Factors Influencing Demand for Reinsurance in Ethiopian Insurance Companies

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January, 2018

Addis Ababa

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A THESIS SUBMITTED TO THE DEPARTMENT OF ACCOUNTING AND FINANCE (AAU) IN PARTIAL FULFILLMENT FOR THE REQUIREMENT OF THE DEGREE OF MASTER OF SCIENCE IN ACCOUNTING & FINANCE

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STATEMENT OF DECLARATION

I, Tewabceh workie, declare that this thesis entitled: Factors influencing demand for reinsurance in Ethiopian insurance companies and submitted in partial fulfillment of the requirements for the Degree of Master of Science in Accounting and Finance, is outcome of my own effort and study and that all sources of materials used for the study have been duly acknowledged. I have produced it independently with only guidance and suggestion of the thesis Advisor. The study complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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ACKNOWLEDGEMENT

I am indebted to many people for their support and assistance in doing this paper, but First and foremost, I would like to thank and praise the Almighty God and Virgin St. Mary for being my strength, your endlessness and all-embracing not only for helping me to finalize this paper, rather for showing me the light and for being there for me in all the difficult and annoying times throughout my life. My beloved family, who gave me a moral and spiritual support to start and finalize this program, I would also like to thank my dearest colleagues and friends they were my strength when I was weak and for their kind support and encouragement to finalize this study.

ACRONYMS AND ABBREVIATIONS

AFRICA- Africa Insurance Company

AVOL- Asset Volatility

AWASH- Awash Insurance Company

BLUE- Best Linear Unbiased Estimators

CLRM – Classical Linear Regression Model

CR –Claim Ratio

DW –Durbin Watson

EIC - Ethiopian Insurance Corporation

FEM – Fixed Effects Models

GWP- Gross Written Premium

GLOBAL- Global Insurance Company

LVRG – Leverage

MTR- Marginal Tax Rates

NBE- National Bank of Ethiopia

NEP- Net Earned Premium

Nib- Nib Insurance Company

NICE- National Insurance Company of Ethiopia

NIC- Net Incurred Claim

NILE- Nile Insurance Company

NOSFA-No-One-Size-Fits-All

NPAT- Net Profit after Tax

NYALA- Nyala Insurance Company

OLS – Ordinary Least Squares

PC- premiums Ceded

RCR- Reinsurance Ceded Ratio

REM- Random Effects Models

ROA – Return on Assets

ROE- Return on Equity

RR- Reinsurance Ratio

RRPHS- Ratio of Reinsurance Recoverable to Policyholders Surplus

TA- Total Asset

TL- Total Liability

TP – Total Premium

UNIC- United Insurance Company

U.K – United Kingdom

U.S – United States

Abstract

Reinsurance plays a critical role in the proper functioning of a stable insurance market. This study aims to investigate the relationship that exists between insurer specific factors and reinsurance demand in the Ethiopian insurance companies. In order to achieve this objective, eight non-life insurance companies were selected for the period of 2005 to 2016. Five hypotheses were formulated and tested using regression analyses, applying explanatory research design and quantitative research approach. The study relied on secondary data extracted from the audited financial statements of the selected insurers. Financial leverage, underwriting risk, firm size, return on asset and asset volatility were taken as independent variables while reinsurance demand was taken as dependent variable being represented by the firms reinsurance ratio. The result of *the fixed effect regression model indicated that a strong positive significant relationship exists among financial leverage with reinsurance demand and asset volatility to reinsurance demand. And also significant negative relationship exists between firms' size and reinsurance demand. The study delivers evidence that financial leverage, total asset volatility and underwriting risk are the most important factors that affect demand for reinsurance in Ethiopian insurance companies. On the basis of these findings, the researcher suggests that Ethiopian insurers should give more attention for these factors whenever they arrange reinsurance agreements.*

Keyword: reinsurance demand, insurer and reinsurer

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

The right functioning of a financial system is vital in assisting economic activities (Das et al., 2003). Financial institution's roles in the economy of a country in general and insurance companies in particular are facilitating the efficient and effective financial system through risk transfer, saving mobilization and intermediation (Das et al., 2003). Therefore, financial institutions, channel funds and transfer risks from one economic unit to another economic unit so as to facilitate trade and resources arrangement (James and Joan, 2003). Insurance companies like other financial institutions share financial, operational and strategic risk; however, the insurance companies are exposed to specific risk which is related to their underwriting activities (James and Joan, 2003).

According to Marijana et al. (2014), underwriting activities risk incorporates the deviation of actual losses from those assumed in time of insurance pricing. Furthermore, some of the risks that insurers underwrite are too large for them to retain. In order to reduce loss exposures, insurance companies transfer part of the risks to other risk underwriters. The most important way they manage the risk is by transferring it to reinsurers.

Cummins et al. (2012), argued as cited in Ghiorghe (2015) insurance companies can cut underwriting risk through diversification and an efficient risk management, significant residual risks remain, and the claims paid by insurers are highly stochastic. Reinsurance is one of risk management tool, and also the primary source of interconnection within the insurance industry (Cummins et al, 2012). Reinsurance is insurance for insurers and appropriate level of reinsurance is one of the premises of the existence and functioning of a stable insurance market (Sojung et al, 2015).

IAIS (2012) defines reinsurance is insurance purchased by one insurer from another reinsurer. Buyer of reinsurance is commonly referred to as the ceding insurer, or cedant, and seller of

insurance coverage is the reinsurer. Thus, the cedant "cedes" reinsurance to the reinsurer. Reinsurance is very important as the mechanism of reinsurance reduces the risk of insurers' bankruptcy in case of very high losses and, hence, protects policyholders (IAIS 2012). Many of both the theoretical and empirical review have revealed that reinsurance is crucial and fundamental to the insurance industry, not only by distributing portfolios of risks but also by improving the insurers' financial solvency and by creating managerial and technical capabilities. (Marijana et al, 2014)

Existing researches made in different countries especially in developed countries have proven insurers', reinsurers' and insurance industry specific factors have had a significant effect on reinsurance demand (Smith and Stulz, 1985; Mayers and Smith. 1990). From the aforementioned inspiration and the data availability at NBE; the researcher can measure the impact of insurer specific factors (Liquidity, Leverage, firm size, underwriting risk, return on assets and asset volatility) on reinsurance demand in Ethiopia insurance industry.

1.2 General Overview of insurance industry and reinsurance business in Ethiopia

Ethiopian insurance company observation was the issuance of proclamation No. 281/1970 and it was issued to provide for the control and regulation of insurance business in Ethiopia (Hailu., 2007). The law required an insurer to be a domestic company whose share capital to be not less than Birr 0.4 million for a general insurance business and Birr 0.6 million in the case of long-term insurance business and Birr 1 million for both insurance business. Non-Ethiopian nationals were not barred from involving in insurance business however 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 later the enactment of the proclamation, the military government that came to power in 1974 put an end to all private enterprise. Then all insurance companies operating were nationalized and from January 1, 1975 onwards the government took over the ownership and control of these companies and merged them into a single unit called Ethiopian Insurance Corporation.

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 indicated the beginning of a new era. Immediately after the enactment of the proclamation private insurance companies began to embellish. According to NBE Directive No. SIB/34/2014, an insurance company is required to be a domestic company whose share capital to be at least Ethiopian Birr 60 million for a general insurance business and Ethiopian Birr 15 million in the case of long term (life) insurance business and Ethiopian Birr 75 million to do both long-term and general insurance business.

Today the total number of insurance companies, their asset and capital increased significantly. At 2016, there are 17 insurance companies in operation. Ethiopian Insurance Corporation (EIC) is state owned while the rest all are private.

Regarding reinsurance business of the Ethiopian insurance industry, the insurance proclamation, (Proclamation No. 746/2012), states that the supervisory body, NBE, shall issue directives specifying the manner in which reinsurance companies established. Therefore, such directives or detailed guidelines related to "the manner in which reinsurance companies established in Ethiopia", has been issued by reinsurance company establishment directive No. SRB/1/2014.The directive provide reinsurance Company shall be established as a share company and run as non-life and life reinsurer; should be solely owned by Ethiopian nationals and/or organizations of Ethiopian nationals. The minimum paid up capital to obtain a license for reinsurance company shall be 500 million (five hundred million birr). The first Ethiopian reinsurance company (Ethiopia Re) was officially established in 2015 G.C according to directive no. SRB/1/2014 with an initial subscribed capital of 660 million (six hundred sixty million birr).

As per the directive no.SIB/44/2016 issued by NBE detailed guideline related to"the criteria and manner in which reinsurance business transacted in Ethiopia", all local insurance companies in the country shall cede at least 25 % of its treaty cession at the beginning of every fiscal year and 5% of each policy they underwrites to Ethiopia Re at the time of each underwriting activities. Therefore, it will minimize the outflow of scarce hard currency.

1.3 Statement of the Problem

Today's global business environment has become increasingly competitive, aggressive and dynamic; thus firms should identify strategies that will insure their existence (Agyei and Yeboah ,2011). 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' reinsurance demand, in order to protect themselves from uncertainties.

As insurers are managing the risks of both their clients and their own risks, they required an integration of risk management into the companies' systems, processes and culture. Agyei and Yeboah (2011) indicated that, some financial institutions have had difficulties in growth of their profitability and some end up closing their doors; probably inadequate risk management policies and practices are the major causes of failures and poor performance of these firms.

Reinsurance plays a critical role in strengthening risk absorbance, solvency, know-how, and in availing foreign capital for the insurance companies. Sojung et al. (2015) point out reinsurance is an essential tool for primary insurance companies to manage underwriting risks, improve insolvency risks, satisfy rigorous regulatory requirements, and deal with uncertainties caused by regulation changes or catastrophic losses. Prevailing theoretical thoughts and empirical examinations of reinsurance demand dominantly highlight insurers-specific characteristics as the most important for insurance companies' decision to rely on reinsurance (Marijana et al., 2014). Weakly capitalized insurers reconstruct a buffer level of capital by raising capital and reducing risk. In contrast, adequately capitalized insurers maintain their capital reserves and increase both their risk and reinsurance levels.Wells et al, (1995) find that mutual insurers use reinsurance to reduce funding difficulties.

Considering the existing empirical research that is almost entirely based on developed countries, have also inconsistent results especially on underwriting risk and asset volatility with reinsurance demand. Study conducted in UK on life insurance market by Kader and Adams (2007) found

underwriting risk and reinsurance demand have a positive significant relationship, while research done on Croatian insurance market by Marijana et al. (2014) found there was no statically significant relationship between underwriting risk and reinsurance demand and also study carried out by Garven and Tennant (2003) affirmed there was a positive significant relationship between asset volatility and reinsurance demand, however studies of Marijana et al (2014) confirmed there is insignificant relation between asset volatility and reinsurance demand. Based on the aforementioned dissimilar study results, the researcher believed that the topic needs further investigation.

Along with the lack of the reinsurance demand analysis inemerging markets, as well as the characteristics of insurance market in Ethiopia, the main aim of this research is to determine internal factors that influence insurance companies' demand for reinsurance in Ethiopia. As Bird (2005) noted this may be referred to as the No-One-Size-Fits-All (NOSFA) principle, i.e. the best policy and administrative design for each country/industry has to be determined carefully in light of the conditions and objectives of that country/industry.Coming back to the case of the Ethiopian insurance sector, while a large body of research on financial institutions on different titles have been undertaken in the banking industry in Ethiopia, very limited researches were conducted in Ethiopian insurance industry like determinants of profitability, dividend payout, capital structure and risk management.

To the researcher's best knowledge, the studies conducted in the areas of insurance are very few in number and never conducted on the factors considered to be determinants of reinsurance demand of insurance industry in Ethiopia. Thus, this research is aimed at filling this gap; motivate other researches to the area and providing appropriate recommendation. This thesis will useful for different level of managers in the sector and researchers who are interested in this area of study as a preliminary study.Therefore, this paper is intended to fill this gap and provide helpful empirical evidence in the study area on the issue of interest.

1.4 Research Objectives

1.4.1 General Objective

The main objective of this study is to examine the impact of insurer specific factors on reinsurance demand in Ethiopian insurance industry.

1.4.2 Specific Objectives

The specific objectives of the study are:

1. To examine the effects of financial leverage on the demand for reinsurance of Ethiopian insurance companies.
2. To identify the effect of firm size on the demand for reinsurance of Ethiopian insurance companies
3. To examine the effect of underwriting risk on demand reinsurance insurance companies in Ethiopia.
4. To identify the impact of return on assets on demand for insurance in Ethiopia.
5. To test the impact of assets volatility on demand for reinsurance of Ethiopian insurance industry.

1.5 Hypotheses of the Studies

Research hypotheses were developed from observation, related literature, and/or theory described in the area of the study. A research hypothesis states the relationship one expects to find as a result of the research (Ary et al, 2010). Considering that the basic aims of the study is to assess the impact insurer specific factors on the demand for reinsurance and based on theories and empirical studies which in detail explained in chapter two at 2.4 and 2.5 related to the issue the following research hypothesis derived.

Ho_1: Financial leverage has a positive significant effect on demand for reinsurance;

Ho_2: Company size has a negative significant effect on demand for reinsurance;

Ho_3: Underwriting risk has a positive significant effect on demand for reinsurance;

Ho_4: Return on Assets has a negative significant effect on demand for reinsurance;

Ho_5: Assets Volatility has a positive significant effect on demand for reinsurance;

1.6 Significance of the study

In Ethiopia, studies on risk management relating to the insurance industry are very scanty, special related to reinsurance issues. From the researcher observations, so far, even those existing studies done in Ethiopia are focused on examining the determinants of profitability of insurance industry and its impact on economic growth. Hence this study might fill the gap by examining the effects of insurer specific factors on the reinsurance demand of insurance companies in Ethiopia. The overall effect of risk management is not limited to insurance industry, but it also affects the overall economy of the country. Therefore, the study is significant in assessing the impact of insurer specific factors on reinsurance demands which helps to identify the prevailing factors and give possible recommendation to solve them. Besides, it will contribute to the body of the existing knowledge and also assist insurance companies, investors, expert's and supervisory authorities in identifying the controlling factors of reinsurance demand and used as reference point to further researchers in the same field.

1.7 Scope of the study

It is important to define the scope of the study to aware readers the direction to which this study is heading. The study is delimited to insurer specific factors affecting reinsurance demand in Ethiopian private insurance companies. The study takes a data of eight non-life insurance companies operates in Ethiopia since 2005 excluding Ethiopia Insurance Corporation (EIC).The data enclosed the explanatory variables: - LVER, TP, CR, ROA and AVOL and explained variables (RR) of non-life insurance companies in Ethiopia.

1.8 Structure of the study

This study is organized into five chapters. The first chapter includes introduction, research problem, and research objectives, significance of the study and scope of the study. The second chapter focuses on the literature review. The review of the literature includes the theoretical review in its first section, review of the previous studies related to the area and conclusion and knowledge gap. Chapter three presents the research design and methodology. Followed by the third chapter fourth chapter that deals with data presentation, analysis results and discussion and the last chapter finally presents the summary, conclusion and recommendation

CHAPTER TWO
REVIEW OF RELATED LITERATURE

The first chapter introduced the problem to be investigated in this study along with purpose and Research objective. In order to put the study within the context of the existing literature, the Subsequent section of this chapter presents the review of both theoretical and empirical studies

2.1. Reinsurance Concept, Nature and Type

2.1.1 Concept of reinsurance

The concept of reinsurance first looked in transport sector, particularly marine insurance, at a comparatively late date (14th or 15th centuries) (Swiss Re, 1996). The cost of single ships and their cargoes in ancient times often had a value disproportionately large to other private holdings, and the whole of the private wealth of an insurer often hung on the outcome of a single voyage or marine adventure. In addition to the huge cost the perils of the sea were greater also, because of the aforementioned reason an insurer would become worried and try to sell parts of his contract to others (reinsurer) and essentially at a higher rate (Hansell, 1999). Reinsurance is the transfer of part of the risks that a direct insurer assumes from an insured, to a second insurance carrier, the reinsurer, who has no direct contractual relationship with the insured, in exchange of a payment called reinsurance premium (Wehrhahn, 2009).

According to Holland, 2009 the first modern fire reinsurance company was officially established in April 1846 in Germany under the name “Cologne Re”. The benefits became evident following the loss of the Great Fire in Hamburg. Swiss Re and Munich were then founded in 1863 and 1880 respectively (Holland, 2009). According to Kopf (1929), the fire insurance business is predominantly responsible for the development of modern reinsurance business. In the present world, however, insurance and reinsurance is a business practice in any modern society. Airliners and satellites have replaced the risks associated with early sailing vessels, hurricanes, earthquakes and terrorisms, sea pirates are risks beyond the great fire of the past. Reinsurance will be of long and continuing importance not only to the insurance business itself but also to risk management worldwide (Holland, 2009).

Scholars and practitioners in the field of insurance/reinsurance define reinsurance in different ways, though difficult to differentiate one from the other. Park (1799) describes the definition of reinsurance as: "re-insurance, as understood by the law of England, may be said to be a contract, which the first insurer enters into, in order to relieve himself from those risks which he has incautiously undertaken, by throwing them upon other underwriters, who are called re-assurers". On the other hand, Outreville (2002) defined reinsurance as the transfer of liability from the primary insurer, the company that issued the insurance contract, to another insurer, the reinsurance company. As per Outreville (2002) the business placed with a reinsurer is called a cession of an insurance company. An insurance company's policyholders have no right of action against the reinsurer, even though the policy holder is probably the main beneficiary of reinsurance arrangements. According to the author, a reinsurance contract therefore deals only with the original insured event or loss exposure, and the reinsurer is liable only to the ceding insurance company (Outreville ,2002).

Similarly, Wehrhahn (2009) defines reinsurance as: *"A financial transaction by which risk is transferred (ceded) from an insurance company (cedant) to a reinsurance company (reinsurer) in exchange of a payment (reinsurance premium)"* and the author also described *"reinsurers are professional entities that exclusively deal with the activity of reinsurance"*. According to Patrik (2001), the reinsurer reciprocally agrees to indemnify the reinsured for a specified share of specified types of insurance claims paid by the cedant for a single insurance policy or for a specified set of policies. A professional reinsurance company can be a multi-national organization operating through a subsidiary or branch offices in different countries, or licensing reinsurance brokers or on a direct basis with its ceding companies (Patrik, 2001).

In general, therefore, a reinsurance business involves two main players, namely the primary (direct) insurers that use reinsurance mainly to cede risks and the professional reinsurers that indeed possess geographically and across insurance lines of very heterogeneous portfolios (Plantin, 2006). Mayers and Smith (1990) find that the decision of insurers to purchase reinsurance is similar to that of any non-financial firm. According to Outreville (2002), insurance companies regardless of size, type, and location use reinsurance as mechanism to share the

potential risks assume with others to spread and minimize risks and catastrophe, and to leverage the business

2.1.2 Nature of reinsurance

Reinsurance has a secondary market nature and is the main feature of the non-life insurance in the insurance business industry (Plantin, 2006). Reinsurance has a global feature as manifested by economic interdependency, mobility of capital and transactions across borders, sharing regulations, international competition and management; and like any product, it is subject to cycles and fluctuations driven by internal and external factors (Plantin, 2006). Thus, the primary insurers' assets consist of reinsurer's capital as a capital structure mix, which may also be a cross border source. The professional reinsurers do indeed hold much diversified portfolios: geographically and across insurance lines. In contrast, primary insurers rather use reinsurance mainly to cede risks, and rarely trade risk with each other. Regarding the behavior between the two parties, Jean- Baptiste and Santomero (2000) expound that long- term relationship between cedant and the reinsurer allows stability between them and further for information symmetry and inclusion of new ideas in pricing of the products of the reinsurance services.

According to Hoerger et al. (1990) and Garven and Lamm-Tennant (2003), reinsurance purchase is a capital structuring decision to substitute capital, so as to keep optimal level of risk to the level of the insurer's capitalization. Reinsurance promotes relationship with clients without increasing insolvency risk, though both insurer and reinsurer may share a larger unexpected loss (Weiss and Chung, 2004; Meier and Outreville, 2006).

2.1.3. Type of reinsurance

Reinsurance is divided into two main types namely: Facultative and Treaty reinsurance (Outreville, 2002; The Chartered Insurance Institute, 2004; Wehrhahn, 2009).

Facultative reinsurance involves individual single risks (insurance policy) the insurer wishes to insure and where the original insurer and the reinsurer reach a common agreement on the terms and conditions to enter into the contract (Outreville, 2002). Facultative reinsurance relates

to large risks in terms of capital and hazardous nature but risks are few and require some degree of adverse selection for the reinsurer. It is useful when the insurer is less experienced, and requires the professional reinsurers' assistance (Outreville, 2002).

Treaty reinsurance, unlike the previous type, provides a solution of an obligatory contract by both parties where the insurer is bound to cede in advance a fixed amount of its business and the reinsurer to accept to the type, terms and conditions of reinsurance (Outreville, 2002). Unlike facultative reinsurance, treaty reinsurance establishes a more stable contractual relationship between the two parties. Most insurers prefer treaty reinsurance because it is less expensive and easier to manage and administer, while facultative is less practical when dealing with a single business class or line, although the choice generally depends on the distribution of risks between the parties (Outreville, 2002).

2.2. Theoretical Review

Insurance is said to be a channel of economic growth by promoting long term savings, encouraging accumulations of capital, and channeling those funds to productive investments (Fatula, 2007 ; Oluoma, 2014). One of the reasons for a growing relevance of insurance is the role it plays in mitigating sudden and devastating occurrences that can disable financially of individuals and corporate organizations (Yinusa and Akinlo, 2013). And the other reason in the developing economies, insurance is growing in importance due to its increasing share in the financial sector productivity (Oke, 2012), Accessibility of insurance services is necessary for the stability of the economy as business organizations can take more risks in the course of their operations.

In the modern period, risk aware individuals and organizations with high risk profile seek adequate protection against the negative outcomes that may arise due to the presence of risk. And Insurance Company also need protection in order to reduce its heavy obligations, seeks to transfer part of its risk burden to other organizations which is reinsurers (Garven et al., 2014; Jirsarael, 2013). According to Park and Xie (2014), reinsurers are at the high point of insurance market environment, because the abilities of reinsurers may bring about financial unrest within the insurance industry, which could result in spillover effect in the entire economy.

According to Park and Xie (2014) as cited in Sunday and Sunday, (2017) stated that besides the risks that insurance companies share with other financial institutions, such as financial risk, operational and strategic risk, the insurers are exposed to specific risk which is related to their underwriting activities. This risk encompasses the variation of actual losses from those assumed in time of insurance pricing. Additionally, some of the risks that insurers underwrite are too large for them to retain, In order to reduce loss exposures, insurance companies transfer part of the risks to other risk underwriters (Marijana et al, 2014). The most important way they manage the risk is by transferring it to reinsurers. This enables insurance companies to stabilize loss experience and increase their underwriting capacity, and it provides them with protection of catastrophic losses and technical assistance in the underwriting activities.

2.2.1 Reinsurance Demand

According to reinsurance agreements the reinsurer does not assume all of the loss exposure of the insurance company but the company retains part of the risk (James and Joan, 2003). So that it is important to investigate the factors that determine the company's decision regarding the size of the risk retention and the amount of the risk that would be transferred to third parties. In other words, it is important to determine the factors that influence demand for reinsurance.

Beginning with Mayers and Smith (1982), a significant body of literature has developed on the corporate demand for insurance. The agreement has been that for large, publicly traded firms, shareholders are able to diversify risk associated with personal risk through holding well diversified portfolios, for these corporations to purchase insurance; therefore, reasons other than risk aversion must exist (James and Joan, 2003). According to Mayers and Smith (1990) the general argument was that market imperfections lead to corporate demand for insurance, with research focusing on "*the structure of the tax code, costs of financial distress including potential investment incentive effects of a corporation's capital structure, the corporation's ownership structure, comparative advantages in real service production, and the composition of corporate managers' compensation packages*." Mayers and Smith (1990) separately developed a theory for risk management that focuses on costly external financing. General conclusion was that risk management has value when it assures that corporations have sufficient capital to take advantage of attractive investment opportunities. Hence, the value of risk management (i.e., hedging, of

which insurance purchasing is an example) is dependent on various market factors including correlations between cash flows and investment opportunities, competitor behavior, and the costs of external financing relative to internal financing.

Cummins and Weiss (2002) have stated that the insurer require reinsurance because it reduces its burden of pure risk. Garven and Tennant (2003) have argued that the reinsurance is used to make sure that the payment of claims in the event of loss and to remain financially solvent. Swiss (2002), Swiss (2003), Garven and Tennant (2003), Baur and Donoghue (2004), Arndt, et al.(2004), Cummins, Dionne, and Nouira (2008), and Pitselis (2008) have stated that the reinsurance practice enhances the capacity of direct insurer and enables it to accept more risks without increasing its own capital while maintaining its solvency requirements. This happens because reinsurance enables the direct insurer to retain fewer losses and require lesser capital as security for losses.

2.2.2. The Role of Reinsurance in the Insurance Industry

Reinsurance is insurance purchased by one insurer from another insurer. The company that buys reinsurance is commonly referred to as the ceding insurer, or cedant, and the company that sells reinsurance coverage is the reinsurer (Garven and Tennant, 2003). Thus, the cedant or cede reinsurance to the reinsurer. Reinsurance plays a critically important role in the risk management strategies of insurers. Insurers manage risks by relying upon the law of large numbers, in that they issue a large number of policies whose losses for the most part are uncorrelated with each other, thus causing aggregate claims to become more predictable than they otherwise would be (Bernard, 2013). This reduces the variance of the insurer's cash cows, thus allowing the insurer to more accurately determine its capital requirements. However, circumstances may arise in which adequate diversification of risk may be difficult to achieve, thus limiting these traditional risk pooling arrangements. For example, losses from natural and manmade catastrophes do not follow the law of large numbers since they are (by their very nature) highly correlated.

Insurers can transfer these risks to reinsurers and thereby reduce their risk exposure and capital requirements, allowing them to accept a larger number of risks with the same amount of capital. Bernard (2013). Besides enhancing insurers' capital position, reinsurance also enables insurers to smooth earnings and reduce regulatory compliance costs (Adiel, 1996). Moreover, reinsurance

can be used to reduce corporate tax payments and to mitigate agency and bankruptcy costs (Mayers and Smith, 1982). Insurance consumers face contractual performance risks, since premiums are paid in advance and consumers rely upon insurers to honor their future claims Froot, (2007). Since claims on insurance policies are generally not tradable, consumers typically have limited opportunities for diversification compared with other corporate claimholders such as bondholders. Not surprisingly, the empirical evidence on default risk in insurance markets indicates that insurance prices are quite sensitive to variations in insurer default risk. For example, Wakker et al. (1997) provide survey evidence that an insurance policy with one percent chance of defaulting is priced 20-30 percent lower compared with an insurance policy with no default risk.

2.2.3. The Costs and Benefits of Reinsurance

As per Hoerger et al, 1990 reinsurance purchase is basically a capital structure decision. Insurers seek to keep an optimal level of underwriting risk relative to their capitalization level. In the case of large losses, equity holders are only liable to pay losses until the assets of the company have been depleted. If there are remaining losses to be paid, equity holders have the option to declare bankruptcy and default in the remaining losses. Phillips, Cummins, and Allen (1998) find that policyholders consider the value of the insolvency option when deciding how much they are willing to pay for the insurance contract. To achieve their solvency target, insurers could increase their capitalization by raising new capital or reduce the risk by transferring a part of it to reinsurers. Thus, reinsurance plays the role of a substitute for capital (Hoerger, Sloan, and Hassan 1990); Garven and Lamm Tennant, 2003).With reinsurance contracts, an insurer transfers premiums collected from customers to a reinsurer. In turn, the reinsurer accepts to bear a part of the risk assumed by the insurer with proportional reinsurance, premiums and claims are shared between the insurer and the reinsurer in the proportion stipulated in the contractual agreement (Garven and Lamm Tennant, 2003). In addition, the reinsurer pays a “ceding commission” to the insurer to compensate it for the costs of underwriting the ceded business. However, the commission is also determined by the nature and composition of the insured business and by the underwriting results. In non-proportional reinsurance, the reinsurer assumes only the losses that exceed a certain amount, called the retention or priority (Garven and Lamm Tennant, 2003).

In calculating the price of the risk transferred, the reinsurer takes into account the loss experience during the previous years and the expected future losses according to the type of risks involved (Bernard, 2013). An insurer will accept to pay loading fees over the actuarial price of the risk transferred. The loading fees should correspond to the cost of the marginal capital needed to support the risk. Since the cost and the quantity of the capital needed to support the risk could be different for the insurer and the reinsurer, the transaction could take place without arbitrage (Berger et al. 1992). According to Bernard 2013 the reinsurance contract is generally negotiated and signed before the beginning of its effectiveness. At that time, the agreement is accepted by both sides and considered as a fair contract. Moreover, loading fees could include the price of insurer's benefits from reinsurer product development skills and risk management expertise. The reinsurer plays an important role in assessing and underwriting risks, and in assisting insurer's efforts to handle claims efficiently (Swiss , 2004).

An insurer is able to diversify underwriting risk when losses of individual policyholders are statistically independent. In insurance markets where risks are statistically independent, such as automobile collision insurance, the expected losses from a large pool of risks are highly predictable and the loss per claim is moderate. Hence, an insurer will provide coverage for large number of policyholders without having to hold large amounts of costly equity capital relative to the quantity of insurance being underwritten Doherty and Dionne, (1993), The problem is that statistical independence is violated when a mega catastrophe occurs; a single event can cause losses to many policyholders simultaneously. However, the risk of a catastrophe in the U.S. for instance is independent from the risk of a catastrophe in other countries. This provides an economic motivation for a global reinsurance market. The U.S. insurance industry diversifies losses across the world to provide coverage and pay losses in areas such as Florida and California, which have high exposure to catastrophic risks and large concentrations of property values. Thus, with global diversification, the amount of capital needed by international reinsurers to support catastrophic risks is lower than the amount of capital needed by local insurers.

Generally Purchasing reinsurance reduces insurers' insolvency risk by stabilizing loss experience, increasing capacity, limiting liability on specific risks, and or protecting against catastrophes. Consequently, reinsurance purchase should reduce capital costs. 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.

2.3. Theory of Reinsurance

2.3.1. Corporate finance theory

This theory suggests that firms purchase insurance to help solve underinvestment problems. The underinvestment problem occurs when stockholders have incentives to forgo an investment with positive net present value because all the benefits from the investment will accrue to debt holders. Mayers and Smith (1987) and Garven and MacMinn (1993) show that firms could guarantee incentive compatibility by including a covenant in the debt contract requiring insurance coverage. The incentives conflict between stockholders and policyholders is specific to stock insurers. With the mutual ownership structure there is no such incentives conflict because policyholders are themselves the owners. However, mutual insurers purchase reinsurance in the same manner as stock insurers. The mutual ownership structure reduces the access of insurers to the capital market. Therefore, mutual have traditionally relied on retained earnings as the primary, if not sole, source of capital. Retaining sufficient capital could prevent the need for frequent variations in premiums and dampen the effects of extraordinary periodic underwriting losses but could also create a free cash-flow problem. Wells et al. (1995) find that mutual insurers have a greater level of free cash flow than stock insurers. Thus, mutual insurers purchase reinsurance as an alternative source of capital and to reduce the free cash flow problem.

2.3.2 .Corporate Demand Theory

According to Iqbal et al. (2014), explicates the desires of a primary insurer to purchase reinsurance coverage against the risks it has assumed. Although, the core desire for demanding insurance or reinsurance coverage is risk sharing, since studies have shown that sharing risks optimally is not a singular reason for adopting reinsurance Plantin, (2006). There is a need for risk diversification in a company's underwriting portfolio so as to curtail the chances of such companies being decimated by taking advantage of the expertise of reinsurance companies in being able to stabilize the shareholders' return Doherty and Tinic, (1981). The primary insurers, due to their business dilemma, which is pondered on risk management and its cover, oftentimes have high degree of enhanced volatility in their level of cash flows, and, therefore, have a

reinsurance arrangement in order to dislodge the risks of insolvency and further reduce the cost of expected bankruptcy (Mayers and Smith, 1990)

2.4 Empirical Studies

The study of Sunday and Sunday (2017) examines the relationship between ceding office gross premium income, underwriting profit and financial stability in Nigerian insurance industry the study made use of primary and secondary data. The primary data were obtained from 246 respondents selected from those companies through the use of structured questionnaire. The secondary data obtained from the 2014 and 2015 published financials of the selected ten companies were used to determine the Reinsurance Ceded Ratio (RCR), Return on Asset (ROA), Return on Equity (ROE) as well as the Ratio of Reinsurance Recoverable to Policyholders Surplus (RRPHS). A descriptive research design was employed. The results of this study show that reinsurance purchase increases significantly the insurers' premium income; it is also shown that profitability of the firm is sensitive to change in reinsurance utilization and has a positive relationship with it. The study concludes that purchasing reinsurance reduces insurers' insolvency risk by stabilizing loss experience and increasing capacity.

Garven and Tennant (2003) investigate the factors that determine demand for reinsurance in the U.S. by applying the panel data analysis on the 1980 to 1987 databases, they test four hypotheses. They try to prove that demand for reinsurance will be greater for insurers that have higher leverage and lower correlation between the firm's investment returns and claims costs. Also, insurers that write "longer-tail" lines of insurance and insurers that concentrate their investments in tax favored assets should have higher demand for reinsurance. The results of regression estimation confirm most of the model predictions .the finding of the study shows that Demand for reinsurance is positively related to leverage, asset volatility, and length of tail (claim delay) and negatively related to the correlation between investment returns and claims costs. The tax shield effect is not empirically confirmed in this study.

The study of Marijana and Maja (2014) investigates the factors that influence insurance companies' demand for reinsurance. Both insurers specific and the reinsurance industry specific factors are analyzed. The empirical analysis is based on panel data consisting of all insurance companies in Croatian insurance market in the period from 2003 to 2011. The results show that

demand for reinsurance is determined by product diversification, profitability, loss volatility as well as by price of reinsurance and the financial strength of reinsurance industry. Contrary to their expectation; size of insurance companies does not significantly determine reinsurance demand.

The study of Denise and Georges (2017) analyzes the relation between insurers liquidity creation and reinsurance demand the main goal of the study was to analyze how liquidity creation affect the demand for reinsurance the result they obtained are mixed indicated that liquidity creation has a negative effect on reinsurance demand for most firms insurers that create more liquidity are less likely to purchase reinsurance.

Kader and Adams (2007) evaluate the effects of the underwriting risk, solvency risk and expected taxes on demand for reinsurance in the United Kingdom life insurers market. Panel data includes 635 insurers and year observations for the period between 1992 and 2004 was used. They predict that insurers with higher underwriting risk need more reinsurance coverage to mitigate solvency risk. Solvency risk is estimated through free asset ratio (reverse leverage) and insurers that have more free assets will cede less reinsurance. They observed relationship between reinsurance decision and before planning tax convexity and predicted negative relation. Tax convexity is measured as the excess of the marginal tax rate over the effective tax rate in that year. Also, it is predicted that the relationship between level of reinsurance and before planning marginal tax rates (MTR) is negative. This study confirms that insurers with higher underwriting risk use more reinsurance and that higher level of leverage increases the demand for reinsurance. Also, it is confirmed that low marginal tax rates cause more reinsurance demand. Additionally, tax convexity is not significant in the reinsurance decision process.

Maria and Ghiorghe (2014) analyze the determinants of the demand for reinsurance in the Romanian insurance market during the period 2008 to 2012 by applying specific panel data techniques the result shows that the determinants of the demand for reinsurance in the Romanian insurance market are the return on total assets ratio, company size, and number of years since the company operates in the Romanian insurance market and the financial leverage in insurance. The return on total assets ratio emphasizes the company's ability to efficiently use its assets and has a

negative influence on the insurers' demand for reinsurance, as insurance companies that are more profitable have a greater capacity to absorb unexpected large losses and do not face the problem of underinvestment, using to smaller extent reinsurance services. The linkage between company size and demand for reinsurance is not negative as they expected, they give justification that it is likely that large companies to appreciate the liquidity component more than small companies, and for the sample used in this study, the liquidity component dominates the solvency component. As for the number of years since the insurer operates in the Romanian insurance market, a negative linkage between this variable and the insurer's demand for reinsurance is expected, because the company gets a greater experience and designs efficient strategies of risk internal diversification over the years.

Vincent and Vivian (2012) examine the interrelations among the demand for reinsurance, liquidity, and leverage in the U.S. property liability insurance industry. Three structural equations are simultaneously estimated on the basis of a two stage least squares paradigm. The empirical results indicate that insurers' liquidity and reinsurance demand are substitutes for each other, and the same relationship is found for liquidity and leverage. On the other hand, empirical findings support the fact that reinsurance demand and leverage are complementary.

Yu Lei and Joan (2008) examine Factors Influencing the Demand for Reinsurance in the Medical Malpractice Insurance Market and test for influences of a variety of organizational and market characteristics on reinsurance demand using the NAIC data base for the years 1995-2001. They find that insurers that are physician directed tend to purchase less reinsurance than do their non physician directed counterparts, particularly the stock insurers. They also find that group affiliation, smaller size, higher leverage, under reserving, greater geographic dispersion, and less specialization in medical malpractice are associated with greater purchase of reinsurance.

Marijana et al. (2014) carried out a research on firm specific characteristics and reinsurance evidence from Croatian insurance companies, Random effects panel model was estimated by using the data about internal characteristics of 19 insurers in the period between 2006 and 2011. The results of empirical analysis show that important factors of the insurance companies' decisions regarding the purchase of reinsurance are leverage, size, return on investment,

ownership structure, as well as a share of non life insurance in total insurance business. Underwriting result and asset volatility do not show statistically significant effect on reinsurance demand in the Croatian insurance market.

2.5 Variable Selection and Research Hypothesis

The researcher focuses on relevant and critical insurer specific factors rather than, taking all possible insurer specific factors. Existing theoretical considerations and empirical examinations of reinsurance demand dominantly highlight insurer's specific characteristics as most important for insurance companies' decision to rely on reinsurance. According to Marijana et al (2014) the major insurer specific factors that determine reinsurance demand are leverage, size, underwriting risk, investment returns, and ownership structure, therefore the researcher wants to focus on insurer specific factors:-financial leverage , underwriting risk, firm size, return on assets and assets volatility.

- **Financial Leverage**

Financial Leverage reflects the degree to which the insurers use debt as its financing source; therefore, the insurance companies' liabilities are highly contained of insurance reserves which represent insurance companies' liabilities to policyholders (Marijana et al. 2014). According to Watson and Head (2010) as cited in John et al. (2013) financial leverage arises when a firm decides to finance a majority of its assets through debt financing. Higher leverage implies higher risk of insolvency. Thus, insurance companies with higher leverage have less own funds to absorb financial and operational losses that result from unexpected events and demand for reinsurance more compared to the companies with lower level of leverage.

James (2003) point out increase in the average claim lowers the firm's premium income and reinsurance premiums; it also causes more investable funds to be generated, this leads to a net increase in financial leverage. Hence one would expect to observe a greater tendency toward reinsurance purchases by firms that underwrite risks with longer claim delays. Specifically, firms that specialize in liability risks should purchase more reinsurance than should firms specializing in property risks.

Moreover empirical findings have confirmed that there is a positive significant relationship between financial leverage and reinsurance demand (Garven and Lamm-Tennant, 2003 and Cole and McCullough, 2006). Firms write more business relative to surplus would have greater need for reinsurance because they have a higher probability of insolvency, and thus higher expected bankruptcy costs (Carson and Hyot, 1995) and Shiu, 2011).

As in the corporate demand theory the primary insurers, due to their business difficulty, which is considered on risk management and its cover, oftentimes have high degree of enhanced volatility in their level of cash flows, and, therefore, have a reinsurance arrangement in order to dislodge the risks of insolvency and further reduce the cost of expected bankruptcy (Mayers and Smith, 1990). Therefore, higher financial leverage is more exposed to deteriorate the underinvestment problem, the risk of insolvency, and bankruptcy costs this leads the insurer for reinsurance purchase. The ratio total liability to total asset is a key indicator of insurer's financial stability. Thus, based on the above theories and empirical studies the researcher formulates the following hypothesis:

Ho_1: Financial leverage has a positive significant effect on demand for reinsurance;

- **Firm Size**

Adams (1995) point out firm size could reflect the strength and ability of firms' reduce expected bankruptcy costs. Large company size means large number of units exposed to risk, which reduces the deviation of actual losses from those expected. Larger insurance companies are able to exploit economies of scale and increase efficiency in both underwriting activities and loss adjustment, which result in lesser demand for reinsurance. Firm size is used to show that larger companies are contributing better economies of scale and providing a higher profits than smaller firms (Flamini et al , 2009).

Mayers and Smith (1990) and Adams (1996) argue that residual claimants in smaller insurance companies are less able to tolerate the pressure of financing new business and/or sustaining unexpectedly large claims than their counterparts in large insurers. Consequently, small

insurance firms are expected to use reinsurance in order to enhance their risk-bearing efficiency, reduce the volatility of their cash flows, and so mitigate bankruptcy risk. In this way, reinsurance can also help to protect the distribution of future payoffs for the owners of small insurance firms.

Thus, in this study, the researcher includes the size variable in order to test the hypothesis that smaller insurers are more likely to purchase reinsurance. Above mentioned empirical finding, as well as that of Cole and McCullough (2006), Lei and Schmit (2010) and Reissaus and Wambach (2005), find the evidence supporting expected bankruptcy costs hypothesis that size negatively impacts the purchase of reinsurance.

In this study, company size is computed as logarithm of total premium of the insurance company. A negative linkage between firm size and reinsurance demand 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 hypothesis:

Ho_2: Company size has a negative significant effect on demand for reinsurance;

- **Underwriting Risk**

Underwriting is the process of selecting certain types of risks that have historically produced a profit and rejecting those risks that do not fit the underwriting criteria of the insurer. 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 and Young, 2010).

Underwriting risk generally refers to the risk of loss on underwriting activity. Insurers expose themselves to risk by underwriting risk and seek to keep the optimal level relative to their capitalization level. Empirical studies conducted reveal that primary insurer can boost its underwriting capacity and reduce its financial exposure by ceding parts of its original risks to reinsurer (Hall, 2010). Kader and Adams (2007) predicted that insurers with higher underwriting risk need more reinsurance coverage to mitigate solvency risk and confirmed with a result that

insurers with higher underwriting risk use more reinsurance. Thus, it is hypothesized for this study as;

Ho_3: Underwriting risk has a positive significant effect on demand for reinsurance;

- **Return on Asset**

Return on asset reflects the capability of insurance company's management to generate profits from the insurers' assets, although it may be biased due to off-balance-sheet activities. Most researchers in the field of insurance and their financial performance stated that the key indicator of a firm's financial performance is ROA (Zenios et al. 1999).Insurance companies financial performance can be measured using underwriting and profitability ratios (Flemings, 2004). William et al. (2004) argued that the performance of insurance companies in financial terms is normally expressed in net earned premium, profitability from underwriting activities, annual turnover, return on investment, and return on equity. On the other hand the return on total assets ratio represents one of the most used methods of quantifying .Arif and Showket (2015) ; Njeru (2013) ; Catherine (2014) ; Mike (1999) and Hafiz (2011) are among others, who have suggested that although there are different ways to measure profitability it is better to use ROA as it helps to measure the overall resource (asset) performance.

Ghiorghe (2015) suggested insurance companies that are more return on asset (profit) have a greater capacity to absorb unexpected large losses and do not face the problem of underinvestment, using to smaller extent reinsurance services. Moreover, study examines the potential effect of profitability on the demand for reinsurance showed more profitable are able to better absorb large unexpected losses and to face financial pressures and therefore it is expected that more profitable insurers will demand less reinsurance. Kader, Adams, and Andersson (2010) and Adams, Hardwick, and Zou (2008) find negative and statistically significant correlation between profitability and reinsurance. Accordingly, the researcher formulates the following hypothesis:

Ho_4: Return on Assets has a negative significant effect on demand for reinsurance;

- **Asset Volatility**

Asset volatility reflects the degree of instability of insurance companies operation (Marijana et al, 2014). As higher volatility implies greater risk, asset volatility reflects the degree of instability of insurance companies business and leads them to buy more reinsurance. Upon empirical studies conducted, an increased volatility of claims gives rise to increased reinsurance demand (Hoergar et al, 1990). Moreover, Haan and Kakes (2010) pointed out that other things remaining constant, insurers operating in more volatile line of business have a greater need for reinsurance than insurers which underwrite lower volatility policy. Garven and Tennant (2003) on their study conducted resulted positive significant relationship among asset volatility and reinsurance demand. Therefore it is hypothesized for these study that;

Ho_5: Assets Volatility has a positive significant effect on demand for reinsurance;

2.6 Summary of Literature Review and Knowledge Gap

This part of the study summarized the existing literature on factors influencing reinsurance demand. Reinsurance demand is highly influenced by a set of factors: insurer, reinsurer and insurance industry (macro-economic factors). Different literature provides evidence as to how insurer optimizes their risk by executing different risk control mechanisms like purchase of reinsurance.

The review of the literatures correspondingly revealed the existence of gap, and shown that factors affecting reinsurance demand requires further investigation. Different scholars using empirical investigation on factors affecting the demand for reinsurance are resulting in dissimilar conclusions. For instance, research conducted by Kader and Adams (2007) which affirmed insurers with higher underwriting risk need more reinsurance coverage to mitigate solvency risk the result indicated that underwriting risk and reinsurance demand have had a positive significant relation. On the other hand study conducted by Marijana et al. (2014) point out that underwriting risk does not show statistically significant effect on reinsurance demand in the Croatian insurance market.

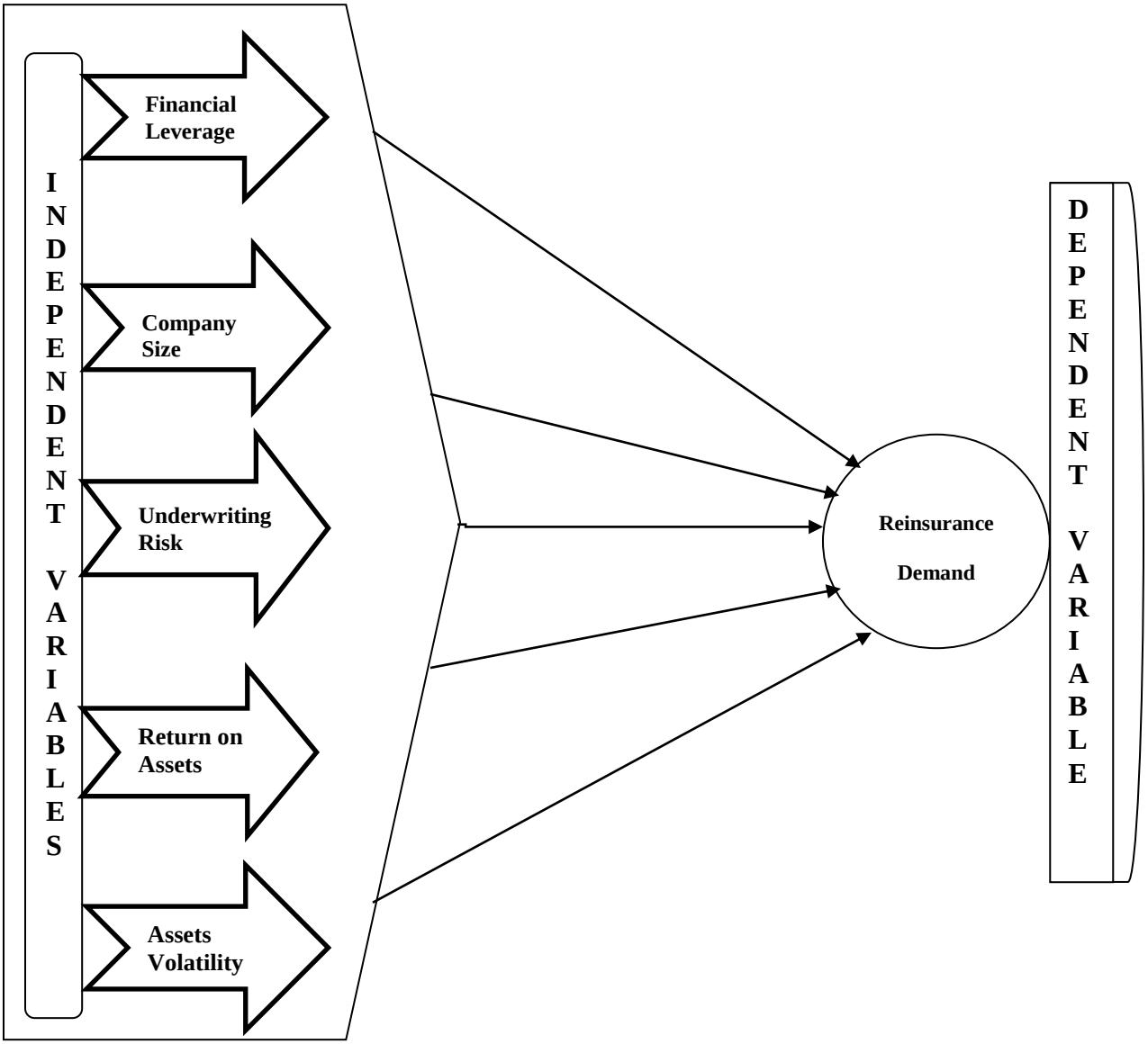
There is also no clear consent on how the asset volatility is related to reinsurance demand. According to Garven and Tennant (2003) asset volatility reflects the degree of instability of insurer business; the result of the study revealed there is positive significant relation between asset volatility and reinsurance demand. However, Marijana et al. (2014) identified there is no indicative relation between insurance companies' decisions regarding the purchase of reinsurance and insurer'sasset volatility. Hence, the results are inconclusive and require more empirical work.Part of the studies encompasses insurance industry level factors, as well, but most of them were carried out in developed economies (Cole and McCullough, 2006, Lei and Schmit, 2010).

Research gaps exist since none of the studies address the impact of insurer specific factors on reinsurance demand in Ethiopian insurance company.Thus, the main aim of this study was to analyze insurers' specific factors that determine Ethiopian insurers' demand for reinsurance. The analysis is based on the panel data consisting of all insurance companies excluding EIC that were active in the Ethiopian insurance market since 2005. Besides contribution to the literature of reinsurance demand in the context of developing insurance market, the paper could make contribution to developing countries insurance companies.

2.7 Conceptual Framework

Theoretical and empirical assessments in preceding topics enabled the researcher to develop the following conceptual framework which describes the relationship between independent variablesand dependent.

Figure 2.1: Conceptual Framework



Source: Researcher design based on theories and empirical literature review

CHAPTER THREE
RESEARCH DESIGN AND METHODOLOGY

The purpose of this study is to evaluate insurer specific factors which influence the demand for reinsurance in Ethiopia insurance industry. For the purpose of this study insurer firm denoted as any insurance companies which purchase insurance policy coverage from Reinsurance Company. By overlooking the aforementioned literature review the researcher used to recognize insurer specific factors on reinsurance demand in Ethiopia insurance industry. This chapter describes in details and systematically how the research is conducted. It illustrated specific issues such as the brief overview of the research design and approach, population and sampling techniques adopted in the study, actual data sources and collection instruments, variables measurements and following the variables measurement model specifications and finally data presentation and analysis techniques used in the study respectively.

3.1 Research Design and Approach

A research design is a tool to achieve research objective, and it's defined as set of advance decisions that makes up the main idea specifying the methods and procedures for collecting and analyzing the needed information (Ary et al, 2010). To assess the impact of insurer specific factors which influence the demand for reinsurance in Ethiopia insurance industry? The primary aim of this study is to evaluate insurer specific factors which influence the demand for reinsurance of insurance industry in Ethiopia. To achieve this objective an explanatory research design is employed. Explanatory type of research design helps to identify and evaluate the causal relationships between the different variables under consideration (Marczyk et al., 2005). 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). Explanatory research design helps to investigate the relationship between insurer specific factors that influence the demand for reinsurance in Ethiopia insurance industry and to reach at a conclusion by taking samples which represent the total population. There are three different way of approaching a problem; qualitative, quantitative and mixed (Ary et al, 2010). For the purpose of this study, the researcher used a quantitative research approach. Quantitative research is a means for testing theories by describing the relationship among variables.

Quantitative data are obtained using either the interval or ratio scale of measurement (Ary et al, 2010).

3.2 Population and Sampling Techniques

The population of the study represents the targeted group as defined in the scope of research. Therefore, target populations of the study are all insurance companies registered by NBE and under operation in Ethiopia from 2005 to 2016 except Ethiopia Insurance Corporation (EIC). The researcher obtains sufficient and representative sample. The researcher purposively selected eight insurance companies as a sample from seventeen insurance companies. Therefore, the total number of insurance operating in Ethiopia is seventeen, of which one state-owned insurance company, i.e.Ethiopia Insurance Corporation (EIC) and sixteen private owned insurances are in Ethiopian insurance industry.

The population is insurance companies in Ethiopia which were under operation since 2005 excluding Ethiopia Insurance Corporation (EIC) because it is massive insurance company in the country with the market share of more than 35% in most parameters (total asset, capital, profit). That means the rest sixteen insurance companies in Ethiopia have the market share of nearly 65% of which eight insurance companies selected as a sample could have a market share of nearly 64.5%. Therefore, eight insurance companies having twelve years data (from 2005 to 2016) are purposively selected as a sample. So, insurance companies such as National Insurance Company of Ethiopia (NICE), Awash Insurance Company (AWASH), Africa Insurance Company (AFRICA), Nyala Insurance Company (NYALA), Nile Insurance Company (NILE), Global Insurance Company (GLOBAL), United Insurance Company (UNIC), and Nib Insurance Company (NIB) are selected as a sample.

3.1 List of insurance companies in Ethiopia with their year of establishment and ownership

No.	Insurance companies	Year of Establishment	Ownership
1	Ethiopian Insurance Corporation	1975	public
2	National Insurance Company of Ethiopia	1994	Private
3	Awash Insurance Company	1994	Private
4	Africa Insurance Company	1994	Private
5	Nyala Insurance Company	1995	Private
6	Nile Insurance Company	1995	Private
7	Global Insurance Company	1997	Private
8	United Insurance Company	1997	Private
9	Nib Insurance Company	2002	Private
10	Lion Insurance Company	2007	Private
11	Ethio-Life and General Insurance Company	2008	Private
12	Oromia Insurance Company	2009	Private
13	Abay Insurance Company	2010	Private
14	Berhan Insurance Company	2011	Private
15	Bunna Insurance Company	2011	Private
16	Tsehay Insurance Company	2012	Private
17	Lucy Insurance Company	2012	Private

Source: data from NBE

Table 3.2 EIC and Sampled Insurers' Market Share (In 000,000)

Years	Insurance Industry			EIC			The Sampled (8) Insurers			The Sampled Insurers Share in Per Cent		
	TA	Capital	Profit	TA	Capital	Profit	TA	Capital	Profit	TA	Capital	Profit
2005	1,297	352	91	668	109	65	628	243	25	100%	100%	100%
2006	1,564	543	106	772	262	55	791	281	50	100%	100%	100%
2007	1,694	545	121	780	246	68	914	299	52	100%	100%	100%
2008	1,960	547	137	860	225	78	1,076	311	65	98%	97%	97%
2009	2,229	609	157	960	245	83	1,237	356	77	97%	98%	98%
2010	2,765	771	306	1,104	266	146	1,550	471	162	93%	93%	93%
2011	3,449	879	312	1,285	260	144	1,960	564	162	91%	91%	91%
2012	4,908	1,165	529	1,785	313	243	2,717	753	270	87%	88%	88%
2013	5,931	1,503	852	2,080	361	343	3,175	974	476	82%	85%	85%
2014	7,059	1,959	965	2,291	425	439	3,725	1,207	432	78%	79%	79%
2015	8,365	2,555	1,148	2,470	428	467	4,360	1,572	525	74%	60%	60%
2016	10,059	3,315	1,029	2,806	703	518	5,055	1,839	382	70%	17%	87%
Total	51,280	14,743	5,753	17,861	3,843	2,649	27,188	8,870	2,678			
Average	4,273	1,229	479	1,488	320	221	2,266	739	223	100%	100%	100%

Source: Researcher computation based on the data from NBE

3.3 Source of Data and Data Collection Instruments

The sources of data for this study are from secondary sources. The secondary data was derived from audited balance sheet, income statement and revenue account of 8 (eight) purposively selected insurer companies in Ethiopia. From these insurers, 12 consecutive years' balance sheet, income statement and revenue account (filed with NBE for the period 2005 to 2016) have been used for the study to examine the effect of insurer specific factors on the demand for reinsurance.The recommended length of data to use in most finance literatures is more than one business cycle (greater than 5 years); therefore the researcher assumed a twelve years data is relevant for this study purpose. There are two main types of sampling procedures: probability sampling and purposive sampling. Choosing the type of sampling technique depends upon the area of research, research methodology, and preference of the researcher (Dawson, 2002).

3.4 Variable Measurement

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

3.4.1 Dependent Variables

- **Reinsurance demand (RR)**

Insurers are willing to diversify risk associated with distinctive risk through holding well-diversified portfolios. As per David and Mary (2016) described diversification of primary insurers' risk exposures and allows them to separate origination from portfolio composition; it enables the financial risks of individuals and corporations to be covered more efficiently, cheaply, and securely than undiversified. For these corporations to purchase insurance policy, therefore, have reasons other than risk aversion must exist. (Yu Lei and Joan 2008).The general argument is that market imperfections lead to corporate demand for reinsurance.

Most previous studies use the reinsurance ratio as a proxy for a reinsurer's demand for reinsurance (Mayers and Smith (1990), Cole and McCullough (2006), Shiu (2011)). Ghiorgheand Ana-Maria (2015) described reinsurance ratio is used to quantify the reinsurance

services purchased by the insurance companies and it's computed as ratio of premiums ceded in reinsurance to gross business written premiums. The reinsurance ratio reflects the volume of reinsurance transactions between insurers and reinsurers.

Reinsurance Demand (RR) = ratio of reinsurance premiums ceded to gross Written premiums for firm;

$$\boldsymbol{Reinsurance\ Ratio\ (RR)} = \frac{\textbf{Premiums Ceded (PC)}}{\textbf{Gross Written Premiums (GWP)}}$$

3.4.2 Independent Variables

Independent variables are classified as insurer Specific factors which could have an effect on the economic model of the dependent variable (reinsurance demand). Therefore, based on the availability of the data at NBE the study considers five insurer specific characteristics which could have an influence on the demand for reinsurance in Ethiopian insurance companies. The variables are namely; Leverage, Firmsize, Underwriting risk, Return on total assets, and Assets volatility. There are:-

- **Financial Leverage**

According to Borde et al., (1994) confirms firms with higher financial leverage are more exposed to worsen the underinvestment problem, the risk of insolvency, and bankruptcy costs. Reinsurance is a substitute for equity which enables insurers to reduce the expected costs of financial distress (Garven and Lamm-Tennant, 2003). Financial leverage measured by calculating the ratio of total liability to total asset.

Leverage (LVRG) = ratio of total liability to total asset;

$$\textbf{Leverage (LVRG)} = \frac{\textbf{Total Liablity (TL)}}{\textbf{Total Asset (TA)}}$$

- **Firm Size**

Firm's size is an explanatory variable that measures the size of the firm (Kouki and Guizani, 2009). Companies can be categorized according to their size (measured by market capitalization, total sales, total assets or total premium) for the purpose of these statistical analyses the researcher use total premium (Al-Najjar and Hussainey, 2009).The large size insurers should buy relatively less reinsurance policy. Moreover, larger insurers are more likely to be able to self-insure (Adams, 1996). As per Marijana et al., (2014) insurers' size is measured by the natural logarithm of total premium.

Firm size (TP): is computed as natural logarithm of total premium of the insurance company.

$$\mathbf{TP = Log\ (Total\ Premium)}$$

- **Underwriting Risk**

As described by Ghiorghe and Ana-Maria (2015) the underwriting risk can have a great influence on the company's stability through higher expenses and also affect the efficiency of the insurers' underwriting activity. The underwriting risk is measured by the ratio of net incurred claim to net earned premium.

Underwriting Risk (CR) = ratio of Net incurred claim to Net earned Premium

$$\mathbf{Underwriting Risk (CR)} = \frac{\mathbf{Net\ Incured\ Claim\ (NIC)}}{\mathbf{Net\ Earned\ Premium\ (NEP)}}$$

- **Return on Assets**

Return on Assets measures the returns to all assets and is often used as an overall index of profitability and the higher the value, the more profitable the business. Most previous studies on insurance sector return on assets is being used as a proxy of profitability and also use to measure the whole company's resources. (Ahmed, 2011; Al-Shami, 2008; Malik, 2011; Lee, 2012)).

Reinsurer companies with high return on assets absorb unexpected large losses and do not face the problem of under investment. (Ghiorghe and Ana-Maria: 2015).

Return on Assets (ROA) = the ratio of Net Profit after Tax to Total Assets;

$$\textbf{Return on Assets (ROA)} = \frac{\textbf{Net Profit After Taxes (NPAT)}}{\textbf{Total Assets (TA)}}$$

- **Assets Volatility**

Asset volatility reflects the degree of instability of insurance companies business. Higher volatility implies greater risk. As the risk is increasing, insurance companies buy more reinsurance. The variable is measured by the ratio of difference between value of the total assets in time t and t-1 to the total asset value in time t-1. (Marijana. et.al. 2014).

Assets Volatility (AVOL) = ratio of change in Total Assets $_{(t)}$ from Total Assets $_{(t-1)}$;to Total Assets;

$$\textbf{Assets Volatility (AVOL)} = \frac{(\textbf{Assets (A) (t)} - \textbf{Assets (A) (t} - \textbf{1}))}{\textbf{Assets (A)}}$$

Table 3.3Lists the dependent and independent variables used in the study, along with a description of each variable and the expected coefficient sign

Dependent Variable	**Description**	
Reinsurance Ratio	(Premiums Ceded /Gross Written Premiums)	
Independent Variables	**Description**	**Expected Sign**
Insurer specific factors		
Financial Leverage	(Total Liablity) / (Total Asset)	+
Company Size	Log (Total premium)	-
Underwriting risk	(Net Incure claim (NIC)/Net Earned premium(NEP)	+
Return on Assets	Net Profit after Taxes (NPAT) /Total Assets (TA)	-
Assets Volatility	(Total Assets (A) (t) – Total Assets (A) (t – 1)) /Total Assets (A)	+

Source: The researcher design

3.5 Model Specification

Model construction involves specifying relationships between two or more variables; perhaps extending to the development of descriptive or predictive equations (William et al., 2010). In

order to achieve the objectives of this study, the panel data regression model is used to identify the relationship between the explained variable demand for reinsurance in Ethiopian insurance industry and explanatory variables financial leverage, solvency, company size, underwriting risk, return on assets and assets volatility which affect the demand for reinsurance. The collected panel data is analyzed using descriptive statistics, correlations and multiple linear regression analysis. Mean values and standard deviations are used to analyze the general trends of the data from 2005 to 2016 based on the sample of 8 insurance companies in Ethiopia and a correlation matrix are 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 demand for reinsurance companies 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 8 Ethiopian insurance companies and the time-series element is reflected the period of study (2005-2016) i.e. twelve years. 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 impact explanatory variables oninsurance companies demand for reinsurance, the following general multiple regression models is adopted from different studies conducted on the same area.

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

$$\mathbf{RR}_{\mathbf{it}} = \beta 0 + \beta 1 \mathbf{LVRG}_{i,t} + \beta 2 \mathbf{TP}_{i,t} + \beta 3 \mathbf{CR}_{i,t} + \beta 4 \mathbf{ROA}_{i,t} + \beta 5 \mathbf{AVOL}_{i,t} + \varepsilon$$

Source: developed by researcher by reviewing previous research works.

Where;
RR = Demand for Reinsurance;
LVRG= Leverage;

TP = Company Size;

CR = Underwriting Risk;

ROA = Return on Assets;

AVOL = Assets Volatility;

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

β0= Intercept

β= 1, 2, 3…5 are parameters to be estimate; i = insurance companies $_i$ = 1. . . 8; and t = the index of time periods and t = 1. . . 12

3.6 Data Presentation and Analysis Techniques

After the data were collected from National bank of Ethiopia (NBE), the researcher rearranged and coded the data. The collected panel data are analyzed and interpreted by using descriptive statistic, correlation analysis and multiple regression estimation method. To enhance the strength of the models and to control the cross section effects of the intercepts the study employed fixed effect regression techniques. The simplest types of fixed effects models allow the intercept in the regression model to differ cross-sectional (Brooks, 2008). The fixed-effects model controls for all time-invariant differences between the individuals, so the estimated coefficients of the fixed-effects models cannot be biased because of omitted time-invariant characteristics.

The study checked whether the proposed empirical model is free from autocorrelation, multicollinearity, heteroskedasticity and normality. 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 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 (BLUE). 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. If any one of those phenomenon turns out to be present, this would be a violation of a key assumption of OLS regression. To conduct this, the researcher used E-views 8 software as recommended by Brooks (2008) due to its ability to help researchers to analyze research easily and efficiently. Redundant fixed effect (likelihood ratio) test is also made to ensure that a fixed effect regression technique is appropriate.

CHAPTER FOUR
DATA ANALUISES AND DISCUSSION OF RESULTS

This chapter presents the results and analysis of data of selected Insurance Companies in Ethiopia 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 2005 up to 2016 and a cross section segment which considered eight Ethiopian non-life insurance companies. The chapter organized into five sections. Section one presents descriptive statistics, section two correlation analysis, section three model specification, section four tests for the classical linear regression model assumptions and section five analysis of results.

4.1 Descriptive Statistics

The descriptive statistics of the dependent and explanatory variables for the sampled Insurance Companies were summarized in table 4.1. The total observation of the study was 96. Also, the table shows the mean, standard deviation, minimum and maximum values for the dependent and independent variables.

Table 4.1: Descriptive Statistics of the Variables

	RR	LVRG	LOG(TP)	CR	ROA	AVOL
Mean	0.227890	0.660816	11.61645	0.670147	0.085464	0.224668
Median	0.230100	0.664031	11.72059	0.661176	0.079316	0.206581
Maximum	0.340100	0.822448	12.85892	1.917311	0.373601	0.670073
Minimum	0.139800	0.452858	8.985445	0.170669	-0.047143	-0.065577
Std. Dev.	0.044165	0.081937	0.902734	0.213118	0.061837	0.145284
Observations	96	96	96	96	96	96

***Source**: Own computation from the financial statements using Eviews 8*

Note: Reinsurance Ratio (RR), Leverage (LVRG), Logarithm of Total Premium LOG (TP), Claim Ratio (CR), Return on Asset (ROA) and Asset Volatility (AVOL).

- **Reinsurance demand:**

As indicated in the above table 4.1, the demand for reinsurance measured by reinsurance ratio shows that Ethiopian insurance company demanded reinsurance coverage on average (23%) over the last twelve years. The mean RR (23%) the sampled non-life insurers were retained (77%) of their gross premium and utilized their capacity exhaustively; this may be an alert for the industry as it was below the international most acceptable ratio range of (30%-70%).For the total sample, the range of RR was a maximum of (34%) and a minimum of (14%). The standard deviation was (4%) of the selected non-life insurers; it means the value of RR deviate from its mean to both sides by (4%) which indicate there was low variation from the mean. The lower standard deviation is a good indication that most of the observations are concentrated around the mean.

- **Financial Leverage:**

This test measures the proportion of total liabilities to total assets of Ethiopian insurance companies. It indicates the ability of the insurance companies to meet their total debt obligations. The average value of the leverage was (66%) that was more than the capital of Ethiopian insurance industry. The maximum value and the minimum value were (82%) and (45%) respectively for the study period. This indicates that most leveraged insurance company among the sampled hold 82% of total debt from its capital structure. On the other hand, low leveraged insurance company of the sampled had 45% of liability on its capital structure and the remaining 55% was contained by shareholders equity. The value of standard deviation was (8%), which was not very far from the normal acceptable standard of 5% and implies that there was low variation from the mean.

- **Firm Size**:

Insurance size measured by logarithm of total premium is used as a proxy. The mean of the logarithm of total premium during the period was (11.62).Size of insurance companies was highly dispersed from its mean value (i.e. 11.62) with the standard deviation of (90%). Therefore, there was high deviation in the volume of gross premium among the study sampled

size of eight non-life insurance companies in Ethiopia from their mean value.The maximum and minimum values were (12.86) and (8.98) respectively.

- **Underwriting Risk:**

Concerning the underwriting risk variable, as a proxy the claim ratio measured by net claims incurred divided by net earned premium. The mean of claim ratio was (67%) which is good as it was below the most international acceptable ratio of (70%). However in the case of Ethiopia it is very high as there were very limited investment opportunity and also these limited investment opportunities are highly regulated by the National Bank of Ethiopia (NBE). On the subject of, the maximum and minimum values of claim ratio were (192%) and (17%) respectively. In which, variations between non-life insurers in terms of the given indicator are very high, given that its value, individually viewed, ranges from only (17%) to as much as (192%) this indicates thatunstable incurred claims were reported. The standard deviation of the selected non-life insurers was (21%), which also indicated that there was high variation.

- **Return on Assets:**

As indicated in the above table 4.1, the return on asset shows that Ethiopian insurance company achieved on average a positive (9%) after tax profit over the last twelve years. The mean ROA (9%) indicated that the sampled non-life insurers were out-performed as it was more than the most common international practices (5%). For the total sample, the range of ROA was a maximum of (37%). Moreover, the most profitable insurance company among the sampled earned 37cents of profit after tax for a single birr invested in the assets of the firm. On the other hand, not profitable insurance company of the sampled lost 5cents of profit after tax for each birr invested in the assets of the firm.The standard deviation was (6%) of the selected non-life insurers; it means the value of ROA deviate from its mean to both sides by (6%) which was good as it close to the most common acceptable standard of 5%.

- **Assets Volatility**:

Concerning the asset volatility variable, the average value of the percentage increase/decrease in total asset was (22%).The highest asset variance for a non-life insurance company was (67%) which were very high and the lowest was (-6%). The dispersion/standard deviation was (14) which

indicated that there was a high dispersion from the mean value of asset volatility on non-life Ethiopian insurers.

4.2 Correlation Analysis

As noted in Brooks (2008), Correlation between two variables measures the degree of linear association between them. Values of the correlation coefficient are always ranged between positive one and negative one. A correlation coefficient of positive one indicates that a perfect positive association between the two variables; while a correlation coefficient of negative one indicates that a perfect negative association between the two variables. A correlation coefficient of zero, on the other hand, indicates that there is no linear relationship between the two variables. The most widely used bi-variant correlation statistics is the Pearson product movement coefficient, commonly called the Pearson correlation. The result of the correlation analysis is shown in Table 4.2. It indicates a relationship between reinsurance demand, and company size and asset volatility had positive relationship, while leverage, claim ratio and return on asset had negative relationship with insurers demand for reinsurance. No case of multi-collinearity among the independent variables existed. Table 4.2 below provides the Pearson's correlation matrix for the variables used in the analysis.

Table 4.2: Correlation Matrix

Covariance Analysis: Ordinary

Sample: 2005 2016

Included observations: 96

Correlation	RR	LVRG	LOG(TP)	CR	ROA	AVOL
RR	1.000000					
LVRG	-0.004442	1.000000				
LOG(TP)	0.015490	0.449648	1.000000			
CR	-0.231778	0.111883	-0.070645	1.000000		
ROA	-0.147026	-0.055006	0.272037	-0.209360	1.000000	
AVOL	0.299899	0.055879	-0.075117	-0.067981	0.067708	1.000000

***Source**: Own computation from the financial statements using Eviews 8*

As can see from the above table 4.2, the correlation result between leverage, underwriting risk measured by (claim ratio) and return on asset had negative correlation with demand for reinsurance with the coefficients of (-0.044), (-0.232) and (-0.147). On the other hand company size and asset volatility had positive relationship with reinsurance demand with the coefficients of (0.015 and (0.299) respectively. This indicates that as ratios of leverage, claim ratio and return on asset increases, demand for reinsurance moves to the opposite direction. In contrary to the above explained variables, the Pearson correlation coefficients of company size (0.0.015) and asset volatility had positive relationship with reinsurance demand.

4.3 Model Specification Test

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 these approaches is done by running a Hausman test and the result is presented as follows.

Random Effect Model: The rationale behind random effects model is that, unlike the fixed effects model, the variation across entities is assumed to be random and uncorrelated with the predictor or independent variables included in the model. Random effect model assume that the entity's error term is not correlated with the predictors which allows for time-invariant variables to play a role as explanatory variables (Oscar, 2007). The result of the test displayed below the Table 4.3.

Table 4.3: Random Effect Test

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	4.068970	5	0.5395

***Source**: Own computation from the financial statements using Eviews 8.*

The null hypothesis of the test was that the random effect method is the preferred regression method. As shown above in table 4.3, random effect Hausman test provide statistical evidence of P-value of 53 %, which means the random effect estimators are insignificant at significant level of 1%. This implies the null hypothesis has been not rejected as according to Brooks (2008) the p-value for the test is greater than 1%, indicating that the random effects model is appropriate.

Redundant Fixed Effects Tests: The fixed-effects model controls for all time-invariant differences between the individuals, so the estimated coefficients of the fixed-effects models cannot be biased because of omitted time-invariant characteristics. One side effect of the features of fixed effects model is that they cannot be used to investigate time-invariant causes of the dependent variables (Oscar, 2007). The pooled regression assumes that the intercepts are the same for each firm. This may be an inappropriate assumption, and Brooks (2008) recommended that we could instead estimate a model with firm fixed effects, which will allow for latent firm specific heterogeneity. The simplest types of fixed effects models allow the intercept in the regression model to differ cross-sectional. To determine whether the fixed effects are necessary or not, this study run a redundant fixed effects test as recommended by Brooks (2008). The results of the test are summarized in the following Table 4.4.

Table 4.4: Redundant fixed effect test

Redundant Fixed Effects Tests

Equation: Untitled

Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	48.014929	(7,83)	0.0000
Cross-section Chi-square	155.450850	7	0.0000

***Source**: Own computation from the financial statements using Eviews 8.*

From Table 4.4 we can conclude that, the p-values associated with the test statistics are zero to 4 decimal places, indicating that it is better to employ the fixed effect model.

According to the above tests results both fixed effect and random effect models are allowable, however 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. 12 year) is greater than the number of cross-sectional units (i.e.8 insurance companies).

Brook (2008) stated that, in the econometric context, a regressor is said to be endogenous if it is correlated with the error term of the data generating process in the population. Endogeneity problems mainly arise due to omitted variables, measurement error of explanatory variables, or if there is a reverse causality between the dependent and the explanatory variables, i.e. the dependent variable causing some explanatory variable as well. A simple fixed effects panel estimator would robust the findings of OLS regression, because the dummy variables included to control for the individual effect automatically control for any time-invariant variable. However, Jean and Michel (2006) suggested that the fixed effects model is preferred in cases where conclusions have to be made on the sample and if the observation (panel data) is less, fixed effects will be more efficient than random effects, while the interests of random effects model are on the overall population.Therefore, based on the above discussion the fixed effect model is preferable for this study.

4.4 Model Diagnosis Test

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. To test multiple regression models, it is necessary to assess whether the collected data violate the key assumptions of regression models because any assumption

violations can result in distorted and biased research results (Hair et al., 1998). Accordingly, the data has to meet certain assumptions as indicated below.

- **The errors have zero mean:**

The first assumption required is that the average value of the errors is zero. In fact, if a constant term is included in the regression equation, this assumption will never be violated (Brook, 2008). In this study the model consisted a constant term called an intercept. In addition by including the intercept we can avoid two main undesirable consequences; first, R-square, could never be negative and second, a regression with intercept parameter could not lead to potentially severe biases in the slope coefficient estimates.

- **Heteroskedasticity:**

It has been assumed that the error terms are homoscedastic. That is, it assumed that the error terms have a constant variance; otherwise they are said to be heteroskedastic. The presence of heteroskedasticity makes the standard errors too big or too low and hence any inferences made could be misleading. The most popular method, a white's test has to be made, to ensure that this assumption is no longer violated. If the probability of F-statistics, Observed R-square, and Scaled explained SS of the heteroscedastic white test result is in excess of 5% then there is no hetroscedastic problem. However, if one of these three is fail then there is existence of hetroscedastic problem (Brook, 2008).

Table 4.5: Heteroskedasticity Test: White

F-statistic	0.951059	Prob. F(5,90)	0.4522
Obs*R-squared	4.817758	Prob. Chi-Square(5)	0.4385
Scaled explained SS	2.427378	Prob. Chi-Square(5)	0.7874

Source: Own computation from the financial statements using Eviews 8.

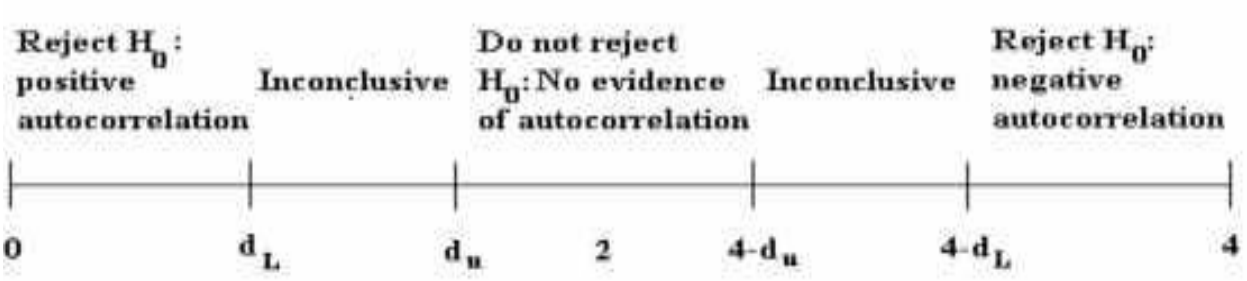
According to the hetroscedastic white test result which is presented on table 4.5 above shows that the probability of F-statistics, Observed R-square, and Scaled explained SS are (45%), (43%),

and (78%) respectively. Hence, the probability of F-statistics, Observed R-square, and Scaled explained SS are in excess of 5% and then there is no problem of hetroscedastic. This implies that the assumption of homoscedasticity or errors have a constant variance full filled its requirement. Therefore, the null hypothesis that the variance of the errors is constant (hemoscedasticity) should not be rejected.

- **Autocorrelation:**

As noted in Brooks (2008) this is an assumption that the covariance between the error terms over time is zero. In other words, it is 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 "auto correlated" or that they are serially correlated. Figure 4.1 below presented the Durbin Watson test for autocorrelation in panel data of this study; the null hypothesis being there is no autocorrelation. Considering the fixed effect regression result and Durbin-Watson 5% significance with 96 observations and 5 explanatory variables (excluding the constant term), the DW is (2.0255). The relevant critical lower and upper values for the test are dL= 1.571 and dU=1.780 respectively. The values of (4 - dU = 4- 1.780 = 2.220).

Figure 4.1: Rejection and Non-Rejection Regions for Durbin-Watson Test



	1.571	1.780	2.0255	2.220	2.290	4

***Source**: Own computation from the financial statements using Eviews 8.*

Brook (2008) recommended that not to reject the null hypothesis of no autocorrelation, if the DW test statistic would be in the non- rejection region of the upper limit (du) and (4-du). Thus the DW test statistic of (2.0255 is between the upper limit (dU) which is (1.780) and the critical value of (4- dU) i.e. (2.220) indicating that there is no evidence for the presence of

autocorrelation and fail to reject the null hypothesis that states there are no serial correlations between the error terms.

- **Multicollinearity Test:**

Multicollinearity in the regression model suggests that there are substantial correlations among independent variables. This phenomenon presents a problem because the estimates of the sample parameters become inefficient and entail large standard errors, which makes the coefficient values and signs unreliable. It also hides the real impact of each variable on the dependent variable (Anderson et al., 2008). High degrees of multicollinearity can result in both regression coefficients being inaccurately estimated, and difficulties in separating the influence of the individual variables on the dependent variables (Hair et al., 1998). In addition, multiple independent variables with high correlation add no additional information to the model. In order to examine the possible degree of multicollinearity among the explanatory variables, correlation matrixes of the selected explanatory variables were presented in table 4.6. Kennedy (2008) suggested that any correlation coefficient above 0.7 could cause a serious multicollinearity problem. Therefore, based on the correlation matrix Table 4.6 there is no problem of multicollinearity.

Table 4.6: Correlation Matrix between Independent Variables

Covariance Analysis: Ordinary

Date: 12/14/17 Time: 02:43

Sample: 2005 2016

Included observations: 96

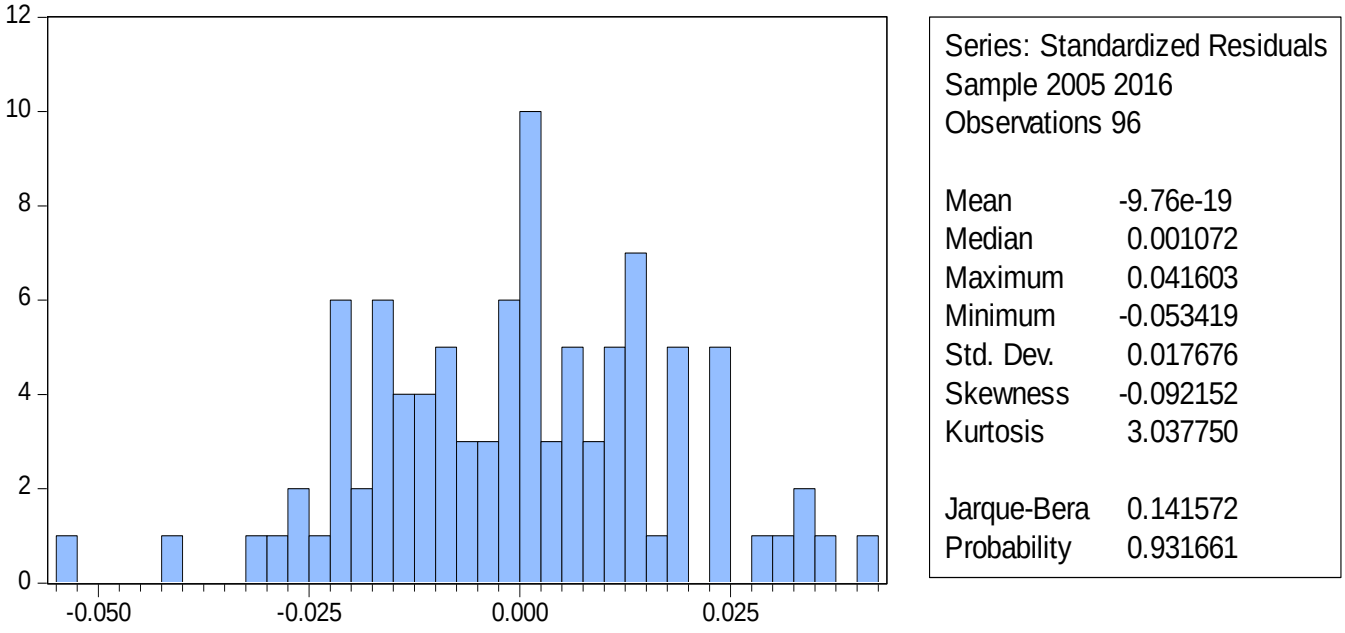
Correlation	LVRG	LOG(TP)	CR	ROA	AVOL
LVRG	1.000000				
LOG(TP)	0.449648	1.000000			
CR	0.111883	-0.070645	1.000000		
ROA	-0.055006	0.272037	-0.209360	1.000000	
AVOL	0.055879	-0.075117	-0.067981	0.067708	1.000000

***Source**: Own computation from the financial statements using Eviews 8*

- **Normality test:**

The normality assumption is about the mean of the residuals is zero. In this study, the normality of the data was mainly checked with the popular Bera-Jarque test statistic (Brooks 2008). The Jarque-Bera statistic has a P-value of 93% implies that the p-value for the Jarque-Bera test for the model is very far greater than 5% which indicates that the errors are normally distributed. Furthermore, according to Brooks (2008) the standardized measurements of a distribution are known as skewness and kurtosis. Skewness measures the extent to which a distribution is not symmetric about its mean value and kurtosis measures how far the tails of the distribution area. A normal distribution is not skewed and is defined to have a coefficient of kurtosis of 3. Skewness that is normal involves a perfectly symmetric distribution. Kurtosis involves the peakedness of the distribution. It is normal involves a distribution that is bell-shaped and not too peaked or flat. The e-views results for the tests of both Skewness and Kurtosis are presented below figure 4.2 are fitted according to their expected conditions.

Figure 4.2: Normality Test Result



Source: *Eviews 8 output*

Based on the statistical results, the study failed to reject the null hypothesis of normality at the 5% significance level.

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. The required Best Linear Unbiased Estimators (BLUE) conditions are also fulfilled through these assumptions test and discussed in the above section.

4.5 Regression Analysis

The Fixed effect Model allows for heterogeneity or individuality among the insurance companies under this study by allowing its own intercept value. This section presents the empirical findings from the econometric output results on "demand for reinsurance of Ethiopian insurance companies. Table 4.7 below reports regression results between the dependent variable (RR) and independent variables.

According to Brooks (2008) the standard error of the estimate is sometimes used as a broad measure of the fit of the regression. It is a measure of how confident one is in the coefficient estimate obtained in the first stage. If a standard error is small, the value of the test statistic will be large relative to the case where the standard error is large. Large standard error is undesirable; everything else being equal, the smaller this quantity is the closer is the fit of the line to the actual data. In this study company size, claim ratio and asset volatility had small standard error their corresponding standard error amount were (0.0033), (0.0101) and (0.0144).

Moreover, from the findings in the below table 4.7, the value of R-Square, also known as the Coefficient of determination is a commonly used statistic to evaluate model fit. R-squared defined that the square of a correlation coefficient; it must lie between 0 and 1. If this correlation is high, the model fits the data well, while if the correlation is low (close to zero), the model is not providing a good fit to the data. The adjusted R-squared compares the explanatory power of regression models that contain different numbers of predictors and it could control the extremes and the biasedness of the model. The 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 were (83%) and (81%) respectively. The result of this estimation particularly the adjusted R-Squared indicates that the changes in the independent variables explain 81% of the changes in the dependent variable. This means leverage, company size, claim ratio, return on asset and asset volatility collectively explain 81% of the changes in reinsurance demand. Thus these variables collectively, are good explanatory variables to identify the reinsurance demand factors of insurance companies in Ethiopia. However, the remaining 19% of changes was explained by other factors which are not included in the model.

Overall reliability and validity of the model was further enhanced by the Probability (F-statistic) value (0.000) which indicates strong statistical significance. Thus the null hypothesis of the overall test of significance that all coefficients are equal to zero was rejected as the p-value was significantly low (less than 0.05).

Table 4.7: Regression Result

Dependent Variable: RR
Method: Panel Least Squares
Date: 12/14/17 Time: 02:33
Sample: 2005 2016
Periods included: 12
Cross-sections included: 8
Total panel (balanced) observations: 96

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.121021	0.040929	2.956843	0.0040
LVRG	0.279818	0.042282	6.617934	0.0000**
LOG(TP)	-0.005789	0.003303	-1.752437	0.0834*
CR	-0.036911	0.010143	-3.639184	0.0005**
ROA	0.002777	0.039349	0.070573	0.9439
AVOL	0.060995	0.014409	4.233210	0.0001**

Effects Specification

Cross-section fixed (dummy variables)			
R-squared	0.839822	Mean dependent var	0.227890
Adjusted R-squared	0.816664	S.D. dependent var	0.044165
S.E. of regression	0.018910	Akaike info criterion	-4.972890
Sum squared resid	0.029681	Schwarz criterion	-4.625635
Log likelihood	251.6987	Hannan-Quinn criter.	-4.832524
F-statistic	36.26458	Durbin-Watson stat	2.025507
Prob(F-statistic)	0.000000		

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

***Source**: Own computation from the financial statements using Eviews 8*

Table 4.7 above shows that three explanatory variables were major factors forreinsurance demand in Ethiopian insurance companies. The significant variables are ranked based on their significant levels; leverage (total liability to total asset), asset volatility (change in total asset over the period) and underwriting risk (claim ratio) were significant at 1% significance level since the p-value for those variables were (0.0000), (0.0001) and (0.0005), respectively.In addition, the logarithm of total premium was significant at 10% significance level as it has the p-value of (0.834). The negative coefficient of explanatory variables against reinsurance demand are; logarithm of total premium (-0.0057) and claim ratio (-0.0369). On the other hand, variables leverage, ROA and asset volatility had a positive relationship with demand for reinsurance of Ethiopian insurance companies and their respective coefficients were (0.2798), (0.0027) and (0.0609).

4.5.1 Financial Leverage and Reinsurance Demand

Ho: Financial leverage has a positive significant effect on demand for reinsurance;

Leverage means the amount of debt used to finance firms' asset. In the case of insurance companies, leverage most comprising of unearned premium, outstanding claims and other technical provisions. Companies with high leverage level usually become less successful due to situation of transforming environment and the need of taking uncertain decisions. Because of this, they might not be able to apply or utilize growth opportunities for expansion of business. It measured by most common ratio of total liability to total asset.

The regression result of this study shows that the coefficient of leverage ratio was positive coefficient (0.2798), which implies that if leverage ratio increase by 1 unit, demand for reinsurance will also increase by (0.2798) units assuming that the remaining independent variables are unchanged. The result of (p-value=0.0000) was statistically significant at a 1% significance level. It indicates that when companies holding more leverage, it will have a significant positive demand for reinsurance coverage. Higher level of leverage implies higher exposure to risk and greater demand for reinsurance.

The result was consistent with Shiu (2011), Adiel (1996), and Chen et al (2001) found that insurers with a higher level of reinsurance choose higher debt ratios, because reinsurance reduces the strain on insurers' capital. Moreover, the authors; Hoerger et, al (1990), Adams.(1996) and Chang.(2014) who were studied on this title were found out the same result which was insurers with higher leverage tend to purchase more reinsurance to reduce their probability of insolvency.

Therefore, current study supports the hypothesis a significant positive relationship of leverage ratio and reinsurance demand of Ethiopian insurance companies. Thus, the null hypothesis can't be rejected.

4.5.2 Asset Volatility and Reinsurance Demand

Ho: Assets Volatility has a positive significant effect on demand for reinsurance;

Asset volatility is the rate at which the amount of an asset moves up and down. It reflects the degree of instability of insurance companies business. Higher volatility implies greater risk. The variable is measured by the ratio of difference between value of the total assets in time t and t-1 to the total asset value in time t-1.Huge fluctuations in total asset indicate a lack of stability in the amount of total resources of an insurance company.

The multiple regression result of this study has a positive and significant relationship with reinsurance demand (RR) of Ethiopian non-life insurance, since the beta coefficient and p-value of asset volatility are (0.0609) and (0.0001) respectively. The positive coefficient indicates that when the rate of asset volatility increase by 1 unit, RR will also increase by (0.0609) unit.

The fixed effect regression output also the same with the expected hypothesis as the rate of asset volatility has positive relationship with reinsurance demand that means when insurers asset more unstable, the demand for reinsurance coverage goes up. Therefore the hypothesis can't be rejecting because of the same positive and significant impact as expected.The result was not the same with the study undertaken by Marijana (2014) in the Croatian insurance market asset volatility do not show statistically significant effect on reinsurance demand.

4.5.3 Underwriting Risk and Reinsurance Demand

Ho: Underwriting risk has a positive significant effect on demand for reinsurance;

The underwriting risk emphasizes the efficiency of the insurers' underwriting activity and the exposure to financial loss resulting from the selection and approval of risks to be insured. Claim ratio is a proxy of underwriting risk in this study and measured by net claims incurred claims divided by net earned premium.

The coefficient of claim ratio which was negative coefficient (-0.0369) that denotes if the claim ratio goes up by 1 unit, reinsurance demand will goes down by (0.0369). Beside probability value of claim ratio was (p-value=0.0005) statistically significant at 1% significance level. Thus the underwriting risk was an influential factor of reinsurance demand for Ethiopian insurers. Though the researcher expected the relationship between underwriting risk and reinsurance

demand based on economic theory and different empirical studies the result was negative coefficient (-0.0369). This may resulted because of administration costs to settle the claim, as claim frequency high contact with reinsurance company expected to increase.

The find was the same with the study conducted by Kader and Adams (2007) insurers with higher underwriting risk use more reinsurance. Thus, the null hypothesis won't be rejected as the researcher also expected significant factor for reinsurance demand.

4.5.4 Firm Size and Reinsurance Demand

Ho: Company size has a negative significant effect on demand for reinsurance;

The size of insurance company affects demand for reinsurance coverage in many ways.Insurance company sizes could reflect its strength and ability to reduce the expected bankruptcy costs. Large company size means large number of units exposed to risk, which reduces the deviation of actual losses from those expected.Insurance company size negatively influences reinsurance purchasing. Company size is computed as logarithm of total premium of the insurance company.

The regression result of this study show that the variable size is negatively coefficient (-0.0057) related to reinsurance demand that means if the size of the company increase by 1 unit, RR will decrease by (0.0057) units considering that other independent variables remain constant. It also statistically significant (p-value=0.0834) at a 10% level of significance. Larger company is more able to manage risk by itself and to reduce probability ofbankruptcy. Precisely, larger companies are more successful in underwritingactivities since they have large number of units exposed to risk which enablereduction of deviation actual losses from those expected. The result complies withthe theory and with the results of existing empirical studies (Mayers and Smith,1990; Adams, 1995; Powell and Sommer 2002; Garven and Tennant, 2003;Reissaus and Wambach 2005, Lei and Schmit, 2008).As the result also identical with the researcher's expectation the null hypothesis has no reject.

4.5.5 Return on Asset and Reinsurance Demand

Ho: Return on Assets has a negative significant effect on demand for reinsurance;

Insurance companies usually take out reinsurance cover to stabilize earnings, increase underwriting capacity and provide protection against catastrophic losses; nevertheless it involves a certain costs. The coefficient of rerun on asset which is measured as ratio of profit after tax to total asset was positive (0.0027), but statistically insignificant even at 10% significance level (p-value=9439) indicating that its influence on demand for reinsurance is negligible. The insignificant parameter indicates that the ROA does not affect Ethiopian insurance reinsurance demand.

The regression result was reverse with the findings of Sunday.A and Sunday.S (2017), which shows that reinsurance purchase, increases significantly the insurers' premium income; it is also shown that profitability of the firm is sensitive to change in reinsurance utilization and has a positive relationship with it. Thus, this result not supports the researcher expectation that significant and negative impact of ROA on Ethiopian insurance companies'reinsurance demand, the researcher going to reject the null hypothesis.

By and large this chapter offered the results of the structured recorded data reviews and discussed the analysis of these results together. From the above data analysis, Ethiopian non-life insurers' reinsurance demand is highly affected by all variables included in this study except ROA. The findings of the study showed that leverage ratio and asset volatility have statistically significant and positive relationship with Ethiopian non-life insurers' reinsurance demand. However, company size and underwriting risk have negative and significant relationship with reinsurance demand. On the other hand, variables ROA has a positive relationship with Ethiopian non-life insurers'reinsurance demand and statistically insignificant.

$RR_{it} = \beta 0 + \beta 1 LVRG_{i,t} + \beta 2 TP_{i,t} + \beta 3 CR_{i,t} + \beta 4 ROA_{i,t} + \beta 5 AVOL_{i,t} + \varepsilon$

Where;

RR = Demand for Reinsurance;

LVRG= Leverage;

TP = Company Size;

CR = Underwriting Risk;

ROA = Return on Assets;

AVOL = Assets Volatility;

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

RRit = 0.1210+ 0.2798LVRG*i, t* – 0.0057TP*i, t* - 0.0369CR*i, t* + 0.0027ROA*i, t* + 0.0609VOL*i, t* + ε

CHAPTER FIVE
SUMMARY, CONCLUSION AND RECOMMENDATION

This is the last chapter of the research paper and it comprehensively summarizes the whole chapters of the research paper and followed by the conclusion of the study by concluding the major findings of the study. The last part forwards some recommendations that are thought to be practical and feasible.

5.1 Summary

The purpose of this study was to investigate whether there is a significant relationship between insurer specific factors (financial leverage, underwriting risk, firm size, return on assets and asset volatility) and reinsurance demand in Ethiopian non-life insurance industry using data from NBE. The study relied on secondary data extracted from the audited balance sheet, income statement and revenue accounts of eight non-life insurance companies registered under NBE since 2005. The independent variables: -LVRG, TP, CR, ROA and AVOL were selected by considering insurer specific factors.

The researcher tried to establish a relation between insurer specific factors and reinsurance demand of non-life insurance companies in Ethiopia. Through the process the researcher used diagnostic tests, selection of appropriate model, multiple regression result and test of hypothesis have been run using statistical package data of EVIEWS8. The appropriate model that has selected for this study was fixed effect model since the data is selected purposively and diagnostic test of all assumptions are valid and met, as a result it is possible to conclude that the model is adequate, statistically good fit, and data's were represented reliably.

LVRG, TP, CR, ROA and AVOL were considered as independent variables while RR was taking as dependent variable representing reinsurance ratio. The results indicate a significant relationship between financial leverage and reinsurance demand, underwriting risk and reinsurance demand, firm sizeand reinsurance demand and also asset volatility and reinsurance demand. However, contrary to the researcher expectationreturn on asset have insignificant effect on reinsurance demand in Ethiopian non-life insurance companies.

5.2 Conclusion

The study revealed factors that influence demand for reinsurance in Ethiopian non-life insurance adding contribution to the literature on reinsurance demand. The study encompasses insurers-specific factors: - LEVG, TP, CR, ROA and AVOL. According to the results, there is strong positive relationship between reinsurance purchase and financial leverage of insurance companies in Ethiopia. Reinsurance demands' also affected byassets volatility and underwriting activities of insurance companies. Contrary to the expectation, return on assets of insurance companies does not significantly determine reinsurance demand. In addition, the results equally showed that purchasing reinsurance reduces insurers' insolvency risks and increases the financial stability of insurance companies by creating stable loss situation, capacity enhancement and minimizing cost from specific risks, and offering protection against uncertain risk. Generally, the study concludes there is a strong relationship between explanatory variables:- financial leverage, firm size, underwriting activity, return on assets and asset volatility and explained variable i.e. reinsurance demand of insurance companies in Ethiopia as explained by the model variables explanatory power adjusted R-Square was 81%, which means reinsurance demand is 81%explained by explanatory variables and it is explained 19% by variables other than the studied variables.

5.3. Recommendation

The recommendations of the research were premised on the summary of and conclusions from the results and discussion. The study has shown a clear understanding of insurer specific factors influence on reinsurance demand of non-life insurance firms.

Ethiopian non-life insurance companies should pay greater attention to the significant variables of financial leverage, asset volatility, company size and underwriting risk before insurer looking for reinsurer.

- Ethiopian non-life insurance companies' reinsurance purchase is highly influenced by financial leverage by means of the purchasing of reinsurance reduces insurers' insolvency risks and increases the financial stability of insurance companies by creating stable loss

situation, capacity enhancement and minimizing cost from specific risks, and offering protection against catastrophes. As described in this paper on previous chapter the Ethiopian insurance industry hold a very great amount of their premium (i.e. 77%) for the studied period of 12 years, this is not the right practice and it is against the researcher's result. The industry have to quickly rearrange this application as if in the meantime catastrophes will happen, it may create financial pressure on their capital and goes to bankrupts.

- Regarding asset volatility the researcher recommends that when insurers asset not stable the insurer have to seek proper reinsurance coverage in order to be saver. As the cost of reinsurance is very high the insurers should retain their premium as far as their right capacity by doing stable growth of their total asset. Moreover, the sector should be conscious for its asset growth rate.

- As the relationship of size and demand for reinsurance is negative, the Ethiopian insurance industry have to intensify the volume of its premiums by taking into consideration the quality of the business in order to avoid unnecessary loss making business, by doing this the sector can build up its capacity and will save reinsurance expenses. As the cost of reinsurance is very high the insurers should retain their premium as far as their right capacity by doing stable growth of their total premium.

- The result revealed that in Ethiopian non-life private insurance companies underwriting risk have had a negative significant effect on demand for reinsurance which contradicted from previous done by Kader and Adams (2007) which affirmed insurers with higher underwriting risk need more reinsurance coverage to mitigate solvency risk and also study conducted by Marijana et al., (2014) point out that underwriting risk does not show statistically significant effect on reinsurance demand. Therefore those dissimilar finding between underwriting risk and demand for reinsurance could open the door for future researches on the area. The researcher also recommends further studies on reinsurance.

- The Ethiopian insurers demand for reinsurance has negative with underwriting risk so the industry should make appropriate reserves in order to protect their capital buffer. Reinforce coordination of underwriting and reinsurance units and ensure prudent risk rating and risk allocation.

- Ethiopian insurers have to formulate policy and procedures in order to transact reinsurance business in effective and efficient way. It could guide them to maximize retention capacity, secure the best possible protection for the reinsurance costs incurred and simplify the administration.

REFERENCE

Adams, M. (1996). The Reinsurance Decision in Life Insurance Firms: An Empirical Test of the Risk-Bearing Hypothesis, Accounting and Finance 36 (1), 15–30.

Adiel, R. (1996). Reinsurance and the management of regulatory ratios and taxes in the property-casualty insurance industry', Journal of Accounting and Economics, 22(1–3), 207–240.

Ahmed, N., Ahmed, Z. and Usman, A. (2011). Determinants of Performance: A Case of Life Insurance Sector of Pakistan, International Research Journal of Finance and Economics, 61, 123-128.

Al-Najjar, B and Hussainey, K. (2009).The association between dividend payout and outside Director ships, Journal of Applied Accounting Research, 1: 4-19.

Altai, Y. (2005). Bank Ownership and Efficiency, Journal of Money, Credit and Banking, 33.

Andersen, T. (2008). The Performance Relationship of Effective Risk Management: Exploring The Firm-Specific Investment Rationale, Long Range Planning, 41(2): 155-176.

Ary, D., Lucy, C. and Sorensen.C, (2010). Introduction to Research in Education.8th Ed Cengage Learning Customer and Sales Support, 1-800-354-9706.

Bird, M. (2005). VAT in Developing and Transitional Economies (DTEs), International Tax Dialogue. VAT Conference, 15-16 March 2005, Rome.

Berger, L; Cummins, J and Tennyson, S. (1992). Reinsurance and the Liability Insurance Crisis, Journal of Risk and Uncertainty 5(3), 253-272.

Bernard, C. (2013). Risk Sharing and Pricing in the Reinsurance Market. In: Handbook of Insurance. Springer New York, pp. 603-626.

Borde, S., Chambliss, K. and Madura, J. (1994). Explaining variation in risk across insurance Companies. Journal of Financial Services Research, 8(3), 177–191.

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

Chang, Y. (2014). Determinants of the Demand for Reinsurance for U.S. Property-Liability Insurance Industry: Quantile Regression Analysis, Management Review, forthcoming.

Chen, Yueyun, Iskandar S.,Hamwi, and Tim Hudson. (2001). The Effect of Ceded Reinsurance on Solvency of Primary Insurers, International Advances in Economic Research,7(1), 65-82.

Cole, C. and McCullough, K. (2006). A Reexamination of the Corporate Demand for Reinsurance, Journal of Risk and Insurance 73 (1), 169–192.

Cummins, J., Feng, Z. and Weiss, M. (2012). Reinsurance Counterparty Relationships and Firm Performance in the U.S. Property-Liability Insurance Industry, [Online], [Retrieved 16 October 2017], http://ssrn.com/abstract=1997444.

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

Denise ,D and Georges, D. (2017), Reinsurance demand and liquidity creation, inter university research center on enterprise network, logistics and transportation.

Doherty, N. and Dionne, G. (1993), Insurance with Undiversifiable Risk: Contract Structure and Organizational Form of Insurance Firms. Journal of Risk and Uncertainty, 6(2), 187-203.

Ernst, and Young, (2010). Analysis and valuation of insurance companies.

Fatula, O. (2007). The imperative of recapitalization and consolidation in the Nigerian insurance industry. Ikeja Bar Review, 128.

Fleming, M. (2004). The Determinants of Operational Performance and Mitigating the Risks Associated with the Insurance Market', Applied Financial Economics, 13, 133-143.

Froot, K., (2001). The Market for Catastrophe Risk: A Clinical Examination. Journal of Financial Economics, 60(2-3), 529-571.

Froot, K. A., (2007). Risk Management, Capital Budgeting, and Capital Structure Policy for Insurers and Reinsurers. Journal of Risk and Insurance 74 (2), 273-299.

Garven, J., Hillard, J., and Grace, M. (2014). Adverse selection in reinsurance market. Working paper, Georgia State University.

Garven, J. and Lamm-Tennant, J. (2003). The Demand for Reinsurance: Theory and Empirical Tests. Insurance and Risk Management 7 (3), 217–237.

Garven, J., Louberg_e. (1996). Reinsurance, Taxes, and Efficiency: A Contingent Claims Model of Insurance Market Equilibrium. Journal of Financial Intermediation 5 (1), 74 -93.

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

Hailu, Z. (2007). Insurance in Ethiopia: Historical Development, Present Status and Future Challenges. Addis Ababa, Ethiopia. Master Printing Press P.L.C.

Hair, J., Black, W., Babin,B., Anderson, R.. and Tatham, R. (1998). Multi-variety data analysis. Pearson education, New Jersy.

Hassan, M. (1990). Loss volatility, bankruptcy, and the demand for reinsurance. Journal of Risk and Uncertainty, 3, 221-245.

Hoerger, T.,Solan, F. and Hassan, M. (1990). Loss Volatility, Bankruptcy, and the Demand for Reinsurance, Journal of Risk and Uncertainty, 3(3): 221-245.

Holland, D. (2009). A Brief History of Reinsurance, Special Edition: Reinsurance News, 65: 4-34.

James, R. and Joan, L (2003). The Demand for Reinsurance: Theory and Empirical Tests. Insurance and Risk Management, Vol. 7, No. 3 PP. 217-237.

Jean-Baptiste, E. and Santomero, A. (2000). The Design of Private Reinsurance Contracts, Journal of Financial Intermediation, 9:274-297.

Jirsarael, S., Kalantari, H., Kalantari, D., Jalah, R., and Nozari, K. (2013). Reinsurance and its Impact on risk management. Arabian Journal of business and management review, 2(6), 223–229.

Kader, H and Adams, M. (2007). Testing for Trade-offs in the Reinsurance Decisions of United Kingdom (UK) Life Insurance Firms, School of Business & Economics Swansea University

Kader, H., Adams, M., and Andersson, L. (2010). The determinants of reinsurance in the Swedish property fire insurance market during the interwar years, 1919-1939. Business History, 52, 268-284.

Kopf, E. (1929). Notes on the Origin and Development of Reinsurance, Proceedings of the casualty Actuarial society, XVI

Kouki, M. and Guizani, M. (2009). Ownership Structure and Dividend Policy Evidence from the Tunisian Stock Market. European Journal of Scientific Research, 1: 42-53.

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.

Lei, Y. and Schmit, J. (2010). Factors Influencing the Demand for Reinsurance in the Medical Malpractice Insurance Market: A Focus on Organization Form. Journal of Insurance Regulation, 29, 1-28.

Licensing and Supervision of Insurance Business Directive No. SIB/34/2004, Investment of Insurance Funds. [Online] [Retrieved 01 September 2017], NBE's website, www.nbe.gov.et.

Licensing and Supervision of Reinsurance Business, Directive No. SRB/1/2014, Reinsurance Company Establishment.[Online] [Retrieved 01 September 2017], NBE's website, www.nbe.gov.et.

Licensing and Supervision of insurance Business, Manner and Criteria of Transacting Reinsurance. Directive No. SIB/44/2016.[Online] [Retrieved 01 September 2017], NBE's website, www.nbe.gov.et.

Malik, H. (2011). Determinants of Insurance Companies Profitability: An Analysis of Insurance Sector of Pakistan, Academic Research International, 1, (3).

Maria .B and Ghiorghe .B (2014), Demand for reinsurance in the Romanian insurance market, Conference Paper · May 2014, Univesrisity of costanata.

Marijana, C. Maja., P. and Tomislava, P. (2014). Factors Influencing Demand for Reinsurance. The 8th International Days of Statistics and Economics, Prague, 297

Marijana, C., Marija, U. and Daniel, K. (2014). Firm Specific Characteristics and Reinsurance – Evidence from Croatian Insurance Companies, MisaoPraksaDBK.God xxiii. (1) 29

Mayers, D. and Smith, C.(1982). On the Corporate Demand for Insurance. Journal of Business and economics . 281-296.

Mayers, D.and Smith, C. (1990). On the Corporate Demand for Insurance: Evidence from the Reinsurance Market. Journal of Business 63 (1), 19–40.

Meir, U. and Utreville.J. (2006). The Business Cycles in Insurance and Reinsurance: The case France, Germany and Switzerland, the Journal of Risk Finance, 7(2):160-176.

National Bank of Ethiopia, Annual Report (2016) of National Bank of Ethiopia.

Oke, O. (2012). Insurance sector development and economic growth in Nigeria. African Journal of Business Management, 6(23), 7016–7023.

Oluoma, R. O. (2014). Impact of insurance market activity on economic growth in Nigeria (Doctoral thesis) University of Nigeria, Nsukka, Nigeria.

Oscar, T. (2007). Panel Data Analysis: Fixed and Random Effects, Princeton University, 4 (2).

Outeville, J. (2002). Introduction to Insurance and Reinsurance Coverage. In: Dror, D.M. A.S. Social Reinsurance: A New Approach to Sustainable Community Health Financing. ILO and WB. 59-74

Park, J. A (1799).A System of the Law of Marine Insurance. Second American Edition from the Latest English Edition. Boston, Massachusetts: Thomas and Andrews, David West, John West. 276-277. [Online], [Retrieved 16 may 2017] http://books.google.com

Park, S. and Xie, X. (2014). Reinsurance and systemic risk: The impact of reinsurer down Grading on property casualty insurers. Journal of Risk and Insurance, 81(3), 587–622.

Patrik, G. (2001). Reinsurance In: Causality Actuarial Society: Foundations of Casualty Actuarial Sciences. 4th ed. Arlington, Virginia: Causality Actuarial Society. 343-484.

Phillips, R. and., Cummins, J. and F. Allen, (1998). Financial Pricing of Insurance in the Multiple- Line Insurance Company. Journal of Risk and Insurance, 65(4), 597-636.

Plantin, G. (2006). Does reinsurance need reinsurance? The Journal of Risk and Insurance, 73(1), 153–168.

Powell, S. and David, W. (2002). Internal versus External Capital Markets in the Insurance Industry: The Role of Reinsurance, Journal of Financial Services Research 31, 173-188.

Reissaus, R. and Wambach, A. (2005). Risk Transfer between Insurers and Reinsurers: An Empirical Analysis. International Conference on Risk Transfer between (Re-) Insurers, Banks,and Markets.

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

Shiu, Y. (2011). Reinsurance and capital structure: Evidence from the United Kingdom non-. life Insurance Industry. The Journal of Risk and Insurance, 78(2), 475–494

Smith, C.and Stulz, R. (1985). The Determinants of Firms' Hedging Policies. Journal of Financial and Quantitative Analysis 20 (04), 391–405.

Sojung, P.,Xiaoying, X. and Pinghai, R. (2015) .The Sensitivity of Reinsurance Demand to Counterparty Risks: Evidence from US Property-Liability Insurance Industry

Sunday,A and Sunday,S .(2017) Reinsurance and performance of the ceding companies: the Nigerian insurance industry experience, Journal of business and economics 31, 19–29.

Swiss, Re. 1996. An Introduction to Reinsurance. Zurich: Swiss, Re.

Swiss R, (2004). Understanding Reinsurance: How Reinsurers Create Value and Manage Risk. Economic Research and consulting, Swiss Reinsurance Company.

The Chartered Insurance Institute. 2004. Principles of Reinsurance. U.K.: The Chartered Insurance Institute.

Vincent .Y and Vivian .S (2012), The Relationships among the Demand for Reinsurance, Liquidity, and Leverage in the U.S. Property Liability Insurance Industry, Chaoyang University of Technology and Department of Risk Management and Insurance.

Wakker, P., Thaler, R., Tversky, A., (1997). Probabilistic insurance. Journal of Risk and Uncertainty 15 (1), 7-28.

Wehrhahn, R. (2009). Introduction to Reinsurance.Primer Series on Insurance. The World Bank:1-38.

Weiss, M. and Chung, J. (2004). U.S. Reinsurance Prices, Financial Quality, and Global Capacity, Journal of Risk and Insurance, 71(3):437-467.

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

Yinusa, O. and Akinlo, T. (2013). Insurance development and economic growth in Nigeria, Journal of Economics and International Finance, 5(5), 218–224.

Yu Lei and Joan, S. (2008).Factors influencing the Demand for Reinsurance in the Medical Malpractice Insurance Market: A Focus on Organizational Form.

Zenios, S., Forsund, F., Hjalmarsson, L., Suominen, M. (1999), Banking efficiency in the Nordic Countries, Journal of Banking & Finance, 17 (1).

APPENDIX

Appendix-1 List of insurance companies in Ethiopia with their year of establishment and Ownership

No.	Insurance companies	Year of Establishment	Ownership
1	Ethiopian Insurance Corporation	1975	public
2	National Insurance Company of Ethiopia	1994	Private
3	Awash Insurance Company	1994	Private
4	Africa Insurance Company	1994	Private
5	Nyala Insurance Company	1995	Private
6	Nile Insurance Company	1995	Private
7	Global Insurance Company	1997	Private
8	United Insurance Company	1997	Private
9	Nib Insurance Company	2002	Private
10	Lion Insurance Company	2007	Private
11	Ethio-Life and General Insurance Company	2008	Private
12	Oromia Insurance Company	2009	Private
13	Abay Insurance Company	2010	Private
14	Berhan Insurance Company	2011	Private
15	Bunna Insurance Company	2011	Private
16	Tsehay Insurance Company	2012	Private
17	Lucy Insurance Company	2012	Private

Appendix-2 EIC and Sampled Insurers' Market Share (In 000,000)

Years	Insurance Industry			EIC			The Sampled (8) Insurers			The Sampled Insurers Share in Per Cent		
	TA	Capital	Profit	TA	Capital	Profit	TA	Capital	Profit	TA	Capital	Profit
2005	1,297	352	91	668	109	65	628	243	25	100%	100%	100%
2006	1,564	543	106	772	262	55	791	281	50	100%	100%	100%
2007	1,694	545	121	780	246	68	914	299	52	100%	100%	100%
2008	1,960	547	137	860	225	78	1,076	311	65	98%	97%	97%
2009	2,229	609	157	960	245	83	1,237	356	77	97%	98%	98%
2010	2,765	771	306	1,104	266	146	1,550	471	162	93%	93%	93%
2011	3,449	879	312	1,285	260	144	1,960	564	162	91%	91%	91%
2012	4,908	1,165	529	1,785	313	243	2,717	753	270	87%	88%	88%
2013	5,931	1,503	852	2,080	361	343	3,175	974	476	82%	85%	85%
2014	7,059	1,959	965	2,291	425	439	3,725	1,207	432	78%	79%	79%
2015	8,365	2,555	1,148	2,470	428	467	4,360	1,572	525	74%	60%	60%
2016	10,059	3,315	1,029	2,806	703	518	5,055	1,839	382	70%	17%	87%
Total	51,280	14,743	5,753	17,861	3,843	2,649	27,188	8,870	2,678			
Average	4,273	1,229	479	1,488	320	221	2,266	739	223	100%	100%	100%

Appendix-3 Lists the dependent and independent variables used in the study

Dependent Variable	**Description**	
Reinsurance Ratio	(Premiums Ceded /Gross Written Premiums)	
Independent Variables	**Description**	**Expected Sign**
Insurer specific factors		
Financial Leverage	(Total Liablity) / (Total Asset)	+
Company Size	Log (Total premium)	-
Underwriting risk	(Net Incure claim (NIC)/Net Earned premium(NEP)	+
Return on Assets	Net Profit after Taxes (NPAT) /Total Assets (TA)	-
Assets Volatility	(Assets (A) (t) – Assets (A) (t – 1)) /Assets (A)	+

Appendix 4 Ratio Data Used for Analysis

Year	Company	RR	LVRG	TP	CR	ROA	AVOL
2005	NICE	0.1653	0.7099	24,698	0.7230	-0.0471	0.0465
2006	NICE	0.1924	0.6834	29,739	0.6603	0.0589	0.2320
2007	NICE	0.1725	0.6816	34,977	0.6459	0.0637	0.2573
2008	NICE	0.1888	0.6662	40,479	0.6740	0.0462	0.2254
2009	NICE	0.2057	0.6802	46,151	0.6813	0.0542	0.2498
2010	NICE	0.1804	0.7029	60,731	0.6773	0.0475	0.2328
2011	NICE	0.1853	0.7869	75,620	0.7276	0.0028	0.3726
2012	NICE	0.2358	0.7511	127,002	0.5405	0.1244	0.6701
2013	NICE	0.2075	0.6919	130,584	0.5903	0.1072	0.3592
2014	NICE	0.1938	0.7362	134,685	0.7002	0.1597	0.2946
2015	NICE	0.1525	0.6778	141,065	0.5620	0.3736	0.1039
2016	NICE	0.1978	0.7195	155,263	0.6571	0.2983	0.1993
2005	AWASH	0.1414	0.6090	50,180	0.5548	0.2674	0.0077
2006	AWASH	0.2269	0.6586	58,674	0.6602	0.1882	0.2274
2007	AWASH	0.1688	0.6863	67,025	0.7769	0.1689	0.2665
2008	AWASH	0.1720	0.7015	91,254	0.7014	0.1724	0.1406
2009	AWASH	0.2116	0.7296	112,856	0.8145	0.1385	0.1864
2010	AWASH	0.1908	0.6892	124,356	0.6249	0.1189	0.1920
2011	AWASH	0.1918	0.7387	228,546	0.6165	0.0924	0.5255
2012	AWASH	0.2201	0.7683	265,412	0.6612	0.0882	0.4168
2013	AWASH	0.2097	0.7349	300,062	0.5905	0.1485	0.1921
2014	AWASH	0.1565	0.6924	312,056	0.6295	0.1254	0.0375
2015	AWASH	0.1748	0.6951	336,720	0.5682	0.0993	0.1174
2016	AWASH	0.2174	0.6701	384,201	0.6327	0.0744	0.2985
2005	AFRICA	0.2642	0.6807	53,545	0.7345	-0.0037	0.0682
2006	AFRICA	0.2934	0.7051	68,102	0.6016	0.0732	0.4511
2007	AFRICA	0.2701	0.7480	82,948	0.8072	0.0204	0.1043
2008	AFRICA	0.2810	0.8017	107,409	0.8175	0.0373	0.3168
2009	AFRICA	0.2608	0.7901	121,817	0.8283	0.0478	0.0351
2010	AFRICA	0.2745	0.8079	176,719	0.8155	0.0579	0.4010
2011	AFRICA	0.2647	0.8224	245,088	0.8200	0.0443	0.2921
2012	AFRICA	0.2586	0.8118	343,849	0.8540	0.0467	0.1728
2013	AFRICA	0.2075	0.7806	310,154	0.8535	0.0523	(0.0171)
2014	AFRICA	0.2569	0.7698	316,062	0.8952	0.0673	0.1013
2015	AFRICA	0.2552	0.6726	327,362	0.8098	0.0626	0.1143
2016	AFRICA	0.2011	0.6417	374,470	0.8180	0.0580	0.0693
2005	NYALA	0.2065	0.5236	57,303	0.4903	0.0419	(0.0413)
2006	NYALA	0.2468	0.5804	72,774	0.5932	0.0805	0.1346
2007	NYALA	0.2401	0.5818	83,500	0.5240	0.0796	0.0229
2008	NYALA	0.2498	0.6337	97,907	0.6822	0.0479	0.1288
2009	NYALA	0.2622	0.5678	94,080	0.6171	0.1188	0.0572

Appendix 4 Ratio Data Used for Analysis

2010	NYALA	0.2754	0.5977	126,168	0.5886	0.1011	0.2421
2011	NYALA	0.2306	0.5760	130,582	0.5484	0.1292	0.1462
2012	NYALA	0.2757	0.5952	145,827	0.4094	0.1401	0.4314
2013	NYALA	0.2901	0.6179	179,825	0.4608	0.1342	0.3839
2014	NYALA	0.2828	0.6029	215,471	0.4197	0.1217	0.2726
2015	NYALA	0.2403	0.6251	235,874	0.5722	0.1065	0.3760
2016	NYALA	0.2686	0.6415	256,874	0.5402	0.1030	0.1587
2005	NILE	0.1809	0.6532	78,931	0.7245	0.0412	0.1791
2006	NILE	0.2197	0.7277	97,922	0.7556	0.0357	0.1883
2007	NILE	0.1730	0.7548	107,630	0.8550	0.0227	0.0597
2008	NILE	0.1841	0.7671	106,909	0.8304	-0.0265	(0.0172)
2009	NILE	0.2006	0.7519	118,707	0.6938	0.0217	0.0337
2010	NILE	0.1824	0.6444	137,362	0.5737	0.1379	0.1542
2011	NILE	0.1527	0.6469	185,513	0.7145	0.0791	0.1892
2012	NILE	0.1470	0.6414	267,280	0.7051	0.1020	0.3609
2013	NILE	0.1587	0.6504	256,943	0.7303	0.0986	0.1618
2014	NILE	0.1424	0.6618	300,433	0.7006	0.1126	0.1470
2015	NILE	0.1398	0.6267	342,707	0.6856	0.0816	0.1833
2016	NILE	0.1698	0.6666	368,745	0.7833	0.0307	0.1351
2005	GLOBAL	0.1993	0.4764	7,986	0.4279	0.0260	0.5335
2006	GLOBAL	0.2196	0.4529	11,071	0.5339	0.0313	0.3166
2007	GLOBAL	0.2296	0.4792	12,688	0.5028	0.0373	0.2068
2008	GLOBAL	0.2605	0.5543	15,319	0.5119	0.0067	0.2076
2009	GLOBAL	0.2890	0.5767	16,084	0.5056	0.0365	0.2198
2010	GLOBAL	0.2586	0.5951	20,015	0.4413	0.0584	0.1255
2011	GLOBAL	0.2558	0.5741	29,903	0.8406	0.0291	0.1193
2012	GLOBAL	0.2601	0.6815	55,152	0.9519	0.0145	0.4320
2013	GLOBAL	0.2684	0.6475	53,896	0.5682	0.1130	0.3270
2014	GLOBAL	0.2202	0.5699	61,725	0.6328	0.1220	0.2406
2015	GLOBAL	0.2196	0.4882	72,781	0.9368	0.1070	0.2099
2016	GLOBAL	0.2268	0.5030	82,667	0.6379	0.0956	0.1831
2005	UNIC	0.2314	0.5914	33,433	0.7379	-0.0156	(0.0656)
2006	UNIC	0.2687	0.5297	48,057	0.5033	0.0709	0.4259
2007	UNIC	0.2664	0.6009	81,294	0.7202	0.0869	0.3682
2008	UNIC	0.2852	0.6195	110,389	0.5878	0.1323	0.3219
2009	UNIC	0.2873	0.6898	114,684	0.7707	0.0472	0.2854
2010	UNIC	0.2783	0.6282	125,636	0.5826	0.1142	0.2280
2011	UNIC	0.2768	0.6518	161,911	0.7130	0.0795	0.2208
2012	UNIC	0.2826	0.6478	193,542	0.6413	0.1011	0.3838
2013	UNIC	0.2587	0.6211	259,873	0.5482	0.1732	0.2064
2014	UNIC	0.2693	0.6206	274,310	0.5329	0.1412	0.1826
2015	UNIC	0.2653	0.5609	296,465	0.6044	0.1306	0.0873
2016	UNIC	0.2345	0.5425	314,828	0.7233	0.0658	0.2029

Appendix 4 Ratio Data Used for Analysis

2005	NIB	0.2164	0.5874	33,048	1.5683	0.0919	0.5398
2006	NIB	0.1924	0.5945	46,601	1.9173	0.0467	0.1795
2007	NIB	0.2163	0.6282	66,443	0.6671	0.0722	0.3557
2008	NIB	0.2492	0.7365	100,188	0.6611	0.0953	0.2778
2009	NIB	0.2698	0.7367	131,810	0.6809	0.0813	0.5315
2010	NIB	0.2808	0.7511	159,854	0.6633	0.0776	0.3007
2011	NIB	0.2801	0.7404	187,542	0.2908	0.0770	0.2165
2012	NIB	0.3401	0.7845	298,647	0.2995	0.0741	0.5545
2013	NIB	0.2489	0.7329	316,890	0.3029	0.0891	0.0893
2014	NIB	0.2734	0.6991	325,843	0.1707	0.0960	0.2582
2015	NIB	0.2319	0.6685	336,845	0.7259	0.0693	0.1655
2016	NIB	0.1988	0.6454	345,871	0.7052	0.0512	0.0806

Appendix-5 Descriptive Statistics of the Variables

	RR	LVRG	LOG(TP)	CR	ROA	AVOL
Mean	0.227890	0.660816	11.61645	0.670147	0.085464	0.224668
Median	0.230100	0.664031	11.72059	0.661176	0.079316	0.206581
Maximum	0.340100	0.822448	12.85892	1.917311	0.373601	0.670073
Minimum	0.139800	0.452858	8.985445	0.170669	-0.047143	-0.065577
Std. Dev.	0.044165	0.081937	0.902734	0.213118	0.061837	0.145284
Observations	96	96	96	96	96	96

Appendix-6 Redundant Fixed effect Tests

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	48.014929	(7,83)	0.0000
Cross-section Chi-square	155.450850	7	0.0000

Appendix-7 Regression Results For impact of insurer specific factors on demand for reinsurance in Ethiopian insurance companies.

Dependent Variable: RR
Method: Panel Least Squares
Date: 12/14/17 Time: 02:33
Sample: 2005 2016
Periods included: 12
Cross-sections included: 8
Total panel (balanced) observations: 96

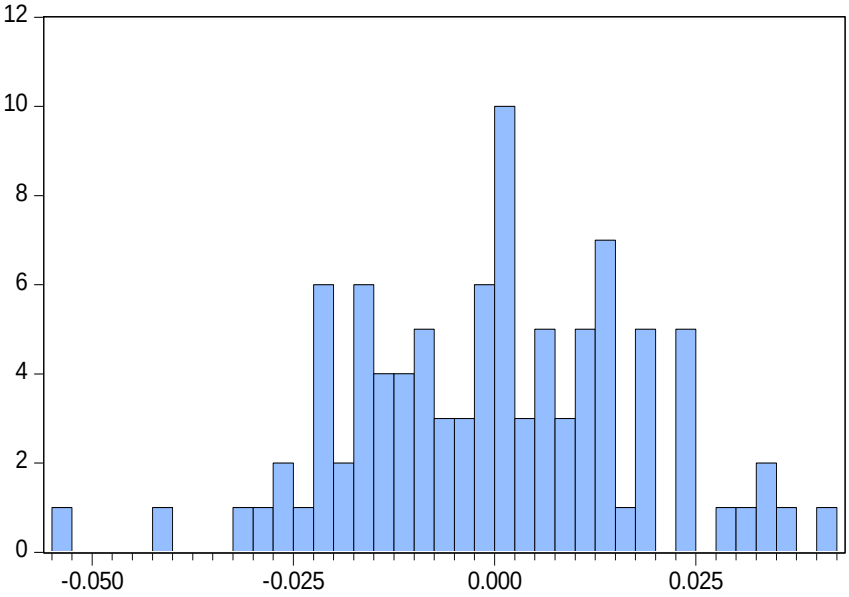
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.121021	0.040929	2.956843	0.0040
LVRG	0.279818	0.042282	6.617934	0.0000
LOG(TP)	-0.005789	0.003303	-1.752437	0.0834
CR	-0.036911	0.010143	-3.639184	0.0005
ROA	0.002777	0.039349	0.070573	0.9439
AVOL	0.060995	0.014409	4.233210	0.0001

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.839822	Mean dependent var	0.227890
Adjusted R-squared	0.816664	S.D. dependent var	0.044165
S.E. of regression	0.018910	Akaike info criterion	-4.972890
Sum squared resid	0.029681	Schwarz criterion	-4.625635
Log likelihood	251.6987	Hannan-Quinn criter.	-4.832524
F-statistic	36.26458	Durbin-Watson stat	2.025507
Prob(F-statistic)	0.000000		

Appendix-8Normality test



Series: Standardized Residuals
Sample 2005 2016
Observations 96

Mean	-9.76e-19
Median	0.001072
Maximum	0.041603
Minimum	-0.053419
Std. Dev.	0.017676
Skewness	-0.092152
Kurtosis	3.037750
Jarque-Bera	0.141572
Probability	0.931661

Appendix-9 Correlation Matrix

Covariance Analysis: Ordinary
Date: 12/14/17 Time: 02:40
Sample: 2005 2016
Included observations: 96

Correlation	RR	LVRG	LOG(TP)	CR	ROA	AVOL
RR	1.000000					
LVRG	-0.004442	1.000000				
LOG(TP)	0.015490	0.449648	1.000000			
CR	-0.231778	0.111883	-0.070645	1.000000		
ROA	-0.147026	-0.055006	0.272037	-0.209360	1.000000	
AVOL	0.299899	0.055879	-0.075117	-0.067981	0.067708	1.000000

Appendix-10 Correlation Matrix between Independent Variables

Covariance Analysis: Ordinary
Date: 12/14/17 Time: 02:43
Sample: 2005 2016
Included observations: 96

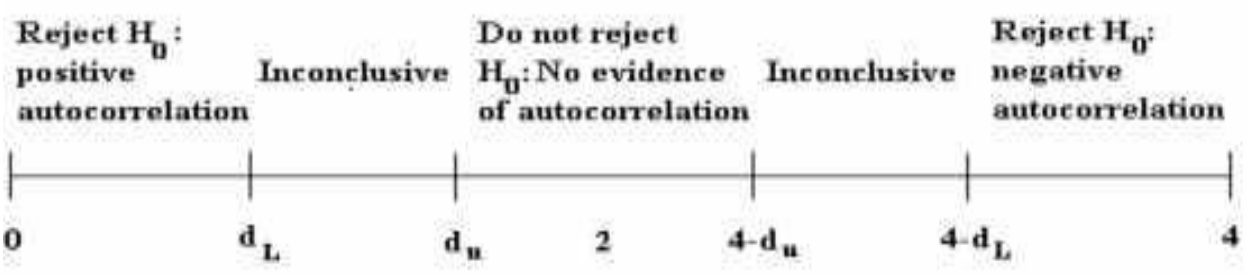
Correlation	LVRG	LOG(TP)	CR	ROA	AVOL
LVRG	1.000000				
LOG(TP)	0.449648	1.000000			
CR	0.111883	-0.070645	1.000000		
ROA	-0.055006	0.272037	-0.209360	1.000000	
AVOL	0.055879	-0.075117	-0.067981	0.067708	1.000000

Appendix-11 Heteroskedasticity Test: White

F-statistic	0.951059	Prob. F(5,90)	0.4522
Obs*R-squared	4.817758	Prob. Chi-Square(5)	0.4385
Scaled explained SS	2.427378	Prob. Chi-Square(5)	0.7874

Appendix-12 Autocorrelation test

Rejection and Non-Rejection Regions for Durbin-Watson Test



	1.571	1.780	2.0256	2.220	2.290	4