

FACTORS AFFECTING PROFITABILITY OF INSURANCE COMPANIES IN ETHIOPIA



SALALE UNIVERSITY COLLEGE OF BUSINESS AND ECONOMICS DEPARTMENT OF ECONOMICS

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DECLARATION

I, Kuma Motuma, ID. No. WM0235/15-0, do hereby declare that this thesis entitled “Factors Affecting Profitability of Insurance Companies In Ethiopia ” is my original work and that it has not been submitted partially or in full by any other person for an award of degree or publication in any other university/institution.

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Signature _____ Date _____.

CERTIFICATE

This is to certify that the thesis entitled “**Factors that Affect Profitability of Insurance Companies in Ethiopia**” submitted to Department of Economics, College of Business and Economics, Salale University by Kuma motuma for the degree of Masters of Science in Development economics, is original work done by the candidate under my supervision. I further certify that the entire thesis represents the independent work of Kuma motuma and all the research works were undertaken by the candidate under my supervision and guidance.

This thesis has been submitted for examination with my approval.

Name of main advisor: Dr. Dejene N. (PHD) Signature _____ Date _____

Name of co-advisor: Dereje A. Signature _____ Date _____

ABBREVIATIONS AND ACRONOMY

GDP: Gross in Domestic Product

NBE: National Bank of Ethiopia

ROA: Return on Asset

ROE: Return on Equity

ROIC: Return on Invested Capital

TA: Tangibility of Assets

UK: United Kingdom

VOC: Volume of Capital

OLS: Ordinary least squares

AG: Age of company

LR: Loss ratio

LQ: Liquidity ratio

IR: Interest rate

IF: Inflation rate

SZ: Size of company

UIC: United insurance company

EIC: Ethiopian Insurance Corporation

ABSTRACT

This study examined the effects of factors (age of company, GDP, inflation rate, interest rate, liquidity ratio, loss ratio, size of company and tangibility of assets) on the profitability of insurance companies in Ethiopia. Profitability is a dependent variable, while age of company, GDP, inflation rate, interest rate, liquidity ratio, loss ratio, size of company and tangibility of assets are independent variables. The sample in this study includes eight of the listed insurance companies (EIC, Awash, Nile, Africa, Nib, Nyala, UNIC and Oromia) for eleven years (2013 - 2023). Secondary data was obtained from the financial statements of insurance companies; the financial publications of NBE were analyzed. Panel data was analyzed using Fixed-effect (FE) Model. From the regression results; age of the company, GDP, liquidity ratio and size of the companies are identified as the most important determinants of profitability. In contrast, inflation rate and loss ratio were negatively but significantly related to profitability. Lastly, interest rate and tangibility of assets were not significantly related to profitability.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Insurance is a contract, represented by a policy, in which a policyholder receives financial protection or reimbursement against losses from an insurance company. Modern Insurance Service in Ethiopia started in 1905. Before the commencement of Modern Insurance Service in the country, there have been traditional practices by which people help each other whenever they face either financial difficulties or needs assistance. “Edir” and “Ekub” are Examples of such traditional practices and have some similarities with Modern Insurance. In the case of “Edir ” people form an association where by each member contributes a fixed sum, normally monthly, to a common fund from which predetermined compensations are paid to members upon occurrence of unforeseen events such as death of family members or relatives. The compensation is meant to cover expenses that a member would incur as the result of the incident. The insurance industry in Ethiopia has been growing rapidly in recent years, driven by factors such as increased awareness, a growing middle class, and a desire for financial security. Currently there are one public owned and seventeen private insurance companies in operation in Ethiopia. (Wako, 2012)

The insurance industry plays a crucial role in the economic development of a country by providing risk management and financial protection to individuals and businesses. In Ethiopia, the insurance sector has been growing steadily, contributing to the overall financial stability and security of the economy. According to (Naveed, Zulfqar and Ahmad, 2017), shows that the efficiency of financial intermediation and transfer of risk can affect economic growth while at the same time institutional insolvencies can result in systemic crises which have unfavorable consequences for the economy as a whole. Therefore, financial institutions such as insurance companies continue to play an important role in financing and insuring economic activities, contributing to the stability of the financial system and the overall stability of the national economy.

According to (Malik and Hifza, 2011), profitability is one of the most important objectives of financial management since one goal of financial management is to maximize the owners' wealth, and profitability is very important determinant of performance. Therefore, insurance companies have importance both for businesses and individuals as they channel funds and indemnify the losses of other sectors in the economy and put them in the same positions as they were before the occurrence of the loss respectively. In addition, insurance companies provide economic and social benefits in the society by prevention of losses, reduction in anxiousness, fear and increasing employment.

Therefore, from the above expression, it can be concluded that the current business world is unsustainable without financial institutions such as insurance companies, because on the one hand, it is normal for some economies to have surpluses and others to have deficits; on the other hand, high-risk enterprises are not able to take various risks in the current extremely uncertain environment. The performance of financial institutions can affect economic growth, while institutional failures can lead to systemic crises with adverse consequences for the entire economy. Therefore, it is necessary to conduct empirical research to find out the important factors that affect the profitability of insurance companies in order to help relevant departments focus on related factors. To this end, the study examined the factors affecting the companies' financial performance by examining empirical evidence in insurance companies, so that the insurer could focus on the appropriate factors of profitability to maximize their profit.

1.2 Statement of the Problem

Profitability is an important tool for measuring the financial performance of companies. Measuring the performance of financial institutions has become increasingly important in the corporate finance literature because companies in these industries act as intermediaries that not only provide a mechanism for saving money and transferring risks, but also help to appropriately direct funds from surplus economic entities to loss-making economic entities. The insurance industry plays an important role in safeguarding and maintaining the economic system, providing vitality for the

development of other industries and the economy, and ensuring the successful operation of the industry. In order to achieve this goal, the insurance industry must be profitable, financially strong, and solvent. Therefore, the main issue that needs to be studied is not only to measure the financial performance of insurance companies but also to have a clear insight into the factors that affect the financial performance of the industry.

High performance reflects management effectiveness and efficiency in making use of company's resources and this in turn contributes to the economy at large. In the same vein, financial performance is a measure of organization's earnings, profits and appreciation in its value which is reflected by the rise in share price (Mohammed and Buhari, 2019). The subject of financial performance has received significant attention from scholars in the various areas of business and strategic management. It has also been the primary concern of business practitioners in all types of organizations since financial performance has implications to organization's health and ultimately its survival (Almajali, 2012).

The insurance sector, in particular, is a vital component of the immunological and repair system of an economy, and its prosperous operation can stimulate the growth of other sectors as well as other enterprises. The optimal functioning of an industry as a whole and of a single firm in particular contributes to the growth of the industry as a whole, which in turn contributes to the economy's overall success by raising the market value of that particular firm (World Bank, 2015).

Measuring the performance of financial institutions has gained the relevance in the corporate finance literature because as intermediaries, these companies in the sector are not only providing the mechanism of saving money and transferring risk but also helps to channel funds in an appropriate way from surplus economic units to deficit economic units so as to support the investment activities in the economy. In this regard Insurance Companies play a significant role in a country's economic growth and offers financial protection to an individual or firm against monetary losses suffered from unforeseen circumstances (Kihara, 2012). This is because the world is characterized by risks and uncertainties and insurance has evolved as a way of providing security against the risks and uncertainties. In this situation, it is vital to identify what drives insurers'

profitability. According to (Malik, 2011), profitability for insurance companies is affected by different factors including actual mortality experience, investment earning, capital gains or losses, the scale of policyholder dividends, and federal and state taxes. (Yuvaraj and Ayele, 2013), Growth, leverage, volume of capital, size, and liquidity are identified as most important determinant factors of profitability in contrast, the age of companies and tangibility of assets (TA) are not significantly related with profitability. (Daare, 2016), examined the determinants of insurers' profitability indicated that , size in terms of total assets, loss ratio, liquidity, age and GDP are positively correlated with ROA while capital adequacy, premium growth and inflation are negatively correlated with return on asset.

In addition (Wanjugu, 2015) on his research point out that, leverage (Lev), equity capital and management capability the better the financial performance of general insurers in Kenya. However size and foreign ownership appear to be negatively related to return on assets. On the other hand research conducted by (Maria, 2014), confirmed that there is direct association between profitability of insurance companies' with both firm-specific factors and macroeconomic factors. However, the results found by the researchers mentioned above in the empirical revealed inconsistencies regarding some variables like age, size and volume of capital according to the country in which the research is conducted.

The profitability of insurance companies in Ethiopia has been fluctuating over time since their establishment. In developing countries, only smaller group of studies examined financial performance of insurance companies; hence there is a need for such studies in insurance sector in developing countries. This is because identifying the factors of financial performance help to avoid losses (Malik, 2011).The study conducted on the factors affecting profitability of insurance companies in Ethiopia is few in number, for example (Daniel and Tilahun , 2013), studied on factors affecting insurance companies' profitability in Ethiopia. They only focused on internal or specific factors and have not considered external factors like macroeconomic (gross domestic products, Inflation and interest rate) on the other hand (Reshid and Suheyli, 2015) on his study company specific factors like underwriting risk, reinsurance dependence, solvency ratio , technical provision risk, liquidity, company size and premium growth and macroeconomic variables such as

growth of gross domestic product and i.e. only financial statement variables but not include non-financial statements variables such as interest rate and inflation.

Therefore, this study is believed to fill the gap explained above by providing information on the internal and external factors that affect profitability by studying the untouched ones and replicating those existing in Ethiopia by studying all the country`s operating insurance companies that have a data on life and general insurance for eleven years.

1.3 Research Questions

Based on the general purpose statement highlighted above, the following specific research question was posed and this study attempts to answer it:

- ❖ What are the internal and external factors that affect Ethiopian insurance companies' profitability?
- ❖ What is the ranking of factors based on their influence on insurance companies' profitability?
- ❖ What is the relationship between the identified factors and profitability in insurance companies?

1.4 Objectives

1.4.1 General objective

The general objective of the study was to identify and assess the main factors that affect the profitability of insurance companies in Ethiopia.

1.4.2 Specific Objectives

Based on the above general objective, the researcher elucidates the following specific objectives:

- To identify the internal and external factors that affect the profitability of insurance companies in Ethiopia
- To rank the factors according to their degree of influence on insurance companies Profitability.

- To determine the relationship between these factors and profitability in insurance companies.

1.5 Hypothesis

A hypothesis is an assumption that is made based on some evidence. This is the initial point of any investigation that translates the research questions into predictions. It includes components like variables, population and the relation between the variables. The null and alternative hypotheses are two competing claims that researchers weigh evidence for and against using a statistical test:

- Null hypothesis (H₀): There's no effect in the population.
- Alternative hypothesis (H_a or H₁): There's an effect in the population.

Accordingly, the following hypotheses are formulated in this study:

Ho1: Loss ratio has no significant impact on profitability of insurance Companies' in Ethiopia

Ho2: Liquidity ratio has no significant impact on profitability of insurance Companies' in Ethiopia

Ho3: Tangibility of assets (TA) has no significant impact on profitability of insurance Companies' in Ethiopia

Ho4: Interest rate has no significant impact on profitability of insurance Companies' in Ethiopia

Ho5: Inflation has no significant impact on profitability of insurance Companies' in Ethiopia

Ho6: Growth Domestic Product has no significant impact on profitability of insurance Companies' in Ethiopia.

Ho7: Age of company has no significant impact on profitability of insurance Companies' in Ethiopia

Ho8: Company Size has no significant impact on profitability of insurance Companies' in Ethiopia

1.6 Significance of the Study

This study aims to assist policymakers, clients, and executives in the insurance sector in Ethiopia by examining key factors influencing the industry. Despite the significant impact of insurance on the country's economy, which is closely tied to the industry's performance and profitability, there is a lack of research in this area. To the best of the researcher's knowledge, there is a scarcity of

empirical studies focusing on the performance of the insurance industries in Ethiopia. Hence, the objective of this study is to close this divide, stimulate additional investigation in this domain, and provide pertinent suggestions. The administration is keen on identifying key performance indicators that determine the success or failure of the company. This enables them to take appropriate actions to enhance the company's performance and make informed decisions. Similarly, the government is interested in identifying companies that operate successfully and those that fail to take the necessary measures to prevent bankruptcy crises. This helps in avoiding financial instability in these companies. Additionally, customers are interested in assessing the ability of insurance companies to fulfill their obligations. They rely on the indicators of success of these companies to determine their reliability in paying claims and meeting their commitments.

1.7 Scope of the study

The study focused exclusively on pinpointing the variables that influence the financial success of insurance firms in Ethiopia. The researcher clearly outlined that the study was limited to analyzing the quantitative determinants of insurance companies' profitability (financial performance) in Ethiopia without incorporating a comprehensive performance evaluation tool. This investigation was restricted to examining the firm-specific factors that influenced the financial performance of insurance firms in Ethiopia from 2013 to 2023 for eleven years.

1.8 Limitations of the study

Throughout the course of the study, the researcher encountered certain controllable (internal) variables that had an impact on the smooth execution of the research, despite the researcher's utmost efforts to design the study appropriately. For example, the lack of resources and literature proved to be hindrances to the research outcomes. Additionally, the absence of relevant and up-to-date published literature, particularly within the Ethiopian context, as well as the insufficient information available on websites, posed significant limitations during the study. It is worth noting that the insurance industry in Ethiopia may confront distinct challenges that were not adequately addressed in this research. Factors such as regulatory constraints, competition dynamics, or

technological advancements could potentially influence profitability, yet they were not thoroughly explored in this study.

1.9 Organization of the study

The research was structured into five sections. The first chapter encompasses the introduction, background of the study, statement of the problem, research hypothesis, objectives of the study, significance of the study, scope of the study, limitations of the study, and the overall organization of the study. Moving on to chapter two, it delves into a review of the literature, encompassing theories, empirical evidence, and the conceptual framework. Chapter three elaborates on the research methodology employed in the study. Chapter four focuses on findings and discussions, where the results are interpreted. Lastly, chapter five is dedicated to the conclusion and potential recommendations based on the study's outcomes.

CHAPTER TWO

LITERATURE REVIEW

2.1 Review of Theoretical Literature

2.1.1. Definitions of Insurance, the Concept of Insurance Companies and their Profitability

Scholars all over the world have tried to define insurance based on their opinions. (Adebisi, 2016) States that insurance is a complicated issue that involves economic and social devices for the handling of risks to life and property. It is social in nature because it represents the cooperation of various individuals for mutual benefits by combining together to reduce the consequences of similar risks. (Michael, 2012), also defined that insurance is designed to protect the financial wellbeing of an individual, company or other entity in case of an expected loss. According to him, some forms of insurance are required by law, while others are optional. Agreeing to the terms of an insurance policy and paying the premium creates a contract between the insurer and the insured. In a legal aspect Insurance is, essentially, a contract by which one party gives a consideration, typically paid in money called premiums, in exchange for a promise from another to make a return payment if a certain loss has occurred. (Cummins, 2014), described that insurance involves covering against events that may or may not happen. (Williams, 2013), defines insurance as “a device by means of which the risks of two or more persons or firms are combined through actual or promised contributions to a fund out of which claimants are paid.

(Das, Davies and Podpiera, 2013) Insurance is also defined as "a device for transferring the risks of individual entities to an insurer, who agrees, for a consideration (called the premium), to assume to a specified extent losses suffered by the insured. Insurance is a form of risk management, used to hedge against the risk of a contingent loss. It involves the transfer of the risk of potential loss from one entity to another in exchange for a risk premium. According to (Kripa& Ajasllari, 2016) defines it as “a contract between the person who buys insurance and an insurance company that sold the policy.” He opines that “by entering into the contract, the insurance company agrees to pay the policy holder or his family members a predetermined sum of money in case of any

unfortunate event for a predetermined fixed sum payable, which is in normal terms called insurance premiums.”

(Sambasivam and Gashaw, 2013), the role of financial institutions in the economy of a country in general and insurance companies in particular and it means their efficient and effective financial system through savings mobilization, risk transfer and intermediation. Therefore, financial institutions, channel funds and transfers risks from one economic unit to another economic units so as to facilitate trade and resources arrangement particularly insurance sector contributes to economic growth, reduction of transaction costs, creation of liquidity, facilitation of economies of scale in investment, spread of financial loss and efficient resources allocation provides indemnification against risks, strengthens the linkage between other sectors of the economy in encouraging growth and stability and by creating a substantial impact on the national income of a country by improving the efficiency of the financial system.

Insurance companies shares the function of banks and other financial institutions beside to the role of risk minimizing by pooling similar risk exposures and helps individuals and organizations to minimize the impact of risk result on their property and life (Niway and Wondwossen, 2016). There are many factors to consider when looking at insurance companies. More than anything, consumers and investors should be concerned about the financial strength of the insurer and its ability to meet its ongoing obligations to holders of insurance policies. (Maria, 2014) , describe that Insurance companies provide unique financial services to the growth and development of every economy. Such specialized financial services range from the underwriting of risks inherent in economic entities and the mobilization of large amount of funds through premiums for long term investments. The risk absorption role of insurers promotes financial stability in the financial markets and provides a sense of peace to economic entities; on top of this the insurance companies’ ability to cover risk in the economy hinge on their capacity to create profit or value for their shareholders.

Among financial intermediaries, the insurance companies play important role, they are the main risk management tool for companies and individuals. Through issuing insurance policies, they collect funds and transfer them to deficit economic units for financing real investment. The importance of insurance is growing due to the increasing share of the insurance sector in the aggregate financial sector in almost every developing country. (Kripa and Ajasllar, 2016) Insurance companies are similar to banks and capital markets as they serve the needs of business units and private households in intermediation by making stable of the economy and also the business participants accept aggravated risks. Theoretical studies and empirical evidence have shown that countries with better developed financial system enjoy faster and more stable long-run growth Well-developed financial markets have a significant positive impact on total factor productivity, which translates into higher long-run development Given that the insurance institutions not only facilitate a myriad of economic transactions through risk transfer and indemnification but are also seen to promote financial intermediation, it is surprising that rigorous and in-depth research of this kind is not more prominent among research topics (Levine, 2004).

2.1.2 Concept of Insurance Companies and Their Profitability

The concept behind insurance is that a group of people exposed to similar risk come together and make contributions towards formation of a pool of funds. In case a person actually suffers a loss on account of such risk, he is compensated out of the same pool of funds. Therefore, contribution to the pool is made by a group of people sharing common risks and collected by the insurance companies in the form of premiums. Furthermore, risk has the element of uncertainty. Human life is subject to risk of death, disability as a result of natural or accidental causes, diseases and hazards. Generally, loss or damage could occur at any time and losses can be mitigated through insurance. Therefore, any introduction to insurance requires a clear understanding of the concept of risk. In this case, many insurance professionals use the word risk to refer to an insured, a prospect for insurance or to the peril that is being insured. They will say that a particular person or property is a good risk or a bad risk, meaning that they have evaluated the underwriting characteristics of that person or property for a particular insurance policy. This usage differs from the strict insurance definition, which defines risk as the uncertainty regarding financial loss.

The insurance companies' ability to cover risk in the economy hinges on their capacity to create profit or value for their shareholders (Baranoff, Brockett and Kahane, 2009).

There are two kinds of performance, financial performance and non-financial performance. The first dimension is company's productivity, or processing inputs into outputs efficiently. The second is profitability dimension, of which company's earnings are bigger than its costs which emphasizes on variables related directly to financial report (Almajali, Alamro and Al-Soub, 2012). The term Profitability consists of two words profit and ability. It is necessary to differentiate between the term Profit and Profitability at this point. The term Profit, from accounting point of view, is arrived at by deducting from total revenue of an enterprise all amount expended in earning that income while the term Profitability is defined as the ability of a given investment to earn a return from its uses. (Reshid and Suheyli, 2015). According to (Kung'u, 2013) the profits measured in monetary terms. Simply, it is the difference between the revenues and expenses. These two factors, revenue and expense are in turn influenced by firm-specific characteristics, industry features and macroeconomic variables. For the continued existence of most business organization and a crucial prerequisite for an increasing competitiveness of a company that operates in a market profit is important because it became sources of dividends, provides additional security against insolvency to investors and management. Profitability is one of the most important objectives of financial management, since one of the main tasks and goals of financial management is to increase shareholders wealth. According to (Swiss, 2008), Profits are determined first by underwriting performance (losses and expenses, which are affected by product pricing, risk selection, claims management, and marketing and administrative expenses); and second, by investment performance, which is a function of asset allocation and asset management as well as asset leverage. For an insurance company, there are two components of profits that we must consider: premium/underwriting income and investment income underwriting income is just any revenue derived from issuing insurance policies. The second area of profitability is investment income. That is, a greater proportion of an insurer's income comes from investments. Generally, a firm's performance can be estimated by measuring its profitability. The term 'profitability' is a relative measure where profit is expressed as a ratio, generally as a percentage.

(Malik, 2011)) and other agree on a number of ratios for the measurement of profitability. These include Return on Assets (ROA), Return on Equity (ROE) and Return on Invested Capital (ROIC). ROA is an indicator of how profitable a company is relative to its total assets. It shows how efficient the management uses its assets to generate earnings. Whereas ROE measures how much profit a company generates with shareholders' investment. ROIC is a measure used to assess a company's efficiency in allocating the capital under its control in profitable investments. This measure gives a sense of how well a company is in using its money to generate returns. Most empirical review argued that the performance of insurance companies in financial terms is normally expressed in net premium earned profitability from underwriting activities, annual turnover, return on investment, and return on equity. These measures could be classified as profit performance measures and investment performance measures.

2.2 Empirical Literature Review

2.2.1 Factors Affecting the Profitability of Insurance Companies in Ethiopia

Performance of financial institutions can affect economic growth while at the same time institutional insolvencies can result in systemic crises which have unfavorable consequences for the economy as a whole. Therefore it requires empirical investigation so as to sort out what are the important factors affecting profitability of insurance companies and this will help concerned bodies to focus on the relevant factors. Different individual in different countries studies the factors that influence the profitability of insurance companies; most of them suggested that firm specific factors and macroeconomic factors play a vital role in influencing insurance companies' profitability. It is therefore very important to identify what are these factors affecting the profitability of insurance companies and help insurance companies to take action on what will increase their profitability and investors to forecast the profitability of insurance companies. To perform so, it is better to see what factors were considered in previous times by different individuals in different countries (Sufian and Kamarudin, 2014).

(Malik and Hifza, 2011), analyze the determinants of Pakistan's insurance company's profitability as measured by ROA. The study used secondary data for the period of 2005-2009 and the

sample is 34 insurance companies' of Pakistan. The variables tested are age, size, voc (volume of capital), leverage and loss ratio. Descriptive statistics and multiple regression analysis were performed to describe the profitability among Pakistan insurance companies. ROA and five variables above were developed to test which factor best explains profitability of Pakistani insurance companies. Result showed that there is no relationship between profitability and age of the company and there is significantly positive relationship between profitability and size. The capital was significantly and positively related to profitability. On the other hand the analysis suggests that a reverse and significant relationship between leverage ratio and loss ratio as independent variables and profitability.

(Yuvaraj and Ayele, 2013), examined the effects of firm specific factors (age of company, size of company, volume of capital, leverage ratio, liquidity ratio, growth and tangibility of assets) on profitability as measured by Return on Assets (ROA). The sample in this study includes nine of the listed insurance companies for nine years (2003- 2011). Secondary data obtained from the financial statements (Balance sheet and Profit/Loss account) of insurance companies, financial publications of National Bank of Ethiopia are analyzed. Descriptive statistics and multiple regression analysis were performed to describe important determinant factors of profitability of insurance companies. From the regression results; growth, leverage, volume of capital, size, and liquidity are identified as most important determinant factors of profitability. In contrast, the age of companies and tangibility of assets are not significantly related with profitability.

(Ajasllari and Kripa, 2016), Assess in their research the impact of 6 internal factors; company size, volume of capital, fixed assets, liquidity, liabilities, growth rate; which affect the profitability of insurance companies in Albania represented by (ROA). They used multiple regression analysis, for 7 companies operating in the Albanian insurance market during the period 2008-2013. The results of the multiple regression indicated that there was a statistically significant relationship between growth rate, liquidity, liabilities and fixed assets to the profitability of insurers, while the impact of factors of company size and the volume of capital was not statistically significant. Fixed assets had a negative correlation with ROA of insurance companies. Despite that statistically insignificant, variables such as company size and the volume of capital had a positive impact on the profitability of insurers companies in Albania.

(Daare, 2016), Analyzed that the effects of firm specific factors (age of company, size of company, volume of capital, leverage ratio and loss ratio) on profitability as measured by ROA defined as the before tax profit divide by total assets. Based on survey of quantitative research, the researcher used to construct an econometric model to identify and measure the determinants of non-life insurance companies' profitability. According to the results, size in terms of total assets, loss ratio, liquidity, age and GDP are positively correlated with ROA while capital adequacy, premium growth and inflation are negatively correlated with ROA.

(Asrat and Tesfahun, 2016), The study analyzes the determinants of profitability of private insurance companies in Ethiopia over the period from 2005 to 2015 by using non probability judgment sampling design of eight private insurance companies' for the econometrics analysis of multiple regressions of fixed effect (FE) approach of panel data. The constituent of firm specific and macro variable (Underwriting risk, Reinsurance Dependence, Solvency Ratio, Premium growth, Company Size and macro factor Growth rate of GDP, Inflation and Interest Rate) analysis was made to investigate the determinants of private insurance company profitability. The panel data model regression analysis shows that private insurers' profitability is statistically significantly affected by firm specific factor which is underwriting risk negatively, company size positively, premium growth positively, and solvency ratio negatively and reinsurance dependency has no influence on profitability and statistically insignificant. The macroeconomic variable economic growth rate has significant influence on profitability and inflation has insignificant influence on insurers' profitability whereas interest rate which measured by time deposit weighted average was insignificant variable.

(Naveed, Zulfqar and Ahmad, 2011), In their research examined the determinants of capital structure of life insurance companies of Pakistan over the period of seven years from 2001 to 2007. For this purpose, leverage is taken as dependent variable while profitability, size, growth, age, risk, tangibility of assets and liquidity are selected as independent variables. The results indicate that size, profitability, liquidity and risk are important determinants of capital structure of life insurance companies of Pakistan. In addition, life insurance companies follow Pecking Order pattern in terms of profitability, liquidity and age as leverage has a negative relationship

with profitability, liquidity and age while positive relationship between leverage and size shows consistency with the Trade-off theory. The results also indicate that leverage has statistically insignificant relationship with growth and tangibility of assets. From stated empirical evidences regarding determinants of insurance companies focused mainly on internal factors affecting profitability and the factors considered are company size, age of company, liquidity, Premium growth, Reinsurance dependency, Leverage and volume of capital. Thus, let us see empirical evidences for each variable independently.

2.2.1.1 Company size

Literature supports there is a positive relation between operational performance and insurance company size. According to (Ramesh, 2017), large corporate size also enables insurers to effectively diversify their assumed risks and respond more quickly to changes in market conditions. It has been suggested that company size is positively related to financial performance. The main reason is that large insurance companies normally have greater capacity for dealing with adverse market fluctuations than small insurance companies. In addition, large insurance companies usually can relatively easily recruit competent employees with professional knowledge as compared to small insurance companies. Furthermore, large insurance companies have economies of scale in terms of the labor cost, which is the most significant production factor for delivering insurance services. It is expected that there is a positive linkage company size and profitability because large insurers are likely to perform better than small insurers as they can achieve operating cost efficiencies through increasing output and saving on the unit cost of innovations in products and process development.

2.2.1.2 Age of Company

(Ahmed, Xie & Issam, 2021), Defined age as the difference between the observation year and the establishment year. They found that the negative coefficient of variable age specifies the negative relationship between age of the life insurance companies and debt ratio. This inverse relationship predicts that in Pakistan older or mature life insurance companies are preferred to utilize small portion of debt in formation of capital. One key reason to employ less debt ratio is

that when firm survives in business for a long time then it can accumulate more funds for running the operations of the business and subsequently keeps away the firm to go for debt financing (Nivorozhkin, 2005). According to (Malik and Hifza, 2011), there was no correlation between company age and profitability of 34 life and non-life insurance companies in Pakistan over 2005-2009.

Regarding firm age, older firms are more experienced, have enjoyed the benefits of learning, are not prone to the liabilities of newness, and can, therefore, enjoy superior performance. Older firms may also benefit from reputation effects, which allow them to earn a higher margin on sales. On the other hand, older firms are prone to inertia, and the bureaucratic ossification that goes along with age; they might have developed routines, which are out of touch with changes in market conditions, in which case an inverse relationship between age and profitability or growth could be observed. (Liargovas & Skandalis, 2008)

2.2.1.3 Liquidity

Liquidity is ability of insurance companies to fulfill their immediate commitments to policyholders and other creditors without having to increase profits on underwriting and investment activities and/or liquidate financial assets also the cash and bank balances are to be kept sufficient to meet the immediate liabilities towards "claims due for payment but not paid" It is usually measured by the current assets to current liabilities (current ratio). It shows the ability to convert an asset to cash quickly and reflects the ability of the firm to manage working capital when kept at normal levels. This implies that high liquidity impedes the need for management to improve annual operational performance (Liargovas & Skandalis, 2008), avert that companies with more liquid assets are less likely to fail because they can realize cash even in very difficult situations, thus expected that insurance companies with more liquid assets will outperform those with less liquid assets.

An alternative hypothesis could be formulated as follows. Maintaining high liquidity can reduce management's discipline as regards both underwriting and investment operations. Moreover, according to the theory of agency costs, high liquidity of assets could increase agency costs for owners because managers might take advantage of the benefits of liquid assets (Almajali, 2012).

In addition, liquid assets imply high reinvestment risk since the proceeds from liquid assets would have to be reinvested after a relatively short period of time. Undoubtedly, reinvestment risk would put a strain on the performance of a company. In this case, it is, therefore, likely that insurance companies with less liquid assets outperform those with more liquid assets.

2.2.1.4 Real GDP growth rate

Real GDP growth rate is the overall value of goods and services produced domestically at a given time (Daniel and Tilahun , 2013), GDP growth is defined as $\frac{GDP_t - GDP_{t-1}}{GDP_{t-1}}$. Real GDP growth rate is a way to see how a country is doing. If the country's economy weakens, the country's financial structure will be poor and overall profits will suffer. The opposite will happen if the real GDP growth rate there is high. The price of the opportunity premium will increase due to GDP growth. Thus, profits will increase due to the overall impact on the economy (Sambasivam and Gashaw, 2013). The country's economic growth will affect people's lifestyle, increase in income and other social aspects. (Liargovas & Skandalis, 2008), assert that GDP is the most commonly used macroeconomic index to measure total economic activity in an economy, its growth rate reflects the state of the business cycle. joint. Measuring GDP is complex but, mostly empirically, it is measured as the ratio of change in current GDP to previous GDP

2.2.1.5 Inflation

When inflation increases, purchasing power decreases, the value of fixed assets is affected, businesses adjust the prices of goods and services, financial markets react and this impacts the composition of investment portfolios. Whenever prices start to rise, people often worry about inflation, and with good reason. The real return on investment depends not on how much extra money you have in your account but on how much more money you can buy. Therefore, in general, it has a negative impact on the ROI of any business (www.investopedia.com). Expected inflation is taken into account when actuaries come up with actuarially reasonable premiums, and inflation itself is unlikely to have a diverse impact on an insurance company's performance. However, if inflation is significantly higher than expected, this could cause financial difficulties for insurers.

For example, unexpected inflation causes real returns on fixed-rate bonds to be lower than expected. As a result, insurance company profit margins are reduced and financial performance is impaired (Malik and Hifza, 2011).

2.2.1.6 Tangibility of Assets

In most studies, the tangibility of insurance company assets is measured by the ratio of fixed assets to total assets. A recent study by (Naveed , Zulfqar and Ahmad, 2016) investigates the impact of firm-level characteristics on the performance of the life insurance industry in Pakistan over a seven-year period. For this purpose, age, risk, growth and tangibility are chosen as explanatory variables while ROA is taken as the dependent variable. OLS regression analysis results show that leverage, scale and risk are the most important factors determining the performance of the life insurance industry, while ROA statistically has a relatively small influence on the performance of the life insurance industry. However, (Liargovas & Skandalis, 2008) finds a positive and significant relationship between asset tangibility and profitability of insurance companies and argues that the higher the level of fixed asset formation, the higher the value, the older and larger the insurance company. In contrast, (Yuqi, 2017) in the United Kingdom found no significant relationship between asset tangibility and insurance company profitability.

2.2.1.7 Loss Ratio

Loss ratio or underwriting risk generally refers to the risk of loss associated with underwriting activities in the insurance and securities industries. In insurance, underwriting risk can arise from an accurate assessment of the risks involved in drafting an insurance contract or from factors completely out of one's control. Control of the insurer/subscriber, so the insurance contract may cost the insurer more than it earns in premiums (www.investopedia.com). Underwriting risk is the risk that the premium collected will not be enough to cover the insurance costs. Insurance prices are established based on estimates of expected loss costs as well as the costs of issuing and administering the policy. Estimates and assumptions used to develop pricing policies may ultimately prove to be incorrect. This may be due to poor assumptions, changing regulatory environments, increased life expectancy, and more weather disasters than expected (Daron, 2014)

Large fluctuations in net premiums indicate a lack of stability in an insurance company's underwriting operations. (Eckles and Barht , 2019), find a negative relationship between premium growth and loss ratio changes, suggesting that premium growth alone does not necessarily lead to higher underwriting risk. Additionally, there is a positive relationship between claims growth and loss ratio change, suggesting that claims growth may be the preferred measure of underwriting risk. Underwriting risk, measured as loss ratio, corresponds to the claims costs incurred by the insurer relative to the net premiums collected.

2.3 Summary of the Related Literature Review & Research Gap

The literature review shows that factors affecting profitability have been extensively studied worldwide. This suggests that both internal and external factors affect the profitability of financial institutions. Many researchers have studied the determinants of insurance company profitability and have reached different conclusions. In Ethiopia case few empirical study made by (Yuvaraj and Ayele, 2013) focused only on internal factors such as age, size, leverage, growth, volume of capital, tangibility of assets and liquidity. (Daniel and Tilahun , 2013), indicated that positive and significant relationship between size, tangibility with profitability; however, loss ratio is statistically significant and negatively related with ROA the result also revealed that there is negative relationship between age and profitability but statistically insignificant.

(Asrat and Tesfahun, 2016), examined the determinant of profitability of private insurance company in Ethiopia over the period from 2005 to 2015 constituent of firm specific and macro variable (Underwriting risk, Reinsurance Dependence, Solvency Ratio, Premium growth, Company Size and macro factor Growth rate of GDP, Inflation and Interest Rate) and analysis was made to investigate the determinants of private insurance company profitability. The analysis shows that private insurers' profitability is statistically significantly affected by firm specific factor which is underwriting risk negatively, company size positively, premium growth positively, and solvency ratio negatively and reinsurance dependency has no influence on profitability and statistically insignificant. The macroeconomic variable economic growth rate has significant

influence on profitability and inflation has insignificant influence on insurers' profitability whereas interest rate which measured by time deposit weighted average was insignificant variable.

In Ethiopia most of the researches focused on banks and other non-financial sectors rather than insurance companies though this study extend the research based on the selected previous empirical by adding additional variables that are the most important factors to determine the profitability of the insurers to both company specific factors and macroeconomic factors in previous studies such as Management competency Index, tangibility of asset, solvency ratio , loss ratio, liquidity and technical provision. Microeconomic factor GDP, Inflation and Interest rate. In addition to this it is important issues to be investigated for the insurance managers, professionals, regulators and policy makers to support the sector in achieving the excellence so that required economic outcomes.

2.4 Conceptual Framework

Figure 2.1, shows that factors affect the profitability of insurance companies in Ethiopia. This study used both internal and external determinants of insurance's profitability, such as the age of the company, tangibility of assets, company size, loss ratio, liquidity, growth rate of GDP, Inflation and Interest rate and how these variables are determine the profitability of insurance Companies in Ethiopia.

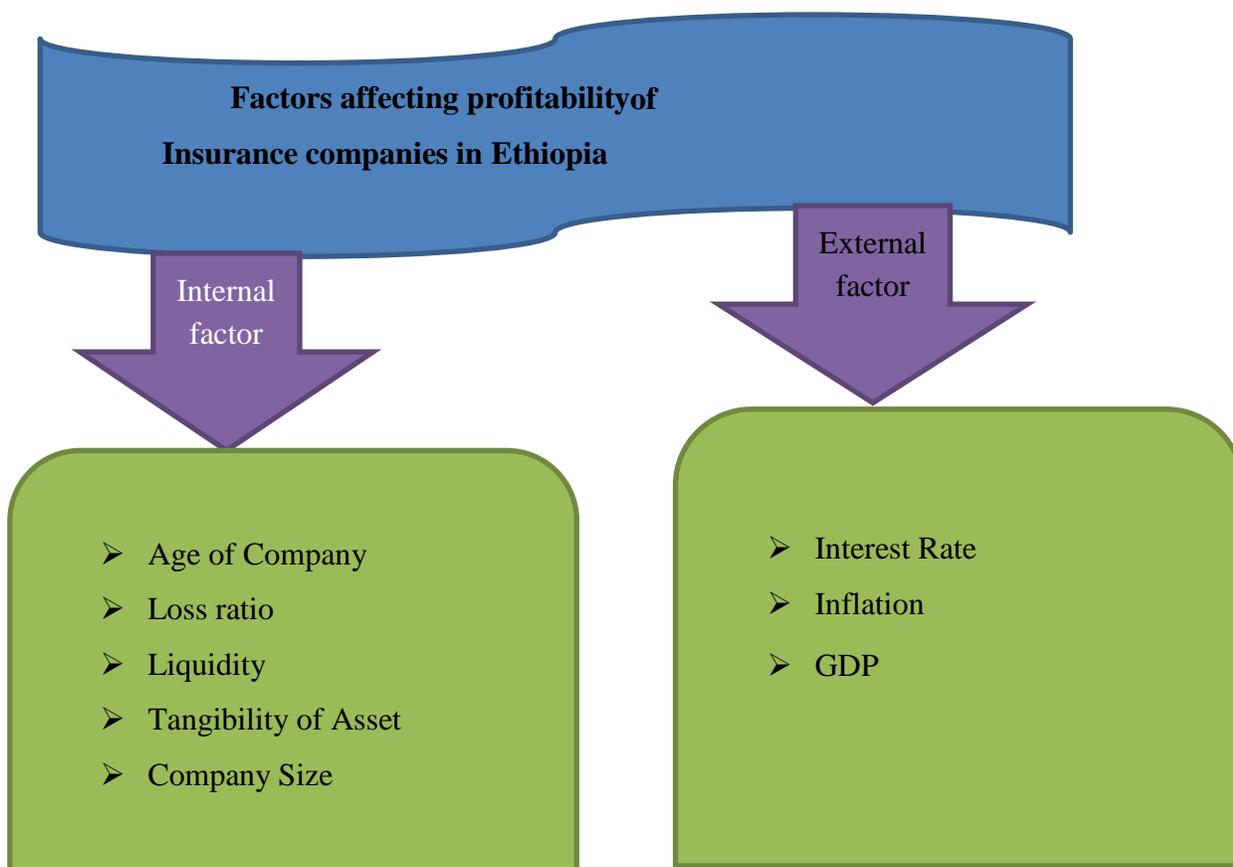


Figure 2.1: Factors affecting profitability of Insurance companies in Ethiopia

The profitability of insurance companies is affected by a variety of factors. As mentioned above, these factors can be further divided into internal factors and external factors. Therefore, most researchers focus on the internal factors that affect profitability, and the factors most considered are company age, company size, debt ratio, growth rate, premium growth rate, tangible assets, and liquidity ratio. Most of the literature focuses on the factors that affect bank profitability rather than insurance companies. Therefore, there is less literature on insurance companies than on banks. The existing literature on insurance companies can be divided into two categories: the determinants of financial performance of general insurance companies and life insurance companies. The empirical evidence on the determinants of insurance companies focuses only on

internal factors such as the insurance company's age, size, leverage ratio, premium growth rate, tangible assets, and liquidity ratio. The results obtained by the above researchers in their empirical studies show inconsistencies in some variables depending on the country in which the study was conducted.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research Design and Approach

A research design is a master plan specifying the methods and procedures for collecting and analyzing the required data. The choice of research design depends on the objectives that the researchers want to achieve (Gerring, 2017). Since this study is designed to examine the relationships between insurance profit and its determinants, objective theories are used by examining the relationship among variables therefore, quantitative research is used. As noted by (Kothari, 2004), explanatory research design examines the cause and effect relationships between dependent and independent variables. Therefore, this study examined the cause and effect relationships between the profitability of insurance companies and their determinants; it is an explanatory research must be undertaken.

The deductive approach begins with a theory, developing hypotheses from that theory, and then collecting and analyzing data to test those hypotheses. In contrast, the inductive approach begins with a set of empirical observations, seeks patterns in those observations, and then theorizes about those patterns (Yuqi, 2017). This study examines the previous findings in the literature and applies the model to Ethiopian insurance companies. Because of these, a deductive approach is adopted by constructing an empirical model and hypothesizing the collinear relationship between determinants and the dependent variable profitability of insurance companies in Ethiopia.

3.2 Type and Source of Data

This study used secondary data sources, which were obtained from the annual reports of eight insurance companies (EIC, Awash, Nile, Africa, Nib, Nyala, UNIC and Oromia) and the National Bank of Ethiopia. This is because the advantage of using secondary data includes higher quality data compared with primary data collected by researchers themselves. (Stewart & Kamins, 2013) as cited by (Yuqi, 2017), the feasibility of conducting panel evidence, which is the case in this study and the permanence of data, which means secondary data generally provide a source of data that is both permanent and available in a form that may be

checked relatively easily by others, i.e., more open to public scrutiny. Therefore, enhance the reliability of the data. The principal secondary data sources for this paper are individual insurance company annual reports, which contain detailed consolidated balance sheets and income statements and the National Bank of Ethiopia, which can provide a comprehensive database for all insurance companies.

The data collected and analyzed was a balanced panel of eight insurance companies in Ethiopia operating over the last 11 years. Panel data is selected by the researcher in order to meet the research objectives, as it best fits the single time series or cross-sectional alone. That is why (Brooks, 2008) in his book clearly presents the advantage of using panel data in this way. First, and perhaps most importantly, we can address a broader range of issues and tackle more complex problems with panel data than would be possible with pure time-series or pure cross-sectional data alone. Second, it is often of interest to examine how variables, or the relationships between them, change dynamically (over time). To do this using pure time-series data would often require a long run of data simply to get a sufficient number of observations to be able to conduct any meaningful hypothesis tests. But by combining cross-sectional and time series data, one can increase the number of degrees of freedom, and thus the power of the test, by employing information on the dynamic behavior of a large number of entities at the same time. The additional variation introduced by combining the data in this way can also help to mitigate problems of multi-collinearity that may arise if time series are modeled individually. Third, by structuring the model in an appropriate way, we can remove the impact of certain forms of omitted variable bias in regression results. Therefore, the combination of time series with cross-sections can enhance the quality and quantity of data in ways that would be impossible using only one of these two dimensions.

3.3 Methods of Data Collection

Data collection is the process of collecting and evaluating information or data from multiple sources to find answers to research problems, answer questions, evaluate results, and predict trends and probabilities. It is a crucial stage in all kinds of analysis, research and decision making, including work in the business, social sciences and medical fields. In order to analyze the factors affecting the profitability of insurance companies in Ethiopia, the researcher focused

on secondary data. That means the insurance financial statements of eight insurance companies for eleven consecutive years (from 2013 to 2023) were collected from the annual reports of individual insurance companies and NBE.

3.4 Target Population

For the study, the target population was eight insurance companies currently registered by the National Bank of Ethiopia and under operation in the country that have data on life and general insurance. The country has one public-owned and seventeen private insurance companies that are operating throughout the country.

3.5 Methods of Data Analysis

The study employed three primary data analysis methods: descriptive analysis, correlation analysis, and regression analysis. These methods were chosen to provide a comprehensive understanding of the relationship between profitability and explanatory variables.

3.5.1 Descriptive Analysis

Descriptive analysis is a method used to summarize and describe the data. It provides an overview of the dataset, including measures of central tendency (such as mean, median, and mode), dispersion (such as range, variance, and standard deviation), and other descriptive statistics. In this study, descriptive analysis was used to provide a general understanding of the dataset (for the period of 2013 - 2022) and its variables.

3.5.2 Correlation Analysis

Correlation analysis is a statistical technique used to determine the relationship between two variables. It measures the strength and direction of the relationship between profitability and explanatory variables. The results of the correlation analysis provide insight into whether there is a positive or negative relationship between these variables and the extent to which they are related.

3.5.3 Regression analysis

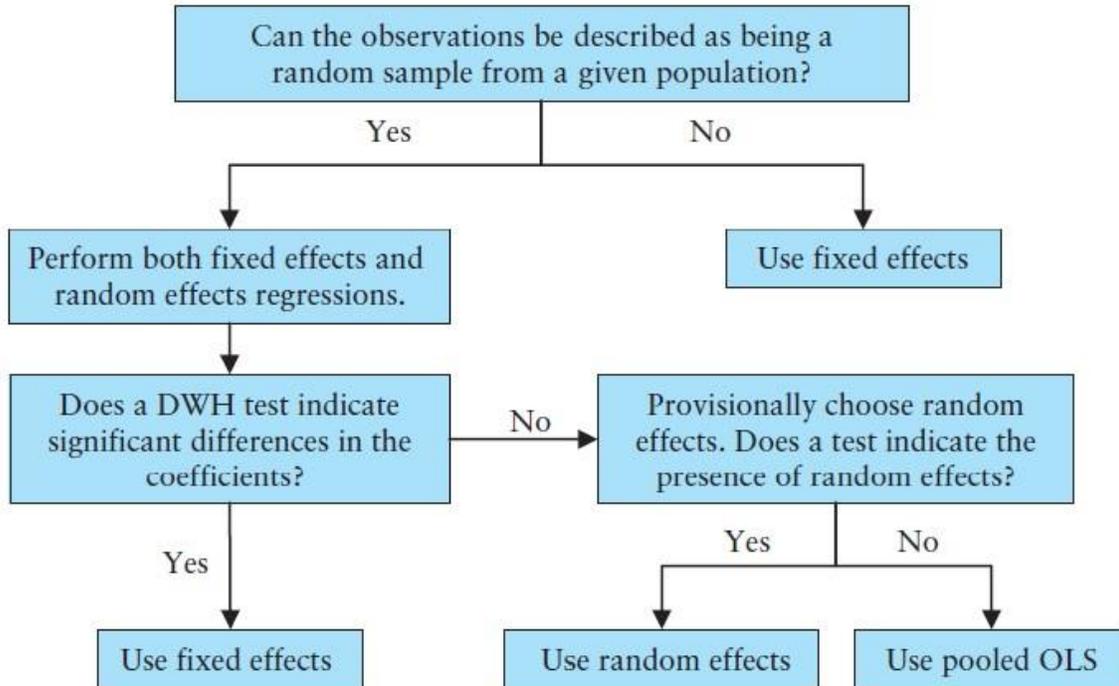
The results of the regression analysis provide the main output for the study, allowing researchers to understand the factors that influence profitability and their respective

contributions. It is used to analyze the impact of various independent variables on the dependent variable, which in this case is the return on assets (ROA).

3.6 Econometric Model

To fulfill the objective, the paper is primarily based on panel data, which is collected through structured document review. Panel data, as noted by (Baltagi, 20005), offers several advantages for research purposes. One of the primary benefits is its ability to control for individual heterogeneity, which is particularly useful when studying entities such as insurance companies. By accounting for individual differences, panel data allows researchers to isolate the impact of specific variables on the outcomes of interest. Additionally, panel data mitigates issues related to collinearity among variables, which can be a concern in traditional time-series or cross-sectional analyses. Furthermore, panel data enables the tracking of trends over time, providing insights that would not be attainable through simple time-series or cross-sectional data. For selecting an appropriate model, the researcher employed techniques proposed by (Dougherty, 2011).

Figure 3.1 shows the decision criteria for selecting a model in the panel data proposed by Dougherty.



Source: Adapted from Dougherty (2011)

Based on the given information, a panel data analysis using a fixed effects regression model is suitable for researching the factors affecting the profitability of insurance companies in Ethiopia. This is because panel data allows for the analysis of both cross-sectional and time series data, which is appropriate given the eight entities (insurance companies) and eleven time periods provided. The fixed effects regression model is appropriate for this research objective as it controls for unobserved heterogeneity at the entity level, which is important when examining the specific factors impacting the profitability of individual insurance companies in Ethiopia. This model is valuable for identifying factors that consistently affect profitability across the ten entities over the specified time period.

The following general multiple regression models of panel data were adopted from different studies conducted in the same area and the functional form of the model is:

$$ROA_{i,t} = \alpha + \sum \beta_j x_{i,t} + u_{i,t} \dots \dots \dots (1)$$

Where:

- $ROA_{i,t}$ is the profitability in insurance company entity i at time t (dependent variable) in this study return on assets (The return on assets (ROA) defined as the insurance companies before tax profit over total assets) is used to measure profitability.
 - $X_{i,t}$ is the independent variable or insurance specific determinants for entity i at time t such as age of the company, loss ratio, liquidity, tangibility of asset, interest rate, inflation rate, growth rate of GDP and company size.
 - α is the intercept
 - β is the coefficient of the independent variable
 - u_{it} is the error term
 - $i =$ Insurance company $i = 1, 2, \dots, 8$ and $t =$ the index of time periods and $t = 1, 2, \dots$
- 11

The explicit form of equation (1) above is represented as follows:

$$ROA_{i,t} = \beta_0 + \beta_1 AG_{i,t} + \beta_2 LR_{i,t} + \beta_3 LQ_{i,t} + \beta_4 TA_{i,t} + \beta_5 IR_{i,t} + \beta_6 IF_{i,t} + \beta_7 GDP_{i,t} + \beta_8 SZ_{i,t} + \epsilon_{i,t}$$

Where:

- $ROA_{i,t}$ = dependent variable return on asset;
- AG = age of company;
- LR = loss ratio;
- LQ = liquidity;
- TA = tangibility of asset;
- IR = interest rate;
- IF = inflation rate;
- GDP = growth rate of GDP;
- SZ = company size

By using the model and comparing the co-efficiency of each explanatory variable, it generates the finding that which factor is more significant in relation to insurance company profitability and the finding corresponded to the evidence in the literature.

3.7 Diagnostic Test

Panel data, also known as longitudinal data or cross-sectional time-series data, refers to data that contains observations on multiple subjects over multiple time periods. When working with panel data, it is important to conduct diagnostic tests to ensure the validity and reliability of the statistical models used. These diagnostic tests help researchers identify potential issues such as heteroscedasticity and autocorrelation (Dougherty, 2011).

Heteroscedasticity Tests

Heteroscedasticity is a common problem encountered in panel data analysis, where the variability of the error term differs across observations. This issue can result in biased parameter estimates and inconsistent standard errors. In order to detect heteroscedasticity, two commonly used tests are White's Test and Huber's Test.

White's test is a widely utilized method for identifying heteroscedasticity in panel data. It relies on the squared values of the ordinary least squares (OLS) residuals. The test statistic follows a chi-squared distribution, with degrees of freedom equal to the number of time periods minus the number of estimated parameters. On the other hand, Huber's test is another approach to detecting heteroscedasticity in panel data. Similar to White's test, it also utilizes the squared values of the OLS residuals. However, Huber's test is more robust to outliers and provides more efficient estimation in the presence of heteroscedasticity.

Autocorrelation Tests

Autocorrelation poses a challenge when the residuals of a regression model exhibit correlation with their own lagged values. This can result in biased parameter estimates and inconsistent standard errors. To detect autocorrelation, two commonly employed tests are the Durbin-Watson test and the Breusch-Godfrey test. The Durbin-Watson test is widely used to identify autocorrelation in panel data. It compares the sum of squared residuals between the current and previous time periods. A value close to 2 signifies the absence of autocorrelation, while values below 1 or above 2 indicate positive or negative autocorrelation, respectively. On the other hand, the Breusch-Godfrey test is another method to detect autocorrelation in panel data. It

utilizes the OLS residuals and their lagged values. The test statistic follows a chi-squared distribution with degrees of freedom equal to the number of lags minus the number of estimated parameters.

3.8 Operational Definitions of the key Terms

ROA: - There are many different ways to measure profitability, namely ROA and ROE. ROA reflects the ability of insurance's management to generate profits from its assets. ROE shows the return to shareholders on their equity. Many scholars suggest that ROA is the key ratio for the evaluation of insurance profitability. ROA was developed in 1919 by Dupont and it emphasizes the company's ability to efficiently use its assets which gives an indication of the capital intensity of the company and is comparable for companies in similar industry (Maria, 2014), reflects the ability of insurance's management to generate profits from the insurance assets is one of the most widely used financial models for performance measurement that determines a firm's ability to make use of its resources.

Tangibility of Asset: - A recent study by (Naveed , Zulfqar and Ahmad, 2016) investigates the impact of firm level characteristics on the performance of the life insurance sector of Pakistan over the period of seven years. For this purpose, tangibility is selected as explanatory variables while ROA is taken as dependent variable, (Malik and Hifza, 2011) found that there exists a positive and significant relationship between tangibility of assets and profitability of insurance companies and argued that the highest the level of fixed assets formation, the older and larger the insurance company is.

Liquidity: is the ability of insurance and reinsurance companies to fulfill their immediate commitments to policyholders and other creditors without having to increase profits from underwriting and investment activities and/or liquidate financial assets.

Loss ratio According to the nature of the insurance industry, the ratio of net claims paid to net premiums earned. The loss ratio is used as a proxy to measure the risk of the insurance companies. This risk is an underwriting risk, which means a premiums collected will not be sufficient to cover the cost of coverage.

Interest Rate: Insurance companies invest much of the collected premiums, so the income generated through investing activities is highly dependent on interest rates. Declining interest

rates usually equate to slower investment income growth, impacting the insurance company's financial performance. (Mohammed and Buhari, 2019) contends that insurance companies may also benefit from rising interest rates, because much of their profit is earned on the float, the period between when premiums are collected and claims are paid out. During this time, insurers invest the premium. It is argued that a continuing decline in market interest rates tends to make it more difficult for insurance companies to provide high interest rates for their customers and, as a result to maintain high levels of profitability.

Growth in Domestic Product:-GDP is the most informative single indicator of progress in economic development. Poor economic conditions can worsen the quality of the financial portfolio, thereby reducing profitability. The growth rate of GDP reflects economic activity as well as the level of economic development and, as such affect the various factors related to the supply and demand for insurance products and services.

Inflation: inflation is a general increase in the pattern of price levels of goods and services. It occurs when the prices of goods and services increase over time. Inflation increases the cost of one product or service or even several products or services. Rather, inflation is a general increase in the overall price level of goods and services in the economy.

Age of Company: The variable age of the company was measured from the number of years to date of establishments (difference between observation year and establishment year), or in other words, the age of each insurance company at time t.

Company Size: refers to the size of the company's operations. We measure it using various metrics, including assets, revenue, production, market capitalization, the number of employees, and invested capital.

CHAPTER FOUR

RESULT AND DISCUSSIONS

4.1 Introduction

This chapter presents, analyzes and discusses data in a detailed manner to respond to research hypotheses and accomplish the objectives of the study. It includes the findings of the study, which was designed to show factors that affect the profitability of insurance companies in Ethiopia. The study has a time series segment spanning from 2013 up to 2023 and a cross section segment that considered eight insurance companies in Ethiopia, such as Ethiopian Insurance Corporation, Awash insurance, Nile insurance, African insurance, Nib insurance, Nyala insurance, United insurance and Oromia insurance. Before conducting the regression of the insurance profitability determinants, it is essential to test the appropriateness of the panel data (both time series and cross section data) based on certain criteria and assumptions of OLS diagnostic tests.

4.2 Presentation of Results and Discussion on the Results

4.2.1 Descriptive Statistics

Descriptive statistics describe both dependent and independent variables. Profitability is the dependent variable; on the other hand, company size, loss ratio, age of company, liquidity, inflation rate, interest rate, tangible asset, and real GDP growth rate are independent variables. This study was conducted to determine the extent; of factors affecting the profitability of Ethiopian insurance companies.

Table 4. 1 summarizes the mean, maximum, minimum and standard deviation of each variable.

Date: 05/02/24 Time: 19:25
Sample: 2013 2023

	ROA	AG	GDP	IF	IR	LQ	LR	SZ	TA
Mean	0.039114	2.852273	83.97354	8.350000	0.590100	1.380341	2.671250	4.577426	9.624986
Median	0.120000	2.000000	83.40665	7.215000	0.700000	1.323500	1.505000	4.735000	7.196896
Maximum	0.320000	4.000000	148.3725	17.00000	0.700000	4.300000	38.11000	7.501980	14.00683
Minimum	0.275000	1.200000	19.77539	3.520000	0.366370	0.270000	24.78000	2.270000	12.53482
Std. Dev.	0.065110	0.062819	20.90632	4.505879	0.205347	0.450608	3.569956	3.460000	0.044592
Skewness	2.376486	0.737752	0.018021	0.599979	-0.711756	2.870809	0.992188	2.851577	3.509062
Kurtosis	8.272413	3.638592	1.757923	1.998526	1.624524	21.47030	10.66878	14.02277	16.40346
Observations	88	88	88	88	88	88	88	88	88

Source: Eviews version 12 outputs

As indicated in the above table, the profitability measures (ROA) show that Ethiopian insurance companies have on averaged positive results over the last eleven years. For the total sample, the mean ROA was 3.91% with a maximum of 32% and a minimum of 27.50%. That means the most profitable insurance company among the sampled earned 32% of profit before tax for a single birr invested in the assets of the firm. This indicates that there is not a good movement by the insurance company towards maximizing ROA in the sample years. The difference between the minimum of 27.5% and the maximum of 32% of ROAs indicates the margin that the ROA ratio of the insurance company ranged over the sample period. Regarding the standard deviation, it means the value of ROA deviated from its mean on both sides by 6.5 percent, which indicates there was low variation from the mean. This implies that insurance companies that loss need to optimize the use of their assets to increase the return on their assets.

The mean age of the company’s value is 2.85 years, with a standard deviation of 0.063 years. The highest and lowest rates are 4.00 and 1.200 years, respectively. This suggests that there is minimal variation among companies in terms of their establishment year, potentially indicating a correlation between age and the ability to achieve economies of scale in the sector. The similarity in age could also be attributed to the absence of monopoly power in the sector, as accumulated experience has led to cost reductions in service delivery. The average GDP growth for the study period is 83.97, with a maximum of 148.37 and a minimum of 19.77. This stable economic growth in Ethiopia during the specified period is evident. In terms of external influences, the average inflation rate was recorded at 8.35, with a wide

range of fluctuations observed, ranging from a minimum of 3.52 to a maximum of 17.00. This volatile situation is further emphasized by a standard deviation of 4.51. Conversely, the average interest rate for the study period stood at 0.59, with a minimum rate of 0.37 and a maximum rate of 0.70. The standard deviation for interest rates was calculated to be 0.21. In the model, liquidity is defined as the ratio of current assets to current liabilities. The mean liquidity ratio is 1.38, with a standard deviation of 0.45, indicating variations in liquidity ratios among the insurance companies being analyzed. The highest liquidity value observed is 4.30, while the lowest is 0.27. Loss ratio, which proxies losses incurred divided by the annual premium earned. The mean incurred claims to earned premium ratio were 2.67. This implies that, on average, most insurance companies from the sample paid 2.67 for the loss incurred out of the total premium earned per year. As indicated on the table, there was a high variation between the highest loss ratio and the lowest loss ratio, i.e., the highest was 38.11, and on the other hand, the lowest was 24.78 with a standard deviation of 3.57. These show that there is high variation in underwriting performance in the insurance industry in Ethiopia during the study period from 2013 to 2023. With regard to the size of the company, as shown in Table 4.1 above, the average size is 4.58 and the value of the standard deviation is 3.46. The maximum and minimum values of size were 7.50 and 2.27, respectively. Hence, there were many varieties of size among insurance companies. Finally, the mean value of the tangibility of assets is 9.62, with an associated variability of only 0.045. Its value ranges from a minimum of 12.53 to a maximum of 14.01. This implies that insurance companies in Ethiopia were in a similar position.

4.2.2 Diagnostic Testing

Diagnostic tests are forceful statistical tests carried out to verify if the data used have met the assumptions underlying the ordinary least squares regression and, where possible, to remove problems associated with panel data. The following sections discuss the results of the diagnostic tests (i.e., normality, heteroscedasticity, autocorrelation and multicollinearity) that ensure whether the data fits the basic assumptions of the classical linear regression model or not. The diagnostic tests carried out in the study are detailed below.

4.2.3 Test for Heteroscedasticity

According to (Brooks, 2008), Heteroskedasticity means that error terms do not have a constant variance. If heteroskedasticity occur, the estimators of the ordinary least square method are inefficient and hypothesis testing is no longer reliable or valid as it will underestimate the variances and standard errors. There are several tests to detect the Heteroskedasticity problem, which are Harvey Test, Glesjer Test, Breusch-Pagan-Goldfrey Test, White's Test and Autoregressive Conditional Heteroskedasticity (ARCH) test. This study used Breusch-Pagan-Goldfrey test to detect the presence of Heteroskedasticity.

H0: There is no heteroskedasticity problem.

H1: There is problem on heteroskedasticity

Table 4. 2 Heteroskedasticity test

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	0.596237	Prob. F(8,79)	0.7782
Obs*R-squared	5.010763	Prob. Chi-Square(8)	0.7564
Scaled explained SS	4.857368	Prob. Chi-Square(8)	0.0620

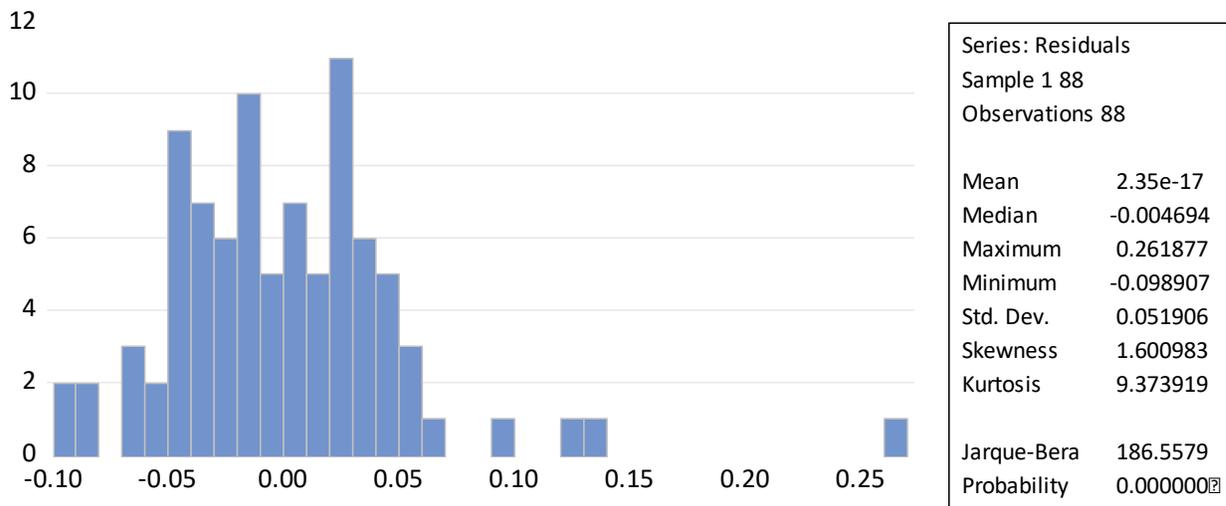
Source: Eview version 12 output

Based on the findings in Table 4.2, since the p-value exceeds the significance level of 0.05, we can conclude that H0 is accepted. Consequently, it can be inferred that there is no heteroscedasticity issue present in the data.

4.2.4 Test for Normality

Normality is a condition in which the variables to be used in the model follow the standard normal distribution. The normality assumption is that the mean of the residuals is zero with constant variance. Therefore, the researcher used graphical methods of testing the normality of the data, as shown below.

Figure 4. 1: Histogram normality test



Source: Eviews version 12 outputs

Since the mean of the data was approximately zero and has a constant variance, it suggests that the model was well-specified and can provide unbiased and consistent parameter estimates.

4.2.5 Test for Serial Correlation

Serial correlation is usually a result of model misspecification or genuine autocorrelation of the model error term. In the presence of such a phenomenon, ordinary least squares are no longer BLUE (best linear unbiased estimators). In such cases, R-squared may be overestimated. There was thus every need to test for serial correlation in the residuals.

According to Brooks (Brooks, 2008), when the error term for any observation is related to the error term of another observation, it indicates that autocorrelation problem exists in this model. In the case of autocorrelation problem, the estimated parameters can still remain unbiased and consistent, but it is inefficient. The result of T-test, F-test or the confidence interval will become invalid due to the fact that the variances of estimators tend to be underestimated or overestimated. Due to the invalid hypothesis testing, it may lead to misleading results on the significance of parameters in the model. Breusch-Godfrey Serial Correlation LM test was used to detect autocorrelation problems.

Table 4. 3: Auto correlation test

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	0.945127	Prob. F(2,77)	0.3931
Obs*R-squared	2.108529	Prob. Chi-Square(2)	0.3484

Table 4.3 shows that the p value is greater than the significant level of 0.05 then H0 is not rejected. Therefore, the data have no autocorrelation problem.

2.2.6 Multicollinearity Test

Multicollinearity is the linear relationship between explanatory variables that creates biased regression model. This problem occurs when the explanatory variables are very highly correlated with each other (Brooks, 2008). Predictor variable should be strongly related to dependent variable but not strongly related to each other. This may lead to the paradoxical effect, whereby the regression model fits the data well but, none of the explanatory variables (individually has a significant impact in predicting the dependent variable. For this purpose, variance inflation factor (VIF) and tolerance test were used to check Multicollinearity for variables if the value of VIF is less than 10 there is no Multicollinearity and on the other hand if VIF greater than or equal to 10 there is a serious Multicollinearity problem.

Table 4. 4: Multicollinearity

Variance Inflation Factors
Date: 05/02/24 Time: 2:25
Sample: 1 88
Included observations: 88

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
AG	6.83E-05	8.703447	1.299383
GDP	6.03E-05	12.45142	4.711251
IF	0.000648	14.42932	5.913384
IR	0.012907	99.26804	6.000519
LQ	0.033474	14.62934	1.394388
LR	9.03E-05	1.194659	1.061021
SZ	2.47E-08	2.630637	1.564343
TA	1.87E-07	1.261808	1.158196
C	0.008668	80.23904	NA

Source: Eviews version 12 outputs

Table 4.4 shows that the value of VIF for all variables was by far less than 10, so they were accepted into the regression model for the estimation of variables.

2.2 Model Specification Test (Fixed effect versus Random effect)

(Brooks, 2008), discusses two approaches for estimating panel data in financial research: fixed effects models (FEM) and random effects models (REM). To determine which approach is better, conducting a Hausman test is necessary. The Hausman test requires the number of cross sections to be greater than the number of coefficients to be estimated. However, in this particular study, the number of cross sections is not greater than the number of coefficients to be estimated, making it impossible to conduct a Hausman test. As a result, a fixed cross-sectional effect is included in the estimation to capture unobserved idiosyncratic effects of different insurance companies. The decision to use a fixed effect model over a random effect model is based on computational convenience as suggested by (Gerring, 2017). In this case, the fixed effect model may be more suitable since the number of time series (i.e. 11 years) exceeds the number of cross-sectional units (i.e. 8 insurance companies). According to (Dougherty, 2011), it is commonly believed that REM is more appropriate when the entities in the sample can be considered as randomly selected from the population, while FEM is more appropriate.

2.3 Discussion of Regression results

This section discusses in detail about the analysis of the results for each explanatory variable and their importance in determining ROA in Ethiopian insurance companies.

Table4. 5: panel regression results

—Variable	Coefficient	Std. Error	t-Statistic	Prob.
AG	0.731792	0.067232	10.88455	0.0007
GDP	0.045931	0.006786	6.768930	0.0040
IF	-0.059572	0.006890	-8.646782	0.0091
IR	0.147626	0.041197	3.583413	0.0606
LQ	0.099806	0.060569	1.647803	0.0104
LR	-0.007677	0.002546	-3.015757	0.0035
TA	0.000133	0.000106	1.261912	0.2111
SZ	0.000228	3.67E-05	6.207163	0.0031
C	6.804696	0.545028	12.48504	0.0000

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.864279	Mean dependent var	0.408252
Adjusted R-squared	0.836004	S.D. dependent var	2.795206
S.E. of regression	1.049192	Sum squared resid	79.25783
F-statistic	30.56663	Durbin-Watson stat	2.395553
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.135013	Mean dependent var	0.391136
Sum squared resid	31.90235	Durbin-Watson stat	2.510306

Source: Eviews version 12 outputs

The estimated results reported in Table 4.5 showed that the R-squared and adjusted R-squared values were 0.864279 and 0.836004, respectively. This means about 86.4% of the variations in ROA of insurance companies were explained by independent variables included in the model. The remaining 13.6% of changes were explained by other factors, which are not included in the model. According to Table 4.5, the F-statistic was 30.56663, and the probability is significant and rejecting the null hypothesis that there is a statistically significant relationship existing between the dependent variable (ROA) and the independent variables, It also shows that the

overall model is highly significant and all the independent variables are jointly significant causes of the variation in profitability of insurance companies.

$$\text{ROA} = 6.804696 + 0.731792\text{AG} + 0.045931\text{GDP} - 0.059571\text{IF} + 0.147626\text{IR} + 0.099806\text{LQ} - 0.007677\text{LR} + 0.000228\text{SZ} + 0.00133\text{TA}$$

Age of the Companies

The company's age is positively associated with the profitability of insurance companies in Ethiopia. The estimation results of the fixed effects model show that there is a significant positive relationship between profitability and company age, with an estimated coefficient of 0.731792. This can be explained by the fact that an increase in firm age by one year will lead to a 73.18% increase in firm profitability, all else remaining equal. This result is consistent with expectations and theory. It is expected that as the years of operation increase, industry experience will increase, and the company is expected to gain sufficient time to conduct research and development to increase market share and thereby improve profitability.

Gross in domestic product (GDP)

According to the table above, growth in domestic product (GDP) has a significant positive impact on the profitability of insurance companies, with an estimated coefficient of 0.045931GDP, which is significant at the 5% significance level. The coefficient of 0.045931 implies that for every 1% increase in GDP growth, there is a corresponding 0.045931% increase in the financial performance of insurance companies. This suggests that maintaining a strong alignment between the growth of the economy and their financial performance is crucial for insurance companies to achieve optimal results.

Inflation rate

From the above table, the panel regression result shows that inflation negatively and significantly affects the profit performance of insurance companies, with a significance level of 5% and a coefficient of -0.059572 . This can be explained by the fact that an increase in the inflation rate by one percent will lead to a 5.96% decrease in firm profitability, all else remaining constant. Thus, the effect of inflation on Ethiopian insurers' profitability is significant.

Interest rate

The interest rate regression results show that there is no statistically significant relationship between interest rates and the profitability of insurance companies in Ethiopia. The regression coefficient is 0.147626, with a p-value of 0.0606. Therefore, since the statistical results did not reveal a significant relationship between the variables, it can be concluded that interest rates have no impact on the profitability of insurance companies in Ethiopia.

Liquidity

A coefficient of liquidity is a financial metric that assesses the ability of a company to pay off its short-term liabilities with its liquid assets. A coefficient of liquidity value of 0.099806 suggests that for every unit of short-term liabilities, the insurance company has 0.099806 units of liquid assets available to cover these obligations. This ratio indicates that the company may have limited liquidity and may face challenges in meeting its short-term financial commitments. The low p-value of 0.0104 further supports the significance of this metric in relation to the insurance company's financial performance or stability.

Loss ratio

From table 4.5, the coefficient of loss ratio, which is measured by claim incurred to earned premium, was negative and statistically significant at the 5% significance level. The estimation results of the fixed effects model show that there is a significantly negative relationship between profitability and loss ratio, with an estimated coefficient of -0.007677. This can be explained by the fact that an increase in the loss ratio by one percent will lead to a 0.77% decrease in the firm's profitability, all else remaining equal. (Yuqi, 2017), Concluded that underwriting risk or loss ratio has a negative influence on the insurer's profitability since taking excessive underwriting risk can affect the company's stability through higher expenses.

Size of the Companies

The size of the company, as measured in terms of their total assets, is positively and significantly influencing the profitability of the firm. The coefficient obtained from the output of 0.000228 implies that, keeping all else constant, a one percent increase in the size of the company causes a 0.023 percent increase in profitability. The finding is in line with both theory and expectation, supporting the fact that both economies of scale and market power would be built as size increased. The finding is supported by different pieces of literature, such as (Swiss,

2008), (Malik and Hifza, 2011) all of which claim the existence of a positive and significant relationship between size and profitability in insurance companies.

Tangibility of an Asset

The findings from the regression analysis on the tangibility of assets indicate a coefficient of 0.000133 and a p-value of 0.2111. This suggests that the coefficient of tangibility of assets has a positive yet insignificant impact on the profitability of insurance companies in Ethiopia. It can be concluded that there is likely no meaningful or statistically significant relationship between the tangibility of assets and the profitability of insurance companies in Ethiopia.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The purpose of this study was to explore the factors affecting the profitability of insurance companies in Ethiopia. The study used secondary data from 8 insurance companies from 2013 to 2023. To describe the profitability among insurance companies, descriptive statistics and inferential analysis were conducted.

Loss ratio and inflation rate were negatively correlated with the profitability of the firm, while the remaining variables (tangible assets, GDP, size of the company, liquidity and age of the company) had a positive association with profitability. The positive and statistically significant correlation between the size of insurance companies and their performance suggests that larger companies tend to outperform smaller ones. This relationship indicates that larger insurance companies are more efficient at taking advantage of economies of scale and generating higher profits. The age of an insurance company significantly influences its profitability. Established companies with a long history benefit from economies of scale, operational efficiencies, and a diversified portfolio of policies. Therefore, the age of an insurance company plays a vital role in determining its profitability in the competitive insurance industry. In Ethiopia, insurance companies pay close attention to the overall economy's growth and develop strategies to align their financial performance with GDP growth. This includes reviewing the relationship between GDP growth and financial performance, assessing the impact of GDP growth on business, and adjusting investment portfolios, risk management strategies, and product offerings.

The explanatory variables of tangibility of assets and interest rate exhibit positive coefficient signs in their beta values. However, tangibility and interest rate do not possess statistical significance, as indicated by their large p-values. Consequently, tangibility and interest rate are not considered influential explanatory variables in determining the performance of insurance companies in Ethiopia over the last eleven years.

5.2 Recommendations

The researcher has formulated the following recommendations based on the analysis carried out in the previous chapter and the conclusions mentioned above.

- The core purpose of an insurance company is to partake in underwriting, where they evaluate and accept risks. In order to mitigate underwriting risk, insurance companies must take steps to minimize potential losses. Firstly, they can enhance their underwriting performance by employing effective risk and product selection techniques. Secondly, to reduce the number of losses, the company should also focus on improving their claim handling practices, particularly in terms of managing claim leakage. This involves addressing issues from both the company's internal departments (such as engineering, inspection, and claim management) and the customer's end. To achieve this, the company should establish a prompt investigation mechanism for reported claims, coupled with a robust confirmation process.
- Larger insurance companies often benefit from economies of scale, allowing them to spread their fixed costs over a larger customer base. This can lead to lower average costs per policy, increasing profitability. Additionally, larger insurers may have more resources to invest in technology, marketing, and risk management strategies, further enhancing their competitive edge. As a result, it is commonly believed that insurance companies should focus on growth and expansion to capitalize on these advantages and improve their profitability in the long run.
- The insurance companies in Ethiopia pay close attention to the growth of the overall economy and develop strategies to align their financial performance with GDP growth. This may involve reviewing and analyzing the relationship between GDP growth and their financial performance, developing strategies to capitalize on economic expansion, monitoring and assessing the impact of GDP growth on their business, collaborating with financial experts or conducting further research to better understand the implications of the coefficient of GDP, and adjusting their investment portfolios, risk management strategies, and product offerings to align with the changing economic landscape and customer demands. By doing so, insurance companies can remain

competitive and responsive to changing market conditions, ensuring they continue to thrive in a growing economy.

- The age of an insurance company is a crucial factor that significantly influences its profitability. Established insurance companies with a long history in the industry often have a more extensive customer base, brand recognition, and established trust among policyholders. This longevity allows them to benefit from economies of scale, operational efficiencies, and a more diversified portfolio of policies. As a result, older insurers may have lower operating costs and higher retention rates compared to newer entrants in the market. Additionally, experienced insurers have had more time to develop risk management strategies, underwriting expertise, and investment portfolios that can contribute to their overall profitability. Therefore, the age of an insurance company plays a vital role in determining its profitability in the competitive insurance industry.
- Based on these findings, it is recommended that insurance companies in Ethiopia pay close attention to their liquidity ratios and take the necessary steps to ensure they meet regulatory requirements and maintain adequate liquidity to support their growth. This may involve reviewing and adjusting their liquidity ratios, conducting a thorough analysis of their current liquidity position, developing and implementing strategies to enhance their liquidity reserves, regularly monitoring and assessing their liquidity ratios, and seeking professional advice from financial experts or conducting further research to better understand the implications of the coefficient of the liquidity ratio and how to optimize their liquidity management practices.
- The National Bank of Ethiopia works closely with investors to determine the most important factors that impact profitability. According to the literature and this study, it is clear that the insurance sector's growth has fallen short of the overall country's growth. The sector is still in its early stages of development.
- Finally, the study aimed to identify the elements influencing the profitability of insurance firms in Ethiopia. Nevertheless, the statistical analysis utilized did not encompass all potential factors impacting insurers' profitability in the country, focusing solely on a limited number of firm-specific and macroeconomic quantitative variables.

As a result, scholars are urged to conduct further research to support the Ethiopian insurance sector, taking into account factors like government regulations and guidelines.

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APPENDICES

Appendix 1 : List of insurance industries in Ethiopia as on 2023

S/N	Name	Establishment Year
1	Ethiopian Insurance Corporation	1975
2	Africa Insurance company S.C	1994
3	Awash insurance company S.C	1994
4	National Insurance company of Ethiopia S.C	1994
5	Nyala Insurance company S.C	1995
6	Nile Insurance company S.C	1995
7	The United Insurance S.C	1997
8	Global Insurance Company S.C	1997
9	NIB insurance company	2002
10	Lion Insurance Company S.C	2007
11	Ethio-Life Insurance S.C	2008
12	Oromia Insurance Company S.C	2009
13	Abay Insurance Company	2010
14	Berhan Insurance company S.C	2011
15	Tsehav Insurance S.C	2012
16	Lucy Insurance S.C	2012
17	Bunna Insurance S.C	2013
18	Zemen Insurance S.C	2020

Source: [Insurers - National Bank \(nbe.gov.et\)](http://insurers.nbe.gov.et)

Appendix 1: summarizes the mean, maximum, minimum and standard deviation of each variable

Date: 05/02/24 Time: 19:25

Sample: 2013 2023

	ROA	AG	GDP	IF	IR	LQ	LR	SZ	TA
Mean	0.039114	2.852273	83.97354	8.350000	0.590100	1.380341	2.671250	4.577426	9.624986
Median	0.120000	2.000000	83.40665	7.215000	0.700000	1.323500	1.505000	4.735000	7.196896
Maximum	0.320000	4.000000	148.3725	17.00000	0.700000	4.300000	38.11000	7.501980	14.00683
Minimum	0.275000	1.200000	19.77539	3.520000	0.366370	0.270000	24.78000	2.270000	12.53482
Std. Dev.	0.065110	0.062819	20.90632	4.505879	0.205347	0.450608	3.569956	3.460000	0.044592
Skewness	2.376486	0.737752	0.018021	0.599979	-0.711756	2.870809	0.992188	2.851577	3.509062
Kurtosis	8.272413	3.638592	1.757923	1.998526	1.624524	21.47030	10.66878	14.02277	16.40346
Observations	88	88	88	88	88	88	88	88	88

Appendix 2: Heteroskedasticity and Autocorrelation test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

Null hypothesis: Homoskedasticity

F-statistic	0.596237	Prob. F(8,79)	0.7782
Obs*R-squared	5.010763	Prob. Chi-Square(8)	0.7564
Scaled explained SS	4.857368	Prob. Chi-Square(8)	0.0620

Breusch-Godfrey Serial Correlation LM Test:

Null hypothesis: No serial correlation at up to 2 lags

F-statistic	0.945127	Prob. F(2,77)	0.3931
Obs*R-squared	2.108529	Prob. Chi-Square(2)	0.3484

Appendix 2: Multicollinearity test

Variance Inflation Factors
 Date: 05/02/24 Time: 2:25
 Sample: 1 88
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TA	1.87E-07	1.261808	1.158196
C	0.008668	80.23904	NA

Appendix 3: panel regression results

—Variable	Coefficient	Std. Error	t-Statistic	Prob.
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LR	-0.007677	0.002546	-3.015757	0.0035
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SZ	0.000228	3.67E-05	6.207163	0.0031
C	6.804696	0.545028	12.48504	0.0000

Effects Specification

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Weighted Statistics

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F-statistic	30.56663	Durbin-Watson stat	2.395553
Prob(F-statistic)	0.000000		

Unweighted Statistics

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Sum squared resid	31.90235	Durbin-Watson stat	2.510306