EVALUATION OF FACTORS AFFECTING FINANCIAL PERFORMANCE OF NON-LIFE INSURANCE BUSINESSES IN SOUTH AFRICA

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DECLARATION

In conception and execution, I Abdulraheem Saheed Hassana, declare that this dissertation is a reflection of my own work. This dissertation reflects academic work carried out by me and has not been submitted to any university or higher institution of learning in any way for another degree. All information used from others published or unpublished works has been duly acknowledged/referenced.

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DEDICATION

I dedicate this work to Almighty Allah, my beloved husband and dearly children.

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My wholehearted and pristine acknowledgement to:

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Abstract

Profitability enhancement through financial analysis remains a crucial tool in accessing the performance of the insurance sector. In the developing countries such as South Africa, there is dearth of information on the impact of explanatory factors on the financial performance of non-life insurance businesses. This study examined the influence of selected firm-specific, macroeconomic and underwriting profit variables on the financial performance of the South African non-life insurance firms. Here, we considered 36 listed non-life insurers with measurable markets over the period 2008 – 2019. The study employed return on asset (ROA) as a function of financial performance as the dependent variables. While the firm size, leverage ratio, premium growth rate, liquidity ratio and tangibility of assets constituted the investigated firm-specific variables, the macroeconomic (income level, inflation rate, GDP growth rate, market structure and trade openness), and underwriting profit (underwriting profit, total investment, shareholder's fund and earning asset ratio) were studied as independent variables using panel data regression approach. The regression results revealed that except leverage and liquidity ratios, other firm-specific variables do not have statistically significant effect on the financial performance of south African non-life insurance firms. On the other hand, only GDP rate and shareholder's fund are the exclusive macroeconomic and underwriting variables, respectively, with statistically significant impact on the financial performance of the non-life insurance firms of South Africa. These results, indeed, gainsay with economic theories. Thus, the leverage and liquidity ratios along with GDP rate and shareholder's fund can be identified as determinants of the financial performance of the South African nonlife insurance sector. While providing some noteworthy insights on rational decisions regarding selection of non-life insurance firms' stocks and strategies that would guide their operations, the data presented in this study will also be beneficial to regulatory authorities in formulating sound and effective policies to ensure economic growth and stability of the republic of South Africa.

CHAPTER ONE

INTRODUCTION

1.1 Study background

The role of the insurance sector is germane in the industry of financial services, as it contributes to economic growth, enables efficient allocation of resources, affects the reduction of transaction costs, contributes to the creation of liquidity, and increases the economies of scale in investments. The insurance sector is a relatively stable segment of the financial system, where the interaction between insurance companies and other financial market participants, such as banks, pension funds and other financial intermediaries, is growing considerably over time (Haiss and Sümegi, 2008).

Similarly, the insurance industry could be seen as a crucial foundation for financial services and the economy in general. As the sector grows within the emerging economies, its activities are also receiving dedicated attention (Alhassan, 2016). Previously, while the utilization and acceptance of the insurance sector in Africa remains well below the global averages, it has however contributed to African economic development in double fold (Swiss Re, 2015). While data exists on the performance of this sector in selected countries in Africa including South Africa (SA), stakeholders still need to advocate for an environment conducive to the growth of the sector in Africa. Theoretically, arguments for the sector as a relevant financial institution exist and supports the existence and significance of national insurance/reinsurance market as crucial parts of economic growth (Swiss Re, 2015). This concept has further been viewed from two perspectives. First, in the financial sector, the perception of growth in economy is inextricably tied to the financial services supply and was seen to be a supply-leading correlation. Second, the financial services demand increases the assets and financial firms' growth. Most developing economies in African, have assumed a supply-led pattern of causality and have considered state-owned insurance companies or monopolies essential to economic development.

The business areas of insurance companies in SA, whose relevance is expressed in terms of further creating of conditions for development of insurance are corporate governance, adequate internal control system, improvement of investment and asset valuation techniques, transparency and activities for the development of insurance culture. These areas are envisaged to be subjected to continuous improvement by insurance companies in years to come. In particular, the importance

of strict compliance with the regulations in the field of compulsory (non-life) insurance by insurance companies is emphasized, especially regarding the promptness of paying claims costs, the costs of conducting the insurance and the application of the bonus-malus system.

The insurance companies have also been recognized as financial intermediaries and risk managers for potential transfer of losses (Liedtke, 2007). Specifically, the insurance businesses contribute to the financial systems improvement through financial stability promotion, lowering potential investments cost, mobilizing domestic savings, and enhancing trade and commerce in transnational transactions (Arena, 2008). However, non-life insurance (NLI) options grant individual access to financial markets, since banks can now transfer credit risk to insurance players (Arena, 2008). Also, owing to the complexity of their operations, they provide significant job creation benefits.

Financial performance is crucial for the survival and further growth and development of insurance companies. In addition, the financial performance of insurance companies has direct implications for insurers, stockholders, employees, brokers, regulatory authorities and potential investors (Kung et al., 2006). Within this context, profitability, size and continuity of the company's operations are the key indicators of a company's performance, and the factors that affect the profitability of insurance companies can be classified as internal factors, insurance industry factors and macroeconomic factors (Pjanić et al., 2018).

Like the company's performance, the profit is a very important prerequisite for increasing the competitiveness of a company operating on the global market. In addition, profit attracts investors and improves the level of solvency, and in this way, increases the consumers' confidence. The financial analysis of companies is an important tool used by officials in the decision-making process on taking over the risks and investment activities of the insurance company. The financial performance of insurance companies is also relevant in the macroeconomic context, because the insurance industry is one of the parts of the financial system, which contributes to fostering economic growth and stability (Burca and Batrinca, 2014).

Most financial literature dealing with the profitability of insurance companies analyzes profitability from the aspect of the impact of internal factors. The variation between the profits of insurance companies over the years in a country depends on both domestic and specific internal factors/firm-specific factors that play a key role in determining profitability/financial performance. For this reason, it is very important to define what are the firm-specific factors and the nature of

their impact, so that insurance companies can take all the necessary measures to increase profitability or financial performance. Also, identifying factors that contribute to the profitability of insurance companies is very important for investors, researchers, financial analysts and supervisors. To obtain a more precise analysis of the financial performance of insurance companies, it is important to consider the total profit or loss arising from business over several years.

Consequent upon realizing the significance of the financial institutions in the country's economy, and especially the importance of insurance companies in financing and securing economic activity, this study examined the factors that affect NLI's financial performance in SA. It also identified the macroeconomic and firm-specific variables impacting financial performance of NLI markets in the country's economies. It provides new insights or perspectives into the potential hindrances to NLI development in SA. While studies have considered factors affecting NLI performances in Latin, Asia and selected African emerging markets (Ma and Pope, 2003; Garcia, 2012; Stojic and Njegomir, 2012; AnaMaria and Ghiorghe, 2014; EmineÖner, 2015; Oktiani et al., 2015; Kramaric et al., 2017; Hasan et al., 2018), there is paucity of information on this subject in SA. Thus, this study explores the dynamics of markets in SA, and provides comprehensive data to fill this knowledge gap. The data obtained will be vital in providing invaluable information that could enhance better understanding of the NLI firms, which will consequently guide marketing strategies and development of effective policies for firms and regulatory authorities, respectively.

1.2 Problem statement

This study is majorly informed by the very limited documentation on the factors militating against NLI markets in SA for the purpose of research and development in the industry. Around 1908s, the insurance sector was founded by foreign investors with interest in African markets prior to government's interest in local insurance businesses. During this period, streamlined economic base within inadequate regulatory frameworks stood as a major hindrance to the sector (UNCTAD, 1985). However, with SA being a nation with favourable and attractive investment opportunities coupled with outstanding developmental prospects for investors worldwide, lack of assurance for investors against common unexpected loss, remained a topical issue. Similarly, individuals gaining from the attractive growth projections cannot invest in some goods/assets, without being aware of the requisite cover against common loss/damage. Again, it has also been advanced that the cost of

investing in SA remains uncertain, and without attractive and favourable insurance, investments could remain hugely impacted (Alhassan and Bayan, 2014). More specifically, the development of NLI directly impacts business and economic growth, leading to higher macro-economic levels of development for all communities. These limitations may be known, but it is not entirely clear what drives the uptake of diversified NLI products. Similarly, little is also known about these drivers or other variables if they influence the NLI sector.

In this study, emphasis was on demystifying these hindrances through investigation into the factors influencing NLI financial performance in SA through 2008 – 2019. To date, most studies have concentrated on life insurance financial performance with little attention on the non-life sector except for those establishing how NLI sector affects economic growth (Akinlo and Apansile, 2014; Akinlo and Olayungbo, 2016), and this has been the motivation for this study on NLI, more importantly that, the sector has wider geographical representation coupled with recent emergence of studies on African insurance businesses. More specifically, the NLI products dominate over 65% of the sector in Africa safe SA, where SA dominates 59.6% of the overall long-term insurance premiums in the continent (Akinlo and Olayungbo, 2016). Therefore, provision of data relating to these factors could be critically important to having better understanding of the NLI companies and improve stakeholders' perspectives of the sector in SA. Such data will also provide cogent information that would guide both decision making and growth strategy operation of the management of insurance businesses.

Furthermore, while studies have examined factors affecting businesses in many industry contexts (Jane et al., 2015; Tu and Choi, 2017), only a few have reported on NLI sector in developing nations, like SA. Again, the need for increased understanding of the identified variables implicated in NLI financial performance is germane to guide management and regulatory bodies with comprehensive information that could guide marketing strategies and development of effective policies, respectively. Considering the above, this study focused on identifying and discussing the firm-specific and macroeconomic variables as well as underwriting profit influencing financial performance of the SA's NLI businesses.

1.3 Research questions

In line with the knowledge gaps addressed in the current study, these research questions were designed:

i. What are the influence of firm-specific factors on the financial performance of NLI firms in SA?

ii. What influence does macroeconomic factors have on the financial performance of NLI firms in SA?

iii. Does underwriting profit affect the financial performance of the SA's NLI firms?

1.4 Aim and Objectives

The study investigated the variables influencing the financial performance of NLI businesses in SA.

The specific objectives through which this aim was achieved include:

i. Identification and assessment of the influence of firm-specific factors on the financial performance of NLI firms in SA.

ii. Identification and analysis of the effect of macroeconomic factors on the SA's NLI firms' financial performance.

iii. Investigation of the effect of underwriting profit on the financial performance of NLI firms in SA.

1.5 Study's scope

The project focused on 36 listed non-life insurers with measurable markets of the 94 domestic NLI providers in SA from 2008 – 2019. The choice of the period of investigation is hinged on both the developmental dynamics in NLI in SA and paucity of information on the subject under consideration. According to the South African Insurance Survey, these insurance firms have reliable data regarding the penetration rate as a function of NL premiums to GDP for the study period. Data from these firms was used to assess the effects of firm-specific and external indicators on NLI financial performance in SA. Historically, SA's NLI performance has grown the most in

the car and property insurance products sectors. This study focused on these two nexuses for the firms to be studied. (Figure 1.1).
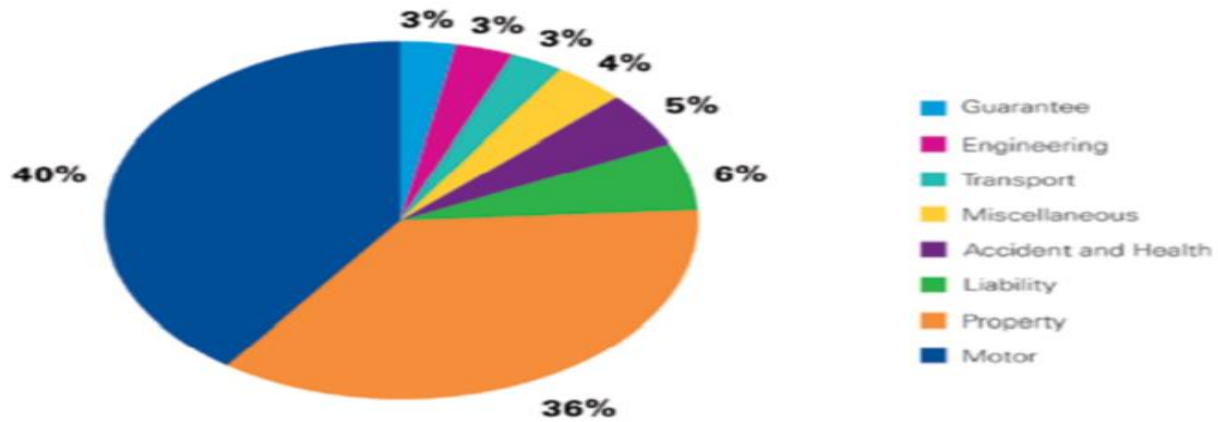
Figure 1.1: SA split of gross written premiums by class (Prudential Authority, 2018)

1.6 Significance of the study

Africa's population is projected to be 2.5 billion with an accompanying double GDP by 2035 (Bizcommunity, 2016). This bodes well for NLI in emerging economies such as SA, since corporate and individual protection from expected losses and damage increases along with investments. This study identified and analyzed the indicators that influence the performance of SA non-life products in selected markets. Growth of commercial and economic activity is slowed by the lack of development of NLI. Hence, it is essential to analyze this sector and understand its factors as crucial components implicated in the growth of the economy. Moreover, insurance firms also serve as institutional investors in their economies, providing necessary debt and equity. As a result, it will be beneficial to study the market dynamics of the NLI sector in SA. The data that obtained would be vital in providing invaluable information that could enhance better understanding of the NLI firms, which will consequently guide marketing strategies and development of effective policies for firms and regulatory authorities, respectively.

1.7 Study's organization

There are five chapters in this study. The first chapter introduces and defines the scope of analysis covered alongside the importance of the study to insurance industry. The second chapter examines

and discusses the current state of the NLI industry in SA, as well as the major factors that have impacted its financial operations so far. The third chapter outlines the key research tools and methodology that were employed in identifying valid firm-specific and external variables that would influence the performance of NLI sector in SA. In chapter four, the findings are discussed in greater details. The fifth chapter deals with these findings in conjunction with the present status of the sector and highlights probable suggestions to insurance firms, government and policy makers in SA. The study concludes by recommending possible grey areas for further works on the dynamics of the SA insurance sector.

1.8 Chapter summary

Here, an overview of the financial performance of the NLI sector globally is provided alongside explanation on the potential impediments stifling its growth in SA. It was noted that, there is dearth of information on this subject in SA and this constituted one of the problems of interest of the study, and as such it was imperative to provide comprehensive data to cover this knowledge gap. Accordingly, the data obtained in this study will be vital in providing invaluable information that could enhance better understanding of the NLI firms, which will be relevant for research and consequently guide marketing strategies and development of effective policies for firms and regulatory authorities respectively in the republic of SA.

Due to the observed limitations and knowledge gap in this context, emphasis was made to demystify the hindrances through investigation into the factors influencing NLI financial performance in SA over a period of 2008 – 2019. This was premised on identification and exploration of the firm-specific and macroeconomic factors as well as influence of underwriting profit on financial performance of the NLI sector in SA, focusing on 36 listed non-life insurers with measurable markets. These essentially constituted and formed the objectives of the study.

The chapter was concluded by highlighting how the dissertation has been organized in five chapters with each chapter linked with each other in succession from introduction (Chapter 1) to discussion of findings (Chapter 5), in relation to the existing financial performance of NLI with probable suggestions/recommendations for policy makers, governments regarding insurance firms

in SA as well as conclusions and possible recommendations for further studies on the insurance market dynamics in SA.

The next chapter (Chapter 2) focuses on comprehensive review of relevant and suitable literature on the topic under review.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The chapter gives brief insight into the historical background as well as the performance of NLI industry in SA. It also presents a detailed literature review on the influence of firm-specific and external factors on NLI performance in Africa and globally. Section 2.1 of the chapter focuses on a conceptual review of NLI markets in Africa. Section 2.2 presents a brief historical background and some concepts of insurance businesses in SA, with particular reference to non-life businesses. The rest of this chapter (Sections 2.3, 2.4 and 2.5) focuses on both the theoretical review and framework as well the empirical survey of literature on the topic being considered.

2.1 Conceptual review

2.1.1 Understanding African NLI market

Although the African insurance sector has been a solid player in the sector with considerable growth over the years, its current performance remains relatively lower than that of advanced market players contributing to the sector and other emerging global players (Table 2.1). This is supported with African penetration rate of 2.8% and 1.4% in 2015 and 2019, compared to 6.2% and 3.88% for the global average penetration rate, respectively (Swiss Re, 2015; 2019). Whilst there is possibility of growth in Africa, the reported performance compared well with those of Central & Eastern Europe and Middle East & Central Asia in 2015 and Central & Eastern Europe in 2019 (Table 2.1). Countries with huge, growing populations and strong/productive economic activities have been largely responsible for the interest and attraction of the continent's insurance business (A. M. Best Company, 2014). In Africa, however, the current stagnant premiums prior to the outbreak of COVID-19 pandemic, coupled with the collapse in oil prices and tourist revenues, may be linked to the present weak economic climate that led to the decrease in market share and premium volumes of non-insurance companies (Table 2.1) (Swiss Re, 2019).

Table 2.1: Global depth of NLI sector across major markets

Market		2015		2019		
		Nonlife premiums (US $ Billion)	Penetration rate (%)	Nonlife premiums (US $ Million)	Penetration rate (%)	Share of world market (%)
Advanced	United States	752	7.30	1831601	8.51	54.25
	Japan	108	10.8	118019	2.31	3.50
	United Kingdom	116	10.6	102022	2.31	3.02
	France	98	9.10	94694	3.20	2.80
	Germany	136	6.50	142301	3.60	4.21
	Italy	49	8.60	43705	2.10	1.29
	South Korean	58	11.30	80037	4.95	2.37
Emerging	Latin America & Caribbean	113	3.10	82947	1.60	2.46
	Central & Eastern Europe	50	1.90	102024	1.19	3.02
	Emerging Asia	190	3.10	342020	1.64	10.13
	Middle East & Central Asia	37	1.60	ND	ND	ND
	Africa	23	2.80	17118	1.4	0.51
World		2124	6.20	3376333	3.88	100

Source: (Swiss Re, 2015; 2019). ND: not determined

On a continental perspective, of the top 10 economies in Africa in 2015, nine except Nigeria had higher penetration rates of non-insurance than the continental average, with Mauritius, Namibia, Morocco and SA topping the chart (Table 2.2). From a financial and economic development standpoint, these four countries are the most advanced in Africa. Nigeria and Egypt are under-

insured in comparison to other developed markets, while Kenya is considered comparable to other developed markets. The situation has not really changed to date with SA, Morocco and Namibia being the major players (Table 2.2) (Swiss Re, 2019). The rest of Africa struggled with low demand and performance for insurance, due to numerous initiatives such as recapitalization of insurance companies, educating consumers, better distribution channels, strengthened reporting and regulations among others, to promote the industry (A. M. Best Company, 2014). There are a number of challenges facing the regulators of the sector, and some of these are claim issues, licensing, poor harmonization of regulatory supervision, and no access to information across countries. In 2013, the increase in the total African insurance premiums by more than 10% was an indication of the growth of the sector and that outpaced the 6% GDP of the continent (Schanz and Company, 2015). Again, like in other emerging markets in the region, the SAn market is already in slowdown mode from USD 176 to USD 160 premiums per capita before the pandemic (Table 2.2) and this could negatively impact the premium growth during and post-pandemic.

Table 2.2: African NLI sector

Country	2015			2019		
	Premiums GDP (US$ Millions)	Penetration Rate (%)	Insurance Density (Premiums per capita, US$)	Premiums GDP (US$ Millions)	Penetration Rate (%)	Insurance Density (Premiums per capita, US$)
SA	9375	2.7	176	7889	2.67	160
Morocco	2257	2.1	67	2676	2.14	70
Egypt	1079	0.4	13	1139	0.34	10
Nigeria	1332	0.2	7	667	0.18	4
Kenya	1152	1.5	25	1210	1.33	24
Algeria	1492	0.7	37	1044	0.67	26
Angola	1110	0.8	50	ND	ND	ND
Namibia	283	2.2	120	225	2.14	107
Tunisia	748	1.5	67	ND	1.69	56

Mauritius	244	1.9	196	ND	ND	ND
Others	4105	ND	ND	ND	ND	ND
Total	**23178**	**0.2**	**21**	**ND**	**ND**	**ND**

Source: (Swiss Re, 2015; 2019). ND: Not determined.

2.2. Historical overview insurance businesses in SA

SA's insurance business can be traced to the emergence of British colonial rule in the Cape Colony by the early 1800s. British rule contributed to the demand for financial services including insurance, since it aided British citizens and businesses entrance. A lack of a local insurance market contributed to the presence of British insurance companies in the Cape Colony. Then, John Houghton and Alexander Macdonald were appointed as the insurance agents of the Phoenix Assurance Company of London on August 6th, 1806, in the Cape of Good Hope to underwrite insurance policies related to fire. Between 1826 and 1844, five more British insurers entered the Colony and in 1935 in the Cape Colony, Zuid- Afrikaansche Brand en Levensversekering Maatschappij became the first indigenous insurance company, followed in 1945 by Old Mutual Insurance in 1945 (formerly called Mutual Life Assurance Society). Equitable Marine was also the first local insurance company to underwrite marine policies in 1849, followed by Colonial Assurance Company in 1874.

As at 1861, over 20 insurance firms operated in the Cape Colony, indicating the industry's growth. In the 1860s, minerals were discovered in Johannesburg, which prompted companies from New Zealand, Australia, Britain and America to establish insurance businesses. At that time, the foreign-owned insurance firms in the Cape Colony had risen to over 50. Due to British dominance of the sector, the Council of Fire Insurance Companies was set up to standardize Fire Office operations, as was the Fire Offices Committee of London. In 1898 and 1894, the Johannesburg Fire Tariff Assurance Association and Cape Town Fire Tariff Committee were respectively formed. With the arrival of British settlers in the Colony, long-term life insurance policies were also introduced to the market.

The Registrar of Insurance required insurers to submit their returns in 1929. These returns allowed for the compilation of statistics about insurance businesses. Table 2.3 displays both the short – and long-term insurance contributions to gross insurance premiums from 1929 to 2019. The Table reveals that the SAn long-term insurance sector dominates historically, representing 89.94% of

insurance premiums in 2019. This growth can be associated with the government sponsored social security programs which were historically absent, thereby aiding demand for self-financed long-term insurance policies.

Table 2.3: Premium composition in the SAn insurance business

Years	Long-term		Short-term	
	Premiums (R'mn)	(% of TP)	Premiums (R'mn)	(% of TP)
1929*	4,960	76.30	1,541	23.70
1950	51	72.86	19	27.14
1960	135	64.29	75	35.71
1970	490	75.38	160	24.62
1990	21,807	74.21	7,580	25.79
2000	147,747	89.51	17,310	10.49
2012**	n/a	80.50	n/a	19.50
2015**	n/a	83.45	n/a	23.45
2019	185,521	89.94	23,550	27.85

*Premium values for 1929 are in thousands of British Pounds. **Figures break down not available. TP= Total premiums= (short-term + long-term) premiums. Sources: Verhoef (2013) and A.M. Best Special Report (2014; 2020).

The number of insurance companies operating in SA increased between 1910 and 1955, and the number of foreign companies on the NLI sector was much > that on the long-term sector (Verhoef, 2013). Nonetheless, the participation of foreign companies grew as a result of the Fiscal and Monetary Policy commission of 1973, which required no foreign company to possess more than 10% ownership.

During this period, workmen's compensation and fire policies dominated the non-life market. In the 1930s, insurers began offering motor insurance policies following the increase in automobile

ownership. After the Motor Vehicle Insurance Act of 1942 went into effect in 1946, everyone who drives, owns or in position to use a vehicle was required to purchase insurance. In 1950, SAn Reinsurance Corporation Limited was formed to cater for the insurance demand that exceeded the capacity of the primary insurance market. Hence, the number of reinsurers dramatically increased by the end of 1985 (Verhoef, 2013).

2.2.1 Supervision and regulation of insurance business

Prior to 1900s, the regulation of insurance business in SA was governed by general laws on mercantile (Verhoef, 2013). The First Union Insurance Act 1923 was the first law to regulate insurance in SA. It combined elements of the regulatory framework in place for insurance markets in the UK, the US and Canada. It gave foreign firms the freedom to provide insurance policies covering investments in their home countries (Verhoef, 2013). Following, the passage of the Insurance Act No 27 (1943), a wave of reforms was introduced into the insurance market. During these periods, regulators focused more on the activities of life insurance companies. Thus, statutory provisions relating to compulsory and discretionary investments were imposed on life insurance companies.

After the AA Mutual liquidated in 1986, the Financial Services Act No 97 (1990) led to the creation of the Insurance Department under the newly formed Financial Services Board (FSB) to regulate the country's insurance businesses. To separate the businesses of long-term and short-term firms, the Insurance Act No 27 (1943) was later replaced by the Long-Term Act 52 of 1998 and Short-Term Insurance Act 53 of 1998. Consequently, this amendment resulted to the abolishment of composite insurance business operations. In addition to licensing insurance companies, the Insurance Division is responsible for promoting financial soundness, improving compliance and legal regulating insurance companies legally. Thus, these functions are carried out through the registration, prudential, compliance and regulatory departments.

A significant development took place in the non-life/short-term market with the addition of engineering and liability product lines (Vivian, 2003).

By 2000, there was increased emphasis on prudential regulation as a result of the adaptation of the Solvency II14 regulatory framework to the SAn market. It was aided through the design and implementation of the Solvency Assessment and Management (SAM) framework. With SAM, the

regulation of the local insurance market was regulated to international standards, and policyholders were protected by a stable market. In order to accomplish this, the insurance regulator would be provided with both qualitative and quantitative tools to track and reduce the risks associated with underwriting insurance policies. Therefore, SAM provides a regulatory framework for risk-based and group-wide supervision of the SA insurance market based on three pillars.

Pillar 1 provides quantitative requirements on the financial soundness of insurers, while Pillar 2 provides information on the risk management and governance framework of insurers. Pillar 3 relates to enhancing market discipline and promoting transparency of the activities undertaken under Pillars 1 and 2.

In December 2014, the Governance and Risk Management Framework (GRMF) bill under Pillar 1 of the SAM was passed for implementation in April 2015. The insurers are required to adopt, implement and document strategies for the prudent management of insurance to protect the interests of policyholders. Among the framework's components are the composition and governance of the board of directors, the risk management system and the internal control system.

The historical developments (milestone and dates) in the insurance market regulation in SA are depicted in Figure 2.1.
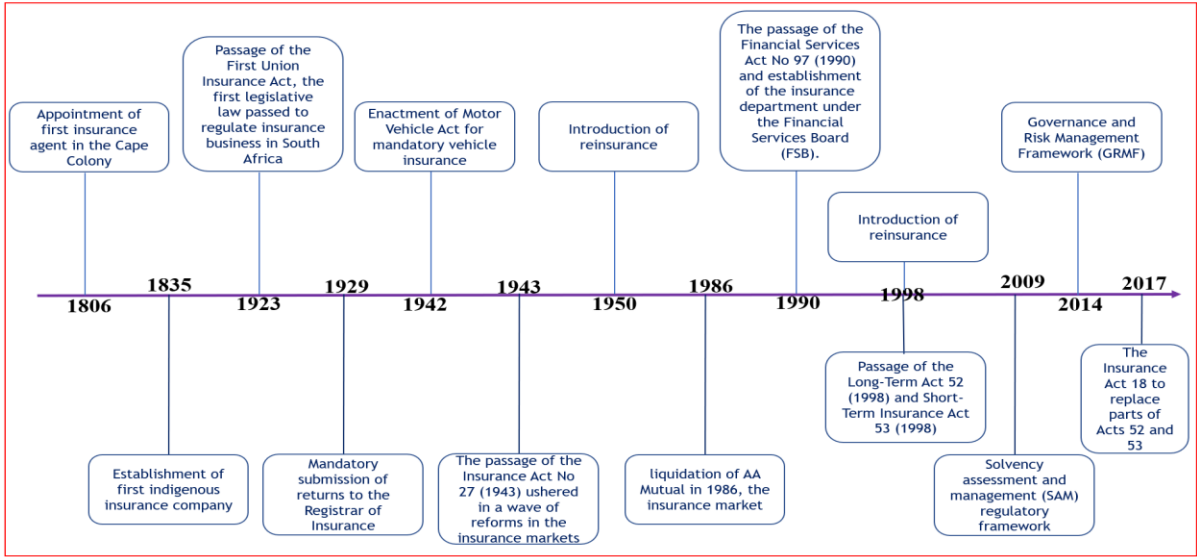
Figure 2.1: Milestones of insurance market development in SA

2.2.2 Non-life insurance market in SA

A short-term insurance business is defined by Short-Term Insurance Act 53 (1998) as the underwriting of insurance business that provides benefits to insureds on a short-term basis. The short-term insurers are required to hold a minimum amount of capital of R5 million. This figure is, however, dependent upon insurers projections for the next five-years. The following paragraphs describe the policies offered by registered short term insurers under the Act.

In contrast to the property policy, the transportation policy gives indemnity to insured for losses arising from the use, possession, or ownership of a vessel, aircraft, or any other vessel for shipping goods by water, air, space or land and treatment of the goods in transit. Motor policies, on the other hand, are policies that insure a policyholder for losses related to the ownership, use and possession of automobiles. This is different from the accident and health policy that offers benefits for the insured in the event of disability, health, or death.

In addition, while the guaranteed policy undertakes to indemnify policyholders in the event that the individual fails to fulfill an obligation, the liability policy deals with premiums collected by insurers to provide cover in the event that a certain liability is incurred. It is different from an engineering policy that covers the risk associated with the possession, use and ownership of machinery or equipment but not motor vehicles used for the purpose of conducting business activities; building constructions and other structures; or the installation of machinery or equipment. However, miscellaneous policies relate to indemnification provided by insurers in respect of risks not covered by the seven other policies.

2.2.3 The market players in short-term insurance business in SA

An overview of the short-term insurance market in SA is shown in Table 2.4. As of 2019, there were over 91 primary insurers offering short-term insurance products or businesses. As at the end of 2012, there was a representation of a marginal decrease from 100 insurers. However, the number of reinsurance companies remained essentially unchanged from 2007 to 2019 (Table 2.4).

Table 2.4: Short-term insurance business features

Number	Years						
	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2019**
Insurers	96	94	100	99	97	100	91
Reinsurers	8	8	10	9	8	8	9

Source: Financial Services Board from 2007 to 2019.

2.2.4 Analysis of NLI sector in SA

In 2012, SA had the largest share (~76.4%, 54.9 billion dollars) of the overall African insurance market premiums, with 2.67% NLI penetration rate (Swiss Re, 2015). With a lower (1.11%) penetration rate attributable to low economic activities in 2019, SA remains the leading NLI market in the continent (Swiss Re, 2019). As of 2019, the number of domestic life and NLI including composite businesses in SA stood at 76, 94 and 4, respectively (FSCA, 2019), with most big players such as Hollard Insurance, Sanlam Emerging markets and Old Mutual among others. leveraging on market penetration in Africa. About ZAR 10 million was the minimum capital requirement to establish the business in SA and the sector was fully privatized with ownership structure granted to stock companies (Schanz and Company, 2015). To target potential customers, Bancassurance was in place to strengthen and protect the sector.

Based on the understanding of the penetration rates of the global non-insurance businesses, the sector's performances have been classified into four developmental stages and SA falls within the third stage of development (Figure 1). Unlike in the dormant stage, where corporate asset non-insurance dominates to secure services and goods exchanged across nations (and countries essentially have < 1% non-life rates) and the emerging growth, characterized by the corporate assets coupled with mandatory individual product lines, and credit insurance products given through the traditional insurance companies and commercial banks (NLI penetration rate of between 1 – 3%), insurance the SAn non- sector exhibited the sustained growth phase by volume, and it is characterized by limited individual/retail insurance products and compulsory product lines

(3 – 5% penetration rate). For the last stage, the sector has a diversified NLI firms, where individuals and firms are enabled to access insurance policies across the continent via their respective providers (with a characteristic > 5% NLI penetration rate). Several factors have been attributed to the prevalence of a typical developmental stage at any given time and this will constitute the discussions in the subsequent section (2.3.1).
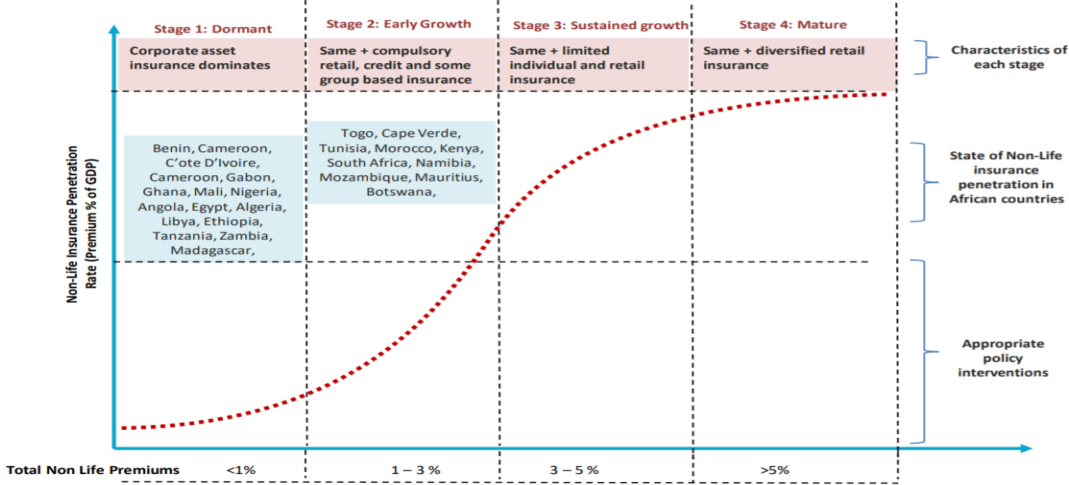
Figure 2.2: Insurance markets development processes in selected African countries. Source: (Chamberlain *et al*., 2017).

2.2.5 South African NLI market challenges

There are four types of challenges that the short-term insurance market players are facing: external, internal, transformational and regulatory. Internally, the short-term insurers face continuous increases in operational costs, due to deteriorating claims experiences (PwC, 2014). Typically, the claims costs are associated with disastrous events such as floods and hailstorms. An updated information and administrative system are necessary to capture the relevant data and improve risk modelling as well as decrease losses from such incidents.

The external environment is characterized by fluctuating low interest rates and security prices, which affect ROI. Insurers' premium revenues are also influenced by general economic conditions and underwriting cycles. Moreover, the depreciation of foreign exchange also increases motor business insurers' claim costs, since most of these claims relate to imported spare parts (PwC, 2014). Additionally, the high cost of using reinsurance contracts is another cost item of short-term

insurance operation. Lastly, new businesses entering the insurance market also affects the pricing and conditions of policies on the market.

With regards the regulatory challenges, insurers are faced serious obstacles in complying with regulatory requirements. For instance, it has become more expensive to carry out insurance operations due to the preparation for Solvency and Assessment Management (SAM) and compliance with International Financial Reporting Standards (IFRS), projects that require investments in system and processes. Finally, the industry faces transformational challenges in adhering to Broad-based Black Economic Empowerment targets. Market participants should design affordable products in order to cover the low-income citizens.

Put together, the foregoing analysis focused on the historical development of the insurance market in SA as well as relevant issues relating to the short-term insurance market. As a whole, the short-term insurance market is observed to be less developed and mature in terms of its contribution to gross domestic product than the long-term insurance market. In this way, short-term insurance can continue to contribute to economic growth by developing further.

The above literature indicates that, despite the fact that companies in the short-term insurance market in SA are generally diversified, the main source of premium revenue is motor and property insurance (Alhassan and Bayan, 2014). However, it is noteworthy to stress that in an age when hails and floods which are becoming more frequent occurrences in the country, over-concentration in those areas of insurance businesses leaves the market exposed to huge losses. The market is also highly concentrated among the top ten insurance operators, although these levels have decreased between 2007 to 2012 due to new entrants entering the market (Alhassan and Bayan, 2014). Generally speaking, the short-term market can be described as being financially strong and positioned well to cater to its policy holders' needs.

2.3. Factors affecting NLI businesses

2.3.1 Macroeconomic factors

The macroeconomic factors are one the most globally examined drivers of NLI performance. Because insurance firms make money by investing premium payments, the overall economic

condition could impact on their operations and performance. Specifically, the insurance businesses invest premiums in real estate, mortgage-backed securities, dividend-paying stocks, and financial institutions, such as banks, all of which are sensitive and vulnerable to prevailing economic conditions. For example, an increase in investment returns could be an indication that the economy is healthy and under such circumstance, the insurance firms may be more likely to accept a claim. However, when investment returns diminish in an unfavourable economy, the insurance business recovers the money somehow, at times by taking out loans or by scrutinizing claims more closely and denying claims. Under this condition, only a fraction of small businesses will have extra money to spend on insurance (Dwilson, 2016) and as such the demand for insurance will be down and providers must compete more to stay in business. Studies have established convincing relationship between economic growth and performance of NLI in both developed (Beenstock et al., 1988; Browne et al., 2000; Esho et al., 2005) and developing (Garcia, 2012; Stojic and Njegomir, 2012; Akinlo and Apansile, 2014; Chitiyo, 2017) countries and advocated evidence of a positive relationship. Studies of developed markets have used changes in GDP per Capita to consider the impact of economic growth on NLI performance. From a financial performance perspective, as the economy grows, through producing more goods and services, consumers have more disposable income that could be used to purchase assets and as such, are most likely to consider the risk of damage and/or loss to those assets, and therefore set aside more to secure their assets through insurance. In SA, NLI performance has typically risen the most within car and property insurance products with other being a fraction of the sector (Figure 1.1).

The supply-leading approach has however been given more attention. Reports have emphasized how the growth in financial systems influences long run growth rates through affecting savings and investment decisions. By transforming savings into investments, through collecting premiums,

insurance providers play a maturity transformation role that catalyses higher production of goods and services in the economy, boosting economic growth. This supply leading process, in addition to the various other benefits of increased financial services products, is seen more broadly as the basis for a positive relationship between insurance activity and economic growth. Recent studies evaluating the influence of economic growth on NLI demand in Africa found that in the short run, insurance premiums might not have a positive significant effect on economic growth, but in the long run insurance will have positive and significant relationship with economic growth (Akinlo and Apansile, 2014; Chitiyo, 2017). The following section demystifies and assesses the vital economic variables as previously used in literature regarding financial performance of NLI sector.

2.3.1.1 Income levels

Although, studies have identified and examined the impact of the economic growth on insurance demand, little attention has been focused on the extent of influence income levels could have on the performance of NLI sector. Income may have a financial-leading impact on non-life penetration rates suggesting that there is a bi-directional relationship between the level of insurance development and the economic development and increased disposable income for individuals that could results in consumers demanding more financial services and products such as insurance. If the negative relationship holds however, the study could conclude otherwise that despite enhanced economic growth, a decrease in financial performance of NLI businesses will indicate that, a higher standard of living does not necessarily lead to higher investment in NLI products in SA. This study will use GDP per capita levels as a proxy for the level of income and to test which relationship holds for SA. Arena (2008) assessed similar relationship and found that while insurance penetration rises with GDP per capita, different levels of GDP are assumed to be accompanied by

different growth rates of penetration and in fact NLI would have a bigger impact on economic growth at low and middle levels of economic development.

2.3.1.2 Interest

Interest rates reflect the price of money for consumers; as it becomes more expensive to access debt capital, individuals would be more willing to access insurance products to cover potential unexpected losses. Underwriting cycle theory further suggests that, when interest rates are high in the marketplace, insurance prices will be low due to a higher loss ratio suggesting that more consumers would be attracted to NLI products as opposed to using debt to cover unexpected losses (Ma and Pope, 2003). Interest rates are therefore anticipated to have a positive effect on the overall performance of NLI sector. Beenstock et al. (1998) have earlier lent credence to the influence of interest rates on NLI performance and established a positive relationship between the two variables.

2.3.1.3 Inflation

As purchasing power falls, consumer's disposable income is prioritized more to necessity goods, and less on additional financial services products such as insurance. Hence, a negative relationship is anticipated between inflation rates and performance of NLI business. Higher inflation rates result in lower disposable income and reduced demand for financial services and products to cover expected losses. While this inverse effect of inflation on life insurance has been well documented (Outreville, 2013,), there is paucity of information on such regarding NLI performance.

2.3.1.4 Price of insurance

Studies have demonstrated that as the costs of providing insurance services increases, insurer's providers are paying out more claims, and this would drive up demand from customers. The price of insurance has typically been measured as the inverse of the loss ratio. A study by Ma and Pope

(2003) evaluated this variable in assessing the role of legal factors on NLI in 44 developed countries and observed evidence of inverse relationship.

2.3.1.5 Financial sector growth

Financial depth captures the size of the financial sector relative to the economy. It is the size of banks, non-banking financial institutions, and financial markets in a country, taken together and compared to a measure of economic output (World Bank, 2016). Previous studies considered this variable and found that this variable was insignificant in their models. An explanation provided was based on the endogenous nature of the Broad Money to GDP (i.e. M2/GDP) variable utilized to test the impact of financial development on NLI demand which would not allow the proxy for banking sector development to convey additional information (Arena, 2008). The data to calculate broad money (M2) likely includes contributions from the insurance sector, therefore it leads to statistically insignificant conclusions.

2.3.1.6 Unemployment rates

Evidence of the effect of unemployment on financial performance of insurance is limited including those for the NLI. However, it is likely that a negative relationship between NLI financial performance and unemployment rate holds, as less people will not be willing and able to take up value added financial services such as insurance.

2.3.1.7 Foreign and direct investment

Foreign direct investment *(*FDI) is an investment made by a company or individual in one country in business interests in another country, in the form of either establishing business operations or acquiring business assets in the other country, such as ownership or controlling interest in a foreign company (Investopedia, 2016). To a reasonable extent, previous studies on the impact of FDI on the demand of NLI which ultimately translate to financial performance, suggest insignificant

relationship between the two variables in both developed and developing countries (Skipper, 1998; Ma and Pope, 2003; Stojic et al., 2012).

2.3.1.8 Market structure

Within developed and developing markets, market concentration has been identified as a statistically significant determinant of NLI demand that could in turn influence financial performance (Ma and Pope, 2003; Treerattanapun, 2011; Stojic and Njengomir, 2012). The measurement variable used to test market concentration is the Herfindhal Index (HI), which sums the market shares of the ten largest non-life insurers in the market and multiplies the result by 10000. A monopolistic insurance market will have a score of 10000, while more competitive markets exhibit scores with following important clients cited as one of the major reasons for service below 1800. The verified relationship has been that a negative relationship exists between market concentration and insurance demand. The less competitive an insurance market is (i.e. higher HI score), the less it attracts foreign insurers who can bring improves business processes and product innovation into the sector, therefore the less increase in the financial performance of NLI. Conversely, the lower the HI score, the more NLI demand and performance should increase. The density ratio of foreign premiums as an indicator for market competitiveness has also been used in this evaluation (Ma and Pope, 2003).

2.3.1.9 Trade openness

This is a function of the indication of the ratio of exports and imports to GDP (Outreville, 2013). It has been opined that higher openness ratio would positively impact NLI performance, as increased trade would require more firms to protect their goods and/or services against potential future losses or damage, increasing the need for NLI services. This study employed merchandise trade statistics as a proxy for trade openness to test this variable to verify previous submissions

that have studied same in relation to economic growth (Arena, 2008; Akinlo and Apansile, 2014) and NLI demand (Chitiyo, 2017).

2.3.2 Social factors

The insurance business is a complex and competitive sector that depends on many interconnected social factors. Even though insurance firm have financial responsibilities, such as addressing claims, issuing policies and performing underwriting tasks, the social side of the business is equally imperative. Insurance agents must possess strong social and interpersonal skills to facilitate conviction in the sales of their products and services (Tucker, 2016). Impediments to this process, would influence the commercial growth of insurance businesses, and therefore limit a rise in penetration rates and overall financial performance. While there is a need to appreciate social human behaviour in relation to eagerness to patronize products and services, this study did not focus on social variables but employed previous relevant literature on this subject to better understand their impact on the financial performance of NLI in SA.

2.3.2.1. Involvement in agricultural operations

This is viewed as the percentage of people in the agricultural workforce. As the marketing of insurance among rural populations is difficult in most developing countries, an agricultural economy may lower demand for insurance and as such an inverse relationship is envisaged between agricultural status and insurance demand and by extension, the overall financial performance (Outreville, 1990). However, variable has been reported to of an insignificant impact on NLI performance and was not considered in this study.

2.3.2.2 Human capital endowment

The human capital is a contributor to an economy's ability in boosting gross domestic product and the level of income in the long run. As the level of income rises, there is greater need for financial

services and products such as insurance, as individuals aspire to have more assets with their disposable income. A human capital augmented Solow-Growth model explained that output and the marginal product of capital are lower in developing nations because they have less human capital than developed countries (Mankiw et al., 1992). Gross tertiary enrolment has been used as the proxy variable for measuring human capital endowment in previous studies with an anticipated positive relationship with NLI demand. While a significant positive correlation existed between human capital endowment and economic growth (Arena, 2008; Akinlo and Apansile, 2014), there is dearth of information on this variable and NLI performance to date. However, an insignificant relationship between NLI demand and human capital endowment has been demonstrated (Outreville, 1990; Browne et al., 2000; Treerattanapun, 2011). More importantly, the applicability of the use of this variable for cross sectional analysis has been critiqued, since the quality of education is hardly measurable and comparable across productive line. A highly skilled labour force, is likely to improve outputs of countries and therefore tertiary education may not be a good proxy of one's understanding of insurance products as the knowledge of these products may not be taught in such institution (Treerattanapun, 2011).

2.3.2.3 Aversion of risk

Aversion of risk is a measure of unwillingness to purchase insurance products/services on the basis that they would likely not require protection against future damage/loss, and would be able to cover their potential losses from savings in the event damage to their goods or property. From a commercial view, it is the likelihood that capital reserves would be able to cover damages without incurring the additional cost of insurance while for an individual it is the likelihood that one's personal savings would be able to cover damages if they occurred. The level of education which is likely to be correlated to higher disposable income of an individual has been used as the proxy

for measuring risk aversion across personal lines, while a measure for risk aversion in commercial lines has not been tested to date. The proxy used for risk aversion has also been problematic, as it assumes that more highly educated individuals are more highly paid, and furthermore does not consider the effect on commercial insurance products in aggregate NLI data.

Initially it was anticipated that a positive relationship would exist between risk aversion and NLI demand and hence financial performance, since the more risk averse an individual is, the higher the amount insured in accordance with the study of Browne and Kim (1993). The authors advanced that a higher level of risk aversion leads to greater awareness of the necessity of insurance. More educated and by assumption more highly paid individuals would be less willing to take up insurance products, as they could afford to replace assets in the event of damage, unless required by law to take up specific insurance products (e.g. housing and car insurance). Hence, making it obvious that studies into the effect of risk aversion on NLI demand/performance have been inconclusive with statistically insignificant results for motor vehicle insurance, and inversely significant in a liability pooled cross sectional analysis (Browne et al., 2000). Due to the bias within the proxy for risk aversion and poor predictability of the relationship at an aggregate level being identified for risk aversion, this variable was not examined in this study.

2.3.2.4 Wealth

The demand for and financial performance of insurance is postulated to increase with wealth when individuals are characterized by increasing relative risk aversion (Saatio, 1971). In contrast, Mossin (1968) argues that insurance coverage decreases with wealth in agreement with the report of Outreville (1990), where it was reported that risk aversion and insurance demand would be negatively related. Since this relationship lies in the ambiguity of the risk aversion-insurance demand relationship, this study did not explore this variable.

2.3.2.5 Loss probability

The loss probability is known to be positively related to NLI demand and performance, since an expectation of future losses would encourage to protect from incurring the costs of this event. Research into probability of loss, has found that the maximum premium and individual is willing to pay for a full property insurance coverage increases with the probability of loss in developed markets (Mossin, 1968). This loss probability has been proxied by urbanization rates, since studies have suggested that the frequency of losses is greater in areas with higher rates of urbanization as a higher rate of interaction exists among individuals (Browne et al., 2000). Another variable utilized to test probability of loss is the crime rate in a country. Esho et. al (2005) submitted that a country where crime is reported will be more likely to reflect an insurance industry with higher claims rates and more consumers willing to purchase insurance. The anticipated relationship therefore was that higher crime rates, resulted in higher demand for NLI products and its subsequent financial performance. This was proved to be statistically significant in developed markets (Esho et al., 2005). Research into the impact of loss probability on NLI demand (using urbanization rates) has found this variable to be insignificant, except in general liability lines where minor statistically significance was detected in a pooled cross-sectional model of all OECD markets (Browne et al., 2000). This would suggest that in general liability insurance investment, lower urbanization rates may boost consumption unlike in other product lines (e.g. motor vehicle). The result however was still treated with caution since it did not also apply in the fixed effects model, therefore probability of loss is still considered insignificant in most cases. While research has been done to consider the effect of social factors on NLI demand, little evidence of these factors being significant to non-life insurance demand/performance has been found.

2.3.3. Cultural factors

The influence of culture on financial systems is a relatively new area of study with the rationale for testing these variables on financial systems or products/services only recently being considered. Usually, where it has been studied in the context of the insurance sector, it has largely been to consider the impact of organizational culture on effectiveness, as opposed to national culture on insurance demand and performance. Although, recent studies have focused on the effect of cultural variables on the life insurance sector, it is surprising that this subject remained unexplored for non-life insurance studies. According to Lemaire et al. (2011), culture impedes non-life insurance more in developed countries, while Treerattanapun (2011) noted that despite covering a larger and more selective representation of developed and developing countries, the sample tends to be biased towards developed European countries, thus including countries from Africa and Central Asia may give better conclusive outcomes. The metric utilized for defining and identifying cultural factors has been Hofstede's study, which identified four dimensions (uncertainty avoidance, power distance, individualism and masculinity) of national culture, for 64 countries across 116 000 participants in 1983. These dimensions collectively explained 49% of the variability in cultural factors across these countries, while other organizational culture measures explained the rest.

2.3.3.1 Avoidance of uncertainty

Avoidance of uncertainty measures the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity (Itim International, 2016). It is anticipated that high level of uncertainty avoidance would correspond with increased insurance performance, as people feel less out of control, with potential unexpected losses. A statistically significant positive relationship between uncertainty avoidance and NLI demand/financial performance has been identified (Lemaire and Park, 2011; Treerattanapun, 2011). Nations with a high degree of uncertainty avoidance tend to have a high level of NLI investment and hence high organizational

financial performance. However, the "eclectic" way in which Hofstede measures uncertainty avoidance (and power distance) based on theoretical reasoning rather than factor analysis draws caution to the reliability of these results (Karolyi, 2016).

2.3.3.2 Distance of power

The Power Distance Index (PDI) is the degree to which the less powerful members of society accept and expect that power is distributed unequally. The fundamental issue here is how society handles inequality among individuals (Itim International, 2016). According to a previous study, the population of a high-power distance country is expected to take sufficient actions to reduce risk and compensate for it, such as developing a road accident fund for motor vehicle users, which would lower the requirement to protect themselves against potential losses in future (Chui and Kwok, 2009). While the example noted here considers the effect of high-power distance in NLI context, it is important to clarify that the study focused on the effect on high-power distance on life insurance demand. By extension, it could be logically stated that countries with a low level of power distance will have a high level of NLI investment as they do not expect government to step in and take the necessary steps to reduce risks and this assumption holds well in both developing and developed countries (Lemaire and Park, 2011; Treerattanapun, 2011).

2.3.3.3 Individualism

Individualism considers whether individuals are expected to take care only of themselves and their immediate families. This in contrast to collectivism which considers the individual's reciprocal role in society where they take care of certain needs and expect their relatives or members of a group to look after them in exchange (Itim International, 2016). A statistically significant positive relationship between individualism and NLI demand/performance has been previously established

(Treerattanapun, 2011; Lemaire and Park, 2011). In the context of insurance, it is expected that more individualistic people will purchase higher levels of insurance products in comparison to more collective-driven societies. Insurance demand and overall performance would therefore be positively related to individualism and negatively related to collectivism.

2.3.3.4 Masculinity

Masculinity is a measure of how biological differences affect roles in society (Treerattanapun, 2011). Chui and Kwok (2009) have earlier established that feminine societies purchased more life insurance products, as they are more sensitive to the needs of their family and want to protect them while an alternate argument for masculine societies being dominant has been advanced to be more in control of the future. The effect of masculinity tends to be ambiguous in NLI investment and this has also been supported by previous studies (Lemaire and Park, 2011; Treerattanapun, 2011).

2.3.3.5 Religion

The religion of an individual could provide perspectives into behavior and this has been identified as an important component of understanding a nation's unique culture (Outreville, 2013). Research into the effect of different religions on NLI demand has suggested that, only Islam has a statistically significant negative effect on performance and demand (Browne and Kim, 1993). Buddhist and Christian beliefs have had no statistically significant effect on NLI sector (Lemaire and Park, 2011; Treerattanapun, 2011). The lack of availability of data on Hofstede's cultural factors for developing economies has halted further research. Due to lack of availability of data (Hofstede's variables, only have statistics for selected Eastern and Northwestern African countries) and no clear method for assigning cultural values to countries without figures, it is practically tricky to make empirical conclusions on the relevance of cultural factors on NLI performance for SA as desired in this study.

2.3.4 Institutional factors

Beyond the macroeconomic, social and cultural factors that affect insurance, there are several political and regulatory factors that impact the institutional framework within which insurance providers can operate. While less attention will be focused on these variables in this study, several reports have considered their role in NLI investment and demand.

2.3.4.1 Legal framework

The legal environment is critical to financial services products, as it governs the conditions under which they can be provided, distributed and purchased by consumers. The importance of the legal system to the insurance industry stems from the positive probability of insurance company insolvency systems that protect creditors rights and therefore promote external debt markets should similarly facilitate performance of insurance (Esho et al., 2005). Studies have lent credence to which legal systems provide a positive environment for insurance products to thrive and have found that except from Islamic law, most legal systems are appropriate for insurance products (Lemaire and Park, 2011). The basis for Islamic law's disapproval is that "insurance is the sale of uncertainty - which is the strongest reason for its prohibition, since insurance is effectively the sale of a commodity that Islamic Law does not recognize as saleable (IslamToday, 2016). Furthermore, the way in which insurance companies generate profits through investing returns, and gaining interest is another point of contention with the religion. It is therefore appropriate that on this basis, countries governed by Islamic Law, or with a large Muslim population experience lower penetration rates than other faith countries. Research into other legal systems also reveals that common law countries provide the greatest protection of shareholder and creditor rights, while French civil law countries provide the least protection (Esho et al., 2005). Results in empirical studies are positive and significant when considering a dummy variable to account for the common

law system in property liability insurance (Browne et al., 2000; Lemaire and Park, 2011; Treerattanapun, 2011). This variable, however, has been understudied due to the lack of good indicators for the type of legal system being available.

2.3.4.2 Enforcement of regulation

Regulatory enforcement has a significant effect on insurance investment, as it determines the ability of the regulatory environment to be upheld. Esho et al. (2005) found a positive and significant relationship between Property Rights and NLI performance/demand. This variable has had little attention in previous studies, with only the study by Esho et al. (2005) exploring regulatory enforcement's impact on NLI demand.

2.3.4.3 Governance and political risk

There has been a surge of interest in the consequences of governance for development and how a country risk could have an impact on global investment strategies by transnational corporations (Outreville, 2013). This country risk rating includes several factors such as political risk, access to finance, sovereign risk and credit ratings, which affect the ability of financial services providers to manipulate the financial structures to generate profits. Previous studies have considered the impact of country risk on NLI demand and found that a negative and empirically significant relationship existed, where a higher level of insurance investment was observed in a region that has low political and investment risk (Lemaire and Park, 2011; Treerattanapun, 2011). No consensus on the proxy variable to be used for measuring country risk has been established as there are many databases measuring country risk but with little public access to their results available.

2.3.4.4 Entrance barriers

A study by Stojic and Njengomir (2012) has considered the impact of barriers to entry on NLI performance. The proxy variable used is the Index of Economic Freedom Data collected by The Heritage Foundation, which looks at property rights, freedom from corruption, fiscal freedom, government spending, business freedom, labour freedom, monetary freedom, trade freedom, investment freedom and financial freedom. The study observed a statistically significant positive relationship between this variable and insurance consumption. No further research into this variable has been conducted to date.

2.4. Theoretical Review

2.4.1 The Resource Dependency Theory

According to the resource dependency theory, organizations can not generate all the resources or functions necessary to maintain themselves and must therefore develop relationships with elements outside environment to acquire the resources and services they needed (Pfeffer, 1973). According to Nienhuser (2008), resource dependency theory is capable to explaining the behavior and performance of organizations as well as the results of decision-making actions including organizational structures and processes. Nienhuser, also explained that external and internal agents played a significant role in the influence of critical resources and the power they held, which affected behavior and the emergence of different organizational structures like mergers. In this study, due to the involvement of external agents in decision-making processes, this type of perspective was not explored.

2.4.2 Agency Theory

Abdullah et al. (2009), explain the relationship between the principals and agents using the agency theory. Using this theory, management board members as elected as the representatives of the owners (principals) of the insurance companies (Magdi and Nadareh, 2002). A management board is responsible for overseeing the business on behalf of the principals, who hire and confer authority on the managers (Cornelius, 2005). Hence, the theory divided the firm's participants into two; the principals (owners) and the agents (managers). Therefore, shareholders expect the agents to act in their best interest (Magdi and Nadareh, 2002). The agent, however, may yield to self-interest or

opportunistic behavior and violate the agreement between the of the principals and the agents' interests (Cornelius, 2005). The motives of agents and principals are likely to differ. These factors may include financial rewards, labor market opportunities, and relationships with other parties that are not directly relevant to principals. Consequently, agents may tend to overestimate the economic performance of their insurance firm or their performance under the contract than what is actually possible. Agents may also be more risk averse than principals, so since their interests differ from those of principals, they may be inclined to distort information flows. Principals may also be concerned about information asymmetries, such as when agents possess information that principals do not have access to (Insurance Institute of Kenya, 2007).

It is possible to approach this issue from the perspective that different motivations and information asymmetries influence how accurate information is, which in turn impacts how much trust principals place their agents. There are a variety of mechanisms that insurance firms can use to align the interests of their agents with their principals and to allow their principals to measure and control their behavior while reinforcing the trust in the agents. The less trust a principal has in an agent, the more likely they are to opt for certain performance-related pay measures and aligning the interests of all parties. In such a case, insurance companies might set their basic salaries at a relatively low level, along with a package of other benefits, such as bonuses and stock options. However, such mechanisms, could create new agency problems concerning the measurement of performance. It is possible that these problems may conspire against the performance of insurance firms, requiring structural reform to reverse this trend. Firms 'obligations can be spelled out in contracts and enforced by imposing penalties for alleged deviations from their objectives (Institute Chartered Accountants, 2005).

2.4.3 The 'Quiet-Life' Theory

According to Hicks (1935), the 'quiet-life' theory provides the basis for theoretical understanding of the relationship between competition and financial performance. Hicks (1935) suggested that less market competition would lead to less managerial efforts to control costs, thereby hindering profitability and financial performance. Insurance companies with market power, according to Hicks, maximize their profits by setting prices above the marginal cost in concentrated markets. Monopoly rents allow these firms to allocate resources inefficiently, which can lead to poor financial performance. Thus, this theory was not applied in this study.

2.4.4 Stakeholder Theory

The stakeholder theory of business organization states that corporations should be public institutions that are socially responsible. In other words, performance should be judged by a larger constituency concerned with employment, market share, and growth in trading relationship with suppliers and customers, in addition to financial results (Maher and Anderson, 1999). Competitors are sometimes considered stakeholders based on their ability to affect a firm and its stakeholders. The stakeholder strategy combines resource-based and market-based views, as well as a socio-political level. In this viewpoint, the firm is used to define the specific stakeholders of a corporation as well as determine the conditions under which these parties should be treated as stakeholders.

2.4.5 Pecking Order Theory

A pecking order refers to a hierarchy of financing from retained earnings, then debt financing, and finally external equity financing. In the view of Myers (1998) the firms prefer internal sources of funding over external sources as a result of transaction costs, agency costs and information asymmetry. Similarly, Donaldson and Davis (1991) affirmed that firms follow the "financing hierarchy" as claimed by the pecking order theory (POT) as a result of the transaction costs. In the same view, Zurigat (2009) posited that transaction costs involve a compensation for the dealer and other expenses for legal, accounting and printing costs as well as taxes and registration fees. Again, Donaldson and Davis maintained that firms that make use of internal finance encounter less or no transaction costs than the use of external financing. Moreover, POT explains that firms follow a "hierarchical" order due to the existence of information asymmetry, which results from the fact that managers of insurance companies know more about investment opportunities and profitability than investors. It was posited by Myers (1998) that information symmetry would lead to a mispricing of a firm's equity, capable of causing adverse impact on the existing shareholders wealth. In light of this theory, insurance firms are not eager to seek external finance if they lack adequate internal funds. If the external sources of funds are inevitable, insurance companies might prefer to make use of those as they have lower capital costs as well as uneven information costs.

It is predicted by the POT model that insurance firms will not achieve the optimal capital structure, but rather follow a certain principle and select external financing when they reach debt capacity. In addition, the POT states that if the firm lacks adequate internal funds, management will finance its activities without restrictions. Thus, short-term financing is acquired first since it requires no

collateral, followed by long-term debt and finally equity issuance (Brealey et al., 2014). Again, POT implies that outside investors are aware of how the insurance company is financed through debt and equity. Therefore, insurance firms consider retained earnings to be a better source of source of funding than outside sources. In the event that retained earnings are not sufficient, the insurance firm will use debt financing. A company finances overtime via the method that provides the least resistance to management, and capital market discipline has little influence on management's behavior. When cash flows and capital investments are out of balance, the capital structure results as a by- product.

2.4.6 Trade-Off Theory

According to the Trade-off theory, firms have an incentive to turn to debt as generating annual profits allows them to benefit from the debt tax exemptions. There is a positive correlation between the effective tax rate and debt (Lopez-Garcia and Sorgob-Mira 2008). The debt of a high level of non-debt tax shields will likely be lower than the debt of a firm with a low level of non-debt tax shields. Trade-off theory predicts a negative relationship between non-debt tax shields and debt. Profitable firms, which take advantage of debt tax shields, can carry a higher level of debt (Fama, 1980). Moreover, profitable companies are more likely to be able to repay their debts and interest, which decreases the likelihood of bankruptcy. There is a positive correlation between profitability and debt in insurance companies. Myers (1998) mentions that firms with high expectations of growth can be reluctant to use large amounts of debt as bankruptcy and agency costs are higher. Due to this, firms with high growth opportunities may not use debt as their first option for financing. It follows that firms with greater growth opportunities have lower levels of debt, since greater opportunities for investment increase the probability of agency problems between managers, owners and creditors, since the former have a strong incentive to underinvest (Myers, 1998). The creditors' interests are protected by using tangible assets as collaterals during a firm's bankruptcy. Michaelas et al. (1999) argue that firms with valuable tangible assets, which can be used as collateral, have easier access to external finance and probably higher debt levels than firms with low levels of tangible assets. Based on the trade-off approach, a positive relationship is forecast between asset tangibility and the level of debt and of the firm, leading to the following hypothesis. In large companies, activities tend to be more diverse, which implies a lower likelihood of bankruptcy (Titman, Wessels 1988). Additionally, large firms with less volatile profits are more

likely benefit from debt tax shields, increasing the potential benefits of debt (Smith and Stulz, 1985). Consequently, a trade-off analysis suggests that large firms tend to increase their debt levels due to a smaller likelihood of bankruptcy, as well as to increase their tax shields.

2.4.7 The Stewardship Theory

The study was based on stewardship theory. This theory protects and maximizes shareholder wealth through the firm's profitability and utility function. Stewards are company executives and managers that work for the shareholders by protecting their interests and increasing profits. The theory indicates that stewards will feel satisfied and motivated when the organization achieves its goal in terms of success. It emphasizes the role of employees or managers in maximizing shareholders' returns on investment through autonomous decision making. A study by Daly et al. (2003) contends that the costs of monitoring and controlling employees can be reduced and that executives and directors should strive to maximize profits or returns on shareholders' investment for the sake of protecting the reputations of shareholders. Therefore, the profitability of the firm has a direct impact on the perception of individual performance. Moreover, the theory points out that the CEO and the chairman have a unique role: reducing agency costs so as to maximize the returns of the company and protect the interests of the shareholders.

2.5 Theoretical Framework: Stewardship theory

This study was founded on stewardship theory. The theory maximizes and protects the wealth and investment of the shareholders as a function of utility and profitability. The executives and managers of the company symbolizes the stewards that protect the interests of the shareholders in a manner that culminate in overall profitability. This framework is of the notation that stewards become motivated, enthusiastic, and satisfied at the success of the organization measured as realization of the set goals. Executives and employees act autonomously to ensure realization of ROI of the shareholders. For most times, costs of controlling/monitoring behaviours of employees are bound to reduce while protecting the confidence of the shareholders, wherein the company is well positioned to take decisions to maximize the ROI in the long-term (Daly et al., 2003). Consequently, the views of individual's performance reflect the profitability of the firm organization. Also, the chairman and CEO are saddled with an exclusive responsibility to reduce costs in the interest of facilitating ROI to protect and maximize the wealth of the shareholders.

2.6 Empirical literature survey

Profitability is a crucial component of financial management as a means to maximize wealth. Adams and Buckle (2003) investigated the factors associated with the performance of the Bermudian insurance companies using the panel data from 47 insurance companies between 1993–1997. Based on empirical findings, firms with high leverage, low liquidity and reinsurers performed better and vice versa. A positive correlation was observed between insurers' operational performance and underwriting risk. In addition, the size and scope of activities of the companies in the study did not significantly affect their performance.

According to Chen et al. (2004), firm-specific factors influence liability and property insurance profitability as well as the financial soundness of insurers, as health and life insurance firms differ from liability and property insurers regarding risk exposures, investment, duration of liability and nature of the business itself. The authors point out that, while the general insurers take risks, life insurers serve as financial intermediaries. In a later study, Hamdan (2008) found that return on invested capital (ROIC), return on equity (ROE), and return on assets (ROA) are crucial variables to determine the financial performance of insurance companies. Thus, ROA measures the financial performance of a company using its total assets. Management's ability to effectively utilize total assets to generate earnings, can be measured by ROE, while profitability is measured by total assets. The ROIC, on the other hand, is a measure of how effective a company is at allocating its capital under its to profitable ventures. A company can determine whether its capital has been used efficiently by comparing its ROIC to its weighted average cost of capital (WACC).

According to Greene and Segal (2004), the financial performance of insurance firms is measured by underwriting profit, net premium earned, annual income, return on equity and return on assets, which could be either profit or investment performance. In the same way, Swiss Re (2008) indicated that profitability is directly linked to investment and underwriting performance. Despite, these assertions, there is clear evidence that ROA remains an important indicator of an insurer's profitability as shown by Hardwick et al. (2011) and Hafiz (2011).

A study by Pervan and Kramaric (2010) analyzed the effect of independent variables on the performance of NLI in the Republic of Croatia in the period from 2003 to 2009 and established that ownership, expense ratio and inflation were negatively and significantly associated with

financial performance. Also, average profitability of the companies examined had a positive and significant impact on the financial performance.

It is also interesting to note that previous studies (Brown, 2001; Hamdan, 2008; Hafiz, 2011; Swiss Re, 2008; Kozak, 2011) have examined the factors of non-life insurers profitability. Specifically, Kozak (2011) studied determinants of profitability of non-life insurance companies in Poland during integration with the European financial system using a panel of 25 NLI companies for the period of 2002‑2009. The results of a regression model that was estimated indicate that the reduction in the share of motor insurance in the portfolio, with simultaneous increase of other types of insurance, has a positive impact on profitability and cost-efficiency of insurance companies. However, offering too broad spectrum of classes of insurance negatively impacts its profitability and cost efficiency. Companies improve profitability and cost efficiency with an increase of their gross premiums and decrease of total operating expenses. Additionally, GDP growth and the market share of foreign owned companies positively impact profitability of non-life insurance companies during the integration period.

The study by Wright (1992), Sandra and Lianga (2007), Hardwick et al. (2011), and Ahmed et al. (2011), have also examined life and health insurance companies. These studies looked at factors influencing financial performance, profitability in terms of company's size and age, tangibility of assets, volume of capital, leverage ratio and liquidity ratio.

Several other evidence-based studies on the financial performance of the insurance sector have also been done, using different variables both for the financial performance as well as the variables upon which it depends. In Ayele's (2012) work, factors such as volume of capital, liquidity, size, growth, leverage, and volume of capital were identified as factors influencing the financial performance of insurance companies in Ethiopia over a nine-year period, but age and tangibility did not affect profitability.

According to Olaosebikan (2012), the determinants of the profitability of micro-life insurers in Nigeria were also investigated, and it was found that profitability was negatively related to leverage ratio, size, and ownership structure of the firms, while profitability was positively related to interest rates. Hence, macroeconomic variables and investment functions are crucial in evaluating the future financial performance of microinsurance businesses in developing countries.

Akotey et al. (2013) applied a panel regression analysis to secondary data collected from 10 insurance companies in Ghana between 2000 and 2010 and found that although gross written premiums correlated positively with insurers' sales profitability, they negatively correlated with investment income. Moreover, a negative relationship was observed underwriting profit and investment income towards the enhancing the overall profitability of life insurers, rather than a complementary one. Price undercutting and overtrading have led to large underwriting losses for life insurers, as it was observed.

Burca and Batrînca (2014) analysed the determinants of financial performance in the Romanian insurance market on the sample of 21 NLI companies during the period 2008-2012. ROA was employed in the model as the dependent variable while 13 explanatory variables (including firm-specific, industry-specific and macroeconomic variables) were tested using the multiple regression analysis. According to the findings, the determinants of the financial performance in the Romanian NLI market are leverage, size, gross written premium growth, underwriting risk, risk retention ratio and solvency margin.

A study of the relationship between firm-specific and macroeconomic indicators with financial performance of Taiwanese property and liability insurance firms. Lee (2014) argues that underwriting risk, reinsurance usage, input costs, return on investment, and share holding pattern all affect operating ratios and ROA. The operating ratio was also found to be related to the economic growth rate but not to profitability. Market share and financial leverage, however, were shown to negatively impact the operating ratio and ROA, respectively, while firm size, firm growth rate, diversification, and inflation rates had no effect on either measure.

Using CARMEL indicators and multiple regression in the 2006-2013 period, the authors analyzed the performance of non-life insurance companies in the insurance market in Serbia. The panel data model indicates a significant negative influence of the financial leverage, retention rate on the profitability of non-life insurers and combined ratio measured by ROA, while the influence of the written premium growth rate, return on investment and company size is significant and positive (Kočović et al., 2014).

Examined results of 198 insurers in nine EU countries for the years 2004 through 2012 (Moro and Anderloni, 2014) determined that ROA is affected by variables related to operation of companies. It is negatively influenced by asset size, combined ratio and diversification and

internationalization, while a positive impact was observed for variables defined as reserves' dimension and asset turnover.

Similarly, previous studies (Mwangi and Iraya, 2014; Mwangi and Murigu, 2015) examined determinants of financial performance in Kenya's general insurance companies. The study of general insurance companies in Kenya for the period 2009-2012 found that factors such as leverage, equity capital, and management capability were significantly related to financial performance, but size did not significantly affect profitability.

Hussain (2015) applied regression analysis to determine the financial performance of life and NLI companies in Pakistan. His findings were based on secondary data of 39 Pakistani's insurance firms for a period of five years between 2006 and 2011. Hussain's findings indicate that the 39 Pakistani insurance firms were positively and significantly impacted by macroeconomic environment, equity market conditions and inflation rate. Regardless, significance and signs of the coefficients for firm-specific factors and macroeconomic variables differ across life and NLI companies due to the nature of their clientele and policy coverage. For example, in life insurance business, financial strength, company size, and financial leverage cannot be ignored in profitability management. NLI companies as well as their specific factors (leverage ratios, relative firm sizes, financial soundness, growth prospects, underwriting risk, and diversification), should keep in mind the macroeconomic environment, equity market conditions, and inflation order to manage profitability. In the same manner, Malik (2015) conducted research on the insurance sector in Pakistan, revealing that there was no relationship between profitability and age of the company, but that the company's size and volume of capital had a significant influence on profitability. However, both loss ratio and leverage ratio showed a negative but significant correlation with financial performance of the companies.

In another study, Cekrezi (2015) investigated how five Albanian insurance companies the performed financially between 2008 to 2013. Using both microeconomic and firm-specific variables on cross-sectional time series data, it was discovered that leverage ratios and risks negatively affected the financial performance of study firms measured as ROA, compared to tangibility ratios positively affecting financial performance. Similarly, Kaya (2015), used panel data over eight years to study the impact of firm-specific factors on the profitability of Turkish 24 NLI firms. The ordinary least squares (OLS) regression model, the one-way fixed effects model,

and the one-way random effects model were employed in this study for the analysis of panel data According to the empirical results, the firm-specific factors affecting the profitability of Turkish NLI companies are the size of the company, age of the company, loss ratio, current ratio, and premium growth rate. This means that out of the eight independent variables examined, only five (age, size, loss ratio, current ratio, and premium growth rate) significantly affected the profitability of the study firms. Specifically size and premium growth rate had positive effect on the performance, whereas all other variables significantly influencing performance have negative sign. This holds for both dependent variables.

Napier (2015) looks at the use of macroeconomic indicators to explain and predict insurance sales, cancellations, and overall underwriting profit in SA. Additionally, he determines if the drivers for insurance demand and profitability differ based on individual wealth by analyzing regression analyses over both low income and high-income consumer groups. According to him, the explanatory variables for sales in the high- and low-income groups differed, suggesting that macroeconomic factors shape buying differently. Furthermore, argues that those sales and profitability in the low-income group were explained by macroeconomic factors.

Also, Saeed and Khurram, (2015) reported that between 2005 and 2013, analysis of the financial performance of 24 insurance companies that deal with NLI in Pakistan, using panel regression revealed that age and loss ratio proved to be significant in determining the financial performance, while the growth of premium, size of firm, debt and expense ratio proved insignificant.

Analysis of the impact of several factors on the profitability of NLI companies in Ghana by Kwaning et al. (2015) between 2009 to 2013 showed that company's growth, gross written premium and size significantly influence the profitability of companies. The results also showed that liquidity and leverage had positive impact, while the claim has negative impact on the profitability of the firms.

In 2016, nine Ethiopian insurance companies were studied to understand the macroeconomic and firm-specific determinants of their financial performance from 2008 through 2013. It was asserted that inflation, leverage, technical provision and under writing risk negatively and significantly affected profitability, unlike solvency ratio, company's age, premium growth and Gross domestic product that were positively (significantly) related to Ethiopian insurance firm profitability (Hailegebreal, 2016). Furthermore, Datu (2016) used panel data between 2008 and 2012 to

examine the impact of insurer's specific indices and macroeconomics on the financial performance of NLI business in the Philippines. The author also observed that the underwriting risk, reinsurance utilization, firm size, leverage, and input cost affected profitability of the companies, but inflation rate and GDP did not.

The analysis of the financial performance of NLI companies in Turkey in the period from 2010 to 2014 by Kaya (2016) considered capital adequacy, liquidity ratio, operating ratios and profitability ratios. The NLI companies that were the subject of the analysis were ranked according to the results of the gray relational analysis (GRA) method. The results of the analysis showed that profitability ratios have the greatest impact on the financial performance of NLI companies. Also, the results revealed that the loss ratio and technical profitability ratio have come to the forefront among profitability ratios. Findings from the study further established that NLI companies can ensure sustainable profitable growth and competitiveness in the market by applying adequate risk-taking strategies, rational pricing policies, efficient control, and optimization of operating costs. Insurance companies are expected to improve their financial results in terms of ensuring capital adequacy for exposure to all risks in business, setting up an investment policy that will ensure optimum liquidity and profitability of insurance companies, reducing loss of funds by more efficient risk taking and determining the price of the assumed risk and company growth strategy based on a sustainable level of profitability.

A study conducted by Ullah et al. (2016) in Bangladesh over 11 years (2004 to 2014) using the panel regression analyzed the impact of selected variables on the profitability of NLI companies. By analyzing the impact of independent variables – underwriting risk, expense ratio, solvency margin, premium growth, asset growth and company size, using an Ordinary Least Squares (OLS) regression model, it was established that there was an indirect relationship between underwriting risk, size, and profitability of the companies. The results also showed that all independent variables, except for premium growth, had a significant impact on the profitability of insurance companies. The underwriting risk and size had negative relationship with ROA. More specifically, the underwriting risk had a moderately significant impact, while size was weakly related to ROA with solvency margin and growth rate being positively related to ROA.

Similarly, in a paper by Olarewaju et al. (2018), where the secondary data gathered on eight Nigerian composite insurance companies were analyzed using the panel data regression model, the studied firm-specific factors were found to be highly relevant in enhancing both the sustainability and financial performance of Nigerian insurance firms. Studying the firms between 2009 and 2015 negatively revealed a linear relationship among ROA, tangibility, leverage, and size of the company, in stark contrast to the positive linear relationship between ROA, risk, and growth of the study companies.

In a more recent Ethiopian study (Tegegn et al., 2020) they examined factors such as liquidity ratio, tangibility of assets, leverage ratio, size and age of the company and premium growth rate on profitability proxied by ROA in insurance companies between 2005 and 2016. Thus, the regression analysis revealed that premium growth rate, liquidity, size and age were the most pertinent factors that determine profitability. Correlatively, compare to the negative relationship observed for liquidity and age for profitability, premium growth rate and size had positive relationship, while there was no significantly profitable relationship between leverage and tangibility of assets.

From the foregoing, it could be inferred that more compelling and unanimous findings are still needed on the factors that determine the financial performance or profitability of insurance firms globally and more specifically in Africa. This study forms part of such studies seeking to demystify factors militating against the financial operation of insurance businesses with reference to nonlife insurance in SA.

2.7 Conceptual Framework

Figure 2.3, below, is the conceptual framework of the study that shows the relationship between the study variables, where the ROA as a function of financial performance depends on the firm-specific, macroeconomic, and underwriting profit variables.
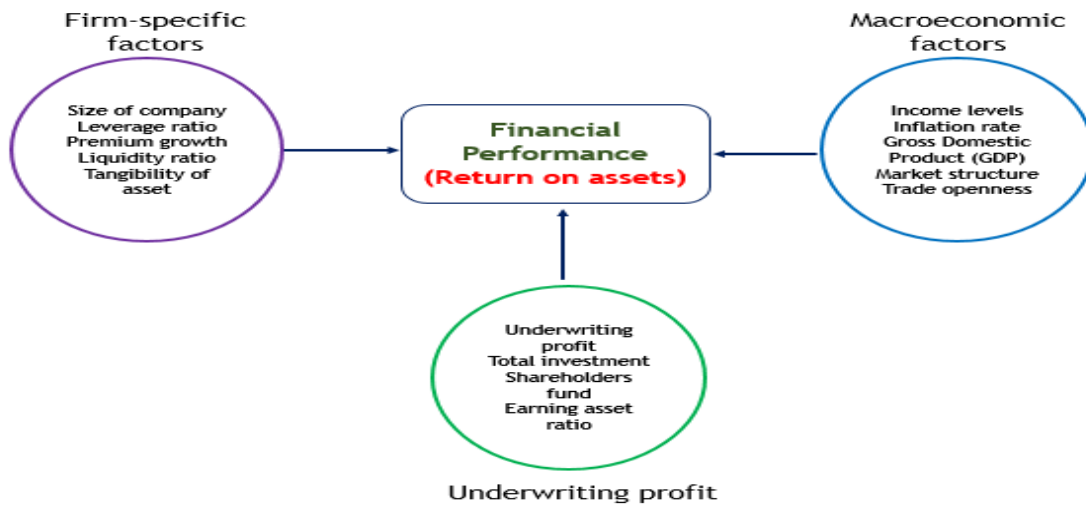
Figure 2.3: The study's conceptual framework

Source: Author's design (2021)

2.8 Chapter Summary

In this chapter, a brief historical background and financial performance of NLI alongside a comprehensive literature review on the influence of firm-specific and external factors on nonlife insurance performance in Africa and worldwide were provided. The rest of the chapter focused on both the theoretical review and framework as well the empirical survey of literature on the topic under review.

The next chapter centers on methodology which encompasses information about the research design, data, model, and estimation techniques. These were aligned with the study objectives.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This section provides information on the type as well as data sources, the sampling population and method, validity of the research instrument, measurement of variables, data analysis methods, models specification, and the result expectation of the explanatory variables on how the objectives of the study were achieved.

3.1   Collection of data

This study employed data (secondary) sourced from Refinitiv Eikon and S&P CapitallQ which are well known databases with readily available data. The 36 listed NLI businesses in SA (ATLASMAG, 2018) constituted the population of this study. This study purposively focused on all the 36 listed non-life insurers in SA over the period 2008 – 2019. While the choice of the period of investigation is hinged on both the developmental dynamics in NLI in SA and paucity of information on the subject under consideration, the chosen insurers have data reputation judging by the South African Insurance Survey, which analyses companies with ample non-life premiums to rate of penetration (GDP) data in the periods under consideration. These firms formed the basis of the data to identify and assess the influence of macroeconomic, firm-specific and underwriting profit variables on NLI financial performance in SA.

3.2 Model specification

In a study by Firdaus (2011), the method of panel data was identified as a viable model of data analysis because it gives an insight on the behaviour of various variables (cross section) at various time points (time series). Hence, this study was a panel one as it involved a combination of data from 36 companies from the year 2008 to 2019. Specifically, the study adopted panel data approach using regression analysis (random, fixed and pooled effect models) in evaluating the influence of underwriting profit, macroeconomic and firm-specific indicators on the financial performance (ROA) of NLI firms in SA between 2008 – 2019.

Besides incorporating information from the data time series and cross section to provide more in-depth data to perform the regression analysis that will reduce/eliminate bias, the panel data approach can overcome problems arising from omitted variables or lack of time series data

(Cepelakova, 2015; Dorofti and Jakubik, 2015). Here, we analyzed how firm-specific factors, macroeconomic variables, and underwriting profit are associated with return on assets (ROA) (Fig. 2) using the following models:

$Financial\ Performance$

$= f(firmspecific\ determinants, macroeconomic\ determinants\ and\ underwriting\ profit)$

Recall, the concept of the model (panel regression) is given as:

$$Y_{it} = a_i + \beta X_{it} + \varepsilon_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(1)$$

Where, Y_{it} is the dependent variable; a_i is the constant term; i is the number of cross-sections that ranges from 1…………N; t is the time period that ranges from 1…………N; β is the coefficient of independent variables; X_{it} is the vector of the independent indices; ε_{it} is the stochastic error term.

Model to achieve objective 1

The firm-specific factors considered include premium growth rate (PGR), leverage ratio (LEV), size of company (SIZ), tangibility of asset (TAN) and liquidity ratio (LIQ) as independent indices against the dependent index (ROA).

$$Y_{it} = f(\ PGR, SIZ, LEV, TAN, \text{LIQ})$$

$$ROA_{it} = \alpha + \beta_1 PGR_{1it} + \beta_2 SIZ_{2it} + \beta_3 LEV_{3it} + \beta_4 TAN_{4it} + \beta_5 LIQ_{5it} + \varepsilon_{it}$$

Model to achieve Objective 2

Income levels (INC), inflation rate (INF), GDP, market structure (MAR) and trade openness (TOP) are the macroeconomic factors of interest, and the dependent variable is ROA in this study.

$$Y_{it} = f(\ INC, INF, GDP, MAR, \text{TOP})$$

$$ROA_{it} = \alpha + \beta_1 INC_{1it} + \beta_2 INF_{2it} + \beta_3 GDP_{3it} + \beta_4 MAR_{4it} + \beta_5 TOP_{5it} + \varepsilon_{it}$$

Model to achieve Objective 3

Underwriting profit (UWP), earning asset ratio (EARATIO), shareholder's fund (SF) and total investment (TI) are used to achieve this objective while having ROA as the dependent variable.

$$ROA_{it} = \alpha + \beta_1 LOGUWP_{1it} + \beta_2 LOGTI_{2it} + \beta_3 LOGSF_{3it} + \beta_4 EARATIO_{4it} + \varepsilon_{it}$$

Underwriting profit, total investment and shareholders fund are logged to reduce the unit even though total investment, shareholders' fund and earning asset ratio are the control variables.

3.3 Selection and measurement of variables

Over the years, accounting ratios/metrics have been used as measurement of variables in studies that examined the factors of importance in understanding the ROA of insurance businesses. Specifically, the dependent variable, ROA, is a financial performance's proxy and an indicator of a firm's capability to make profits and guarantee the payment of claims and benefits to policyholders. These have been previously measured by ROA. In accordance with Burca and Batrinca (2014), a profit is a crucial requirement to improve the viability of the insurance firm in national and global markets, whereas ROA remains a key indicator of a company's profitability, especially in the insurance sector (Malik, 2011). Here, the choice of both indicators (independent and dependent) as explanatory factors has been guided by comprehensive literature search and the selected under listed variables have been suggested to influence the ROA of insurance companies.

Profitability (ROA): Profitability compares the company's capability to attainment of the company's investment funds and assets as a function of return's rate. The insurance firm's ROA is vital to its survival, growth, and competitiveness. Thus, the insurance firm cannot survive and will not be attractive to prospective investors to meet its objectives if profits are not made. Profitability remains a financial performance indicator to evaluate a firm's capability to secure earnings compared with its spending and other incurred costs. Therefore, measuring the past, current and estimating future profit remains crucial. According to Tegetn et al. (2020), profitability gives insights on contingency reserves and adequacy of working capital, capability to raise capital, overhead cost structure, and proficient application of assets through the critical trends' assessments of financial indicators. It could further be viewed as initiation stage (progressive) for evaluating the financial muscle and creditworthiness of a business over time. Like in several other studies that have examined insurance firms' ROA, we also measured profitability as ROA (profit after tax÷ total asset.) in this study.

Size of company (SIZ): Reinvestment of earnings and external funds acquisition are direct reflections of a company's capability to expand its size, and this may signify success. However, the company's size may impede its ROA. Although, studies have used diverse variables e.g total asset and employees' size to ascertain the size of insurance companies, other variables such as net premium can also be used (Ahmed et al., 2010).

Leverage ratio (LEV): This can be expressed as the ratio of borrowing to earning power as it reflects a company's total debt to asset of the businesses. At any given instance, the total expected claims must be lower than the total premium for the company be seen as progressive.

Tangibility of assets (TAN): Tangible (physical) assets such as stock bonds, cash, furniture, machinery, inventory, gadgets, equipment, vehicles, land etc. remain the core of a company's success which makes it to continue to be operational, though not directly evident to the customers. It is usually expressed as the fraction of the fixed asset of a firm to the total assets as a function of its financial strength.

Premium growth rate (PGR): This measures the major source of income by an insurance entity and an increased PGR reflects financial growth and resulting from market share growth. All things being equal, the PGR is expected to be positively associated with ROA and normally represented as obvious variations in gross written premium.

Liquidity ratio (LIQ): Is an indication of the probability to pay liabilities such as appropriate payments for losses/benefits and operating expenses by an insurer. It considers the fraction of the total current assets of a firm to the total current liabilities.

Income level (INC): Arena (2008) had earlier found that while penetration of insurance increased with GDP (per capita), different levels of GDP are assumed to be associated with diverse penetration growth rates. Hence, this study used the levels of GDP per capita as an index of INC and tested the accompanied relationship with the SA context.

Inflation rate (INF): Inflation, a phenomenon where the price of economic services or goods have considerably increased, indicates fragile purchasing power, an indication of sharp devaluation of a country's currency. While a very low inflation rate will retard economic growth, a high inflation rate will also lower the price of shares of banking assets, and ultimately impede a firm's ROA. In corporate settings, high inflation will cause a decline in the profitability of a company. Previous studies such Kalengkongan (2013), indicated that a significant negative effect exists between INF and insurance companies' ROA.

Gross domestic product (GDP): This is a country-level determinant of profitability in the insurance sector; therefore, increase in GDP, measured as the final output of goods and services (Gebru, 2015), is taken as the proxy of economic growth.

Market structure (MAR): Over the years, the concentration of market has remained a critical index of NLI demand negatively influencing ROA as a function of financial performance (Stojic and Njengomir, 2012). One of the instruments of evaluation of the MAR has always been the foreign premiums' density ratio as a function of market competitiveness (Ma and Pope, 2003).

Trade openness (TOP): This is a function of the indication of imports and exports' ratio to GDP (Outreville, 2013). A positive influence is anticipated on the NLI's ROA if the openness ratio is high. This is because firms would have to protect their investments from risk factors and occurrences which will promote increased trade (Chitiyo, 2017).

Underwriting profit (UWP): This is a measure of excess earned premiums after consideration of expenses and claims. It does not usually consider the profits from invested premiums (Kamau, 2014).

Total investment (TI): This covers the initial investment, the working capital, and subsequent investments imperative for an operational and profitable organization (D' Arcy and Garven, 1990).

Shareholder's fund (SF): This represents the owners' claim on assets after settlement of debts. It is usually composed of both the funds invested via preferred or common shares including invested fund after the initial payment, and the retained earnings, including net earnings not shared with shareholders over the years (Oyatayo, and Abass, 2020). Mathematically, it is the total assets less total liabilities.

Earning asset ratio (EAR): This measures the fraction of mean earning assets to total assets and normally used use to evaluate the proportion of assets actively generating income over a specific duration. It gives insight into how likely profit can be generated by the firm (D' Arcy and Garven, 1990).

Table 3.1 highlights these indicators and previous studies exploring their use as important factors of ROA in insurance businesses.

Table 3.1: Variables' description

Variables		Measurement	Reference(s)
Dependent		Financial performance (profitability: ROA)	Net profit before tax/total assets	
Independent	**Firm-specific**	Company size (SIZ)	Natural logarithm of total assets	Hardwick et al. (2011), Swiss Re (2008), Malik (2011)
		Leverage ratio (LEV)	Total liability/Total assets	Chen and Wong, (2004), Hamadan (2008)
		Tangibility of assets (TAN)	Fixed assets/Total assets	Hafiz (2011)
		Premium growth rate (PGR)	PGR=(GWP (t) – GWP (t-1)) ÷ GWP(t-1)	EmineÖner (2015), AnaMaria and Ghiorghe (2014)
		Liquidity ratio (LIQ)	Total current assets/Total current liabilities	Kramaric et al. (2017)
		Income level (INC)	GDP/capita rates as a proxy for income level	Arena (2008)

		Inflation rate (INF)	Percentage of inflation rate based on Central Bank Report	Oktiani et al. (2015)
	Macroeconomic	Market structure (MAR)	Herfindhal Index (HI): Σmarket shares of 10 largest non-life firms x 10000.	Ma and Pope (2003)
		Gross domestic product (GDP)	Annual percentage change in GDP=(GDPt−GDPt−1)/GDPt−1	Hasan et al. (2018)
		Trade openness (TOP)	(Exports/imports)/GDP	Outreville (2013)
	Underwriting profit	Underwriting profit (UWP)	The difference between the earned premiums and its expenses and claims	Kamau (2014)
		Total investment (TI)	Initial investment plus the working capital and other investments	D' Arcy and Garven (1990)
		Shareholder's fund (SF)	Total assets less total liabilities	Oyatayo, and Abass (2020)
		Earning asset ratio (EAR)	Ratio of mean earning assets to total assets	D' Arcy and Garven (1990)

Note: GWP= gross written premium.

3.4 Reliability and validity

Using the unit root test, cross sectional dependence test and Hausman test, the validity and reliability of the data employed in this study was ascertained. The Augmented Dickey-Fuller test

was utilized to ascertain the stationary or non-stationary nature of the time series prior to regression analysis to avoid issues with significance value emanating from data that are not related when non-stationary series are used. The Hausman test was employed in choosing the most appropriate model among the fixed and the random effect. Also, cross sectional dependence test helped to eliminate the cross-sectional dependence among the insurers used.

3.5 Approach to research objectives.

Unit root test, descriptive analysis, correlation analysis and regression analysis (random, fixed and pooled effect models) were used to analyze the research objectives. Also, Hausman test was adopted as the post assessment test to justify the reliability of the model that are estimated.

3.6 Chapter summary

This chapter provides details of the type and sources of secondary data used and the overall research design. The sampling population and method, reliability and validity of the research instrument, measurement of variables, data analysis methods, models specification, and the result expectation of the indicators on how the objectives of the study were achieved were also detailed.

The next chapter centers on the analysis and interpretation of data generated followed by comprehensive discussion of the results obtained.

CHAPTER FOUR

RESULTS PRESENTATION, DATA INTERPRETATION AND DISCUSSION

4.0 Introduction

In this section, the data generated in this study are discussed. It starts with the unit root analysis which helps in determining the nature of data set obtained in the study. Then the results of each objective are clearly presented in the order of descriptive statistics to correlation statistics and panel regression.

4.1 Unit root result

To determine if a variable in a regression has a unit root some test can be carried out, some of these tests include the Phillips-Perron test, Augmented Dickey-Fuller test (ADF test), KPSS test, ADF-GLS assessment among others. Kocenda and Cerny (2015) documents that the purpose of testing unit root in a model or regression is to ascertain the stationarity of stochastic element. Therefore, to avoid the absence of unit root in variables of a regression model establishes the that the regression is stationary, i.e., the variables have a constant mean and variance over time. Edrees (2016) also established that the presence of unit in a regression could result in very high R-Squared value and ultimately gives invalid results. The ADF test was adopted in ascertaining the presence of unit root. The hypothesis of Null state that each indices has unit root, while there is no unit root for the alternative. The ADF test probability value must be $< 5\%$, and in addition t-statistics of the ADF test must be $>$ values at 5% for all variables in the regression the alternative would be accepted while the hypothesis of Null would be rejected. The ADF test was carried out on all variables in each objective of this study and the result showed that probability value of each test is $< 5\%$ and their t-statistics (absolute value) were all $>$ the values at 5% level at level for most of the variables, except for variables such as tangibility of assets, size and log of shareholder's funds, and the three variable were stationary at first differential level with a $< 5\%$ probability value. The results of the unit root assessment are in appendix.

4.2 Analysis of data to achieve the objectives of the research

This study employs analysis of panel data (the fixed, random and pooled effect) in estimating the factors (both firm specific and macroeconomic factors) that are responsible or affects ROA of NLI

sector in SA. The Hausman's test was also adopted to assess which of fixed or random effect was most suitable or appropriate result for each of the objective. The pooled regression fixed, and random effect tests were carried out for each objective. In as much as some of the independent variables were significant in the pooled regression, the study did not account for the pooled regression results, this is because the regression model does not distinguish between the study's various NLI businesses. In other words, the pooled model denies the heterogeneity or individuality that may exist among the NLI firm, which the fixed and random effect account for.

4.2.1 Results for objective one

Table 4.1: Objective one variables' descriptive statistics

	ROA	PGR	LIQ	TAN	LEV	SIZ
Mean	0.046666	1.194047	0.909524	0.400998	0.659781	3.192838
Median	0.036139	1.369596	0.943456	0.282953	0.696651	2.788516
Maximum	0.446103	3.199229	1.000000	8.532063	1.539972	5.625379
Minimum	0.000000	-68.34470	0.000000	0.000000	0.000000	0.000000
Std. Dev.	0.053521	3.391256	0.124811	0.582985	0.205002	1.229144
Skewness	3.667561	-20.02359	-3.110003	7.360196	-0.309177	0.282116
Kurtosis	20.60032	411.1461	16.64482	92.55686	3.151387	2.151813
Jarque-Bera	6544.356	3027366.	4047.653	148268.2	7.295024	18.68002
Probability	0.000000	0.000000	0.000000	0.000000	0.026056	0.000088
Sum	20.15975	515.8281	392.9145	173.2311	285.0253	1379.306
Sum Sq. Dev.	1.234576	4956.766	6.713999	146.4848	18.11316	651.1525
Observations	432	432	432	432	432	432

The descriptive statistics of the variables in the first objective is shown in Table 4.1. It could be observed that, the ROA of the NLI firms has an average mean of 0.0466 which is the lowest for all variables, a standard deviation (SD) of 0.053521 with 0 and 0.4461 as minimum and maximum

values, respectively. Also, it shows that the PGR has an average of 1.1940 and a SD of 3.391 which is more than two times the mean of the variable. Liquidity as a variable has a maximum and minimum value of 1 and 0, respectively, with an average and SD of 0.909524 and -0.1248, respectively. The TAN for these NLI firms has a SD of 0.5829 with a mean 0.4009 and a maximum and minimum values of 8.532 (which is the maximum for the variables) and 0.0 respectively. The leverage ratio and size of the firms has a mean of 0.6597 and 3.1928 respectively with size having the highest mean in the data set.

Table 4.2: Results of Pearson's correlation for objective one

	ROA	PGR	LIQ	TAN	LEV	SIZ
ROA	1	-0.0273	-0.0328	-0.1636	-0.4077	-0.1885
PGR	-0.0273	1	-0.0042	-0.0242	-0.2071	-0.0188
LIQ	-0.0328	-0.0042	1	0.1075	0.4819	0.5201
TAN	-0.1636	-0.0242	0.1075	1	0.1310	0.1100
LEV	-0.4077	-0.2071	0.4819	0.1310	1	0.6431
SIZ	-0.1885	-0.0188	0.5201	0.1100	0.6431	1

Table 4.3: Panel result

Independent variables	Random Effect Test Significance	t-Statistics	Standard Coefficient	Fixed Effect Test Significance	t statistics	Standard Coefficient
PGR	0.0138*	-2.4726	0-.0023	0.0966	-1.6655	-0.00086
LIQ	0**	10.7544	0.0927	0**	9.4133	0.3138
TAN	0.0749	-1.7854	-0.0113	0.0723	-1.8022	-0.0065
LEV	0**	-4.9542	-0.1512	0.0059**	-2.768	-0.059
SIZ	0.248	-1.1568	0.0039	0.5988	-0.5266	-0.0045
Constant	0**	-5.9052	-0.1194	0**	-8.2401	-0.1818
F-statistics P-value	0			0		

		Durbin-Watson stat=				
R-Squared	0.2508	1.3765		0.6977		
Adjusted R-squared	0.242			0.6667		
Hausman Test (Proba>Chi Sq Statistic) = 44.2808	**Hausman test probability value =0.0000**					

Significant of * and ** represent 5% and 1% respectively

Table 4.3 presents the panel outcome from the random and fixed effect techniques of objective one of the study. The Hausman test probability value is 0.000 which is less than 5%, therefore the fixed effect result is the most appropriate result for objective one. Also, the Durbin-Watson statistics value of (1.3765) is > the R-squared value (0.2508) indicating that our regression is not spurious.

Premium Growth Rate (PGR): As indicated in Table 4.3, premium growth rate is negative but has a non-significant relationship with ROA. This clearly indicates that PGR is not a vital firm determinant in determining NLI firm's ROA in SA, which is not consistent with the report of Kaya (2015) who documented PGR as one of the factors that determines financial performance of insurance firms as well as that of AnaMaria and Ghiorghe (2014) that found negative but significant association with ROA as a function of profitability and PGR for insurance firms in Turkey.

Liquidity Ratio (LIQ): The result obtained with respect to liquidity ratio revealed that it is statistically significant and positively related to ROA at 1% level (Table 4.3). It also indicates that 1% increase in liquidity ratio will leads to 0.313% increase in ROA of the NLI firms provided other factors that could contribute to the increase in return of asset are well controlled. By implications, the NLI firms with higher liquidity ratios are anticipated to have lesser chances for failure of obligation payment to policyholders and firms with good liquidity can meet all its roles

at maturity despite the difficult circumstances due to the large supply current assets. This is the case with the observations in the present study, where a ROA positively associated with the estimated liquidity ratio of the study firms and the submission is consistent with a previous report (Oktiani et al., 2015), where a similar observation was given with a submission that the NLI firms can create a larger profit in line with the increase in current assets. Furthermore, the result also shows that the liquidity ratio is a vital firm factor determinant in determining ROA of NLI firm in SA and this agrees with the work of Tegegn et al. (2020) who also found that liquidity ratio is an important determinant of ROA.

Tangibility of Asset (TAN): The TAN is negative and not significant (statistically) with ROA. The result shows that tangibility of asset is not an important firm specific factor responsible for determining ROA of NLI firms in SA (Table 4.3). While this observation contracts the report of Hassan et al. (2019) on indicators impeding the ROA of NLI firms in Bangladish, it is in perfect agreement with the submissions of Li (2007) and Ahmed et al. (2011).

Leverage Ratio (LEV): Table 4.3 also shows that leverage ratio is negatively and significantly (1%) associated with ROA of NLI firms in SA as a function of financial performance. It also revealed a 1% rise in LEV that culminated to -0.059% decrease in ROA of the NLI firms provided other factors that could contribute to increase in ROA are well kept. This result suggests that should the firms increase their debt (if operating with debt), the profitability will significantly decline. This observation regarding LEV in the current study is in tandem with previous studies (Hamadan, 2008; Malik, 2011; Hailegebreal, 2016), but in sharp contrast to that of Mwangi and Murigu (2015), that affirmed that LEV was not associated with ROA in Kenyan insurance firms. Considering the foregoing, it could be substantiated that leverage ratio constitute a vital firm factor in determining ROA of NLI firms in SA.

Size (SIZ): Table 4.3 shows that SIZ of NLI firms is not significant but negatively associated with ROA. Generally, smaller companies have a higher risk of insolvency, as the receivables' cost tend to be more index as they have lower market power and hence can charge lower prices and have lower revenue efficiency (Cummins and Nini, 2002). This is however in sharp contrast to the observation in the current study where the size of the NLI firms negatively associated but without significantly influencing ROA, indicating that a rise in SIZ of the study firms had no impact on ROA. Although, size benefits the insurers in several ways such s diversification (Cummins and

Nini, 2002), the observation in this study takes a different dimension, suggesting that such concept do not hold for the SA NLI firms considered in this study.

4.2.2 Result for objective two

Table 4.4: Descriptive Statistics

	ROA	INC	INF	MAR	GDP	TOP
Mean	0.046883	1.311850	1.379372	2.210453	1.076966	1.357887
Median	0.036169	1.232422	1.289420	2.131346	1.085647	1.402739
Maximum	0.446103	3.136234	3.136779	2.779967	2.522314	2.767898
Minimum	0.000331	0.327179	0.561136	0.778586	-0.080922	0.832509
Std. Dev.	0.053550	0.494277	0.438590	0.547157	0.663664	0.387153
Skewness	3.669516	0.260249	0.558756	-1.029066	0.149853	1.238760
Kurtosis	20.58872	3.601564	4.018413	3.573543	2.154770	5.636965
Jarque-Bera	6507.772	11.02120	39.71926	81.40672	13.20291	227.4681
Probability	0.000000	0.004044	0.000000	0.000000	0.001358	0.000000
Sum	20.15975	548.3532	575.1983	946.0741	424.3247	566.2387
Sum Sq.Dev.	1.230200	101.8770	80.02208	127.8357	173.0968	62.35319
Observations	430	418	417	428	394	417

The descriptive statistics of the indicators in objective two which is to determine the macroeconomic factors' (INC, INF, GDP, MAR and TOP) impact on ROA of the NLI firms in SA is presented in Table 4.4. These variables are logged and transformed to reduce heteroskedasticity and to normalize the data since some of the variables have mean that are greater than the median (William, 2020). It could be observed that ROA has the least mean value of 0.046883 among all variables with a SD of 0.053550 with a maximum and minimum values of 0.446103 and 0.000331 respectively. Income levels, has an average value of 1.311850 and a SD of 0.494277. The minimum and maximum values are 0.327179 and 3.136234 respectively. INF has a mean of 1.3793

with a lower SD of 0.4385 with a minimum and maximum values of 0.5611 and 3.1367 respectively. Log of market structure has the mean value in all the variables with a value of 2.2104 but a much lower SD of 0.54716 with the highest median of 2.21045 among the variables. GDP has an average of 1.0769 and a SD of 0.6637 with maximum and minimum values of 2.5223 and -0.0809 respectively. The last macroeconomic variable is the log of trade openness with a mean of 1.3578 and SD of 0.3871 with a minimum and maximum values of 0.8325 and 2.7678, respectively.

Table 4.5: Pearson's Correlation

	ROA	INC	INF	MAR	GDP	TOP
ROA	1	-0.0967	-0.0935	0.0172	0.2578	-0.1305
INC	-0.0967	1	0.9952	-0.3626	0.0107	-0.1829
INF	-0.0935	0.9952	1	-0.3529	0.0029	-0.1874
MAR	0.0172	-0.3626	-0.3528	1	-0.1209	0.0331
GDP	0.2579	0.0107	0.0029	-0.1209	1	0.2366
TOP	-0.1305	-0.1829	-0.1874	0.0331	0.2367	1

Table 4.5 revealed that ROA is negatively correlated with log inc, log mar and log top with correlation values of -0.0967, -0.0935 and -0.1305 respectively, meaning that decrease in income levels, inflation, trade openness in the economy will result in increase in ROA of the NLI firms in SA.

Table 4.6: Panel result of objective two

Independent variables	Random Effect Test Significance	t-Statistics	Standard Coefficient	Fixed Effect Test Significance	t statistics	Standard Coefficient
INC	0.6462	-0.4594	-0.0183	0.7865	0.2710	-0.011
INF	0.5215	0.6416	0.0273	0.6181	0.4989	0.0217
MAR	0.5376	0.6170	0.0048	0.4753	0.7147	0.0068

GDP	0.0098**	2.5971	0.0101	0.0779	1.7684	0.0072
TOP	0.4455	-0.7637	-0.0056	0.8114	-0.2388	0.0086
Constant	0.4178	0.8112	0.0192	0.7334	0.3409	0.0085
F-statistics P-value	0.1001			0.0000		
R-Squared	0.0246	Durbin-Watson stat= 1.7534		0.7614		
Adjusted R-squared	0.01139			0.7336		
Hausman Test (Proba>Chi Sq Statistic) = 10.07	**Hausman test probability value =0.0732**					

Significant of ** represents 1%

Table 4.6 above reveals the panel outcome from the random and fixed effect techniques of objective two of the study. The Hausman test probability value is 7.32% which is more than 5%, hence, the random effect result is the most appropriate result for the objective two. Also, the Durbin-Watson statistics value (1.7534) is greater than the R-squared indicating that our regression is not spurious.

Gross Domestic Product (GDP): Presented in Table 4.6 is the data obtained with respect to GDP and it clearly shows that GDP is positive and the only macroeconomic variable that is statistically significant (1%). This implies that 1 percent rise in GDP leads to 0.01007% rise in ROA of the SA NLI firms provided other factors that could contribute to the increase in ROA are well controlled. The observation in this study is consistent with a previous study (Hailegebreal, 2016) but contrasted the submission of Data (2016) who document that GDP has no significant relationship with the ROA of NLI firms in Philippines.

Income Level (INC): The log of income level in this study non-statistically and negatively associated with ROA of the NLI firms in SA (Table 4.6).

Market Structure (MAR): The log of market structure has a positive correlation with ROA, but do not have significant relationship with the ROA of the NLI firms in SA (Table 4.6).

Inflation rate (INF): Under normal circumstance, a high inflation rate will impact economic growth through lowering of shares price of banking assets, which can affect the financial performance of the firm. This may also imply that a high inflation rate can result in decreased profitability of a company. In this study, the log of inflation positively but not significantly associated with financial performance as measured by ROA of the NLI firms in SA. While this contrasts the report of Kalengkongan (2013), where the rate of inflation negatively and significantly impacted the ROA of insurance firms, it is consistent with the finding of Lee (2014), where no relationship existed between inflation rate and ROA.

Trade Openness (TOP): The log of trade openness non-significantly and negatively related to ROA of the NLI firms in SA (Table 4.6).

4.2.3 Panel result for objective three

Table 4.7 Descriptive statistics of objective three

	ROA	TI	SF	UWP	E_A_RATO
Mean	0.046883	2.877007	2.035741	2.563280	0.363645
Median	0.036169	2.578589	1.778117	2.206355	0.354072
Maximum	0.446103	5.445985	4.110653	4.679818	0.967708
Minimum	0.000331	-0.276275	-1.217495	0.819914	0.017876
Std. Dev.	0.053550	1.310117	1.119934	1.097416	0.196288
Skewness	3.669516	0.182481	-0.102278	0.313185	0.333326
Kurtosis	20.58872	2.114596	2.801817	1.752669	2.646197
Jarque-Bera	6507.772	16.43205	1.419593	32.79423	8.544000
Probability	0.000000	0.000270	0.491744	0.000000	0.013954

Sum	20.15975	1237.113	855.0110	1035.565	130.9122
Sum Sq. Dev.	1.230200	736.3382	525.5321	485.3421	13.83192
Observations	430	430	420	404	360

From Table 4.7 depicts the descriptive statistics of the indicators of the third objective. The ROA obviously has the least mean value of all the variables with 0.046883. The SD is 0.05355 and a lowest and highest value of 0.000331 and 0.446103, respectively. The log of total investment has the highest mean of all the variables with 2.8770 and with a highest maximum value of 5.4459 with a minimum value of 0.2762 and the highest SD value of 1.3101 of all the variables. The log of shareholder's fund has a mean of 2.03574 and SD of 1.119 with lowest and highest value of -1.2174 and 4.1106. The log of underwriting profit has the second highest maximum value of 4.6798 and highest minimum value of 0.8199 with SD and mean of 1.0974 and 2.5632 respectively. Table 4.7 also shows that earning asset ratio shows a mean of 0.36364 and a SD of 0.1962 with highest and lowest values of 0.0178 and 0.9677.

Table 4.8 Correlation result for objective three

	ROA	TI	SF	UWP	E_A_RATIO
ROA	1	-0.4500	-0.3365	-0.4050	0.2557
TI	-0.4500	1	0.6751	0.9458	-0.6561
SF	-0.3365	0.6751	1	0.7605	-0.3601
UWP	-0.4050	0.9458	0.7605	1	-0.5349
E_A_RATIO	0.2557	-0.6561	-0.3601	-0.53495	1

The results of the correlation of the indicators for objective three revealed that, log of total investment, log of shareholder's fund and log of underwriting profit are negatively associated with ROA with -0.4500, -0.3365 and -0.4050 correlation values, respectively (Table 4.8). This observation means that each of these variables moves in opposite direction to ROA i.e. TI, SF and

UWP increases the ROA of NLI firm in SA increases Earning-asset ratio shows a positive correlation with ROA illustrating that as earning asset ratio increases the ROA of NLI firms in SA increases.

Table 4.9: Panel result of objective three

Independent variables	Random Effect Test Significance	t-Statistics	Standard Coefficient	Fixed Effect Test Significance	t statistics	Standard Coefficient
TI	0.0007**	-3.4274	-0.0198	0.0331*	-2.1401	-0.017923
SF	0.0077**	-2.6786	-0.0088	0.0003**	-3.6601	-0.017074
UWP	0.0492*	1.9734	0.0149	0.9652	-0.0436	-0.000574
E_A_RATIO	0.5695	-0.5693	-0.0086	0.002842**	0.1354	0.002842
Constant	0.0000**	6.9358	0.0785	0.0000**	4.4406	0.123791
F-statistics P-value	0.0000			0.0000		
R-Squared	0.103659	Durbin-Watson stat= 1.6357				
Adjusted R-squared	0.093560					
Hausman Test (Proba>Chi Sq Statistic) = 10.72	Hausman test probability value =0.0299					

Significant of * and ** represent 5% and 1% respectively

Table 4.9 reveals the panel result from the random and fixed effect techniques of objective three of the study. The Hausman test probability value is 2.99% which is more than 5%, hence, the effect (random) result is the best result for the objective two. Also, the Durbin-Watson statistic of (1.6357) is greater than the R-Squared value indicating that the regression is not spurious.

Objective three of this study was to investigate if underwriting profit of NLI firms in SA contributes to their financial performance as taken by ROA, and the findings are herewith presented.

Total investment (TI): In this study, the log of TI is negatively and significantly (at 1% level) associated with financial performance as measured by ROA (Table 4.9). It was also observed that 1% increase in total investment leads to -0.0198% decrease in ROA of the NLI firms provided that other indicators impeding ROA are not controlled.

Shareholder's funds (SF): The data obtained regarding the impact of SF on UWP revealed a negative and significant (at 1% level) relationship with financial performance (Table 4.9). This observation could imply that that a 1% increase in shareholder's fund leads to -0.0088% decrease in ROA of the SA NLI firms provided other factors that could contribute to the increase in ROA are well kept.

Underwriting profit (UWP): Underwriting profit associated positively and significantly (at 5% level) ROA (Table 4.9). The result also dictates that 1% increase in UWP leads to 0.0149% increase in ROA of the SA NLI firms provided other factors that could lead to the increase in ROA are controlled. This indicates that UWP positively influence ROA of non-insurance firms in SA.

Earning asset ratio (EAR): The EAR in this study negatively correlated with ROA but is statistically insignificant.

Discussion: Financial performance (ROA) of NLI firm and underwriting profit

Underwriting profit is one of the greatest interests of concern for insurance organizations but it is however limited by the rules and regulations guiding the different insurance firms in maximizing its benefits. D' Arcy and Garven (1990), documents that insurance firms obtain their underwriting profit by deducting incurred claims, income taxes, loading expenses and administrative cost from the sum of their investment gains and underwriting premiums. In other words, total net premiums minus claims and expenses. Hofflander and Drandell (1969) posits that insurance firms can do well in financial performance with little or no profit from their underwriting risk, this is different from the view of Akotey et al (2013) who established that there is a cut-off or a non-complementary association between investment income and UWP which is a major contributor to ROA of NLI firms. In a similar report, Kamau (2014) empirically investigated how UWP

associates with investment income of NLI firms in Kenya using secondary data from 2000 to 2011 and concluded that UWP non-significantly and positively correlated with investments. Contrary to the observation in this study, Oyatayo, and Abass (2020) established shareholder's fund as a variable that informs on the underwriting capacity of a NLI firms, indicating that the more the shareholder's fund available to undertake risk the more the profit from underwriting. Consequent upon these outcomes and judging by the findings of obtained in this study, it could be inferred that, the effect of UWP on the ROA of non-insurance firms is still unclear within the insurance world and, with little or no empirical fact in SA context advancing the correlation between UWP and financial performance as a function of ROA.

4.3 Chapter summary

In this chapter, the results are presented and discussed within the purview of the current state of the NLI business. Of the independent variables considered against ROA, the leverage and liquidity ratios along with GDP rate and shareholder's fund were identified as influencers of the financial performance of the South African NLI sector. The findings from the study contribute to the current understanding of the factors impeding the ROA of the SA NLI firms and could aid strategic implementation to improve the profitability of the firms within the overall market structure in the country.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.0 Introduction

In this chapter, the summary, conclusion and recommendations from the study are presented. The major contributions of the study to existing knowledge, limitations and possible areas of further research are also stated.

This dissertation is considered empirical studies and data on the indicators of financial performance (ROA) of NLI businesses in SA. Specifically, it examined the impact of firm-specific and macroeconomic variables as well as UWP as explanatory indicators on the ROA of the NLI firms. The annual financial secondary data employed in this study, which covered 36 listed SAn NLI firms from 2008 to 2019, was obtained from Refinitiv Eikon and S&P CapitallQ. The dissertation consists of five chapters, of which Chapter one focused on introduction and definition the scope of analysis covered as well as the significance of the study within insurance business. Chapter two was dedicated to review of literature on the NLI sector in SA and assessed the key factors identified to influence its financial performance to date, while Chapter three outlined the main methodology and research tools adopted in identifying valid firm-specific, macroeconomic and UWP variables that influencing the financial performance of NLI sector in SA. For this section, the panel data regression approach was employed. Chapter four presented the findings of the study alongside their discussion in greater details, as per the present state of the insurance sector and suggested probable recommendations for insurance firms, government and policy makers in SA. The last chapter provides conclusion from the study and highlights the limitations alongside suggestions for possible grey areas for further studies on the insurance structure dynamics in SA, Africa and other emerging markets with special focus on insurance.

5.1 Summary of key results

Over the study period (2008 – 2019) and the factors (firm-specific, macroeconomic and underwriting profit) influencing the financial performance (ROA) of 36 listed South African NLI businesses examined in this study, adopting the panel data regression approach, it was observed that, except for the leverage and liquidity ratios, other firm-specific variables had no significant (statistical) impact on ROA of the firms. Similarly, only GDP rate and shareholder's fund were

the statistically significant macroeconomic and underwriting variables, respectively, impacting ROA of SAn firms considered. Put together, the leverage and liquidity ratios along with GDP rate and shareholder's fund were noted as influencers of the financial performance of the SA NLI sector. This conclusion is consistent across selected econometric methods used in regression analyses models of NLI sector. In this context, it was evident that, for a good ROA of the NLI firms in SA, the companies should be able to calculate the technical reserves appropriately, construct the optimal portfolio to be able to generate maximum profits and streamline operating expenses. While providing some noteworthy insights on rational decisions regarding selection of NLI firms' stocks and strategies that would guide their operations, the data presented in this study will also be beneficial to regulatory authorities in formulating robust policies that will enhance growth of the economy growth and stability of the republic of SA.

5.2 Contributions to knowledge and limitations

As at the time of compilation of the work and to the best of my knowledge, this dissertation is the first exclusive assessment of the factors influencing the financial performance of the NLI firms in SA. The data employed and analyses performed in this study makes tangible contributions to the existing body of knowledge on the NLI sector. Firstly, the study covered critical literature in NLI sector and used the Unit root test, descriptive analysis, correlation and regression analyses as well as Hausman test to demystify the influence of explanatory (macroeconomic, firm-specific and underwriting profit) factors on financial performance of the SAn NLI businesses from 2008 to 2019. The importance of such assessment helps to appreciate the scope and significance of policies (regulatory) in enhancing the overall insurance performance and ameliorating the differences in the ROA of insurers.

Secondly, the dissertation also highlights the first empirical evaluation of financial performance in the SA NLI firms, which is germane in appreciating the capability of insurance frontliners to reduce cost and optimize both investment incomes and premiums.

Despite these contributions, the following limitations could be identified: First, financial data was used in this study to provide answers to the research questions which served as motivation for the putting together of the dissertation. Hence, the conclusions from the empirical evaluation were limited to the data (secondary) utilized. Another limitation has to do with the period of coverage.

Due to limitations regarding data, comparison could not be made to the periods before and after the regulations of 1998. Having access to such data could have assisted in ascertaining the influence of the legislative act on the variables or factors of interest in this study. Finally, the recommendation emanating from this work as well as the main findings only relates to the financial performance of the SAn NLI sector. Hence, extrapolation of the results for other African NLI entities may be limited due to variations in regulatory framework, development and market structures.

5.3 Recommendations

The analysis performed in dissertation seeks to provide baseline data that will stimulate further studies on NLI sector in Africa. As a relatively new and upcoming field of study in the continent, further studies catering for the following research gaps, which were not considered in the current study need to be done.

Firstly, considering the findings on the study factors in this study on ROA, a deeper method of qualitatively analysis of the operational environment of selected SA NLI firms could be considered in future studies. Such studies will provide information on identification of the issues bothering on NLI firms' management to avail baseline information for other NLI businesses in SA. The financial data assessment performed in this context is limited. Finally, the methodological approaches adopted analysis employed in this study may be attempted for the non-life and life insurance markets in other African countries, as well as other global upcoming insurance structures.

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APPENDIX A: Unit root Result

Note: A variable in a regression must be stationary, meaning that it has a constant mean and variance. So, for a variable to be stationary, it must not have a unit root. Therefore, we need to reject Null Hypothesis, to do this we observe two values in each table below:

1.) The ADF test Probability value, which must always be less than 5%.
2.) We compare the absolute values of the t-Statistics of the ADF test and Test Critical Values at 5% (which is our measure). For the variable to be stationary the t-statistics of the ADF test statistics must be more or greater than the critical value at 5%. For example, for ROA the t-statistics of 6.386529 is more than 2.868073 and again the probability value of the ADF test is 0.0000.

Therefore, ROA is stationary, and we reject the NULL Hypothesis.

Null Hypothesis: ROA has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=17)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		**-6.386529**	**0.0000**
Test critical values:	1% level	-3.445409	
	5% level	**-2.868073**	
	10% level	-2.570315	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(ROA)
Method: Least Squares
Date: 07/09/21   Time: 22:26
Sample (adjusted): 3 430
Included observations: 428 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ROA(-1)	-0.251412	0.039366	-6.386529	0.0000
D(ROA(-1))	-0.310592	0.045902	-6.766337	0.0000
C	0.011727	0.002651	4.423637	0.0000

==

Null Hypothesis: E_A_RATIO has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on AIC, maxlag=16)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		**-4.568282**	**0.0002**
Test critical values:	1% level	-3.449220	
	5% level	**-2.869750**	
	10% level	-2.571213	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(E_A_RATIO)
Method: Least Squares
Date: 07/09/21   Time: 22:39
Sample (adjusted): 2 430
Included observations: 343 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
E_A_RATIO(-1)	-0.123294	0.026989	-4.568282	0.0000
C	0.043781	0.011030	3.969192	0.0001

R-squared	0.057671	Mean dependent var	-0.000509
Adjusted R-squared	0.054907	S.D. dependent var	0.100213
S.E. of regression	0.097423	Akaike info criterion	-1.813690
Sum squared resid	3.236529	Schwarz criterion	-1.791313
Log likelihood	313.0479	Hannan-Quinn criter.	-1.804776
F-statistic	20.86920	Durbin-Watson stat	2.012199
Prob(F-statistic)	0.000007		

==

Null Hypothesis: LEV has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on AIC, maxlag=17)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		**-6.116630**	**0.0000**
Test critical values:	1% level	-3.445409	
	5% level	**-2.868073**	
	10% level	-2.570315	

*MacKinnon (1996) one-sided p-values.

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Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LEV)
Method: Least Squares

Date: 07/09/21   Time: 22:42
Sample (adjusted): 2 432
Included observations: 428 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LEV(-1)	**-0.157527**	**0.025754**	**-6.116630**	**0.0000**
C	0.105301	0.017842	5.901729	0.0000

R-squared	0.080734	Mean dependent var	0.000832
Adjusted R-squared	0.078576	S.D. dependent var	0.111247
S.E. of regression	0.106787	Akaike info criterion	-1.631305
Sum squared resid	4.857846	Schwarz criterion	-1.612337
Log likelihood	351.0993	Hannan-Quinn criter.	-1.623814
F-statistic	37.41316	Durbin-Watson stat	2.014033
Prob(F-statistic)	0.000000		

Null Hypothesis: LIQ has a unit root
Exogenous: Constant
Lag Length: 17 (Automatic - based on AIC, maxlag=17)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		**-3.628996**	**0.0056**
Test critical values:	1% level	-3.446734	
	5% level	**-2.868657**	
	10% level	-2.570627	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LIQ)
Method: Least Squares
Date: 07/09/21   Time: 22:44
Sample (adjusted): 19 432
Included observations: 394 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LIQ(-1)	-0.116063	0.031982	-3.628996	0.0003
D(LIQ(-1))	0.095313	0.055569	1.715223	0.0871
D(LIQ(-2))	-0.071748	0.055055	-1.303187	0.1933
D(LIQ(-3))	0.106652	0.054962	1.940489	0.0531
D(LIQ(-4))	0.006750	0.054362	0.124168	0.9012
D(LIQ(-5))	0.119677	0.053976	2.217213	0.0272
D(LIQ(-6))	0.140482	0.049769	2.822675	0.0050
D(LIQ(-7))	0.001558	0.049638	0.031384	0.9750
D(LIQ(-8))	0.005013	0.049540	0.101184	0.9195
D(LIQ(-9))	-0.034672	0.048906	-0.708953	0.4788
D(LIQ(-10))	0.056333	0.048600	1.159117	0.2471
D(LIQ(-11))	-0.037759	0.048363	-0.780743	0.4354
D(LIQ(-12))	-0.300623	0.048463	-6.203139	0.0000
D(LIQ(-13))	0.073269	0.050867	1.440399	0.1506
D(LIQ(-14))	-0.070026	0.050618	-1.383429	0.1674

D(LIQ(-15))	0.110871	0.050741	2.185023	0.0295
D(LIQ(-16))	-0.049778	0.050146	-0.992654	0.3215
D(LIQ(-17))	0.112598	0.049131	2.291815	0.0225
C	0.105747	0.029187	3.623055	0.0003

R-squared	0.212563	Mean dependent var	0.000110
Adjusted R-squared	0.174766	S.D. dependent var	0.049834
S.E. of regression	0.045270	Akaike info criterion	-3.305324
Sum squared resid	0.768514	Schwarz criterion	-3.113571
Log likelihood	670.1487	Hannan-Quinn criter.	-3.229342
F-statistic	5.623800	Durbin-Watson stat	2.013623
Prob(F-statistic)	0.000000		

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Null Hypothesis: LOG_INC has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on AIC, maxlag=17)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		**-5.908600**	**0.0000**
Test critical values:	1% level	-3.445852	
	5% level	**-2.868268**	
	10% level	-2.570419	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOG_INC)
Method: Least Squares
Date: 07/09/21   Time: 22:48
Sample (adjusted): 2 430
Included observations: 416 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG_INC(-1)	-0.152062	0.025736	-5.908600	0.0000
C	0.198077	0.036085	5.489198	0.0000

R-squared	0.077769	Mean dependent var	-0.001431
Adjusted R-squared	0.075542	S.D. dependent var	0.269991
S.E. of regression	0.259593	Akaike info criterion	0.145391
Sum squared resid	27.89880	Schwarz criterion	0.164769
Log likelihood	-28.24129	Hannan-Quinn criter.	0.153053
F-statistic	34.91156	Durbin-Watson stat	2.121552
Prob(F-statistic)	0.000000		

===

Null Hypothesis: LOG_INF has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on AIC, maxlag=17)

	t-Statistic	Prob.*

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	**-6.155886**	**0.0000**
Test critical values: 1% level	-3.445928	
5% level	-2.868302	
10% level	-2.570437	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOG_INF)
Method: Least Squares
Date: 07/09/21   Time: 22:49
Sample (adjusted): 2 430
Included observations: 414 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG_INF(-1)	-0.164390	0.026705	-6.155886	0.0000
C	0.225920	0.038659	5.843865	0.0000

R-squared	0.084231	Mean dependent var	-0.000838
Adjusted R-squared	0.082008	S.D. dependent var	0.249161
S.E. of regression	0.238726	Akaike info criterion	-0.022183
Sum squared resid	23.47988	Schwarz criterion	-0.002735
Log likelihood	6.591924	Hannan-Quinn criter.	-0.014492
F-statistic	37.89494	Durbin-Watson stat	2.148050
Prob(F-statistic)	0.000000		

===

Null Hypothesis: D(LOG_MAR) has a unit root (1st Level)
Exogenous: Constant
Lag Length: 9 (Automatic - based on AIC, maxlag=17)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	**-5.457028**	**0.0000**
Test critical values: 1% level	-3.446241	
5% level	**-2.868440**	
10% level	-2.570511	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOG_MAR,2)
Method: Least Squares
Date: 07/09/21   Time: 22:52
Sample (adjusted): 12 430
Included observations: 406 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOG_MAR(-1))	-1.016189	0.186217	-5.457028	0.0000

D(LOG_MAR(-1),2)	-0.035707	0.173087	-0.206298	0.8367
D(LOG_MAR(-2),2)	-0.129132	0.160055	-0.806795	0.4203
D(LOG_MAR(-3),2)	-0.147645	0.147283	-1.002462	0.3167
D(LOG_MAR(-4),2)	-0.134382	0.134676	-0.997815	0.3190
D(LOG_MAR(-5),2)	-0.168466	0.121008	-1.392195	0.1646
D(LOG_MAR(-6),2)	-0.180427	0.106580	-1.692884	0.0913
D(LOG_MAR(-7),2)	-0.235560	0.089464	-2.632998	0.0088
D(LOG_MAR(-8),2)	-0.292894	0.069547	-4.211443	0.0000
D(LOG_MAR(-9),2)	-0.346328	0.047297	-7.322412	0.0000
C	-0.002534	0.005721	-0.442853	0.6581

R-squared	0.601625	Mean dependent var	0.000644
Adjusted R-squared	0.591539	S.D. dependent var	0.179685
S.E. of regression	0.114838	Akaike info criterion	-1.463862
Sum squared resid	5.209203	Schwarz criterion	-1.355316
Log likelihood	308.1640	Hannan-Quinn criter.	-1.420902
F-statistic	59.65273	Durbin-Watson stat	1.980821
Prob(F-statistic)	0.000000		

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Null Hypothesis: LOG_SF has a unit root
Exogenous: Constant
Lag Length: 12 (Automatic - based on AIC, maxlag=17)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		**-4.717731**	**0.0001**
Test critical values:	1% level	-3.446734	
	5% level	**-2.868657**	
	10% level	-2.570627	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOG_SF)
Method: Least Squares
Date: 07/09/21   Time: 22:54
Sample (adjusted): 14 430
Included observations: 394 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG_SF(-1)	-0.169006	0.035824	-4.717731	0.0000
D(LOG_SF(-1))	0.100115	0.050221	1.993515	0.0469
D(LOG_SF(-2))	0.067168	0.050288	1.335660	0.1825
D(LOG_SF(-3))	0.091895	0.049394	1.860471	0.0636
D(LOG_SF(-4))	0.061618	0.049445	1.246181	0.2135
D(LOG_SF(-5))	0.081714	0.049256	1.658960	0.0979
D(LOG_SF(-6))	0.065357	0.049279	1.326266	0.1855
D(LOG_SF(-7))	0.091446	0.049134	1.861143	0.0635
D(LOG_SF(-8))	0.060163	0.049180	1.223304	0.2220
D(LOG_SF(-9))	0.082431	0.048984	1.682812	0.0932
D(LOG_SF(-10))	-0.026339	0.049001	-0.537515	0.5912

D(LOG_SF(-11))	0.069272	0.048771	1.420334	0.1563
D(LOG_SF(-12))	-0.303886	0.051096	-5.947322	0.0000
C	0.342804	0.076124	4.503259	0.0000

R-squared	0.192456	Mean dependent var	0.001994
Adjusted R-squared	0.164830	S.D. dependent var	0.526196
S.E. of regression	0.480878	Akaike info criterion	1.408480
Sum squared resid	87.87257	Schwarz criterion	1.549771
Log likelihood	-263.4705	Hannan-Quinn criter.	1.464466
F-statistic	6.966356	Durbin-Watson stat	2.008239
Prob(F-statistic)	0.000000		

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Null Hypothesis: LOG_TI has a unit root
Exogenous: Constant
Lag Length: 12 (Automatic - based on AIC, maxlag=17)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		**-3.190334**	**0.0213**
Test critical values:	1% level	-3.445814	
	5% level	**-2.868252**	
	10% level	-2.570410	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOG_TI)
Method: Least Squares
Date: 07/09/21   Time: 22:56
Sample (adjusted): 14 430
Included observations: 417 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG_TI(-1)	-0.076602	0.024011	-3.190334	0.0015
D(LOG_TI(-1))	0.024241	0.047427	0.511124	0.6095
D(LOG_TI(-2))	0.043945	0.047283	0.929413	0.3532
D(LOG_TI(-3))	-0.023066	0.047287	-0.487786	0.6260
D(LOG_TI(-4))	0.024626	0.047090	0.522949	0.6013
D(LOG_TI(-5))	0.005094	0.047071	0.108226	0.9139
D(LOG_TI(-6))	0.052927	0.046979	1.126600	0.2606
D(LOG_TI(-7))	0.019279	0.047040	0.409845	0.6821
D(LOG_TI(-8))	0.033449	0.046917	0.712936	0.4763
D(LOG_TI(-9))	-0.015015	0.046881	-0.320268	0.7489
D(LOG_TI(-10))	0.037021	0.046615	0.794184	0.4276
D(LOG_TI(-11))	-0.005363	0.046592	-0.115117	0.9084
D(LOG_TI(-12))	-0.356500	0.047533	-7.499978	0.0000
C	0.225503	0.073282	3.077213	0.0022

R-squared	0.172307	Mean dependent var	0.004237
Adjusted R-squared	0.145607	S.D. dependent var	0.533212
S.E. of regression	0.492866	Akaike info criterion	1.455838
Sum squared resid	97.89555	Schwarz criterion	1.591242
Log likelihood	-289.5423	Hannan-Quinn criter.	1.509371

F-statistic	6.453498	Durbin-Watson stat	1.992385
Prob(F-statistic)	0.000000		

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Null Hypothesis: D(LOG_SF) has a unit root
Exogenous: Constant
Lag Length: 13 (Automatic - based on AIC, maxlag=17)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		**-8.961002**	**0.0000**
Test critical values:	1% level	-3.446906	
	5% level	**-2.868732**	
	10% level	-2.570668	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOG_SF,2)
Method: Least Squares
Date: 07/09/21   Time: 22:58
Sample (adjusted): 16 430
Included observations: 390 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOG_SF(-1))	-1.841597	0.205512	-8.961002	0.0000
D(LOG_SF(-1),2)	0.816220	0.189621	4.304474	0.0000
D(LOG_SF(-2),2)	0.757229	0.174028	4.351189	0.0000
D(LOG_SF(-3),2)	0.753174	0.165247	4.557876	0.0000
D(LOG_SF(-4),2)	0.718584	0.156073	4.604164	0.0000
D(LOG_SF(-5),2)	0.714511	0.148445	4.813319	0.0000
D(LOG_SF(-6),2)	0.693716	0.140336	4.943265	0.0000
D(LOG_SF(-7),2)	0.701651	0.132059	5.313171	0.0000
D(LOG_SF(-8),2)	0.677054	0.123230	5.494220	0.0000
D(LOG_SF(-9),2)	0.676905	0.113782	5.949160	0.0000
D(LOG_SF(-10),2)	0.568126	0.103633	5.482102	0.0000
D(LOG_SF(-11),2)	0.561868	0.091585	6.134905	0.0000
D(LOG_SF(-12),2)	0.180569	0.076528	2.359516	0.0188
D(LOG_SF(-13),2)	0.094023	0.053632	1.753120	0.0804
C	0.001092	0.025002	0.043658	0.9652

R-squared	0.572492	Mean dependent var	0.000167
Adjusted R-squared	0.556532	S.D. dependent var	0.741443
S.E. of regression	0.493752	Akaike info criterion	1.464135
Sum squared resid	91.42160	Schwarz criterion	1.616679
Log likelihood	-270.5064	Hannan-Quinn criter.	1.524604
F-statistic	35.86978	Durbin-Watson stat	2.005696
Prob(F-statistic)	0.000000		

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Null Hypothesis: LOG_TI has a unit root
Exogenous: Constant
Lag Length: 12 (Automatic - based on AIC, maxlag=17)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	**-3.190334**	**0.0213**
Test critical values:	1% level	-3.445814
	5% level	**-2.868252**
	10% level	-2.570410

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOG_TI)
Method: Least Squares
Date: 07/09/21   Time: 23:00
Sample (adjusted): 14 430
Included observations: 417 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG_TI(-1)	-0.076602	0.024011	-3.190334	0.0015
D(LOG_TI(-1))	0.024241	0.047427	0.511124	0.6095
D(LOG_TI(-2))	0.043945	0.047283	0.929413	0.3532
D(LOG_TI(-3))	-0.023066	0.047287	-0.487786	0.6260
D(LOG_TI(-4))	0.024626	0.047090	0.522949	0.6013
D(LOG_TI(-5))	0.005094	0.047071	0.108226	0.9139
D(LOG_TI(-6))	0.052927	0.046979	1.126600	0.2606
D(LOG_TI(-7))	0.019279	0.047040	0.409845	0.6821
D(LOG_TI(-8))	0.033449	0.046917	0.712936	0.4763
D(LOG_TI(-9))	-0.015015	0.046881	-0.320268	0.7489
D(LOG_TI(-10))	0.037021	0.046615	0.794184	0.4276
D(LOG_TI(-11))	-0.005363	0.046592	-0.115117	0.9084
D(LOG_TI(-12))	-0.356500	0.047533	-7.499978	0.0000
C	0.225503	0.073282	3.077213	0.0022

R-squared	0.172307	Mean dependent var	0.004237
Adjusted R-squared	0.145607	S.D. dependent var	0.533212
S.E. of regression	0.492866	Akaike info criterion	1.455838
Sum squared resid	97.89555	Schwarz criterion	1.591242
Log likelihood	-289.5423	Hannan-Quinn criter.	1.509371
F-statistic	6.453498	Durbin-Watson stat	1.992385
Prob(F-statistic)	0.000000		

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Null Hypothesis: LOG_UWP has a unit root
Exogenous: Constant
Lag Length: 12 (Automatic - based on AIC, maxlag=17)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	**-3.028752**	**0.0332**
Test critical values:	1% level	-3.448675
	5% level	**-2.869511**
	10% level	-2.571085

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOG_UWP)
Method: Least Squares
Date: 07/09/21   Time: 23:02
Sample (adjusted): 14 430
Included observations: 353 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG_UWP(-1)	-0.081210	0.026813	-3.028752	0.0026
D(LOG_UWP(-1))	0.060980	0.047048	1.296102	0.1958
D(LOG_UWP(-2))	0.036039	0.047100	0.765171	0.4447
D(LOG_UWP(-3))	0.031691	0.047030	0.673852	0.5009
D(LOG_UWP(-4))	0.000507	0.046990	0.010781	0.9914
D(LOG_UWP(-5))	0.033340	0.046902	0.710845	0.4777
D(LOG_UWP(-6))	0.030725	0.046877	0.655440	0.5126
D(LOG_UWP(-7))	0.037026	0.046837	0.790513	0.4298
D(LOG_UWP(-8))	0.022002	0.046858	0.469551	0.6390
D(LOG_UWP(-9))	0.035997	0.046678	0.771174	0.4411
D(LOG_UWP(-10))	0.029479	0.046628	0.632211	0.5277
D(LOG_UWP(-11))	0.040441	0.046567	0.868436	0.3858
D(LOG_UWP(-12))	-0.489267	0.048027	-10.18737	0.0000
C	0.208747	0.071424	2.922671	0.0037

R-squared	0.292615	Mean dependent var		0.002635
Adjusted R-squared	0.265489	S.D. dependent var		0.472369
S.E. of regression	0.404837	Akaike info criterion		1.068189
Sum squared resid	55.55981	Schwarz criterion		1.221534
Log likelihood	-174.5354	Hannan-Quinn criter.		1.129206
F-statistic	10.78693	Durbin-Watson stat		1.985566
Prob(F-statistic)	0.000000			

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Null Hypothesis: PGR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on AIC, maxlag=17)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		**-20.69227**	**0.0000**
Test critical values:	1% level	-3.445409	
	5% level	**-2.868073**	
	10% level	-2.570315	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(PGR)
Method: Least Squares
Date: 07/09/21   Time: 23:03
Sample (adjusted): 2 432
Included observations: 428 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PGR(-1)	-1.002497	0.048448	-20.69227	0.0000
C	1.205433	0.174737	6.898545	0.0000

R-squared	0.501270	Mean dependent var		0.004717
Adjusted R-squared	0.500100	S.D. dependent var		4.822728
S.E. of regression	3.409844	Akaike info criterion		5.295872
Sum squared resid	4953.118	Schwarz criterion		5.314840
Log likelihood	-1131.317	Hannan-Quinn criter.		5.303363
F-statistic	428.1700	Durbin-Watson stat		2.004698
Prob(F-statistic)	0.000000			

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Null Hypothesis: SIZ has a unit root
Exogenous: Constant
Lag Length: 12 (Automatic - based on AIC, maxlag=17)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		**-3.316451**	**0.0148**
Test critical values:	1% level	-3.446321	
	5% level	**-2.868475**	
	10% level	-2.570530	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SIZ)
Method: Least Squares
Date: 07/09/21   Time: 23:08
Sample (adjusted): 14 432
Included observations: 404 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SIZ(-1)	-0.082170	0.024777	-3.316451	0.0010
D(SIZ(-1))	0.055784	0.046474	1.200334	0.2307
D(SIZ(-2))	0.017418	0.046486	0.374700	0.7081
D(SIZ(-3))	0.017698	0.046254	0.382634	0.7022
D(SIZ(-4))	0.017015	0.046168	0.368541	0.7127
D(SIZ(-5))	0.035926	0.046137	0.778676	0.4366
D(SIZ(-6))	0.018173	0.046122	0.394023	0.6938
D(SIZ(-7))	0.041051	0.046036	0.891731	0.3731
D(SIZ(-8))	0.041665	0.046009	0.905568	0.3657
D(SIZ(-9))	0.022987	0.045945	0.500318	0.6171
D(SIZ(-10))	0.012321	0.045853	0.268704	0.7883
D(SIZ(-11))	0.031873	0.045762	0.696483	0.4865
D(SIZ(-12))	-0.429543	0.047833	-8.980031	0.0000
C	0.266113	0.082528	3.224498	0.0014

R-squared	0.227123	Mean dependent var		0.002020
Adjusted R-squared	0.201361	S.D. dependent var		0.506313
S.E. of regression	0.452474	Akaike info criterion		1.285868

		Sum squared resid	79.84591	Schwarz criterion	1.424531
Log likelihood	-245.7453	Hannan-Quinn criter.	1.340759
F-statistic	8.816026	Durbin-Watson stat	2.012249
Prob(F-statistic)	0.000000		

===

Null Hypothesis: TAN has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on AIC, maxlag=17)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		**-8.291277**	**0.0000**
Test critical values:	1% level	-3.445590	
	5% level	**-2.868153**	
	10% level	-2.570357	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TAN)
Method: Least Squares
Date: 07/09/21   Time: 23:09
Sample (adjusted): 3 432
Included observations: 423 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TAN(-1)	-0.396232	0.047789	-8.291277	0.0000
D(TAN(-1))	-0.214258	0.047626	-4.498730	0.0000
C	0.162641	0.031080	5.233037	0.0000
R-squared	0.286620	Mean dependent var	0.000899
Adjusted R-squared	0.283223	S.D. dependent var	0.589193
S.E. of regression	0.498827	Akaike info criterion	1.453950
Sum squared resid	104.5077	Schwarz criterion	1.482655
Log likelihood	-304.5105	Hannan-Quinn criter.	1.465293
F-statistic	84.37334	Durbin-Watson stat	2.006809
Prob(F-statistic)	0.000000		