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Effect of Liquidity Management on Performance of Insurance Companies in Ethiopia

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DEPARTMENT OF ACCOUNTING AND FINANCE

MSc IN ACCOUNTING AND FINANCE

EFFECT OF LIQUIDITY MANAGEMENT ON PERFORMANCE OF INSURANCE COMPANIES IN ETHIOPIA

BY

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June, 2023

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A THESIS PAPER SUBMITTED TO DEPARTMENT OF ACCOUNTING AND FINANCE IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF SCIENCE IN ACCOUNTING & FINANCE

BY

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June, 2023

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Declaration

This is to certify that the thesis entitled "Effect of Liquidity management on performance of insurance companies in Ethiopia", submitted in partial fulfillment of the requirements for the Master of science in Accounting and Finance of the Department of Accounting and Finance, Bahir Dar University, is a record of original work carried out by me and has never been submitted to this or any other institution to get any other degree or certificates. The assistance and help I received during the course of this investigation have been duly acknowledged.

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I hereby certify that I have supervised, read and evaluated this thesis titled "**Effect of Liquidity management on performance of insurance companies in Ethiopia**" prepared by Alemnesh Moges under my guidance. I recommend the thesis be submitted for oral defense

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We hereby certify that we have examined this thesis entitled "**Effect of Liquidity management on performance of insurance companies in Ethiopia**" by Alemnesh Moges. We hereby certify that the thesis is accepted for fulfilling the requirements for the award of the degree of "Master of Science (MSC) in Accounting and Finance.

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Abstract

Liquidity is critical to the successful running of all organizations, especially financial institutions. Financial institutions are the backbone of a nation's economy. Like other financial institutions such as banking and the stock market, the insurance sector is also vital for the sustainable economic growth of any country by ensuring the wellbeing of individuals, groups, businesses, organizations, and the country as a whole. However, insurance sector in Ethiopia did not contribute to the development of the nation's economy as expected. The basic obstacle behind this was financial instability, which occurred due to the illiquidity of the companies. As a result, the primary objective of this study was to empirically investigate the effect of liquidity management on the performance of insurance companies in Ethiopia. As regards this study, it used positivist philosophy, a quantitative research approach, an explanatory research design, and a descriptive research design. This study used secondary data types that audited financial statements used. The data required for the variables was collected from the national bank of Ethiopia and the World Bank, which purposively selected 10 sample insurance companies in Ethiopia. The analysis of the study was conducted using multiple leaner regressions based on descriptive and inferential statistics on insurance companies over the study period of 2013–2022 G.C. In the same manner, the study used a random-effects regression model. The major finding of the study was that defensive interval ratio, cash ratio, current ratio, debtor's turnover ratio, and age variables are positively and statistically significant determinates of performance. Among these, the outstanding claims ratio is negative and statistically significant at a 5% level. Conversely, gross domestic product and the size of the firms have a positive and statistically insignificant relationship with performance, and inflation has a negative relationship with performance. However, the strength of the variables, gross domestic product, inflation, and size, is insignificant at a 5% significance level. The study recommends that, in carrying out their financial decisions, insurance companies in Ethiopia should carefully ascertain and properly measure the effect of those significant variables in order to maximize their value.

***Keywords**: Financial institutions, performance, insurance companies, Ethiopia*.

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Abbreviations and acronyms

AG……Age of the Firm

CAR……Cash Ratio

Co……..Corporation

CR……Current Ratio

DIR…….....Defensive Interval Ratio

DTR…….Debtors Turnover Rat

FEM……..Fixed Effects Model

FI…….Financial Institution

INF…….Inflation

NBE……National Bank of Ethiopia

OLS……..Ordinary Least Squares

ROA……..Return on Asset

SME's……Small and Medium Enterprises

SZ……Size

GDP……Gross Domestic Product

OCR……..Outstanding Claims Ratio

ROE…….Return on Equity

ROI……..Return on Investment

CHAPTER ONE

1. INTRODUCTION

1.1 Background of the Study

Financial performance refers to a firm's ability to generate new resources from day-to-day operations over a given period of time Bora, (2008). It involves enhancing shareholders wealth and profit-making, which are among the major objectives of a firm. Pandey, (2005). The financial performance of insurance companies is normally expressed in net premium earned, profitability from underwriting activities, annual turnover, return on investment, and return on equity Williams et al., and (2004). Insurance companies are particularly interested in the effects of liquidity management performance patterns because these companies require funds to settle claims or pay damages at the time of loss.

Liquidity risk Volatility and mismatch between the current resources and the current obligations of the company According to Adalsteinsson (2014), liquidity can generally be described as the capability to adequately generate cash to settle financial obligations and honor claims. It is also the ability to meet obligations as they come due and finance increases in assets without necessarily suffering undesirable losses. Liquidity is an important variable in business operations. It shows that a business organization has the ability to meet its short-term obligations without suffering undesirable losses. Bala, Salisu, and Sani (2022) The concept of liquidity comprises the current ratio, Quick ratio, cash ratio, and networking capital to total assets ratio Setiawan, et al , (2020).

Liquidity management in the insurance industry entails managing organizational funds in such a way that the company is able to maintain sufficiently adequate (but not excessive) cash to meet their financial commitments to their customers, shareholders, and other stakeholders as and when due. The indicators of poor liquidity management are falling asset prices, inadequate debt, and low marketability of assets. Brealey, (2012). Many companies, as a result, face the challenge of reduced profitability. In the contemporary world, many financial institutions play the role of financial intermediaries. That is, they help to connect borrowers with financial deficits and lenders with excess funds. Like other financial institutions such as banking and the stock market,

the insurance sector is also vital for the sustainable economic growth of any country by ensuring the wellbeing of individuals, groups, businesses, organisations, and the country as a whole. The insurance sector plays an important role in the financial services industry in almost all developed and developing countries, contributing to economic growth, efficient resource allocation, reduction of transaction costs, creation of liquidity, facilitation of economies of scale in investment, and spread of financial losses. Haiss et al. (2008)

By considering the role of the insurance sector for the wellbeing of individual people, groups of people, businesses, organizations, and the country as a whole, investigating the relationship between liquidity management and the performance of insurance companies is now a perfect decision. Profitability and liquidity as performance indicators are very important to the major stakeholders: shareholders, creditors, and tax authorities. Olagunji et al. (2011) Thus, maintaining a sound liquidity position is one of the significant indicators of better performance for a bank. Without ensuring adequate liquidity, the banking sector will fail to maintain its current leading position in mobilizing resources and allocating funds to profitable ends in the economy. Wilner, (2000). Therefore, profitability and liquidity are effective indicators of the corporate health and performance of not only commercial banks but all profit-oriented ventures. Eljelly, (2004). So, the topic "Effects of Liquidity Management on the Performance of Insurance Companies Perspective" will cover the relevant field to have a look at the liquidity and profitability position of the insurance sector as an indicator of the performance of the overall insurance industry.

In Ethiopia, insurance companies were introduced in 1960. E.C. worked in collaboration with foreign insurance companies. In the country, the critical financial companies operating are banks, insurance companies, and microfinance institutions. For the last decade, Ethiopian financial institutions in general and insurance companies in particular have shown impressive progress in terms of number and service, which not only creates employment opportunities but also enhances business activities in the Ethiopian economy. In the current time, Ethiopia has eighteen public as well as private insurance companies operating in the country, including Ethiopian Insurance Corporation, which is publicly owned, and 18 private insurance companies NBE (2022), thereby the researcher aims to investigate and identify effects of liquidity management on the performance of insurance companies in Ethiopia".

1.2. Statement of the Problem

Liquidity is the ability of a firm to meet its short-term obligations, like payments to creditors, bills payable, and outstanding expenses. Liquidity is the availability of funds, or assurance that funds will be available, to honor all cash outflow commitments (both on and off the balance sheet) as they fall due. These commitments are generally met through cash inflows, supplemented by assets readily convertible to cash, or through the company's capacity to borrow NBE, (2022).

Following the seminal work of Keynes, (1936) liquidity preference theory, a vast theoretical literature was developed, which led to the formulation of alternative theories such as Baumol's model, Miller and Orr's model, developed in, (1952) and (1966) respectively, according to Litzenberger, (1973),developed trade-off theory and pecking order theory developed by Gordon ,(1961). These theories point to a number of specific factors that may affect the effects of liquidity management on the performance of insurance companies, such as the defensive interval ratio, Cash Ratio, Current Ratio, Debtor's Turnover Ratio, and Outstanding Claims ratio, and microeconomic factors (inflation and GDP growth rate). For instance Trade-off theory implies an opposite association between liquidity and return on assets that focuses on the cost and benefit of each assumption. However, pecking order indicates the direct connection between liquid assets and return on assets. According to Liquidity preference theory, liquidity preference refers to the demand for money by firms because of less risk. Consequently, return on assets has a positive relationship with the current ratio and cash ratio. Therefore, based on this theoretical theory, there is no common result: one is positive, the other is negative. The researcher fills this theoretical gap to investigate the effect of liquidity management on the performance of insurance companies in Ethiopia.

Empirically, it is critical to the successful running of all organizations, especially financial institutions. Liquidity has been identified as one of the most crucial goals of working capital management and a central pillar of cash management. The concept of liquidity comprises the current ratio, Quick ratio, cash ratio, and networking capital to total assets ratio Setiawan, et al (2020).

There are studies conducted related to factors affecting the financial performance of financial institutions. According to the results by Egegn, et al. (2020), Gagni, Derbali, and Jamel's (2018) finding proves that the size of the company has a negative impact on the profit of the insurance company. According to the research conducted by Wolde et al. (2020) and Meanza (2014), leverage has a negative and significant impact on the profitability of insurance firms.

According to Chijuka et al. (2014), GDP has a positive and significant impact on profitability. Shikur, et al. (2022), but GDP has a positive but insignificant effect on the profitability of Ethiopian private insurance firms. In contrast to Abate, T. W., and Mesfin, E. A. (2019). Chijuka (2014), Nnado and Ugwu (2016), Ahmed, et al. (2022), Melaku (2016), Said, M., & Ali, H. (2016) conducted the Effects of inflation on profitability. Other studies, such as Sisay (2017), Lealem (2020), and Habtamu Alebachew (2021), were also conducted on different factors affecting the profitability of Ethiopian insurance companies. There are scant studies conducted on the effects of liquidity-specific variables on the performance of insurance companies.

According to Kassa (2021), capital adequacy (CAP), GDP, and inflation rate had a positive and significant effect, and non-interest expense to total revenue ratio had a negative and significant effect. On the other hand, current asset to total asset ratio (CATAR), loan to deposit ratio (LDR), and liquid asset ratio (LATAR), Liquid assets to net current liabilities ratio (Quick ratio), and liquid asset to deposit ratio (LATDR) had an inverse relationship and an insignificant effect on the ROA of the selected commercial banks within the study time frame. Therefore, liquidity management had a non-linear effect on the performance of the banks.

David concludes in his study that the greatest threat to liquidity may occur in an insurance firm during a catastrophe when a large number of claims are received directly, or there could even be prospects of a significantly large claim, for which insurance companies should have optimal liquidity. David W. K. Kariuki,(2021) verified that a rise in the management of liquidity increased financial performance by 0.721, an expansion of capital adequacy increased financial performance by 0.701, and an increase in the size of firms increased financial performance by 0.523. Kipngetich, (2019). Patrick's study showed that liquidity management has not had a significant impact on insurance companies' performance like equity management, which affects long-term stability. Patrick, (2018)

According to Owolabi & Obida (2012), there are causative relationships between profitability expressed in terms of return on assets (ROA), return on equity (ROE), and return on investment (ROI), and the liquidity management of companies measured in terms of their debtor Collection Period (DCP), creditor Payment Period (CPP), and Cash Conversion Cycle (CCC).

According to Azhar, S. (2015), quick ratio and absolute liquid ratio are not having a significant impact but showing a positive sign, indicating an increase in liquidity will increase profitability. However, there is a significant impact of liquidity and management efficiency on the profitability of power distribution utilities in India.

Wambu, (2013) found that there was a positive relationship between profitability and liquidity management of banks and insurance companies operating in Ghana; however, the coefficients from the study were not significant. According to the research conducted by Wasiuzzaman, Arumugam, and Al-Najjar (2013), profitability and liquidity have a positive relationship.

In contrast, Fiador, (2016), Ghosh, Wasiuzzaman, (2015), and Tran et al. (2017) found a negative impact of liquidity on profitability. On the other hand, Alarussi, A. S., and Alhaderi, S. M., (2018) On the other hand, Liquidity does not show any significant relationship with profitability. As the researcher mentioned above, prior researchers mainly focused on common factors. Such as the Cash Ratio, Current Ratio, Debtor's Turnover Ratio, Inflation, GDP growth rate, size of the firm, and age. And they got different results for the same variable.

Generally, theoretically, tradeoff advocates an inverse relationship between liquidity and profitability that centers the cost and benefit of every decision. Whereas pecking order advocates the positive relationship between liquid assets and performance. Empirically, the impact of liquidity management on the performance of insurance companies has been an issue in many studies of empirical research conducted abroad. While studies by Deloof (2003), Eljelly (2004), Lazaridis & Tryfonidis (2006), Garcia & Martinez (2007), and Ombworo (2014) revealed an inversely significant relationship between liquidity and the profitability of insurance companies, these studies also found that this relationship is not causal. Most researchers have a controversial or inconsistent gap in the above-mentioned empirical and theoretical gaps, with one side being positive and the other being negative. The researcher was motivated to investigate the effects of

liquidity management on the performance of insurance companies in Ethiopia in order to close this gap. Additionally, the majority of the research was done in Africa rather than Ethiopia; therefore, by including additional variables such as the defensive interval ratio and outstanding claims ratio, the research was able to more adequately study Ethiopia.

1.3 Objectives of the Study

1.3.1 General Objective

The main objective of this study is to investigate effects of liquidity management on performance of insurance companies in Ethiopia

1.3.2 Specific objective

1. To investigate the effect of macroeconomic variables (Inflation, GDP growth rate) on return on asset of insurance companies in Ethiopia.

2. To examine the effect of insurance companies specific variables (such as: Defensive Interval Ratio, Cash Ratio, Current Ratio, Debtor's Turnover Ratio, and Outstanding Claims Ratio,) on return on asset insurance companies in Ethiopia.

1.4 Research Hypothesis

H1: Defensive interval ratio has a positive significant effect on performance

H2: Cash ratio has a positive significant effect on performance

H3: Debtors turnover ratio has a positive significant effect on performance

H4: Current ratio has a positive significant effect on performance

H5: outstanding claims ratio has a positive significant effect on performance

H6: GDP growth has a positive significant effect on performance

H7: Inflation rate has a positive significant effect on performance

H8: Age has a positive significant effect on performance

H9: Size has a positive significant effect on performance

1.5. Significance of the Study

The significance of this study stems from the fact that the insurance sector plays a key role in supporting the country's economic growth and providing coverage for assets and services exposed to various insurable hazards for Ethiopians. The main justification for doing this study at this time is that prior investigations into the impact of liquidity management on the performance of Ethiopia's insurance industry were either too small or had implications that were irrelevant. Investigating how liquidity management affects the following parties and stakeholders considers the performance of the insurance sector during the current era to be important: First and foremost, management of the insurance company that is interested in identifying performance indicators will take the necessary steps to enhance the performance of the insurance company by making the best choices to maximize the level of liquidity. In order to prevent illiquidity and corporate insolvency, the government is likewise curious about whether businesses run with the highest level of liquidity. Furthermore, the findings of this publication offer a foundation for potential future scholars who wish to go into this research topic.

1.6 .Scope of the Study

The scope of this study was limited to investigating the effect of liquidity management on the performance of insurance companies in Ethiopia. For ten years, from 2013 to 2022 GC, the researchers examined secondary yearly data from those insurance companies, which updated comprehensive information in mature companies. Finally, the study was also limited to a sample of, on the basis of establishment years, only ten insurance companies in Ethiopia that were selected from the population of 18 insurance companies in Ethiopia. The study also considered key firm-specific factors and macroeconomic variables that affect return on assets (Cash Ratio, Outstanding Claims Ratio, Current Ratio, Debtor’s Turnover Ratio, Inflation, GDP, size, and age). The reason for selecting those variables was considering the need for the study and the objective of the study. These variables are shaped to be worthy of consideration, and they have also been repeatedly used more than twice by other previous researchers. Ismail, R. (2016), Wardoyo, D. U., Melati, N., & Oktavianta, M. (2021), Effiong, S. A., & Ejabu, F. E. (2020). Agubata, N. S. (2021), and Enekwe, C. I. (2015) Daare, W. J. (2016); Mwangi, F. M. (2014); Batool, A., & Sahi, A. (2019); Patrick, O. (2018); Lalon, R. M.; & Das, J. (2022). Generally, the

study was geographically restricted to only country insurance companies in Ethiopia. Second Based on the time restriction to ten years only, it also restricted the type of data, for instance, secondary data from the national bank of Ethiopia and World Bank data.

1.7 Limitation of the study

Although the study was well conducted, it is not free from some constraints. At the initial stage of the paper, there were twelve explanatory variables. However, during the investigation, the variable productivity was excluded from the study because there was not sufficient data to support a balanced panel data set. Second, not include all insurance companies operating in Ethiopia due to their inability to fulfill the required financial statement report and operation for ten years.

1.8. Organization of the Paper

This study has five chapters. Chapter one is an introduction. Following on from this is Chapter two, a review of theoretical and empirical literature, and Chapter three, methodology. Then, chapter four presents the results and analysis of the study, and finally, chapter five presents the conclusions, possible recommendations and further studies suggestions.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

1. Introduction

This chapter consists of the theoretical and empirical parts of related literature. In the theoretical review part liquidity preference Baumol's model, Miller & Orr model and Pecking order theory of liquidity have been discussed. The empirical literature part discusses past studies that were conducted in the area of factors determining return on asset in this part, the variables that were included, the methodology that was used to undertake the study, and the results of the studied under review have been discussed. This chapter ends by discussing factors that determine return on asset and by presenting the conceptual framework of the study.

2.1. Definition of Liquidity Management

Liquidity refers to the ability to meet expected and unexpected demands for cash. Specifically, it is a company's ability to meet the cash demands of its policy and contract holders without suffering any (or a very minimal) loss. It also means conversion of assets into cash during the normal course of business and to have regular uninterrupted flow of cash and cash equivalent to need outside. Short term obligations when due and also ensure availability of money for every days business activity. The issue of liquidity in case of corporation has two dimensions; the quantitative and qualitative dimensions. The quantitative dimension of liquidity includes the quantum, structure and utilization of liquid assets such as cash, cash equivalents etc. On the other hand, the qualitative aspect of liquidity emphasizes upon the ability of a firm to need all present and potential demand on cash in a manner that will minimize cost and comparatively maximize the value of the business enterprise (Joy, 2007). As per theory of Joy, (2007) the term liquidity is avital determinant in successful business operations. For the each and every existence of business in operation, the firm should have requisite optimal degree of liquidity in their balance sheet. Liquidity level should be neither excessive nor short. Excess level of current asset refers idle funds without appropriate investment, which may lead to lower return, over speculation, and unjustified extension, extension of liberal credit, liberal dividend policy etc.; whereas shortage in liquidity position result in interruptions of business operations and finally shutdown of business. An optimal balance between excessive and inadequate or extreme situations therefore should be

maintained for efficient operation of business through skill full liquidity management. The need for effective management of liquidity corporate sector has become greater in recent periods.

2.1.1 Concept of Liquidity Management

Liquidity management is very important for every organization that means to pay current obligations on business, the payment obligations include operating and financial expenses that are short term but maturing long term debt .. When managing liquidity of business two major features of current assets must be boom in every one's mind: - Short life and, Swift transformation of current asset into other form of assets. Short life Span: Current assets have a short life span, cash balance may be hold idle for a week or account receivable may have a life span of 30 to 60 days and inventories may be held for 30 days to 100 days. The short life of short term asset depends upon the need of firm, in the activities of purchasing, production, sales, collection and the degree of synchronization among them. Swift transformation into Other Assets: Forms each current asset had swiftly transformed into other assets forms. Cash is used for acquiring raw materials. Raw materials are transformed into finished goods. Finished goods generally sold on credit are converted into account receivable (book debts); & finally, Account receivable on realization generated cash Joy, (2007). The operating cycle can be said to be; the heart of the need for liquidity position. The uninterrupted flow from liquidity to vendors to inventory to debtors and back into cash what is collected is named as operating cycle. If it is possible to finish the process immediately, there would no need of liquid finance. However, it is not achievable; the business is forced to have current assets. Since cash in and cash out do not be match, firms have to necessity keep cash or investment in short-term liquid securities more than any other asset. Therefore they will be in a position to meet due obligation as per requirement. Business aspects must have enough Inventories to guard against the possibility of not being able to meet a demand for their products to customers. Enough inventory level provides a cushion against being out of stock. If the companies have to be more competitive they must convert goods to sales to their customers on credit which receivables the holding of account receivable. It is in these mechanisms that an adequate level of liquidity is absolutely necessary for smooth sales activity which, in turn, enhances the liquid position of the concerns Solomon, E (2000)

2.2 Theoretical Review

In this section the theory of liquidity preference, Baumol's model, Miller & Orr model and Pecking order theory of liquidity are presented

2.2.1 Liquidity preference theory

Keynes (1936) was the first to develop the concept of liquidity in his book The General Theory of Employment, Interest and Money to explain determination of the interest rate by the supply and demand for money. Liquidity preference refers to the demand for money, considered as liquidity. The idea that investors demand a premium for securities with longer maturities, entail greater risk, because they would prefer to hold cash, which entails less risk. The more liquid an investment, the easier it is to sell quickly for its full value. Because interest rates are more volatile in the short term, the premium on short- versus medium-term securities will be greater than the premium on medium- versus long term securities. For example, a three-year Treasury note might pay 1% interest, a 10-year treasury note might pay 3% interest and a 30- year treasury bond might pay 4% interest.

2.2.2 Baumol's model

Baumol (1952) developed an inventory management model which was applicable in determining the level of cash to be held by the business firms. He described the holding costs and the ordering costs of cash in a fashion similar to those costs associated with inventory. His conclusion was that the rational individual will, given the price level, demand cash in proportion to the square root of the value of these transactions. The Baumol's model assumes the cash managers invest excess fund in interest bearing securities and liquidates them to meet the firm s demand for cash. As investment return increase, the opportunity cost of holding cash increases and the cash manager decreases cash balance. As transaction cost (cost of liquidating short–term investment) increase, the cash manager decrease the number of times the liquidates securities, leading to higher cash balances. However as is the case with the Nevertheless, the economics order quantity model, Baumol s model has restrictions when using the assumptions of fixed and predictable demand, as well as instant supplies when applying for replacement cash .

2.2.3 Miller & Orr model

Miller & Orr (1966) developed a model of demand for money. Under the model, the firm allows the cash balance to fluctuate between the upper control limit and the lower control limit, making a purchase and sale of marketable securities only when one of these limits is reached. The assumption is that the net cash flows are normally distributed with a zero value of mean and a standard deviation. This model provides two control limits – the upper control limit and the lower control limit as well as a return point. When the firm's cash limit fluctuates at random and touches the upper limit, the firm buys sufficient marketable securities to come back to a normal level of cash balance that is the return point. Similarly, when the firm's cash flows wander and touch the lower limit, it sells sufficient marketable securities to bring the cash balance back to the normal level that is the return point.

2.2.4 Pecking order theory of liquidity

Introduced very influential pecking order theory saying; manager prefers to finance deficit of capital by issuing safe security. Myers (1984) extended the work of Gordon (1961) by applying the term "pecking order" to Gordon's description of firms' sequence of financing. The theory states that, in the event where retained earnings and other internal source of financing will be low to invest then manager will issue debt and only issue new equity with possibility of issuing junk debt (financial distress possibility). The theory emerges as a result of asymmetric information existing in the financial markets, that is, corporate managers often have better information about the health of their companies than outside investors. Apart from the transaction costs of issuing new securities, companies have to accept the information costs arising from asymmetric information. In this way, new securities issued on the financial market could be infra–valued because of informational asymmetries, and this is especially true in the case of new equities. Tradeoff and pecking order theories center the importance of the thought of liquid assets. Tradeoff advocates an inverse relationship between liquidity and profitability that center the cost and benefit of every decision. Whereas, pecking order advocate the positive relationship between liquid assets and performance.

2.3. Empirical Review

2.3.1 Empirical Reviews outside Africa

2.3.1.1 **Defensive interval ratio**

This ratio refers to the period in which the company can continue to pay the expenses of its existing liquidity without resorting to obtaining cash flows from outside the company Robinson et al., (2015). Defensive interval ratio is not related to have any relationship with the net profit.

2.3.1.2 Cash ratio

Velnampy & Kajananthan, (2013) analyzed cash position and profitability among listed telecommunication firms in Sri Lanka over a period from 2005 to 2011. The objective of the study was to establish the causality that exists between the profitability and cash position. This was immediate by the need to unravel on whether performances are caused by cash position or the vice versa. The investigation has been conducted by analyzing the two companies profit measured by ROA and ROE as the dependent and the cash position as liquidity measure as the independent variables. Correlation analysis has been employed to find out the relationships between these variables and multiple linear regression analysis was used to find out the effect of cash position on performance. Based on the correlation analysis, there was a positive significant relationship between cash position ratios and return on equity and assets in the Sri Lanka telecom plc. But, there was no significant relationship between cash position ratios and ROA and ROE in the Dialog telecom Plc. in the Sri Lankan case. Finally, Sri Lanka telecom Plc. cash position ratios had effect on the performance measures comparing with Dialog telecom Plc. in the Sri Lankan case study.

2.3.1.3 Debtor's turnover ratio

Lazaridis &Tryfonidis, (2006) conducted a study investigating the relationship between working capital management and profitability of listed companies in the Athens stock exchange. They used a sample of 131 companies listed in the Athens Stock Exchange (ASE) for the period of 2001- 2004. The objective of their paper was to establish among that was statistically significant between performance, the cash conversion cycle and its components for listed firms in the ASE. They use regression analysis with the gross operating profit as the dependent variable and

independent variables being number of days' accounts receivables, number of days' accounts payables and cash conversion cycle. They observed that the net operating profit was negatively correlated with the variables of number of days' accounts receivables, number of days' accounts payables and cash conversion cycle. Garcia & Martinez, (2007) conducted a study on the effect of working capital management Small and medium enterprises profitability on Spanish firms. They gathered a panel data of 8,872 small to medium-sized firms covering the year 1996-2002 and tested the effects of working capital 26 management on SME performance by using the panel data techniques. The results which were robust to the presence of indignity demonstrated that managers could create value by reducing their inventories and the number of days for which their accounts were outstanding. Moreover, shortening the cash conversion cycle was also seen to improve the firm's profitability.

2.3.1.4 Current ratio

Eljelly, (2004) conducted a study examining the relationship between profitability and liquidity as measured by current ratio. The study was based on a sample of 29 joint stock companies in Saudi Arabia. He used correlation and regression analysis for analysis and found significant negative relation between the firm's profitability and its current ratio. This interconnection was more evident in companies with high current ratios. Higher industry performance level, however, the study found that the cash conversion ratio was of more importance as a measure of liquidity than current ratio that affects performance. Sumita, (2015) conducted study on effect of liquidity on the performance of Steel authority of India Limited for the accounting period from 2000/01 to 2009/10 by using Secondary data from the published Annual Reports of SAIL. ROC has been taken as outcome variable and three liquidity ratios, such as, current ratio, liquid ratio and cash ratio has been taken as outcome variable and three liquidity ratios, such as, current ratio, liquid ratio and cash ratio has been taken as explanatory variable. Correlation Coefficient is applied to examine the effect of liquidity on profitability performance and student t-test has been used to test the hypotheses. The results of the study reveal that out of the three ratios used for the study, current ratio has positively and significantly affect the profitability of the company. Thus, the management of the company should focus on the maintenance of current ratio. On the other hand, Eljelly (2004) found that there was a significant negative relationship between a firm's

profitability and its liquidity level. When firms have more assets than liabilities, this might be a sign that they are losing investment opportunities that could return in profits for the company.

2.3.1.5 The effects of macroeconomics variables on profitability: - Economic growth and Inflation

Batool, A., & Sahi, A. (2019). Investigating the determinants of the financial performance of insurance companies in the USA and UK during the global financial crisis Found that GDP has a positive and significant relationship with the dependent variables of the return on assets of insurance companies in the United States. However, Rashid, A., and Kemal, M. U. (2018), Investigating the impact of internal (micro) and external (macro) factors on the profitability of insurance companies, found that gross domestic product (GDP) has no significant impact on the performance of life insurers.

Alomar & Azzam, I. A. (2017). Effect of micro and macro factors on the performance of the listed Jordanian insurance companies the regression results showed that GDP has a statistically positive and significant effect on the profitability of Jordan's insurance industry. However, this study identified that inflation has no significant effect on the profitability of the insurance industry in Jordan. However, Banerjee, R., and Aajumdar, S. (2018) investigated the impact of firm-specific and macroeconomic factors on the financial performance of the UAE insurance sector. The regression results showed that GDP has a positive and significant impact on profitability, while the effect of inflation is significant with a negative sign. Financial performance of the UAE insurance sector. According to Cudiamat, A and Siy, J. S. (2017), Determinants of profitability in life insurance companies: evidence from the Philippines, GDP and inflation were shown to have no statistically significant effects on return on assets.

2.3.1.6 Age of insurance companies

According to Ahmeti, Y., and Iseni, E. (2022), Factors affecting the profitability of insurance companies Evidence from Kosovo Age has a positive and insignificant effect on the return on assets. Ance sector of Pakistan Results show that age is negatively related to profitability. But size is positively related to profitability.

2.3.1.7 Size of companies

According to Ben Dhiab, l. (2021), investigate the determinants of insurance firms' profitability: an empirical study of the Saudi insurance market. The result found that size has positive and insignificant impacts on profitability; however, Bhattarai, b. P. (2020) Factors influencing the profitability of insurance companies in Nepa. Size has a positive and significant relationship with profitability, which expresses that when the size of an insurance company increases, the profit of the insurance company increases, and vice versa.

2.4 Studies in African Countries

2.4.1 Cash ratio

Study by Omesa, (2015) to establish the effect of liquidity on the financial performance of financial institutions listed in the Nairobi Securities Exchange. The study adopted descriptive 28 research design where secondary data was retrieved from the balance sheets, income statements and notes of 19 financial institutions in the NSE for period covering 2010-2014. A regression model was developed to determine the relationship between the dependent variable (Financial performance) and independent variables included liquidity while capital structure was used as the control variable. Pearson's correlation and regression analysis were used for the analysis. The results indicated that the relationship between liquidity and financial performance is weak with an adjusted R2 of 55.17% and liquidity had an insignificant relationship with ROA .The results further show that there is a negative relationship between NSE listed financial institutions' cash position indicator with ROA. This might be explained with the view that with inadequate cash position, then the firm will borrow at possible high interest rate costs and thus reduce the firm's financial performance. The study concluded that liquidity management is not a contributor alone of the firm's financial performance and there exist other variable that will influence ROA.in the study of Lasisi, Isiaka and Olalekan1 (2018) Claim loss and premium growth have no a statistical significant relationship with performance of insurance firms in Nigeria. The result of the study also shows that insurance firms claim loss was negatively related to performance (ROA) while premium growth were positively related to insurance performance**.**

2.4.2 Current ratio

Maina, (2011) conducted a study examining the relationship between liquidity management and profitability of the Oil companies in Kenya and covered the period 2007- 2010. A regression model was developed to determine the relationship between the dependent variable (Profitability of the firms) and independent variables (liquidity position). The independent variable used in the model consisted of Current ratio, quick ratio, cash conversion cycle, while the age of the firm were used as control variables. Pearson's correlation and regression analysis were used for the analysis and tests of significance were carried out for all variables using t-test at the 95% level of significance. The results indicated that the relationship between liquidity and profitability was weak and also that all the independent variables had a significant relationship with ROA except the quick ratio and cash conversion cycle. The results further showed that there was a strong negative relationship between quick ratios with its ROA. Wambu, (2013) conducted a on the relationship between the profitability and the liquidity of insurance companies in Kenya. The aim of this study was to establish whether the profitability of insurance companies is affected by the liquidity levels of the insurance. The population of the study comprised of all 44 insurance companies in Kenya operating in the years 2008 to 2012. The study involved secondary data collection of the return on assets, to measure profitability and Central Bank of Kenya liquidity ratio and current ratio to measure liquidity during a specific year. The study used secondary data obtained from audited financial statements of the banks at the end of the years of study. The study used descriptive statistics that is regression analysis and correlation to establish the relationship between the study variables. Profitability measured by Return on Assets (ROA) was the dependent variable while current ratio and Central Bank of Kenya liquidity ratios were the independent variables. He found out that there was a positive relationship between profitability and liquidity of commercial banks in Kenya. Liquidity was found to be one of the determinants of profitability of commercial banks in Kenya over the years of study. According to David, et al, (2021). "Influence of liquidity on financial performance of insurance companies in Kenya. The study finding that current ratio had a significant positive effect on ROA. These findings indicate that improving the current ratio amongst the insurance companies would lead to increased ROA.

2.4.3 Outstanding claim ratio

It represents the amount paid to the insured for the reported losses. We expect to have a negative relationship with profitability, explained by the fact that higher levels of claims can lead to higher insolvency rates, therefore affecting profitability. Akotey et al. (2013) However, Riya, K., and Nimalathasan, B. (2013) Liquidity management and profitability: A case study of investigate Liquidity Management and Profitability: A Case Study of Listed insurance companies in Sri Lanka**.** The regression result shows that the outstanding claim ratio is positive and significant. Effect on return on assets.

2.4.4 Debtor's turnover ratio (DTO)

It shows how many times the company collects its accounts receivable. A high ratio increases the liquidity of the company. It is calculated by dividing net credit sales by average accounts receivable. According to Agha, H. (2014) and Wajo, A. R. (2021), the regression result shows a positive and statistically significant effect of DTR on performance.

2.4.5 The effects of macroeconomics variables on profitability: - Economic growth and Inflation

Several factors have been suggested as impacting profitability, and these factors include macroeconomic factors such as economic growth and inflation. The effect of economic growth and inflation on the profitability of insurance companies has not been adequately investigated. According to Olaosebikan, (2012), Poposki and et al. (2012), Hussain (2012), and Chen-Ying Lee (2014), among others, investigate the effects of economic growth and inflation on insurance company profitability. Isayas, Y. N. (2022). Determinants of banks' profitability: Empirical evidence from banks in Ethiopia The regression result shows that inflation has a negative but insignificant effect on the profitability of commercial banks in Ethiopia, while the GDP growth rate is found to have a positive and significant impact on Ethiopian commercial banks 'financial performance. There is more empirical evidence on the effects of economic growth and inflation on banking sector profitability compared to insurance company profitability. Additionally, Daare, W. J. (2016) Identify factors that determine non-life insurance companies` profitability in

India. The result shows that inflation has a significant negative relationship while GDP has a positive effect on ROA but is insignificant.

2.4.6 Age of companies

The age of a company as it relates to insurance company performance has been considered in several studies. Tegegn, et al, (2020). Investigate Factors affecting the profitability of insurance companies in Ethiopia: panel evidence the regression results showed that the age of the company is negatively related to the profitability of insurance companies in Ethiopia. The estimation result of the random effect model reveals that there is a negative and significant relationship between profitability and the age of the company. However, Ajao M. (1019) investigates firm-specific factors and the performance of Insurance Firms in Nigeria. This study found that the age of insurance companies was observed to be insignificant but positively related to performance. It implies that the age of insurance companies is an important firm-specific factor that influences the performance of insurance companies in Nigeria. The empirical findings as they relate to age and the insurance company's performance have been mixed. Kaguri (2012), Sumaira and Amjad (2013), Derbali (2014), Kaya (2015), Berteji (2016), and Hammami (2016), in their respective studies, found that age has a significant relationship with performance. Ahmed et al. (2011), Ayele (2012), Mehari and Aemiro (2013), Sambasivam and Ayele (2013), and Kazeem (2015) found that the age of an insurance company is not a significant determinant of performance in their respective studies. Malik (2011), Mwangi (2015), and Murigu (2015) found no relationship between age and performance in their respective studies.

2.4.7 Size of company

Merra, T. M. (2020). Factors affecting the profitability of insurance companies in Ethiopia based on panel evidence this study found that Size has positively and significantly influenced the profitability of the firm. Derbali, A. M. S. (2014) Determinants of the performance of insurance companies in Tunisia: the case of life insurance this study found that Size has a negative and statistically significant effect on life insurance. Tunisian small companies are more efficient than those of larger sizes. Additionally Meher, K. C., & Zewudu, T. (2020). Determinants of a firm's internal and macroeconomic factors on the financial performance of Ethiopian insurers this study found that Size has positively and significantly influenced the profitability of the firm. However Onsongo, B. J. (2015) Also investigated were the Determinants of financial performance for life

insurance. Companies in Kenya. The result indicated that Size has been positive and insignificant. On the other hand, Mayowa G. Ajao's (2019) study indicates that size is negatively and significantly related to performance. This suggests that large insurance companies, in terms of total assets, are likely to be less profitable, which implies poor performance.

2.5 Summary of Literature and Research Gaps

Many empirical studies have been conducted abroad regarding the effect of liquidity management on the performance of insurance companies. A review of the literature showed that studies on the effect of liquidity management on the performance of the insurance sector revealed serious inconsistencies. Some empirical studies, such as Lyroudi & Lazoridis (2000), Mathuva (2009), Wambu (2013), Lartey, Antwiand, & Boadi (2013), Kimondo (2014), and Karani (2014), show a positive and significant relationship between liquidity and performance, while studies conducted by Deloof (2003), Eljelly (2004), Lazaridis & Tryfonidis (2006), Garcia & Martinez (2007), Ombworo (2014), and Chen and Wong (2004) show that there is an inversely significant relationship between liquidity and performance of firms. The study conducted by Batool, a., and Sahi, a. (2019) Banerjee, r., & Majumdar, s. (2018). Alomari, M. W., & Azzam, I. A. (2017). Isayas, Y. N. (2022) shows a positive and significant relationship between GDP and performance. Whereas, Daare, W. J. (2016), and Kemal, M. U. (2018) and Siy, J. S. (2017) show a positive and statistically insignificant relationship between GDP and performance.

The research was conducted by Alomari, M. W., and Azzam, I. A. (2017). Isayas, Y. N. (2022) revealed that inflation and performance have no significant relationship, while Majumdar, S. (2018) shows the negative and statistically significant impact of inflation on the performance of insurance companies.

The research was conducted by Merra, T. M. (2020) and Malik, H. (2011). Shows that this has a negative effect on the performance of insurance companies. Whereas Kaguri (2012), Sumaira and Amjad (2013), Derbali (2014), Kaya (2015), Berteji (2016), and Hammami (2016) show that this has a positive effect on the performance of insurance companies.

The research was conducted by Merra, T. M. (2020), Meher, K. C., and Zewudu, T. (2020). Shows a positive and significant relationship between size and performance. Whereas, Mayowa G. Ajao (2019) and Derbali, A. M. S., (2014) Shows a significant negative relationship between size and performance. In general, both macroeconomic and microeconomic factors are believed to have an effect on the performance of Ethiopian insurance companies, and there is inconsistency among the findings in the literature. In addition to inconsistencies among studies, previous researchers did not include major proxies of liquidity management such as the defensive interval ratio and outstanding claims ratio, which have a major effect on the performance of financial institutions**.**

2.6 Conceptual Framework

According to Regoniel (2015), a conceptual framework represents the researcher's synthesis of the literature on how to explain a phenomenon. It maps out the actions required in the course of the study, given his previous knowledge of other researchers' point of view and his observations on the subject of research. Conceptual framework is a network of interlinked concepts that together provide a comprehensive understanding of a phenomenon Jabareen, (2009). In this study, the dependent variable return on asset while the independent variables are the determinants of return on asset. The study has eleven independent factors determining the return on asset of Ethiopian insurance companies Those factors are GDP growth rate, Inflation rate, Defensive Interval Ratio, Cash Ratio, Current Ratio, Debtor's Turnover Ratio, Outstanding Claims Ratio, size and age. The Conceptual framework of these variables is a guide to the research and shows how they determine return on asset of Ethiopian insurance companies. This conceptual frame work can be elaborate using the following diagram.

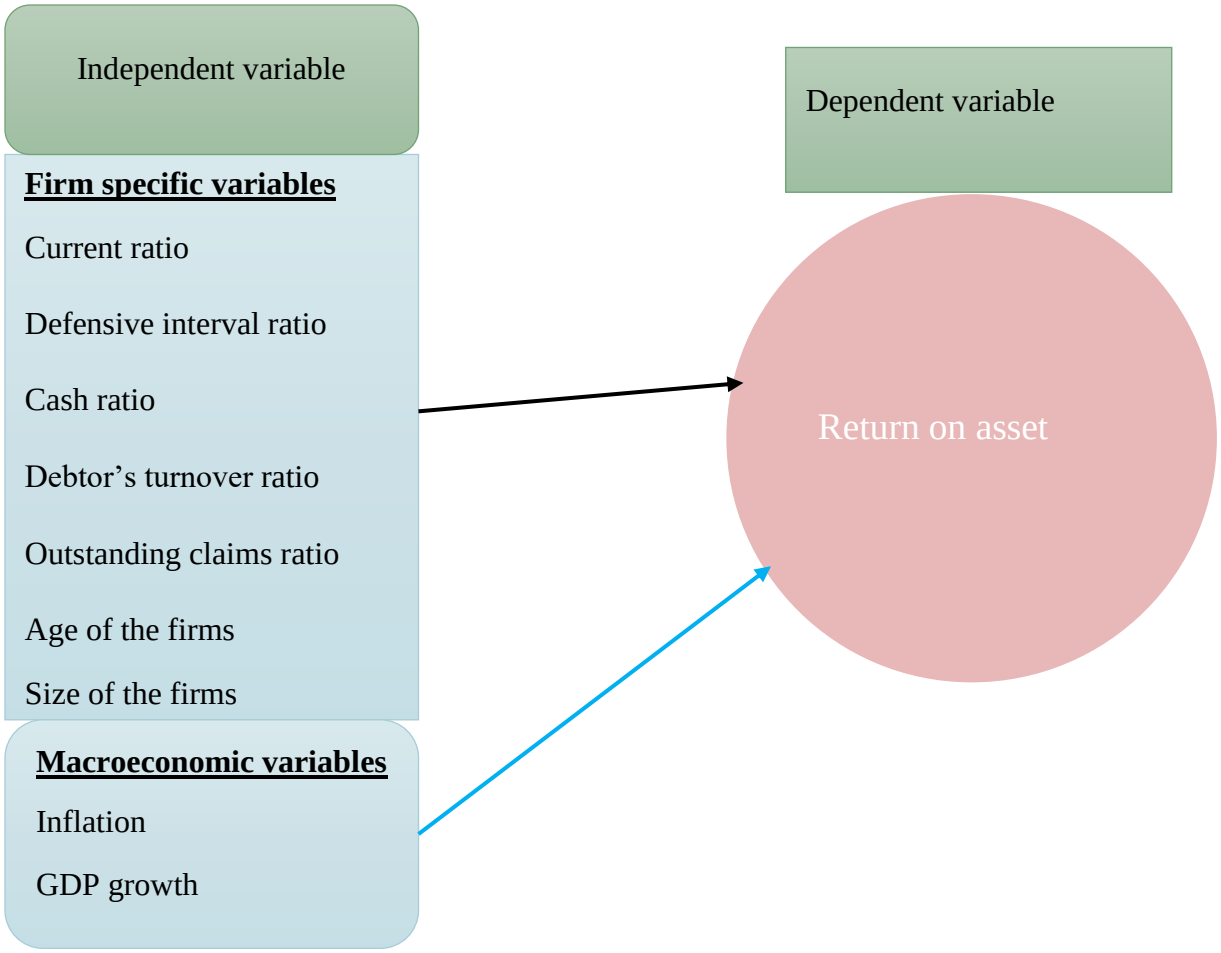

Figure 2. 1: Conceptual framework

Source: - Author's own formulation from theoretical and empirical literature

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research Approach

According to Creswell (2014), there are three research approaches. Namely, quantitative research approaches, qualitative research approaches, and mixed research approaches Quantitative research employs a review of the existing literature to deductively develop theories and hypotheses to be tested. It is a means of testing objective theories by examining the causal relationship between variables. These variables, in turn, can typically be measured on instruments so that numbered data can be analyzed using statistical methods. Qualitative research is used to provide an understanding of social reality based on subjective interpretation. The research process involves emerging questions and procedures, data typically collected from the participants' environment, data analysis building inductively from details of general issues, and the researcher making interpretations of the meaning of the data. Other types of research approaches were mixed. This approach seeks a practical knowledge claim philosophy that consists of both quantitative and qualitative approaches. Thus, among the three listed research approaches, this study used a quantitative research approach. Because the quantitative research approach tends to assume that there is a cause-and-effect relationship between known variables. In addition to a quantitative approach, the researcher primarily uses postpositive claims for developing knowledge. Post-positivists hold a deterministic philosophy in which causes probably determine effects or outcomes.

3.2 Research Design

Research design is the overall plan for connecting conceptual research problems to pertinent and achievable empirical research. It is an inquiry that provides specific direction for procedures in research. Creswell, (2014). According to Srejesh, Mohapatra, and Anusree (2014), there are three types of research designs. Those are descriptive research designs, exploratory research designs, and explanatory research designs. Descriptive Research Design is the method of collecting information by asking a set of pre-formulated questions in a predetermined sequence in a structured questionnaire to a sample of individuals. Exploratory research is used to identify the boundaries of the environment in which the problem, opportunity, or situation of interest is likely

to be found and to identify the hidden factors or variables found there that might be relevant to the research. Finally, the explanatory research design is used to identify the cause-and-effect relationship between variables. Since the main objective of the study was to examine the cause-and-effect relationship between the determinants of Return on Assets (Defensive Interval Ratio, Cash Ratio, Outstanding Claims Ratio, Current Ratio, Debtor's Turnover Ratio, Inflation, GDP growth rate, firm size, and age of the firm), Hence, in this study, the researcher used an explanatory this method shows the cause-and-effect relationship between variables and provides an accurate and valid representation of variables, respectively.

3.3 Population of the Study

The target population of this study covered all insurance companies in Ethiopia. Currently, in Ethiopia, there are about eighteen (18) Insurance companies, based on the national bank of Ethiopia's annual report for 2022 G.C. Among these, one was state-owned, and the remaining are privately owned. Due to the researcher's intention to provide the most reliable and up-to-date result, the length of this study is ten years, from 2013 to 2022.

3.4 Sample Size and Sampling Techniques

This study covered some insurance companies that are established and operate in Ethiopia and also had a minimum of ten years of financial data at the time of data collection on the selected variables.

According to Adams et al. (2007), a non-probability sample that conforms to certain criteria is called purposive sampling. Purposive sampling, also known as judgment sampling, is a method of selecting sample members solely on the basis of the researcher's knowledge and judgment. Out of 18 insurance companies, the following ten were selected based on their data availability for the balanced panel data set.

Table 3. 1: List of sampled Ethiopian insurance companies

No	Name of insurance companies	Establishing year based on (G.C)	Service	Over the periods of 2013/14-2022/23years
1	Ethiopian insurance corporation	1984	General	10
2	Africa insurance company S.C	1/12/2002	General	10
3	Awash insurance company S.C	1/10/2002	General	10
4	National insurance company of Ethiopia S.C	23/09/2002	General	10
5	Nile insurance company S.C	11/04/2003	General	10
6	Nyala insurance company S.C	6/01/2003	General	10
7	Global insurance company S.C	11/01/2005	General	10
8	The united insurance company S.C	1/04/2005	General	10
9	Nib insurance company S.C	1/05/2010	General	10
10	Lion insurance company S.C	1/07/2008	General	10

Source: National Bank of Ethiopia, 2022/23 G.C.

3.5 Data type and sources

The researcher uses secondary data only, which are audited financial statements of each company: balance sheet and income statements, annual report of NBE and other relevant statistical documents .The source of data was collected by soft copy in excel mode (with permission) from National Bank of Ethiopia (NBE) .Generally based on this study the researcher uses the source data by national bank of Ethiopia and world bank. Data type also secondary data used. Secondary data was collected from the financial statement of the insurance companies from the period of ten consecutive years 2013-2022.

3.6 Methods of Data collection instrument

The document review method was used by the researcher in order to collect all the necessary information to achieve the objectives of the study. As a secondary data collection tool for this study, document review mainly focused on reviewing the audited financial statements (balance sheet and income statement) of ten insurance companies to obtain the necessary figures. Besides, the NBE annual reports, World Bank quarterly bulletins, and other related documents were collected and reviewed by the researcher to get the necessary figures regarding macroeconomic (external) variables.

3.7 Method of data analysis

The collected data was analyzed by employing both descriptive and inferential statistics. The multivariate ordinal least squares (OLS) regression technique was employed to determine the relationship between the multiple independent variables and the dependent variable. One regression equation was used to test the hypotheses constructed in relation to both macro-economic and firm-specific determinants of performance. The collected panel data were regressed using STATA 17 statistical software, and the regression outputs were analyzed. On top of this, MS Excel 2016 was also used to compute and feed convenient data into STATA. First, the data were tested to ensure the validity of the classical linear regression model's (CLRM) assumptions. Second, tests of the hypotheses that were previously developed in Chapter one were made based on the general estimated model, which examined the relationship between performance and its determinants for Ethiopian insurance companies.

3.7.1 Model specification.

The Multivariate ordinary least squares (OLS) regression model was used in order to examine the effect of liquidity management on the performance of insurance companies' in Ethiopia. The selected model is due to the nature of the data and the dependent variables. Moreover, the nature of the data means that the data was both cross-sectional and time-series or panel data, and the dependent variable was explained in terms of number. For this reason, the OLS regression model was appropriate for the study. The OLS estimator is the best estimator because it has the lowest variance as compared to any estimator obtained using other econometric methods. A multiple regression model was used to analyze the data collected from the financial statements of insurance companies operating in Ethiopia. Over the sample period, descriptive statistics of the

variables and regression analysis of the dependent variable have been calculated. In addition, a correlation matrix would be used to identify the relationship between each variable among them and the dependent variable. Then, most of the existing empirical studies on the performance using STATA software's OLS (ordinary least squares) regression model were carried out to test the relationship between return on assets and their potential determinant factors in the selected insurance companies in Ethiopia. Multiple regressions have also been used to determine the most significant and influential explanatory variables affecting the performance of insurance companies in Ethiopia. In connection with this, the general model for this study, as is mostly found in the existing literature, is represented by:

$$\mathbf{Y_{it} = \alpha + \beta X_{it} + \varepsilon_{it}}$$

The subscript i representing the cross-sectional dimension number of insurance company each ten selected only and t denote the time-series dimension like number of year's ten years. The left-hand variable $\mathbf{Y_{it}}$, represents the dependent variable in the model, which is the firm's return on asset $\mathbf{X_{it}}$ Contains the set of independent variables in the estimation model, is taken to be constant overtime t and specific to the individual cross-sectional unit i. If **α** is taken to be the same across units, then OLS were provides a consistent and coefficient estimate of **α** and **β**.

∑ i.t it represents dummy variables

Therefore, the model for this study has based on econometrics book used by D. N. Gujarati, and Gunasekar (2012), with some modification to explain the relationships between dependent and independent variable shown below.

General form of the equation is:

Return on asset=the function of (Cash Ratio, Debtor's Turnover Ratio, Current Ratio, Outstanding Claims Ratio, Defensive interval ratio, gross domestic product, Inflation, size and age) based on this modification of the model as follows.

Specified form of the equation is:

$$ROA_{i,t} = \beta o + \beta_1(CAR_{i,t}) + \beta_2(DTR_{i,t}) + \beta_3(CR_{i,t}) + \beta_4(OCR_{i,t}) + \beta_5(DIR_{i,t}) + \beta_6(GDP_t) + \beta_7(INR_t) + \beta_8(SZ_{i,t}) + \beta_9(AG_{i,t}) + \varepsilon_{i,t}$$

Where: ROA = Return on Asset

i=number of insurance companies (1, 2, 3…….10)

t= number of years or time periods (2013……2022)

β0 =constant coefficient

B1-β9 = regression coefficients for measuring independent variables

∑ i.t = dummy variables/ error term.

Where: ROA =Return on asset	*DIR = Defensive interval ratio*
CR = Cash Ratio	*OCR =Outstanding Claims Ratio*
CR =Current Ratio	*SZ =Size company*
DTR= Debtor's Turnover Ratio	*AG =Age of companies*
GDP =gross domestic product	*INR= Inflation*

Therefore, the estimated regression coefficients measures of how much a unit of Return on asset is changed with a unit change in the explanatory variables included in the model.

3.7.2. Variables and research model

The study has to types of variables; dependent variable (return on asset) and independent variables (Cash Ratio, Defensive interval ratio, Current Ratio, Debtor's Turnover Ratio, Outstanding Claims Ratio, gross domestic product, Inflation, size and age)

Table 3. 2: Description of the variables and their expected Sign

Variable	Symbol	Measurement	Expected sign of the hypothesis
Dependent Variable			
Return on asset	ROA	Net income/Total asset	
Independent Variables			
Cash Ratio	CAR	Cash + cash equivalent / Current liabilities	+
Debtor's turnover	DRR	Net credit sales/ Average accounts receivable	+
Current ratio	CR	Current asset/Current liability	+
Outstanding claims ratio	OCR	Unpaid Claims rate/Risk premium rate	_
Defensive interval ratio	DIR	Current Assets / Daily Operational Expenses	+
Inflation rate	INF	Annual change in inflation rate	+
Gross domestic product	GDP	Annual change in real GDP growth rate	+
Size	SZ	Natural logarithm of total asset=ln (total asset)	+
Age	AG	Natural logarithm age of insurance companies'	+

3.8. Assumptions tested

- There is no heteroskedasticity problems, means the variance between the residual terms should be constant.
- No perfect multicollinearity between independent variables, means no explanatory variable can be written as a linear function of other explanatory variables.
- No autocorrelation between the errors, means a situation in which no identifiable relationship exists between the values of the error term.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

1. INTRODUCTION

This section of the paper focuses on the analysis and discussion of findings based on data from selected insurance companies. A regression analysis was conducted, and interpretations were drawn from it. A summary of descriptive statistics and regression results from the stata output was given, followed by detailed analysis and discussion of the results. Correlation analysis is also to know the magnitude of the relationship with dependent and independent variables and the details interpreted from it. In addition, the researcher also conducted the Hussmann test, F-test, Breusch and Pagan multiplier LM tests to know whether the model is fixed, random and pooled regression effects, and a unit root test for data stationary assumptions to increase the reliability of the study.

4.1. Descriptive Statistics

Descriptive statistics are used to describe the sample data of each variable in the study with a single value that represents the data's center, the largest and smallest data values. It is also used to determine how far the data deviates from the mean. The mean is the sum of the observations divided by the total number of observations. It measures central tendency. The standard deviation is the squared root of the variance. It indicates how to close the data from the mean. It’s called the measure of dispersion. A minimum is the lowest value in the variables, and a maximum is the largest value in the variables. The dependent variable used in this study was Return on asset the independent variables were Cash Ratio, Current Ratio, and Defensive interval ratio, Debtor’s Turnover Ratio, Outstanding Claims Ratio, Inflation, GDP, Size and Age. Accordingly, the regression result, mean, standard deviation, maximum, and minimum values of each variable were discussed here to show the nature of the data used for detailed analysis in this regression result as follows.

Table 4. 1: Summary of descriptive statistics

```
. summarize ROA CAR DTR CR OCR DIR GDP INR SZ AG

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
         ROA |        100    .1064619    .0488456       .0111      .2312
         CAR |        100     .575706    .2245871       .1959     1.0777
         DTR |        100    7.264916    3.447726       2.031      16.52
          CR |        100    1.103029    .3576567       .5431      2.405
         OCR |        100    .7457345     .544231       .1001     2.6811
-------------+---------------------------------------------------------
         DIR |        100    7.882758    3.401933       1.987      15.98
         GDP |        100       .0838    .0172052        .051       .104
         INR |        100       .1485    .0791103        .074       .338
          SZ |        100    10.48533    1.268009      8.4257    12.4641
          AG |        100     1.16916     .248395        .602     1.9552
```

Source: Stata 17 output from 2013–2022 G.C.

As shown in Table 4.1 above, the mean value of Return on asset (ROA) (0.1064619), considered a common indicator of performance for all insurance companies, implies that, on average, firms can earn 10.64 percent of profit after tax on each Birr invested in assets. As the maximum (0.2312) and minimum value (0.0111) show, among the insurance companies studied, the most successful company earned 23.12 percent of profit after tax on each birr invested in total assets, while the weakest performing firm earned 1.11 percent profit after tax during the period covering 2013–2022. On the other side, the standard deviation of ROA of 0.0488456 indicates that the mean value of ROA was deviated from its mean by 4.8 percent. The Mean value of 7.889358 ears for the defensive interval ratio (DIR) indicates that insurance companies can operate for 7.89 years without needing to tap into capital assets other than their current assets. This implies that companies are cautious in the management of their current assets to protect their company from shortages of liquid assets. The maximum value of 15.98 years and the minimum of 1.987 years show that firms with good liquidity positions can operate for about 15.98 years without using their capital sources, and companies with adverse liquidity levels can only operate for 1.987 years without using their capital assets during the ten previous years. On the other hand, a standard deviation of 3.401933 years indicates that the variation in companies' ability to stay in

operation without using capital sources is about 3.401933 years. This implies that there was a big variation in the liquidity position of insurance companies in Ethiopia during the period covering 2013–2022.

Cash ratio is a stricter, more conservative measure of liquidity with a mean value of 0. 575706 shows that insurance companies during 2013–2022 had on average 57.57 cents of cash and cash equivalents to cover Birr one's current liability. This result is an indicator that firms have ideal cash and cash equivalents to fund their current obligations. Since a cash ratio not lower than 0.5 to 1 is usually preferred CFI, (2015). During conservative periods, companies CAR was 107.77%, which means that a company can pay off its current liabilities with cash and cash equivalents and have funds left over. During periods with lower investment in most liquid assets, companies have only 19.59 cents to cover Birr 1's current liability in 2013–2022. A standard deviation of 0.2245871 indicates that variation in holdings of cash and cash equivalents to cover current liabilities among companies was about 22.45 cents around the mean. The current ratio, taken as a classic measure of liquidity with a mean value of 1.103029, indicates that insurance companies in Ethiopia can pay debts due within one year out of their current assets. The current ratio in Table 4.1 above reveals companies have on average Birr 1.103029 for every Birr one that is owed by the firm during 2013–2022. A maximum of 2.405 and a minimum of 0.5431 show that companies have Birr 2.405 to cover Birr one current liability during higher investment in current assets and 54.31 cents to cover Birr one current obligations during lower investment in current assets during the period covering 2013–2022. The standard deviation of current during the study period was 0.3576567. This implies that the variation in the ratio of current assets to current liabilities was 35.76567. This is a high variation in the ability of firms to cover their current liabilities only by using current assets. The mean values of OCR and DTR were 0.7457345 and 7.264916, respectively. The ratio of claims outstanding to total claims filed, with a mean of 0.7457345, implies that out of Birr one claims filed, firms have not yet paid 74.57345 cents. Companies have liberal customers. On the other hand, the maximum values of OCR and DTR were 2.6811 and 16.52, respectively. The minimum values of OCR and DTR were 0.1001 and 2.031, respectively. The variation of each value around the mean was 54.4231 cents and 3.447726 times for DTR. In the last four columns of Table 4.1, the mean of GDP, INR, SZ, and AG is 0.0838, 0.1485, 10.48533, and 1.16916, respectively. The mean value of the GDP growth

rate in Ethiopia was around 8.38 percent, and the standard deviation of the GDP growth rate was 0.0172052 percent. This implies that there was also little volatility in each observation of the GDP growth rate from its mean value during 2013–2022. The minimum and maximum values of the GDP growth rate for the last ten years were 5.1% and 10.4%, respectively. The average value of the Ethiopian Inflation rate during the study period was around 14.85%, and the standard deviation for the inflation rate was around 7.91103%; this confirms that there was also little volatility in each observation of the inflation rate from its mean value during 2013–2022. The minimum and maximum values were 7.4% and 33.8%, respectively. This shows that there was some government control over the inflation rate, so those insurance companies were not significantly affected by it. The mean value of firms' sizes was 10.48533 during the period between 2013 and 2022. The minimum value was 8.4257, and the maximum value was 12.4641. The mean deviates during the year by 1.268009, so firms' sizes had fewer variations during the period because the standard deviation was below the mean value. The average age of insurance companies was 1.16916 during the period under study. The minimum and maximum values were 0.602 and 1.9552, respectively. The mean value deviates by 0.248395 during the period.

4.2. Correlation Matrix

According to Brooks (2008), using inferential statistics, correlation analysis is another statistical tool to measure the magnitude of the linear relationship between two or more variables that fluctuate together. Correlation analysis investigates the relationship between various variables, both dependent and independent. The correlation coefficient results of the variables in the correlation analysis should be between +1 and -1, which is used to measure the strength and degree of the linear relationship between two variables, while the sign denotes the direction of the correlation. A negative one (-1) correlation coefficient implies the existence of a perfect negative relationship between the two variables, whereas a positive one (+1) correlation coefficient indicates a perfect positive linear relationship, and a zero (0) correlation also indicates the absence of any linear relationship between the two variables. The correlation matrix for the variables used in the analysis was constructed. The purpose of undertaking correlation analysis was to determine whether there is a Multicollinearity problem in the model to indicate that the variables move together or not in the same direction, and the correlation coefficient indicates the

strength of the linear relationship between the two variables. If y and x are said to be correlated, it means that they are treated in a completely symmetrical manner (Brooks, 2014).

Table 4. 2: Correlation Matrix and Their Significance Level of Correlation for Dependent Variables and Independent Variables (obs = 100)

```
. correlate ROA CAR DTR CR OCR DIR GDP INR SZ AG
(obs=100)
```

	ROA	CAR	DTR	CR	OCR	DIR	GDP	INR	SZ	AG
ROA	1.0000									
CAR	0.3989	1.0000								
DTR	0.4032	-0.0346	1.0000							
CR	0.6717	0.2327	0.1998	1.0000						
OCR	-0.4869	-0.4464	-0.1484	-0.2599	1.0000					
DIR	0.5518	0.0627	0.4883	0.2768	-0.3109	1.0000				
GDP	-0.2288	-0.0536	-0.0635	-0.3053	0.1143	-0.2476	1.0000			
INR	0.1629	0.0428	0.0071	0.2721	-0.0494	0.2007	-0.8264	1.0000		
SZ	-0.1284	-0.0384	-0.1222	-0.2481	0.0979	-0.1463	0.7084	-0.6824	1.0000	
AG	0.3052	0.1742	-0.1068	0.1529	-0.1341	0.0693	-0.3999	0.3338	-0.3008	1.0000

Source: Stata 17 output from 2013–2022 G.C.

4.2.1 Correlational Analysis Results between Dependent and Independent Variables

According to table 4.2, the net income to the total assets or dependent variables in Ethiopian insurance companies is correlated at 39.89 percent with cash, at 40.32% with debtor turnover ratio, and at 67.17 percent with a company's ability to pay short-term obligations or those due within one year. At -48.69 percent with Outstanding Claims Ratio, at 55.18 percent with Defensive Interval ratio, at -12.84 percent with firm size, at 30.52 percent with age of the firm, at -22.88 percent, and 16.29 percent with GDP and inflation, respectively. This means that in Ethiopia, insurance companies have a current ratio, or defensive interval ratio. Cash ratio, debtors' turnover ratio, Inflation rate, and Age have a positive association through performance, with (67.17%, 55.18%, 39.89%, 40.32%, 16.29%, and 30.52%), respectively, over the last ten years for insurance companies in Ethiopia. On the other hand, the coefficient of correlation between return on asset and Outstanding Claims Ratio, GDP, and SZ was -48.69%, -22.88%, and -12.48%, which implies that the relationship between Outstanding Claims Ratio, GDP, and SZ has a negative relationship with return on asset over the last ten years for insurance companies in

Ethiopia. In the above interpretation result, the coefficient of correlation is only negatively and positively correlated, not zero or absence of correlation with relationship to dependent variables. Furthermore, the independent variables have a considerably larger link (negative or positive) with the dependent variables of the selected insurance companies in Ethiopia, as shown in Table 4.2. In the final analysis, the selected explanatory variable are found to have a strong and significant relationship with the dependent variables As a result, the chosen independent variable can explain the dependent variable in Ethiopian insurance companies to a great extent.

4.2.2 Correlational Analysis Result between Independent Variables with Independent Variables

According to Table 4.2, cash ratio was positively correlated with current ratio, Defensive Interval Ratio, Inflation rate, and age, with correlation coefficients of 0.2327, 0.0627, 0.0428, and 0.1742, respectively. In Ethiopian insurance firms during the ten years, it was negatively correlated with the debtor's Turnover Ratio, Outstanding Claims Ratio, size, and GDP growth rate, with correlation coefficients of -0.0346, -0.4464, -0.0384, and -0.0536, respectively. The debtor's Turnover Ratio was positively correlated with the cash ratio, Defensive Interval ratio, and Inflation rate, with correlation coefficients of 0.1998, 0.4883, and 0.0071, respectively. However, there is a negative correlation with the outstanding claims ratio, GDP growth rate, size, and age, with correlation coefficients of -0.1484, -0.0635,-0.0635 ,-0.1222 and -0.1068, respectively. The current ratio was positively correlated with the defensive interval ratio, Inflation rate, and age, with correlation coefficients of 0.2768, 0.2721, and 0.1529, respectively. It was negatively correlated with the Outstanding Claims Ratio, GDP growth rate, and size with correlation coefficients of -0.2599, -0.3053, and -0.2481, respectively. The outstanding claims ratio was positively correlated with GDP growth rate and size, with correlation coefficients of 0.1143 and 0.0979, respectively. It was negatively correlated with the defensive interval ratio, age, and Inflation rate, with correlation coefficients of -0.3109, -0.1341, and -0.0494, respectively. The defensive interval ratio was positively correlated with age and Inflation rate with correlation coefficients of 0.0693 and 0.2007, respectively; it was negatively correlated with size and GDP growth rate with correlation coefficients of -0.1463 and -0.2476. GDP growth rate was positively correlated with only size, with correlation coefficients of 0.7089. However, GDP growth rate is negatively correlated with Inflation rate and age, with correlation coefficients of -0.8264 and -

0.3999, respectively. Over a ten-year period. Inflation rate was positively correlated with only age with a correlation coefficient of 0.3338 and negatively correlated with size with a correlation coefficient of -0.6824 respectively. The firm's size was only negatively correlated with age, with a correlation coefficient of -0.3008.In general, the correlation coefficient of all dependent and independent variables is not perfectly zero between +1 and -1. Despite the fact that the test correlation assumption has a drawback in that there is no clear cutoff point for determining the existence of a near correlation problem, Cameron and Trivedi (2005) believe that correlation coefficients below 0.9 may not cause serial correlation problems. Brooks (2008) also states that the correlation coefficient of an explanatory variable should not exceed 0.9. This shows that there was no problem with the correlation between the dependent and independent variables.

4.3 Test of Assumptions

The most critical assumptions linked to the classical linear regression model states that panel data are tested in the following sub-sections: link test, Normality tests, Multicolinearity tests, Hetroscedasticity tests, autocorrelation tests, and the corresponding ones have been prepared to make the data available, give reliable results, and make the model fit the data. These assumptions were required to be tested because the estimation technique, multivariate ordinary least squares (OLS), has a number of desirable properties. Therefore, hypothesis testing regarding the coefficient estimates could be validly conducted. Furthermore, the other fundamental one, the stationary test, is shown.

4.3.1 Test of Stationary

In order to determine the stationary nature of the variables, the study employed a panel research approach in testing the two hypotheses. The approach combines the attributes of time series and cross-sectional data. Therefore, the researcher first tested the data and variables with a unit root test in order to ascertain from the beginning whether the researcher was dealing with the nature of data and, secondly, to know whether or not the result and findings always held in the long run. Specifically, the Levin-Lin-Chu Test is used to test the results from the Stata. As a rule of thumb, non-stationary data is unpredictable and cannot be predicted. Using non-stationary panel data results in an output that is spurious in the sense that there is a sign of the existence of a relationship between two variables where one does not exist.

Ho: Panels no are stationary

Ha: Panels are stationary

Table 4. 3: Levin- Lin - Chu unit root test

Variables	Statistics		Number of lags (L)
	t-Static	Prob-value	
ROA	-6.9963	0.0000	L(1)
CAR	-5.6011	0.0000	L(1)
DTR	-3.8434	0.0001	L(0)
CR	-1.1587	0.01233	L(1)
OCR	-1.7930	0.0365	L(1)
DIR	-1.8290	0.0337	L(1)
GDP	-4.2780	0.0000	L(0)
INR	-6.5529	0.02113	(1)
SZ	-2.8042	0.0025	(1)
AG	-3.4726	0.0003	(1)

Source**:** Stata 17 output from 2013–2022 G.C.

As shown in the above table 4.3, the p-value of each variable (ROA, CAR, DTR, CR, OCR, DIR, GDP, INR, SZ and AG) is less than the alpha value 0.05 This shows that the null hypothesis which is variables are non-stationary has been rejected, because the result shows that p-value of each variable is statistically significant. A rejection of the null hypothesis implied that the series was stationary**.**

4.3.2. Test of the mean value of the error terms have zero (Ɛ (ut) = 0) assumption

According to Verbeek (2008), if a constant term is included in the regression equation, this assumption is never violated. This regression model used in this study included a constant term. This assumption was not violated. Therefore, since the constant term is included in the regression equation, the average value of the error term in this study is expected to be zero. The error has a mean of zero (Ut) =0).

4.3.3 Heteroscedasticity Test

The other assumption of classical regression model is that the variance of the error term in regression findings is constant. Gujarati et al. (2012), (Xi, X) is equal to zero. If the variance of the error term of the different observations is not the same, Hetroscedasticity must be present in the model. This test is based on Breusch-Pagan/Cook-Weisberg tests, comparing the null hypothesis that the error variance is all equal to the alternative hypothesis that the error variance is a multiplicative function of one or more variables. At each level of predictor variables, the residual terms' variance should be constant. This simply means that the residual at each level of the predictor should have the same variance or homoscedasticity; if the variance is not the same, the residuals are not homoscedastic. The Breusch-Pagan/Cook-Weisberg test for the hypothesis is shown in the table below.

Ho: There is no heteroscedasticity in the model

H1: Ho is false

Table 4. 4: Breusch - Pagan/cook-Weisberg test for Hetroscedasticity

```
Breusch–Pagan/Cook–Weisberg test for heteroskedasticity
Assumption: Normal error terms
Variable: Fitted values of ROA

H0: Constant variance

    chi2(1) =   0.11
Prob > chi2 = 0.7427
```

Source: Stata 17 output from 2013–2022 G.C.

The p-value is 0.7427, which is greater than 0.05, as shown in table 4.4 Therefore, in this study, it is not possible to reject the null hypothesis of homoscedasticity. So, homoscedasticity is accepted by the researcher. As a result, there are no Hetroscedasticity issues with this model. As can be seen from the preceding test, Breusch-Pagan/Cook-Weisberg test for Hetroscedasticity, all versions of the test have p-values considerably greater than 0.05, which is 0.7427 for this model, indicating that Heteroscedasticity is not a concern. This data is homoscedastic, which means that the error term's variance is constant. Heteroscedasticity was not a significant issue in this research

4.3.4 Test of Multicollinearity

Mulicolinearity is the type of the test that makes an evaluation of whether the independent variable under the study is correlated or not. According to Brooks (2014) the absence of multicollinearity assumption says that the explanatory variables are not correlated with one another. If the explanatory variables have no relationship with one another, they are said to be orthogonal to one another. Adding or removing a variable from a regression equation would not change the values of the coefficients on the other variables if the explanatory variables were orthogonal to one another. A small degree of association between explanatory variables will almost always occur, but will not result in significant precision loss.

Table 4. 5: Variable Inflation Factor (VIF) Technique to Detect Multicollinearity

Variable	VIF	1/VIF
GDP	3.90	0.256540
INR	3.46	0.289177
SZ	2.22	0.449838
DIR	1.55	0.643155
DTR	1.43	0.699824
OCR	1.42	0.702516
CAR	1.32	0.755208
AG	1.26	0.796081
CR	1.25	0.798695
Mean VIF	1.98	

.

Source**:** Stata 17 output from 2013–2022 G.C.

The variance inflation factor for the Multicolinearity test is shown in able 4.5 above. If an explanatory variable has a strong linear association with other explanatory variables, the VIF indicates it. As a result, the mean variance inflation factor (VIF) was found to be 1.98, which is significantly lower than the threshold of 10 and thus does not violate the acceptable level. In

other words, in the non-rejection region, there is no collinearity between explanatory variables. The VIF for individual explanatory factors, for instance, was found to be very low. This shows that the model's explanatory variables were not strongly correlated with one another. In other words, the threshold for all independent variables was less than ten (10) points. Therefore, there is no Multicollinearity problem in this study**.**

4.3.5 Test of Normality

As noted in Brook (2008), in order to conduct a single or joint hypothesis test about the model parameter, the normality assumption must be fulfilled. The simplest test for normality is a visual check of the histogram that compares the observed data values with a distribution that approximates the distribution. As a result, the researcher employed graphical methods of testing normality, such as the histogram and normal P-P. Standardized plot test and non-graphical normality tests such as Skewness or kurtosis test, Shapiro-Wilk test for normality in numerical tests.so numerical test is more reflected in normality. For this reason, the researcher used only numerical test in Skewness or kurtosis test, Shapiro-Wilk test for normality as the following shows that the study has no normality problem.

4.3.5.1 Skewness or kurtosis Test of Normality

The stata results for the tests of skewness or kurtosis presented in Table 4.6 show that the researcher does not reject the null hypothesis as the p-value is quite high for both the skewness and kurtosis tests for normality. The joint test p-value (0.2247) is greater than the level of significance of 5%. This indicates that the data were consistent with the normal distribution assumption.

Ho: The data is normally distributed.

Ha: The data is not normally distributed

Table 4. 6: skewness and kurtosis test for norm

Skewness and kurtosis tests for normality

Variable	Obs	Pr(skewness)	Pr(kurtosis)	Joint test Adj chi2(2)	Joint test Prob>chi2
ROA	100	0.7277	0.0951	2.99	0.2247

Source**:** Stata 17 output from 2013–2022 G.C.

The skewness/kurtosis test for normality in the above table shows that the joint test p-value is greater than 0.05, which means p-value = 0.2247. As a result, the researcher does not reject the null hypothesis of normality, and this regression model indicates that it is normality distributed.

4.3.5.2 Shapiro - wilk Test for Normality

The Shapiro-Wilk test is designed to test normality by comparing the data to a normal distribution with the same mean and standard deviation as the sample. If the test is not significant, then the data is normal, so any value above 5% indicates normality distributed**.**

Table 4. 7: Shapiro-Wilk W test for normality

Shapiro–Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
ROA	100	0.98261	1.435	0.802	0.21132

Source: Stata 17 output from 2013–2022 G.C.

Table 4.7 presents the Shapiro-Wilk test, which showed that the p-value of the test is 0.21132. This shows that there is no strong evidence to reject the null hypothesis that the distribution is normal at a level of 5%. The S-W test also inferred that the data was consistent with a normal distribution assumption**.**

4.3.6 Test of Autocorrelation

According to Gujarati and Porter (2009) the assumption of no autocorrelation between the disturbances assumes that given any two X values, Xi and Xj (i≠ j), the correlation between any two ui and uj (i≠ j), is zero. According to Brooks (2014), the errors are assumed to be unrelated to one another, If the errors are not uncorrelated with one another, they are said to be auto

correlated 'or serially correlated '. If the errors are correlated with one another, they are said to be auto correlated. The Durbin Watson (DW) autocorrelation test was used to put this assumption to the test. Durbin-Watson (DW) is a first order autocorrelation test, which looks for a relationship between an error and its immediately preceding value.

Ho: there is no autocorrelation

Ha: there is an autocorrelation

Table 4. 8: Durbin Watson (DW) test to check autocorrelation

```
. dwstat

Durbin-Watson d-statistic( 10,   100) =  1.767554
```

Source: Stata 17 output from 2013–2022 G.C.

In general, in the above result, the DW statistic value is near 2, so there are no autocorrelation problems. A rule of thumb is that statistical values in the range of 1.5 to 2.5 are relatively normal. Values outside of this range could be cause for concern. Therefore, the result is 1.767554 in the region of Ho, so there is no autocorrelation problem. So the residuals are independent of each other. This means that the number of disturbance observations on one is not equal to the number of disturbance observations on another (i, j).

4.4 Test of Model Specification

A typical specification error occurs when the estimated model does not include the correct set of explanatory variables. This specification error takes two forms: omitting one or more relevant explanatory variables or including one or more irrelevant explanatory variables. Either form of specification error results in problems with OLS estimates. The Ramsey reset test and the link test are used to detect specification errors. If the omitted variables are not correlated with the included variables, the estimators are unbiased, and model specification errors will not occur. The following is the hypothesis for the model specification test:

Ho: The model has not correctly specified or omitted variable

Ha: The model has correctly specified or no omitted variable.

4.4.1 Ramsey Reset Test for Omitted Variables in the Model

Reset stands for the regression specification error test and was proposed by Ramsey (1969). This test is made on the basis of a null hypothesis, that is, a hypothesis that says the model has no omitted variables. The decision rule based on the result rejects Ho because the p-value is higher than 5%.

Table 4.9: Reset Test for Omitted Variables in the Model

```
Ramsey RESET test for omitted variables
Omitted: Powers of fitted values of ROA

H0: Model has no omitted variables

F(3, 87) =     1.03
Prob > F = 0.3840
```

Source**:** Stata 17 output from 2013–2022 G.C.

The alternative hypothesis is that the model does not have an omitted variable bias. The p-value is higher than the usual threshold of 5%, so the null hypothesis cannot be rejected, and it can be concluded that the model has no omitted variables. It is safe to say that there is no omitted specification in the data. The reset result, shown in the above table, indicates that it is impossible to test the alternative hypothesis that states the absence of omitted variables, indicating no model specification error.

4.4.2 Link Test Model Specfication Error Test

Through the Link test, a model specification test is carried out. The null hypothesis that the regression is accurately defined serves as the basis of the link test. The link test implies that if the model is correctly specified, it should be impossible to identify any additional independent variables that are significant other than through chance. The link test approach was used in this study to generate two new variables in order to test the model specification error using Stata. These variables are the prediction variable (_hat) and the square prediction variable (_hatsq). The model was then refitted, or regressed, using these two variables as predictors. This means that by running a new regression with the observed (_hat) as the dependent variable predicted and (_hatsq) as the independent variable predicted, Theoretically, the variable of prediction (_hat) should be significant since it is the predicted value, and the variable of square prediction (_hats

q) should not be significant because if the model is specified correctly, the square prediction should not have much explanatory influence. The link test is summarized in the below table as follows:

Table 4.10 the link test model specification errors

ROA	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
_hat	1.039365	.2255592	4.61	0.000	.5916925	1.487038
_hatsq	-.1826245	1.009754	-0.18	0.857	-2.186707	1.821458
_cons	-.0017991	.0120347	-0.15	0.881	-.0256846	.0220865

Source**:** Stata 17 output from 2013–2022 G.C.

Practically, the link test result confirmed that the predicted value, the variable of prediction (_hat), is a significant variable, and the variable of square prediction (_hatsq), is not significant. As a result, the null hypothesis was accepted, which our model specified correctly. In other words, the decision rule assumes the p-value prediction value (_hat) is less than 5% and the p-value square prediction value (_hatsq) is greater than 5%. Our model is correctly specified, or there is no specification error. If the p-value specification error exists or our model is miss specified, the null hypothesis is rejected. Therefore, in the above table results, the p-value (_hat) is 0.000 less than 5% or significant, and the p-value square prediction value (_hatsq) is insignificant or 0.857 greater than 5%. The null hypothesis accepted is that our model is correctly specified or that no specification error exists.

4.5 Estimation of the Model

4.5.1. Fixed Effect versus Random Effect

The appropriateness of the random-effect or fixed-effect approach must be determined. It is challenging to determine whether a fixed-effect model or a random-effect model is more appropriate. If the data are thought to be uncorrelated, random effects might be appropriate, but coupled data is better off with fixed effects. The null hypothesis for this test is that the unobservable heterogeneity term is not correlated or that a random effect model is appropriate with the independent variables. If the test rejects the null hypothesis, then we employ the fixed

effects method (Padachi, 2006). The assumption of the panel regression function states that the intercepts are the same for each company. This may be an inappropriate assumption; Brooks (2008) recommended that we instead estimate a model with firm fixed effects, which allows for latent company-specific heterogeneity. The simplest types of fixed effects models allow the intercept in the regression model to differ cross-sectional. To determine whether the fixed effects are necessary or not, this study ran a random effects test as recommended by Brooks (2008). According to Hausman (1978), the specification test can be used to determine if fixed or random effect models are appropriate. The commonly used estimators for panel data analysis are fixed effects and random effects. In the absence of an alternative, the null hypothesis would be rejected. Rejecting the null hypothesis implies that the fixed effect estimator is applied to the model. The inverse is also true. The results are based on the Hausman specification test as recommended by Brooks (2014). The result of the correlated random effects Hausman test is presented below in Table 4.11. To do this,

Ho; random effect model is appropriate

H1; fixed effect model is appropriate

Table 4.11: Hausman Test

```
                            b = consistent under Ho and Ha; obtained from xtreg
             B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =        9.28
                Prob>chi2 =      0.2333

.
```

Source**:** Stata 17 output from 2013–2022 G.C.

As shown in Table 4.11 above, the null hypothesis was that the random effect estimation model was appropriate; the alternative hypothesis was that the fixed effect estimation model was not appropriate in this study, and the probability was 0.2333. Or 23.33%, which was more than 5%. This means that the researcher cannot reject the null hypothesis but can reasonably accept it, which means that the random effect estimation model was appropriate. From an economic perspective, random effect estimators have the advantage of securing more efficient coefficient estimates because they save N-1 degrees of freedom or parameters to be estimated compared to

their fixed effect counterparts. Moreover, it offers the ability to estimate coefficients of time-invariant repressors, a characteristic not shared by the within-fixed-effect estimator. According to Cameron and Trivedi (2009), the model is a random effect model, and the regression was estimated with a general least squares (GLS) estimator. Otherwise, the model is a fixed-effect model, and the regression was estimated using the ordinary least squares estimator. Therefore, in the random effect model used in the study, regression is estimated with a general least squares (GLS) estimator. Then, based on these two models, the random effect model is the more appropriate model for this study.

4.5.2 Testing for Random Effect and Pooled Regression Estimation Model

The researcher wants to check whether a random or pooled regression estimation model is better. This was cross-checked with the LM test. The Breusch and Pagan lagrangian multiplier (LM) tests were used to decide between a random effect and a pooled regression estimation model. The null hypothesis was that variance across those insurance companies under study is greater than 5%; a random effect model is an appropriate model. Otherwise, the alternative hypothesis was that a pooled regression estimation model was appropriate. So the researcher wants to check whether a random or pooled regression estimation model is better. The LM test contrasts the random effect with the pooled estimation model as follows:

Ho: The model is a random effect model; the regression was estimated with general least square (GLS) estimator.

Ha: The model is a pooled regression estimation model; the regression is estimated with pooled ordinary least square (OLS).

Table 4.12: Breusch and pagan Lagrangian multiplier test

```
Breusch and Pagan Lagrangian multiplier test for random effects

        ROA[ID,t] = Xb + u[ID] + e[ID,t]

        Estimated results:
                             |       Var     SD = sqrt(Var)
                -------------+------------------------------
                         ROA |    .0023859       .0488456
                           e |    .0005136       .0226638
                           u |     .000175       .0132286

        Test: Var(u) = 0
                                  chibar2(01) =     5.20
                               Prob > chibar2 =   0.0113
```

Source: Stata 17 output from 2013–2022 G.C.

The Breusch and Pagan lagrangian multiplier test shows that the p-value of a model is 0.0113, which is less than the 5% level of significance. Hence, the null hypothesis of the random regression estimation model is appropriate. So the alternative hypothesis is rejected, and the null hypothesis is accepted. In the above result, the null hypotheses were accepted as well as a p-value less than 0.05, so the pooled regression estimation model is not used in this study. Both the Hausman test and the Breusch and Pagan LM test state that the random effect estimation model is the best model to represent the data. And the main difference between fixed effect and random effect estimation models was that fixed effect has dummy variables, whereas random effect omits dummy variables. The model is a random effect model; the regression was estimated with a general least squares (GLS) estimator, so the regression analysis and discussion of the results in the next sections of this paper were made based on the random effects model of panel estimation.

4.6 Regression Result and Discussions

This section presents the regression results that investigate the effect of liquidity management on the performance of insurance companies' in Ethiopia. It symbolizes a given the good fitness of the model is measured by adjusting R-squared, which measures how much of the dependent variables were explained by a given explanatory variable of insurance companies' performance measured by Return on assets. The model is a random effect model, and the regression was

estimated with a general least squares (GLS) estimator. The regression results analysis and models developed using Stata 17 software is shown below.

Table 4.13: Regression Result

Random-effects GLS regression — Number of obs = 100
Group variable: ID — Number of groups = 10

R-squared:
Within = 0.5677
Between = 0.9299
Overall = 0.7462

Obs per group:
min = 10
avg = 10.0
max = 10

Wald chi2(9) = 254.61
corr(u_i, X) = 0 (assumed) — Prob > chi2 = 0.0000

ROA	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
CAR	.0377728	.013408	2.82	0.005	.0114935	.0640521
DTR	.0028086	.0009004	3.12	0.002	.0010438	.0045734
CR	.0651379	.0082038	7.94	0.000	.0490587	.081217
OCR	-.0141714	.0057946	-2.45	0.014	-.0255287	-.0028142
DIR	.003852	.000959	4.02	0.000	.0019724	.0057316
GDP	.0292061	.2960389	0.10	0.921	-.5510195	.6094317
INR	-.0144605	.0605659	-0.24	0.811	-.1331675	.1042465
SZ	.0045623	.00304	1.50	0.133	-.0013959	.0105206
AG	.044407	.0117625	3.78	0.000	.0213529	.0674611
_cons	-.1273901	.0477873	-2.67	0.008	-.2210515	-.0337287
sigma_u	.00208133					
sigma_e	.02259124					
rho	.00841648	(fraction of variance due to u_i)				

Source: Stata 17 output from 2013–2022 G.C.

As shown in Table 4.13 above, it was ascertained that the estimated result of multiple regression analysis was at a satisfactory level, where STATA produced three R-squared results. **R-sq. within:** The R-squared from the mean-deviated regression, that is, the ordinary r-squared from running GLS on the transformed data, Within R-squared, the variability explained by the explanatory variables after taking out the random effects **R-Sq. between:** first, it computes the

fitted values using the random-effects parameter vector and the within-individual means of the independent variables. Then it calculates the R-squared as the squared correlation between those predicted values and the within-individual means of the original y variable. **R-sq. overall** means that it computes the fitted values using the random-effects parameter vector and the original, untransformed values of the independent variables. Then calculate the R-squared as the squared correlation between those predicted values and the original, untransformed y variable. In the above table, 4.13 R-sq. overall was used to explain 0.7462 (74.62%) explanatory variables (CAR, DTR, CR, OCR, DIR, and AG). The overall R-square measures the success of the regression in predicting the values of the dependent variable in the sample. The statistic will equal one if the regression fits perfectly and zero if it fits no better than the sample mean of the dependent variable. There is a rule of thumb that can be used to determine the R-square value as follows: A value of 0.1 indicates a poor fit; a value of 0.11 to 0.3 indicates a modest fit; a value of 0.31 to 0.5 indicates a moderate fit; and a value greater than 0.5 indicates a strong fit. Gitundu et al. (2016) found that in this study, the output of the econometrics model shows that the model has strong explanatory power. Hence, an R-square coefficient of 0.7462 has been obtained from the estimated regression model, revealing that 74.62% of the variation in return on assets as a proxy of performance is explained by selected explanatory variables. All independent variables can explain about 74.62% of the return on assets of insurance companies in Ethiopia. While the remaining 25.38% of the change in the return on asset regression model is explained by other factors that are not included in the regression line, the Wald chi2 (9) of 254.61 suggests that the model fits the data significantly. The Wald chi2 test measures the fitness of the model, and the recommended Wald chi2 should be greater than 5 for it to be considered fit. The regression Wald chi2 takes a value of 254.61, which is greater than 5. The model was strongly fitted for the estimation. Furthermore, the reliability and validity of the model were further enhanced by the probability of p > chi2 = 0.000, which indicates the overall model has strong statistical significance. Thus, the null hypothesis of the overall test of significance that all coefficients are equal to zero was rejected as the p-value was significantly low (less than 0.05). This infers that all selected explanatory variables can jointly affect the performance of Ethiopian insurance companies. Therefore, the overall models are accepted. The most important information is presented on the lower pane of the regression output. On the first column, we have the names of the dependent variable (ROA) and those of the explanatory variables (CAR, DTR, CR, OCR,

DIR, GDP, INR, SZ, and AG), and cons is the constant term (intercept) of the regression. In the second column (Coef.), the values of the coefficients (α, β_1, β_2, β_3, β_4, β_5, β_6, β_7, β_8, and β_9) and error term (ε) are listed.

The third column (Std.Err.) shows the standard errors that are related to coefficients. The fourth column (t) lists the t-statistics used in testing whether a given coefficient is significantly different from zero. Further in the fifth column (P > t), the two-tailed p-values used in testing the null hypothesis make the coefficient zero. To this end, the confidence interval for the coefficient is given in the last two columns. The regression value and analyses of the upper right corner in Table 4.13 are discussed as follows:

Thus, based on the above regression output, the panel linear regression model for this study could be written as follows:

ROAi,t = -0.1273901+0.0377728(CARi, t) +0.0028086(DTRi, t) +0.0651379(CRi, t)-0.0141714(OCRi, t) +0.003852(DIRi, t) +0.0292061(GDPt)-0.0144605(INRt) +0.0045623(SZi, t) +0.044407(AGi, t) + εi.t

4.6.1. Discussion of Results

A. Cash ratio and return on asset

As shown in Table 4.13 above, the cash ratio, measured as the ratio of a company's total cash and cash equivalent to its current liabilities, is a statistically significant predictor of the performance of insurance companies in Ethiopia. In this empirical study, it was found that the cash ratio has a positive coefficient of 0.0377728 with a p-value of 0.005. As the results shown in Table 4.13 above show, there is a statistically significant and positive relationship between the cash ratio and the performance of the insurance sector in Ethiopia at a 1% level of significance. This implies that as a company's ability to repay its short-term debt with cash or near-cash resources, such as easily marketable securities, increases, the performance of the insurance sector also improves. The coefficient of cash ratio of 0.0377728 indicates that as the ability of a firm to repay its short-term debt with cash and cash equivalents increases or decreases by 1% within a company, the performance of insurance companies in Ethiopia will also increase or decrease by

3.77728% over time. The positive relationship between the two shows that, if the company is forced to pay all current liabilities immediately, its ability to do so without having to sell or liquidate other assets is of great importance to improving the performance of the insurance sector in Ethiopia. If the case is reversed, this is the worst-case scenario where the company is about to go out of business or go bankrupt. The result of this study is in line with previous empirical studies by Velnampy & Kajananthan (2013) and Omesa (2015). Their study showed that the cash ratio of a financial institution and its performance are significantly and positively related. Therefore, based on the above result, reject the hypotheses stated; there was a positive and statistically significant relationship between the cash ratio and the return on assets.

B. Debtor's Turnover Ratio and Return on Assets

As shown in Table 4.13, DTR has a positive and significant impact on performance. The regression results revealed that the coefficient of DTR and p-value were 0.0028086 and 0.002, respectively. This shows that DTR has a positive and statistically significant effect on the performance of Ethiopian insurance companies. This indicates that an increase in one debtor turnover ratio will lead to an increase in profitability by 0.28086 times. This implies that the higher the value of debtor turnover, the more efficient the management of debtors or sales, or the more liquid the debtors. This finding supports the result. Wajo, A. R. (2021), who found a positive and statistically significant effect of DTR on performance Therefore, the hypotheses stated that there was a positive and statistically significant relationship between Debtor's Turnover ratio and return on asset were rejected.

C. Current ratio and return on asset

As shown in Table 4.13 above, the current ratio measured as the spread of current assets to current liabilities has a significant and positive relationship with the performance of the insurance sector in Ethiopia at a 1% level of significance. This reveals that the performance of insurance companies is best with a higher current ratio than a lower ratio of current assets to current liabilities. This ratio is an important measure of liquidity because short-term liabilities are due within the next year. This implies that the insurance company has only a limited amount of time to raise additional funds to pay for these liabilities. Companies can improve their return on each asset invested by balancing their current assets with their current obligations. With a

regression coefficient of 0.0651379, t-statistics of 7.94, and a p-value of 0.000, the regression results of the study show that there is a statistically significant positive relationship between the current ratio of insurance companies and their performance in Ethiopia at the 1% level of significance. It is possible to conclude that as the ratio of current assets to current liabilities changes by 1% within a company, the overtime performance of insurance companies in Ethiopia will also change by 6.51379%. The finding also goes in line with Wambu (2013) and Sumita (2015). Their study showed that the current ratio of financial institutions and their performance are significantly and positively related. Therefore, based on the above result, reject the hypotheses stated; there was a positive and statistically significant relationship.

D. Outstanding claims ratio Return on assets

Outstanding claims ratio, measured as the proportion of outstanding claims rate to risk premium rate, is found to be a significant but negative determinant of the performance of the insurance sector in Ethiopia during the study period at a 5% significance level**.** This implies that insurance companies with huge amounts of unpaid claims have lower performance than firms that pay their claims on time. In a practical situation, firms with a high level of liability simply indicate that unpaid balances are subject to interest and penalty charges. Interest expenses and penalties have indirectly had a negative effect on the return on assets or performance of insurance companies. As shown in Table 4.13 above, negative coefficients for OCR with a value of -0.0141714 reveal a negative relationship between the outstanding claims ratio and the performance of insurance companies. It is possible to conclude that as the ratio of outstanding claims to net premium earned changes by 1% within the company, the performance of the insurance sector in Ethiopia will also decrease or increase by 1.41714% over time. The finding also goes in line with Putra, I. & Dharma, D. (2017)**,** Gede Eky Kharisma, Edy Sujana, and Gusti Ayu Purnamawati (2015), and Fadlin R.P. and Rachma Fitriati (2013). Therefore, based on the above result, reject the hypotheses stated: there was a negative and statistically significant relationship between OCR and the performance of insurance companies in Ethiopia during the study period. As stated in the problem statement section of this paper, there is no study that incorporates outstanding claims ratio as a predictor variable. Researchers have to test theoretical concepts regarding the effect of outstanding claims ratio on the performance of the insurance companies in Ethiopia. According

to Pandey (2015), as the unpaid portion of filed claims increases, firms' performance could also decline.

E. Defensive interval ratio and Return on asset

As shown in the regression result in Table 4.13, the defensive interval ratio has a positive and statistically significant effect on the return on assets of Ethiopian insurance companies. This direction of finding was in line with the hypotheses of this study and in line with the findings of Abdu, I. K. (2020), Durrah, Rahman, Jamil, and Ghafeer (2016), who found a positive statistically significant effect on defensive interval ratio and profitability. This discovery was seemingly pioneered by this study. This implies that the performance of insurance companies with a higher ratio of liquid assets to daily cash requirements is better than that of firms with a lower defensive interval ratio. Performance is likely to improve with the time period in which firms can stay in operation without needing capital assets because, as firms are forced to sell capital assets to cover their daily expenditures, the profit-generating power of the company will also decline. It is possible to conclude that there is a significant positive relationship between the defensive interval ratio and the return on assets of insurance companies in Ethiopia. Therefore, the hypotheses stated that there was a positive and statistically significant relationship between defensive interval ratio and performance insurance companies were rejected.

F. Age and return on assets

Based on Table 4.13 above, the age of insurance companies has a positive and significant effect on the return on assets of Ethiopian insurance companies. A beta coefficient of 0.044407 This implies that when the age of the company increases by one year, the profitability of the insurance company will also increase by 0.044 units. This may be due to experience in the operation system, being familiar with customers, or having a high market share to enhance profit. This finding was in line with previous findings by Daare, W. J. (2016). Kramaric, T. P., Miletic, M., Pavic, I. (2017), and Derbali, A., & Jamel, L. (2018) found a positive and significant relationship between age and profitability. Therefore, the hypotheses stated that there was a positive and statistically significant relationship between age and performance were rejected.

4.8. Summary of Findings

In this chapter, the results of descriptive and inferential statistics are discussed. Several assumptions or diagnostic tests, such as the unit root test, model specification test, multicollinearity test, autocorrelation test, and normality test, were also performed to achieve the objectives of this study. The table below summarizes the expected results and actual or regression results as follows:

Table 4.14: Summary of Expected results and Actual results

Variable	Expected sign and effect	Actual sign and effect
Return on Asset		
Debtor's turnover ratio	Positive & significant	Positive & significant
Cash Ratio	Positive & significant	Positive & significant
Outstanding claims ratio	Negative & significant	Negative & significant
Current ratio	Positive & significant	Positive & significant
Defensive interval ratio	Positive& significant	Positive & significant
Gross domestic product	Positive & significant	Positive & insignificant
Inflation rate	Positive & significant	Positive & insignificant
Size	Positive & significant	Positive & insignificant
Age	Positive & significant	Positive & significant

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5. Introduction

In the previous chapter, the results of the study were presented and discussed. This chapter deals with the conclusions and recommendations of the study based on the findings. Hence, section 5.1 presents the conclusions, and section 5.2 presents the recommendations and avenues for future research and improvements provided in section

5.1. Conclusion

Liquidity is the ability of a firm to meet its short-term obligations, like payments to creditors, bills payable, and outstanding expenses**.** To meet this need and obligation, insurers could have enough liquid; otherwise, they would lose major customers and run to liquidate their business.

The main objective of this study is to investigate the effects of liquidity management on the performance of insurance companies in Ethiopia for the period 2013–2022. A balanced panel of 10 insurance companies and 100 observations have been used for the analysis. The regression results revealed that 74.62 percent of the variation in the dependent variable (profitability as measured by return on assets) is explained by the independent variables included in the model. However, their degree of significance is not the same. This means those explanatory variables are good at explaining profitability for Ethiopian insurance companies. In general, based on the regression analysis, the following conclusion has been provided:

❖ based on the regression analysis, variables such as the defensive interval ratio, cash ratio, current ratio, outstanding claims ratio, age and debtor's turnover ratio have a statistically significant effect on the performance of Ethiopian insurance companies.

❖ Explanatory variables such as GDP, inflation, and size are believed to be statistically insignificant in the performance of Ethiopian insurance companies during the period under study.

Finally, as shown in the overall R-square of the regression result, the explanatory factors are good at explaining the performance of Ethiopian insurance companies. From those explanatory variables, the researcher concludes that the defensive interval ratio, cash ratio, current ratio, outstanding claims ratio, age, and debtor's turnover ratio are the most powerful variables in explaining the performance of Ethiopian insurance companies' liquidity.

5.2. Recommendation

Based on the conclusion above, the study has drawn the following recommendations to insurance companies, investors, and shareholders: lenders; academicians; and policymakers at different levels: This study has been focused on some macro-economic and firm-specific determinants of performance (ROA) in ten sampled Ethiopian insurance companies over the 2013–2022 period. Therefore, future researchers who want to conduct their studies on the same topic are Recommended to:

- The study recommends that, in carrying out their financial decisions, insurance companies in Ethiopia should carefully ascertain and properly measure the effect of those significant variables like the defensive interval ratio, cash ratio, current ratio, outstanding claims ratio age, and debtor turnover ratio rate in order to maximize their value.
- In this study, the researcher's findings show a significant positive relationship between the cash ratio and the return on assets of Ethiopian insurance companies. This result shows that the companies' cash and cash equivalents increased. So the management of insurance companies should do more. To improve its cash ratio, a company can strive to have more cash on hand in case of short-term liquidation or demand for payments. This includes turning over inventory quicker, holding less inventory, or not prepaying expenses. Therefore, a company can reduce its short-term liabilities.
- Insurance companies 'companies should pursue return on asset increases since doing so simultaneously enhances liquidity.
- Insurance companies should invest in liquid assets that improve the liquidity of the company to ensure that it's able to meet its short-term financial obligations as and when they fall due.

- ❖ Ethiopian insurance companies should increase the amount of the defensive interval ratio. It means the company is more liquid. The company can continue its work without the requirement of using its non-current assets or outside financial resources, and the return on assets is increased by a significant amount.

5.3 Suggestions for further studies

Suggestions for future research are also forwarded, as follows:

In developed countries, the majority of studies have been done on the effect of liquidity management on the performance of insurance companies. However, studies in this area are limited in developing countries, particularly Ethiopia. Therefore, a study of the effect of liquidity management on performance is essential for getting over these limitations. This study examined both firm-specific and macroeconomic determinants of Ethiopian insurance companies using selected variables from 2013 to 2022. Nonetheless, there are so many variables that were not involved in this study. Consequently, future researchers may be interested in validating the consistency of the result and providing supplementary results for this study by including other variables like loss ratio, managerial efficiency, and tangibility of asset and capital adequacy**.** Moreover, the same study may be required for newly emerging insurance companies. The contribution of the current study sheds light on future research. For example, future research could be conducted in developing and emerging economies like Ethiopia.

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APPENDIX

Appendix (1): The data used in the regression analysis

EIC	1	2013	0.0712	0.6687	5.6232	1.0872	0.6348	5.89	0.099	0.135	11.7432	1.4771
EIC	1	2014	0.0511	0.6552	4.7632	0.9917	0.7437	4.95	0.103	0.081	12.4641	1.4913
EIC	1	2015	0.1366	0.9865	3.231	0.9405	0.3415	5.91	0.104	0.077	9.3927	0.9051
EIC	1	2016	0.1652	0.9988	3.555	0.9677	0.3874	6.92	0.08	0.097	11.828	1.9185
EIC	1	2017	0.1894	0.9999	3.5627	0.9849	0.2456	6.952	0.101	0.074	11.877	1.5314
EIC	1	2018	0.1955	1.0012	3.8321	2.1079	0.1326	7.96	0.077	0.146	10.9221	1.444
EIC	1	2019	0.1988	1.0321	3.965	1.3224	0.1353	7.965	0.09	0.126	10.0041	1.5563
EIC	1	2020	0.2001	1.0356	4.325	2.0012	0.1012	8.99	0.061	0.199	10.1121	1.5682
EIC	1	2021	0.1999	0.9652	3.89	1.0165	0.4553	8.02	0.063	0.202	10.2752	1.5797
EIC	1	2022	0.2312	1.0777	4.5	2.405	0.2653	8.963	0.061	0.338	10.2501	1.491
Afic	2	2013	0.0579	0.6713	5.97	0.7889	0.6225	6.99	0.099	0.135	11.754	0.7791
Afic	2	2014	0.053	0.6413	5.6	0.8271	0.6986	4.043	0.103	0.081	11.808	1.0139
Afic	2	2015	0.0532	0.6427	5.23	0.6717	0.6395	4.025	0.104	0.077	11.7849	1.1461
Afic	2	2016	0.0111	0.2413	2.32	0.5431	0.1089	11.025	0.08	0.097	11.8847	1.076
Afic	2	2017	0.0804	0.5326	6.4	0.6317	0.7695	7.035	0.101	0.074	11.8363	1.2041
Afic	2	2018	0.072	0.5168	7.21	1.0724	0.8625	6.983	0.077	0.146	11.1644	1.0304
Afic	2	2019	0.083	0.6029	6.64	0.5885	0.6598	7.003	0.09	0.126	9.2356	1.5552
Afic	2	2020	0.0855	0.6119	6.55	0.8655	0.3963	7.079	0.061	0.199	9.149	1.5787
Afic	2	2021	0.0965	0.7056	7.65	0.7856	0.5322	8.005	0.063	0.202	9.1578	1.301
Afic	2	2022	0.0999	0.7013	7.88	0.8555	0.5021	8.999	0.061	0.338	9.1416	1.0222
Awash	3	2013	0.0904	0.8762	7.4	0.8322	0.5641	8.091	0.099	0.135	11.0221	1.0791
Awash	3	2014	0.0795	0.8922	7.59	0.7846	0.6325	6.081	0.103	0.081	12.0642	1.0139
Awash	3	2015	0.0793	0.4841	7.39	0.8507	0.6344	6.967	0.104	0.077	11.7113	1.1461
Awash	3	2016	0.1485	0.6005	7.684	0.8859	0.2131	13.01	0.08	0.097	12.0034	1.076
Awash	3	2017	0.1022	0.7986	7.22	0.8609	0.3212	9.051	0.101	0.074	11.2408	1.2041
Awash	3	2018	0.1161	0.3256	7.95	1.3947	0.3001	10.51	0.077	0.146	11.334	1.0304
Awash	3	2019	0.1235	0.8304	7.85	1.3222	0.2598	10.005	0.09	0.126	9.3974	1.0552
Awash	3	2020	0.1252	0.5665	7.96	0.9633	0.2456	11.87	0.061	0.199	9.4573	1.0787
Awash	3	2021	0.1352	0.5737	8.325	0.8965	0.2312	12.976	0.063	0.202	9.5511	1.301
Awash	3	2022	0.1452	0.7145	8.96	1.0022	0.1658	12.002	0.061	0.338	8.7111	1.1222

Nic	4	2013	0.0475	0.7349	4.75	0.9921	0.9256	5.01	0.099	0.135	11.3446	1.0791
Nic	4	2014	0.029	0.7006	2.92	1.1206	0.9881	3.899	0.103	0.081	11.4052	1.1139
Nic	4	2015	0.1743	0.6856	10.35	1.0525	0.1231	6.001	0.104	0.077	11.4482	1.1461
Nic	4	2016	0.0613	0.6556	6.31	1.2023	0.7365	5.01	0.08	0.097	11.527	1.076
Nic	4	2017	0.0695	0.5655	6.59	1.1232	0.7265	5.01	0.101	0.074	11.6016	1.2041
Nic	4	2018	0.1202	0.5266	8.32	1.208	0.2365	11.02	0.077	0.146	8.6943	1.2304
Nic	4	2019	0.1231	0.5656	8.8	1.235	0.2001	11.01	0.09	0.126	8.7109	1.055
Nic	4	2020	0.1323	0.6773	8.5	1.3522	0.1996	12.001	0.061	0.199	8.7132	1.0787
Nic	4	2021	0.1322	0.7276	8.352	1.3255	0.1999	11.01	0.063	0.202	8.7876	1.301
Nic	4	2022	0.135	0.8965	8.96	1.4322	0.1002	12.87	0.061	0.338	8.7876	1.322
Nile	5	2013	0.1379	0.4001	3.97	1.4275	0.7898	12.001	0.099	0.135	11.6688	1.0413
Nile	5	2014	0.098	0.2999	3.65	0.9642	1.2101	8.001	0.103	0.081	11.7382	1.0791
Nile	5	2015	0.102	0.3312	8.32	1.0891	0.9689	9.001	0.104	0.077	11.817	1.1139
Nile	5	2016	0.1096	0.3478	5.96	1.1108	0.8695	9.001	0.08	0.097	11.8655	1.1461
Nile	5	2017	0.1397	0.6579	3.97	1.3229	0.53625	12.001	0.101	0.074	10.9157	1.076
Nile	5	2018	0.0851	0.2531	8.15	0.9138	0.9868	7.001	0.077	0.146	10.9985	1.2041
Nile	5	2019	0.0853	0.2532	8.35	0.9121	0.8695	7.879	0.09	0.126	9.141	1.2304
Nile	5	2020	0.0963	0.3111	9.36	0.9985	0.5895	8.989	0.061	0.199	9.1914	1.3552
Nile	5	2021	0.0955	0.2004	9.55	0.9925	0.7785	8.0011	0.063	0.202	9.2953	1.1787
Nile	5	2022	0.1123	0.3721	11.23	1	0.3625	10.878	0.061	0.338	9.4172	1.301
Nyala	6	2013	0.1011	0.8965	7.36	0.9823	0.3255	9.001	0.099	0.135	11.6776	0.9542
Nyala	6	2014	0.1591	0.6325	10.65	1.0176	0.1101	8.985	0.103	0.081	11.7909	1
Nyala	6	2015	0.182	0.8788	12.36	1.0995	0.1001	9.987	0.104	0.077	11.9356	1.0413
Nyala	6	2016	0.1647	0.5031	13.2	1.1423	0.1021	15.98	0.08	0.097	11.199	1.0791
Nyala	6	2017	0.1434	0.4712	10.32	1.0176	0.2355	13.99	0.101	0.074	12.0976	1.1139
Nyala	6	2018	0.1227	0.4111	9.325	1.0018	0.3321	11.99	0.077	0.146	9.2867	1.4461
Nyala	6	2019	0.1258	0.4366	10.3	1.0525	0.3215	11.99	0.09	0.126	9.312	1.376
Nyala	6	2020	0.1268	0.4652	2.4302	1.1444	0.9907	3.9879	0.061	0.199	9.3339	1.2041
Nyala	6	2021	0.1351	0.4894	3.15	1.3654	0.9908	3.9879	0.063	0.202	9.4104	1.2304
Nyala	6	2022	0.1255	0.3955	2.65	1.2322	0.9998	11.999	0.061	0.338	9.4072	1.9552
GloIC	7	2013	0.0584	0.2455	5.48	0.8795	0.9263	4.989	0.099	0.135	11.0941	0.9542
GloIC	7	2014	0.0364	0.2196	3.46	0.7952	0.9989	2.001	0.103	0.081	11.1877	1
GloIC	7	2015	0.0203	0.1999	2.031	0.916	1.321	2.3	0.104	0.077	11.2705	1.0413
GloIC	7	2016	0.1532	0.6518	13.65	1.135	0.1298	4.11	0.08	0.097	11.3435	1.0791
GloIC	7	2017	0.1603	0.6904	14.32	1.3519	0.1212	5.981	0.101	0.074	11.2768	1.1139
GloIC	7	2018	0.1364	0.5795	12.01	1.6279	0.2314	4.899	0.077	0.146	8.4817	1.4461
GloIC	7	2019	0.1385	0.5793	13.22	1.6322	0.2211	4.01	0.09	0.126	8.5711	1.176
GloIC	7	2020	0.1401	0.6485	13.65	1.9855	0.5111	5.001	0.061	0.199	8.6248	1.2041
GloIC	7	2021	0.1452	0.8022	5.326	2.199	0.2101	12.01	0.063	0.202	8.6948	1.0304
GloIC	7	2022	0.1653	0.2161	2.32	2.2966	0.2001	7.01	0.061	0.338	8.7681	0.9552

Unic	8	2013	0.1142	0.5252	11.245	1.1695	1.8642	10.99	0.099	0.135	11.6914	0.9542
Unic	8	2014	0.0874	0.3352	8.47	1.0893	2.6811	7.01	0.103	0.081	11.768	1
Unic	8	2015	0.1219	0.4452	11.91	1.2454	2.3625	11.09	0.104	0.077	11.7449	1.0413
Unic	8	2016	0.1632	0.5063	8.632	1.6684	1.3451	5.99	0.08	0.097	11.8426	1.0791
Unic	8	2017	0.1412	0.3475	7.32	1.2112	1.4115	5.999	0.101	0.074	11.963	1.7139
Unic	8	2018	0.1306	0.3029	6.301	1.2015	1.5012	12.99	0.077	0.146	11.2726	1.1461
Unic	8	2019	0.1342	0.3743	13.23	1.2866	1.4562	12.99	0.09	0.126	9.1815	1.376
Unic	8	2020	0.1562	0.4613	15.63	1.3952	1.3212	14.01	0.061	0.199	9.211	1.2041
Unic	8	2021	0.1632	0.5095	16.32	1.4355	1.2315	15.01	0.063	0.202	9.2577	1.2304
Unic	8	2022	0.1655	0.5202	16.52	1.4625	1.1235	13.99	0.061	0.338	8.4257	1.2552
NibIC	9	2013	0.0776	0.3232	7.89	0.8797	1.112	6.003	0.099	0.135	11.7372	0.602
NibIC	9	2014	0.0899	0.3832	8.66	0.8999	0.9562	7.988	0.103	0.081	11.8354	0.698
NibIC	9	2015	0.0885	0.3521	8.36	0.8693	0.9652	7.105	0.104	0.077	11.88	0.7781
NibIC	9	2016	0.1112	0.5534	11.31	1.0518	0.5231	10.011	0.08	0.097	11.9417	0.845
NibIC	9	2017	0.1127	0.6011	10.77	1.1079	0.1235	9.005	0.101	0.074	11.9982	0.903
NibIC	9	2018	0.0756	0.8591	7.65	0.9807	0.9985	6.0039	0.077	0.146	10.7932	0.9542
NibIC	9	2019	0.0873	0.8182	8.74	1.0255	0.8758	9.02	0.09	0.126	9.1858	1
NibIC	9	2020	0.0355	0.8647	3.668	0.8236	1.3521	9.01	0.061	0.199	9.239	1.0413
NibIC	9	2021	0.0685	0.8846	6.86	0.9036	1.0214	5.03	0.063	0.202	9.2915	1.0791
NibIC	9	2022	0.0652	0.7728	6.53	0.8122	1.0121	5.01	0.061	0.338	9.3482	1.3139
LioIC	10	2013	0.0255	0.4365	2.65	0.7632	1.5655	3.999	0.099	0.135	11.2037	0.7781
LioIC	10	2014	0.0355	0.5258	3.98	0.7632	1.4526	2.0041	0.103	0.081	11.3642	0.845
LioIC	10	2015	0.0452	0.4896	4.325	0.9585	1.0265	3.001	0.104	0.077	11.4323	0.903
LioIC	10	2016	0.04459	0.5456	4.59	0.9362	1.7325	4.003	0.08	0.097	11.5253	0.9542
LioIC	10	2017	0.02322	0.3352	2.325	0.6355	1.0362	1.987	0.101	0.074	10.6107	0.95557
LioIC	10	2018	0.04516	0.5586	4.164	0.9325	1.3265	3.978	0.077	0.146	8.7816	1.0414
LioIC	10	2019	0.03672	0.4365	3.655	0.7825	1.935	2.989	0.09	0.126	8.8588	1.0791
LioIC	10	2020	0.03637	0.4245	3.741	0.7635	1.3265	2.9989	0.061	0.199	8.9253	1.7139
LioIC	10	2021	0.03255	0.3562	3.5512	0.6524	1.6552	2.989	0.063	0.302	8.9906	1.1461
LioIC	10	2022	0.02878	0.1959	2.894	0.6985	1.7	1.999	0.051	0.338	9.1218	1.776

Appendix (2) Diagnostic test and other output

- **Hausman test**

```
                         b = consistent under Ho and Ha; obtained from xtreg
          B = inconsistent under Ha, efficient under Ho; obtained from xtreg

   Test:  Ho:  difference in coefficients not systematic

                chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                        =        9.28
              Prob>chi2 =      0.2333

.
```

- **Skewness -kurtosis- test for normality**

Skewness and kurtosis tests for normality

				Joint test	
Variable	Obs	Pr(skewness)	Pr(kurtosis)	Adj chi2(2)	Prob>chi2
ROA	100	0.7277	0.0951	2.99	0.2247

- Durbin Watson (DW) test

```
. dwstat

Durbin-Watson d-statistic( 10,   100) =  1.767554
```

- RESET Test for Omitted Variables

```
Ramsey RESET test for omitted variables
Omitted: Powers of fitted values of ROA

H0: Model has no omitted variables

F(3, 87) =    1.03
Prob > F = 0.3840
```

❖ **Levin – Lin - Chu unit root – Test**

Variables	Statistics		Number of lags (L)
	t-Static	Prob-value	
ROA	-6.9963	0.0000	L(1)
CAR	-5.6011	0.0000	L(1)
DTR	-3.8434	0.0001	L(0)
CR	-1.1587	0.01233	L(1)
OCR	-1.7930	0.0365	L(1)
DIR	-1.8290	0.0337	L(1)
GDP	-4.2780	0.0000	L(0)
INR	-6.5529	0.02113	(1)
SZ	-2.8042	0.0025	(1)
AG	-3.4726	0.0003	(1)

❖ **Breusch-Pagan/ Cook-Weisberg test for Heteroskedasticity**

```
Breusch–Pagan/Cook–Weisberg test for heteroskedasticity
Assumption: Normal error terms
Variable: Fitted values of ROA

H0: Constant variance

    chi2(1) =   0.11
Prob > chi2 = 0.7427
```

❖ **Variable Inflation Factor (VIF) Technique to Detect Multicollinearity**

Variable	VIF	1/VIF
GDP	3.90	0.256540
INR	3.46	0.289177
SZ	2.22	0.449838
DIR	1.55	0.643155
DTR	1.43	0.699824
OCR	1.42	0.702516
CAR	1.32	0.755208
AG	1.26	0.796081
CR	1.25	0.798695
Mean VIF	1.98	

.

❖ Breusch and pagan Lagrangian multiplier test

```
Breusch and Pagan Lagrangian multiplier test for random effects

        ROA[ID,t] = Xb + u[ID] + e[ID,t]

        Estimated results:
                         |       Var     SD = sqrt(Var)
                ---------+------------------------------
                     ROA |    .0023859       .0488456
                       e |    .0005136       .0226638
                       u |     .000175       .0132286

        Test: Var(u) = 0
                                  chibar2(01) =     5.20
                              Prob > chibar2 =   0.0113
```

❖ The Panel Multiple Linear Model Regression Results

```
Random-effects GLS regression                   Number of obs     =        100
Group variable: ID                              Number of groups  =         10

R-squared:                                      Obs per group:
     Within  = 0.5677                                         min =         10
     Between = 0.9299                                         avg =       10.0
     Overall = 0.7462                                         max =         10

                                                Wald chi2(9)      =     254.61
corr(u_i, X) = 0 (assumed)                      Prob > chi2       =     0.0000
```

ROA	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
CAR	.0377728	.013408	2.82	0.005	.0114935	.0640521
DTR	.0028086	.0009004	3.12	0.002	.0010438	.0045734
CR	.0651379	.0082038	7.94	0.000	.0490587	.081217
OCR	-.0141714	.0057946	-2.45	0.014	-.0255287	-.0028142
DIR	.003852	.000959	4.02	0.000	.0019724	.0057316
GDP	.0292061	.2960389	0.10	0.921	-.5510195	.6094317
INR	-.0144605	.0605659	-0.24	0.811	-.1331675	.1042465
SZ	.0045623	.00304	1.50	0.133	-.0013959	.0105206
AG	.044407	.0117625	3.78	0.000	.0213529	.0674611
_cons	-.1273901	.0477873	-2.67	0.008	-.2210515	-.0337287
sigma_u	.00208133					
sigma_e	.02259124					
rho	.00841648	(fraction of variance due to u_i)				