hypothesis emphasises the importance of financial services being the prerequisite for economic activities to take place, and without it, they would not take place. The theory can be traced back to Joseph Schumpeter and his Theory of Economic Development, in which he theorised that to carry out new combinations that bring about an expansion of the economy that differs from the usual type of production, banks' ability to enhance the purchasing power of entrepreneurs who need finance, through the creation of credit that finances new productive activities, is invaluable

(Schumpeter, 1912). As per Patrick (1966), a phenomenon in which financial institutions are created prior to the demand for their services, and they are able to supply their financial services with dual functions of shifting resources from conventional sectors to contemporary sectors and fostering and boosting entrepreneurial activity in the new production environment is called the supply-leading hypothesis. As such, the financial market needs to grow and be innovative so that it minimises its costs and remains efficient and effective in its intermediary role, as that would mean a low cost of finance and urgency in the processing of information. Considering the growth and efficiency of the financial market in Malawi in its intermediary activities, it underscores the need to empirically test the supply-leading theory with the aim of ascertaining how the insurance industry has been effective in helping to spearhead the growth of the economy.

### 2.4.2 The Demand-Following Hypothesis

Also known as the growth-led hypothesis, the demand-following hypothesis is based on the premise that the increase of the real output sector of the economy generates the appetite for services of a financial nature, and consequently, financial institutions with all their assets, liabilities, and services expand their activities in support of the booming production sector. The theory contends that as the financial services industry follows the dynamic needs of investors and savers in the economy and as the economy grows, the needs for the investors and savers keep on expanding and hence the penetration and deepening of the financial market (Patrick, 1966). The premise of the theory was mentioned by Joan Robinson where she contended that "there is a general tendency for the supply of finance to move with the demand for it" such that even if some great entrepreneurial ideas may fail due to lack of finance, in most cases, it is the finance that follows the enterprise (Robinson, 1952). Therefore, it could be argued, following this theory, that the underdevelopment of the Malawian financial market emanates from the low economic expansion, which has not increased demand for financial services products. However, this would have to be established through an empirical study.

### 2.4.3 The Feedback Hypothesis

According to the feedback hypothesis, a two-way direction of influence exists between the expansion of the financial industry and the growth of the economy. As per Patrick (1966), the interplay between demand-following and supply-leading theories may occur sequentially depending on the industrial capacity's development level, with the latter leading and the former following as economic expansion progresses to more diversified avenues. The theory contends that, at first, growth may be induced by a supply of financial services. As the economy grows, the expanding productivity sector would long for products and services of a financial nature to meet their needs, which would, in turn, grow the financial services industry, and these forces will be working in two directions, thereby affecting each other.

### 2.4.4 The Neutrality Hypothesis

The neutrality hypothesis emanates from the notion that the financial industry and the growth of the economy do not have feedback influence on each other. Anwer et al. (2019) claim that this hypothesis has its origins in the works of Lucas (1988). There have been several studies that have recognised the neutrality hypotheses, such as Dash et al. (2018) and Pradhan et al. (2016), to be part of the broad set of theories of the interaction of economic growth and financial industry expansion. This hypothesis holds that the financial services industry has no influence on economic expansion and vice versa.

## 2.5 Empirical Literature on Insurance – Growth Nexus

The insurance market development studies have used several variables as proxies for insurance activities, such as gross premium, which measures the total premiums collected; a ratio of gross premium to GDP, which estimates the insurance penetration; or the proportion of the population that is covered by gross premiums, which estimates insurance density (Outreville, 2013). All these measures have their strengths and weaknesses, but they reasonably approximate the activities in the insurance industry.

Although empirical research on the finance-growth connection on the growth of the economy and banking industry and/or stock market is old enough, it is only recently that attention has been paid to the influence of the insurance industry despite the sector being identified as crucial to economic development by the United Nations Conference on Trade and Development (UNCTAD, 1964). The earliest empirical study on this topic was by Ward & Zurbruegg (2000) who assessed the short run and long run connection of the expansion of economy and insurance industry activities for nine OECD countries using 1961 to 1996 output data for real premium and real GDP. They discovered that insurance development had a causal influence on economic expansion in Japan and Canada, but insignificant causal association was observed for the United States, Australia, the United Kingdom, and Switzerland. The study showed that causality goes in both directions, with insurance causing growth and vice versa for Italy. They concluded that causality is specific to each country depending on factors that are prevalent in that country.

In another study, Adams et al. (2005) explored the causal long term link between insurance, banking, and economic expansion in Sweden and discovered that economic growth is the source of insurance market development after using 1830 to 1998 time series data in their study. In contrast to Ward & Zurbruegg (2000), who did not establish a long run causal link between the growth of the economy and the insurance industry in the United Kingdom, Kugler & Ofoghi (2005), using disaggregated components of the gross insurance premium, established a positive relationship for each component and proved that insurance market activities cause economic expansion in the short term as well as the long run.

Haiss & Sümegi (2008) used 1992 to 2005 panel data from several countries to investigate the insurance-growth interaction for twenty-nine European nations and discovered that in Switzerland, Norway and Iceland and 15 EU members, life insurance positively influenced the growth of GDP, whereas, for the Central and Eastern EU member states who are novel to the European Union, GDP growth was mainly driven by liability insurance. Analysing panel data with the aid of the Generalised Method of Moments (GMM) model to explore the causal link between insurance industry activities for both nonlife and life insurance and the growth of the economy in fifty-five countries, Arena (2008) discovered a robust causal link which showed that insurance industry causes the economy to grow. The interaction varies, with high-income countries' economic growth being influenced more by the life insurance industry, while nonlife insurance influences both high and low-income countries' growth economically. Han et al. (2010) studied the connection between the growth of GDP and the insurance industry using insurance density as a regressor. The study covered seventy-seven economies whose panel data spanned between 1994 and 2005. A positive correlation was identified between economic growth and the insurance industry, and unlike Arena (2008), they found that the developing economies were influenced more by both life and nonlife insurance development than the developed nations.

Furthermore, the influence of the growth of the insurance industry on productivity improvement, capital accumulation and output growth was studied by Azman-Saini & Smith (2011) using panel data for fifty-one countries from 1981 to 2005. The study found that the growth of the economy was caused by the insurance industry development through the improvement of capital accumulation for developing countries and the enhancement of productivity for developed countries. Another empirical study on the insurance-growth nexus was conducted by Ege and Saraç (2011) using panel data from twenty-nine countries from 1999 to 2008, and the study established a positive connection between the insurance industry and economic expansion.

The insurance–growth connection was equally investigated by Lee (2011) using granular data on actual insurance premiums for ten OECD countries. The period of his study was between 1979 and 2006, and the study utilised panel data of both life and property liability insurance. He established that bidirectional causality exists between economic expansion and the insurance business in both the short and long runs, with property liability insurance activities having a larger effect on the real expansion of the economy than life insurance. In a related study, Zhou et al. (2012) utilised the insurance market's stock returns as the insurance proxy to explore the link between the insurance industry and the growth of the economy. Covering a period between 1982 and 2008, their study utilised quarterly data from thirty-eight nations (23 developed and 15 developing economies). They found the prevalence of a connection between the growth of the economy and insurance stock returns, and this result was influenced by the state of legal and governance environment of the economy, whereby the relationship was more significant in developed economies than it was for developed economies.

In a component-focused study, Chen et al. (2012) studied one component of the insurance market, namely life insurance, to determine how it influences the growth of the economy in sixty economies by analysing data from 1976 to 2005. They found that the growth of the economy is positively influenced by the expansion of the life insurance industry, with the relationship affected by conditions such as the level of economic development. In addition, the stock market activities were found to have a substitution impact on the life insurance industry. Focusing on the Taiwanese economy to study the prevalence of a causal interaction between insurance demand or financial industry expansion and economic expansion, Horng et al. (2012) established that insurance demand is Granger caused by economic expansion in the short run while financial industry development results into the expansion of the economy. The study utilised long-term data from 1961 to 2006. In a similar manner to a country and a component-specific study, Ghosh (2013) investigated how the growth of India's economy is influenced by the activities in the life insurance industry by employing the VAR-VECM model. A long term connection was identified, which showed that the life insurance business enhances India's economic expansion.

Alhassan & Fiador (2014) added research evidence to the body of knowledge on the growth-insurance connection by studying the long run interaction between the growth of Ghana's economy and insurance penetration, utilising time series data from 1990 to 2010. Employing the ARDL model, their research work found the presence of a causal connection between the growth of Ghana's economy and insurance penetration in the long run, with the growth of the economy being Granger caused by activities in both life and nonlife insurance industry. Using the bootstrap Panel Granger Causality test to examine how insurance activities affect economic growth for ten OECD nations, Chang et al. (2014) established causality in one direction for five countries, which showed that growth of the economy is Granger caused by insurance activities while the direction of causality was opposite for Canada's life insurance industry, USA for total and property liability insurance and Italy with respect to life and total insurance activities. The study also proved a feedback hypothesis for life insurance and economic development for the USA while no causality existed between economic expansion and all insurance activities for Belgium, and also no causality for Italy (nonlife insurance only), Sweden (life insurance only) and Canada (total and nonlife insurance).

Investigating the impact of the insurance business on the expansion of Romania's economy, Cristea et al. (2014) carried out a research utilising time series data from 1997 to 2012, and they established a correlation between the growth of Romania's economy and insurance business, with life insurance showing a greater correlation than the nonlife one. They were unable to prove the causal relationship. Using the ARDL bounds approach to cointegration to investigate the equilibrium connection between the growth of the economy and insurance industry activities, Alhassan & Biekpe (2016) used time series data from eight selected countries in Africa from 1990 to 2010 and found the existence of a cointegrating interaction in five nations that included South Africa, Nigeria, Morocco, Mauritius, and Kenya. In their study, the growth of the economy was caused by the expansion of the insurance industry for South Africa, Nigeria, Mauritius and Kenya, while Morocco showed the bidirectional causality. There was also evidence of supply leading hypothesis for Algeria and Madagascar, while there was mixed causality for Gabon.

In another study, Pradhan et al. (2016) utilised panel data from 1988 to 2012 to study the causal relationships between the growth of the economy on one hand and broad money, capitalisation of the stock market and insurance market penetration on the other for the Association of South East Asian Nations (ASEAN) Regional Forum (ARF) nations. They discovered short run bidirectional causation between the growth of the economy and insurance penetration, validating the feedback hypothesis.

Taking ten of Africa's leading financial economies for a case study for testing the synergistic effect of financial or insurance industry development and growth of their economies, Balcilar et al. (2018) utilised the GMM model on data from 1995 to 2016 to establish a feedback causal connection between economic expansion and either the insurance industry or the banking industry. They found complementarities between the insurance sector and the banking sector. Anwer et al. (2019) found a two-way causal link between the growth of Malaysia's economy and the insurance industry, and they also identified cointegration among physical capital development, industrial production, human capital development, insurance activities and economic expansion of Malaysia. Their research work utilised time series data from 1990 to 2015 in which they identified structural breaks, and they employed the combined cointegration model to minimise the impact of the structural breaks.

Employing the pooled mean group method, Din et al. (2020) undertook an empirical study to investigate the short run and long run connection between growth of the economy and insurance industry development in several economies utilising data from 1980 to 2015. They discovered that nonlife insurance and economic expansion are positively and significantly connected with all proxies of the insurance industry in both the short and long terms, while for the life insurance industry, all the other proxies showed a significant connection except for life insurance penetration. Factors such as religious and cultural traditions, variety and diversity of insurance products, state involvement by participating economies and level of education contributed to noted differences. Balcilar et al. (2020) used data from eleven African nations from 1995 to 2016 and applied models that are resilient to cross-sectional dependency and heterogeneity to demonstrate that both total insurance and its disaggregated components of life and nonlife insurance have a long-term influence (for total insurance) and short term and long term influences (for life and nonlife insurance) on growth of the economy. The bidirectional causality and, therefore, the feedback hypothesis were proved in this study, in which the influence of property liability insurance on economic growth outweighed that of life insurance.

In post-transitional Central and Eastern Europe, an empirical study on the connection between insurance and the growth of the economy involving fourteen countries, namely Albania, Hungary, Lithuania, Estonia, Croatia, Serbia, Slovenia, North Macedonia, Latvia, Bosnia and Herzegovina, Bulgaria, Poland, Slovakia and the Czech Republic, using data from 1998 to 2016, was conducted by Bayar et al. (2021), and they discovered the existence of one way causality in which growth of the economy Granger caused both property liability and life insurance activities.

After carefully analysing the extant empirical evidence that is available so far, it is clear that the outcomes of the direction of the causation between economic expansion and insurance industry expansion are inconclusive, as some studies have discovered one-way causality running from the insurance industry to expansion of the economy while causation has been found to run in the other direction in other studies. Furthermore, some studies have identified a bidirectional causal connection between the growth of the economy and the expansion of the insurance industry. As a result, further research is required to assist in defining the causal direction between the expansion of the economy and the expansion of the insurance industry.

Apart from the inconclusive results, the majority of the available studies were done in developed countries in the West, such as Italy, Canada, USA, Belgium and many others, and also in some emerging and frontier markets in Asia and Africa, such as Malaysia, Poland, Kenya and Ghana, which may not have attributes of a low-income country in SSA where there is underdeveloped financial market with a few long-term products on the market, the general population's participation levels in the formal financial market is very low, and international market access is almost negligible. There is a gap that needs to be filled by carrying out an empirical study in this environment whose results would shed light on the market mechanisms that spur growth of economies in these environments.

Additionally, the earlier studies that investigated the insurance–growth interaction at a single-country macro-level in Ghana, Botswana and Vietnam did not use a bootstrapped model with high robustness. This study will use the bootstrapped Augmented ARDL principles by

(McNown et al., 2016, 2018; Sam et al., 2019) for both the linear and nonlinear models so that the results are more credible. As far as I know, no other empirical study on the growth-insurance connection has ever been undertaken in a country classified as low-income, and this study will be the first one to be done in a low-income country in SSA.

# Chapter 3: Research Methodology

## 3.1 Introduction

The research methodology that will be employed to help the study achieve its research objectives is outlined in this Chapter. The sections start with motivating for the reason the proposed research approach is the appropriate one for the study. Thereafter, it goes on to describe the data sources and samples, followed by the appropriate model that will be used to analyse the data. It ends with the appropriate estimation approaches that will be undertaken and all the detailed steps that will be followed to ensure that the hypotheses are tested and proved, and the research questions are answered.

## 3.2 Research Approach

Three approaches may be used to carry out research, and these are qualitative, quantitative and mixed approaches. To realise the study's objectives and answer the research questions, hypotheses will have to be proved about whether a causal interaction exists between the expansion of the economy and insurance penetration. Therefore, the most appropriate approach to be used to prove the hypotheses will be the quantitative one. The type of data that will be used is interval in nature, and deductive reasoning will have to be employed, guided by the positivist philosophical perspective, to prove the hypotheses that have been developed. Analysis of the data utilising an appropriate econometric model will be employed so that its results are used to make a decision about the null hypotheses that have been formulated.

## 3.3 Research Design

### 3.3.1 Data Sources and Sample Size

Secondary data from multiple sources, such as the World Bank's Global Financial Development database (GFDD) and World Development Indicators (WDI), which were updated in September 2022, and the Reserve Bank of Malawi (RBM) will be collected in this study. The dataset will cover more than 30 years with the aim of ensuring that normal distribution properties for data hold, in line with the Central Limit Theory (Keller, 2018). In addition to the RBM as the data source, the Ministry of Finance was the direct supervisor of the financial market prior to the change of the laws in 2010, which transferred the supervisory roles of the financial market to the RBM. So, data for the period before the new laws came into force would be found at the Ministry of Finance. Currently, the RBM is the supervisor of all financial institutions, and they produce both monthly and annual reports about the financial market and all its sectors in Malawi. The Insurance Institute of Malawi will also be checked for some data that is historical about the insurance industry, which may help in the study, too, as they also produce some statistics for the industry. The WDI and the GFDD of the World Bank are the most comprehensive source of data that will be used. Time series data spanning between 1980 to 2021 will be targeted. However, the availability of data may limit the length of time the study will cover.

### 3.4 Regression Model

Once data collection is completed from the sources that have been described above for the maximum time possible, subject to their availability, it will first undergo descriptive analysis to appreciate the patterns that may exist and any other factors that need to be considered at that stage before subjecting it to the appropriate inferential analytical model that is being proposed.

Learning from earlier studies on the growth-insurance connection, Han et al. (2010), Ghosh (2013), Alhassan & Fiador (2014) and Alhassan & Biekpe (2016) utilised a linear time series model that will be adopted by this study. To avoid biased estimation of cointegration and causality, control variables, namely human capital development, trade openness and inflation, will be included in the model. These variables are adopted from Alhassan & Fiador (2014), Arena (2008), Alhassan & Biekpe (2016) and Han et al. (2010). As the time series data for Malawi is volatile due to economic instability, all variables will be firstly mean-centred and then converted to their natural logarithms. The logarithms of the mean-centred variables will be subjected to the analytical model to enable the analysis to use the Ordinary Least Square (OLS) model and its linearity in parameters properties to ably interpret the coefficients of the variables as percentage changes of the explanatory variables against the unit change of the dependent variable.

The log-linear relation that will be used to investigate the insurance-growth nexus for Malawi will be estimated by the following model:

$$LnGDP_t = \beta_0 + \beta_1 LnIP_t + \beta_2 LnHCap_t + \beta_3 LnInf_t + \beta_4 LnTrad_t + \varepsilon_t \quad (1)$$

The disaggregated components of insurance penetration are life insurance penetration and nonlife insurance penetration, and the regression models that capture the relationships between the life insurance and the nonlife insurance elements will be specified in models (2) and (3), respectively.

$$LnGDP_t = \Psi_0 + \Psi_1 LnLIP_t + \Psi_2 LnHCap_t + \Psi_3 LnInf_t + \Psi_4 LnTrad_t + \varkappa_t \quad (2)$$

$$LnGDP_t = \partial_0 + \partial_1 LnNLIP_t + \partial_2 LnHCap_t + \partial_3 LnInf_t + \partial_4 LnTrad_t + \eta_t \quad (3)$$

Where:
$LnGDP_t$ represents the logarithm of the GDP growth in year t
$LnIP_t$ represents the logarithm of Insurance Penetration in year t
$LnLIP_t$ represents the logarithm of Life Insurance Penetration in year t
$LnNLIP_t$ represents the logarithm of Nonlife Insurance Penetration in year t
$LnHCap_t$ represents the logarithm of Human Capital Development in year t
$LnInf_t$ represents the logarithm of the inflation rate in year t
$LnTrad_t$ represents the logarithm of the aggregate of imports and exports divided by GDP in year t
$\beta_0$, $\Psi_0$ and $\partial_0$ represent constants in models (1), (2) and (3), respectively
$\beta_1$ to $\beta_4$, $\Psi_1$ to $\Psi_4$, and $\partial_1$ to $\partial_4$ represent regressors' coefficients in models (1) to (3), respectively, which measure the percentage change per one unit of the dependent variables
$\varepsilon_t$, $\varkappa_t$, and $\eta_t$ represents the error terms in models (1) to (3), respectively

### 3.5 Natural Log Transformation of Variables

To reduce the volatility of variables and increase the interpretive ability of the coefficients of the models, the variables were firstly mean-centred and then transformed into their natural logarithms. Considering that some variables, such as GDP, had negative values, the study was faced with two options since a negative variable could not be converted into its logarithmic form. The first option was to drop the observation, which would truncate the dataset's number of observations and create a gap that would negatively affect the credibility of the results. The second option was to find a means of transforming the variables uniformly so that they converted and had the same treatment. The study opted for the second option, and the logarithmic transformation formula of Busse & Hefeker (2007, p. 404) was adopted as follows:

$$y = \ln(x + \sqrt{(x^2 + 1)}),$$

Where: $y$ is the transformed natural logarithm of $x$

$x$ is the variable to be transformed into a natural logarithm

The main benefits of this approach were that no observation was omitted from the variables, and it helped to retain a sample of 37 observations that were there from the beginning. Equally, this transformation seemed to retain the same properties of variables without significant alterations in the dataset. It is these transformed variables that were used to carry out a unit root test and the analyses that followed.

## 3.6 Variable Description and Quantification for the Model

### 3.6.1 Economic Growth (GDP)

There are several ways a country would measure the value of economic activities that take place in that country. The Gross Domestic Product (GDP) and Gross National Product (GNP) are two of the most prominent measurements. GDP, according to Callen (2008), is the monetary worth of final services and products from a specific country in a given time. GNP, on the other hand, considers products and services generated by a country's inhabitants regardless of where economic activity occurs (Callen, 2008). It is for this reason that the GDP was favoured in this study as it is a reasonable measure of economic activities that take place in a specific country, and it excludes activities that may have taken place outside the country of study.

There are several studies that have used the growth rate of the GDP to reasonably proxy the expansion of the economy in the financial or insurance market–growth nexus. Various studies such as Alhassan & Biekpe (2016); Alhassan & Fiador (2014); Arena (2008); Han et al. (2010);

Kugler & Ofoghi (2005) and Ward & Zurbruegg (2000) have used the GDP growth as a reasonable representation of the growth of the economy in their analysis. For that reason, GDP growth is adopted as the regressand in the model for analysis of this research work.

### 3.6.2 Insurance Penetration (IP)

There is a divergence of measures that have been used to measure insurance market activities. Some studies, such as Han et al. (2010), utilised insurance density to stand for the insurance market activities. Insurance density measures the average amount of money spent on insurance products by each individual in a country, and its calculation involves finding the quotient of gross premiums per annum and the number of people in that year (Outreville, 2013). This measure is not very popular in many studies, and in the case of Malawi, it may be difficult to estimate, with accuracy, the population levels because of the scarcity of reliable data over the study period.

The other proxy commonly used to measure insurance activity levels is insurance penetration. Insurance penetration measures the relative influence of the insurance market within an economy as it uses the quotient of gross premiums written and the GDP (Outreville, 2013). Various studies, such as Alhassan & Fiador (2014); Anwer et al. (2019); Arena (2008); Azman-Saini & Smith (2011); Bayar et al. (2021) and Pradhan et al. (2017) and many others, have measured the expansion of the insurance industry with the use of insurance penetration in their empirical studies to establish if the insurance business causes economic growth. Therefore, to determine the causal interaction between the insurance industry and the expansion of the economy, this study will use insurance penetration as a regressor in the model.

Insurance penetration shall be further disaggregated into nonlife insurance penetration (NLIP) and life insurance penetration (LIP). Risk transfer, indemnification and financial intermediation are the main roles the insurance industry plays. In that regard, LIP is claimed to capture the financial intermediatory services while the NLIP will capture the risk transfer and the indemnification against losses (Ward & Zurbruegg, 2000), thereby making the insurance penetration the right proxy for insurance market activities. The priori expectation for this variable is that it will positively affect the dependent variable.

Therefore, the hypothesis for the first objective of this study will be:

$H_0$: A relationship does not exist between the insurance business and the expansion of the economy in Malawi.
$H_1$: A relationship exists between the insurance business and the expansion of the economy in Malawi.

Ancillary to the main hypothesis, there will be the other hypothesis that will be tested to address the causality direction so that the second objective of the study is achieved, and that second hypothesis will be:
$H_0$: No causality in any direction exists between the insurance industry and the growth of Malawi's economy.
$H_1$: Causality in at least one direction exists between the insurance industry and the growth of Malawi's economy.

### 3.6.3 Human Capital Development (HCAP)

The process of investing in the knowledge of the population to enable them to acquire skills and technical know-how for long run economic growth is referred to as human capital development (Romer, 1986). Denison (1961), as cited by Lucas (1988), posited that the training of the population increases human capital for productivity. It is this productivity after training that increases economic growth. Human capital development was used as a control variable in the insurance-growth connection studies to increase the model's explanatory power, and those studies include Anwer et al. (2019); Arena (2008); Chen et al. (2012) and Han et al. (2010). With the exception of Han et al. (2010), who used tertiary education admission rate to stand for human capital development, the other studies used secondary school participation rate to represent human capital development.

This study will use the secondary school admission rate to represent human capital development because there are many individuals in Malawi who start working soon after completing secondary school education, thereby turning into a productive labour force (Mussa, 2013; Smith et al., 2016). As such, the majority of the labour force does not possess a post-secondary school qualification, although they are adequately contributing to economic growth. In addition, the availability of data for tertiary-level education level human capital development covering the entire study period may not be guaranteed. Human capital development is expected to positively affect the growth of the economy in the model.

### 3.6.4 Annual Inflation Rate (INF)

Inflation is an important control variable due to the role that it plays in affecting aggregate demand for goods and services. Several authors have defined inflation in several ways by focusing on either its cause and effect or by just giving a broad definition. As cited by Hansen & Newman (2022), Mises (1912) provided a definition of inflation as an increase in the supply of money not represented by an increase in the demand for money, leading to a fall in the purchasing power of money. This definition gives the cause and effect of inflation. Others have defined inflation as the rate of increase in general or specific prices of products and services in a given period (Oner, 2010), and this can be noticed by consumers of goods and services when they start paying more for the goods and services that they buy thereby affecting the quantities they can afford if there is no related change in their incomes. Inflation negatively affects financial market development and real activities (Huybens & Smith, 1999) and therefore, this negative influence is anticipated on the regressand in the model.

### 3.6.5 Trade Openness (TRAD)

This expresses the proportion of the sum of imports and exports to GDP to signify the openness of the market, and it has the ability to affect productivity in the country through the crowding out effect on locally produced goods by imported products in the short term while affecting technology transfer and globalisation in the long run (Musila & Yiheyis, 2015), and consequently affecting economic growth. Alhassan & Fiador (2014) claimed that the openness of the market can extend the market thereby stimulating economic growth, and can increase labour productivity by bringing in a skilled labour force, which improves local labour force skills and productivity. The use of openness of trade in insurance-growth connection empirical studies as a control variable is supported by several studies that include Alhassan & Biekpe (2016); Alhassan & Fiador (2014); Arena (2008); Balcilar et al. (2020) and Ege & Saraç (2011), and it is for this reason that it has been included in this study. The increase in trade openness, holding other factors constant, is anticipated to be associated with the increase in the expansion of the economy in the model.

To summarise it all, the hypothesised results, when the model is run, are that increased growth of the economy will be associated with increases in insurance penetration, human capital development or trade openness. However, inflation will negatively influence the growth of the economy.

### 3.7 Estimation Approach

Using the model outlined in the preceding section, the study aspires to empirically investigate the insurance-growth connection in Malawi. To achieve that objective, there is a need to put in place measures that ensure that errors in the testing process are minimised, and all elements of bias are reduced to the extent possible. Other researchers will be accorded the opportunity to ascertain the validity of all results and findings of this study because the data and methodology used will be fully discussed in this report, and they will be available for testing by those who may take an interest in the work. To test the cointegration between the growth of the economy and the expansion of the insurance industry in Malawi, the study will use the Augmented ARDL bounds test for cointegration by McNown et al. (2016, 2018) and Sam et al. (2019), which is a product of bootstrapping and augmentation of the ARDL by Pesaran (1999) and Pesaran et al. (2001). Considering that the Augmented ARDL is a linear regression model, it will be important under this study to meet all the linear regression assumptions such that the coefficients, $\beta_1$ to $\beta_4$, are best linear unbiased estimators (BLUE) in the models to conform to Gauss–Markov theorem (Gujarati & Porter, 2009). As such, diagnostic analyses that include Ramsey's RESET Test to diagnose the specification and the omission errors (Ramsey, 1969), the Jacque-Bera residuals test of ascertaining normality of the error term, $\varepsilon_t$, the Breusch-Pagan-Godfrey Heteroscedasticity Test that examines the error term's change in the variance over time (Breusch & Pagan, 1979; Godfrey, 1978b), the Breusch–Godfrey (BG) Serial Correlation LM Test that examines the connection between prior period errors and those for the current period for all variables (Breusch, 1978; Godfrey, 1978a), and both the (CUSUM) and the Cumulative Sum of Squared Recursive Residuals (CUSUMSQ) tests that ascertains model's stability over time (Brown et al., 1975).

#### 3.7.1 Stationarity Test of Time Series Data

Technically, the Augmented ARDL model does not need all variables to be stationary for it to be applied. Provided the integration orders of the variables do not surpass one, the Augmented

ARDL is capable of producing credible results using any combination of variables that are either integrated of order one, referred to as I(1), or stationary or integrated of order zero, referred to as I(0) (McNown et al., 2018; Pesaran et al., 2001; Sam et al., 2019). It is for this reason that the stationarity test will have to be undertaken to avoid utilising variables that are integrated of an order greater than one.

Considering that this study will use time series data, which is mostly not stationary according to Nelson & Plosser (1982), the study will use the Augmented Dickey-Fuller (ADF) Test by Dickey & Fuller (1981) because it is robust in handling the problem of serial correlation in the error term, as lagged values of the dependent variable are included in the differenced Random Walk model (Gujarati & Porter, 2009). The ADF test's null hypothesis, $\delta = 0$, signifying nonstationary of time series, will be tested against the alternative hypothesis, $\delta < 0$, signifying its stationary. The tau ($\tau$) statistic, as developed by Dickey & Fuller (1979), will be used instead of the t-statistic. If the absolute value of ADF is smaller than its absolute critical value, the null hypothesis will not be rejected, and it will signify the nonstationarity of the time series. However, if the absolute value of ADF surpasses the absolute critical value, the null hypothesis will be rejected, signifying the stationarity of the time series (Nkoro & Uko, 2016).

To ensure that the stationarity test is correct, bearing in mind that the ADF test has low power, the series will be subject to the Philips-Perron (PP) test (Phillips & Perron, 1988), which has similar hypotheses to the ADF. The PP test is a nonparametric method for unit root testing that addresses the serial correlation problem of the error terms without adding the lagged depend variable terms (Gujarati & Porter, 2009; Nkoro & Uko, 2016; Phillips & Perron, 1988). If both tests agree, it will confirm the correct integration order of the time series.

Upon establishing the nonstationarity of a time series at level, it will be first differenced and subjected to the unit root tests again. If stationarity test results on the first differenced time series show that it is stationary, the Augmented ARDL will be applied. If they are found still to be nonstationary, another model of cointegration will have to be applied since Augmented ARDL does not work with time series variables which are integrated of orders greater than one (Sam et al., 2019).

### 3.7.2 Cointegration Analysis

### 3.7.2.1 Augmented Linear ARDL

Although using the OLS model to regress time series variables that are nonstationary would produce spurious results, the relationship of the nonstationary time series variables, in the long run, tends to be stationary (Engle & Granger, 1987). This tendency by the nonstationary variables to not diverge much from each other over a long time, although in the short term, they could drift apart due to seasonal factors and would eventually be brought together by some economic forces, is known as cointegration (Granger, 1986). To perform the cointegration test, the Augmented ARDL bounds test of cointegration by McNown et al. (2016, 2018) and Sam et al. (2019) will be preferred to the cointegration methods Johansen and Juselius (1990) and Engle and Granger (1987) because the latter two are asymptotic methods that require large samples while the Augmented ARDL works with small samples (Pesaran et al., 2001; Sam et al., 2019). The study period is from 1983 to 2019 because of the availability of data. This is a small dataset which may not be amenable to models that are asymptotic. The ARDL model has been successfully used by other studies such as Pattichis (1999) who used a sample of 20 observations; Mah (2000) who used a sample of 17 observations; Narayan & Smyth (2003) who used a sample of 31 observations; Enisan & Olufisayo (2009) who used a sample of 24 observations; Alhassan & Fiador (2014) who used a sample of 20 observations; Alhassan & Biekpe (2016) who used a sample of 21 observations, and Taneja et al. (2023) who used a sample of 27 observations and it produced reasonable results that could model the relationships under study.

The Augmented ARDL model for investigating the link between the insurance industry and the growth of the economy in Malawi is specified in model (4) below:

$$\begin{aligned}\Delta LnGDP_t = {} & \alpha_0 + \sum_{i=1}^{u} \alpha_{1i}\,\Delta LnGDP_{t-i} + \sum_{i=0}^{v} \alpha_{2i}\,\Delta LnIP_{t-i} + \sum_{i=0}^{w} \alpha_{3i}\,\Delta LnHCap_{t-i} + \sum_{i=0}^{x} \alpha_{4i}\,\Delta LnInf_{t-i} \\ & + \sum_{i=0}^{y} \alpha_{5i}\,\Delta LnTrad_{t-i} + \lambda_0 LnGDP_{t-1} + \lambda_1 LnIP_{t-1} + \lambda_2 LnHCap_{t-1} + \lambda_3 LnInf_{t-1} \\ & + \lambda_4 LnTrad_{t-1} + \varepsilon_t \qquad (4)\end{aligned}$$

As with the model for total insurance penetration, interactions of the disaggregated components of insurance penetration with the expansion of the economy will be treated separately, with life insurance penetration specified in model (5) and nonlife insurance penetration specified in model (6), as follows:

$$\Delta LnGDP_t = \alpha_0 + \sum_{i=1}^{u} \alpha_{1i}\, \Delta LnGDP_{t-i} + \sum_{i=0}^{v} \alpha_{2i}\, \Delta LnLIP_{t-i} + \sum_{i=0}^{w} \alpha_{3i}\, \Delta LnHCap_{t-i} + \sum_{i=0}^{x} \alpha_{4i}\, \Delta LnInf_{t-i} + \sum_{i=0}^{y} \alpha_{5i}\, \Delta LnTrad_{t-i} + \lambda_0 LnGDP_{t-1} + \lambda_1 LnLIP_{t-1} + \lambda_2 LnHCap_{t-1} + \lambda_3 LnInf_{t-1} + \lambda_4 LnTrad_{t-1} + \varepsilon_t \quad (5)$$

$$\Delta LnGDP_t = \alpha_0 + \sum_{i=1}^{u} \alpha_{1i}\, \Delta LnGDP_{t-i} + \sum_{i=0}^{v} \alpha_{2i}\, \Delta LnNLIP_{t-i} + \sum_{i=0}^{w} \alpha_{3i}\, \Delta LnHCap_{t-i} + \sum_{i=0}^{x} \alpha_{4i}\, \Delta LnInf_{t-i} + \sum_{i=0}^{y} \alpha_{5i}\, \Delta LnTrad_{t-i} + \lambda_0 LnGDP_{t-1} + \lambda_1 LnNLIP_{t-1} + \lambda_2 LnHCap_{t-1} + \lambda_3 LnInf_{t-1} + \lambda_4 LnTrad_{t-1} + \varepsilon_t \quad (6)$$

Whereas in Models (4), (5) and (6), *u, v, w, x* and *y* are optimal lags of the variable, which will be selected automatically utilising the Akaike's Information Criterion (AIC), Δ is the difference operator, and ε is the white noise error term. The study will estimate $\alpha_0$ to $\alpha_5$ and also $\lambda_0$ to $\lambda_4$ as parameters in the models.

McNown et al. (2018) and Sam et al. (2019) require three tests of cointegration of variables to employ the Augmented ARDL. The first two tests were prescribed by Pesaran et al. (2001). They involve determining the lagged variables combined and the overall significance of the coefficients, $\lambda_0$ to $\lambda_4$, through the F-test and the t-test of the lagged dependent variable, $\lambda_0$. The F-test for joint significance of the lagged variables, which is also known as the bounds test, is performed by testing the hypothesis below:

$H_0$: $\lambda_0 = \lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = 0$ (signifying no level relationship among variables)
$H_1$: $\lambda_0 \neq \lambda_1 \neq \lambda_2 \neq \lambda_3 \neq \lambda_4 \neq 0$ (signifying that level relationships exist among variables)

Narayan (2005) critical values of bounds test will be utilised because the sample size is small. These critical values have proved to be effective in studies with small samples, such as Alhassan & Biekpe (2016); Alhassan & Fiador (2014) and Kriskkumar et al. (2022), just to mention a few. If the calculated F-statistic falls below the lower critical constraint, I(0), there is no level association among the variables and hence no cointegration of variables. If the estimated F-statistic surpasses the upper critical constraint, I(1), the null hypothesis will be rejected in favour of the alternative hypothesis, indicating the presence of a long run link between the variables. Inconclusive findings will occur whenever the calculated F-statistic is between I(0) and I(1).

The second test, the t-test on the lagged dependent variable, will be performed with the aim of eliminating the potential case of degenerate lagged dependent variable, which signifies non-cointegration of variables. Degenerate cases take place whenever either the lagged dependent variable or the lagged independent variables are insignificant within an error correction term such that the residual gap between the dependent and independent variables is not closed as there is an incomplete error correction term. In that scenario, the equilibrium linear relationship may fall apart (McNown et al., 2016, 2018; Sam et al., 2019). McNown et al. (2018) named the degenerate lagged independent variable case, Case #1, while the degenerated lagged dependent variable case was named Case #2. Hypothesis testing of the lagged dependent variable's t-test will be the following:

$H_{0:}$ $\lambda_0 = 0$ (signifying no significance of lagged dependent variable, hence no cointegration)
$H_{1:}$ $\lambda_0 \neq 0$ (signifying the significance of the lagged dependent variable, hence cointegration)

Pesaran et al. (2001) provided critical values that will be used for this t-test. The calculated test statistic will be likened to the lower, I(0), and the upper, I(1), limits. If the test statistic exceeds the upper limit, it will signify cointegration and a rejection of the null hypothesis. If its lies under I(0), there will be degenerate lagged dependent variable case, Case #2.

Although Pesaran (1999) and Pesaran et al. (2001) assumed that the regressand is I(1), which helped to rule out the possible existence of Degenerate Case #1, the limited efficacy of the stationarity test motivated McNown et al. (2016, 2018) and Sam et al. (2019) to propose a lagged independent variables F*-test so that the study confirms that in the error term, the lagged independent variables are significant to avoid Degenerate Case #1. Below is the F*-test on the lagged independent variables' hypothesis:

$H_0$: $\lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = 0$ (Lagged independent variables are not significant in ECT)

$H_1$: $\lambda_1 \neq \lambda_2 \neq \lambda_3 \neq \lambda_4 \neq 0$ (Lagged independent variables are significant in ECT)

The F*-test's critical values will be taken from Sam et al. (2019, p. 130). If the estimated $F^*$-statistic is above the I(1), cointegration will be proved after rejecting the null hypothesis, and if it falls below the I(0), the study will not reject the null, thereby confirming the presence of degenerate lagged independent variables case, Case #1.

The Augmented ARDL McNown et al. (2018) and Sam et al. (2019) is robust in the sense that once all three tests are significant, cointegration will be confirmed. If one or more of them fails, the long-run relationship will not be confirmed as that will be evidence of the existence of degenerate case(s).

### 3.7.2.2 Short Run and Long Run Regression Models

Upon confirming the equilibrium relationship between the regressand and regressors using the Augmented ARDL, the short run interactions that capture seasonal fluctuations in the time series will be ascertained to study how, despite these fluctuations, the long run cointegration is still maintained. The ability of the series to return to equilibrium in the short run is aided by the error correction mechanism which corrects the proportion of disequilibrium from one period to another (Engle & Granger, 1987). Therefore, this study will parametrise the Augmented ARDL model to model the long run connection and the dynamic fluctuations in the short term utilising the Error Correction Model (ECM) to analyse the rate at which the short run dynamic fluctuations are able to revert to equilibrium connection based on past changes of the variables and also changes in the variables to the past equilibrium errors. Equations (7) and (8) specify the long and short run models, respectively.

$$LnGDP_t = \theta_0 + \sum_{i=1}^{p} \omega_{1i} LnGDP_{t-i} + \sum_{i=0}^{q} \omega_{2i} LnIP_{t-i} + \sum_{i=0}^{r} \omega_{3i} LnHCap_{t-i} + \sum_{i=0}^{s} \omega_{4i} LnInf_{t-i} + \sum_{i=0}^{u} \omega_{5i} LnTrad_{t-i} + \upsilon_t \quad (7)$$

$$\Delta LnGDP_t = \vartheta_0 + \sum_{i=1}^{p} \varphi_{1i}\,\Delta LnGDP_{t-i} + \sum_{i=0}^{q} \varphi_{2i}\,\Delta LnIP_{t-i} + \sum_{i=0}^{r} \varphi_{3i}\,\Delta LnHCap_{t-i} + \sum_{i=0}^{s} \varphi_{4i}\,\Delta LnInf_{t-i} + \sum_{i=0}^{u} \varphi_{5i}\,\Delta LnTrad_{t-i} + \mu_t ECT_{t-1} + \upsilon_t \quad (8)$$

The long and short run linkages between the expansion of the economy and life insurance penetration will be captured using Models (9) and (10), respectively, while those of nonlife insurance penetration will be assessed using Models (11) and (12) respectively as below:

$$LnGDP_t = \theta_0 + \sum_{i=1}^{p} \omega_{1i}\,LnGDP_{t-i} + \sum_{i=0}^{q} \omega_{2i}\,LnLIP_{t-i} + \sum_{i=0}^{r} \omega_{3i}\,LnHCap_{t-i} + \sum_{i=0}^{s} \omega_{4i}\,LnInf_{t-i} + \sum_{i=0}^{u} \omega_{5i}\,LnTrad_{t-i} + \upsilon_t \quad (9)$$

$$\Delta LnGDP_t = \vartheta_0 + \sum_{i=1}^{p} \varphi_{1i}\,\Delta LnGDP_{t-i} + \sum_{i=0}^{q} \varphi_{2i}\,\Delta LnLIP_{t-i} + \sum_{i=0}^{r} \varphi_{3i}\,\Delta LnHCap_{t-i} + \sum_{i=0}^{s} \varphi_{4i}\,\Delta LnInf_{t-i} + \sum_{i=0}^{u} \varphi_{5i}\,\Delta LnTrad_{t-i} + \mu_t ECT_{t-1} + \upsilon_t \quad (10)$$

$$LnGDP_t = \theta_0 + \sum_{i=1}^{p} \omega_{1i}\,LnGDP_{t-i} + \sum_{i=0}^{q} \omega_{2i}\,LnNLIP_{t-i} + \sum_{i=0}^{r} \omega_{3i}\,LnHCap_{t-i} + \sum_{i=0}^{s} \omega_{4i}\,LnInf_{t-i} + \sum_{i=0}^{u} \omega_{5i}\,LnTrad_{t-i} + \upsilon_t \quad (11)$$

$$\Delta LnGDP_t = \vartheta_0 + \sum_{i=1}^{p} \varphi_{1i}\,\Delta LnGDP_{t-i} + \sum_{i=0}^{q} \varphi_{2i}\,\Delta LnNLIP_{t-i} + \sum_{i=0}^{r} \varphi_{3i}\,\Delta LnHCap_{t-i} + \sum_{i=0}^{s} \varphi_{4i}\,\Delta LnInf_{t-i} + \sum_{i=0}^{u} \varphi_{5i}\,\Delta LnTrad_{t-i} + \mu_t ECT_{t-1} + \upsilon_t \quad (12)$$

In Models (9) to (12), $\upsilon_t$ stands for the error variable while the ECT stands for the Error Correction Term. Error correction term coefficient is represented by $\mu_t$ and it measures the rate at which departures from the equilibrium relationship are corrected to return to the equilibrium in the subsequent period.

Upon establishing that the equilibrium relationship exists after running the Augment ARDL model, it will also indicate the existence of a causal connection in at least one direction among the variables (Granger, 1988). Therefore, the Vector Error Correction Model (VECM) will be employed in the study to establish the causality direction between activities in the insurance industry and the expansion of the economy.

If the long run connection is not established in the models, only the short run relationships will be analysed further, without the error correction term, to ascertain the existence of any significant connection between economic expansion and the insurance business in Malawi. In that case, the causality direction between the activities of the insurance industry and the growth of the economy in Malawi will be tested through the use of the Vector Autoregressive (VAR) framework.

#### 3.7.2.3 Nonlinear Autoregressive Distributed Lag (NARDL)

There may be cases where the linear ARDL model shows that it is not properly specified because the relationship between the activities of the insurance industry and the growth of the economy is not linear. Furthermore, studies such as Arena (2008); Dawd & Benlagha (2023); Enz (2000); Hatemi-J et al. (2019); Horvey et al. (2023); Olayungbo (2015) and Tran et al. (2022) have shown that activities of the insurance industry affect the expansion of the economy in a nonlinear way. As such, this study will proceed to test the asymmetric connection between insurance and the expansion of the economy using the Nonlinear Autoregressive Distributed Lag (NARDL) model of Shin et al. (2014). The NARDL model decomposes the partial sums of the regressor(s) into their partial elements of negative and positive values so that the impacts of the decomposed partial sums on the dependent variables are studied individually. The NARDL model will be used to test if there exists asymmetric cointegration between partial sums of insurance penetration and economic expansion. The decomposition of the insurance penetration component into two partial variables, a negative and a positive, will be expressed as follows:

$$IP_t = IP_0 + IP_t^+ + IP_t^-$$

Equally, the decomposed partial variables of the life and nonlife insurance penetrations will be expressed as below:

$$LIP_t = LIP_0 + LIP_t^+ + LIP_t^-$$
$$NLIP_t = NLIP_0 + NLIP_t^+ + NLIP_t^-$$

Therefore, the decomposed positive and negative partial sums of the Insurance Penetration variables will be given by the following expressions:

$$IP_t^+ = \sum_{j=1}^{t} \Delta IP_t^+ = \sum_{j=1}^{t} Max(\Delta IP_t, 0)$$
$$IP_t^- = \sum_{j=1}^{t} \Delta IP_t^- = \sum_{j=1}^{t} Min(\Delta IP_t, 0)$$

Likewise, the decomposed positive and negative life and nonlife insurance penetration partial sums will be found by the expressions below:

$$LIP_t^+ = \sum_{j=1}^{t} \Delta LIP_t^+ = \sum_{j=1}^{t} Max(\Delta LIP_t, 0)$$
$$LIP_t^- = \sum_{j=1}^{t} \Delta LIP_t^- = \sum_{j=1}^{t} Min(\Delta LIP_t, 0)$$

$$NLIP_t^+ = \sum_{j=1}^{t} \Delta NLIP_t^+ = \sum_{j=1}^{t} Max(\Delta NLIP_t, 0)$$
$$NLIP_t^- = \sum_{j=1}^{t} \Delta NLIP_t^- = \sum_{j=1}^{t} Min(\Delta NLIP_t, 0)$$

Consequently, the cointegration of the NARDL models that emanate from rearranging equations (4), (5) and (6) to take into account the positive and negative Insurance Penetration asymmetries and its disaggregated parts of life and nonlife insurance penetration are shown in models (13), (14) and (15) respectively as below:

$$\Delta LnGDP_t = \xi_0 + \sum_{i=1}^{u} \xi_{1i}\, \Delta LnGDP_{t-i} + \sum_{i=0}^{v} \xi_{2i}\, \Delta LnIP^{+}_{t-i} + \sum_{i=0}^{w} \xi_{3i}\, \Delta LnIP^{-}_{t-i} + \sum_{i=0}^{x} \xi_{4i}\, \Delta LnHCap_{t-i} + \sum_{i=0}^{y} \xi_{5i}\, \Delta LnInf_{t-i} + \sum_{i=0}^{z} \xi_{6i}\, \Delta LnTrad_{t-i} + \sigma_0 LnGDP_{t-1} + \sigma_1 LnIP^{+}_{t-1} + \sigma_2 LnIP^{-}_{t-1} + \sigma_3 LnHCap_{t-1} + \sigma_4 LnInf_{t-1} + \sigma_5 LnTrad_{t-1} + \varepsilon_t \quad (13)$$

$$\Delta LnGDP_t = \xi_0 + \sum_{i=1}^{u} \xi_{1i}\, \Delta LnGDP_{t-i} + \sum_{i=0}^{v} \xi_{2i}\, \Delta LnLIP^{+}_{t-i} + \sum_{i=0}^{w} \xi_{3i}\, \Delta LnLIP^{-}_{t-i} + \sum_{i=0}^{x} \xi_{4i}\, \Delta LnHCap_{t-i} + \sum_{i=0}^{y} \xi_{5i}\, \Delta LnInf_{t-i} + \sum_{i=0}^{z} \xi_{6i}\, \Delta LnTrad_{t-i} + \sigma_0 LnGDP_{t-1} + \sigma_1 LnLIP^{+}_{t-1} + \sigma_2 LnLIP^{-}_{t-1} + \sigma_3 LnHCap_{t-1} + \sigma_4 LnInf_{t-1} + \sigma_5 LnTrad_{t-1} + \varepsilon_t \quad (14)$$

$$\Delta LnGDP_t = \xi_0 + \sum_{i=1}^{u} \xi_{1i}\, \Delta LnGDP_{t-i} + \sum_{i=0}^{v} \xi_{2i}\, \Delta LnNLIP^{+}_{t-i} + \sum_{i=0}^{w} \xi_{3i}\, \Delta LnNLIP^{-}_{t-i} + \sum_{i=0}^{x} \xi_{4i}\, \Delta LnHCap_{t-i} + \sum_{i=0}^{y} \xi_{5i}\, \Delta LnInf_{t-i} + \sum_{i=0}^{z} \xi_{6i}\, \Delta LnTrad_{t-i} + \sigma_0 LnGDP_{t-1} + \sigma_1 LnNLIP^{+}_{t-1} + \sigma_2 LnNLIP^{-}_{t-1} + \sigma_3 LnHCap_{t-1} + \sigma_4 LnInf_{t-1} + \sigma_5 LnTrad_{t-1} + \varepsilon_t \quad (15)$$

Just like the augmented ARDL model, the bounds test of cointegration to test the significance of all coefficients of the lagged variables will be undertaken to establish the asymmetric connection between the growth of the economy and decomposed Insurance Penetration elements.

Models (16) and (17) will model the long term and short term asymmetric links, respectively, between partial sums of total insurance penetration and the expansion of the economy. For the partial sums of life and nonlife insurance penetrations with economic expansion, the long term and short term asymmetric relationship will be investigated using models (18) and (19) for life insurance penetration respectively and (20) and (21) for nonlife insurance penetration respectively as below:

$$LnGDP_t = \propto_0 + \sum_{i=1}^{p} \propto_{1i} LnGDP_{t-i} + \sum_{i=0}^{q} \propto_{2i}^{+} LnIP_{t-i}^{+} + \sum_{i=0}^{r} \propto_{3i}^{-} LnIP_{t-i}^{-} + \sum_{i=0}^{s} \propto_{4i} LnHCap_{t-i} + \sum_{i=0}^{u} \propto_{5i} LnInf_{t-i} + \sum_{i=0}^{v} \propto_{6i} LnTrad_{t-i} + \upsilon_t \qquad (16)$$

$$\Delta LnGDP_t = \emptyset_0 + \sum_{i=1}^{p} \emptyset_{1i} \Delta LnGDP_{t-i} + \sum_{i=0}^{q} \emptyset_{2i}^{+} \Delta LnIP_{t-i}^{+} + \sum_{i=0}^{r} \emptyset_{3i}^{-} \Delta LnIP_{t-i}^{-} + \sum_{i=0}^{s} \emptyset_{4i} \Delta LnHCap_{t-i} + \sum_{i=0}^{u} \emptyset_{5i} \Delta LnInf_{t-i} + \sum_{i=0}^{v} \emptyset_{6i} \Delta LnTrad_{t-i} + \mu_t ECT_{t-1} + \upsilon_t \qquad (17)$$

$$LnGDP_t = \propto_0 + \sum_{i=1}^{p} \propto_{1i} LnGDP_{t-i} + \sum_{i=0}^{q} \propto_{2i}^{+} LnLIP_{t-i}^{+} + \sum_{i=0}^{r} \propto_{3i}^{-} LnLIP_{t-i}^{-} + \sum_{i=0}^{s} \propto_{4i} LnHCap_{t-i} + \sum_{i=0}^{u} \propto_{5i} LnInf_{t-i} + \sum_{i=0}^{v} \propto_{6i} LnTrad_{t-i} + \upsilon_t \qquad (18)$$

$$\Delta LnGDP_t = \emptyset_0 + \sum_{i=1}^{p} \emptyset_{1i} \Delta LnGDP_{t-i} + \sum_{i=0}^{q} \emptyset_{2i}^{+} \Delta LnLIP_{t-i}^{+} + \sum_{i=0}^{r} \emptyset_{3i}^{-} \Delta LnLIP_{t-i}^{-} + \sum_{i=0}^{s} \emptyset_{4i} \Delta LnHCap_{t-i} + \sum_{i=0}^{u} \emptyset_{5i} \Delta LnInf_{t-i} + \sum_{i=0}^{v} \emptyset_{6i} \Delta LnTrad_{t-i} + \mu_t ECT_{t-1} + \upsilon_t \qquad (19)$$

$$LnGDP_t = \propto_0 + \sum_{i=1}^{p} \propto_{1i} LnGDP_{t-i} + \sum_{i=0}^{q} \propto_{2i}^{+} LnNLIP_{t-i}^{+} + \sum_{i=0}^{r} \propto_{3i}^{-} LnNLIP_{t-i}^{-} + \sum_{i=0}^{s} \propto_{4i} LnHCap_{t-i} + \sum_{i=0}^{u} \propto_{5i} LnInf_{t-i} + \sum_{i=0}^{v} \propto_{6i} LnTrad_{t-i} + \upsilon_t \qquad (20)$$

$$\Delta LnGDP_t = \emptyset_0 + \sum_{i=1}^{p} \emptyset_{1i} \Delta LnGDP_{t-i} + \sum_{i=0}^{q} \emptyset_{2i}^{+} \Delta LnNLIP_{t-i}^{+} + \sum_{i=0}^{r} \emptyset_{3i}^{-} \Delta LnNLIP_{t-i}^{-} + \sum_{i=0}^{s} \emptyset_{4i} \Delta LnHCap_{t-i} + \sum_{i=0}^{u} \emptyset_{5i} \Delta LnInf_{t-i} + \sum_{i=0}^{v} \emptyset_{6i} \Delta LnTrad_{t-i} + \mu_t ECT_{t-1} + \upsilon_t \qquad (21)$$

Due to the influence of positive and negative variations in the growth of the GDP as a result of the asymmetric changes in the partial sums of negative and positive insurance penetration movements and its disaggregated parts of life and nonlife insurance penetration, long run coefficients of the insurance penetration will be estimated by $\frac{-\propto_{2i}^{+}}{\propto_{1i}}$ and $\frac{-\propto_{3i}^{-}}{\propto_{1i}}$, with the long run asymmetry tested using the F-statistic Wald Test through testing the hypothesis $H_0: \frac{-\propto_{2i}^{+}}{\propto_{1i}} = \frac{-\propto_{3i}^{-}}{\propto_{1i}}$ against the alternative hypothesis of $H_1: \frac{-\propto_{2i}^{+}}{\propto_{1i}} \neq \frac{-\propto_{3i}^{-}}{\propto_{1i}}$. Its significance would mean rejecting the null hypothesis of the existence of symmetry in the decomposed positive and negative partial sums for the alternative hypothesis, thereby signifying the prevalence of asymmetric connection. Equally, the Wald Test will be used to test the existence of the short run asymmetries in the model by testing the null hypothesis $H_0: \sum_{k=0}^{n} \emptyset_{2i}^{+} = \sum_{3i}^{n} \emptyset_{3i}^{-}$ against the alternative hypothesis, $H_1: \sum_{k=0}^{n} \emptyset_{2i}^{+} \neq \sum_{3i}^{n} \emptyset_{3i}^{-}$. The significance of the F-statistic Wald Test shall indicate that asymmetries are present in the short run.

#### 3.7.2.4 Vector Autoregressive Model

If the equilibrium relationships, using the augmented linear ARDL, and the nonlinear asymmetric long run relationships, using the NARDL, are not established between the expansion of the economy and the insurance industry, the focus will change towards investigating the short run connections. In that case, there will not be the error correction mechanisation to revert the short run deviations to the long run. Therefore, instead of using the VECM for analysis of the Granger causality, the study will adopt the Sims (1980) unrestricted Vector Autoregressive (VAR) model, as it was effectively utilised to study Granger causality in insurance–growth nexus studies by Alhassan & Biekpe (2016) and Dash et al. (2018) in which no cointegration was found between insurance industry and economic expansion.

A VAR is a linear model with a certain number of variables in which a variable in each equation is explained by both its lagged values and the current and lagged values of the other variables in that equation (Stock & Watson, 2001). In a VAR, all variables are endogenous, and they are regressed, in turn, using the OLS properties on their lagged terms as well as the lagged observations of all the remaining variables that have been used in the model (Ford, 1986). Consequently, the number of variables in a VAR model would determine the number of equations in the framework so that the dynamic interactions are captured simultaneously as they affect each other without having a prior prioritisation of which variable is a regressor and which ones are regressands. The appropriate lag structure of the variables will be determined using the AIC so that the problems of reduced degrees of freedom and multicollinearity are minimised by not including too many lags, but also there should be an assurance that the model is not misspecified by including too few lags (Gujarati & Porter, 2009). One way of achieving this is by the use of the guidelines provided by Toda & Yamamoto (1995) who stipulated that the lag structure of the VAR should not be less than the integration order of the variables. The specification of the VAR model used to investigate Granger causality between the insurance industry and the expansion of the economy for Malawi in the short term will be captured by Models (22) and (23). For convenience purposes and conservation of space, the other models in this VAR framework that have control variables, namely trade openness, human capital development, and annual inflation, as regressands, have not been presented here since they are not the centre of the study, although they affect the efficacy of the models. The focus of the study was to assess the causal connection between insurance and expansion of the economy. This presentation of the VAR models, which show insurance business and economic expansion, is repeated for life as well as nonlife insurance penetration.

$$LnGDP_t = \alpha_1 + \sum_{i=1}^{k} \beta_{1i} \, LnGDP_{t-i} + \sum_{i=1}^{k} \gamma_{1i} \, LnIP_{t-i} + \sum_{i=1}^{k} \delta_{1i} \, LnHCap_{t-i} + \sum_{i=1}^{k} \theta_{1i} \, LnInf_{t-i} + \sum_{i=1}^{k} \vartheta_{1i} \, LnTrad_{t-i} + \varepsilon_{1t} \quad (22)$$

$$LnIP_t = \alpha_2 + \sum_{i=1}^{k} \beta_{2i} \, LnGDP_{t-i} + \sum_{i=1}^{k} \gamma_{2i} \, LnIP_{t-i} + \sum_{i=1}^{k} \delta_{2i} \, LnHCap_{t-i} + \sum_{i=1}^{k} \theta_{2i} \, LnInf_{t-i} + \sum_{i=1}^{k} \vartheta_{2i} \, LnTrad_{t-i} + \varepsilon_{2t} \quad (23)$$

Likewise, the VAR model used to investigate Granger causality between life insurance penetration and economic expansion in Malawi will be estimated by Models (24) and (25), while that for nonlife insurance penetration and economic expansion will be modelled through (26) and (27)

$$LnGDP_t = \alpha_3 + \sum_{i=1}^{k} \beta_{3i} \, LnGDP_{t-i} + \sum_{i=1}^{k} \gamma_{3i} \, LnLIP_{t-i} + \sum_{i=1}^{k} \delta_{3i} \, LnHCap_{t-i} + \sum_{i=1}^{k} \theta_{3i} \, LnInf_{t-i} + \sum_{i=1}^{k} \vartheta_{3i} \, LnTrad_{t-i} + \varepsilon_{3t} \quad (24)$$

$$LnLIP_t = \alpha_4 + \sum_{i=1}^{k} \beta_{4i}\, LnGDP_{t-i} + \sum_{i=1}^{k} \gamma_{4i}\, LnLIP_{t-i} + \sum_{i=1}^{k} \delta_{4i}\, LnHCap_{t-i} + \sum_{i=1}^{k} \theta_{4i}\, LnInf_{t-i} + \sum_{i=1}^{k} \vartheta_{4i}\, LnTrad_{t-i} + \varepsilon_{4t} \quad (25)$$

$$LnGDP_t = \alpha_5 + \sum_{i=1}^{k} \beta_{5i}\, LnGDP_{t-i} + \sum_{i=1}^{k} \gamma_{5i}\, LnNLIP_{t-i} + \sum_{i=1}^{k} \delta_{5i}\, LnHCap_{t-i} + \sum_{i=1}^{k} \theta_{5i}\, LnInf_{t-i} + \sum_{i=1}^{k} \vartheta_{5i}\, LnTrad_{t-i} + \varepsilon_{5t} \quad (26)$$

$$LnNLIP_t = \alpha_6 + \sum_{i=1}^{k} \beta_{6i}\, LnGDP_{t-i} + \sum_{i=1}^{k} \gamma_{6i}\, LnNLIP_{t-i} + \sum_{i=1}^{k} \delta_{6i}\, LnHCap_{t-i} + \sum_{i=1}^{k} \theta_{6i}\, LnInf_{t-i} + \sum_{i=1}^{k} \vartheta_{6i}\, LnTrad_{t-i} + \varepsilon_{6t} \quad (27)$$

Where $\alpha_1$ to $\alpha_6$ represent the constants in Models (22) to (27) and $\beta_1$ to $\beta_6$, $\gamma_1$ to $\gamma_6$, $\delta_1$ to $\delta_6$, $\theta_1$ to $\theta_6$ and $\vartheta_1$ to $\vartheta_6$ are coefficients of log GDP growth, log insurance penetration and its disaggregated components depending in the model, log human capital development, log inflation rate and log trade openness respectively in models (22) to (27). $\varepsilon_1$ to $\varepsilon_6$ represent the error terms for each model from Model (22) to (27).

To examine Granger causality between insurance activities and Malawi's economic expansion using VAR, two tests will be used in this study so that they act as a check on each other. The tests that will be used are the Chi-square test based on the Wald test block exogeneity test as well as the pairwise Granger causality F-statistic test. The coefficients to be tested are $\gamma_1$, $\gamma_3$ to $\gamma_5$ in Models (22), (24), and (26), respectively, to establish if insurance market activities Granger cause economic growth. If these coefficients are statistically significant, the null hypothesis of insurance market activities do not Granger cause economic growth in Malawi will be rejected, signifying the existence of supply-leading theory in the growth–insurance connection in Malawi. Likewise, if $\beta_2$ $\beta_4$ and $\beta_6$ are found to be statistically significant in Models (23), (25) and (27), respectively, it will signify that economic growth Granger causes insurance market activities in Malawi since the null hypothesis of GDP growth does not Granger cause insurance penetration will be rejected confirming the existence of the demand – following hypothesis. If all coefficients $\gamma_1$, $\gamma_3$ to $\gamma_5$ in Models (22), (24) and (26), respectively and $\beta_2$ $\beta_4$ and $\beta_6$ in Models (23), (25) and (27) respectively are found to be statistically significant, it would mean that there is a bidirectional causality between insurance market activities in Malawi and economic growth signifying the presence of the feedback hypothesis. On the other hand, if all the coefficients $\gamma_1$, $\gamma_3$ to $\gamma_5$ in Models (22), (24) and (26) respectively and $\beta_2$ $\beta_4$ and $\beta_6$ in Models (23), (25) and (27) respectively are found not to be statistically significant, it will show that the insurance market activities in Malawi do not have any impact on the expansion of the economy and likewise, economic expansion does not exert influence on Malawi's insurance market. This will indicate the presence of the neutrality hypothesis in Malawi.

To ensure the robustness of the Granger causality test using VAR, the models will be subjected to diagnostic tests to satisfy the study that there was no presence of serial correlation, nonnormality and heteroscedasticity in the models.

# Chapter 4: Research Findings and Discussions

## 4.1 Introduction

In this chapter, the results of the study are presented and discussed in detail with the aim of addressing the research questions that were set for the study, thereby assisting the study in meeting its objectives. The discussion starts with a descriptive presentation of the data that was used for the study, followed by a graphical presentation of each variable, which outlines the general overview of the trends and patterns of each variable. Thereafter, unit root and cointegration analysis results are presented, followed by a detailed discussion of empirical models' results that will address the research questions and prove the hypotheses.

## 4.2 Descriptive Statistics

As shown in Table 3, there are 37 observations in the sample that was used for this study starting from 1983 to 2019. The period of study was determined by data that was found in the data sources to produce a balanced set of data series. The averages per annum for the period under study were 3.993%, 1.786%, 0.649%, 1.137%, 28.222%, 20.179% and 0.435% for annual GDP growth rate (GDP), insurance penetration (IP), life insurance penetration (LIP), nonlife insurance penetration (NLIP), human capital development (HCAP), annual inflation rate (INF) and trade openness (TRAD) respectively. INF showed to have the largest range of 75.914%, with the highest data point of 83.326% and the lowest data point of 7.412%, indicating the volatility of inflation in Malawi. It was skewed to the right, and as such, the mean and median points were closer to the minimum value than they were to the maximum value. The skewness of INF was positive at 2.528, indicating that there were more data points whose values were lower than the mean than those whose values were higher than the mean. In addition, the standard deviation was higher for the annual inflation rate at 14.290%. The INF series, with a Jarque-Bera probability below 5%, seemed not normally distributed. On the other hand, Trade Openness seemed to have the smallest range of 0.341%, and its standard deviation was small at 0.071. Trade openness seemed to be less skewed and more normally distributed, with a Jacque-Bera probability of 54.8%. In between these two opposite ends were the GDP, IP, LIP, NLIP and HCAP, whose ranges were 26.97%, 1.30%, 1.06%, 1.19% and 24.42%, respectively. Of the five variables, IP, NLIP and HCAP series seemed more normally distributed with Jacque-Bera probabilities of 44.7%, 20.8% and 21.2%, respectively, while the GDP and LIP series seemed not to be normally distribution with Jacque-Bera probabilities of 0.1% and 0% respectively. The GDP and HCAP series were relatively skewed to the left, with mean and median values being closer to the maximum value than the minimum value. On the other hand, IP LIP and NLIP were relatively skewed to the right, with the mean and median values being close to the minimum value.

In terms of the height of the peak of the distribution curve, INF's curve was highly peaked with a kurtosis of 11.40, followed by LIP, GDP and TRAD at kurtosis of 9.64, 5.70 and 3.50, respectively. These three were above the normal level, which is generally considered to be at a kurtosis of 3.00. On the other end, HCAP had a flatter distribution than normal at a kurtosis of 1.61, and IP and NLIP were higher than the HCAP with a kurtosis of 2.17 and 2.65, respectively. A further graphical presentation of each variable and a detailed analysis of the individual variable is provided in the subsequent subsections.

As for the insurance's contribution to the expansion of the economy over the study period, life insurance contributed 0.649%, while nonlife contributed more than life insurance at 1.137% of the GDP. Overall, the insurance industry contributed, on average, 1.786% to the GDP of Malawi between 1983 and 2019.

**Table 3:** *Descriptive Statistics*

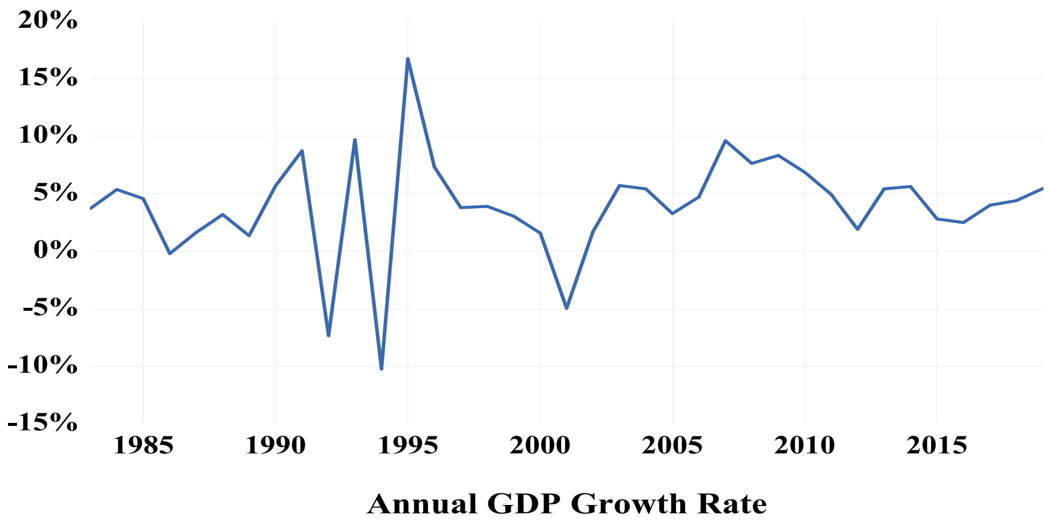
| | **GDP** | **IP** | **LIP** | **NLIP** | **HCAP** | **INF** | **TRAD** |
|---|---|---|---|---|---|---|---|
| Mean | 3.993 | 1.786 | 0.649 | 1.137 | 28.222 | 20.179 | 0.435 |
| Median | 4.392 | 1.820 | 0.603 | 1.081 | 29.748 | 14.745 | 0.432 |
| Maximum | 16.729 | 2.553 | 1.451 | 1.890 | 40.773 | 83.326 | 0.600 |
| Minimum | -10.240 | 1.254 | 0.388 | 0.704 | 16.351 | 7.412 | 0.259 |
| Std. Dev. | 4.659 | 0.367 | 0.191 | 0.311 | 8.553 | 14.290 | 0.071 |
| Skewness | -0.684 | 0.301 | 2.190 | 0.692 | -0.154 | 2.528 | 0.365 |
| Kurtosis | 5.701 | 2.173 | 9.637 | 2.650 | 1.614 | 11.401 | 3.496 |
| Jarque-Bera | 14.129 | 1.611 | 97.503 | 3.143 | 3.106 | 148.199 | 1.202 |
| Probability | 0.001 | 0.447 | 0.000 | 0.208 | 0.212 | 0.000 | 0.548 |
| Sum | 147.745 | 66.081 | 24.016 | 42.065 | 1044.229 | 746.637 | 16.098 |
| Sum Sq. Dev. | 781.354 | 4.845 | 1.309 | 3.477 | 2633.771 | 7351.415 | 0.184 |
| Observations | 37 | 37 | 37 | 37 | 37 | 37 | 37 |

*Note: GDP=Gross Domestic Product; IP=Insurance penetration; LIP=Life Insurance penetration; NLIP=Non-Life Insurance penetration; HCAP=Human Capital Development; INF=Annual Inflation rate; TRAD= Trade Openness Source: Author's Compilation from research data*

### 4.2.1 Annual GDP Growth Rate (GDP)

Figure 1 shows the graphical presentation of the yearly GDP expansion rate for Malawi from 1983 to 2019, which was the period under study. The graph shows that the highest GDP growth rate of 16.73% was reached in 1995 due to factors such as reforms in the agricultural sector, coupled with favourable weather conditions that facilitated good harvests, together with support from multilateral and bilateral donor agencies (Cammack, 2004). The annual GDP growth rate shows high volatility between 1990 and 1996, which is evidenced by fluctuations that made the GDP growth graph oscillate from high rates to low rates. There are several factors that contributed to the volatility, which include, among others, adverse weather conditions, political instability that led to riots which forced a referendum that ushered in the multiparty system of government, withholding of multilateral budgetary support due to political and structural adjustment pressures which hampered the plan of the Government to finance the budget and led to trade imbalance and devaluation of the Malawi Kwacha (Cammack, 2004; Malawi Government, 2003). The GDP growth rate reached its lowest level of -10.24% in 1994 due to the 1993/1994 drought conditions and the inability of farmers to access improved and modern seeds for agricultural production (Chirwa & Ngalawa, 2006). Between 1996 and 2001, there was a gradual reduction in the growth of GDP due to the Government's inability to maintain fiscal discipline, which increased the fiscal deficit and led to the successive devaluations of the Malawi Kwacha (Cammack, 2004). In 2001, Malawi registered a negative growth of -4.975%, mainly due to poor agricultural performance that resulted from the drought that occurred in that year (Dossani, 2012; IMF, 2017). The economic growth between 2005 and 2010 coincided with several factors that included the introduction and implementation of the Malawi Growth and Development Strategy (MGDS) for 2006 to 2012, which highlighted key strategic areas of focus for achieving economic growth (Dossani, 2012) and the favourable weather conditions that improved agricultural production (IMF, 2017). The graph shows that, on average, the annual GDP growth rate had been almost stationary around the 4% range, with some periodic deviations above or below this level before the situation went back to the average level. According to the UNDP, sustainable development and meaningful progress toward achieving SGDs would be attained if the average annual GDP growth rate is at least 7.2% (UNDP, 2018), which was not reached continuously in the period under study. The GDP seems not to be stationary, and the unit root test in the subsequent sections would determine the integration level of the GDP series. There seemed not to be a trend in this series, and it would be reasonable to treat it as a series without any trend.

**Figure 1:** *Yearly GDP Growth Rate for Malawi from 1983 to 2019*

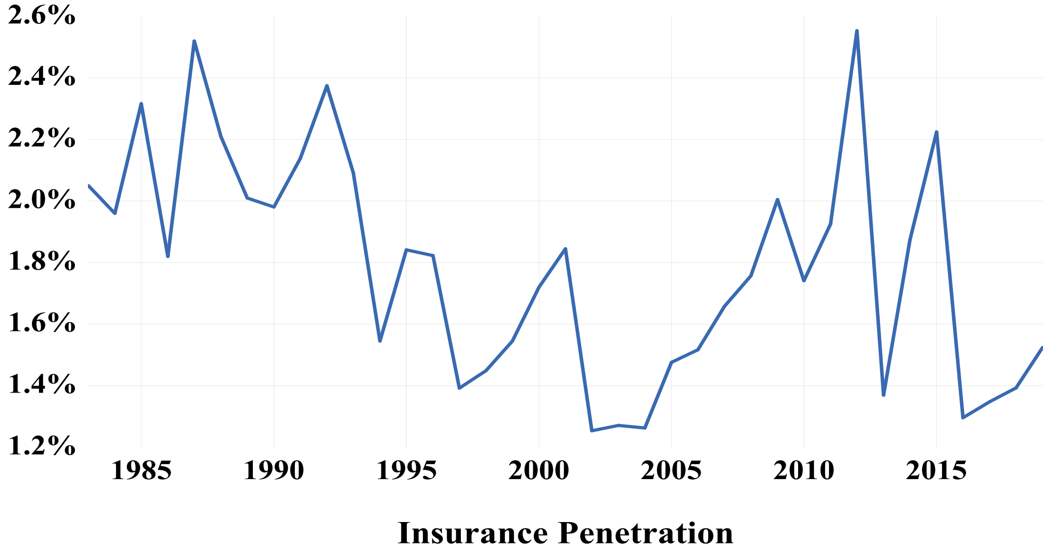



*Note: Sourced from Author's Compilation from EViews Output*

### 4.2.2 Insurance Penetration (IP)

Insurance penetration (IP) is another important variable that was tested to see if it causes growth of the GDP in Malawi. Figure 2 presents a graphical representation of how IP moved from 1983 to 2019, which was the period under study. IP peaked at 2.5% of GDP in 2012 during the period under study, and the lowest it ever reached was in 2002 at 1.25%. The movement of the IP series seemed to coincide with the Malawi Kwacha exchange rate regime that was adopted at that time such that it seemed to remain stable or increase whenever the Malawi Kwacha was stable, and then it would decrease whenever there was a devaluation of the local currency. This pattern seemed to hold from 1985 to 1993 when the Malawi Kwacha was valued with reference to a weighted basket of seven major international currencies, and a devaluation thereafter coincided with the decrease in IP. Similarly, Malawi adopted a floated foreign exchange regime between 1997 and 2001, which was followed by a heavy devaluation and then from 2004 to 2012, was a managed float followed by a devaluation also, and another devaluation occurred in 2015 (Pauw et al., 2013). On the face of it, the series looked not to be stationary. However, the unit root test in the subsequent sections would determine if it needed to be differenced to become stationary. The series does not have any trend or pattern, so it would be reasonable to treat it as a series without any trend.

**Figure 2:** *Annual Insurance Penetration Rate for Malawi from 1983 to 2019*

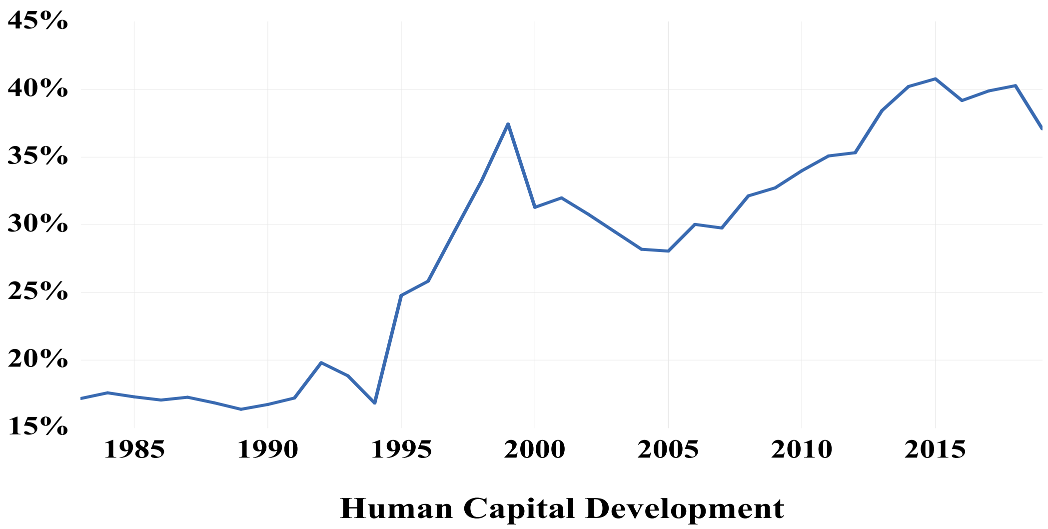



*Note: Sourced from Author's Compilation from EViews Output*

### 4.2.3 Human Capital Development (HCAP)

Figure 3 shows the graphical presentation of human capital development (HCAP) for Malawi between 1983 and 2019, and it shows that the series was not stationary as it kept on rising with time. The graph shows that secondary school enrollment started rising in 1994 when the Government of Malawi introduced the free education system at the primary school level, which increased access to education for low-income Malawians, although it was critiqued for failing to improve the quality of education (Al-Samarrai & Zaman, 2007). The highest percentage of secondary school enrollment was achieved in 2015 at 40.7%, and the lowest secondary school enrollment was registered in 1989 at 28%.  Since 2006, after the Multilateral Debt Relief Initiative (MDRI) on Heavily Indebted Poor Countries (HIPC), the Malawi Government committed to increasing secondary school enrollment as part of reinvesting resources that were freed through debt relief and also refocusing on achieving SDGs (Cassimon et al., 2013; UNDP, 2018) and hence the graph started rising after 2006. A unit root test in the subsequent sections would determine if the first differencing would stabilise the series and make it usable as a control variable.

**Figure 3:** *Human Capital Development Rate for Malawi from 1983 to 2019*

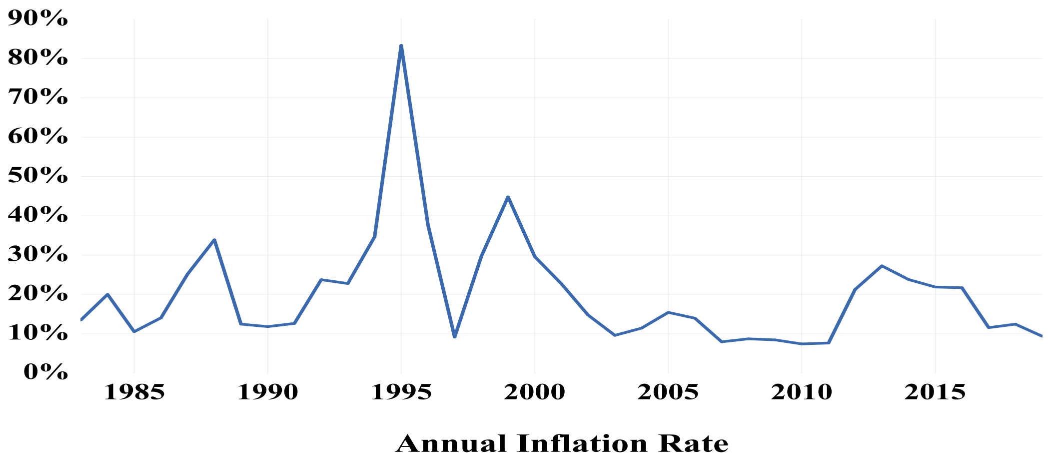



*Note: Sourced from Author's Compilation from EViews Output*

### 4.2.4 Annual Inflation Rate (INF)

As a key variable that affects aggregate demand, high inflation was a key factor that affected economic growth in Malawi between 1983 and 2019, as shown in Figure 4. Inflation was directly affected by the Malawi Kwacha devaluation against the international currencies, and the exchange rate regime contributed predominantly to inflation rather than the monetary regime (Mangani, 2012). Figure 4 shows the spike in inflation whenever there was a devaluation of the Malawi Kwacha due to the changes in exchange rate regimes such as after 1984 and 1994, when Malawi was implementing the structural adjustments (Jombo et al., 2014) and in 2012, when the major devaluation was done (Pauw et al., 2013) to correct what was termed the overvaluation of the Malawi Kwacha compared to international currencies that include the United States Dollar. The highest inflation in the period of the study, 83.3%, occurred in 1995, while the lowest inflation rate, 7.4%, was registered in 2010. Nkume & Ngalawa (2014) argued that there is a maximum inflation rate threshold of 17% that is deemed optimum and above which it would negatively affect the economic growth of a country, and in the case of Malawi, whenever inflation rate was lower than 17% per annum, the GDP growth rate tended to increase as were the cases between 1989 and 1991, 1995 and 1998, and 2005 and 2011. The graph seems to indicate non-stationarity in the inflation time series, and the stationarity test would show if it could become stationary after first differencing.

**Figure 4:** *Annual Inflation Rate for Malawi from 1983 to 2019*

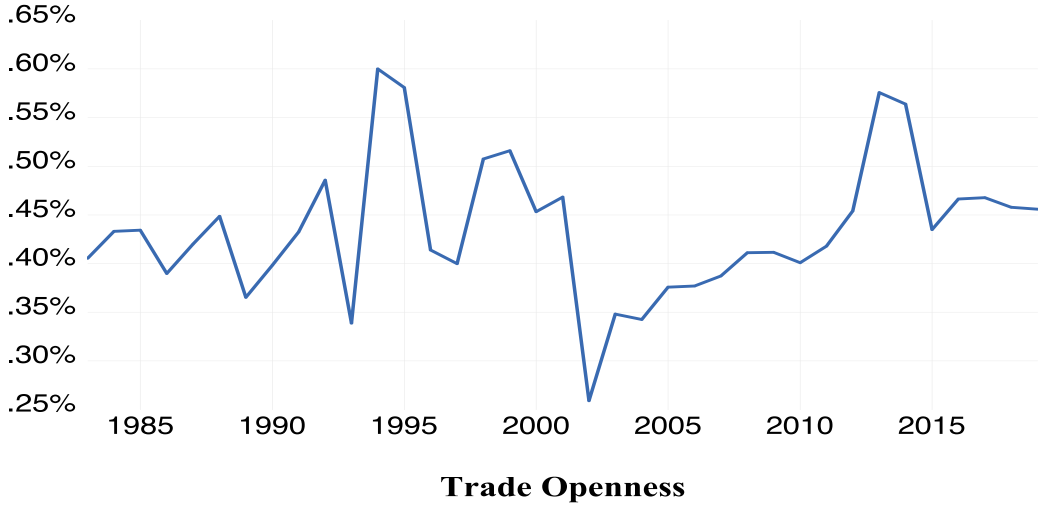



*Note: Sourced from Author's Compilation from EViews Output*

### 4.2.5 Trade Openness (TRAD)

Figure 5 shows that the sum of imports and exports as a proportion of the country's GDP followed the general movement of the economy with low levels whenever the GDP growth rate reduced and high levels whenever a high GDP growth rate occurred. Between 1983 and 2019, the lowest level was reached in 2002 when there was a severe draught which contributed to the shrinking of the economy and a negative rate of growth, and therefore affected agricultural exports and the country's ability to import goods and services since importers' wealth was negatively affected (IMF, 2017). The highest peak was in 1994 before the major devaluation that occurred in that year to realign the overvalued Malawi Kwacha. The series seemed not to be stationary subject to the confirmation of the stationarity test results, which will be presented in the subsequent sections to determine its right integration order so that it can be used in the cointegration model that has been selected for analysis of the data.

**Figure 5:** *Trade Openness Rate for Malawi from 1983 to 2019*




*Notes: Author's Compilation based on EViews Output*

### 4.3 Correlation of Variables

Table 4 presents the pairwise correlation between the variables. This was done to check if the level of correlation among the variables was too high, such that it could affect the accuracy of the regression model results that use these variables. The correlation coefficient, r, ranges from -1 to 1, with the extreme ends signifying perfect negative or positive correlation, respectively, and the middle, 0, signifying no correlation (George & Mallery, 2022). The closer the coefficient value is to the two opposite ends, the stronger the correlation and vice versa. When pairwise correlation is negatively correlated, it means that the increase in one variable tends to be associated with the decrease in the other variable, and vice versa. Conversely, when there is a positive correlation, it means that the increase in one variable tends to be associated with the increase in the other variable, and vice versa. As a general rule, a correlation coefficient between variables of 0.8 to 0.9, in absolute terms, is considered high and may increase the risk of multicollinearity in the model, and this has to be checked by employing restricted model techniques that would ascertain if there are some omitted variables or there are variables that need to be dropped that cause multicollinearity (Kennedy, 2008).

Table 4 demonstrates the presence of a negative correlation between yearly GDP growth and both insurance penetration and trade openness with coefficients of -0.060 and -0.155, respectively, but the relationships were weak since they were closer to 0. This signifies that an increase in either IP or TRAD tended to be connected with a reduction in GDP expansion in this study. Alternatively, there were significant positive correlations between GDP expansion and both human capital development and inflation in the period under study with positive coefficients of 0.136 and 0.123, respectively. This signifies that increases in either HCAP or INF would be associated with an increase in GDP between 1983 and 2019.

Amongst the other variables, the highest correlations existed between TRAD and INF with a positive coefficient of 0.597, which may signal the potential risk of multicollinearity in the models. Equally, there was also a negative but significant correlation between IP and HCAP with a coefficient of -0.471, and this also had the potential of creating multicollinearity in the model. The other relationships among the other variables had coefficients of less than 0.3, and they showed low correlation amongst them.

**Table 4:** *Pairwise Correlation of Variables*

| VARIABLES | GDP | IP | HCAP | INF | TRAD |
|---|---|---|---|---|---|
| **GDP** | 1.000 | -0.060 | 0.136 | 0.123 | -0.155 |
| **IP** | -0.060 | 1.000 | -0.471 | 0.088 | 0.047 |
| **HCAP** | 0.136 | -0.471 | 1.000 | -0.071 | 0.209 |
| **INF** | 0.123 | 0.088 | -0.071 | 1.000 | 0.597 |
| **TRAD** | -0.155 | 0.047 | 0.209 | 0.597 | 1.000 |

*Note: GDP=Gross Domestic Product; IP=Insurance penetration; LIP=Life Insurance penetration; NLIP=Non-Life Insurance penetration; HCAP=Human Capital Development; INF= Annual Inflation Rate; TRAD=Trade Openness. Source: Author's Compilation from research data*

### 4.4 Stationarity Test Results

Before running either the NARDL model or the linear ARDL model for cointegration, there is a need to ensure that none of the variables is integrated of an order higher than one (Pesaran, 1999; Pesaran et al., 2001; Shin et al., 2014). The variables should be integrated of orders between I(0) and I(1). To establish this prerequisite before running the models, a unit root test was carried out using the Augmented Dickey-Fuller (ADF) and validated by the Phillips-Perron (PP) tests and the results were tabulated in Table 5.

The unit root test was performed by comparing the absolute critical value at 5% against the absolute value of the test statistic. At level, if either ADF or PP test statistics, in absolute terms, surpassed the critical value, in absolute terms, the null hypothesis of nonstationary was rejected to confirm the stationarity of the series. For variables that were not stationary at level, the test was repeated using their first differenced series, and they all proved to be stationary at first difference. The AIC was utilised to automatically select the lag length of each Augmented Dicky-Fuller (ADF) test, whereas the Newey-West bandwidth selection criteria was utilised in the automatic selection of the bandwidth for the Phillip-Peron (PP) test. The number of lags and bandwidth selected for each ADF and PP test, respectively, are reported in the parentheses against each test. Table 5 shows that LnGDP, LnIP, LnINF and LnTRAD were stationary at level, I(0), while the other variables had unit root at level. LnHCAP, LnLIP and LnNLIP became stationary at first differencing, an indication that they are integrated to the first order, I(1).

**Table 5:** *Unit Root Test Results*

| | **ADF Test** | | **Phillip-Peron Test** | | |
|---|---|---|---|---|---|
| | **With Constant** | **ADF Critical Value @5%** | **With Cosntant** | **PP Critical Value @5%** | **Decision** |
| **Variables in Log Form** | **Level** | **Level** | **Level** | **Level** | |
| LnGDP | -5.7293(0)* | -2.9458 | -5.7297(1)* | -2.9458 | Stationary |
| LnIP | -3.6358(0)* | -2.9458 | -3.7399(4)* | -2.9458 | Stationary |
| LnHCAP | -0.9721(0) | -2.9458 | -1.0438(1) | -2.9458 | Not Stationary |
| LnINF | -3.1001(0)** | -2.9458 | -3.0519(4)** | -2.9458 | Stationary |
| LnTRAD | -4.0631(0)* | -2.9458 | -4.0734(1)* | -2.9458 | Stationary |
| LnLIP | -1.9202(2) | -2.9458 | -4.7898(4)* | -2.9458 | Not Stationary |
| LnNLIP | -2.3659(0) | -2.9458 | -2.2304(1) | -2.9458 | Not Stationary |
| | **1st Difference** | **1st Difference** | **1st Difference** | **1st Difference** | |
| LnHCAP | -4.4339(0)* | -2.9484 | -4.4942(2)* | -2.9484 | Stationary |
| LnLIP | -8.6979(1)* | -2.9511 | -11.0364(3)* | -2.9484 | Stationary |
| LnNLIP | -6.0374(1)* | -2.9511 | -10.8037(13)* | -2.9484 | Stationary |

*Note: Parentheses contain the number of lags selected based on automatic AIC for each ADF test and automatic bandwidth selected using Newey-West for each PP Test. *, **, and *** show significance at 1%, 5% and 10% respectively. GDP=Gross Domestic Product; IP=Insurance penetration; LIP=Life Insurance penetration; NLIP=Non-Life Insurance penetration; HCAP=Human Capital Development INF=Annual Inflation Rate; TRAD=Trade Openness Source: Author's Compilation from research data*

### 4.5 Cointegration Analysis Results Using Linear ARDL Model

The study progressed with performing the cointegration test utilising the linear ARDL model of Pesaran (1999) and Pesaran et al. (2001), which was augmented and bootstrapped by

McNown et al. (2016, 2018) and Sam et al. (2019). For ease of reference, Model 1 for total insurance penetration stands for Model (4), Model 2 for life insurance penetration stands for Model (5), and Model 3 for nonlife insurance penetration stands for Model (6). Maximum lags for each model were automatically selected using the AIC. On the first run, Model 1's lag structure was (1,0,0,0,2). However, the cumulative sum of squares of recursive residuals test for the model to detect sudden changes in the constancy of the relationships in the model, as proposed by Brown et al. (1975), showed that Model 1 was unstable in its initial form due to structural breaks in 1994 that were confirmed by a Chow Test (Chow, 1960) which necessitated the inclusion of a dummy variable to take care of it. As such, the revised Model 1's lag structure was (1, 2, 2, 0, 1, 0, 2), and it included the lag structure for the dummy variable and the interaction between the dummy variable and insurance penetration variable. Model 2 did not show any sign of structural breaks, and its lag structure was (1, 2, 2, 3, 4). Just like Model 2, Model 3 did not suffer from structural breaks, and its lag structure was (1, 1, 2, 2, 1).

### 4.5.1 Bounds Test for Cointegration Results for Linear ARDL

The study proceeded to perform the bounds test of cointegration by running the F-test on all lagged variables at level, the t-test on the lagged dependent variable at level and the F*-test on lagged independent variables at level to ensure that cointegration among the variables existed without degenerate Cases #1 and #2 (McNown et al., 2016, 2018; Sam et al., 2019). The results of the bounds cointegration test are outlined in Table 6.

**Table 6:** *Augmented ARDL Bounds Test Results for Linear Models*

| **Model Output** | **Model 1** | **F-Statistic = 8.494** | **t - Statistic = -6.872** | | **F*- Statistic = 3.331** | |
|---|---|---|---|---|---|---|
| **Bounds Test** | **Model 2** | **F-Statistic = 7.073** | **t - Statistic = -5.493** | | **F*- Statistic = 1.512** | |
| **statistics:** | **Model 3** | **F-Statistic = 11.085** | **t - Statistic = -7.031** | | **F*- Statistic = 3.514** | |
| **Significance level** | **10%** | | **5%** | | **1%** | |
| | I(0) | I(1) | I(0) | I(1) | I(0) | I(1) |
| F - Statistic CV | 2.752 | 3.994 | 3.354 | 4.774 | 4.768 | 6.670 |
| t - Statistic CV | -2.570 | -3.660 | -2.860 | -3.990 | -3.430 | -4.600 |
| F*- Statistic CV | 2.220 | 3.840 | 2.800 | 4.700 | 4.150 | 6.830 |

*Note: k = 6 for Model 1 and K = 4 for Models 2 and 3, N = 37. Critical values used were for Case III, Unrestricted Constant and No Trend. Source: Author's Compilation from research data*

From Table 6, k was the number of regressors in each model, which was 6 for Model 1 due to the dummy variable and 4 for Models 2 and 3. N was the sample size, which was 37. Case III critical values of unrestricted constant without trend were used for all models. I(0) and I(1) represent the lower and the upper bounds of the critical values, respectively, which were used at 1%, 5% and 10% significance levels. Narayan (2005) critical values for the F – Statistic were used due to the small dataset of 37 observations. Critical values for the t – t-statistic were obtained from Pesaran et al. (2001), and critical values for the F* - statistic were obtained from Sam et al. (2019).

Each of the Models 1, 2 and 3 had an F-statistic of 8.494, 7.073 and 11.085, respectively, which were higher than the I(1) 5% F-statistic critical value of 4.774. This indicated that, in all the models, there was significance in the joint lagged level variables. However, as per the augmented ARDL by McNown et al. (2016, 2018) and Sam et al. (2019), the joint bounds test of lagged level variables is not adequate to conclude the existence of the long-run relationship to avoid degenerate Cases #1 and #2. Therefore, the other two tests followed to rule out the degenerate cases. The t-statistics for the lagged dependent variables, in absolute terms, for Models 1, 2 and 3 were 6.872, 5.493 and 7.031, respectively, and they all surpassed the 5% upper critical value, I(1), in absolute terms of 3.99. Therefore, the result confirmed the nonexistence of degenerate lagged dependent variable case (Case #2) since the t-test was significant (McNown et al., 2016, 2018; Sam et al., 2019). The F*-statistics on lagged independent variables for Models 1, 2 and 3 were 3.331, 1.512 and 3.514, respectively, which, compared to the 5% critical level, were all lower than the upper critical value of 4.70. The results show that there was the presence of degenerate lagged independent variables case (Case #1), and therefore, no long run connection was proved between economic expansion and insurance penetration in Malawi. These results were consistent with Ward & Zurbruegg (2000), who proved no cointegration between insurance activities and economic expansion for Austria, Switzerland, the U.K., and the U.S.; Guochen & Chiwei (2012) who proved no connection between economic expansion and insurance in some low-income provinces in China; Chang et al. (2014) who found no relationship between insurance activities and economic growth in Belgium; and Dash et al. (2018) who found no cointegration relationship between insurance market activities and economic growth in Cyprus, Greece, Ireland and Latvia. However, these results were not consistent with other studies that found the presence of an equilibrium interaction between insurance market activities and economic expansion, such as Alhassan & Fiador (2014); Anwer et al. (2019); Horng et al. (2012) and Kugler & Ofoghi (2005) just to mention a few. The absence of cointegration between insurance market activities and economic growth may be explained with reference to several factors that may have affected this outcome, and these factors include a lack of development of the financial market, which includes the insurance sector (Sulemana & Dramani, 2022), insurance market activities taking place below the thresholds that would have an impact on economic activities (Asongu & Odhiambo, 2020) and the inadvertent exclusion of the key agricultural sector from the insurance market which drives the economy (Maganga et al., 2021; Makaudze, 2018).

### 4.5.2 Linear ARDL Models Diagnostics Results

The linear models were tested to verify if they were robust enough to analyse the relationship between insurance market activities and economic growth in Malawi, and the diagnostic tests results are laid out in Table 7. All three linear models did not suffer from heteroscedasticity as the probabilities of the Breusch–Pagan–Godfrey (BPG) tests were 6%, 34% and 41% for Models 1, 2 and 3, respectively, and they were all above 5% critical value, and therefore the null hypothesis of homoscedasticity of residuals could not be rejected. This showed that the residuals of all the models were stable. Similarly, the models did not suffer from serial correlation as the null hypothesis of no serial correlation in the residuals of the models could not be rejected with probabilities of the Breusch-Godfrey Serial Correlation LM Test of 99%, 53% and 86% for Models 1, 2 and 3 respectively which were all above 5% critical value. This meant that the variables coefficients' standard errors were not affected, and the models were producing the correct probabilities. Another important diagnostic test was the normality test of the residuals, and this was done using the Jarque-Bera test. The probabilities of the Jarque-Bera test for Models 1, 2 and 3 were 66%, 88% and 39%, respectively, and the normal distribution null hypothesis could not be rejected. Therefore, there was normality in the models, and the models were robust.

To test the specification and stability of the models, the Ramsey RESET test and recursive estimates test were carried out on the models to ascertain if the models were properly specified and were stable. The Ramsey REST test showed 61%, 56% and 78% probabilities for Models 1, 2 and 3, respectively, such that proper specification of the models null was not rejected. Likewise, the three models' CUSUM and CUSUMSQ of the recursive residuals were within the 5% critical values. Despite not finding cointegration, the models were robust enough to carry out the analysis, and the results could be relied upon.

**Table 7:** *Linear ARDL Models Diagnostic Results*

| | **Model 1** | **Model 2** | **Model 3** |
|---|---|---|---|
| Breusch–Pagan–Godfrey (BPG) test: Chi-square (Probability) | 20.4002 (0.0599) | 17.6769 (0.3432) | 11.2991 (0.4186) |
| Breusch-Godfrey Serial Correlation LM Test: Chi-square (Probability) | 0.0181 (0.9910) | 1.2766 (0.5282) | 0.3019 (0.8599) |
| Jarque-Bera test (Probability) | 0.8459 (0.6551) | 0.2572 (0.8793) | 1.8906 (0.3886) |
| Ramsey RESET: F-statistic (Probability) | 0.2744 (0.6059) | 0.3467 (0.5648) | 0.0806 (0.7792) |

*Note: Parentheses contain the probability of each diagnostic test for each model. Source: Author's Compilation from research data*

The study proceeded with testing the nonlinear relationship using the NARDL Model by Shin et al. (2014) since there was a possibility that the failure to find a long run relationship in the linear model may have indicated the existence of a nonlinear relationship among the variables. This follows the study of Enz (2000), who posited that the relationship between insurance market activities and per capita economic growth follows the S-curve whereby insurance activities greatly affect economic growth at a certain level of economic expansion, and the influence is low at some lower or higher thresholds. Likewise, several studies established a nonlinear interaction between insurance and economic expansion, such as Hatemi-J et al. (2019), Horvey et al. (2023), Olayungbo (2015), and Tran et al. (2022) and therefore, the research work proceeded with testing the long run asymmetric interaction that may exist between insurance business activities and economic expansion in Malawi.

## 4.6 Asymmetric Cointegration Analysis Results Using Nonlinear ARDL (NARDL)

### 4.6.1 NARDL Bounds Test Results

Following the augmented ARDL principles by McNown et al. (2016, 2018) and Sam et al. (2019), the bounds tests for the NARDL of Shin et al. (2014) to test the long run asymmetric relationship between the partial sums of negative and positive variations in the insurance industry activities and expansion of the economy were performed whose results are shown in Table 8. For ease of reference, Model 4 for total insurance penetration stood for Model (13), Model 5 for life insurance penetration stood for Model (14), and Model 6 for nonlife insurance penetration stood for Model (15). Just like the linear ARDL for each model, the number of lags for each variable in the model was automatically selected using the Akaike Information

Criteria. After taking into consideration the structural breaks issue with Model 4 for total insurance penetration, the NARDL models lag structures were (1, 1, 0, 2, 2, 0, 1, 0) for Model 4, (1, 0, 0, 2, 0, 2) for Model 5 and (1, 0, 1, 2, 2, 1) for Model 6.

Using the Narayan (2005) critical values for the bounds test on the lagged coefficients of all level variables, Models 4, 5 and 6 produced F-statistic values of 8.952, 6.495 and 11.467, which were all above the 5% critical value of I(1) signifying that all lagged coefficients of level variables were jointly significant in the bounds test of cointegration. The t-test for the lagged dependent variables at level had values of 7.411, 5.463 and 7.798, in absolute terms, for Models 4, 5 and 6, respectively, which were all higher than the t-statistic, in absolute terms, of 3.99 signifying the significance, in all models, of the lagged dependent variables. The results showed that the models did not suffer from degenerate lagged dependent variable cases (Case #2). However, the results for the F*-statistic of the joint lagged coefficients of independent variables at level showed that they were not significant at 5% critical value in all three models. The F*-test statistics for Models 4, 5 and 6 were 4.036, 1.516 and 3.168, respectively, which were lower than the 4.700 critical value signifying the presence of degenerate lagged independent variable case (Case #1) and therefore confirming no long run asymmetric interaction between insurance market activities and economic expansion in Malawi using the NARDL model. Unlike the studies of Hatemi-J et al. (2019), Olayungbo (2015) and Tran et al. (2022), who found asymmetric long run relationships between insurance market activities and economic growth in Nigeria and Vietnam, this study could not find that there was a long run asymmetric relationship between insurance market activities and economic growth in Malawi.

**Table 8***: Augmented NARDL Bounds Test Results*

| **Model Output** | **Model 4** | **F-Statistic = 8.952** | **t - Statistic = -7.411** | | **F*- Statistic = 4.036** | |
|---|---|---|---|---|---|---|
| **Bounds Test** | **Model 5** | **F-Statistic = 6.495** | **t - Statistic = -5.463** | | **F*- Statistic = 1.516** | |
| **statistics:** | **Model 6** | **F-Statistic = 11.467** | **t - Statistic = -7.798** | | **F*- Statistic = 3.168** | |
| **Significance level** | **10%** | | **5%** | | **1%** | |
| | I(0) | I(1) | I(0) | I(1) | I(0) | I(1) |
| F - Statistic CV | 2.752 | 3.994 | 3.354 | 4.774 | 4.768 | 6.670 |
| t - Statistic CV | -2.570 | -3.660 | -2.860 | -3.990 | -3.430 | -4.600 |
| F*- Statistic CV | 2.220 | 3.840 | 2.800 | 4.700 | 4.150 | 6.830 |

*Note: k = 6 for Model 4 and k = 4 for Models 5 and 6, N = 37. Critical values used were for Case III, Unrestricted Constant and No Trend. Source: Author's Compilation from research data*

Therefore, the study proceeded to test the short run asymmetric relationship between insurance market activities and economic growth. However, before the short run test, the study undertook model diagnostics to satisfy itself that the models did not have inherent deficiencies that would have impacted their abilities to produce robust results for the asymmetric cointegration of the variables in the models.

### 4.6.2 Nonlinear ARDL Models Diagnostics Results

Table 9 presents the Nonlinear ARDL Models diagnostics results for Models 4, 5 and 6, which were testing the asymmetric connection, in the long run, between the insurance industry and economic expansion in Malawi. The test results for homoscedasticity in the residuals of all three models using the Breusch–Pagan–Godfrey (BPG) test proved homoscedasticity in all the three models at 5% critical value since probabilities of the BPG test in Models 4, 5 and 6 were 24%, 62% and 90% respectively. So, the models did not suffer from heteroscedasticity, whose presence would have affected their results. Likewise, to assess the potential presence of serial correlation amongst the variables, the nonlinear models were subjected to the Breusch-Godfrey Serial Correlation LM Test. No serial correlation was identified in the models since the probabilities of the BG LM test were 9%, 45% and 55% for Models 4, 5 and 6, respectively and at 5% critical value, the study could not reject the null hypothesis of no serial correlation. The third test for the suitability of the model involved checking if the residuals of the models followed a normal distribution, which is the requirement of the NARDL Models. The Jacque-Berra test for normality of residuals was performed, and its results showed that the null hypothesis of normal distribution of residuals at 5% critical value could not be rejected as the models had probabilities of 98%, 99% and 43% for Models 4, 5 and 6 respectively.

The Ramsey RESET test was run on the models to ascertain whether the models did not suffer from omission of variables and misspecification. The Ramsey REST test results demonstrated no prevalence of misspecification and omission of variables in the models, as the null hypothesis of the models being properly specified could not be rejected at 5%. The test results showed the Ramsey RESET F-statistic probabilities of 29%, 99% and 44% for Models 4, 5 and 6, respectively. The results for the models' CUSUM and CUSUMQ of the recursive residuals showed that they were all stable within the 5% critical value.

**Table 9:** *NARDL Models Diagnostic Results*

| | Model 4 | Model 5 | Model 6 |
|---|---|---|---|
| Breusch–Pagan–Godfrey (BPG) test: Chi-square (Probability) | 17.396 (0.235) | 8.095 (0.620) | 6.291 (0.901) |
| Breusch-Godfrey Serial Correlation LM Test: Chi-square (Probability) | 4.816 (0.090) | 1.586 (0.452) | 1.211 (0.546) |
| Jarque-Bera test (Probability) | 0.046 (0.977) | 0.387 (0.824) | 1.667 (0.434) |
| Ramsey RESET: F-statistic (Probability) | 1.195 (0.288) | 0.000 (0.994) | 0.624 (0.438) |

*Note: Parentheses contain the probability of each diagnostic test for each model. Source: Author's Compilation from research data*

### 4.7 Short Run Linear and Nonlinear Analysis Results

#### 4.7.1 Short Run Results for Linear ARDL

Having failed to establish the equilibrium interaction between insurance market activities and economic expansion in Malawi, the study proceeded with carrying out short run analysis of the linear ARDL and the Nonlinear ARDL models to check if short run causalities could be established. The short run results for the linear ARDL are presented in Table 10. In the short run, the first lags of the GDP of all linear models significantly affected the GDP in a negative manner, with Model 1 having a higher influence with a coefficient of 63% than Models 3 and 2 at 61% and 47%, respectively. In all the short run linear models, insurance market activities, as measured by total insurance penetration, life insurance penetration and nonlife insurance penetration, in the current and lag periods did not have any significant influence on economic expansion. All the coefficients of insurance penetration were not statistically significant at 5% critical value. This can equally be attributed to the threshold levels that the insurance market is operating on in Malawi (Asongu & Odhiambo, 2020) and the phenomenon that the key driving force of economic growth of Malawi, the agricultural sector, is barely insured (Maganga et al. 2021; Makaudze, 2018).

Just like insurance penetration, human capital development activities did not have any significant bearing on economic growth in the short run. The outcome may be explained with reference to realities on the ground where the economic activities that the secondary school level employees are engaged in are clerical and unskilled in nature such that their impact on the economic growth of Malawi cannot be properly isolated from those done by individuals who did not attain education (Mussa, 2013). Inflation had a negative as well as significant influence on economic growth at 10% in all models, either in the current period or in the lag period. However, when tested jointly using the Wald F-test, the combined lags of inflation had an insignificant influence on economic expansion in the short run. In all models, there was no significant interaction between the expansion of the economy and trade openness, signifying that trade openness hardly affected economic expansion in the short run.

**Table 10:** *Short Run Linear Coefficients and their Probability of T-statistics Results*

| | Model 1 | Model 2 | Model 3 |
|---|---|---|---|
| C | 0.165 (0.668) | 0.258 (0.496) | 0.153 (0.695) |
| D(LnGDP(-1)) | -0.630 (0.001)* | -0.467 (0.035)** | -0.607 (0.002)* |
| D(LnIP) | 0.611 (0.573) | | |
| D(LnLIP) | | -2.164 (0.293) | |
| D(LnLIP(-1)) | | -1.384 (0.546) | |
| D(LnLIP(-2)) | | 2.841 (0.233) | |
| D(LnNLIP) | | | 1.235 (0.578) |
| D(LnNLIP(-1)) | | | -0.948 (0.650) |
| D(LnHCAP) | -0.682 (0.264) | -0.999 (0.132) | -0.746 (0.229) |
| D(LnHCAP(-1)) | 0.877 (0.169) | 0.963 (0.176) | 0.800 (0.205) |
| D(LnHCAP(-2)) | -1.006 (0.100) | -0.720 (0.243) | -0.852 (0.165) |
| D(LnINF) | -0.372 (0.082)*** | -0.029 (0.923) | -0.430 (0.085)*** |
| D(LnINF(-1)) | 0.116 (0.433) | -0.014 (0.952) | 0.033 (0.854) |
| D(LnINF(-2)) | -0.263 (0.071)*** | -0.122 (0.609) | -0.229 (0.114) |
| D(LnINF(-3)) | | 0.567 (0.031)** | |
| D(LnTRAD) | 3.887 (0.529) | -2.354 (0.797) | 4.879 (0.492) |
| D(LnTRAD(-1)) | | 4.178 (0.674) | 6.340 (0.280) |
| D(LnTRAD(-2)) | | -3.437 (0.762) | |
| D(LnTRAD(-3)) | | -11.064 (0.259) | |
| D(LnTRAD(-4)) | | -11.673 (0.121) | |

*Note: GDP=Gross Domestic Product; IP=Insurance penetration; LIP=Life Insurance penetration; NLIP=Non-Life Insurance penetration; HCAP=Human Capital Development; INF= Annual Inflation Rate; TRAD= Trade Openness *, **, and *** show significance at 1%, 5% and 10% respectively. The parentheses represent the p-value of the coefficient. Source: Author's Compilation from research data*

### 4.7.2 Results for Short Run Asymmetry Using NARDL

For the NARDL models, Table 11 shows the short run results. To test the short run asymmetry in the models, the short run significant partial sums of the insurance penetration, nonlife insurance penetration and life insurance penetration were supposed to be tested using the Wald test with the aim of ascertaining the presence of asymmetric connections with the expansion of the economy. Only the first lagged value of the differenced negative partial sum of insurance penetration was significant at 5% in Model 4, and that of nonlife insurance penetration was significant at 10% in Model 6. There were no significant partial sums in Model 5, and all positive partial sums were not significant in all models. As such, following the Stepwise Least Square Method, all partial sums are not significant enough to enable the analysis of asymmetric relationships to be conducted in the short run models. This signified that there was no short run asymmetric relationship from the insurance market that would significantly affect economic growth in Malawi.

**Table 11:** *Short Run Nonlinear Coefficients and their Probability of T-statistics Results*

| | **Model 4** | **Model 5** | **Model 6** |
|---|---|---|---|
| C | 0.400 (0.588) | 0.283 (0.641) | 0.510 (0.419) |
| D(LnGDP(-1)) | -0.649 (0.001)* | -0.642 (0.004)* | -0.532 (0.005)* |
| D(LnI_POS) | -4.926 (0.094)*** | | |
| D(LnIP_POS(-1)) | 1.794 (0.548) | | |
| D(LnIP_NEG) | 2.224 (0.221) | | |
| D(LnIP_NEG(-1)) | -3.276 (0.041)** | | |
| D(LnLIP_POS) | | 1.266 (0.803) | |
| D(LnLIP_POS(-1)) | | -1.266 (0.588) | |
| D(LnLIP_NEG) | | -4.348 (0.311) | |
| D(LnLIP_NEG(-1)) | | 2.420 (0.768) | |
| D(LnNLIP_POS) | | | -5.074 (0.188) |
| D(LnNLIP_POS(-1)) | | | 0.235 (0.942) |
| D(LnNLIP_NEG) | | | 4.881 (0.072)*** |
| D(LnNLIP_NEG(-1)) | | | -4.508 (0.125) |
| D(LnHCAP) | -0.615 (0.284) | -0.720 (0.273) | -0.561 (0.332) |
| D(LnHCAP(-1)) | 0.552 (0.372) | 0.584 (0.387) | 0.628 (0.294) |
| D(LnHCAP(-2)) | -0.832 (0.150) | -0.683 (0.257) | -0.833 (0.148) |
| D(LnINF) | -0.175 (0.480) | -0.293 (0.240) | -0.217 (0.355) |
| D(LnINF(-1)) | 0.154 (0.313) | | 0.184 (0.220) |
| D(LnINF(-2)) | -0.265 (0.074)*** | | -0.196 (0.169) |
| D(LnTRAD) | 0.317 (0.963) | 4.866 (0.580) | -0.273 (0.966) |
| D(LnTRAD(-1)) | | 9.300 (0.124) | |

*Note: GDP=Gross Domestic Product; IP=Insurance penetration; LIP=Life Insurance penetration; NLIP=Non-Life Insurance penetration; HCAP= Human Capital Development; INF= Annual Inflation Rate; TRAD= Trade Openness *, **, and *** show significance at 1%, 5% and 10% respectively. The parentheses represent the p-value of the coefficient. Source: Author's Compilation from research data*

### 4.8 Short Run Granger Causality Results Using VAR

As both the linear and nonlinear models did not produce evidence of cointegration between insurance market activities and economic growth in Malawi, the Granger causality test was conducted using the VAR Model to test the short run Granger causality. Following the guidelines provided by Toda & Yamamoto (1995) who posited that utilising integrated variables in the VAR model would not affect the asymptotic properties of the results as long as the appropriate lag structure was used in the VAR model, the study proceeded with executing the Granger causality test of the interaction between economic expansion in Malawi and insurance business utilising all variables at level, irrespective of whether they had a unit root or not. This would only work so long as the maximum lag length in the VAR model was larger than the highest order of integration (Toda & Yamamoto, 1995). For the variables used, the maximum lag was two based on the AIC. Results of the Chi-Square of the VAR Granger Causality/Block Exogeneity Wald Tests and the F-Statistic of the Pairwise Granger Causality Tests are presented in Table 12 in Panel A. The diagnostics of the Granger causality test are presented in Panel B of Table 12.

The results of the Granger causality tests using both the Wald Test Chi-Square and the Pairwise Granger causality F-statistic agreed that there was neither causality running from insurance market activities to economic growth nor causality running from economic growth to insurance market activities in Malawi. All the test statistics were above 5% critical value, and therefore, the null hypotheses of insurance activities do not cause economic growth or economic growth does not cause an increase in insurance market activities could not be rejected. This showed that for Malawi, the neutrality hypothesis, in which there is no causal interaction between the insurance business and the expansion of the economy, was prevalent. The results agreed with several other studies that found no interaction between the insurance business and economic expansion such as Ward & Zurbruegg (2000) who did not establish causality between insurance and economic expansion in the US, UK and Austria, Chang et al. (2014) who proved no causal interaction between insurance and economic expansion in Belgium, Guochen & Chiwei (2012) who found no causal relationship in some low-income provinces in China and Dash et al. (2018) who did not find a causal link between insurance and economic activities in Latvia, Ireland Greece and Cyprus.

From Panel B, the VAR model diagnostics showed that the models were robust enough to carry out the test since there was no serial correlation in the models as all the probabilities of the serial correlation LM test statistics were above 5%, at 65% for the total insurance penetration model, 67% for the life insurance penetration model and 45% for the nonlife insurance penetration model. The null hypothesis of no serial correlation in the models could not be rejected. However, there was a problem of nonnormality of residuals in the life insurance penetration model since the null hypothesis of normal distribution of residuals using the Jacque-Bera test was rejected at 1% critical value when the Jacque-Bera test probability was 0%. This entails that the Wald test Granger causality results should be treated with caution. However, the fact that the F-statistic pairwise Granger causality test proved the same result of no Granger causality between economic expansion and life insurance penetration in the short run, it strengthened the credibility of the Chi-Square test, and it acted as a control for the other test. Models for total insurance penetration and nonlife insurance penetration had Jacque-Bera probabilities of 88% and 72%, respectively, which were all above the 5% critical value leading to the failure to reject the null hypothesis of normal distribution. Therefore, results showed that there was normality in models for total insurance penetration and nonlife insurance penetration. The heteroscedasticity tests showed that all the VAR Granger causality tests were homoscedastic, with Chi-Square probabilities of 9%, 7% and 13% for total insurance penetration model, life insurance penetration model and nonlife insurance model, respectively, and the joint Chi-Square test for each model could not reject the null hypothesis of homoscedasticity at 5% critical level.

**Table 12:** *Granger Causality Using Wald Test and Pairwise F-Test and its Diagnostics*

| | Chi-Square | F- Statistic | Decision |
|---|---|---|---|
| **Panel A** | | | |
| **VAR Granger Causality/Block Exogeneity Wald Tests** Dependent variable: LnGDP | | | |
| From LnIP to LnGDP | 1.114 (0.573) | | Do not reject the null |
| From LnLIP to LnGDP | 1.665 (0.435) | | Do not reject the null |
| From LnNLIP to LnGDP | 4.890 (0.087) | | Do not reject the null |
| From LnGDP to LnIP | 0.053 (0.974) | | Do not reject the null |
| From LnGDP to LnLIP | 2.142 (0.343) | | Do not reject the null |
| From LnGDP to LnNLIP | 0.845 (0.655) | | Do not reject the null |
| **Pairwise Granger Causality Tests** | | | |
| LnIP does not Granger Cause LnGDP | | 0.985 (0.385) | Do not reject the null |
| LnGDP does not Granger Cause LnIP | | 0.952 (0.397) | Do not reject the null |
| LnLIP does not Granger Cause LnGDP | | 1.251 (0.301) | Do not reject the null |
| LnGDP does not Granger Cause LnLIP | | 2.831 (0.075) | Do not reject the null |
| LnNLIP does not Granger Cause LnGDP | | 1.995 (0.154) | Do not reject the null |
| LnGDP does not Granger Cause LnNLIP | | 0.462 (0.635) | Do not reject the null |
| **Panel B** | | | |
| **Residual Serial Correlation LM Tests** | | **Rao F-stat** | |
| LnIP $H_0$: No serial correlation up to Lag 2 | | 0.894 (0.653) | Do not reject the null |
| LnLIP $H_0$: No serial correlation up to Lag 2 | | 0.880 (0.673) | Do not reject the null |
| LnNLIP $H_0$: No serial correlation up to Lag 2 | | 1.035 (0.452) | Do not reject the null |
| **Residual Normality Tests Orthogonalization: Cholesky (Lutkepohl)** | | | |
| LnIP: Jarque-Bera (joint test) | | 5.127 (0.8825) | Do not reject the null |
| LnLIP: Jarque-Bera (joint test) | | 33.502 (0.000) | Reject the null |
| LnNLIP: Jarque-Bera (joint test) | | 7.026 (0.723) | Do not reject the null |
| **VAR Residual Heteroskedasticity Tests (Levels and Squares)** | | | |
| LnIP: Joint | 333.903 (0.087) | | Do not reject the null |
| LnLIP: Joint | 336.282 (0.073) | | Do not reject the null |
| LnNLIP: Joint | 327.945 (0.128) | | Do not reject the null |

*Note: Parentheses contain the probability of each model's diagnostic test*

# Chapter 5: Conclusion and Recommendations

## 5.1 Introduction

Chapter 5 summarises the results that were laid out in Chapter 4 with a focus on linking them to the research objectives that were set in the earlier chapter. The conclusions that have been reached from the results of the detailed data analysis that was undertaken are presented. The chapter ends with the limitations of the study and recommendations that have been proposed in the study.

## 5.2 Study Summary and Conclusions

The nuances of the interaction between the insurance industry and economic expansion in Malawi had never been investigated before in the literature, as earlier studies focused on economies that are not similar to Malawi. This study sets out to investigate if there exists a relationship between insurance market activities and economic growth in Malawi. Further to establishing the relationship, the second motive was to study the causality direction between economic expansion and insurance business activities in Malawi. To achieve these objectives, the long run linear relationship was investigated using the augmented linear ARDL model in which GDP growth rate was the dependent variable while the insurance penetration and its disaggregated components of life insurance penetration and nonlife insurance penetration were the independent variables. To moderate the bias in the models, human capital development, inflation and trade openness were included as control variables based on available studies on insurance-growth connections. The results of the analysis showed that there is no long run linear interaction between insurance market activities and economic growth in Malawi, and the same applies to all its disaggregated components, too. Consequently, a short run linear ARDL model was utilised to assess if there was a short run relationship between insurance market activities and economic growth in Malawi. Just like the long run linear model, the results showed the inexistence of the short run relationship.

The absence of cointegration between the insurance industry and economic expansion in Malawi using the linear model motivated the study to investigate the same using the nonlinear ARDL model since studies such as (Dawd & Benlagha, 2023; Enz, 2000; Hatemi-J et al., 2019; Horvey et al., 2023; Olayungbo, 2015; Tran et al., 2022) had shown that there is a nonlinear relationship between insurance market activities and economic development. As such, the long run and short run asymmetric interactions between economic growth and insurance activities in Malawi were investigated using the NARDL by McNown et al. (2016, 2018); Sam et al. (2019). The results showed that there was no presence of either the long run or the short run asymmetric connection in Malawi between the insurance business and economic growth. Therefore, using the two tests, the study found that the no interaction between insurance market activities and economic expansion null hypothesis could not be rejected, and the main research question was answered in the affirmative that there was no relationship, either in the long run or short run, between the insurance activities and economic growth in Malawi.

Since the cointegration of the growth of the economy and insurance could not be proved, the study proceeded with undertaking the Granger causality test using the VAR model, which established that Granger causality between insurance activities and expansion of the economy does not exist in any direction. The results proved the existence of the neutrality hypothesis, and these results were in agreement with  Chang et al. (2014) for Belgium, Guochen & Chiwei (2012) for low-income provinces in China, Ward & Zurbruegg (2000) for US, UK and Austria and Dash et al. (2018) for Latvia, Ireland, Greece and Cyprus. This outcome was ascribed to the low development of the financial market in Malawi, which reduced its efficiency (Sulemana & Dramani, 2022) and affected the ability of the insurance market to perform its pivotal functions in the mitigation of risk, indemnification and accumulation of capital as posited by Arena (2008) and Azman-Saini & Smith (2011). In addition, the insurance market in Malawi was operating below a threshold that would enable it to create an influence on economic expansion due to the S-curve type of connection between insurance business activities and economic expansion (Asongu & Odhiambo, 2020; Enz, 2000).

The control variables, namely human capital development, trade openness and inflation, were also not statistically significant to explain the movement of economic growth in the short term.

### 5.3 Recommendations

The study recommends that the Government should continue with the ongoing reforms to the financial services industry, especially the insurance industry, and put in place policies that would help the financial market in Malawi to develop and deepen by opening it up to more players to enter and diversify it so that there is no concentration on a few big players. The entrance of new players in the market will bring variety and differentiation of products, which will target new customers and broaden the market. Consequently, there will be an increase in insurance penetration due to large volumes of trade, and this may reach thresholds that would create a significant impact on economic growth. In addition, the regulatory framework for the financial market, especially the insurance market, should be enhanced and aligned with the key growth-enhancing economic activities in the agricultural sector.

As many rural farmers have high exposure to risk due to drought and adverse weather conditions in Malawi, and they do not participate in the insurance market despite subsistence agriculture being the key driver of economic expansion in Malawi, the Government should put in place measures to help the rural farmers take insurance products that would help them reduce their exposure and improve their safety nets. The main insurance product that these farmers would benefit from is weather index insurance, which covers the farmers against bad weather. This product has failed to gain traction because of a variety of factors that include lack of awareness and information asymmetry, lack of equipment, high costs of premiums, the basis risk not being well correlated to the risk factor and poor information collection and storage (Makaudze, 2018). The Government should facilitate the repackaging of the weather index insurance product by involving banks to sell the product together with loans to farmers and add the insurance premium to the interest rate. The Government should guarantee these loans so that the risk is reduced for the farmers who are not bankable. In addition, the participating small-scale farmers should work in clubs to reduce the risk. This product should be reinsured at the regional or international level to transfer the risk. The resultant effect on rural farmers' participation in the insurance industry in Malawi will be that it will push upwards the threshold of insurance penetration, thereby enabling insurance activities to affect economic growth.

### 5.4 Limitations of the Study and Further Research Areas

The availability of data with a longer span than the 37 years that was used in this study would present a better picture. It would provide room for the possibility of using other models that are asymptotic. This was the main limitation of the study.

Further studies may need to be conducted using insurance density as a regressor in the model to represent the insurance business to see if the results would be similar. Din et al. (2020) found that insurance penetration as a proxy of the insurance industry may sometimes produce results that are not similar to other proxies. Although there is a limitation with access to gross insurance premium data and accurate population figures, this would be an interesting area for comparative purposes.

In addition, there is a need to conduct a study of the insurance market in Malawi together with other financial market sectors, including banks and the stock market, against economic growth. The influence of some governance factors should be included to see if the results would be different.

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