Determinants of Insurance Companies Profitability in Ethiopia

Suheyli Reshid

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This is to certify that the thesis prepared by Suheyli Reshid, entitled: Determinants of Insurance Companies Profitability in Ethiopia and submitted in partial fulfillment of the requirements for the Degree of Master of Science (Accounting and Finance) compiles with the regulations of the University and meets the accepted standards with respect to originality and quality.

Signed by the Examining Committee:

Advisor ***Dr. Abebaw Kassie*** *Signature_____ Date_____*

Examiner ***Dr. Abebe Yitayew*** *Signature_____ Date_____*

Examiner ***Dr. Arega Seyoum*** *Signature_____ Date_____*

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Chair of Department of Graduate Program Coordinator

Abstract

Determinants of Insurance Companies profitability in Ethiopia

Active financial analysis has become one of the important tools that actuaries use to model the underwriting and investment operations of insurance companies. The first step in carrying out the analysis is to investigate the most important factors affecting company profitability. This study seeks to find the determinants of insurance companies' profitability in Ethiopia. In order to achieve this objective, the study used mixed research approach. Panel data covering eleven-year period from 2004 – 2014 are analyzed for nine insurance companies. Also in-depth interview is conducted with company managers. The findings of the study showed that underwriting risk, technical provision and solvency ratio have statistically significant and negative relationship with insurers' profitability. However, reinsurance dependence has negative but insignificant relationship with profitability. On the other hand, variables like liquidity, company size and premium growth have a positive and statistically significant relationship with insurers' profitability. In addition, economic growth rate has significant influence on profitability whereas inflation has insignificant influence on insurers' profitability. The study provides evidence that underwriting risk, technical provision and liquidity are the most important factors that affect profitability of insurance companies in Ethiopia. So, the study recommends that Ethiopian insurance companies' managers should give consideration to underwriting risk, technical provision and liquidity to increases their profitability significantly.

Keywords: *profitability, determinants, insurance*

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List of Acronyms/ Abbreviations

CIEP	Claims Incurred To Earned Premiums
CLRM	Classical Linear Regression Model
CACL	Current Asset to Current Liability
COE	Claims Outstanding To Equity
CS	Company Size
DW	Dublin Watson
EIC	Ethiopian Insurance Corporation
FEM	Fixed Effect Model
GDP	Gross Domestic Product
HO	Null Hypothesis
INF	Inflation
LIQ	Liquidity
MOFED	Ministry of Finance and Economic Development
NANPW	Net Asset to Net Written Premium
NBE	National Bank of Ethiopia
OLS	Ordinary List Square
PCTA	Premium Ceded To Total Asset
PG	Premium Growth
REM	Random Effect Model
ROA	Return on Asset

CHAPTER ONE

1. Introduction

In modern society, financial industry is growing rapidly and gaining importance in the global financial development. The financial system comprises of financial institutions, financial instruments and financial markets that provide an effective payment, credit system and risk transfer and thereby facilitate channelizing of funds from savers to the investors of the economy. According to Frederic & Eakins (2009), financial institutions not only affect our everyday life but also involve huge flows of funds, which in turn affect business profits, the production of goods and services, and even the economic well-being of countries. The financial institutions enable an economy to be more productive as it allows investors with few resources to use savings from those with few prospects of investing. Research surveyed by Naved (2011), reveals that the efficiency of financial intermediation and transfer of risk can affect economic growth while at the same time institutional insolvencies can result in systemic crises which have unfavorable consequences for the economy as a whole. Hence, the important role that financial institutions such as insurance companies remain in financing and insuring economic activity and contribute to the stability of the financial system in particular and the stability of the economy of concerned country in general is part of immune and repair system of the economy. The insurance sector plays important role in the financial services industry in almost developed and developing countries, contributing to economic growth, efficient resource allocation, reduction of transaction costs, creation of liquidity, facilitation of economics of scale in investment, and spread of financial losses (Haiss and Sumegi, 2008).

Every firm is most concerned with its profitability. Profitability indicates how well management of an enterprise generates earnings by using the resources at its disposal. In the other words the ability to earn profit e.i. profitability, it is composed of two words profit and ability. The word profit represents the absolute figure of profit but an absolute

figure alone does not give an exact ideas of the adequacy or otherwise of increase or change in performance as shown in the financial statement of the enterprise. The word 'ability' reflects the power of an enterprise to earn profits, it is called earning performance.

According to Hifza Malik, (2011), profitability is one of the most important objectives of financial management since one goal of financial management is to maximize the owners' wealth, and profitability is very important determinant of performance. A business that is not profitable cannot survive. Conversely, a business that is highly profitable has the ability to reward its owners with a large return on their investment. Hence, the ultimate goal of a business entity is to earn profit in order to make sure the sustainability of the business in prevailing market conditions. Pandey (1980) defined the profitability as the ability of a business, whereas it interprets the term profit in relation to other elements. A financial benefit is realized when the amount of revenue gained from a business activity exceeds the expenses, costs and taxes needed to sustain the activity. Although there are numerous approaches, generally, insurers' profitability is estimated through the examination of premium and investment income and of the underwriting results or of the overall operating performance.

There has been a growing number of studies recently that test for measures and determinants of firm profitability. Financial industry's profitability has attracted scholarly attention in recent studies due to its importance in performance measurement. However, in the context of the insurance sector particularly in developing countries or emerging markets like Ethiopia it has received little attention.

To this end, this study is examined the determinants of insurance companies' profitability in Ethiopia. This will not only add to existing literature but also it will serve as identifying the determinants insurance companies' profitability is useful for investors, researchers, financial analysts and supervisory authorities.

1.1. Overview of the Ethiopian Insurance Industry

The Ethiopian insurance industry does not have a long history of development despite the country's long history of civilization. Modern forms of insurance service which were introduced in Ethiopia by Europeans, trace their origin as far back as 1905 when the bank of Abyssinia began to transact fire and marine insurance as an agent of a foreign insurance company. The number of insurance companies increased significantly and reached 33 in 1960. At that time insurance business like any business undertaking was classified as trade and was administered by the provisions of the commercial code. This was the only legislation in force in respect of insurance except the maritime code of Ethiopia that was issued to govern the operations of maritime business and the related marine insurance. The law required an insurer to be a domestic company whose share capital (fully subscribed) to be not less than Birr 400,000 for a general insurance business and Birr 600,000 in the case of long-term insurance business and Birr one million to do both long-term & general insurance business. Non-Ethiopian nationals were not barred from participating in insurance business. However, the proclamation defined domestic company as a share company having its head office in Ethiopia and in the case of a company transacting a general insurance business at least 51% and in the case of a company transacting life insurance business, at least 30% of the paid-up capital must be held by Ethiopian national companies.

Four years after the enactment of the proclamation, the military government that came to power in 1974 put an end to all private entrepreneurship. Then all insurance companies operating were nationalized and from January 1, 1975 onwards the government took over the ownership and control of these companies & merged them into a single unit called Ethiopian Insurance Corporation. The insurance sector during the command economic system was characterized by monopoly of the sector by the government, lack of dynamism and innovation, volatile premium growth rates and reliance on a couple of

classes of insurance business (motor and marine) for much of gross premium income. The nationalization of private insurance companies, the restrictions imposed on private business ventures, and management of the insurance sector had significant adverse impact on the development and growth of Ethiopian insurance industry (Hailu, 2007).

However, following the change in the political environment in 1991, the proclamation for the licensing and supervision of insurance business No. 86/1994 heralded the beginning of a new era. Immediately after the enactment of the proclamation private insurance companies began to flourish. According to the directive of ISB/34/2014, any insurance company required to be a domestic company whose share capital (fully subscribed) to be not less than Ethiopian Birr 60m for a general insurance business and Ethiopian Birr 15m in the case of long term (life) insurance business and Ethiopian Birr 75m to do both long-term & general insurance business.

Today the total number of insurance companies, branches and their capital increased significantly. At 2014, there are seventeen insurance companies in operation. Ethiopian Insurance Corporation (EIC) is state owned while the rest are private. Number of branch reached 332 in 2014.The gross premium of sector is 5 billion in 2014, which is increasing 8% from previous year total premium of the sector i.e. 4.6billion (NBE, annual report 2014).

1.2. Statement of the problem

Insurance plays a significant role in a country's economic growth and offers financial protection to an individual or firm against monetary losses suffered from unforeseen circumstances (Kihara, 2012).This is because the world is characterized by risks and uncertainties and insurance has evolved as a way of providing security against the risks and uncertainties. In this context, it is crucial to know what drives insurers' profitability. Profitability is propulsive element of any investments in different projects and relative measure of success for a business; it is the efficiency of a company or industry to generate earnings.

Due to the unique accounting system used by insurance companies, profitability of the industry has always been difficult to measure as compared with other financial institutions or corporations. Different scholars using empirical investigation on the determinants of insurers' profitability are resulted in different conclusions. For insurers', profitability is affected by a host of factors including actual mortality experience, investment earning, capital gains or losses, the scale of policyholder dividends, and federal and state taxes (Wright 1992). According to Swiss (2008), insurers' profitability is determined first by underwriting performance (losses and expenses, which are affected by product pricing, risk selection, claims management, and marketing and administrative expenses); and second, by investment performance, which is a function of asset allocation and asset management as well as asset leverage. Khan (2013) revealed that leverage, size, earnings volatility and age of the firm are significant determinants of profitability while growth opportunities and liquidity are not significant determinants of profitability. A study of Ahmed (2008) examined the determinants of insurers' profitability indicated that size, volume of capital, leverage & loss ratio are significant determinants of profitability. Other studies conducted in the area of insurers' profitability (Curak, 2012; Shiu, 2014; Maria and Ghiorghe, 2014) verified that there is a direct association between profitability of insurance companies and it's both internal and external determinants. Even though, all these and other researchers conducted study on this area, the determinants of profitability have been debated for many years and still unsolved issues in the corporate finance literature.

Coming back to the case of the Ethiopian insurance sector, while a large body of research on financial institutions profitability has been undertaken in the banking industry in Ethiopia, to the researcher's best knowledge, the studies conducted in the areas of insurance are few in number and did not give such an emphasis on the factors considered to be determinants of profitability of insurance industry in Ethiopia. For instance, (Abate, 2012) studied factors affecting insurance companies' profitability in Ethiopia. He focused

only on internal factors and have not considered external factors like macroeconomic (gross domestic products, Inflation) and basic internal factors like underwriting risk, operational, technical reserve, reinsurance risks and solvency ratio that are potentially accountable for determinant of insurers' profitability (Lee 2014) & (Shiu 2014). Therefore, the factors which affect the profitability of insurance companies have not been adequately investigated. Thus, current paper extended prior research and contributes to the literature on the determinants of profitability in a number of ways. First, a comprehensive research on profitability determinants using both company specific factors and macroeconomic variables was not conducted in the Ethiopian insurance industry. Second, insurance is a risky business and basic risk factors for insurance such as underwriting risk, operational, technical reserve, reinsurance risks and solvency ratio have not used in previous studies but, these variables are the most important factors to determaine the profitability of the insurers. Third, prior studies mostly adopted a quantitative approach only without considering a lot of limitations of it which resulted fail to perform their conclusions.

Therefore, this study seeks to fill the above explained gap by providing information about the internal and external factors that affects profitability by examining the untouched one, and replicating the existing in the Ethiopia by using all insurance company operating in the country that have 11 years data. To this end, the study provided insights into the profitability determinants of insurance companies in Ethiopian.

1.3. Objective of the study

The core objective to conduct this study is to investigate the most important determinants of profitability in the insurance sector of Ethiopia.

Based on the above general objective, the study has the following specific objectives:

1) To identify the internal factors that determine the insurance companies profitability in Ethiopia.

2) To identify the macroeconomic factors on insurance companies profitability in Ethiopia.
3) To rank the determinants according to their degree of influence on insurance companies' profitability.

1.4 Scope and limitation of the study

The study was limited to examination of the internal and external factors affecting insurers' profitability of all insurance companies registered by the NBE and that have at least eleven years data i.e., 2004-2014. The period of 2004 –2014 was selected because, in Ethiopia, large numbers of private insurance established following 1994 financial liberalization and the period has significant structural change in profitability in Ethiopian insurance industry.In addition, eleven years is assumed to be relevant because five years and above is the recommended length of data to use in most finance literatures. This is the reason to start the investigation of this research from 2004 until 2014 year. Further, in order to get an accurate picture of insurers' profitability determinants, researcher believed that it is important to consider eleven years, as any insurance company can have one unprofitable year, which is compensated by a certain form of profitability achieved over several years. However, insurance companies operating for less than eleven years excluded in this study because they do not have full data for the study period. Even if the profitability is influenced by variables such as industry dynamics and competitive market position, the perspective of the study confined merely on company specific factors like underwriting risk, reinsurance dependence, solvency ratio or capital adequacy, technical provision risk, liquidity, company size and premium growth and macroeconomic variables such as growth of gross domestic product and inflation that are potentially liable for determinant of insurers profitability based on the selected previous empirical works. Due to the unique accounting system used by life assurance business, the secondary data collection from income statement, balance sheet and revenue account was limited to only general insurance business, because income statement of life assurance

business is not prepared at the end of each year. It may be prepared one time in three years or five years due to difficulty to prepare income statement of life assurance business and it needs an actuary which is high cost and also not all insurance company in Ethiopia gives life assurance services.

1.5. The significance of the study

The study importance emerges from the fact that insurance sector plays a significant role in enhancing the country economy, and providing critical services for people in Ethiopia, the current study was empirically implemented a comprehensive analytical framework of profitability in the case of Ethiopian insurance sector.

This study, attempted to assess the determinants of insurance profitability in Ethiopia, provides evidence on what effect the firm-specific factors and the macroeconomic factors have on the insurance company's profitability in Ethiopia. Analyzing and understanding the impact of different factors on the insurance profitability in Ethiopia is a major stepping result to enlighten what should be done if profitability is to be achieved.

In Ethiopia, no more researches have been investigated on determinants of Ethiopian insurance companies' profitability, so the current study is a base for other studies in the same field, and it will help in adding value to this subject. The current study was also provided a comprehensive framework and literature about firms' profitability, and the factors influencing it in the case of Ethiopian insurance companies.

The findings of the study also benefits to insurance companies, regulatory authorities, managers and others interested in the area the opportunity to gain deep knowledge about the relationship of internal and external factors and profitability. This in turn helps them knowing factors affecting profitability and thereby takes appropriate actions to increase profitability of insurance industry. It is hoped that the outcome of this study also provide an insight of the insurance industry to other researchers.

1.6. Organization of the paper

The research paper was organized in to five chapters. Chapter one is introduction where overview of the insurance industry in Ethiopia, statement of the problem, objectives of the study, scope and limitation, and significance of the study presented. Chapter two is review of literature in which theories, empirical evidence and conceptual frame work are identified. Chapter three is research methodology. Chapter four is results and discussion in which the finding results are interpreted. Finally, Chapter five brings to an end the research with conclusion and possible recommendation.

CHAPTER TWO

2. Review of literature

Several factors influence insurance profitability, recognizing and understanding the underlying concepts and definitions of the insurance sector is essential in order to vouch results and analyses. Hence, chapter two serves as background for this study by describing concepts of financial intermediation and factors that could influence insurance profitability. Subsequent chapters will build on concepts and definitions described here. In light of the above, the purpose of this chapter is to review the literature in the area of determinants of insurance profitability. This chapter therefore covers four broad topics that are related to determinants of insurance profitability. Section 2.1 about definition & role of insurance, concept of its profitability and theory about insurance profitability. This is followed by a review of relevant empirical studies on determinants of insurance profitability in section 2.2. Section 2.3 is about research hypothesis. Finally,summary and conceptual frame work on the literature review presented in section 2.4.

2.1. Theoretical review

This section reviews the basic theoretical issues related to insurance and insurer's profitability and its determinants. Hence, section 2.1.1 presents the role of insurance in the economy. Then, section 2.1.2 presents concepts of insurers' profitability. Finally, section 2.1.3 presents the theories related to insurer's profitability.

2.1.1. Definition and Role of Insurance

Insurance is a contract in which the insured transfers risk of potential loss to the insurer who promises to compensate the former upon suffering loss. The insured then pays an agreed fee called a premium in consideration for this promise. The promisor is called the insurer and the promisee is called the insured (Lowe, 1999). Insurance premium is the monetary consideration paid by the insured to the insurer for the cover granted by the insurance policy. The Insurer takes on a number of clients (Insured) who pay small

premiums that form an aggregate fund called the premium fund (Norman, 2000). The likelihood of an event or loss may be mathematically calculated or it may be based on the statistical results of past experience in order to determine the amount of premiums that would be required to accumulate a common fund or pool, to meet the losses upon their arising (Grose, 1992).

The term insurance defined by referring two important schools of thoughts: i) transfer school and ii) pooling school. According to transfer school, “insurance is a device for the reduction of uncertainty of one party, called the insured, through the transfer of particular risks to another party ; called the insured, who offers a restoration, at least in part of economic losses suffered by the insured” (Irving, 1956). On the other hand, according to pooling school “the essence of insurance lies in the elimination of uncertainty or risk of loss for the individual through the combination of large number of similarly exposed individuals” (Alfred, 1935), cited in (Tanveer 2010). Insurance operates on the principle of pooling risks where the people contribute to a common fund in form of premiums and where the lucky ones who do not suffer loss help the unlucky ones who suffer loss during a defined insurance period (Irukwu 1994).

It seems Insurance not only facilitates economic transactions through risk transfer and indemnification but it also promotes financial intermediation (Ward and Zurbruegg, 2000). More specifically, insurance can have effects such as promote financial stability, mobilize savings, facilitate trade and commerce, enable risk to be managed more efficiently, encourage loss mitigation, foster efficient capital allocation and also can be a substitute for and complement government security programs (Skipper, 2001).

Insurance provides economic protection from identified risks occurring or discovered within a specified period. Insurance is a unique product in that the ultimate cost is often unknown until long after the coverage period, while the revenue premium payments by policyholders are received before or during the coverage period.

Insurance is an important growing part of the financial sector in virtually all the developed and developing countries (Das et al., 2003). A resilient and well regulated insurance industry can significantly contribute to economic growth and efficient resource allocation through transfer of risk and mobilization of savings. In addition, it can enhance financial system efficiency by reducing transaction costs, creating liquidity and facilitating economies of scale in investment (Bodla et al., 2003).

Insurance business is usually divided into two main classes namely: a) General insurance business - This is a contract between an insurer and the insured where by the insurer undertakes to indemnify the assured against losses, which may result from the occurrence of specified events within specified periods. General insurance business can be sub-divided into: motor, fire, accident, oil and gas, contractors' all risks and engineering risks; marine and credit insurance, bond and surety ship etc. This is a contract between the assurer and the assured whereby the assurer undertakes to pay benefits to the policy holder on the attainment of a specified event. b) Life assurance business**:** comprises individual life business, group life insurance and pension business, health insurance business and annuities.

2.1.2. The Concept of Insurance Profitability

Profitability consists of two words profit and ability. It is necessary to differentiate between the term Profit and Profitability at this point. The term Profit, from accounting point of view, is arrived at by deducting from total revenue of an enterprise all amount expended in earning that income while the term Profitability is defined as the ability of a given investment to earn a return from its use.

Profitability is one of the most important objectives of financial management because one goal of financial management is to maximize the owner`s wealth and profitability which in turn indicates better financial performance. According to Hifza Malik (2011) insurance plays a crucial role in fostering commercial and infrastructural businesses. From the latter perspective, it promotes financial and social stability, mobilizes and channels savings,

supports trade, commerce and entrepreneurial activity and improves the quality of the lives of individuals and the overall wellbeing in a country.

Renbao Chen et.al (2004) stated in his investigation that "higher profits provide both the means (greater availability of finance from retained profits or from the capital market) and the incentive (a high rate of return) for new investment". Therefore, we can understand from the above explanation that insurance companies have double responsibility: in one way they are required to be profitable so as to have high rate of return for new investment. On the other hand, insurance companies need to be profitable in order to be solvent enough so as to make other industries in the economy as they were before even after risk occurred.

Profitability is a measure of evaluating the overall efficiency of the business. The best possible course for evaluation of business efficiency may be input-output analysis. Profitability can be measured by relating output as a proportion of input or matching it with the results of other firms of the same industry or results attained in the different periods of operations. Profitability of a firm can be evaluated by comparing the amount of capital employed i.e. the input with income earned i.e. the output. This is popularly known as return on investment or return on capital employed.Profitable means that insurance companies are earning more revenues than being disbursed as expenses.

2.1.3. Theories of insurer's profitability

There is no general theory that provides a unifying framework for the study determinant of the insurer's profitability. Because of this, this study tries to view some theories which are nearer to the concept of insurance profitability and its determinants.

Modern Portfolio Theory

Modern portfolio theory was developed by Harry Markowitz in 1952. The theory suggests that investors can improve the performance of their portfolios by allocating their investments into different classes of financial securities and industrial sectors that are not expected to react similarly if new information emerges. It assists in selecting the most

efficient investments by analyzing various possible portfolios of the given securities. By choosing securities that do not move exactly together, MPT model shows investors how to reduce their risk. It is based on expected returns (mean) and the standard deviation (variance) of the various portfolios. MPT attempts to maximize expected portfolio returns for a given amount of portfolio risk, or equivalently minimize risk for a given level of return by carefully choosing the proportions of various assets. It models a portfolio as a weighted combination of assets, so that the return of a portfolio is the weighted combination of the assets return.

Since insurance firms are investments by themselves its standard practice for them to invest in a diversified portfolio to minimize risk and harness the returns of the various investment options on offer. When choosing a portfolio investors should maximize the discounted (or capitalized) value of future returns. Since the future is not known with certainty, it must be expected or anticipated returns which are discounted. Through combining different assets whose returns are not perfectly positively correlated, MPT seeks to reduce the total variance of the portfolio return. MPT also assumes that investors are rational and the markets are efficient.

MPT emphasizes maximizing returns while minimizing risks, while giving recognition to the existence of systematic and non-systematic risks. These concepts are usually referred to when discussing financial investments. Insurance being influenced by risks and returns as well, also finds meaning through MPT. Diversification is the solution against being a victim of concentration risk. Over-reliance on similar assets' profitability and hopes that contingent liabilities do not become actual obligations are risks that can wipe-out risk-portfolios in an instant. Non-systematic risks and alphas are the main items that give underwriting skills meaning. Non-systematic risks can be eliminated by widening the coverage of insurance over more assureds. In doing so, diversification is achieved. Alphas, on the other hand, represent the surprise return or inherent profitability of an asset and in converting this concept onto the insurance industry, this is perhaps the

inherent characteristics of an insured property and how the hazards and other circumstances are minimized, wherein it is more probable that the premiums paid by the assured will eventually be kept at the end of the insurance policy coverage period. While financial assets are capable of delivering abnormal returns, insurable risks are also able to remain abnormally intact and avoid transforming into real obligations for the insurance company. The fewer obligations an insurance company has, the more the profit they have.

Arbitrage Pricing Theory

Arbitrage Pricing Theory (APT) was proposed by Stephen Ross in 1976. APT agrees that though many different specific forces can influence the return of any individual firm, these particular effects tend to cancel out in large and well diversified portfolio. This is the principle of diversification and it has an influence in the field of insurance. An insurance company has no way of knowing whether any particular individual will become sick or will be involved in an accident, but the company is able to accurately predict its losses on a large pool of such risk. However, an insurance company is not entirely free of risk simply because it insures a large number of individuals. Natural disaster or changes in health care can have major influences on insurance losses by simultaneously affecting many claimants.

Cummins (1994) states that insurance companies are corporations and insurance policies can be interpreted as specific types of financial instrument or contingent claim thus it is natural to apply financial models to insurance pricing. The models are designed to estimate the insurance prices that would pertain in a competitive market. Charging a price at least as high as the competitive price (reservation price) increases the market value of the company. Charging a lower price would reduce the company's market value. Thus, financial models and financial prices are among the key items of information that insurers should have at their disposal when making financial decisions about tariff schedules, reinsurance contract terms, etc.

Black Swan Theory

The concept of black swan events was popularized by Nassim Nicholas Taleb in 2008. It states that the world is severely affected by events that are rare and difficult to predict, events of low probability but high impact. Silberzath (2013), states that a black swan does not create a new category of events, but is simply the occurrence of a known category, the probability of which was under estimated. They occur not because their probability is inherently incalculable, but because the model used to calculate them is wrong, or because though the model was correct, the possibility of occurrence was dismissed in practice. Their implications for markets and investment are compelling and need to be taken seriously. The Black Swan is an essential concept for understanding how we make mistakes in estimating the probabilities of different events belonging to a known universe.

Davidson (2010) states that since probabilistic risks can be quantified by human computing power, the future is insurable against risky probabilistic occurrences. The cost of such insurance, or self-insurance, will take into account all entrepreneurial marginal cost calculations (or by contingency contracts in a complete general equilibrium system). This insurance process permits entrepreneurs to make profit maximizing rational production and investment choices even in the short run when dealing with risky known processes. It is just that the short run does not provide a sufficiently large sample, for enough black swans to appear to calculate the probabilistic risk of encountering a black swan. In the long run, those entrepreneurs who in their price marginal cost calculations include these insurance costs as if they knew the objective probabilities implicit in Knight's unchanging reality will make the efficient decision and will, in Knight's system, earn profit. The greatest risks are never the ones you can see and measure, but the ones you can’t see and therefore can never measure. The ones that seem so far outside the boundary of normal probability that you can’t imagine they could happen in your lifetime even though, of course, they do happen, more often than you care to realize. What may be

a black swan to society at large may have limited insurance impact; likewise, some events that cause catastrophic losses may not seem extreme from other perspectives. Nobody wants to de-risk, in the sense that they want to actually take some money off the table. It's all about pricing and quantifying risk, and of course hedging against it. Demand for protection against so-called tail risks is increasing as investors react to black swan events. An investor or a firm does not have to try to be too smart in trying to forecast what is going to happen and which hedge is going to perform better what they need to do is accumulate cheap protection. Insurance firms offer this cheap protection where by large losses can be hedged against by paying small amounts known as premiums. By having such products, insurance firms accumulate premiums in a pool, since the occurrence of these events is minimal, they may end up paying none thus better financial performance.

2.2. Determinants of insurance profitability: An empirical Review

The disparity of profit among insurance companies over the years in a given country would result to suggest that internal factors or firm specific factors and macroeconomic factors play a crucial role in influencing their profitability. It is therefore imperative to identify what are these factors as it can help insurance companies to take action on what will increase their profitability and investors to forecast the profitability of insurance companies in Ethiopia. To do so, it is better to see what factors were considered in previous times by different individuals in different countries.

Rudolf (2001), in his paper, examined the key factors and latest trends determining profitability in the major non-life insurance markets. The study focused on the non-life insurance markets of the group of seven countries (G7) mainly for the period 1996 to 2000. To analyse the profitability, investment results and underwriting results were compared between countries and across lines of business and to analyse the drivers of profitability, return on equity was decomposed into its main components namely underwriting results and investment income. The results indicated that only Germany and

Japan did not have negative underwriting results and return on equity was high in UK, moderate in Canada and US, and low in France and Germany. The study found that underwriting result and investment yield are negatively correlated. The research suggested that due to uncertain prospects for investment results, the insurers must focus on underwriting results to achieve greater profitability.

Shiu (2004) analyzed the determinants of the performance of the UK general insurance companies, over the period 1986–1999, by using three key indicators: investment yield, percentage change in shareholders funds and return on shareholders funds. Based on a panel data set, the author empirically tested 12 explanatory variables and showed that the performance of insurers have a positive correlation with the interest rate, return on equity, solvency margin and liquidity, and a negative correlation with inflation and reinsurance dependence.

Greene (2004) argued that the profitability of insurance is normally expressed in net premium earned, profitability from underwriting activities, annual turnover, return on investment, return on equity. These measures could be classified as profit performance measures and investment performance measures.

Hoyt and Powell (2006), in their research paper, analysed the financial performance of medical liability insurer by using two appropriate measures, namely, the economic combined ratio and the return on equity. The period for the study was from 1996 to 2004. Based on ECR, medical liability insurers, as a group reported modest profitability in only three years (1996, 1997 and 2004). In contrast, these insurers sustained losses in six consecutive years from 1998 to 2003. The average profit ratio (return on net premiums earned) during the period 1996 to 2004 was negative thirteen per cent. The study found that there was no evidence that medical liability insurers had been earning excessive returns or that they were over-capitalized. The research concluded that there was no evidence that medical malpractice insurance was overpriced.

Holzheu (2006), in his research paper, measured the underwriting profitability of insurance markets. The study used economic combined ratio as alternative key performance indicator instead of conventionally published combined ratio. It reflects underwriting profitability more accurately. The study focused on the underwriting profitability of six major non-life markets, the US, the UK, Germany, Japan, France and Canada from 1994 to 2004. The results indicated the picture for the business year results for Japan, Canada, France, Germany and the UK were broadly consistent with the US results. The results for the years 1994 to 1997 and 2002 to 2004 were profitable, though often only moderately. The period from 1998 to 2001 exhibited dismal underwriting results. Substantial improvements in underwriting results from 2001 to 2003 restored profitability to the level of the 1994 to 1997 period. The study further pointed out that the ten year average underwriting margins before taxes were positive in all countries implying a positive contribution to profits from the insurance activities. However, the contribution was only about one- two per cent in the US and Japan, two-three per cent in France, five per cent in Canada and the UK, and six per cent in Germany. The study found that these positive results were necessary but not a sufficient condition for creating shareholder value. Profits must also cover tax and the insurers' capital cost. During the period 1994 to 2004, it was difficult for the industry to earn its underwriting cost of capital.

Hamdan (2008) examined determinants of insurance company's profitability in UAE. The study used secondary data for the period of 2004-2007. The study revealed that there is no relationship between profitability and age of the company and there is significantly positive relationship between profitability and size & volume of capital.Result also shows that Leverage ratio & loss ratio significantly and opposite related to profitability.

According to Swiss (2008) profits are determined first by underwriting performance (losses and expenses, which are affected by product pricing, risk selection, claims

management, and marketing and administrative expenses); and second, by investment performance, which is a function of asset allocation and asset management as well as asset leverage. The first division of the decomposition shows that an insurer's ROE is determined by earnings after taxes realized for each unit of net premiums (or profit margin) and by the amount of capital funds used to finance and secure the risk exposure of each premium unit (solvency).

Malik (2011) examined in his paper, the determinants of Pakistan's insurance companies profitability proxied by ROA. The study used secondary data for the period of 2005-2009 and the sample was 34 insurance companies of Pakistan. The variables tested in the study are age, size, voc, leverage and loss ratio. Descriptive statistics and multiple regression analysis were performed to describe the profitability among Pakistani insurance companies. Result showed that there is no relationship between profitability and age of the company and there is significantly positive relationship between profitability and size. Result also shows that volume of capital was significantly and positively related to profitability. On the other hand the analysis suggests that a reverse and significant relationship between leverage ratio and loss ratio as independent variables and profitability.

Kozak (2011) examined determinants of profitability of non-life insurance companies in Poland during integration with the European financial system for the period of 2002–2009. The results indicated that the reduction in the share of motor insurance in the portfolio, with simultaneous increase of other types of insurance has a positive impact on profitability and cost-efficiency of insurance companies. However, offering too broad spectrum of classes of insurance negatively impacts its profitability and cost efficiency. Companies improve profitability and cost efficiency with an increase of their gross premiums and decrease of total operating expenses. Additionally increases of the GDP growth and the market share of foreign owned companies positively impact profitability of non-life insurance companies during the integration period.

Ikonic et al. (2011) analyzed the profitability of the Serbian insurance companies by applying the IMF CARMEL methodology. Thus, by determining four indicators related to the capital adequacy of insurers, the authors highlight that capital adequacy is vital for a company, as it may generate a good level of profitability. The analysis indicated that the Serbian insurance market falls into the category of developed markets and that there are good perspectives of evolution.

Curak et al. (2012) examined the determinants of the profitability of the Croatian composite insurers' between 2004 and 2009. The determinants of profitability, selected as explanatory variables include both internal factors specific to insurance companies and external factors specific to the economic environment. By applying panel data technique, the authors show that company size, underwriting risk, inflation and return on equity have a significant influence on insurers' profitability. The final results indicate that the Croatian insurance market has a low level of development, but it is very dynamic.

Yuvaraj and Abate (2013) examined the internal factors affecting profitability of insurance companies as measured by ROA. The sample in the study included nine of the listed insurance companies for years (2003- 2011). The results of regression analysis reveals that leverage, size, volume of capital, growth and liquidity are most important determinant of performance of life insurance sector whereas ROA has statistically insignificant relationship with, age and tangibility. As the findings show that liquidity do have negative impact on profitability and it provides further implication on the effective risk management practices in the companies.

Daniel and Tilahun (2013) in their paper evaluated determinants of insurance companies' performance in Ethiopia over the period of 2005 to 2010. The results revealed that firm size, leverage, loss ratio and tangibility of assets were statistically significant to explain performance of insurance companies in Ethiopia. The result of the study also showed that insurers' size, leverage and tangibility of assets were positively related to insurance performance, while loss ratio was negatively related to performance (ROA). Firm age,

liquidity and growth in written premium have no a statistical significant relationship with performance of insurers.

Anna-Maria and Ghiorghe (2014) in their paper evaluated the determinants of financial performance in the Romanian insurance market, between 2008 and 2012. The authors analyzed the financial performance of insurance companies at micro and macroeconomic level, being determined both by internal factors represented by specific characteristics of the company, and external factors regarding connected institutions and macroeconomic environment by applying specific panel data techniques. The results achieved the determinants of the financial performance in the Romanian insurance market are the financial leverage, company size, growth of gross written premiums, underwriting risk, risk retention ratio and solvency margin.

Pervan (2014) investigated how insurance companies in Macedonia performed and according to the findings of panel analysis regarding the determinants of profitability, it was revealed that expense ratio, claim ratio, Size of the insurer, economic growth (GDP), and inflation have statistically significant influence on insurers' performance. Expense as well as Claims ratios (CR) have negative and statistically significant influence on insurers' profitability while size has a positive influence on the insurers' profitability. GDP growth positively affects insurers profitability i.e. growth of overall economic activity encourage demand for insurers services and indirectly result in higher insurers income while Inflation on profitability is statistically significant and negative, suggesting that higher levels of inflation cause higher interest rates and lower bond prices which in turn reduce portfolio returns.

Lee (2014) investigated in his study the relationship between firm specific factors and macroeconomics on profitability in Taiwanese property-liability insurance industry using the panel data over the1999 through 2009 time period. Using operating ratio and return on assets (ROA) for the two kinds of profitability indicators to measure insurers' profitability. The results show that underwriting risk, reinsurance usage, input cost, return

on investment and financial holding group have significant influence on profitability in both operating ratio and ROA models. The insurance subsidiaries of financial holding group compared with other insurance companies, showing lower profitability. In addition, economic growth rate has significant influence on profitability in operating ratio model but insignificant influence on profitability in ROA.

2.3. Research hypothesis and determinants selection

Based on the previous empirical studies, insurers' profitability is influenced by both internal and external factors. Whereas internal factors focused on an insurer's specific characteristic, the external factors concerned macroeconomic variables.

2.3.1. Specific determinants (internal factors)

The internal determinants of insurance company's profitability are those management controllable factors which account for the inter-firm differences in profitability, given the external environment.

A. Underwriting risk

Underwriting risk is the risk that the premiums collected will not be sufficient to cover the cost of coverage. Insurance prices are established based on estimates of expected claim costs and the costs to issue and administer the policy. The estimates and assumptions used to develop policy pricing may prove to ultimately be inaccurate. This may be due to poor assumptions, changing legal environments, increased longevity, higher than expected weather catastrophes (Ernst & Young, 2010). Huge fluctuations in net premiums written indicate a lack of stability in underwriting operation of an insurance company. An unusual increase in net premiums written might indicate that the company is engaging in the so-called "cash-flow underwriting" to attempt to survive its financial difficulty. However, this is not necessarily the case. An unusual increase in net premiums written could indicate favourable business expansion if it is accompanied by adequate reserving, profitable operations, and stable products mix (National Association of Insurance Commissioner, 2001). Barth and Eckles (2009) find a negative relationship

between premium growth and changes in loss ratios, suggesting that premium growth alone does not necessarily result in higher underwriting risk. Further, there is a positive relationship between claim count growth and changes in loss ratios, suggesting that claim count growth may be a preferred measure of underwriting risk.

Organizations that engage in risky activities are likely to have more volatile cash flows than entities whose management is more averse to risk-taking (Fama and Jensen, 1983). As a consequence, insurers that underwrite risky business (e.g., catastrophe coverage) will need to ensure that good standards of management are applied to mitigate their exposure to underwriting losses ex-ante and maximize returns on invested assets ex-post. This could improve annual operational performance by encouraging managers to increase cash flows through risk taking. On the other hand, excessive risk-taking could adversely affect the profitability of insurers and reinsurance companies. Furthermore, higher annual insurance losses will tend to increase the level of corporate management expenses ex-post (e.g., claims investigation and loss adjustment costs) that could further exacerbate a decline in reported operational performance. In contrast, insurers companies with lower than expected annual losses are likely to have better operational performance because, for example, they do not incur such high monitoring and claims handling costs. Thus a negative connection between the underwriting risk and the insurer's profitability is expected, since taking an excessive underwriting risk can affect the company's stability through higher expenses. Consequently, the researcher formulates the following null hypothesis:

Ho1: Underwriting risk has no significant impact on profitability of insurance companies' in Ethiopia.

B. Reinsurance Dependence

Insurance companies usually take out reinsurance cover to stabilise earnings, increase underwriting capacity and provide protection against catastrophic losses. Nevertheless,

there is a cost for reinsurance. As a result, determining an appropriate ceding level is important for insurance companies, and they have to try to strike a balance between decreasing insolvency risk and reducing potential profitability. Although it increases operational stability, increasing reinsurance dependence, i.e. lowering the retention level, reduces the potential profitability. Purchasing reinsurance reduces insurers' insolvency risk by stabilizing loss experience, increasing capacity, limiting liability on specific risks, and/or protecting against catastrophes. However, transferring risk to reinsurers is expensive. The cost of reinsurance for an insurer can be much larger than the actuarial price of the risk transferred. Cummins, Dionne, Gagne, and Nouira (2008), they analyzed empirically the costs and the benefits of reinsurance for a sample of US property-liability insurers. The results show that reinsurance purchase increases significantly the insurer's costs but reduces significantly the volatility of the loss ratio. With purchasing reinsurance, insurers accept to pay higher costs of insurance production to reduce their underwriting risk. Insurers with higher reinsurance dependence tend to have a lower level of firm profitability. It is possible that an insurer that cedes more business to reinsurer and keeps lower retention more or less operates like a reinsurance broker who only transfers risk without underwriting risk and is likely to report less profit for a relatively high percentage of the premium received is ceded to reinsurers (Lee, 2012). Therefore, based on the above analysis, the following null hypothesis formulate:

Ho2: Reinsurance dependence has no significant impact on profitability of insurance companies' in Ethiopia.

C. Solvency Ratio (Capital adequacy)

Available solvency ratio means the excess value of assets over the value of insurance liabilities and other liabilities of policyholders' and shareholders' funds (Charumathi 2013). The result in his study indicated that there is a significant positive relationship

between profitability and solvency ratio. Solvency ratio is an important indicator of the financial health of an insurance firm and denotes its ability to survive in the long run. Insurance companies with higher solvency margin are considered to be more sound financially. Financially sound insurance companies are better able to attract prospective policyholders and are better able to adhere to the specified underwriting guidelines. Insurance companies with higher solvency margin outperform those with lower solvency margin (Shiu, 20114).

On the other hand, assuming that the company is in its first stage, the manager will choose to invest using the retained earnings in order to increase profitability. This means that the internal financing will continue until the retained earnings reach the amount of zero. Furthermore, Durinck et al. (1997) found that the faster the growth, the more external financing firms will use. However, this increase in external financing is mainly through an increase in the liabilities, as the increase in external equity financing was not found significant. As a company grows, the solvency ratio will thus become smaller.

Therefore, based on the above analysis, the following null hypothesis formulate:

Ho3: Solvency ratio has no significant impact on profitability of insurance companies' in Ethiopia.

D. Liquidity

Liquidity refers to the degree to which debt obligations coming due in the next 12 months can be paid from cash or assets that will be turned into cash. It is usually measured by the current assets to current liabilities (current ratio). It shows the ability to convert an asset to cash quickly and reflects the ability of the firm to manage working capital when kept at normal levels. A firm can use liquid assets to finance its activities and investments when external finance is not available or it is too costly. On the other hand, higher liquidity

would allow a firm to deal with unexpected contingencies and to cope with its obligations during periods of low earnings (Liargovas, and Skandalis, 2008)

Maintaining high liquidity can reduce management's discipline as regards both underwriting and investment operations. Moreover, according to the theory of agency costs, high liquidity of assets could increase agency costs for owners because managers might take advantage of the benefits of liquid assets (Adams and Buckle, 2000). In addition, liquid assets imply high reinvestment risk since the proceeds from liquid assets would have to be reinvested after a relatively short period of time. Undoubtedly, reinvestment risk would put a strain on the performance of a company. In this case, it is, therefore, likely that insurance companies with less liquid assets outperform those with more liquid assets. Nevertheless, agency costs and reinvestment risk can be effectively minimised if proper actions are taken. Thus, the expected sign of the profitability and asset liquidity ratio is unpredictable based on prior research. Consequently, the researcher formulates the following hypothesis:

Ho4: Liquidity has no significant impact on profitability of insurance companies' in Ethiopia.

E. Premium growth

Premium revenue is the primary source of revenue for most insurers, and it is generally more persistent than other revenue sources. Therefore, premium growth should help predict future revenue and earnings growth. For insurance company, especially those writing long-tail policies, income in periods of premium growth is understated due to the overstatement of losses and loss expenses, which are measured undiscounted. If premium revenue is relatively stable over time, this bias is offset by the omission of interest expense on the loss reserve. However, when premium revenue increases (declines) over time, the omitted interest expense is smaller (larger) than the overstatement of the losses and loss expenses, and so income is understated (overstated) Charumathi (2013).

Premium growth measures the rate of market penetration. Empirical results showed that the rapid growth of premium volume is one of the causal factors of insurers' insolvency (Kim et al. 1995).

Premium growth is driven by exposure growth (an increase in the number of policyholders) and rate-level growth (an increase in the average price per exposure). These two sources of growth have different persistence and risk implications. Exposure growth is valuable if the products are properly priced, but in a competitive market, significant exposure growth may be an indication of underpricing. This is the primary motivation for using premium growth as a potential early warning signal of financial impairment. In contrast, premium growth attributable to rate increases may reduce risk if the same customers are paying more for the same risk exposure. However, if the rate increases alter or reflect a change in the mix of customers, the new book of business can generate unexpected losses if it is mispriced. Maria (2014) argue that an excessive growth of underwritings generates a higher underwriting risk and the necessity to increase the volume of technical reserves and excessively increase the volume of the gross written premiums may lead to self-destruction, as other important objectives, such as selecting profitable investment portfolios could be neglected. Thus, the expected sign of the premium growth is unpredictable based on prior research.

Ho5: There is no significant effect between growth of gross written premium and insurance companies' profitability in Ethiopia.

F. Company Size

It has been suggested that company size is positively related to profitability. The main reasons behind this can be summarized as follows. First, large insurance companies normally have greater capacity for dealing with adverse market fluctuations than small insurance companies. Second, large insurance companies usually can relatively easily

recruit able employees with professional knowledge compared with small insurance companies. Third, large insurance companies have economies of scale in terms of the labor cost, which is the most significant production factor for delivering insurance services (Shiu, 2014). Company size is computed as decimal logarithm of total assets of the insurance company. A positive linkage between company size and its profitability is expected, since larger firms have more resources, a better risk diversification, complex information systems and a better expenses management. Thus, the researcher formulates the following null hypothesis:

Ho6: Company size has no significant impact on profitability of insurance companies' in Ethiopia.

G.Technical Provisions risk

Risk of holding insufficient technical provisions or of holding unjustifiably excessive provisions. Where provisions are set at a lower level than actually required then this could present the company's financial position in a better light than it actually is. This could result in inappropriate underwriting decisions being made. For example, more risky policies may be underwritten on the basis that more capital is available to support this than is actually the case, or higher levels of business may be written (Lawrie S.). Insurance companies collect premiums in advance and keep them in reserve accounts for future claim settlements. For instance, most premiums collected by insurance companies are kept in outstanding claims and unearned premiums reserves which are two main accounts in the liability side of the balance sheet. Outstanding claims reserve is considered riskier than ordinary long-term corporate debt since neither the magnitude nor the timing of the cash flows is known (Shiu,2014). Consequently, the researcher formulates the following null hypothesis:

Ho7: Technical provision has no significant impact on profitability of insurance companies' in Ethiopia.

2.3.2. Macroeconomics variables (External Factor)

H. Growth rate of GDP

Growth rate of GDP reflects economic activity as well as level of economic development and as such affect the various factors related to the supply and demand for insurance products and services. GDP is the most informative single indicator of progress in economic development. Poor economic conditions can worsen the quality of the finance portfolio, thereby reducing profitability. If GDP grows, the likelihood of selling insurance policies also grows and insurers are likely to benefit from that in form of higher profits. Outreville (1990) investigated the economic significance of insurance in developing countries. He compares 45 developed and developing countries and concludes that there is a positive but non-linear relationship between general insurance premiums and GDP per capita. Maja (2012) also examined that GDP growth positively affects insurers profitability i.e. growth of overall economic activity encourage demand for insurers services and indirectly result in higher. Thus, the researcher formulates the following null hypothesis:

Ho8: Gross domestic product has no significant impact on profitability of insurance companies' in Ethiopia.

I. Inflation

Inflation certainly plays a role in insurance and has adverse impact on many aspects of insurance operations, such as claims, expenses and technical provisions (Daykin, Pentikäinen & Pesonen, 1994). Expected inflation is taken into account when actuaries set actuarially fair premiums, inflation itself is unlikely to seriously impact on the performance of insurance companies. Nevertheless, if inflation is significantly greater than expected, it could cause insurance companies financial difficulty. For instance, unexpected inflation makes real returns on fixed-rate bonds lower than expected. As a consequence, profit margins of insurance companies are compressed and financial

performance is accordingly impaired (Browne, Carson & Hoyt, 1999). The inflation could affect insurance companies' profitability influencing both their liabilities and assets. In expectation of inflation claim payments increases as well as reserves that are required in anticipation of the higher claims, consequently reducing technical result and profitability. Taking into consideration that inflation affects assets side of the balance sheet, as the bond markets adjust to the higher level of inflation, interest rates begin to rise. This result in bond prices fall, negatively affecting value of investment portfolio. Given the negative relationship between inflation and returns on both fixed-income securities and equities, it is expected that the relationship between profitability and inflation will be negative. Thus, the researcher formulates the following null hypothesis:

Ho9: Inflation has no significant impact on profitability of insurance companies' in Ethiopia.

2.4. Summary of the literature review & Conceptual Framework

2.4.1. Summary of the literature review

A lot of empirical works has been done regarding determinants of profitability. Review of the literature showed that the researches on the determinants of profitability had been comprehensively studied in developed countries around the world and in some emerging countries like Pakistan, India and Taiwan. Besides, in Ethiopia most of the researches focused on banks and other non-financial sectors rather than insurance companies.

Different scholars using empirical investigation on the determinants of profitability are resulting in dissimilar conclusions. For instance, an empirical study by Daniel &Tilahun (2013) indicated that positive and significant relationship between size, tangibility and leverage with profitability; however, loss ratio is statistically significant and negatively related with ROA. The result also revealed that there is negative relationship between age and profitability but statistically insignificant. On the other hand, a study of Ahmed (2008) examined the determinants of insurance companies profitability in UAE indicated

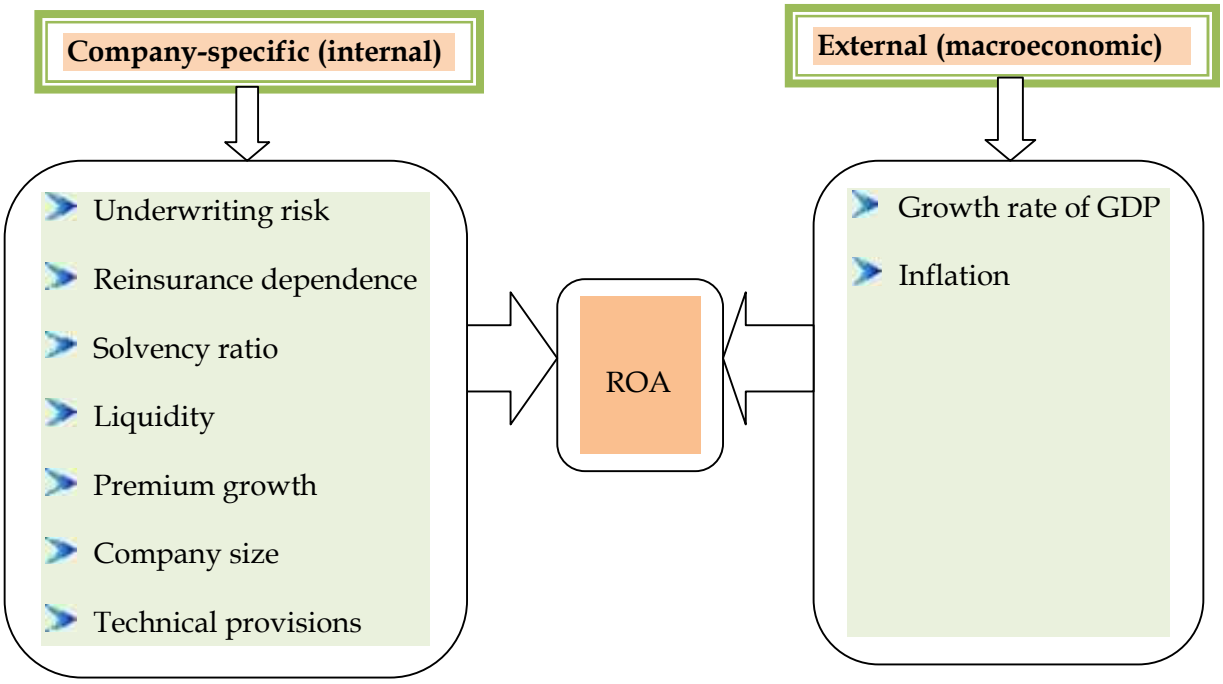
that that there is no relationship between profitability and age of the company and there is significantly positive relationship between profitability and size & volume of capital. Result also shows that Leverage ratio & loss ratio significantly and opposite related to profitability. Khan and Amjad (2013) revealed that leverage, size, earnings volatility and age of the firm are significant determinants of profitability while growth opportunities and liquidity are not significant determinants of profitability. This initiate that determinants of profitability are issue that requires further investigation.

Empirical evidences regarding determinants of insurance companies' profitability (Yuvaraj and Abate 2013) focused only on internal factors such as age, size, leverage, growth, volume of capital, tangibility of assets and liquidity. However this study was focused on other factors like underwriting risk, reinsurance dependence, solvency margin, liquidity risk, premium growth, technical provisions, company size, inflation and growth rate of GDP because these variables exert strong impact on insurance companies' profitability based on the selected previous empirical works.

2.4.2. Conceptual Framework

Different empirical evidences suggested that profitability of financial institutions affected by internal and external factors. This study used both internal and external determinants of insurance's profitability includes underwriting risk, reinsurance dependence, solvency ratio, liquidity, premium growth, technical provisions, company size, growth rate of GDP and inflation. The study was identified how these variables determine the profitability of insurance company in Ethiopia.

Figure 2.1. Conceptual framework: Relation between insurance companys' profitability and its determinants



Source: Researcher-design

CHAPTER THREE

3. Research methodology

The purpose of this chapter is to present the research methodology which is adopted in the study. The chapter arranged as follows. Section 3.1 presents research approaches. This is followed by research method adopted in section 3.2. Section 3.3 presents variable definition.Finally a conclusion is presented in section 3.4.

3.1. Research approaches

When conducting a research, there are different ways of approaching the problem. According to Creswell (2009), there are three approaches of research; quantitative, qualitative and mixed. The following discussions briefly presents the basic features of these research approaches.

Quantitative research is a means for testing objective theories by examining the relationship among variables (Creswell, 2009). On the other hand, qualitative research approach is a means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem with intent of developing a theory or pattern inductively (Creswell, 2009). Finally, mixed methods approach is an approach in which the researchers emphasize the research problem and use all approaches available to understand the problem (Creswell, 2003).

Hence, based on the above discussions of the three research approaches and by considering the research problem and objective, in this study, the quantitative method is primarily used. However, to have a better insight and gain a richer understanding about the research problem, the quantitative method is supplemented by the qualitative method of inquiry. That is, to get the benefits of a mixed methods approach and to mitigate the bias in adopting only either quantitative or qualitative approach. Therefore, employing mixed approach is used to counterbalance the biases (limitations) of applying any of a single approach and a means to offset the weaknesses inherent within method with the

strengths of the other method (Creswell, 2003). In addition, adopting mixed approach in this study is justified as it provides the best understanding of a research problem because it opens the door to multiple methods of data collection and to both generalize the findings to a population and develop a detailed view of the meaning of a phenomenon or concept for individuals (Creswell, 2003).

The current study is used explanatory research design started with a quantitative survey study and identified results and then followed up these results with an in-depth interview qualitative study to best understand the research problem. If the objective is to determine which variable might be causing a certain behavior, i.e. whether there is a cause and effect relationship between variables, explanatory research must be undertaken (Shields 2013).

3.2. Research methods adopted

Decision regarding the selection of research instrument, the nature of data collection and analysis are based on the research method used in a study. Selection of appropriate research methods is very important because it decides the quality of study findings. The following sections discuss consecutively the quantitative and qualitative aspects of the research method.

3.2.1: Quantitative aspect of research method

The use of survey design provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population in order to generalize from the sample to the population (Creswell, 2009). As a result, in order to generalize the findings to the whole insurance operated in the country, in the current study the researcher adopted survey research method.

Survey can be useful when a researcher wants to collect data on phenomena that cannot be directly observed. Creswell (2003) stated that the purpose of survey is to generalize description of trends, attitudes, or opinions from a sample to a population so that inferences can be made about some characteristic, attitude, or behavior of this population.

Moreover, as noted in Fowler (1986) it is also reasonable to use survey designs because of its benefits such as the economy of the design and the rapid turnaround in data collection and identifying attributes of a large population from a small group of individuals. Therefore, it is logical to apply survey method for this study. The survey is carried out by means of structured document review.

Sample design

The target populations of the study are all insurance companies registered by NBE and under operation in Ethiopia. Currently, seventeen insurance companies are working in Ethiopia (as presented in appendix 1). In order to reach meaningful conclusion, there is no need to sample from the seventeen insurance companies, as they are already few in numbers to collect information over the period of 2004-2014. But, because of lack of 11 years data in most of the newly established insurance companies, the number of sample is reduced to nine. The researcher believes that the sample size is sufficient to make sound conclusion about the population as far as it covers more than 50% of the total population. Moreover, the inclusion of Ethiopian insurance Corporation (EIC) in the sample which takes the lions share in the country's insurance activity makes the sample more representative and reasonable. Hence samples are chosen to represent the relevant attributes of the whole population. Accordingly, available audited financial statements of eleven consecutive years from 2004-2014 of each insurance companies include in the sample frame is consider (99 yearly observation). Thus, to make the panel data structured, i.e. every cross-section follows the same regular frequency with the same start and end dates. Besides, eleven years is assumed to be relevant because five years and above is the recommended length of data to use in most finance literatures.

The procedure used for drawing the sample from the available lists is the insurance service year profile, for the reason that the study intend to use document sources. Therefore, sample size is decided based on the availability of operating data in the insurance operating in Ethiopia. According to Singh, (2006) when the subjects used in the

sample is homogeneous, using purposive sampling technique is appropriate. Therefore, the researcher used purposive sampling method to draw the sample from the population.

Data sources and collection instruments

The necessary data that used in the study is obtained through both primary and secondary sources. The sources of data for this research are mainly from secondary sources, but for the purpose of supporting the finding of the research, primary data were used to some extent. While books, journal articles, and internet were explored to gather published data on the issues under investigation, primary data on determinant of profitability are collected from the manager of insurance companies through unstructured questionnaire. Secondary data on insurance companies are obtained from insurance company's audited financial statements and their annual reports filed with NBE. Moreover, in order to analyze the relationship that exists between profitability and macro-economic variables, macroeconomic data are collected for the same years. Those macroeconomic data are gathered from the records held by NBE and MoFED through structured document review.

According to Koul (2006) using appropriate data gathering instruments help researchers to combine the strengths and amend some of the inadequacies of any source of data to minimize risk of irrelevant conclusion. He further argues that consistent and reliable research indicates that research conducted by using appropriate data collection instruments increase the credibility and value of the research findings. In view of this concept, questionnaire surveys for manager of insurance companies and supervisory officers, and secondary data (audited financial statements; balance sheet, income statement and revenue account) are used for this study to collect required data by using purposive sampling.

3.2.2. Qualitative aspect of research method

In the current study, qualitative data is gathered as a supplementary of the quantitative one. Since the nature of this research requires in-depth understanding of the factors determine insurance company's profitability in Ethiopia, an interview is suitable to uncover such information. Smith et al. (1991) commented that the interview method is the most fundamental of all qualitative methods and is claimed to be the best method for gathering information.

The researcher has conducted an in-depth interview in unstructured face to face interview form. In respect of instrument, unstructured face to face interview has been used because of its flexibility and also allowing new questions to be bring up during the interview. As a result, the response of the interviewees' for the interview questions is used for supporting the result obtained from analysis of structure record reviews or as arguments. Regarding the sample design, non-probability purposive sampling method was adopted. So, to explore the view of company officials about the determinants of insurance profitability, nine managers (three managers from Ethiopian insurance corporation and six from two private insurance companies are interviewed by using unstructured face to-face interviews.

3.2.3 Data analysis techniques and model specification

According to William (2010), model building involves specifying relationships between two or more variables; perhaps extending to the development of descriptive or predictive equations. In order to achieve the objectives of this research study, the panel data regression model is used to identify the relationship between the profitability of insurance companies and explanatory variables like underwriting risk, reinsurance dependence, solvency ratio, liquidity, premium growth, company size, technical provisions, inflation and growth rate of GDP. This is because prior studies; Malik (2011), Shiu (2004),

Charumathi (2012) mostly developed this model to identify the determinant of insurance companies profitability. Thus, the collected panel data is analyzed using descriptive statistics, correlations, multiple linear regression analysis and inferential statistics. Mean values and standard deviations are used to analyze the general trends of the data from 2004 to 2014 based on the sector sample of 9 insurance companies and a correlation matrix is also used to examine the relationship between the dependent variable and explanatory variables. In addition, ordinary least square (OLS) is conducted using statistical package "EVIEWS" to determine the most significant and influential explanatory variables affecting the profitability of the insurance industry in Ethiopia.

Modeling is based on panel data techniques. Panel data or longitudinal data, comprises of both cross-sectional elements and time-series elements; the cross-sectional element is reflected by the different Ethiopian insurance company and the time-series element is reflected the period of study (2004-2014). Panel data is favored over pure time-series or cross-sectional data because it can control for individual heterogeneity and there is a less degree of multi-linearity between variables (Altai, 2005).

In light of the above, to investigate the effect of insurance-specific and macroeconomic determinants of insurers profitability, the following general multiple regression model is adopted from different studies conducted on the same area.

$$ROAit = \beta_0 + \beta_1 (ISD)xt + \beta_2 (MED)yt + eit$$

Where;

ROA_{it} is a dependent variable for insurance i at time t; $B_{0,}$ β_1 and, β_2 represent estimated coefficients including the intercept; $(ISD)_{xt}$ represent the x-th insurance specific determinants at time t; (MED)yt represent the y-th macroeconomic determinants at time t ; eit is the error term.

The equation that account for individual explanatory variables which are specified for this particular study is given as follows.

$$ROAit = \beta_0 + \beta_1 UR_{i,t} + \beta_2 RD_{i,t} + \beta_3 SR_{i,t} + \beta_4 TP_{i,t} + \beta_5 LQ_{i,t} + \beta_6 CS_{i,t} + \beta_7 PG_{i,t} + \beta_8 I_{i,t} + \beta_9 GDP_{i,t} + \varepsilon$$

Source: developed by researcher by reviewing previous research works.

Where:

ROAit = dependent variable return on asset; PG = premium growth;

UR = underwriting risk; TP = technical provision;

RD = reinsurance dependence; GDP = growth rate of GDP;

LQ = Liquidity; I = inflation;

CS= company size

SR = solvency ratio;

Є =is the error component for company i at time t assumed to have mean zero E [Є it] = 0

β_0= Constant

β= 1, 2, 3…9 are parameters to be estimate;

i = Insurance company i = 1. . . 9; and t = the index of time periods and t = 1. . . 11

The issue that may arise from the use of panel data is whether the individual effect is considered to be fixed or random. While random effects estimation addresses the endogeneity issue by instrumenting potentially endogenous variables, it also assumes that the individual firm effects are uncorrelated with the exogenous variables. On the other hand, the fixed effect estimation deals successfully with the correlated effects problem. The choice between both approaches is done by running a Hausman test. To conduct a Hausman test the number of cross section should be greater than the number of coefficients to be estimated. But, in this study the numbers of coefficients are equal with the number of cross sections so it is not possible to conduct a Hausman test.

Therefore a fixed cross-sectional effect is specified in the estimation so as to capture unobserved idiosyncratic effects of different insurance companies. In addition, as noted in Gujarati (2004) if T (the number of time series data) is large and N (the number of

cross-sectional units) is small, there is likely to be little difference in the values of the parameters estimated by fixed effect model and random effect model. Hence, the choice here is based on computational convenience. On this score, fixed effect model may be preferable than random effect model (Gujarati 2003). Since the number of time series (i.e. 11 year) is greater than the number of cross-sectional units (i.e. 9 insurance companies) and adjusted R^2 value and Durbin-Watson stat value increases with the use of cross-sectional fixed effect model, fixed effect model is preferable than random effect model in this case.

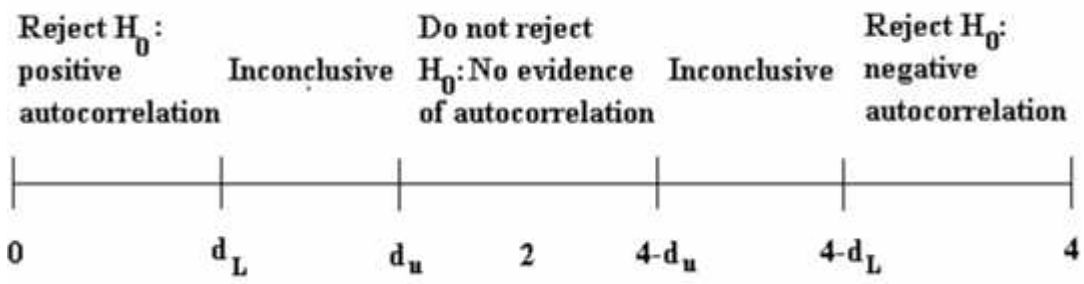
As mentioned in Brooks (2008), there are basic assumptions required to show that the estimation technique, OLS had a number of desirable properties, and also so that hypothesis tests regarding the coefficient estimates could validly be conducted. If these Classical Linear Regression Model (CLRM) assumptions hold, then the estimators determined by OLS will have a number of desirable properties, and are known as Best Linear Unbiased Estimators. Therefore, for the purpose of this study, diagnostic tests are performed to ensure whether the assumptions of the CLRM are blue or not in the model. Consequently, the basic CLRM assumptions test in this study are errors have zero mean, homoscedasticity, autocorrelation, normality and multicollinearity. According to Brooks (2008) when the assumptions are satisfied, it means that all the information available from the patterns was used. But, if there is assumption violation of that data usually means that there is a pattern of data that have not included in the model, and could actually find a model that fits the data better.

The first assumption is errors have zero mean. According to Brooks (2008), if a constant term is included in the regression equation, this assumption will never be violated. The second assumption is hetroskedasity. The assumption of homoscedasticity is that the variance of the errors is constant or equal. If the variance of the errors is not constant, this

would be known as hetroskedasity (Guajarati, 2004). In order to test homoscedasticity the white test will be used.

The third assumption is the autocorrelation assumption that the covariance between the error terms over time is zero; it assumed that the errors are uncorrelated with one another. If the errors are not uncorrelated with one another, it would be stated that they are serially correlated. Usually, Durbin-Watson (DW) value in the main regression table is considered and used to test the presence of autocorrelation. According to Brooks (2008), DW has 2 critical values: an upper critical value (dU) and a lower critical value (dL), and there is also an intermediate region where the null hypothesis of no autocorrelation can neither be rejected nor not rejected.

Figure 3.1: Rejection and Non-Rejection Regions for DW Test



The rejection, non-rejection, and inconclusive regions are shown on the number line in figure 3.1. So, the null hypothesis is rejected and the existence of positive autocorrelation presumed if DW is less than the lower critical value; the null hypothesis is rejected and the existence of negative autocorrelation presumed if DW is greater than 4 minus the lower critical value; the null hypothesis is not rejected and no significant residual autocorrelation is presumed if DW is between the upper and 4 minus the upper limits; the null hypothesis is neither rejected nor not rejected if DW is between the lower and the upper limits, and between 4 minus the upper and 4 minus the lower limits.

The fourth assumption is Normality of the error distribution that assumed the errors of prediction (differences between the obtained and predicted dependent variable scores) are normally distributed. Violation of this assumption can be detected by constructing a histogram of residuals (Brooks, 2008).

Finally the fifth assumption is multicollinearity assumption which refers to the situation in which the independent variables are highly correlated. When independent variables are multicollinear, there is overlap or sharing of predictive power. This may lead to the paradoxical effect, whereby the regression model fit the data well, but none of the explanatory variables (individually) has a significant impact in predicting the dependent variable (Gujarati, 2004). A Pearson correlation was used for the purpose of testing multicollinearity in this study. The Pearson correlation matrix is a technique of testing multicollinearity of explanatory variables by investigating the relationship of biviariate variables (Wooldridge, 2006).

3.3. Variable definition/ measurement

This section explains the variables used as dependent and independent (explanatory) variables in this study. The definitions/measurements used for these variables are described as follow:

3.3.1. Dependent variable

The most commonly used profitability ratios are net profit margin, return on assest (ROA) and return on equity. The return on total assets ratio represents one of the most used methods of quantifying financial performance. It was developed in 1919 by Dupont and it emphasizes the company's ability to efficiently use its assets (Maria,2014). ROA reflects the ability of insurance's management to generate profits from the insurances' assets, although it may be biased due to off-balance-sheet activities. In most of the previous studies on insurance sector, return on assest (ROA) is being used as a proxy of profitability (Ahmed, 2011); (Al-Shami, 2008); (Malik, 2011); (Lee, 2014). Therefore,

this study has attempted to measure profitability by using ROA similar to most of the aforementioned researchers. ROA= Net profit before tax / Total Assets

3.3.2. Independent variables

This subsection describes the independent variables that is used in the ecoometric model to estimate the dependent variable. To measure the predictor variables of insurance companies' profitability in Ethiopia, nine measures are used as independent variables which are extracted from different studies. The variables namely; underwriting risk, reinsurance dependence, solvency margin, liquidity, company size, premium growth, technical provisions, inflation and growth rate of GDP.

Underwriting risk- The underwriting risk emphasizes the efficiency of the insurers' underwriting activity and it is measured through the losses incurred divided by annual premium earned.

Reinsurance dependence- The reinsurance dependence is calculated as ratio of gross written premiums ceded in reinsurance to total assets. Insurance companies reinsure a certain amount of the risk underwritten in order to reduce bankruptcy risk in the case of high losses. Although reinsurance improves the stability of the insurance company through risk dispersion, achievement of solvency requirements, risk profile equilibration and growth of the underwriting capacity, it involves a certain cost.

Solvency ratio: The solvency ratio is calculated as ratio of net assets to net written premiums, and represents a key indicator of the insurer's financial stability.

Technical provision risk: Risk of holding insufficient technical provisions or of holding unjustifiably excessive provisions. Where provisions are set at a lower level than actually required then this could present the company's financial position in a better light than it

actually is. This could result in inappropriate underwriting decisions being made. A technical provision is measured by Safety Ratio (claims outstanding to equity ratio).

Liquidity: the liquidity ratio measures the firm's ability to use its near cash or quick assets to retire its liabilities. Liquidity Ratio = Current Assets / Current Liabilities.

Company size: is computed as logarithm of total assets of the insurance company.

Premium growth: Proxy for premium growth is the percentage increase in gross written premiums (GWP). The equation is expressed as: PG = (GWP (t) – GWP (t-1)) / GWP (t-1).

Growth of real GDP: it is a macroeconomic variable, and it is expected to have a positive influence on the insurers' financial performance, since economic growth improves the living standards and the levels of income, increasing the purchasing power of population. Economic Growth Rates (EGR) = (GDP t−GDP t − 1)/GDP t − 1, where GDP respects real gross domestic product.

Inflation- occurs when the prices of goods and services increase over time. Inflation cannot be measured by an increase in the cost of one product or service, or even several products or services. Rather, inflation is a general increase in the overall price level of the goods and services in the economy. Inflation rates (IR) = $(I_t - I_{t-1})/I_{t-1}$,

The following table 3.1 presents the summary of hypothesized expected sign for the relationship between the explanatory variables (independent variables) and insurance profitability (dependent variable).

Table 3.1 Descripton of the variables and their expected relationship

Variables		Definition/Measure	Expected sign
Dependent	Profitability(ROA)	Net profit before tax/total assets	NA
Independent	Underwriting risk	claim incurred / premium earned	-
	Reinsurance dependence	premium ceded/total asset	-
	Solvency margin(SM)	net assets to net written premiums	+/-
	Company size	Natural logarithm of total assets	+
	Liquidity(LQ)	Current Assets / Current Liabilities	+/-
	Premium growth(PG)	PG = (GWP (t) – GWP (t-1)) / GWP (t-1)	+/-
	Technical provisions	claims outstanding to equity ratio	-
	Inflation(I)	$I = (Inf_t - Inf_{t-1})/Inf_{t-1}$,	-
	Growth rate of GDP	$(GDP_t - GDP_{t-1})/GDP_{t-1}$	+

Source: Compiled by the researcher based on earlier studies

3.4. Conclusions and the relationships between research hypotheses and the data source

This chapter discussed the research approach, design, research methods and different data sources which are used to address the study problem. Based on the underlying principles of research methods and research problem, a mixed method is chosen as appropriate to this research. Finally, summary of hypotheses, variables and data sources are presented in table 3.2 below.

Table 3.2 Link between research hypotheses, variables and the different data sources

Research hypotheses	**Variables**	**Data sources**
Ho1: Underwriting risk has no significant impact on profitability of insurance company's in Ethiopia.	**Dependent variable:** Profitability(ROA)	Insurance specific data from revenue statement and balance sheet held by NBE and the and macroeconomic data from the records held by NBE and MOFED
Ho2: Reinsurance dependence has no significant impact on profitability of insurance company's in Ethiopia.	**Independent variables:**	
Ho3: Solvency ratio has no significant impact on profitability of insurance company's in Ethiopia.	▪ Underwriting risk, ▪ Reinsurance dependence, ▪ solvency margin, ▪ liquidity, ▪ company size	
Ho4: Liquidity has no significant impact on profitability of insurance company's in Ethiopia.		
Ho5: There is no significant effect between growth of gross written premium and insurance company's profitability in Ethiopia.	▪ premium growth, ▪ technical provisions, ▪ growth rate of GDP ▪ inflation	

Ho6: Company size has no significant impact on profitability of insurance company's in Ethiopia.		
Ho7: Technical provision has no significant impact on profitability of insurance company's in Ethiopia.		
Ho8: Gross domestic product has no significant impact on profitability of insurance company's in Ethiopia.		
Ho9: Inflation has no significant impact on profitability of insurance company's in Ethiopia.		

Source: Compiled by the researcher based on earlier studies

CHAPTER FOUR

4. Results and Discussions

The preceding chapter presented the research methods adopted in the study. This chapter analysis the determinants of insurance company's profitability, using the annual balanced panel data, where all the variables are observed for each cross-section and each time period. The study has a time series segment covering from the period 2004 up to 2014 and a cross section segment which considered nine Ethiopian insurance companies. This chapter is organized into four sections. Section one presents model specification & tests for the classical linear regression model assumptions. Section two discusses descriptive statistics and correlation analysis. Section three presents discussion of results and finally, section four is about summary of the main findings.

4.1. Model Specification Test (Fixed effect Versus Random effect)

There are broadly two classes of panel estimator approaches that can be employed in financial research: fixed effects models (FEM) and random effects models (REM) (Brooks, 2008). The choice between both approaches is done by running a Hausman test. To conduct a Hausman test the number of cross section should be greater than the number of coefficients to be estimated. But, in this study the numbers of cross section are nor greater than the number of coefficients to be estimated so it is not possible to conduct a Hausman test. Therefore a fixed cross-sectional effect is specified in the estimation so as to capture unobserved idiosyncratic effects of different insurance companies. In addition, as noted in Gujarati (2003) if T (the number of time series data) is large and N (the number of cross-sectional units) is small, there is likely to be little difference in the values of the parameters estimated by fixed effect model and random effect model. Hence, the choice here is based on computational convenience. On this score, fixed effect model may be preferable than random effect model (Gujarati, 2003). Since the number of

time series (i.e. 11 year) is greater than the number of cross-sectional units (i.e.9 insurance companies).

According to Brooks (2008) and Wooldridge (2006), it is often said that the REM is more appropriate when the entities in the sample can be thought of as having been randomly selected from the population, but a FEM is more plausible when the entities in the sample effectively constitute the entire population/sample frame. Hence, the sample for this study was not selected randomly and equals to the sample frame FEM is appropriate.

4.1.1 Tests for the Classical Linear Regression Model (CLRM) assumptions

This section presents the test for the assumptions of classical linear regression model (CLRM) namely the error have zero mean, hetroskedasity, autocorrelation, normality and multicollinearity.

The errors have zero mean (E(ut) = 0). According to Brooks (2008), if a constant term is included in the regression equation, this assumption will never be violated. Thus, since the regression model used in this study included a constant term, this assumption was not violated.

Homoscedasticity (variance of the errors is constant (Var (ut) = $\sigma^2 < \infty$). This assumption requires that the variance of the errors to be constant. If the errors do not have a constant variance, it is said that the assumption of homoscedasticity has been violated. This violation is termed as heteroscedasticity. In this study white test was used to test for existence of heteroscedasticity across the range of explanatory variables.

Table 4.1 Heteroskedasticity Test: White

F-statistic	0.812644	Prob. F(9,89)	0.6058
Obs*R-squared	7.517776	Prob. Chi-Square(9)	0.5834
Scaled explained SS	11.77801	Prob. Chi-Square(9)	0.2261

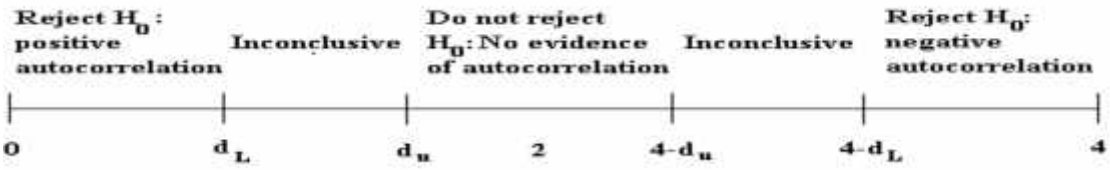
Source: Eview output from data of sample insurance com, 2004 – 2014

In this study as shown in table 4.1, both the F-statistic and Chi-Square versions of the test statistic gave the same conclusion that there is no evidence for the presence of heteroscedasticity, since the p-values were in excess of 0.05. The third version of the test statistic, 'Scaled explained SS', which as the name suggests is based on a normalized version of the explained sum of squares from the auxiliary regression, also gave the same conclusion that there is no evidence for the presence of heteroscedasticity problem, since the p-value was considerably in excess of 0.05.

Covariance between the error terms over time is zero (cov (ui,uj) = 0.) This is an assumption that the errors are linearly independent of one another (uncorrelated with one another). If the errors are correlated with one another, it is stated that they are auto correlated. Brooks (2008) noted that the test for the existence of autocorrelation is made using the Durbin-Watson (DW) test and Breusch-Godfrey test. As far as concerning this paper the researcher used both the Durbin–Watson test and the Breusch-Godfrey test to detect the proplem of autocorrelation.

The DW test uses two critical values ; the upper critical value (dU) and the lower critical value (dL). According to DW test, the null hypothesis of there is no autocorrelation will be rejected if the DW value from the regression is less than DL and greater than 4 minus dL. But the null hypothesis is not rejected if the DW value is between dU, and 4 minus dU. And finally, the test result will be inconclusive if the DW value is between dU and dL, and between 4 minus dU and 4 minus dL. The rejection /non-rejection rule is given by selecting the appropriate region from the following figure:

Rejection and non-rejection regions for Durbin-Watson Test



0	dl=1.357	du= 1.741	1.869	4-du=2.259	4-dl=2.643	4

Source: Eview output and durbin Watson table

The Durbin-Watson test statistic value in the regression result was 1.869. To identify determinants of Ethiopian insurance companies profitability, 99 (9*11) observations were used in the model. Therefore, to test for autocorrelation, the DW test critical values were used. Then relevant critical lower and upper values for the test are dL= 1.357 and dU=1.741 respectively. The values of 4 - dU = 4-1.741=2.259; 4 - dL = 4-1.357=2.643. The Durbin-Watson test statistic of 1.869 is clearly between the upper limit (dU) which is 1.741 and the critical value of 4- dU i.e.2.259 and thus, the null hypothesis of no autocorrelation is within the non- rejection region of the number line and thus there is no evidence for the presence of autocorrelation. Other test for the existence of autocorrelation is by using Breusch-Godfrey test.

Table 4.2 Breusch-Godfrey Serial Correlation LM Test:

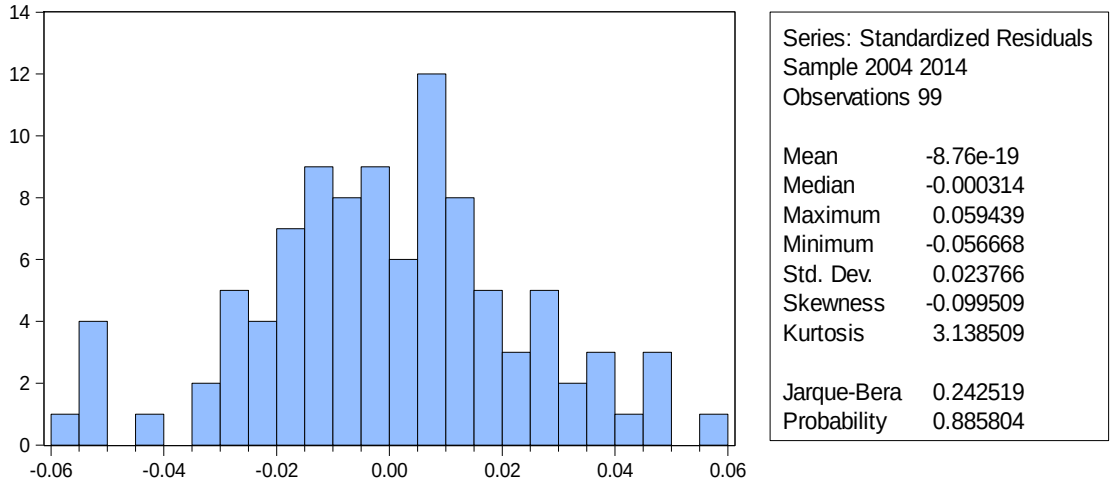
F-statistic	0.848016	Prob. F(1,88)	0.3596
Obs*R-squared	0.944912	Prob. Chi-Square(1)	0.3310

Source: Eview output

Both versions of the test; an *F*-version and a $\chi 2$ version of the test indicate that the null hypothesis of no autocorrelation should not be rejected. The conclusion from both versions of the test in this case is that the null hypothesis of no autocorrelation is not rejected.

Test for Normality-According to Brooks (2008), if the residuals are normally distributed, the histogram should be bell-shaped and the Bera-Jarque statistic would not be significant. This means that the p-value given at the bottom of the normality test screen should be greater than 0.05 to support the null hypothesis of presence of normal distribution at the 5 percent level.

Figure 4.1: Normality Test Result



Source: Eviews output

The above diagram witnesses that normality assumption holds, i.e., the coefficient of kurtosis was close to 3, and the Bera-Jarque statistic has a P-value of 0.89 implying that the data were consistent with a normal distribution assumption. Based on the statistical result, the study failed to reject the null hypothesis of normality at the 5% significance level.

Multicollinearity Test-Multicollinearity in the regression model suggests substantial correlations among independent variables. This phenomenon introduces a problem because the estimates of the sample parameters become inefficient and entail large standard errors, which makes the coefficient values and signs unreliable. In addition, multiple independent variables with high correlation add no additional information to the

model. It also conceals the real impact of each variable on the dependent variable (Anderson et al., 2008). Hair et al. (2006) argued that correlation coefficient below 0.9 may not cause serious multicollinearity problem. In addition, Malhotra(2007) stated that multicollinearity problems exists when the correlation coefficient among variables should be greater than 0.75.

Table 4.3: Correlation Matrix between independent variables

	CACL	CS	CIEP	COE	PG	PCTA	NANPW	GDP	INF
CACL	1.00								
CS	-0.27	1.00							
CIEP	-0.33	0.06	1.00						
COE	-0.48	0.49	0.42	1.00					
PG	-0.10	0.00	-0.03	-0.09	1.00				
PCTA	-0.10	0.51	-0.36	0.23	0.18	1.00			
NANPW	0.68	-0.41	-0.51	-0.71	-0.19	-0.14	1.00		
GDP	0.23	-0.45	-0.03	-0.25	0.11	-0.23	0.20	1.00	
INF	-0.22	0.13	0.17	0.20	0.28	0.12	-0.23	-0.32	1.00

Source: Eviews output

The method used in this study to test the existence of multicollinearity was by checking the Pearson correlation between the independent variables. The correlations between the independent variables are shown in table 4.3 above. All correlation results are below 0.75, which indicates that multicollinearity is not a problem for this study.

In general, all tests illustrated above were testimonials as to the employed model was not sensitive to the problems of violation of the CLRM assumption.

4.2 Descriptive statistics

Table 4.4 presents a summary of the descriptive statistics of the dependent and independent variables for nine insurance companies for a period of eleven years from 2004-2014 with a total of 99 observations. Key figures, including mean, maximum, minimum and standard deviation value were reported.

Table 4.4: Descriptive Statistics of the Variables

Variables	Mean	Std.Dev.	Maximum	Minimum	Pro	Obsv
ROA	0.08	0.05	0.19	-0.10	0.15	99
CACL	1.05	0.31	2.60	0.54	0.00	99
COE	0.77	0.35	1.52	0.11	0.56	99
CIEP	0.63	0.15	0.90	0.13	0.00	99
PCTA	0.16	0.08	0.47	0.03	0.00	99
CS	19.04	1.05	21.55	16.53	0.00	99
NANPW	0.83	0.44	2.46	0.30	0.82	99
PG	0.21	0.21	0.84	-0.52	0.02	99
GDP	0.11	0.01	0.13	0.10	0.26	99
INF	0.16	0.11	0.36	0.03	0.00	99

Source: Financial statements of sampled insurance companies

As indicated in the above table, the profitability measures (ROA) shows that Ethiopian insurance company achieved on average a positive before tax profit over the last eleven years. For the total sample, the mean of ROA was 8% with a maximum of 19% and a minimum of -10%. That means the most profitable insurance company among the sampled earned 19cents of profit before tax for a single birr invested in the assets of the firm. On the other hand, not profitable insurance company of the sampled lost 10cents of profit before tax for each birr invested in the assets of the firm. This clearly illustrates the disparity of rates of return earned by insurance companies'. Regarding the standard deviation, it means the value of ROA deviate from its mean to both sides by 5 percent which indicate there was low variation from the mean. This implies that insurance

companies incurred loss need to optimize the use of their assets to increase the return on their assets.

Concerning the underwriting risk variable, as proxies by losses incurred divided by annual premium earned; the mean of incurred claims to earned premium ratio was 63 percent. This implies that on average, most insurance companies from the sample paid 63 percent loss incurred out of the total premium earned per year which was favorable as compared with acceptable standard of around 70%. The highest ratio of losses incurred to earned premium value was 90 percent which is above the maximum standard of 70%, but the minimum value for a company in a particular year was 13 percent which is far below the maximum standard of 70 percent. This indicates that there is high variation in underwriting performance in insurance industry in Ethiopia during the study period.

The average value of technical provision as measured by the ratio of reserve for claims outstanding to equity was 0.77. This implies that on average, reserve for claims outstanding was 0.77 times equity. The highest claims outstanding to equity for a company in a particular year was 1.52 which is far below the maximum standard of 2.5 times and the minimum ratio was 0.11times.

The average value for solvency ratio as measured by net asset to net written premium was 0.83. The standard deviation of 0.44, maximum of 2.46 and the minimum of 0.30 which is higher than the minimum requirement of 20 percent.

Liquidity measures the ability of insurance companies to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses. The average value of the liquidity measured by current ratio was 105% that was far below the NBE requirement of 150% which showed the sector was operating at a low current ratio position during the study period. The average value 1.05 indicates that for each one birr current liability there was 1.05 birr current asset to meet obligation. The maximum value and the minimum value was 2.60 and 0.54 respectively for the study period. The value of

standard deviation (i.e. 0.31) indicates high dispersion from the mean value of liquidity in the case of Ethiopia insurance companies.

The average value of the growth variable as proxied by change in gross written premium was 21percent. This implies that on average, the insurance companies' gross premium increased by 21 percent over the study period. While the accepted values of premium growth range is between –33% and +33%, the maximum & minimum values of premium growth were 84 &-52 percent respectively.This high increase and decrease in premium growth for a company in a particular year indicates that unstable premium underwritings.

The outputs of the descriptive statistics indicate that the mean of reinsurance dependency as proxied by premium ceded to total asset was 16%.This means that on average 16 percent of gross premium collected as percentage of total asset was ceded to reinsurance which is below the standard of around 30%. The maximum value of premium ceded ratio was 47 percent and a minimum value of 3 percent. The minimum ratio of premium ceded indicate that the lower risk of dependency on reinsurance, but the higher will be the exposure of the capital base to unforeseen above average losses and catastrophe. Further, to check the size of the insurance company and its relationship with profitability, logarithm of total asset is used as proxy. The mean of the logarithm of total assets over the period 2004 to 2014 was 19.04. Size of insurance companies was highly dispersed from its mean value (i.e. 19.04) with the standard deviation of 1.05. The maximum and minimum values were 21.55 and 16.53 respectively. The maximum value indicating the Ethiopian Insurance Corporation (EIC) and the minimum value was some of privately owned insurance companies such as Global and Nice among the sampled insurance companies.

Regarding GDP, the mean value of real GDP growth rate was 11% indicating the average real growth rate of the country's economy over the past 11 years. The maximum growth of the economy was recorded in the year 2005 (i.e. 12.6%) and the minimum was in the

year 2013 (i.e. 9.8%). The country has been recording double digit growth rate with little dispersion towards the average over the period under study with the standard deviation of one percent. This indicates that economic growth in Ethiopia during the period of 2004 to 2014 remains stable.

Finally, othe variable employed in this study, general inflation had rate (i.e. 16.2%) of the country on average over the past eleven years was more than the average GDP. The maximum inflation was recorded in the year 2009 (i.e. 36.4%) and the minimum was in the year 2010 (i.e. 2.8%). The rate of inflation was highly dispersed over the periods under study towards its mean with standard deviation of 11 %. This implies that inflation rate in Ethiopia during the study period was somewhat unstable.

4.2.1 Correlation Analysis

Correlation is a way to index the degree to which two or more variables are associated with or related to each other. The most widely used bi-variant correlation statistics is the Pearson product-movement coefficient, commonly called the Pearson correlation which is used in this study.

According to Brooks (2008), if it is stated that y and x are correlated, it means that y and x are being treated in a completely symmetrical way. Thus, it is not implied that changes in x cause changes in y, or indeed that changes in y cause changes in x rather, it is simply stated that there is evidence for a linear relationship between the two variables, and that movements in the two are on average related to an extent given by the correlation coefficient.

Table 4.5 below provides the Pearson's correlation matrix for the variables used in the analysis.

Table 4.5 Correlation matrix

Correlation Probability	ROA	CIEP	COE	CACL	PCTA	NANPW	CS	PG	GDP	INF
ROA	1.000 -----									
CIEP	-0.403 0.000	1.000 -----								
COE	-0.056 0.581	0.424 0.000	1.000 -----							
CACL	-0.012 0.909	-0.335 0.001	-0.485 0.000	1.000 -----						
PCTA	0.380 0.000	-0.364 0.000	0.227 0.024	-0.101 0.320	1.000 -----					
NANPW	-0.104 0.305	-0.512 0.000	-0.708 0.000	0.684 0.000	-0.137 0.177	1.000 -----				
CS	0.547 0.000	0.060 0.555	0.490 0.000	-0.270 0.007	0.514 0.000	-0.408 0.000	1.000 -----			
PG	0.212 0.035	-0.032 0.755	-0.085 0.402	-0.104 0.308	0.181 0.073	-0.193 0.055	0.003 0.978	1.000 -----		
GDP	-0.483 0.000	-0.034 0.738	-0.246 0.014	0.228 0.023	-0.226 0.025	0.200 0.048	-0.454 0.000	0.113 0.267	1.000 -----	
INF	0.057 0.574	0.167 0.099	0.203 0.044	-0.222 0.028	0.118 0.246	-0.231 0.021	0.125 0.217	0.280 0.005	-0.325 0.001	1.000 -----

Source: Financial statements of sampled insurance companies

As can be seen from the above table,the correlation result between underwriting risk (claims incurred to earned premium) had negative correlation with return on equity and significantly correlated at 1 percent significant level with a coefficient of -0.40. Besides, claims outstanding to equity, current ratio and net asset to net written premium had

negative relationship with return on equity with a coefficient of -0.06, -0.01 and -0.10 respectively. This indicates that as a ratio of technical provision, liquidity and solvency increases, profitability moves to the opposite direction, but the negative relationship are not statistically different from zero. In contrary to the above explained variables, the Pearson correlation coefficients of premium growth 0.21, reinsurance dependency 0.38, and company size 0.55 had positive relationship with return on equity at five percent, 1 percent and 1 percent significance level respectively. Further, there was negative correlation between macro economic variable gross domestic product with return on equity with a coefficient of -0.48 at one percent significance level and contrary, association between inflation and return on equity was positive but statistically not different from zero.

4.3 Regression Results and Discussion

This section presents the empirical findings from the econometric output and interview results on determinants of insurance companies' profitability in Ethiopia. Table 4.6 below reports regression results between the dependent variable (ROA) and explanatory variables. Under the following regression outputs the beta coefficient may be negative or positive; beta indicates that each variable's level of influence on the dependent variable. P-value indicates at what percentage or precession level of each variable is significant. The R-squared value measures how well the regression model explains the actual variations in the dependent variable (Brooks, 2008). R-squared statistics and the adjusted-R squared statistics of the model was 81% and 77% respectively. The adjusted R^2 value 77% indicates the total variability of determinant of insurance companies profitability was explained by the variables in the model. Thus these variables collectively, are good explanatory variables to identify the determinant of insurance companies profitability in Ethiopia. The regression F-statistic (20.4) and the p-value of zero attached to the test statistic reveal that the null hypothesis that all of the coefficients are jointly zero should

be rejected. Thus, it implies that the independent variables in the model were able to explain variations in the dependent variable.

Table 4.6 Regression Results for determinants of Ethiopian insurance companies' profitability

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.020062	0.188358	-0.106511	0.9154
CIEP	-0.230835	0.031399	-7.351733	0.0000***
COE	-0.057701	0.014859	-3.883378	0.0002***
CACL	0.024973	0.012509	1.996438	0.0492**
PCTA	-0.052605	0.057185	-0.919907	0.3604
NANPW	-0.084780	0.018446	-4.596187	0.0000***
CS	0.029349	0.007005	4.189974	0.0001***
PG	0.034256	0.018691	1.832796	0.0705*
GDP	-1.970838	0.564583	-3.490786	0.0008***
INF	-0.040773	0.029050	-1.403573	0.1643
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.810840	Durbin-Watson stat		1.869868
Adjusted R-squared	0.771140			
F-statistic	20.42411			
Prob(F-statistic)	0.000000			

***, **, * indicates significant at 1%, 5%, and 10% significance level respectively.

Source: Financial statements of sampled insurance companies and own computation

Table 4.6 above shows that all explanatory variables except two variables i.e. premium ceded to total asset (reinsurance dependency) and inflation were significant impact on profitability. Among the significant variables, underwriting risk ratio (claim incurred to earned premium), technical provision ratio (claims outstanding to equity), solvency ratio, company size and real GDP were significant at 1% significance level since the p-value for those variables were 0.000. Whereas variables like liquidity and premium growth were significant at 5% and 10% significance level respectively.

Regarding the coefficient of explanatory variables; underwriting risk ratio, technical provisions ratio, reinsurance dependence, solvency ratio, gross domestic products and inflation were negative against profitability as far as the coefficients for those variables were -0.232, -0.058, -0.053, -0.085, -1.971 and -0.041 respectively. On the other hand, variables like premium growth, company size and liquidity had a positive relationship with profitability as far as their respective coefficients were 0.034, 0.029 and 0.025 respectively.

Regarding the interview results, in depth interviews were conducted with nine managers (three managers from Ethiopian Insurance Corporation and six from two private insurance companies are interviewed by using unstructured face to-face interviews. The nine managers interviewed were from finance, underwriting and reinsurance departments. The interview questions were fully unstructured and focused on the identification of determinants of Ethiopian insurance companies profitability in general. More specifically, the interview questions were also tried to identify how those factors can influence profitability, the major determinants among the influential factors, mitigation strategy taken by the insurance to reduce the negative influence of controllable factors and their general opinion regarding the issue of insurance profitability.

On the question that focuses on the determinants of profitability, respondents offered various factors, especially since the question was open ended. A number of factors were mentioned by particular interviewees about factors affecting insurers'

profitability.Despite varying responses, however, the most common determinants of profitability includes variables such as underwriting and liability, investment or market risk, reinsurance, lack of innovative products or investment opportunity and fear of risky investments by insurance company themselves, technical reserve, liquidity, industry effect (price cutting), number of claims, moral hazard, quality of underwriter, size, contagion and related part, operational, technological risk, legal and regulatory, gross domestic products, interest rate change and inflation.

The profitability determinants are individually discussed in the next Paragraph by referring regression result of table 4.6, interview results and previous empirical studies.

Underwriting risk:- The underwriting risk emphasizes the efficiency of the insurer's underwriting activity and the exposure to financial loss resulting from the selection and approval of risks to be insured. It is a risk of losses from underpriced products, insufficient volume of premium, improper underwriting controls, the development of new products that are not properly priced.The coefficient of underwriting which is measured by claim incurred to earned premium ratio was negative and statistically significant at 1% significance level (p-value=0). The results indicate that low underwriting risk produce positive effect on profitability. It implies that higher underwriting risk increases the operating ratio, indicating adverse effect on the firm's profitability.This finding is consistent with previous studies Ying Lee (2014), Burca and Batrinca (2014). They concluded that underwriting risk has a negative influence on the insurer's profitability, since taking an excessive underwriting risk can affect the company's stability through higher expenses. The finding is consistent with the interview results suggested that underwriting is a fundamental objective to produce profitable book of business. The interviewees indicated that the major causes of underwriting risk are lack of adequate pre risk evaluation and selection, difficulty of standard criteria for risk evaluation; claims handling practice are not up to desirable practice level, most branch managers are production oriented instead of profit oriented. Other basic the reason is moral hazard; the

possibility that insured's may deliberately cause an insured event or pretend that such an event occurred to obtain insurance payments. Thus, this study supports the hypothesis that significant negative impact of underwriting risk on insurance companies' profitability.

Reinsurance dependence:- Insurance companies usually take out reinsurance cover to stabilise earnings, increase underwriting capacity and provide protection against catastrophic losses, nevertheless it involves a certain costs.The coefficient of reinsurance dependence which is measured as ratio of premiums ceded in reinsurance to total asset was negative, but statistically insignificant even at 10% significance level (p-value=0.3604) indicating that its influence is negligible.The insignificant parameter indicates that the reinsurance dependence does not affect Ethiopian insurance profitability. Referring to previous studies, the results concerning reinsurance dependence are mixed. Shiu (2014) found a negative relationship between reinsurance dependence and insurers profitability, but it is not significant which is consistent with this study. However, Ying lee (2014) found a significant negative relationship between reinsurance dependence and insurance profits.

The interview result pointed out mixed idea about the impact of reinsurance dependence on Ethiopian insurance companies profitability. According to the interviewees, dependency on reinsurance has important for insurance companies' profitability due to protection against exposure to large or accumulation of losses, additional capacity for insuring big risk, the higher the premium ceded the higher is the reinsurance coverage, but determining an appropriate retention level is important for insurance companies. The negative side of reinsurance dependence on Ethiopian insurance companies is outflow of foreign exchange to reinsurance business which have a negative influence over the insurance industry and economy of the country. To reduce the outflow of foreign exchange, National Bank of Ethiopia made new directives (SRB/1/2014) about reinsurance company establishment in Ethiopia. The objective of this directive is to

promote a financial resource mobilization and reduces cost related to cross-border reinsurance transactions.Therefore, conclusion about the impact of reinsurance dependence on insurers' profitability remains ambiguous and further research is required. Thus this study unable to reject the null hypothesis which states there is no impact of reinsurance dependence on Ethiopian insurance companies profitability.

Liquidity:-.Liquidity is the availability of funds, or assurance that funds will be available, to honor all cash outflow commitments (both on and off-balance sheet) as they fall due. More than any other type of financial institution, insurance companies are subject to unpredictable but significant demands for cash. When a disaster such as a hurricane or earthquake occurs, insurers must be able to start making payouts very quickly in order to avoid major hardship to policyholders. The regression results in this research indicate that the relation between liquidity and profitability is positive and significant at 5% significancy level (p-value= 0.0492). This result implies that more liquid insurance have higher profitability, all other things held constant, if current assets pay insurance firm's current liabilities, it will have direct positive impact on profitability. Regarding the impact of liquidity on profitability, the interviewees revealed that insurance firm in nature must be liquid to meet claims obligation, to avoid loss of business and damage to public image. According to the interviewees major causes of liquidity risk are sometimes premium is not collected as expected, when the company has no clear cash management policies, lower rate of interest at bank for time deposit. The current study is consistent with the previous emperical findings; (Amal, 2012 and Chen & Wong, 2004).They suggested that the insurance companies should increase the current assets and decrease current liabilities because, companies with a lower level of liquidity will have more cash constraints and will have more difficulties in repaying to policyholders when loss occurred. Since liquidity measures the ability of insurance companies to fulfill their immediate commitments to policyholders and other creditors without having to increase profits on underwriting and investment activities and liquidate

financial assets. Consistent with this, National Bank of Ethiopia made directive No SIB/25/2004. According to this directive, insurance companies should keep amount of liquid cash (i.e. 65%) of total admitted asset to meet immediate commitments to policyholders.If the insurance companies meets this commitment, they will become sound and increase customer satisfaction and helps more premium collection from customers and results increase in profitability. Thus, this study support the hypothesis that liquidity has positive impact on profitability of insurance companies in Ethiopia, as it is statistically significant.

Technical provision risk:- Technical provision risk is that the companies' liability to policyholders could be understated. The high level of technical provision risk indicators may signal a bad use of capital resources or failure to generate its portfolio. An insurance company is obliged to determine, at the end of accounting period, the technical reserve for settling liabilities from insurance contracts and they serve for settling liabilities set forth in the issued insurance policies. Technical reserve is generated from the technical premium funds. Their level is determined by actuarial methods and it depends on future liabilities and structure of insurance portfolio. Outstanding claims reserve is considered riskier than ordinary long-term corporate debt since neither the magnitude nor the timing of the cash flows is known.The regression result of this study show that the coefficient of technical provision which is measured by claims outstanding to equity was negative and statistically significant at 1% significance level (p-value=0.0002). The result indicates that companies holding insufficient provision for outstanding will have negative impact on profitability because understatement can result in the company being unable to discharge its entire obligation to the public. According to the interview results, the major causes of inadequate provision problems are lack of optional reserve arrangement such as claims fluctuation reserve, absence of reserve for man -made or moral hazard and this may lead to overstatement of current year's profit but actually not. The result was consistent with Shiu (2014) in UK found that negative but statistically insignificant

relationship between technical provision and profitability of firms. Therefore, current study supports the hypothesis a significant negative impact of technical provision risk on insurance company's profitability.

Solvency ratio (Capital Adequacy):- Solvency ratio is one of the indicators of financial soundness. Insurance companies with higher solvency ratio are considered to be more sound financially. Financially sound insurance companies are better able to attract prospective policyholders and are better able to adhere to the specified underwriting guidelines. By adhering to the guidelines, the insurance companies can expect a better underwriting result. The coefficient of solvency ratio which is measured by net assets to net written premiums was negative and statistically significant at 1% significance level (p-value=0). This means that the more solvent a company is (i.e. more equity or less underwrite premium), the less profitability it will have.The result indicates that insurance companies increase underwrite premium to increase the underwriting profit without increasing their capital ,which may results an excess of liabilities over assets, sometimes referred to as capital deficit. It follows then that the smaller the equity base in relation to the liabilities of the company, the lower the company's ability to absorb unforeseen shocks and unable to guarantee repayment to all claimants. The interview result suggested that adequate capital is the principal element to kick of business, insure continuous operation, sustainability and growth of the business and to increase retention capacity of the insurers. While underwrite premium increase, insurance companies in Ethiopia due to lack of capital adequacy, they may not retain premium collected from mega projects and they may cede high percentage to cross- border reinsurers. To avoid this problem, NBE made new directive (SIB/34/2014). According to this directine "SIB/34/2014" about the capital increments, all insurers existing or under formation insurers should have to increase their capital for both life and general from (3m &4m to 15m & 60m) respectively. Durinck et al. (1997) found that companies are required to use some degree of liabilities to finance their activities if they want to increase profit.

Assuming that the company is in its first stage, the manager will choose to invest using the retained earnings in order to increase profitability. This means that the internal financing will continue until the retained earnings reach the amount of zero the faster the growth, the more external financing firms will use. However, this increase in external financing is mainly through an increase in the liabilities, as the increase in external equity financing was not found significant. As a company grows, the solvency ratio will thus become smaller.Therefore one can conclude that solvency ratio was a key driver of profitability of insurance companies in Ethiopia.

Company size:-Regarding the variable size of the insurer it can be stated that, it is much harder for smaller companies to write insurance premiums than for bigger ones since smaller company cannot secure their clients in the cases of aggregate uncertainty or big catastrophe event. Larger insurers can achieve operating cost efficiencies through increasing output i.e. they are able to realize economies of scale especially in terms of labor costs, which is the most important factor for delivering insurance services. Company size is computed as logarithm of total assets of the insurance company. The regression result of this study show that the variable size is positively related to profitability and statistically significant at the 1% level of significance (p-value=0.0001).This indicates that profitability of large insurance companies is better than small size companies. Profitability is likely to increase in size, because large insurance companies normally have greater capacity for dealing with adverse market fluctuations than small insurance companies and have more economies of scale in terms of the unit cost, which is the most significant production factor for delivering insurance services, complex information systems and a better expenses management. The finding of this study is congruent with, Malik (2011), Chen and Wong (2004) and Shiu (2014).They revealed that large corporate size enables to effectively diversify their assumed risks and respond more quickly to changes in market conditions. An increase in total assets such as the establishment of more branches and the adoption of new technologies enables an

insurer to underwrite more policies which may increase the underwriting profit and the total net profit. Hence, this study supports the hypothesis that firm size is a significant positive determinant of insurers profitability in Ethiopia.

Premium growth:-Premium growth measures the rate of market penetration. Concerning the premium growth, the regression results in this research imply that the relation between premium growth and profitability is positive and significant at 10% significancy level (p-value= 0.0909).The positive coefficient of growth in writing premium indicates a positive relationship between growth in writing premium and profitability. It implies that Insurance companies underwrite more premium over the years have better chance of being profitable for the reason that they gain return from premium collected when the excessive attention on marketing to grow premiums with a proportionate allocation of resources towards the management of their investment portfolios is given. The result of the study supports the findings of Chen and Wong (2004), but their found is not significantly different from zero. This result clearly supports hypothesis that premium growth has a positive and significant impact on profitability of insurance companies in Ethiopia.

***Gross domestic product*: -** Gross domestic product is the market value of all finished goods and services produced in a country within a specified period, mostly one year. It is a gauge of economic recession and recovery and an economy's general monetary ability to address externalities. Oshinloye et al (2009) showed that no country can experience meaningful development without the presence of formidable insurance industry, thereby making insurance business in any nation indispensable irrespective of its quota to the gross domestic product. According to Ezirim (2002), insurance industry is perceived as an indispensable tool of economic progress, growth and development. Growth rate of GDP reflects economic activity as well as level of economic development and as such affect the various factors related to the supply and demand for insurance products and services. If GDP grows, the likelihood of selling insurance policies also grows and

insurers are likely to benefit from that in form of higher profits. However, result of this study shows that a negative coefficient of -1.970 and it was statistically significant at 1% significance level (P-value 0.0008) indicating that growth in economic condition measured in terms of gross domestic product have negative impact on profitability of Ethiopian insurers for the study period. The finding is consistent with the interview results suggests that while the country's continuous economic growth, the growth of insurance industry in Ethiopia is not good, because the level of awareness about insurance in the populace is very low. Other basic the reason behind this result is while economic growth increases activities like automobile insurance, home owner insurance, worker compensations; the demand for insurance coverage for such activities are relatively inelastic. Lack of innovative products or investment opportunity and fear of risky investments by insurance company themselves, industry effect (price cutting) and moral hazard are also other reasons for this result. The finding of this study is congruent with (Naveed, 2008), (Maria, 2014), and Lee (2014). But their finding was not significantly different from zero. The current study found that economic growth is not positively affect the insurer's profitability in Ethiopia and thus the conclusion about the impact of Ethiopian economic growth on insurers' profitability remains ambiguous and further research is required.

Inflation:-The inflation could affect insurance companies' profitability influencing both their liabilities and assets. In expectation of inflation, claim payments increases as well as reserves that are required in anticipation of the higher claims, consequently reducing technical result and profitability. The coefficient of inflation was negative, but it was not statistically significant, (p-values 0. 1643), thus the effect of inflation on Ethiopian insurers' profitability is not significant. The result suggested that inflation is not a determinant of insurers' profitability in Ethiopia. The interview result reveals inverse to regression results. According to the interviewees, inflation has negative impact on insurers profitability because inflation affects results of underwriting premiums, since

policies are typically not adjusted periodically. For instance, the price of automobiles or spare parts increased from time to time, but the price of rate chart is not adjusted for underwrite premiums as a price increased, which resulting in costs increased faster than revenues.Negative influences of inflation on insurers' profitability was confirmed in empirical studies by Shiu (2014), Pervan (2012) and Ying Lee (2014), but are not significantly different from zero.

4.4 Summary of main findings

Generally this chapter presented the results of the structured record reviews and in depth interview and then discussed the analysis of these results jointly. From the above data analysis, Ethiopian insurers' profitability is highly affected by all variables included in this study except reinsurance dependency and inflation. The findings of the study showed that underwriting risk, technical provision and solvency ratio have statistically significant and negative relationship with insurers' profitability. However, reinsurance dependence has negative but insignificant relationship with profitability. On the other hand, variables like liquidity, company size and premium growth have a positive and statistically significant relationship with insurers' profitability. In addition, economic growth rate has significant influence on profitability whereas inflation has insignificant influence on insurers' profitability. The next chapter will discuss the conclusions and recommendations of the study.

CHAPTER FIVE

5. Conclusions and Recommendation

The preceding chapter presented the results and discussion, while this chapter deals with conclusions and recommendations based on the findings of the study. Accordingly this chapter is organized into two subsections. Section 5.1 presents the conclusions and section 5.2 presents the recommendations.

5.1. Conclusions

Insurance plays a significant role in a country's economic growth and offers financial protection to an individual or firm against monetary losses suffered from unforeseen circumstances. Therefore, in order to survive negative shocks and maintain a good financial stability, it is important to identify the determinants that mostly influence the insurers' profitability. To this end, this study aimed at examining possible factors i.e. the main insurance-specific and macro-economic factors that can affect Ethiopian insurance profitability and to what extent these determinants exert impact on Ethiopian insurers profitability. Mixed method research approach, particularly structured review of insurers' documents and in-depth interviews are used to achieve the stated objective. More specifically, the analyses are performed using data derived from the financial statements of insurance companies in Ethiopia during eleven-year period from 2004-2014 by descriptive statistics and multiple regressions and in-depth interview with company managers. Nine insurance companies are selected as a sample from seventeen insurance companies currently operating in Ethiopia. Fixed effect model is used to estimate the regression equation. In the study underwriting risk, reinsurance dependence, solvency ratio (capital adequacy), technical provision, liquidity, company size, premium growth, real GDP and inflation are considered as independent variables while return on asset is considered as dependent variables. The empirical findings on the effect of insurance profitability in Ethiopia for the sample suggested the following conclusions.

The results of the regression analysis showed negative relationship between the ratio of underwriting risk (claims incurred to earned premium) and profitability with strong statistical significance. This shows that as minimizing underwriting risk it will certainly improve the insurers' profitability since taking an excessive underwriting risk can affect the company's stability through higher expenses. Again, the result showed a negative relationship between reinsurance dependence and technical provision with profitability. This indicates that as minimizing dependency on reinsurers or decreasing amount of premium ceded will result in increased profitability. A negative relationship between profitability and technical provision ratio implies inadequate provision hold decrease insurance companies' ability to pay claims and will result unable an insurer to underwrite more policies which may decrease the underwriting profit and the total net profit. A positive relationship between profitability and liquidity implies a good liquidity position increases insurance companies' ability to pay claims incurred and will have positive impact on insurers' profitability. The ratio of net asset to net written premium has a negative impact on ROA with statistical significance. This implies that higher level of solvency ratio results in lower profit. Regarding premium growth, results in this study revealed that premium growth has a positive and significant effect on profitability. This implies that insurance companies underwrite more premium over the years have better chance of being profitable when the underwriters are cost conscious and profit oriented. The logarithm of total assets has a positive impact on profitability with strong significance coefficient. This indicates that as larger insurance companies of the country experience more significant increases in profitability through economies of scale. The economic growth rate has significant and negative influence on insurers' profitability which is inconsistency with the theory of if economy grows, the likelihood of selling insurance policies also grows and insurers are likely to benefit from that in form of higher profits. On the other hand, inflation has little or no impact on the profitability of Ethiopian companies, since inflation was not significant even at 10% significance level.

In general, underwriting risk, technical provision, liquidity, company size, solvency ratio, premium growth and gross domestic products are significant key drivers of profitability of insurance companies in Ethiopia whereas reinsurance dependence and inflation are insignificant determinant of insurance companies' profitability in Ethiopia.

5.2 Recommendations

On the basis of the findings of this study, the researcher has drawn the following recommendations:

- Since underwriting is basic activity for insurance industry in Ethiopia, the insurers should reduce the impact of underwriting risk (amount of losses) by improving their underwriting performance through techniques like product selections, increase claims handling practice and gathering sufficient information or detail about subject matter of insurance before agreement with the insured.
- The sector was operating at low liquidity position; therefore the insurers' should closely review liquidity risk and device the strategy like liquidity management program and cash flow forecast to reduce the high liquidity risk.
- As far as absence of secondary market, lack of innovative products, industry competition, price cutting and fear of risky investments by insurers themselves, moral hazards are also factors that can affect Ethiopian insurance profitability negatively; insurers should try their best in order to provide new product developments, new insurance services and to participate in risky investment areas which may in turn increases their profitability significantly.
- Finally, the study sought to investigate the determinant of insurers' profitability in Ethiopia. However, the variables used in the statistical analysis did not include all factors that can affect Ethiopian insurers' profitability. Thus, future research shall conduct research on the issue like impact of government regulation policy and other directives and non- financial determinant of insurance profitability such as management quality, efficiency and productivity.

References

Abdelkader, D. (2014), determinants of performance of insurance companies in Tunisia, International Journal of Innovation and Applied Studies

Abebaw, Y. (2014), determinants of financial performance: a study on selected micro finance institutions in Ethiopia, Jimma University

Amdemikael, A. (2012), factors affecting profitability: An empirical study on Ethiopian Banking Industry, MSc thesis, Addis Ababa University.

Adams, M. & Buckle, M. (2000), the determinants of operational performance in the Bermuda insurance market, Working Paper, European Business Management School, University of Wales

Altai, Y. (2005), Bank Ownership and Efficiency, Journal of Money, Credit and Banking

Amal, A. (2012), Factors Affecting the Financial Performance of Jordanian Insurance Companies Listed at Amman Stock Exchange, Journal of Management Research Vol.4

Ana, M. & Ghiorghe, B. (2014), determinants of Financial Performance in the Romanian Insurance Market, International Journal of Academic Research in Accounting, Finance and Management Sciences Vol. 4

Anderson, D. and Williams, T. (2008), Statistics for business and economics, Thomson South-Western

Barth, M. & Eckles, L. (2009), an empirical investigation of the effect of growth on short term changes in loss ratios. Journal of Risk and Insurance

Belayneh, H. (2011), Determinants of Commercial Banks Profitability: An Empirical Study on Ethiopian Commercial Banks, AAU

Boadi, A. & Victor, C. (2013), determinants of profitability of insurance firms in Ghana, International Journal of Business and Social Research (IJBSR), Volume -3,

Bodla, B. and Garg, P. (2003), Insurance Fundamentals, Environment and Procedures, Deep & Deep Publications Pvt. Ltd

Brooks, C (2008), Introductory Econometrics for Finance, 2nd edn, Cambridge University Press, New York.

Browne, M.& Hoyt, R. (1999), Economic and market predictors of insolvencies in the life-health insurance industry, The Journal of Risk and Insurance

Charumathi (2012), Determinants of Profitability of Indian Life Insurers, Proceedings of the World Congress on Engineering Vol I

Charumathi (2013), the determinants of solvency margin of Indian general insurers

Chen, L. (2014), effects of firm specific factors and macroeconomics on profitability of property-liability insurance industry in Taiwan, Asian Economic and Financial Review

Chen, R., & Wong, K., (2004), the determinants of financial health of Asian insurance companies. *Journal of Risk and Insurance*

Creswell, W. (2003, Research design, qualitative, quantitative and mixed methods approaches, 2nd edn, Sage Publications, California.

Creswell, W. (2009, Research design: quantitative, qualitative and mixed methods approaches, 3rd edn, Sage Publications, California.

Cummins, J. Dionne, G., Gagne, R., & Nouira, A. (2008), the costs and benefits of reinsurance, Working Paper, Temple University

Cummins, D. (1994), Capital structure and the cost of equity capital in the property-liability insurance industry

Curak M., Pervan, M. & Poposki, K. (2012), how well insurance companies in Macedonia perform? Researches in Applied Economics and Management - Volume I

Daniel M. & Tilahun A (2013), firm specific factors that determine insurance companies' performance in Ethiopia, European Scientific Journal vol.9

Das. S., Nigel D. and Richard P., (2003, Insurance and Issues in Financial Soundness, International Monetary Fund

Daykin, C., Pentikäinen, T.& Pesonen, M. (1994), Practical risk theory for actuaries, U.K

Davidson, P. (2010), Black swans and Knight epistemological uncertainty, concepts and underlying behavior and post Walrasian Theory

Durinck E., Laveren E. and Lybaert N. (1997), the impact of sales growth above a sustainable level on the financing choice of Belgian Industrial

Easterby, M. Thorpe, R. and Lowe, A. (1991, Management Research, an Introduction, London, Sage Publications Incorporation

Edwin, J., Martin J., Stephen J. and William N. (1997), Modern portfolio theory, Journal of Banking & Finance

Eldabi, T. (2002, Quantitative and qualitative Decision Making Methods in Simulation Modeling, Management Decision, 40(1):64-73

Ernst & Young (2010), analysis and valuation of insurance companies

Ezirim, C. (2002), Contending with the Challenges and Imperatives of Marketing Insurance Services in a Sub-Sahara African Country: The case of Nigeria". Journal of Economics and Business Sciences, Vol. No

Fama, F. and Jensen, C. (1983), Agency problems and residual claims, Journal of Law and Economics

Fowler, FJ. (1986), Survey research methods, 3rd edn, Sage Publications, USA

Frederic, S. Stanley, G. and Eakins,(2009),financial Markets and Institutions, 7th edition

Gill, A. and Mathur, N. (2011), factors that affect potential growth of Canadian firms, journal of applied finance & banking

Grose, V. (1992) ,Risk Management from a technical Perceptive: The Geneva Papers on Risk Insurance Vol. 12

Gujarat, N. (2003) ,Basic Econometric, 4th edn, USA: McGraw–Hill

Hamdan, A. (2008), thesis Determinants of insurance companies' profitability in UAE.

Haiss, P. and Sumegi, K. (2008), The Relationship of Insurance and Economic Growth in Europe, A Theoretical and Empirical Analysis

Hair, J. and Black, W. (2006), Multivariate data analysis, New York, Prentice Hall

Hifza, M. (2011), determinants of insurance companies' profitability: an analysis of insurance sector of Pakistan, Academic Research International, Volume 1

Hoyt, R. and Powell, S. (2006), Assessing Financial Performance in Medical Professional Liability Insurance, Journal of Insurance Regulation

Holzheu, T. (2006), Measuring Underwriting Profitability of the Non-Life Insurance Industry, Swiss RE Sigma, No.3 12.

Ikonic, D., Arsic N. and Miloševic, S. (2011), Growth Potential and Profitability Analysis of Insurance Companies in the Republic of Serbia, Chinese Business Review

Irukwu J.O (1994) Insurance Management in Africa Cayton press (W.A) ltd, Ibadan, Nigeria

Ivamy (1993) General Principles of Insurance Law; Butter Worths London, Dublin and Ediniborough , 6th Edition.

Karthik, M. & Balamurugan, M. (2011) ,Performance of Insurance Industry in India,

Kearney, S. (2010), Measuring Insurer Profitability, the Institutes, American Institute for Chartered Property Casualty Underwriters

Kerchar, M. (2008), Philosophical paradigms, inquiry strategies and knowledge claims: applying the principles of research design and conduct to taxation', E-Journal of Tax Research,

Khan, S, Bilal, J. and Tufail, S. (2013), Determinants of profitability panel data evidence from insurance sector of Pakistan, Elixir Fin. Mgmt.(Elixir International Journal)

Kim, A. (1995, the use of event history Analysis to examine insurers insolvencies, journal of risk and Insurance

Kihara, M. (2012), the Importance of Insurance its challenges and solutions

Kozak (2011), determinants of profitability of non-life insurance companies in Poland during integration with the european financial system

Koul, L. (2006), Method of educational research, Vikas Publishing House, New Delhi.

Lee, .H. (2012), An analysis of reinsurance and firm performance, Evidence from the Taiwan property-liability insurance industry, The Geneva Papers on Risk and Insurance-Issues and Practice

Liargovas,p, & Skandalis,k. (2008). Factor affecting firms financial performance The Case of Greece, University of Peloponnese.

Lowe (1999), Management Research, An introduction, Sage publications Ltd London

Malhotra, N. (2007), Marketing research; an applied orientation, 5th edition,

Markowitz, H (1952), modern portfolio theory and investment analysis, the journal of finance

Mulugeta, A. (2007), Insurance in Ethiopia, Historical Development

Mwangi, F.(2013), the effect of macroeconomic variables on financial performance of Aviation Industry in Kenya

Oshinloye, M. O. (2009), the impact of Insurance Activities on Economic

Outreville, F. (1990), the economic significance of insurance markets in developing countries Risk Insurer

National Bank of Ethiopia, Annual Report of National Bank of Ethiopia. Available from: www.nbe.org.et [Accessed 10 December 2014

Nassim N.Taleb, (2008), the Black Swan theory and decision analysis

Naveed, A., Zulfqar A., Ahmad, U. (2011), Determinants of Performance, A Case Of Life Insurance Sector of Pakistan, International Research Journal of Finance and Economics, Eurojournals Publishing

Nachamias, D. and Frankfort, C. (1996), Research Methods in the Social Sciences (5th Edition)

NAIC (2001), Insurance Regulatory Information System, Property/casualty

Nguyen, K. M. (2006), Financial Management and Profitability of Small and Medium Enterprises, Southern Cross University Thesis Submitted to the Graduate College

of Management in partial fulfillment of requirements for the degree of Doctor of business Administration

Norman J. (2000), Insurance Theory Concepts, University of Caroline. Arnold School of Public Health Administration

Pandey, I.M. (1980) ,Concept of earning power. Accounting Journal

Pal, V.and Malik, N.S. (2007), A Multivariate Analysis of the Financial Characteristics of commercial banks in India" The ICFAI Journal of Bank Management, Vol. V1, No.3

Pearce, D. K. &, Roley, R. V. (1988), Firm characteristics, unanticipated Inflation, and stock returns, The Journal of Finance

Philip, H. and Mike, A (1999), Firm Size and Growth in the UK Insurance Industry

Rao, D. T. (1998), Operational Efficiency of Life Insurance Corporation of India, Journal of Indian School of Political Economy, Vol.10, No. 3,

Rebao, C and Ann, W (2004), Determinants of Financial Health of Asian Insurance Companies, the Journal of Risk and Insurance Volume 71

Ross, S. (1976), the arbitrage theory of capital asset pricing, Journal of Economic theory

Rudolf, E. (2001), Profitability of the Non-Life Insurance Industry, its Back- to-Basics Time, Swiss RE, Sigma, No.5

Sangmi, M. (2002), Profitability Management in Commercial Banks: An Exploratory Study, The Business Review, Vol.8, No.1

Shields,N. (2013), A Playbook for Research Methods: Integrating Conceptual Frameworks and Project Management

Silberzath, P. (2013), Risk, uncertainty and Black Swans theoretical differences and practical implications

Singh, K. Y. (2006), Fundamentals of research methodology and statistics, new age international (p) limited, New Delhi

Skipper, Jr., Harold D., (2001), Insurance in the General Agreement on Trade in Services, AEI Press Washington USA P 1-84.

Swiss, R. (2008), Profitability of Non-Life Insurance Industry, Egypt,

Verma, V. (2003), Building Profitability in Auto Insurance, the Journal

Waheed, A. (2011), Financial Performance of Pakistan Insurance Industry in Global Scenario, Far East Journal of Psychology and Business Vol 3

Ward, D. and Ralf Z. (2000), Does insurance promote economic growth? evidence from OECD countries". journal of risk and insurance. (4)

William, H. Greene, (2004), Profitability and Efficiency in the U.S Life Insurance Industry, Journal of Productivity Analysis, Kluwer Academic Publisher, Netherlands

William, G. Zikmund, Barry, J. Babin, C and Mitch, G. (2010), Research Business Methods, 8 ed. Canada.

Wright K. M. (1992), the Life Insurance Industry in the United States an Analysis of Economic and Regulatory Issues". Country Economics Department the world Bank Policy Research Working Paper (wps 857)

Wooldridge, J M (2006), Introductory Econometric: A Modern Approach. International Student edition, 3rd ed,

Yuvaraj & Abate G. (2013), performance of insurance companies in Ethiopia, International Journal of Marketing, Financial Services & Management Research

Y. SHIU (2004), "determinants of UK general insurance company performance"

Appendices

Appendix I: List of Insurance Companies in Ethiopia

No	Name	Establishment date
1	Ethiopian Insurance Corporation	1975
2	Africa Insurance Company	1/12/1994
3	Awash Insurance Company	1/10/1994
4	Global Insurance Company	11/1/1997
5	Lion Insurance Company	1/7/2007
6	NIB Insurance Company	1/5/2002
7	Nile Insurance Company	11/4/1995
8	Nyala Insurance Company	6/1/1995
9	United Insurance	1/4/1997
10	Abay Insurance Company	26/07/2010
11	Berhan Insurance	24/05/2011
12	National Insurance Company of Ethiopia	23/09/1994
13	Oromia Insurance Company	26/01/2009
14	Ethio-Life and General Insurance	23/10/2008
15	Tsehay Insurance	28/03/2012
16	Bunna Insurance	23/8/2011
17	Lucy Insurance	15/11/2012

Source: www.nbe.org.et

Appendix II: Instrument for Unstructured face- to-face interview on the determinants of insurance companies' profitability in Ethiopia

1. In what condition underwriting risk, reinsurance dependence, solvency, liquidity, premium growth, company size, technical provisions, and growth rate of GDP and inflation affect the profitability of your company?
2. How do those variables influence your company's profitability in general?
3. Among the problem that can influence your company's profitability, which of them is more affects your insurance company's profitability?
4. Do you think that macroeconomic environments influence your insurance company's profitability?
5. What types of measures are taken by your company in order to reduce the influence that affects profitability negatively?
6. Any idea or comment?

Appendix-III: Regression Results For Determinants of insurance companies profitability

Dependent Variable: ROA

Method: Panel Least Squares

Date: 04/15/15 Time: 16:27

Sample: 2004 2014

Periods included: 11

Cross-sections included: 9

Total panel (balanced) observations: 99

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.020062	0.188358	-0.106511	0.9154
CIEP	-0.230835	0.031399	-7.351733	0.0000
COE	-0.057701	0.014859	-3.883378	0.0002
CACL	0.024973	0.012509	1.996438	0.0492
PCTA	-0.052605	0.057185	-0.919907	0.3604
NANPW	-0.084780	0.018446	-4.596187	0.0000
CS	0.029349	0.007005	4.189974	0.0001
PG	0.034256	0.018691	1.832796	0.0705
GDP	-1.970838	0.564583	-3.490786	0.0008
INF	-0.040773	0.029050	-1.403573	0.1643

Effects Specification

Cross-section fixed (dummy variables)

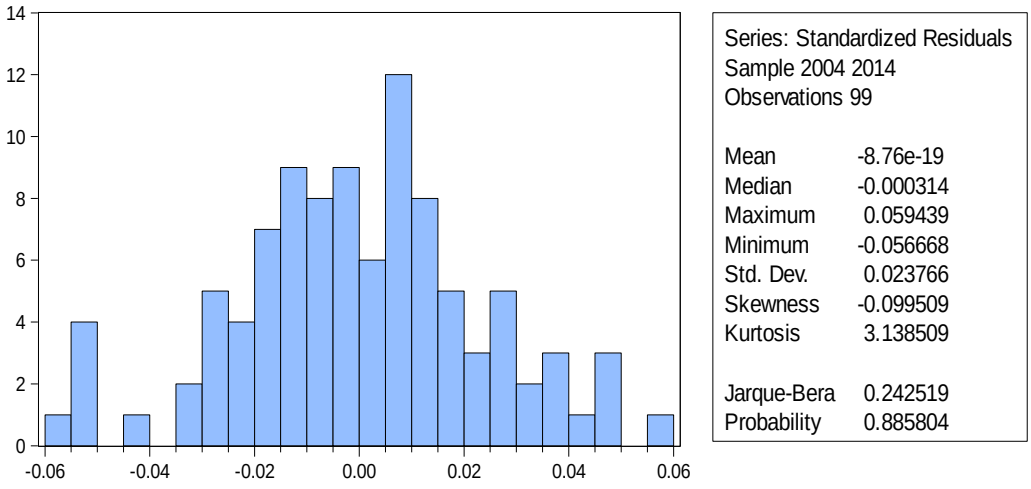
R-squared	0.810840	Mean dependent var	0.078252
Adjusted R-squared	0.771140	S.D. dependent var	0.054644
S.E. of regression	0.026141	Akaike info criterion	-4.287630
Sum squared resid	0.055353	Schwarz criterion	-3.815790
Log likelihood	230.2377	Hannan-Quinn criter.	-4.096722
F-statistic	20.42411	Durbin-Watson stat	1.869868
Prob(F-statistic)	0.000000		

Appendix IV: Diagnostic tests results for OLS Assumptions

1. Normality test

Ho: Residuals are normally distributed

Ha: Residuals are not normally distributed



2. Heteroskedasticity test

Ho: The variance of the error is homoscedastic

Ha: The variance of the error is heteroscedastic

Heteroskedasticity Test: White

F-statistic	0.812644	Prob. F(9,89)	0.6058
Obs*R-squared	7.517776	Prob. Chi-Square(9)	0.5834
Scaled explained SS	11.77801	Prob. Chi-Square(9)	0.2261

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 04/15/15 Time: 16:49

Sample: 1 99

Included observations: 99

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.005833	0.003066	1.902563	0.0603
CIEP^2	7.94E-05	0.001284	0.061866	0.9508
COE^2	-0.000322	0.000378	-0.850629	0.3973
CACL^2	0.000185	0.000277	0.667476	0.5062
PCTA^2	0.007349	0.005561	1.321580	0.1897
NANPW^2	-0.000306	0.000289	-1.059292	0.2923
CS^2	-1.22E-05	6.00E-06	-2.028351	0.0455
PG^2	0.000659	0.001585	0.415857	0.6785
GDP^2	-0.051755	0.115154	-0.449438	0.6542
INF^2	0.000348	0.004457	0.077993	0.9380

R-squared	0.075937	Mean dependent var	0.000835
Adjusted R-squared	-0.017507	S.D. dependent var	0.001652
S.E. of regression	0.001667	Akaike info criterion	-9.860506
Sum squared resid	0.000247	Schwarz criterion	-9.598373
Log likelihood	498.0951	Hannan-Quinn criter.	-9.754447
F-statistic	0.812644	Durbin-Watson stat	1.957370
Prob(F-statistic)	0.605849		

There is no problem of heteroscedasticity

3. Autocorrelation test

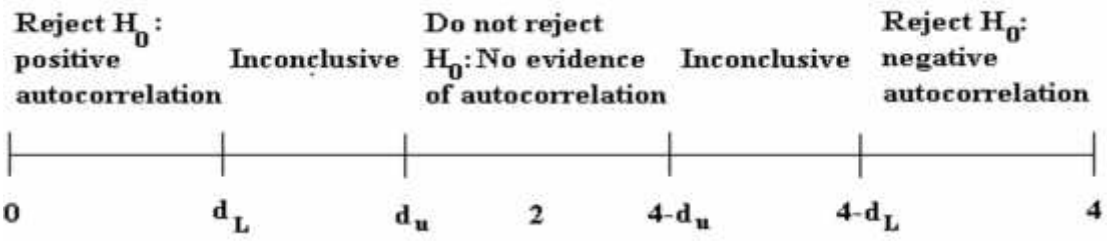
Ho: The errors are uncorrelated with one another

Ha: The errors are correlated with one another

A) Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.848016	Prob. F(1,88)	0.3596
Obs*R-squared	0.944912	Prob. Chi-Square(1)	0.3310

B) Durbin-Watson Test



0	dl=1.357	du= 1.741	1.869	4-du=2.259	4-dl=2.643	4

There is no problem of autocorrelation

Appendix V Ratio data used for analysis

year	Insurance	ROA	CIEP	NAPW	CACL	CS	PG	PCTA	COE	GDP	INF
2004	EIC	0.0942	0.4843	0.6562	1.0198	20.2562	0.0212	0.1822	1.3533	0.1173	0.0735
2005	EIC	0.0986	0.5409	0.6080	1.1529	20.3211	0.0966	0.1835	1.1595	0.1264	0.0613
2006	EIC	0.0719	0.6662	1.2986	1.2307	20.4656	0.1420	0.1854	0.4934	0.1154	0.1058
2007	EIC	0.0881	0.6929	0.9822	1.2072	20.4749	0.2038	0.2116	0.6528	0.1179	0.1582
2008	EIC	0.0909	0.7177	0.7878	0.9924	20.5730	0.1943	0.2446	0.7762	0.1119	0.2530
2009	EIC	0.0868	0.7297	0.7403	1.1070	20.6827	0.1757	0.2626	0.9033	0.1004	0.3640
2010	EIC	0.1331	0.6174	0.6731	1.0872	20.8226	0.3283	0.3436	0.7845	0.1057	0.0280
2011	EIC	0.1122	0.7446	0.4806	0.9917	20.9745	0.2716	0.3449	0.9646	0.1128	0.1810
2012	EIC	0.1366	0.5591	0.3345	0.9405	21.3027	0.5066	0.3079	1.1192	0.1090	0.3410
2013	EIC	0.1652	0.6659	0.3418	0.9677	21.4558	0.3750	0.4738	1.0717	0.0982	0.1350
2014	EIC	0.1921	0.6023	0.3587	0.9849	21.5523	-0.0780	0.3047	0.8813	0.1035	0.0810
2004	AIC	-0.0345	0.4882	1.6185	2.2190	18.2785	-0.5231	0.0312	0.6363	0.1173	0.0735
2005	AIC	0.0812	0.5548	0.7848	1.1551	18.2754	0.5978	0.0820	0.5121	0.1264	0.0613
2006	AIC	0.0604	0.6602	0.6886	1.1046	18.4804	0.3565	0.1455	0.4540	0.1154	0.1058
2007	AIC	0.0650	0.7768	0.5833	0.9892	18.7166	0.2779	0.1092	0.6250	0.1179	0.1582
2008	AIC	0.0685	0.7014	0.5487	0.8171	18.8482	0.1582	0.1130	0.8102	0.1119	0.2530
2009	AIC	0.0518	0.8145	0.5412	0.7856	19.0191	0.1446	0.1342	1.0127	0.1004	0.3640
2010	AIC	0.1109	0.6249	0.6022	0.8322	19.1947	0.1994	0.1217	0.9011	0.1057	0.0280
2011	AIC	0.0795	0.6165	0.5247	0.7846	19.6171	0.4738	0.1182	0.9483	0.1128	0.1810
2012	AIC	0.0793	0.6612	0.4609	0.8507	19.9655	0.5838	0.1861	1.3910	0.1090	0.3410
2013	AIC	0.1485	0.6127	0.5206	0.8890	20.1411	0.0770	0.1132	1.2153	0.0982	0.1350
2014	AIC	0.1022	0.6436	0.6315	0.8609	20.1780	0.0213	0.1255	1.0402	0.1035	0.0810
2004	Global	0.0333	0.4987	2.4633	2.6041	16.5266	0.1652	0.1344	0.1776	0.1173	0.0735
2005	Global	0.0404	0.4278	2.1480	2.2456	16.9541	0.2379	0.1024	0.1052	0.1264	0.0613
2006	Global	0.0432	0.5568	2.0201	2.3062	17.2292	0.3862	0.0936	0.1121	0.1154	0.1058
2007	Global	0.0546	0.5029	2.1175	1.5432	17.4171	0.1461	0.1002	0.1292	0.1179	0.1582
2008	Global	0.0452	0.5119	1.7416	0.8466	17.6058	0.2073	0.0902	0.1758	0.1119	0.2530
2009	Global	0.0541	0.5056	1.9987	0.9619	17.8044	0.0499	0.0861	0.2175	0.1004	0.3640
2010	Global	0.0805	0.4413	1.5971	0.8395	17.9226	0.2444	0.0759	0.1829	0.1057	0.0280
2011	Global	0.0364	0.7878	1.2508	0.9195	17.9954	0.4940	0.1171	0.2570	0.1128	0.1810
2012	Global	0.0203	0.8762	0.6860	0.9160	18.3545	0.8444	0.1249	0.5911	0.1090	0.3410
2013	Global	0.1532	0.5682	1.0522	1.1350	18.6375	-0.0228	0.0989	0.5254	0.0982	0.1350
2014	Global	0.1603	0.4841	1.3768	1.3519	18.8530	0.1452	0.0882	0.3093	0.1035	0.0810
2004	Nile	0.0157	0.7531	0.8321	0.9514	18.6772	0.1482	0.0559	0.6231	0.1173	0.0735
2005	Nile	0.0412	0.7245	0.8174	0.8388	18.8420	0.1446	0.0937	0.6799	0.1264	0.0613
2006	NILE	0.0357	0.7986	0.6455	1.0210	19.0145	0.2406	0.1188	0.9930	0.1154	0.1058
2007	Nile	0.0227	0.8550	0.5287	0.8810	19.0725	0.0991	0.0970	1.3161	0.1179	0.1582
2008	Nile	-0.0265	0.8304	0.5035	0.6843	19.0552	-0.0067	0.1044	1.4956	0.1119	0.2530

2009	Nile	0.0217	0.6938	0.5553	0.7184	19.0884	0.1104	0.1621	1.1953	0.1004	0.3640
2010	Nile	0.1379	0.5737	0.7013	0.9275	19.2317	0.1572	0.1033	0.6235	0.1057	0.0280
2011	Nile	0.0980	0.7145	0.6049	0.9642	19.4050	0.3433	0.1058	0.5008	0.1128	0.1810
2012	Nile	0.1020	0.7051	0.5728	1.0891	19.7131	0.4486	0.1079	0.4954	0.1090	0.3410
2013	Nile	0.1096	0.7349	0.6944	1.1108	19.8631	-0.0387	0.1038	0.7620	0.0982	0.1350
2014	Nile	0.1187	0.7006	0.6370	1.0900	20.0003	0.1693	0.0882	0.7477	0.1035	0.0810
2004	Nice	0.0244	0.6558	0.5037	0.7666	17.0120	0.1548	0.1199	0.8537	0.1173	0.0735
2005	Nice	-0.0471	0.7230	0.3427	0.7054	17.0574	0.1918	0.1191	1.1612	0.1264	0.0613
2006	Nice	0.0620	0.6603	0.3924	0.7321	17.2660	0.2041	0.1369	0.8475	0.1154	0.1058
2007	Nice	0.0849	0.6459	0.4154	0.9490	17.4950	0.1761	0.1162	0.9227	0.1179	0.1582
2008	Nice	0.0572	0.6740	0.4459	0.9315	17.5967	0.1573	0.1742	0.7264	0.1119	0.2530
2009	Nice	0.0463	0.6813	0.4460	0.8112	17.7498	0.1401	0.1857	0.8073	0.1004	0.3640
2010	Nice	0.0588	0.6773	0.4067	0.9921	17.9591	0.3159	0.2330	0.8420	0.1057	0.0280
2011	Nice	0.0029	0.7276	0.2992	1.1206	18.2758	0.2452	0.1620	1.4686	0.1128	0.1810
2012	Nice	0.1743	0.5405	0.3506	1.0525	18.7887	0.6795	0.1691	0.7890	0.1090	0.3410
2013	Nice	0.1237	0.5903	0.5326	1.1587	19.2143	0.1288	0.1345	0.6708	0.0982	0.1350
2014	Nice	0.0695	0.7002	0.5467	1.1232	19.3538	0.0532	0.1113	0.8386	0.1035	0.0810
2004	Africa	0.0111	0.6711	1.0231	1.2203	18.4407	-0.2096	0.1110	0.7493	0.1173	0.0735
2005	Africa	-0.0037	0.7345	0.8833	1.1168	18.5067	0.1185	0.1298	0.8788	0.1264	0.0613
2006	Africa	0.0732	0.6016	1.0024	1.1610	18.8790	0.2719	0.1365	0.6882	0.1154	0.1058
2007	Africa	0.0204	0.8072	0.7922	1.0833	18.9782	0.2180	0.1570	0.8767	0.1179	0.1582
2008	Africa	0.0373	0.8175	0.5904	0.9990	19.2533	0.2949	0.1313	1.1165	0.1119	0.2530
2009	Africa	0.0478	0.8283	0.5547	0.9361	19.2878	0.1341	0.1335	1.2872	0.1004	0.3640
2010	Africa	0.0579	0.8155	0.4997	0.8890	19.6250	0.4507	0.1455	1.2174	0.1057	0.0280
2011	Africa	0.0530	0.8200	0.4080	0.8271	19.8813	0.3869	0.1337	1.3935	0.1128	0.1810
2012	Africa	0.0532	0.8540	0.3730	0.6717	20.0406	0.4030	0.1760	1.5086	0.1090	0.3410
2013	Africa	0.0619	0.8535	0.4433	0.5431	20.0234	-0.0980	0.1296	1.5200	0.0982	0.1350
2014	Africa	0.0804	0.8952	0.5361	0.6317	20.1199	0.0190	0.1485	1.5166	0.1035	0.0810
2004	Nib	-0.1023	0.8384	0.9135	0.7403	17.5067	-0.0056	0.0808	0.1940	0.1173	0.0735
2005	Nib	0.0919	0.1322	1.3811	0.9825	17.9384	0.3792	0.2366	0.2002	0.1264	0.0613
2006	Nib	0.0467	0.1657	1.3722	1.0050	18.1034	0.4101	0.3444	0.2998	0.1154	0.1058
2007	Nib	0.0757	0.6671	0.6657	1.0541	18.4078	0.4258	0.1145	0.3664	0.1179	0.1582
2008	Nib	0.1122	0.6612	0.3853	0.8573	18.6529	0.5079	0.1104	0.6415	0.1119	0.2530
2009	Nib	0.0975	0.6809	0.4498	0.9426	19.0792	0.3156	0.0969	0.8437	0.1004	0.3640
2010	Nib	0.0934	0.6633	0.4399	0.9797	19.3421	0.3094	0.1210	0.8669	0.1057	0.0280
2011	Nib	0.0899	0.2909	0.9488	0.9999	19.5381	0.2576	0.4365	0.9359	0.1128	0.1810
2012	Nib	0.0885	0.2995	0.5795	0.9693	19.9792	0.5482	0.3354	1.0765	0.1090	0.3410
2013	Nib	0.1112	0.2689	1.1918	1.0518	20.0647	-0.0571	0.3881	1.0261	0.0982	0.1350
2014	Nib	0.1127	0.3049	1.5354	1.1079	20.2944	0.0632	0.3214	0.9189	0.1035	0.0810
2004	Nyala	0.0580	0.5900	1.2226	1.0757	18.5505	0.1212	0.1036	0.4088	0.1173	0.0735

2005	Nyala	0.0720	0.4903	1.1435	1.0837	18.5083	0.0780	0.1084	0.4411	0.1264	0.0613
2006	Nyala	0.0945	0.5932	0.8833	1.1956	18.6345	0.2700	0.1125	0.6300	0.1154	0.1058
2007	Nyala	0.0972	0.5240	0.8350	1.0771	18.6571	0.1474	0.1583	0.6048	0.1179	0.1582
2008	Nyala	0.0557	0.6822	0.6601	0.9721	18.7783	0.1725	0.1297	0.8249	0.1119	0.2530
2009	Nyala	0.1340	0.6171	0.9413	0.9063	18.8339	-0.0391	0.1632	0.6730	0.1004	0.3640
2010	Nyala	0.1377	0.5886	0.9627	0.9823	19.0508	0.3411	0.2541	0.6312	0.1057	0.0280
2011	Nyala	0.1591	0.5484	0.9785	1.0176	19.1872	0.1037	0.2137	0.5407	0.1128	0.1810
2012	Nyala	0.1820	0.4094	0.9219	1.0995	19.5459	0.3411	0.1671	0.4191	0.1090	0.3410
2013	Nyala	0.1647	0.4608	1.0309	1.1423	19.8708	0.3033	0.2002	0.6298	0.0982	0.1350
2014	Nyala	0.1434	0.5396	1.1895	1.2176	20.1119	0.0940	0.1569	0.5978	0.1035	0.0810
2004	Unic	-0.0545	0.8424	0.8923	1.0633	18.0014	-0.1236	0.0944	0.6729	0.1173	0.0735
2005	Unic	-0.0156	0.8111	0.9769	1.0159	17.9336	-0.0834	0.1259	0.6933	0.1264	0.0613
2006	Unic	0.0922	0.5033	1.0589	1.2362	18.2884	0.4374	0.1044	0.4734	0.1154	0.1058
2007	Unic	0.1002	0.7202	0.7464	1.1115	18.5299	0.6916	0.1941	0.6558	0.1179	0.1582
2008	Unic	0.1668	0.5878	0.7181	1.1068	18.8090	0.3579	0.2189	0.7362	0.1119	0.2530
2009	Unic	0.0472	0.7707	0.7048	1.0268	18.9672	0.0389	0.2239	1.0010	0.1004	0.3640
2010	Unic	0.1409	0.5826	0.8697	1.1695	19.1726	0.0955	0.1649	0.7027	0.1057	0.0280
2011	Unic	0.0874	0.7130	0.7699	1.1893	19.3721	0.2887	0.1731	0.7898	0.1128	0.1810
2012	Unic	0.1219	0.6413	0.7360	1.2454	19.6969	0.4762	0.1885	0.6802	0.1090	0.3410
2013	Unic	0.1732	0.5427	0.9182	1.2684	19.8845	0.0415	0.1632	0.6520	0.0982	0.1350
2014	Unic	0.1412	0.5413	0.9549	0.9112	20.0522	0.1019	0.1394	0.5877	0.1035	0.0810