Firm Specific Determinants of General Insurance Business Solvency Margin: Evidence from Private Insurance Companies in Ethiopia

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A Thesis submitted to the Department of Accounting and Finance in Partial Fulfillment of the Requirements for the award of the Degree of Master of Science in Accounting and Finance

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Statement of Declaration

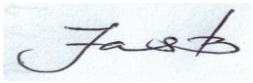
I, Teferi Debas Yirsaw, declare that this thesis entitled "***Firm Specific Determinants of General Insurance Business Solvency Margin: Evidence from Private Insurance Companies in Ethiopia"*** submitted by myself for the award of M.Sc. Degree in Accounting and Finance at Addis Ababa University is my original work and has not been previously submitted for the award of any degree or diploma at this or any other University or College, and that all the reference materials contained therein have been duly acknowledged.

Name: Teferi Debas

Signature: _____ Date: _____

Statement of Certifcation

This is to certifiy that this research work entitled"***Firm Specific Determinants of General Insurance Business Solvency Margin: Evidence from Private Insurance Companies in Ethiopia***" is original work of Teferi Debas carried out under my supervision. As it fulfills all the requirements for the award of the Degree of Masters of Science in Accounting and Finance, I endorse this through my signature.



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ACRONYMS

Adj	- Adjusted
ASM	- Available Solvency Margin
Coef	- Coefficient
Df	- Degree of Freedom
ER	- Expense Ratio
FS	- Firm Size
GAAP	- Generally Accepted Accounting Standard
GDP	- Gross Domestic Product
HO	– Null Hypothesis
IFRS	- International Financial Reporting Standard
LR	- Loss Ratio
LQR	- Liquidity Ratio
MS	- Mean of Square
NBE	– National Bank of Ethiopia
Obs	- Observation
OM	- Operating Margin
PG	- Premium Growth
Prob	- Probability
RIAI	- Reinsurance & Actuarial Issue
SIB	- Supervision of Insurance Business
Std. err	- Standard error
SS	- Sum of Square
VECM	- Vector Error Correction Model
VIF	- Variance Inflation Factor

Abstract

The objective of this study was to identify and examine firm specific determinants of the general insurance business solvency margins of the private insurance companies in Ethiopia. The target population was defined as all private insurance companies. Hence, the research design was a census survey of private insurance companies in Ethiopia which operated in the insurance industry from 2007/8 to 2016/7. Secondary data were collected from the financial statements of insurance companies and NBE. The data collected were analyzed using standard deviation, mean, correlation and multiple linear regression statistical analysis tools. Multiple regression analysis was carried out in order to see independent variables impact on the solvency margin of insurance companies. This study examined the effects of firm specific factors (firm size, liquidity ratio, operating margin, loss ratio, expense ratio, premium growth, and reinsurance & actuarial issue) on solvency margin. Solvency margin is dependent variable while firm size, liquidity ratio, operating margin, loss ratio, expense ratio, premium growth and reinsurance & actuarial issue are independent variables. The outcome of the study revealed that all studied independent variables were of the predicted sign. That means, firm size, liquidity ratio and operating margin positively related to solvency margin whereas loss ratio, expense ratio, premium growth and reinsurance & actuarial issue affected solvency margin negatively. Firm size, liquidity ratio and reinsurance & actuarial issue affect solvency margin significantly whereas operating margin, premium growth, loss ratio and expense ratio affect solvency margin insignificantly. NBE should develop a clear directive, which can be checked easily by any concerned body, regarding the reinsurance arrangement of the insurance company and set the minimum level insurance premium for each class of business to protect the health of insurance companies and ultimately protect the interest of policyholders. Insurance companies should use reinsurance as a risk management tool, increase their firm size, charge risk commensurate premium for the risk they shoulder and continue maintaining the appropriate level of liquidity ratio. Finally, investors, lenders and policy holders should take into account insurance company's firm size, reinsurance & actuarial issue (retention level) and liquidity ratio level before taking an investing, financing and buying insurance policy decisions respectively.

Key Words: Reinsurance and Actuarial Issue, Expense ratio, Firm size, Liquidity ratio, Loss ratio, Private insurers, Operating margin, Premium growth and Solvency margins.

CHAPTER ONE
INTRODUCTION

1.1. Background of the Study

According to Simpson & Damoah (2008) insurance is an important and rising part of the financial sector in both developed and developing economies even though the rate of growth differs among them. The primary role of the insurance industry is indemnifying policy holders for the risks they face. It also creates strong bondage with other sectors of the economy in promoting growth and stability and contributes a significant impact on the national income of a country. To put it simply, it plays substantial intermediary roles in terms of risk transferring, enhancing investment, creation of job opportunities and plays an important role in the development of major projects.

Due to the many benefits of insurance to individuals and to every economy, measures must be put in place to ensure their survival in the financial market and to monitor their financial health in order to prevent insolvencies and protect policyholders in today's increasingly competitive markets Asare (2015).

To achieve the above, it is essential to have a resilient and a well-regulated insurance industry that provides adequate incentives for efficiency and fairness as well as safeguards the interests of the policyholders. Moreover, it is imperative that the insurance supervisory systems and practices are continually upgraded to cope with developments as well as understand and address financial and systemic stability concerns arising from the insurance sector as they emerge Simpson & Damoah (2008).

Supervision is done to check whether insurance operations are complying with the relevant laws, regulations, directives, particularly whether they are accomplishing their contractual commitments (i.e. promises) they have made to the policy holder (legal supervision) and whether they are financially capable to meet their commitments (solvency).The commitments of an insurance company can be well explained by the technical provisions (liabilities). In Ethiopia, the insurance industry average technical provisions for the year ended June 2017, 2016 and 2015 accounts 72%, 75.75% and74% respectively. The data shows that technical

liabilities are the major source of risks. This risk has an impact on the solvency of insurance companies.

Solvency margin mainly depend on the strength of capital and adequacy of technical reserves, maintained for the obligations entered into, that may fluctuate under unforeseen situation. Adequate solvency margin enables insurers to better withstand the risks that it faces, cope up with adverse developments it may experience and meet obligations to policy holders. All insurers business risks in general and that of asset liability management in particular can be tackled, among other things, by the proper measurement of margin of solvency. For proper determination of an insurer's solvency margin, valuation of assets and liabilities on continuous basis is very crucial NBE, directive (No. SIB/45/2016).

Therefore, the study has focused and interpreted the study results of firm specific determinants of general insurance business solvency margin of private insurance companies operating in Ethiopia. The first reason for focusing general insurance business is its huge portion of the underwriting premium in the industry. It accounts 95% of the total underwriting premium as per National Bank of Ethiopia 2017/18 report. The second reason is it requires huge amount of minimum capital as compared to long term insurance. As per directive No. SIB/34/2013, the minimum paid-up capital required to start general business is 60 million whereas for long term insurance is 15 million. The third reason is the profit of general insurance business is declared annually whereas the profit of long-term insurance is declared every three years.

1.2. Statement of the Problem

The insurance industry in particular is part of immune and repair system of an economy and successful operation of the industry can set energy for other industries and development of an economy Kasturi (2006).To do so the insurance industry is expected to be financially solvent and strong through being profitable in operation Naveed et al (2011) as cited by Abate (2012).

On the contrary, insurer insolvency is common in Africa and other developing countries and causes huge financial loss to economies and policyholders Barros & Obijiaku (2007) as cited by Asare (2015).

Thousands of policyholders suddenly find themselves with some very serious problems Cummins et al (1995). This calls for the need for periodic monitoring and evaluation of the financial condition of insurance companies by regulators, investors and insurer management.

In practice, due to the fundamental characteristics of presence of uncertainty in the insurance contract it may be difficult to determine the exact value of the liabilities, or whether the assets would be sufficient to meet all those liabilities. Therefore, a considerable degree of estimation is required for liabilities and assets, which itself are causes of concern as the estimation may or may not be true. In strict sense, this concern led the supervisory and regulatory authorities to require insurance companies to maintain a solvency margin, by which assets must exceed liabilities at every point of time. This strict imposition of statutory solvency requirement is to protect the interest of policyholders. The insurance companies also try to meet compulsory requirement as essential part of their business because they want to avoid insolvency. Accordingly, a sound financial management policy is followed by insurance companies which aim to maintain adequacy of solvency margin at every point of time Verma (2014).

There is no insolvent (bankrupt) insurance company in Ethiopia to date. But a solvent or profitable insurance company could go insolvent at any time unless its financial status is monitored carefully. The growing unethical competition in the insurance industry such as premium rate undercutting, unethical underwriting and marketing practices, the tendency to open the sector to Ethiopian Diaspora and to join world trade organization will be threats to the Ethiopian insurance industry. These problems may lead to the inability of insurers to pay claims and meet other liabilities since they are charging a lesser amount of premium from period to period in a situation where the risk they are shouldering increases from time to time to the contrary, which makes clients frustrates when claims are due as stated in 2017/18 financial statements of almost all insurance companies in Ethiopia.

If an insurer is declared insolvent or bankrupt, it causes huge financial loss to people, society and the economy at large. During this unfortunate time, the policy holder especially those who have insurance cover suffer a lot. This demand insurer's senior executive management, the board of directors and particularly regulators to periodically monitor and evaluate financial condition of insurance companies. Insurance companies have to consider certain major factors that determine their solvency margin to remain financially solid. The major firm specific factors that significantly affect general insurers' solvency margin in growing economies as per the study result of Chen & Wong (2004), Asare (2015), Joo (2013), Darvari

et al (2015) and Komen (2012) are firm size, investment performance, underwriting result, liquidity ratio, combined ratio, operating margin, premium growth, expense ratio, loss ratio and growth rate of surplus.

Studies were conducted on determinants of solvency margin in developed countries in the USA, Europe and Asia: Petroni (2000), Rao & Srinivasulu (2013), Huang & Eling (2013) Haiss & Sümegi (2008), Ahmed et al (2011) as cited by Asare (2015), Moreno et al (2018), Misas and Moreno (2017), Rauch and Wende (2015), Darvari et al (2015), Yakob (2012) and Hsiao & Whang (2009) as cited by Jawad & Ayyash (2019) and Caporale et al (2017), Todevski and Fotov (2017), Verma (2014), Joo (2013), Charumathi (2013) and chen and Wong (2004).

The above listed studies identified the following macro and firm specific variables as determinants of solvency margin. These were: leverage, investment performance, liquidity, investment risk, profitability, underwriting risk, mutual- type organization, company size, reinsurance use, capital, losses payed, premium obtained, provisions payed premium, interest rates, wholesale price, credit provided by financial institutions, growth premium written, usage of derivatives, operating risk, loss compensation, loss ratio, expense ratio, combined ratio, growth of the company, age of company, tangibility of asset, capital adequacy, market share, the ratio of total interest paid to fixed capital, surplus ratio, capital equity, management efficiency, market sensitivity, operating margin and inflation. All the variables select for this study were included in the previous studies.

The majority of these studies showed similar result on the effect of independent variables on solvency margin. Firm size had a positive and significant factor on solvency margin, loss ratio affected solvency margin negatively, expense ratio affected solvency margin negatively, liquidity ratio had a significant positive effect on solvency margin, operating margin affected solvency margin significantly and positively, premium growth affected solvency margin negatively and finally reinsurance and actuarial issue (retention)affected solvency margin negatively.

The studies conducted in Ethiopian insurance industry focused on determinants of premium growth and profitability, on the effect of financial risk on performance of insurance companies, on challenges and prospects of life insurance, on financial distress and its determinants in bank and insurance industry in Ethiopia, on determinants of life insurance demand in Ethiopia. See Daniel (2017), Adane (2017), Dejen (2017), Abate (2012), Meaza

(2014), Hanna Mariam (2015), Mistre (2015), Gemachis (2017), Zewge (2019), Kiddist (2018), Amrot (2014), Goitom (2019) and Amare (2019).

As far as the knowledge of the study is concerned, there is no study that has been carried out on this topic in Ethiopia. The absence of empirical studies in Ethiopia concerning firm specific determinants of insurance company's solvency margin is then what motivated the researcher to put his own contribution on the topic (issue).

Insurance companies that identify and work on the main determinants of their solvency margin reassures (sends message to) creditors and policy holders that they can pay their debts easily. Policy holders can use the significant factors or determinants of solvency margin from the financial statement of insurance companies as a base for selecting an insurance company before buying an insurance cover which they are in need of. Identifying the basic determinants of solvency margin helps the insurance company to work on the most important determinants of solvency margin and in evaluating and selecting the appropriate capital structure that maximize future profitability. Investors want to invest in a company which is profitable and that can conduct business without interruption (solvent) for unforeseen period of time.

This study attempted to work on such untouched empirical evidence in the country specifically on firm specific determinants of general insurance business solvency margin of private insurance companies in Ethiopia since the issue investigated is very crucial for the policy holders, insurance managers, professionals, regulators and policy makers to support the sector in achieving the excellence.

This is what motivated the researcher to study the topic which focused on the firm specific determinants of general insurance solvency margin of Ethiopian private insurance companies.

1.3. The objective of the Study

The general objective of this study was to identify firm specific determinants of general insurance business solvency margin of private insurance companies in Ethiopian for the period from 2007/08 to 2016/17.

1.3.1. Specific Objective

The specific objectives of the study were;

1. To examine the effect of firm size on general insurance business solvency margin of Ethiopian private insurance companies.
2. To evaluate the effect of liquidity ratio on general insurance business solvency margin of Ethiopian private insurance companies.
3. To identify the effect of operating margin on general insurance business solvency margin of Ethiopian private insurance companies.
4. To examine the effect of loss ratio on general insurance business solvency margin of Ethiopian private insurance companies.
5. To examine the effect of expense ratio on general insurance business solvency margin of Ethiopian private insurance companies.
6. To examine the effect of premium growth on general insurance business solvency margin of Ethiopian private insurance companies.
7. To examine the effect of reinsurance and actuarial issue on general insurance business solvency margin of Ethiopian private insurance companies.

1.4. Research Hypotheses

To achieve the above objectives and based on literature review the study has developed the following hypotheses.

H1: Firm size has a positive and significant effect on general insurance business solvency margin of Ethiopian private insurance companies.

H2: Liquidity ratio has a positive and significant effect on general insurance business solvency margin of Ethiopian private insurance companies.

H3: Operating margin has a positive and significant effect on general insurance business solvency margin of Ethiopian private insurance companies.

H4: Loss ratio has a negative and significant effect on general insurance business solvency margin of Ethiopian private insurance companies.

H5: Expense ratio has a negative and significant effect on general insurance business solvency margin of Ethiopian private insurance companies.

H6: Premium growth has a negative and significant effect on general insurance business solvency margin of Ethiopian private insurance companies.

H7: Reinsurance and Actuarial issue has a negative and significant effect on general insurance business solvency margin of Ethiopian private insurance companies.

1.5. Significance of the Study

This research will be important to Ethiopia insurance companies since it will help to know and take appropriate action on those factors that affect their company general insurance business solvency margin significantly.

The research will also enable the Ethiopian Insurance Regulatory Body, National Bank of Ethiopia (NBE), to enhance existing legal and regulatory policies and rules of supervising insurance companies.

Further, the research will add to the body of knowledge in finance discipline by relating practical aspects of solvency and used as a reference for future related studies in the Ethiopian insurance industry.

Finally, the research will enable policyholders and shareholders to assess whether the insurance companies are compliant with the relevant regulation and it could help them to make an informed decision on which company(s) to get insurance cover or invest.

1.6. Scope of the Study

This research focused on nine private insurance companies in Ethiopia. It covered ten years of financial statement data (2007/08 to 2016/17). The study has excluded the government insurance company, Ethiopian Insurance Corporation, due to unavailability of data. The amount of gross premium underwritten and premium ceded was not shown on the financial statements prepared by the company. It starts from the net earned premium. If I had had the chance of getting the data, I wouldn't include in the research since it had an outlier effect as its size is too huge as compared with Ethiopian private insurance companies. The study selected firm size, liquidity ratio, premium growth, operating margin, loss ratio, expense ratio and reinsurance & actuarial issue as independent variables and solvency margin as dependent variable. The data were collected from the financial statements of selected insurance companies and from NBE.

1.7. Limitation of the Study

The categorization or classification of the accounts might not be consistent from insurance company to insurance company. This may had an impact on the value of variables. The study was limited only to examination of seven firm specific variables affecting general insurance business solvency margin of Ethiopian private insurance companies that have ten years data. The study includes only quantitative data. Seven private insurance companies operating for less than ten years excluded in this study because they do not have full data for the study period.

1.8. Organization of the study

This study has been organized into five chapters. The first one deals with the introduction, statement of the problem, research hypothesis, objective, background, significance, limitation, scope and organization of the study. The second chapter deals with introduction, review of both theoretical and empirical literature, conceptual frame work that deals with firm specific determinants of general insurance business solvency margin of private insurance companies, summary and knowledge gap. The third chapter comprised of introduction, research methodology which includes; research approach, method, design, data used in the research, sampling technique, the measurement of independent variables and model specification. The fourth chapter is focus on the data analysis and result interpretation. The final chapter, chapter five, includes summary, conclusion, recommendations and suggestion for further study.

CHAPTER TWO
LITERATURE REVIEW

2.1. Introduction

This chapter presents a detail review of both theoretical and empirical literature used to connect to the research objectives and justify the hypothesis. It generally covers the conceptual framework, the relationship between available solvency margin and independent variables (firm size, loss ratio, liquidity ratio, operating margin, premium growth, reinsurance & actuarial issue and expense ratio) and conceptual framework. Finally, the chapter summary and the knowledge gap is presented and discussed.

2.2. Theoretical Literature

2.2.1. Solvency Margin

Solvency margin is defined as a minimum excess on an insurer's assets over its liabilities set by regulators. It is an important proxy measure of the financial health of an insurance company and denotes its ability to survive in the long run. It is the extra capital that an insurance company is required to hold. All insurance companies have to pay claims (current or future claims) to policy holders Gour & Gupta (2012).

Insurance Business Proclamation No. 746/2012 of Ethiopia defines solvency margin as the excess of admitted asset over admitted liabilities to be maintained by an insurance company for long term insurance and for general insurance.

Solvency margin is one of the important indicators or standards to know the financial soundness of firms since the firms with higher solvency margin are deemed to be more financially sound than the one with the lower solvency margin. An insurance company that have adequate solvency margin firm can meet its obligations towards its customers and society in a better. This capacity (meeting obligations easily when due) in-turn able to retain and attract more customers. From the existing and new customers, the insurance company can generate huge volume of premium revenue. Therefore, a higher solvency margin may result in excellent realization of goals by the insurers easily. On the other hand, uncertainly is one of the fundamental characteristics of insurance business, as it involves uncertainty

regarding timing of occurrence of claim as well as cost of claim. In such a business of uncertainty, the solvency margin acts as cushion to protect the interest of policyholder as well as to ensure the survival of insurance business Verma (2014).

Insurers are expected to put aside a certain sum to cover these liabilities. These are also referred to as technical provisions. Insurance, however, is risky business and unforeseen events might occur sometimes, resulting in higher claims not anticipated earlier Gour & Gupta (2012). In such circumstances, technical provisions though initially prudent, may prove insufficient for taking care of liabilities. If the liability is large, there is a possibility of the insurance company becoming insolvent. This would create an awkward situation for the insurance sector, regulator and also the government. The solvency margin is thus aimed at averting such a crisis Gour & Gupta (2012).

The authorities' motivation for imposing statutory solvency requirements is to protect the consumer. However, the industry itself also has an interest in avoiding insolvencies. Sound financial management requires an adequate solvency margin to be maintained. The supervisory authority will aim to ensure that a company remains able to meet its liabilities. Management will also be seeking to maintain the company's financial health and profitability. However, for various reasons, the financial state of an insurer may deteriorate rapidly. The statutory solvency margin is intended to give early warning of the need for corrective action, or for intervention by the supervisor, before insolvency is reached. This provides a mechanism for initiating discussions with a company over the need for additional capital, changes in underwriting practice, etc. The solvency margin must be sizeable enough to enable action to be taken in good time if the company is unable or unwilling to take corrective action itself Dakin et al (1984).

A well-developed and evolved insurance sector is a boon for economic development as it provides long- term funds for infrastructure development at the same time strengthening the risk taking ability of the country Charumathi (2013). Chen and Wong (2004) also suggest that a strong and healthy insurance sector is of utmost importance for all groups and sectors of the economy.

An insurer is insolvent if its assets are inadequate or illiquid to pay the claims arising. The solvency of insurance company or its financial strength depends chiefly on whether enough technical reserves have been set up for the obligations entered into and whether the company has adequate capital as security Kansal (2004) as cited by Charumathi (2013).

The minimum solvency margin and the methods of valuations of assets and liabilities of an insurer are prescribed in the insurance regulations of the respective country. The importance of evaluating the assets and liabilities in a reliable way was highlighted by Pentikainen (1967) as cited by Charumathi (2013).

Daykin (1984) as cited by Charumathi (2013) established a framework differentiating between technical reserves and solvency margin of general insurers particularly in the context of a company having adequate resources to continue underwriting of business. Harrington & Nelson (1986) as cited by Charumathi (2013) suggested a new methodology using regression analysis for assessing the financial strength of U.S. property liability insurers.

2.2.2. Explanatory Variables

The financial health of insurers can be influenced by both internal/firm-specific factors and external/industry-wide/ macro factors. Some studies focus on determining the effects of both factors on the financial stability of insurers Chen & Wong (2004) and McDonald (1993). Chen & Wong (2004) reviewed firm-specific and market factors that affect both life and non-life insurers separately. Most of the firm-specific factors that affect the financial soundness of an insurer are financial ratios. A financial ratio is defined as a comparison between one bit of financial information and another. A financial ratio may also be defined as a relative magnitude of two selected numerical values taken from an enterprise's financial statements. These ratios are used to try to evaluate the overall financial condition of an organization. Some of the firm-specific factors that affect an insurer’s financial health include financial ratios, surplus growth, operating margin, liquidity ratio, and combined ratio.

The present study, however, focuses on quantitative firm-specific determinants of the solvency margin/financial health of general insurance business of private insurance companies in Ethiopia.

For this study, certain ratios were selected based on their significance in predicting solvency from previous literatures Chen & Wong (2004), Charumathi (2013), Joo (2013), Darvari et al (2015) and Asare (2015). Except reinsurance & actuarial issue and firm size which were adopted from Charumathi (2013), expense ratio which was adopted from Darvari et al (2015) and loss ratio which was adopted from Joo (2013) and Darvari et al (2015), all of them were adopted from Chen & Wong (2004).

2.2.2.1. Firm size and Solvency:

The financial health of insurance firms is influenced by their assets size. Total premium, total admitted assets, total assets and capital & surplus are some of the variables used to assess the firm size. This study used total asset to measure the financial strength of general insurers as used in some of the earlier studies. As regulators are less likely to liquidate large insurers, it is expected that small insurers are more vulnerable to insolvency BarNiv and Hershbarger (1990) and Cummins et al (1995) as cited by Chen and Wong (2004). Variables used to measure firm size include total premium, total admitted assets, and capital and surplus.

2.2.2.2. Loss Ratio and Solvency:

Claims (losses) are undesirable to insurers. Insurers, therefore, would like to incur less claims Owusu-Ansah (2010) as cited by Joo (2013). The use of "claims paid" or "losses incurred" as a factor of financial soundness has attracted criticism because an unexpected up-ward change in losses (due to an environmental catastrophe or a terrorist attack) would be considered as an increased output quantity and, therefore, would result in efficiency enhancement of the respective company Joo (2013). It is calculated by dividing losses incurred to net earned premium.

2.2.2.3. Expense Ratio and Solvency:

It includes the percentage of insurance premium used to pay for an insurer's expense including overhead, marketing and commissions. It is the money used in acquiring and writing and servicing an insurance policy. It is calculated as underwriting expense to net premiums earned Darvari et al (2015).

2.2.2.4. Liquidity Ratio and Solvency:

Liquidity is the capability of an insurer to pay liabilities, which include operating expenses and payment for losses/benefits under insurance policies, when due. For an insurer, cash flow (mainly premiums and investment income) and liquidation of assets are the two sources of liquidity Hampton (1993) as cited by Joo (2013). Lee and Urrutia (1996) as cited by Chen and Wong (2004) found that the current liquidity ratio is a significant indicator of solvency. The stability of the liquidity ratio is a necessary measure of corporate solvency Dambolena and Khoury (1980) as cited by Chen and Wong (2004).

2.2.2.5. Operating Margin and Solvency:

An insurer is considered profitable when their earning or revenues are greater than the amount they have disbursed (expensed). Kramer (1996) as cited by Joo (2013) found a positive relationship between operating margin and financial solidity, which is, operating margin, is negatively correlated to the rate of insolvency.
Operating margin is defined as the ratio of net operating income to premiums earned Lee and Urrutia (1996) as cited by Chen and Wong (2004).

2.2.2.6. Premium Growth and Solvency:

Premium growth measures the rate of market penetration. Empirical results show that rapid growth of premium volume is one of the causal factors in insurers' insolvency Kim et al (1995) as cited by Komen (2012). Being too obsessed with growth can lead to self-destruction as other important objectives might be neglected. This is especially true during an economic downturn, such as the Asian Financial Crisis Komen (2012).

2.2.2.7. Reinsurance & Actuarial Issue and Solvency:

The solvency position of an insurance company will be assessed on a net of reinsurance basis. The regulator also requires insurers to maintain appropriate retention commensurate with its financial strength and volume of business.

As per directive NBE directive No. SIB/44/2014, reinsurance is an important risk management tool that can be used to reduce insurance risk and the volatility of financial result, stabilize solvency, make more efficient use of capital, better withstand catastrophic events, increase underwriting capacity and draw on reinsurer's expertise. Inadequate reinsurance risk management practices and procedures can materially affect an insurer's financial soundness and reputation, and can ultimately contribute to its failure.

Doherty and Tinic (1981) find that reinsurance contracts make primary insurers manage cash flow volatility more effectively, and result in better future underwriting ability, and lower insolvency probability.

2.3. Empirical Literature

The majority of studies that emphasize monitoring or predicting the financial health of insurers have focused on general or nonlife insurance Chen (1999), Shiu (2004), Hrechaniuk et al (2007), Simpson & Damoah (2008), Pervan & Pavic (2010) Malik (2011) and Charumathi (2013) as cited by Asare (2015). The major theme across these studies focus on either the financial health, efficiency or the contribution of insurance to economic development Barros et al (2010) and Bikkr & Leuvensteijn (2008) as cited by Asare (2015).

Pasiouras & Gaginis (2013) as cited by Asare (2015) used an accounting based measure, called the Z-score to determine the association between firms' soundness (solvency) and regulatory policies in the insurance industry over the period 2003– 2007. Their findings were that, regulations related to both technical provisions and investments have an impact on the soundness of firms.

The study conducted by Jawad and Ayyash (2019) focus on determinants of the solvency of insurance companies in Palestine. The study investigated the factors that affect the solvency of the insurance companies in Palestine and highlighted the nature and strength of the relationship between liquidity, investment, leverage, claims and the solvency of the insurance companies in Palestine. Based on the data of the financial statements of seven insurance companies and by using regression of fixed effects of panel data for 2010-2017, the study found that the claims have a positive effect on the financial solvency and leverage has a negative effect on the solvency of insurance companies in Palestine, while investment and liquidity have an insignificant effect on financial solvency.

Moreno et al (2018) as cited by Jawad and Ayyash (2019) analyzed the factors determining the solvency of insurance companies operating from 2008-2015 in Spain using a dynamic panel data model. The study result found that profitability, underwriting risk and mutual- type organization were positively correlated with actual solvency margins whereas company size, reinsurance use, and life insurance specialization inversely.

The study conducted by Caporale et al (2017) focused on analyzing the determinants of insolvency risk for general insurance firms in the UK. The results showed that interest rates, liquidity, profitability, leverage were significant determinants of the insolvency risk of insurers. However, in contrast to other studies, two macroeconomic factors (wholesale price and credit provided by financial institutions) and firm-specific factors (growth premium

written, reinsurance, usage of derivatives and organizational form) were also crucial for assessing the credit risk of general insurance firms.

The study conducted by Todevski & Fotov (2017) focused on the solvency margin determinants for Macedonian insurance sector. The research analyzed relationship between solvency margin of Macedonian insurance sector and several internal variables, in the period between 2010 and 2016 using time series VECM model. Solvency and soundness of the Macedonian insurance sector is represented with solvency margin in all three model, with life, non-life and life and non-life values separately. This three models used capital, losses payed, premium obtained, provisions payed and administrative costs as an independent variables. According to the results, the solvency and the risk of the Macedonian insurance sector is determined by the capital, losses payed, premium obtained, provisions payed and administrative costs, which have high strong relation and causality with the dependent variables. The variables loss payed and premium showed a negative statistical significance on solvency margin, while capital, administrative costs and intermediary provision payed, showed positive statistical significance on the same explanatory variables.

Misas and Moreno (2017) as cited by Jawad and Ayyash (2019) have also examined the factors affecting the regulatory solvency of insurance companies in Spain, where the study found that the growth in premiums and reinsurance has a negative impact on the regulatory solvency of insurance companies, while the investment risk, operational leverage, and size of the enterprise did not have a statistically significant impact.

Rauch and Wende (2015) in Germany as cited by Jawad and Ayyash (2019) found that operating leverage has a negative impact on the regulatory solvency of insurance companies, while the investment risk had a positive impact.

Darvari et al (2015) as cited by Jawad and Ayyash (2019) analyzed the relationship between solvency ratio and financial indicators of Iranian insurance companies. The study employed linear regression model and used some firm specific characteristics such as reinsurance & actuarial issue, expense ratio, loss ratio, combined ratio and ability of loss compensation against the solvency ratio. The study result showed that the ability of loss compensation has significant positive relationship with the solvency ratio. But loss ratio, expense ratio and combined ratio have significant negative relationship with solvency ratio. It also found that solvency ratio of Iranian insurance companies is not influenced by reinsurance & actuarial issue.

The study conducted by Verma (2014) focus on the impact of corporate characteristics on solvency margin of Indian life insurance companies. The study focuses on six company specific characteristics such as tangibility of asset, liquidity, growth of the company, firm size, profitability and age. The result found showed that liquidity, growth of the company, profitability and age affect solvency margin positively whereas firm size and tangibility affect negatively.
Age and profitability affect solvency margin significantly whereas the rest have insignificant effect on it.

The study conducted by Charumathi (2013) focus on the determinants of solvency margin of Indian general insurers. The study focuses on six company specific characteristics such as capital adequacy, reinsurance & actuarial issue, efficiency and profitability, investment performance, firm size and combined ratio. The result found that except reinsurance & actuarial issue all other factors determine the solvency margin significantly.

The study conducted by Joo (2013) focus on analyzing the financial stability of Indian nonlife insurance companies. The study used firm size, investment performance, liquidity ratio, operating margin, combined ratio, claims ratio, market share and underwriting profitability as independent variable that have an impact on solvency margin. Of these seven variables the result of five variables (market share, firm size, liquidity, claim ratio and underwriting profitability) are of the predicted sign. Of these seven variables the result of three variables (operating margin, investment income and claim ratio) affected solvency margin negatively. Of these seven variables the result of four variables (operating margin, firm size, combined ratio and claim ratio) affected solvency margin significantly.

In the study Yakob (2012) as cited by Jawad and Ayyash (2019), which addressed the factors affecting the solvency of insurance companies in Malaysia, corporate factors were taken into account, using the regression of random effects of panel data. The study result showed that leverage, liquidity, the ratio of total interest paid to fixed capital and surplus ratio have a negative and statistically significant impact on the solvency of insurance companies in Malaysia.

Efficiency studies have been conducted on insurance in Africa and other parts of the world Hao (2007) and Chen et al (2009). Likewise, other studies have been conducted on the financial health and efficiency of both life and non-life industries in Asia.

Hsiao and Whang (2009) as cited by Jawad and Ayyash (2019) assessed the financial situation and monitor the solvency of selected samples in Taiwan. The study examined capital equity, assets, profitability, liquidity, management, market sensitivity. The study result found that all the factors have a positive and statistically significant impact on the solvency of insurance companies in Taiwan.

The study conducted by Chen and Wong (2004) focus on determinants of financial health of four Asian countries insurance companies. The study examined both firm specific and macro factors that determine the financial health of the Asian insurance companies. The hypothesis, factors and the expected effect were stated as follows.

Firm specific factors that affect general insurer's solvency margin positively are firm size, operating margin and liquidity ratio. Firm specific factors that affect general insurer's solvency margin negatively are premium growth, surplus growth and combined ratio. Firm specific factors that affect life/health insurers are insurer's solvency margin positively are firm size, investment performance and operating margin. Firm specific factors that affect life/health insurer's solvency margin negatively are change in asset mix, change in product mix and insurance leverage.

Market/economic factors that affect both general and life/health insurers solvency margin negatively are number of insurers (competition), interest rate changes and inflation rate change. But, absolute level of interest rate affects general and life insurers' solvency margin positively.

The result showed that the factors that significantly affect the financial health of general insurers in Asian economies were firm size, investment performance, liquidity ratio, surplus growth, combined ratio, and operating margin. The factors that significantly affect the financial health life insurers in the same economy are firm size, change in asset mix, investment performance, and change in product mix.

Little has, however, been done on the financial health of insurers in Africa. The study conducted by Asare (2015), Komen (2012) and Mvula (2009) are among them.

Asare (2015) focused on determinants of financial health of life Insurance companies in Ghana. The result showed that seven of (firm size, liquidity ratio, investment performance, operating margin, claims incurred, combined ratio and inflation) the nine are significant

variables for solvency margin whereas premium growth and reforms are not. Of the significant variables operating margin, liquidity ratio, investment performance and firm size were positively related to solvency while claims incurred, inflation and combined ratio have a negative impact on the financial health of life insurance companies.

The study of Komen (2012) emphasized on the topic called determinants of solvency margins of insurance companies in Kenya. The study focuses on firm specific determinants of solvency margin of insurance companies in Kenya. The hypothesis developed for the variables were: firm size, investment performance, liquidity ratio and operating margin are factors that related to solvency margin positively whereas combined ratio, surplus growth and premium growth are related to negatively. The result found was consistent with the majority of the hypothesis developed by the study. Four of (liquidity ratio, operating margin, combined ratio [expense and claims ratio] and premium growth) the seven studied variables were similar to the predicted sign whereas growth in surplus, investment performance and firm size were contrary to the predicted results.

Mvula (2009) conducted a study on the topic called the impact of macroeconomic condition on the liquidity and solvency of the insurance industry in Namibia. The study result showed as there was no significant relation between solvency of the insurer and return on investment as well as solvency and return on asset.
There was no study conducted on firm specific determinants of general insurance business solvency margin of Ethiopian private insurance companies to date.

In summary, the majority of the study showed that firm size had a positive and significant factor on solvency margin Joo (2013), Hsiao and Whang (2009),Chen and Wong (2004), Charumathi (2013) and Asare (2015). But the study results of Moreno et al (2018), Komen (2012), Misas and Moreno (2017) and Verma (2014) showed as it affected solvency margin negatively and insignificantly.

The study result of Darvari et al (2015), Joo (2013) and Asare (2015) showed that loss ratio affected solvency margin significantly and negatively. Whereas, the study result of Jawad and Ayyash (2019) showed as claims had a positive and significant effect on solvency margin.
The study result of Darvari et al (2015) showed that expense ratio had significant negative relationship with solvency ratio.

The majority of the study showed as liquidity ratio had a significant positive effect on solvency margin Caporale et al (2017), Hsiao and Whang (2009), Chen and Wong (2004), and Asare (2015). The study result of Verma (2014), Komen (2012) and Joo (2013) showed that liquidity has a positive but an insignificant effect on solvency margin. On the other hand, the study result of Yakob (2012) showed that liquidity ratio had a negative and statistically significant impact on the solvency whereas the study result of Jawad and Ayyash (2019) showed as liquidity had a negative and an insignificant effect on solvency margin.

The study result of Chen and Wong (2004) and Asare (2015) showed as operating margin had significant and positive relation with solvency margin whereas the study of Komen (2012) showed that operating margin affected solvency margin positively like that of Chen and Wong (2004) and Asare (2015) but insignificantly. On the other hand, the study conducted by Joo (2013) showed that it affects solvency margin significantly but negatively.

The study result of Misas and Moreno (2017), Komen (2012), Caporale et al (2017) and Chen and Wong (2004) showed as premium growth had a negative but insignificant impact on solvency margin. On the other hand the study result of Asare (2015) showed as it has a positive but insignificant effect on solvency margin.

The study result of Misas and Moreno (2017) and Moreno et al (2018) showed as reinsurance and actuarial issue has a negative impact on solvency margin. On the other hand, the study result of Charumathi (2013) showed that it affected the solvency margin positively but insignificantly, the study result of Caporale et al (2017) showed as it affected solvency margin positively and significantly and the study result of Darvari et al (2015) showed that reinsurance & actuarial issue doesn't affect solvency margin.

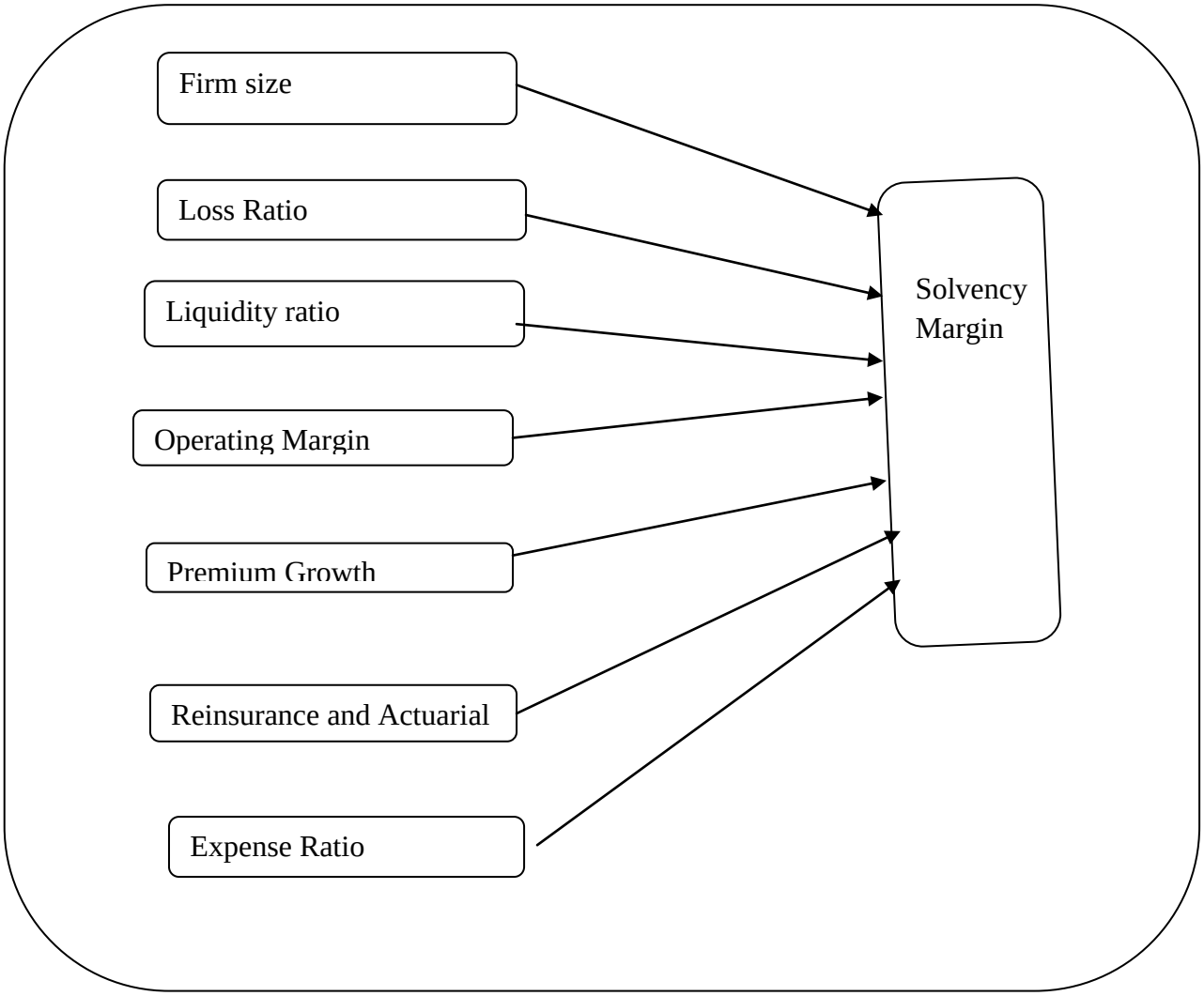
2.4. Summary and Hypothesis Development

The study results of almost all researchers showed that the sign and the level of significance of each variable (the hypothesis) had on solvency margin have been almost similar. Majority of the researchers have reached similar result on each independent variable identified in their research. As can be seen from the studies discussed above, almost all studies used determinates that the study have selected. Based on the result of the previous research, there is no change on the hypotheses developed and stated in chapter one.

2.5.Conceptual Framework

The conceptual framework of the study was developed to explain the firm specific determinants of available solvency margin. By summarizing previous studies, firm size, loss ratio, expense ratio, liquidity ratio, premium growth, reinsurance & actuarial issue and operating margin were selected and included as independent variables that influenced insurance companies' available solvency margin as measured by total admitted asset less total admitted liability. Accordingly, the hypotheses listed in chapter one above was tested by the study. Firm specific determinants of general insurance business solvency margin of private insurance companies in Ethiopia were depicted as follows:

Figure 2.1.Conceptual framework of the study



Source: *Chen& Wong (2004), Charumathi (2013) Joo (2013), Jawad and Ayyash (2019), Darvariet al (2015) and Asare (2015).*

2.6. Knowledge Gap

Almost all the results of the previous studies on each variable were similar except the following points.

Firm size considered as a factor which is significant and positive determinant for solvency margin except a study conducted by Moreno, et al (2018), Verma (2014), Misas and Moreno (2017) and Komen (2012). These studies showed that firm size had a negative effect on solvency margin.

Operating margin considered as a factor which is significant and positive determinant for solvency margin except a study conducted by Joo (2013).The study result of Joo (2013) showed that operating margin had negative but significant effect on solvency margin.

Loss ratio considered as a factor which is significant and negative determinant for solvency margin except a study conducted by Jawad & Ayyash (2019). The study result of Jawad & Ayyash (2019) showed as it had positive and significant effect on solvency margin.

Liquidity ratio considered as a factor which is significant and positively determinant for solvency margin except a study conducted by Yakob (2012),Verma (2014), Komen (2012), Joo (2013) and Jawad & Ayyash (2019). The study result of Verma (2014), Komen (2012) and Joo (2013) showed that liquidity has a positive but an insignificant effect on solvency on the other hand the study result of Jawad & Ayyash (2019) showed as liquidity ratio had negative and insignificant impact whereas the study result of Yakob (2012) showed as it had a negative and significant effect on solvency margin.

Reinsurance & actuarial issue considered as a factor which is significant and negatively determinant for solvency margin except a study conducted by Darvari et al (2015), Caporale et al (2017) and Charumathi (2013).The study result of Charumathi (2013) showed that reinsurance & actuarial issue had an insignificant positive relationship with solvency margin, the study result of Caporale et al (2017) showed as it had positive and significant effect on solvency margin whereas the study result of Darvari et al (2015) showed as there is no relationship between reinsurance & actuarial issue and solvency margin.

Copule of studies also claim that firm size had a negative effect on solvency margin Moreno (2018), Verma (2014) and Komen (2012), operating margin had a negative effect on solvency

margin Joo (2013), loss ratio had a positive effect on solvency margin Jawad & Ayyash (2019), liquidity ratio had a negative and an insignificant effect Jawad & Ayyash (2019), positive and an insignificant Verma (2014), Komen (2012) and Joo (2013) and negative and statistically significant impact on the solvency Yakob (2012) and reinsurance & actuarial issue had insignificant positive relationship with solvency margin Charumathi (2013), positive and significant effect on solvency margin Caporale et al (2017) and no relationship between retention and solvency margin Darvari et al (2015).

But firm with a big size, having high liquid asset over liquid liability, having an appropriate reinsurance arrangement and having high operating income, will have high solvency margin i.e these variables had positive relationship with solvency. This means, as these variables increase, the solvency margin of the company increase too and the reverse holds true.

On the contrary, when loss ratio changes, the solvency margin changes in the opposite direction i.e. when the loss ratio increases, the solvency margin of the company decrease and the reverse holds true. This is because as loss ratio increase, the cash outflow increase as a result it has a negative impact on solvency.

Regarding reinsurance & actuarial issue, when the insurance company holds or retains higher amount of the risk (not ceded to reinsurers), it is almost certain that the risk will materialize and it affects the solvency margin of the insurance company.

The study have seen the above inconsistencies and no study conducted on this topic in Ethiopian insurance industry yet. This research tried to show the cases in Ethiopia and also tried to address those inconsistencies.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Introduction

This chapter provides the detail steps and procedures used to conduct the analysis of determinants general insurance business solvency margin of private insurance companies. It includes the approach adopted to examine the effect of main determinants of solvency margin, the research design, the type of data and data sources, the sampling method and size, the methods used to manage and analyze the data, and the process of developing empirical model with identification and measurement of its components and expected relationship between the dependent and independent variables.

3.2. Research Approach

This study examines the previous findings in the literature, and applies the model in Ethiopian private insurance companies. Therefore, a deductive approach is adopted by constructing an empirical model and hypothesizing its collinear relationship between determinants and its dependent variable: solvency margin of general insurance business of Ethiopian private insurance companies.

3.3. Research Method

In achieving the objectives and obtaining answers for the research hypothesis, the study adopted a quantitative method research approach. The target population consists of sixteen private insurance companies. The number of total insurance companies under study is nine and observation is also for ten years and then nine times ten, becomes ninety total observations were included.

3.4. Research Design

Quantitative research is based on the measurement and the analysis of causal relationships between variables.

Therefore to achieve the objective of this research, this study has used primarily quantitative research method, which constructed an econometric model to identify and measure the firm specific determinants of general insurance business solvency margin of Ethiopian private insurance companies.

Table 3.1: Hypotheses of the effects of various factors on general insurance business solvency margin of Ethiopian private insurance companies

Insurance Company's Specific Factors Hypothesis	Abbreviations	Expected Effect
Firm Size	FS	+
Liquidity Ratio	LQR	+
Operating Margin	OP	+
Loss Ratio	LR	-
Reinsurance & actuarial issue	RIAI	-
Premium Growth	PG	-
Expense Ratio	ER	-

Source: *Chen & Wong (2004), Charumathi (2013), Joo (2013), Jawad and Ayyash (2019), Darvari et al (2015) and Asare (2015).*

3.5. Data and Data Sources

To achieve the research objectives, the study focused on secondary data, which were obtained from annual reports of individual insurance companies and NBE. The study used secondary data since it generally provide a source of data that is both permanent and available in a form that may be checked relatively easily by others, i.e. more open to public scrutiny.

The principal secondary data sources for this study were individual insurance companies annual reports that contain detailed consolidated balance sheets and income statements and National Bank of Ethiopia 2017/18, which provides a comprehensive database for all insurance companies.

The data collected and analyzed is a balanced panel of nine insurance companies in Ethiopia operating over the last ten years. Panel data is preferred by the study in order to meet the research objectives as it best fits better than the single time series or cross-sectional alone.

3.6. Sampling Method

Given the research objectives coupled with research hypotheses, the study used a census survey of all private insurance companies established and serving with in the specified period of time (from June 2008 to June 2017). The size was nine insurance companies operating over the period of ten years. These are National Insurance Company of Ethiopia S.C, Awash Insurance Company S.C, Africa Insurance Company S.C, Nyala Insurance Company S.C, Nile Insurance Company S.C, Global Insurance Company S.C, The United Insurance S.C, NIB Insurance Company S.C and Lion Insurance Company S.C.

3.7. Data Analysis

The study used descriptive, correlation and regression data analysis methods. This part of the research provides the descriptive analysis of the panel data and variables for the study in collaboration with some important tests, discusses the correlation analysis between dependent and independent variables, deals the results of the linear regression analysis that constitute the main findings of this study.

3.7.1. Descriptive Analysis

The descriptive statistics discusses and presents an overview of all variables used in the analysis. In this part the mean, minimum, maximum, standard deviation of the variables are produced.

3.7.2. Correlation Analysis

Correlation analysis shows how variables are related to each other. Its results represent the nature, direction and significant of the correlation of the variables considered under this study.

3.7.3. Regression Analysis

The regression analysis is used to examine the relationship between the solvency margin of general insurance business of Ethiopian private insurance companies and explanatory variables such as firm size, liquidity ratio, premium growth, loss ratio, liquidity ratio, reinsurance & actuarial issue and expense ratio.

The result of a regression analysis is an equation that represents the best prediction of a dependent variable from several other independent variables.

The following regression equation was estimated as follow:

Available Solvency Margin (ASM_{it}) = $aO + a_1FZ + a_2 LR + a_3 LQR + a_4 OM + a_5 ER + a_6 PG + a7RIAI + \varepsilon_i$

Where:

a_o= intercept coefficient.

$a_1, a_2 \ldots\ldots\ldots\ldots a_7$ = coefficient for each variable 1 - 7, respectively.

i=1,2....., N = Number of Insurers

t = 1, 2.....t = time periods, in our case in years.

ε_i = The Error term that is assumed to have zero mean and constant variance

In this model, all independent variables were entered the regression equation at once to examine the relationship between the whole set of predictor and dependent variable. The aim of this analysis is to determine which independent variables are highly significant to determine the company's solvency margin.

3.8. Measurement of Variable

Further, the measurements that have been found to be significant in previous studies in predicting insurer's insolvency/solvency margins are summarized below. This study has adopted the same ratios in computing the independent variables.

Table 3.2: ***Lists of Financial Ratios Employed for Predicting Insurers Insolvency and Sources of References***

Ratios	Mathematical expressions	Sources
Solvency margin	Total admitted asset less total admitted liabilities	NBE directive no. SIB/45/2016
Operating Margin	Operating income/net sales(premium earned)	Komen (2012) and Asare (2015)
Liquidity Ratio	Stated Liabilities / Liquid assets (Accounting value)	Brockett et al. (1994), Ambrose and Seward (1988), NAIC
Loss Ratio	Claims incurred/ Net earned premium	Darvari et al (2015), Joo (2013) and Asare (2015).
Reinsurance and Actuarial issues	Net underwriting premium/ Gross underwriting premium	Charumathi (2013)
Premium Growth	(Current year premium - prior year premium) / Prior year	Lee and Urrutia (1996), Ambrose and Seward (1988), Hampton (1993), NAIC
Firm Size	Total assets	Charumathi (2013)
Expense Ratio	Total Expense /Net earned premium	Darvari et al (2015)

SOURCE*: Chen & Wong (2004), Charumathi (2013), Joo (2013), Jawad and Ayyash (2019), Darvari et al (2015), Asare (2015) and NBE directive No. SIB45/2016.*

CHAPTER FOUR
DATA ANALYSIS AND RESULT DISCUSSIONS

4.1. Introduction

This chapter presents, analyzes and discusses data in detail to answer research hypothesis and achieve the objectives of the study. It covers the results of the study which was designed to establish firm specific determinants of general insurance business solvency margin of Ethiopian private insurance companies. Nine insurance companies meet the criteria of selection for study out of the 16 registered private insurance companies. It means they exist throughout the period under review i.e. from 2007/2008 up to 2016/2017.

The variables that were collected from the financial statements of insurance companies were available solvency margin (ASM), liquidity ratio (LQR), loss ratio (LR), firm size (FS), reinsurance & actuarial issue (RIAI), operating margin (OM), expense ratio (ER) and premium growth (PG).

This chapter covered model specification, descriptive statistic, correlation analysis, regression analysis and finally summary of findings.

4.2. Descriptive Statistics

Descriptive statistics describes both dependent and independent variables. Available solvency margin (ASM) is the dependent variable whereas firm size, liquidity ratio, premium growth, loss ratio, liquidity ratio, reinsurance & actuarial issue and expense ratio are independent variables. Variables for nine insurance companies for a period of ten years with a total of 90 observations were summarized. This study is conducted to what extent; the variations in factors affect the available solvency margin of Ethiopian private insurance company's general insurance business.

Table 4.1 summarizes the mean, maximum, minimum and standard deviation of each variable as follows.

Table 4.1 Descriptive statistics

Dependent Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
ASM	90	103.2119	84.01546	6.911462	391.0223
Independent Variables	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
FS	90	361.1146	254.3523	23.23585	1056.849
LQR	90	0.9693415	0.2181381	0.2625542	1.631958
RIAI	90	158.4029	103.4285	9.347917	417.39
OM	90	8.662212	14.72731	-30.32994	52.02541
PG	90	0.2237826	0.2357452	-0.0979944	1.623396
LR	90	0.6550301	0.1320571	0.2688974	1.087682
ER	90	0.3033512	0.2305616	0.1145895	2.334809

Source: Stata output

The mean values of all the variables ranges from minimum of 0.22 for PG to a maximum of 361.11 for FS.

Available solvency margin is measured by total admitted asset less total liability. Its average and standard deviation for the nine studied insurance companies during the study period was about 103.21 and 84.02 respectively. This shows the presence of high variations in the values of available solvency margin for general insurance business across the private insurance companies included for this study. The maximum and minimum available solvency margins over the years were 6.91 and 391.02 million respectively.

Firm size is measured by total asset. The mean value of firm size and its standard deviation is 361.11 and 254.35 respectively. Therefore, there exists significant variation in size among private insurance companies included in this study. The maximum and minimum firm sizes over the years were 23.24 million and 1.057 billion respectively.

Liquidity ratio is measured by the ratio of current asset to current liabilities. The mean value of liquidity ratio (current asset to current liability) is 0.97. The maximum standard current liability to current asset should be 1.05 or current asset to liability of 0.95. This implies that, the maximum current liability the insurance company held should be Birr 1.05 for Birr 1current asset or the company should have a minimum of Birr0.95 current asset for every

single current liability. So, insurance companies on average hold a bit higher current asset for every single current liability. The value of the standard deviation is 0.22. This shows the existence of moderate differences among the values of liquidity ratio across private insurance companies. The maximum and minimum liquidity ratios over the year were 0.26 and 1.63 respectively.

Reinsurance & actuarial issue is measured by the difference between gross premium underwritten and premium ceded to reinsurers. It is the amount of premium retained after cession. The mean value of reinsurance & actuarial issue is 158.40 and the value of standard deviation for the same variable is 103.43. The values show the existence of significant variations in the values of reinsurance & actuarial issue among studied private insurance companies. The maximum and minimum reinsurance & actuarial issue over the years were 9.35 and 417.39 million respectively.NBE has a directive regarding the level of risk retention (Directive No. SIB/44/2016). According to the directive, per risk gross retention for any line of business should be not less than 5% and greater than 10% of an insurer's total capital and reserves regardless of the number of years the insurance companies were in operation. It also advises the companies to protect the gross risk they have retained using appropriate additional reinsurance arrangements, working and/or catastrophic excess of loss. But it doesn't state the minimum or maximum limit (level) the insurance companies are expected to arrange reinsurance for the amount retained. To the contrary, NBE used market (industry average) as a bench mark in evaluating the retention level of each and every insurance company (NBE quarterly offsite surveillance report) not the above mentioned directive. NBE used market (industry average) to monitor and evaluate insurance companies risk retention since there is no clear guideline on how much should insurance companies cede from the gross amount that was retained.

The value of operating margin is measured by profit from main operation of the company. The average value for operating margin has become 8.66 with a standard deviation of 14.73. The figures show the existence of significance variation in operating profit among the studied private insurance companies included in this study. The maximum and minimum operating margins over the years were -30.33 million losses and 52.03 million profit respectively.

Premium growth is measured by the difference in gross written premium divided by the previous year premium. The mean value for premium growth is 0.22 and the standard deviation is 0.24. The values show the existence of very low variation in increase in gross premium among private insurance companies. The maximum and minimum premium

growths over the years were –0.098 and 1.62 respectively. It means the growth rate ranges from decrease of gross premium by 9.8% up to an increase in gross premium by 162.34%. But the acceptable value of premium growth range as per NBE is between –33% and +33%. Even though the minimum and the mean average premium growth are within acceptable range, the maximum is on the contrary highly deviates from the standard set by NBE. This high increase in premium growth for a company in a particular year indicates unstable premium underwritings.

Loss ratio is the ratio of the claims incurred to net earned premium. The mean value of loss ratio is 0.66, which is lower than the maximum limit of 0.70 set by NBE with the value of standard deviation 0.13 which also shows us the existence of significant difference among the values of loss ratio for private insurance companies under consideration. The maximum and minimum loss ratios over the years were 0.27 and 1.09 respectively. Even though the minimum is within the acceptable level, the maximum is by far higher than the maximum level set by National Bank of Ethiopia.

Finally, expense ratio is the ratio of the administrative expenses to net earned premium. The mean value of expense ratio is 0.30, which is lower than the maximum limit of 0.35 set by NBE with the value of standard deviation 0.23 which also shows us the existence of significant difference among the values of expense ratio for private insurance companies under consideration. The maximum and minimum loss ratios over the years were 0.11 and 2.33 respectively. Even though the minimum is within the acceptable level, the maximum is by far higher than the maximum level set by National Bank of Ethiopia.

4.3. Model Specification Test(Fixed effect versus Random effect)

Hausman test should be conducted to choose the best model among fixed effect and random effect models. To conduct the test, the number of cross sections (nine insurance companies) should be greater than the number of time serious (10 years) to be estimated Gujarati (2003) as cited by Amare (2019). When the number of cross sections is less than the number of time serious, there is likely to be little value difference between in the value of parameters estimated by fixed effect model and random effect model.

On the other hand, Brooks (2008) and Wooldridge (2006) as cited by Dejen (2017) said that the random effect model is more appropriate when the entities in the sample can be thought of as having been randomly selected from the population.

Therefore, fixed effect model is appropriate for the study without conducting Hausman test since the number of cross sections (number insurance companies) is less than the number of time serious and the studied insurance companies was not collected randomly as stated in chapter three of this study.

4.4. Correlation Analysis

The correlation coefficient represents the linear relationship between two variables. The analysis with regard to significant correlations between the dependent variable and each independent variable separately were done to decide whether to accept or reject the hypotheses.

4.4.1. Correlation Analysis between Available Solvency Margin and Independent Variables

ASM is correlated with other independent variables either positively or negatively. The correlation analysis was undertaken between available solvency and independent variables; firm size, liquidity ratio, premium growth, operating margin, loss ratio, reinsurance & actuarial issue and expense ratio.

As it can be seen from the table 4.2 bellow, ASM is positively correlated with firm size, reinsurance & actuarial issue and operating margin with a value of 0.9516, 0.7899 and 0.1947 respectively. It is also negatively correlated with liquidity ratio, premium growth, loss ratio and expense ratio with a value of -0.0554, -0.3240, -0.1203 and -0.0677respectively. The smallest correlation coefficient -0.0554 which is correlation between ASM and liquidity ratio.

The highest positive percentages are measured by firm size and reinsurance & actuarial issue. The coefficients of correlations are 0.9516 and 0.7899 respectively. They are positively correlated with available solvency margin which means ASM increase as these variables increases.

4.4.2. Correlation Analysis between Independent Variables

The correlation between explanatory variables; firm size, liquidity ratio, premium growth, operating margin, loss ratio, reinsurance & actuarial issue and expense ratio are presented and analyzed in table 4.3 below.

Table 4.2 Correlation matrix between ASM and independent variables

. Correlate ASM, FS, LQR, RIAI, OM, PG, LR, ER

(obs=90)

	ASM	FS	LQR	RIAI	OM	PG	LR	ER
ASM	1.0000							
FS	0.9516	1.0000						
LQR	-0.0554	-0.1731	1.0000					
RIAI	0.7899	0.8917	-0.3358	1.0000				
OM	0.1947	0.1531	0.2805	0.0496	1.0000			
PG	-0.3240	-0.3060	0.0228	-0.2268	-0.0717	1.0000		
LR	-0.1203	-0.0573	-0.2654	0.1087	-0.6564	0.0920	1.0000	
ER	-0.0677	-0.1041	0.2240	-0.1670	-0.1044	-0.1057	0.1404	1.0000

Source: ***Stata output***

Table 4.3 Correlation matrix between independent variables

. Correlate:FS, LQR, RIAI, OM, PG, LR, ER
(obs=90)

	FS	LQR	RIAI	OM	PG	LR	ER
FS	1.0000						
LQR	-0.1731	1.0000					
RIAI	0.8917	-0.3358	1.0000				
OM	0.1531	0.2805	0.0496	1.0000			
PG	-0.3060	0.0228	-0.2268	-0.0717	1.0000		
LR	-0.0573	-0.2654	0.1087	-0.6564	0.0920	1.0000	
ER	-0.1041	0.2240	-0.1670	-0.1044	-0.1057	0.1404	1.0000

Source: ***Stata output***

The size of insurance company is negatively related to liquidity ratio, premium growth, loss ratio and expense ratio. On the other hand, it is positively related to reinsurance & actuarial issue and operating margin.

Liquidity has a positive correlation coefficient value with operating margin, premium growth and expense ratio and a negative correlation coefficient value with firm size, reinsurance & actuarial issue and loss ratio.

Reinsurance & actuarial issue is negatively correlated to liquidity ratio, premium growth and expense ratio and is positively correlated with the firm size, operating margin and loss ratio.

Operating margin has a positive correlation coefficient with firm size, liquidity ratio, and reinsurance & actuarial issue. On the other hand, it is negatively related with premium growth, loss ratio and expense ratio.

Premium growth has a positive correlation coefficient with liquidity ratio and loss ratio only and is negatively related with firm size, reinsurance & actuarial issue, operating margin and expense ratio.

Loss ratio has positive correlation coefficient with reinsurance & actuarial issue, premium growth and expense ratio only and is negatively related with firm size, liquidity ratio, and operating margin.

Finally, expense ratio has positive correlation coefficient with liquidity ratio and loss ratio only and is negatively related with firm size, reinsurance & actuarial issue, operating margin and premium growth.

Firm size of insurance companies was highly correlated with reinsurance & actuarial issue as compared to other independent variables included in this study with the coefficient of 0.89. It was the highest correlation.

4.5. Regression Analysis

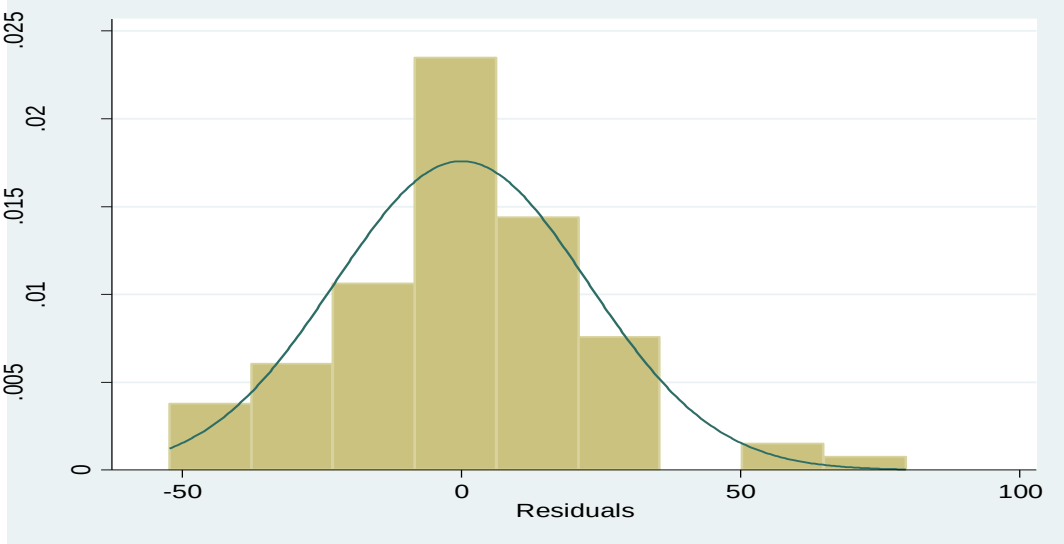
Diagnostic test was carried out to ensure that the data fits the basic assumptions of classical linear regression model.

Normality test

Brooks (2008) noted that in order to conduct hypothesis test about the model parameter, the normality assumption must be fulfilled. To fulfill this assumption, the mean value of the residuals should be distributed to the mean of zero. It can be checked in many different ways; the simplest way is by observing a histogram of the values. The histogram should be bell shaped. Therefore, the study used graphical method to test normality.

From figure 4.1 below, it can be noted that the residual is normally distributed to the mean of zero since the shape of the histogram is bell shaped. Therefore, the normality assumption is fulfilled.

Figure 4.1 Histogram with all independent variables



Source: Stata output

Normality can also be tested using stata software sktest r command. Sktest shows the number of observations is 90 and the probability of skewness which is 0.3092 implies that the skewness is asymptotically normally distributed since p-value of skweness 0.3092 is greater than 0.05.

Prob (kurtosis) indicates that kurtosis is also asymptotically distributed since its p-value 0.0565 is greater than 0.05.

The chi^2 is 0.0767; it is greater than 0.05 implying that it is significant at 5% level. Therefore, the null hypothesis cannot be rejected and skewness test for normality, residual shows normal distribution.

Table 4.4 Skewness/Kurtosis tests for Normality

Skewness/Kurtosis tests for Normality

Sktest r		------- joint ------			
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adjchi2 (2)	Prob>chi2
r	90	0.3092	0.056	55.14	0.0767

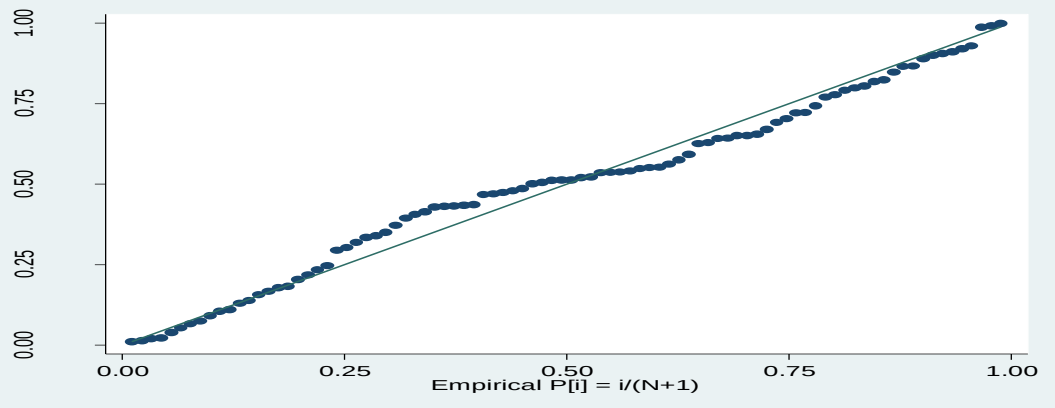
Source: stata output

Linearity of the Model

According to Gujarati (2003), Linearity in the parameters is relevant for the development of the regression. Linear regression should be always linear in the parameters. The parameters or coefficients should be raised to the first power only. It may or may not be linear in the explanatory variables, the X's, and it can also be checked using a graph.

The dashed thin black line represents a normal distribution while the dotted line represents the distribution of the residuals. We are looking for the residual line to match the diagonal line of the normal distribution as closely as possible. This appears to be the case in figure4.2 below. Though there is some deviation, the residuals appear to be essentially normally distributed.

Figure 4.2 Linearity Graph with all variables



Source: Stata output

The errors have zero mean

According to Brooks (2008), if a constant term is included in the regression equation, this assumption will never be violated. Thus, since the regression model used in this study included a constant term, this assumption was not violated.

Tests of Hetroscedasticity

The assumption of homoscedasticity says that the variance of the errors is constant (Brooks, 2008). If the residuals or errors do not have constant variance they are said to be heteroskedastic. Chi Square (0.069) is greater than 0.05 and it is insignificant to reject the hypothesis. So, the study accepted HO which says there is no hetroskedasticity, which means the variance of the error term is constant.

Table 4.5 Test of Hetroskedasticity

```
.estatimtest, white
White's test for Ho: homoskedasticity
Against Ha: unrestricted heteroskedasticity

chi2(35)     =     48.11
Prob>chi2    =    0.0690
-------------------------------------------------------------------------------
              Source |       chi2       df       p
---------------------+---------------------------------------------------------
Heteroskedasticity |         48.11       35    0.0690
          Skewness |         11.87        7    0.1050
          Kurtosis |          1.47        1    0.2259
---------------------+---------------------------------------------------------
             Total |         61.45       43    0.0337
-------------------------------------------------------------------------------
```

Source: Stata output

Multicollinearity Test

Multicollinearity shows the correlation between independent variables. If independent variables are highly correlated, they create double effect on the model. Including highly correlated independent variables in the model creates large standard errors, which makes the coefficient values and signs unreliable.

The existence of Multicollinearity problem is investigated using tolerance value and variance inflator factor (VIF) value. A higher VIF or an insignificant tolerance (1/VIF) value indicates the existence of highly correlated variables or a perfect linear combination of the independent variables in the equation (model) that should not be included to the regression equation. Tolerance ranges from zero to one.

Different scholars set different amount on the maximum limit of correlation coefficient. Hair et al (2006) and Malhotra (2007) as cited by Dejen (2017) argued that the correlation coefficient below 0.9 and 0.75 respectively may not cause serious multicollinearity problem. The outputs of VIF and tolerance values are stated in table 4.6 below.

Table 4.6 Test for Multicollinearity

vif

Variable	VIF	1/VIF
RIAI	6.59	0.151682
FS	6.16	0.162271
LR	2.02	0.496239
OM	1.89	0.528119
LQR	1.39	0.721022
ER	1.16	0.862812
PG	1.14	0.873576
Mean VIF	2.91	

Source: Stata output

As we can see from the above table the VIF value for all variables becomes less and the tolerance value for all variables not near to zero. Hence, there is no problem of multicollinearity between the variables in the model.

Auto Correlation Test

Autocorrelation refers to the degree of correlation between the values of the same variables across different observations in the data. The existence or nonexistence of autocorrelation problem was tested by the Breusch–Godfrey serial correlation LM test. It is a test for autocorrelation in the errors or residuals in the model. The null hypothesis states that there is no serial correlation.

As shown in table 4.7 below, Prob> chi^2 = 0.4256 is greater than 0.05. This shows that the null hypothesis of the model, which says no serial correlation, cannot be rejected at 5% level of significance. The result shows us there is no Autocorrelation problem.

Table 4.7 Autocorrelation test result

. estatbgodfrey, lag (88)

Breusch-Godfrey LM test for autocorrelation

lags (p)	chi2	df	Prob> chi2
88	89.835	88	0.4256

H0: no serial correlation

Source: Stata output

Model Specification

A model specification error is an error which occurs by omitting one or more relevant variables or by including one or more irrelevant variables in the model. The existence of omitted relevant variable was checked by adjusted R square and P value of the model. It can also be checked by stata command called ovtest.

AS shown in table 4.8 below, Prob> F = 0.0793 which is greater than 0.05. This shows that the null hypothesis of the model, which says no omitted variable, cannot be rejected at 5% level of significance. The result shows us there are no omitted variables.

Table 4.8 Model specification

Ramsey RESET test using powers of the fitted values of ASM, ovtest
Ho: model has no omitted variables
F (3, 79) = 2.34
Prob> F = 0.0793

Source: Stata output

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

Table 4.9 ANOVA table

Reg: ASM, FS, LQR, RIAI, OM, PG, LR, ER

Source	SS	df	MS	Number of obs = 90
Model	582395.603	7	83199.3719	F(7, 82) = 148.90
Residual	45819.6427	82	558.77613	Prob> F = 0.0000
Total	628215.246	89	7058.59827	R-squared = 0.9271
				Adj R-squared = 0.9208
				Root MSE = 23.638

ASM	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
FS	.3780933	.024455	15.46	0.000*	.3294444	.4267421
LQR	26.55225	13.52752	1.96	0.053**	-.3582972	53.46279
RIAI	-.172054	.0622038	-2.77	0.007*	-.2957972	-.0483108
OM	.0156696	.234118	0.07	0.947	-.4500658	.4814049
PG	-7.928707	11.37184	-0.70	0.488	-30.55092	14.6935
LR	-6.028813	26.93498	-0.22	0.823	-59.61107	47.55344
ER	-.0416126	11.69982	-0.00	0.997	-23.31627	23.23305
_cons	-26.20715	23.19143	-1.13	0.262	-72.34228	19.92799

Source: Stata output

Note: ** and* indicates significance at 10% and 1% level significance respectively.

4.6. Result Discussion

The ANOVA table 4.9 above shows that the F value is significant at p=0.000. The model explains the relationship between the independent variables and the dependent variable. Moreover, the model is significant and uses all the independent variables are predictors of the ASM.

It is noted from the regression result that the adjusted R square of the model is 0.9208. This indicates that the model is the best to explain ASM of general insurance business of private insurance companies in Ethiopia. Which means on average 92.08 % of the change in ASM can be explained by the variables in the model. Hence the function for regression equation for the model is:

$$ASM = -26.21 + 0.38FS + 26.55LQR - 0.17RIAI + 0.02OM - 7.93PG - 6.03\,LR - 0.04ER + \varepsilon$$

Accordingly, the regression result from table 4.9 shows that, firm size (FS), liquidity ratio (LQR) and reinsurance & actuarial issue (RIA) have significant effects on general insurance business available solvency margin of Ethiopian private insurance companies. Whereas, operating margin (OM), premium growth (PG), loss ratio (LR) and expense ratio (ER) have no significant impact on insurance company's solvency margin. The above solvency margin determinants of insurance companies were individually discussed in the next paragraphs referring regression result of ANOVA table.

Firm Size (FS)

The regression results show a regression coefficient of 0.378, t-statistics of 15.46 and p-value of 0.000. Since the p value of firm size 0.000 is less than 0.05 and its coefficient is positive, it significantly and positively affects solvency margin of general insurance business of Ethiopian private insurance companies. Hence, H1 is accepted.

The coefficient of firm size is positive and highly significant, meaning that well capitalized insurance companies experience higher solvency margin. Firm size is one of the important

determining factors of solvency margin of insurance companies in Ethiopia. This finding is consistent with the hypothesis (both with predicted sign and significance) and with the previous studies of Hsiao and Whang (2009), Chen and Wong (2004), BarNiv & Hershbarger (1990), Cummins et al (1995), Charmathi (2013), Joo (2013) and Asare (2015).

Liquidity Ratio (LQR):

The regression results show a regression coefficient of 26.55, t-statistics of 1.96 and p-value of 0.053. Since the p value of liquidity ratio 0.053 is less than 0.10 and its coefficient is positive, it significantly and positively affects solvency margin of general insurance business of Ethiopian private insurance companies. Hence, H2 is accepted.

The coefficient of liquidity is positive and highly significant, meaning that an insurance company having high liquid asset over its liquid liability have a higher solvency margin. Liquidity is one of the other important determining factors of solvency margin of insurance companies in Ethiopia. This finding is consistent with the hypothesis (both sign and significance) and with previous studies Chen and Wong (2004), Lee and Urrutia (1996), Caporale et al (2017), Hsiao and Whang (2009) and Asare (2015). It is also consistent with the studies of Verma (2014), Komen (2012) and Joo (2013) on its predicted sign but not on its significance.

Operating Margin (OM):

The regression results show a regression coefficient of 0.02, t-statistics of 0.07 and p-value of 0.95. Since the p value of operating margin (0.95) is higher than 0.05, it does not significantly affect solvency margin of general insurance business of Ethiopian private insurance companies. Hence, H3 is not accepted. The finding is consistent with the predicted sign but it is not significant.

This finding was consistent with previous study of Komen (2012) both on sign and significance. It is also consistent with the previous studies of Chen and Wong (2004) and Asare (2015) on its predicted sign but not on its significance.

The contribution of operating margin to solvency was insignificant since almost all Ethiopian private insurances companies are not operationally profitable (insurance companies 2017/18 financial report).

Loss Ratio (LR):

The regression results show a regression coefficient of -6.03, t-statistics of -0.22 and p-value of 0.82. Since the p value of premium growth 0.82 is higher than 0.05, it does not significantly affect solvency margin of general insurance business of Ethiopian private insurance companies. Hence, H4 is not accepted. The finding is consistent with the predicted sign but not its significance.

The study result is consistent with previous studies of Joo (2013), Darvari et al (2015) and Asare (2015) by predicted sign but not by its significance. The result of the study shows as it affect solvency margin insignificantly but the previous studies showed as it affected significantly.

Expense Ratio (ER):

The regression results show a regression coefficient of -0.04, t-statistics of -0.00 and p-value of 0.997. Since the p value of expense ratio 0.997 is higher than 0.05, it does not significantly affect solvency margin of general insurance business of Ethiopian private insurance companies. Hence, H5 is not accepted. The finding is consistent with the predicted sign but not its significance.

It is consistent with the outcome of the study conducted by Dreary et al (2015) by predicted sign but not its significance. The result of the study shows as it affect solvency margin insignificantly but the previous study showed as it affected significantly.

Premium growth (PG):

The regression results show a regression coefficient of -7.93, t-statistics of -0.70 and p-value of 0.49. Since the p value of premium growth 0.49 is higher than 0.05, it has does not significantly affects solvency margin of general insurance business of Ethiopian private insurance companies.

Hence, H6 is not accepted. The finding is consistent with the predicted sign but not its significance.

Empirical results such as Komen (2012) show that rapid growth of premium volume is one of the causal factors in insurer's insolvency. Being too obsessed with growth can lead to self-destruction as other important objectives might be neglected.

Premium Growth which shows the growth in premiums collected is insignificant predictor of financial health. The result of the study is consistent with Komen (2012), Misas and Moreno (2017) and Chen & Wong (2004) both with predicted sign and significance.

Reinsurance & Actuarial Issue (RIAI):

The regression results show a regression coefficient of -0.17, t-statistics of -2.77 and p-value of 0.007. Since the p value of reinsurance and actuarial issue 0.007 is less than 0.05 and its coefficient is negative, it significantly and negatively affects solvency margin of general insurance business of Ethiopian private insurance companies. Hence, H7 is accepted. The finding is consistent with the predicted sign and it's significant.

The result implies that when insurance companies depend little on reinsurance or when they absorb huge percentage of the risk, their solvency margin declines since they bear a huge likely risk and pay a huge amount of claim as a result. The coefficient of reinsurance and actuarial issue is negative and highly significant, meaning that an insurance company retaining a huge portion of premium and risk reduces the solvency margin of the insurance companies. Reinsurance and actuarial issue is the other important determinant factor of solvency margin of general insurance business of private insurance companies in Ethiopia.

The finding of the study is consistent with the results of the studies conducted by Moreno (2018), Misas and Moreno (2017) both in predicted sign and significance.

Table 4.10 Summary of actual and expected signs of independent variables

Indep. Variables	Abbreviations	Expected result	Actual result
Firm Size	FS	Positive and significant	Positive and significant
Liquidity Ratio	LQR	Positive and significant	Positive and significant
Operating Margin	OM	Positive and significant	Positive and insignificant
Loss Ratio	LR	Negative and significant	Negative and insignificant
Reinsurance & actuarial issue	RIAI	Negative and significant	Negative and significant
Premium Growth	PG	Negative and significant	Negative and insignificant
Expense Ratio	ER	Negative and significant	Negative and insignificant

CHAPTER FIVE

SUMMARY, CONCLUSIONS, RECOMMENDATIONS AND SUGESSTIONS

5.1. Introduction

This chapter contains summary of findings, conclusions, recommendations and suggestions for further research.

5.2. Summary of Findings

As it is noted from the regression result (ANOVA Table), the p-value of F- statistic is 0.0000 which means the model was significant and can interpret the coefficient and the significance of each independent variable. The adjusted R square of the model is 0.9208 which means on average 92.08 % of the change in ASM can be explained by the variables in the model. The actual and expected values of each variable are the same.

The regression result showed that, firm size, reinsurance and actuarial issue and liquidity ratio affected solvency margin of general insurance business of Ethiopian private insurance companies significantly. It means, well-capitalized insurance companies and that had the appropriate level of liquidity ratio and reinsurance and actuarial issue (retention) have higher solvency margin. The result on firm size, reinsurance and actuarial issue and liquidity ratio is consistent with the hypothesis (both with predicted sign and significance) and with the previous studies stated in chapter two and chapter four.

Operating margin, loss ratio, expense ratio and premium growth affected solvency margin of general insurance business of Ethiopian private insurance companies insignificantly. The results of the four variables are consistent with the predicted sign. When we compare with the previous studies, study results of operating margin and premium growth are consistent with previous (both with predicted sign and significance) but the study result of loss ratio and expense ratio are not consistent with the previous which means the study result of previous studies shows both ratio's affected solvency margin significantly as stated in chapter two and chapter four.

5.3. Conclusions

The study examined the determinants of general insurance business solvency margins of private insurance companies in Ethiopia. The study revealed all the studied independent variables were of the predicted sign. Firm size, liquidity ratio and operating margin were positively related whereas premium growth, loss ratio, reinsurance & actuarial issue and expense ratio were negatively related to solvency margin.

The multivariate regression for the insurers has generated statistically significant results consistent with three of the seven hypotheses formulated. Firm size, liquidity ratio and reinsurance & actuarial issue affected solvency margin significantly but operating margin, premium growth, loss ratio and expense ratio affect solvency margin insignificantly.

The results of the study have some important policy implications for regulating and monitoring insurers' solvency. Since liquidity ratio, reinsurance & actuarial issue and firm size are the most direct measures of insurer's financial health, regulators, insurance companies, investors and other stakeholders may consider using them as an indicator of possible financial difficulties.

5.4. Recommendations

Monitoring the pricing and the reinsurance arrangement of the insurance company is crucial since both premium growth and high retention have a negative impact on solvency margin. Reinsurance and actuarial issue (retention) should be given special attention since it does not only affect solvency margin negatively but also significantly.

NBE has a directive regarding the level of risk retention (Directive No. SIB/44/2016). According to the directive, per risk gross retention for any line of business should be not less than 5% and greater than 10% of an insurer's total capital and reserves regardless of the number of years the insurance companies were in operation. It also advises the companies to protect the gross risk they have retained using appropriate additional reinsurance arrangements, working and/or catastrophic excess of loss. But it doesn't state the minimum or maximum limit (level) the

insurance companies are expected to arrange reinsurance for the amount retained. To the contrary, NBE used market (industry average) as a bench mark in evaluating the retention level of each and every insurance company (NBE quarterly offsite surveillance report) not the above mentioned directive.NBE used market (industry average) to monitor and evaluate insurance companies risk retention since there is no clear guideline on how much should insurance companies cede from the gross amount that was retained.

Increasing the size of the firm has a positive and significant effect on the solvency of insurance companies. It has also a positive impact on the liquidity and retention capacity of firms. As the size of firm increases, their liquid asset should also increases by 65% as per Directive No.SIB25/2014 of NBE.As the size of the firm increase the retention capacity of the firm also increases.

The negative relationship between premium growth and solvency margin indicates that the companies are not collecting enough premiums that cover the cash outflows of the company. In other words, insurance companies are carrying higher risk for each premium collected. That means, insurance companies are not collecting risk commensurate premium.

As per the study result of Verma (2014), identifying and working on major determinants of solvency margin is very crucial since a financially sound insurance firm can meet its obligations towards its customers and society in a better way and in-turn able to retain and attract more customers. Alternatively, the insurers' performance can be improved through the higher solvency margin, as the better risks in terms of large number of customers are attracted to the more solvent insurers, and these insurers are better able to get higher premium revenues. A higher solvency margin may result in excellent realization of goals by the insurers.

Therefore, the regulatory body (NBE), insurance companies, investors and policy holders should take the following measure.

- NBE should set clear standard on the reinsurance arrangements of insurance companies that can be checked and monitored by any stakeholder similar to the guidelines of maximum acceptable loss ratio, expense ratio, combined ratio and investment of

insurance funds (Directive No.SIB25/2014, Quarterly offsite examination report of NBE).

- Insurance companies should use reinsurance as a risk management tool and therefore should buy sufficient reinsurance (cede risk instead of maintaining it) to the risks they shoulder since it helps to reduce risk at times of financial distress and to maintain the appropriate solvency margin.

- Insurance companies should increase their firm size by either issuing shares or borrowing long term liabilities since it has positive and significant impact on solvency margin.

- Insurance companies should charge appropriate amount of premium for the risk they shoulder instead of focusing on the growth of premium. This is because the growth of premium affected solvency margin negatively even though the effect is insignificant.

- The regulatory body should set a floor rate for each class of business to protect the health of insurance companies.

- Insurance companies should continue maintaining the appropriate level of liquidity ratio as it has a positive and significant impact on the amount of solvency margin.

- Investors, lenders and policy holders should consider an insurance company that has large firm size and appropriate level of liquidity ratio before investing, financing and buying insurance policies. This is because an insurance company that has huge asset and the appropriate level of liquid asset can easily settle payments when due.

5.5. Suggestions for Further Research

The study has focused on only firm specific general insurance business solvency margin determinants. It also used only quantitative secondary data. Qualitative assessment is considered as an important addition in the process of better assessing an insurer's financial conditions. So, it will be comprehensive if a study conducts a research by including macro variables and qualitative data in determining general insurance and /or life insurance business solvency margin.

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Glossary of Terms

Admitted Asset: Admitted assets are assets of an insurance company permitted by state law to be included in calculation of available solvency margin. The amount after deducting value that should have been deducted from total asset as per the directive of the country.

Admitted Liabilities: Admitted liabilities are all recorded liabilities of the company.

Cession : A reinsurance term meaning that portion of a risk that is passed on to reinsurers by ceding companies.

Combined Ratio: The combined ratio is a measure of insurer profitability, calculated simply by taking the sum of claim-related losses and general business costs and then dividing that sum by the earned premiums over the period.

Expense Ratio: a measure of profitability calculated by dividing the expenses associated with acquiring, underwriting, and servicing premiums by the net premiums earned by the insurance company.

General Insurance: General insurance is typically defined as any insurance that is not determined to be life insurance

Liquidity Ratio: Is a result of dividing cash and other liquid assets by the short term borrowings and current liabilities.

Long Term Insurance: is a contract between an insurance policy holder and an insurer where the insurer promises to pay a designated beneficiary a sum of money (the benefit) upon the death of an insured person.

Loss ratio: is the **loss** an insurer incurs due to paid claims as a percentage of premiums earned.

Operating Margin: It measures how much profit a company makes on a profit, after paying for all expenses but before paying interest or tax

Peril:something that causes or may cause injury, loss, or destruction.

Policyholder : A person or legal entity who owns an insurance policy/any other person or legal entity who has legal right to claim the benefits under that insurance policy.

Premium **:** The amount of money a policyholder pays to purchase his/her insurance policy.

Premium Growth: it is the change in premium between two or more consecutive years.

Reinsurers **:** is an insurance company that insures the risks of other insurance companies.

Reinsurance & actuarial issue (premium Retention): the gross premium retained after cession to reinsurers private insurance companies.

Technical provisions represent the amount that an insurer requires to fulfil its insurance obligations and settle all expected commitments to policyholders and other beneficiaries arising over the lifetime of the insurer's portfolio of insurance contracts.

List of Insurance companies operating in Ethiopia

No	Insurance companies	Type	Date of establishment
1	Ethiopian Insurance Corporation S.C	General	1976
2	National Insurance Company of Ethiopia S.C	General	23/09/1994
3	Awash Insurance Company S.C	Composite	1/10/1994
4	Africa Insurance Company S.C	Composite	1/12/1994
5	Nyala Insurance Company S.C	Composite	6/1/1995
6	Nile Insurance Company S.C	Composite	11/4/1995
7	Global Insurance Company S.C.	General	11/1/1997
	The United Insurance S.C	Composite	1/4/1997
9	NIB Insurance Company S.C	Composite	1/5/2002
10	Lion Insurance Company S.C	General	1/7/2007
11	Ethio-Life & General Insurance S.C	Composite	23/10/2008
12	Oromia Insurance Company S.C	General	26/1/2009
13	Abay Insurance company S.C	Composite	26/7/2010
14	Berhan Insurance Company S.C	General	24/5/2011
15	Tsehay Insurance Company S.C	General	28/3/2012
16	Lucy Insurance Company S.C	General	1/10/2012
17	Bunna Insurance Company S.C	General	21/5/2013

Source: - *https://www.nbe.gov.et/financial/insurer.html 8 November 2019*

name: <unnamed>
log: F:\Habtamu\teferi.log
opened on: 10 Jan 2020, 07:46:08

. sum asm fs lqr riai om pg lr er

Variable	Obs	Mean	Std. Dev.	Min	Max
asm	90	103.2119	84.01546	6.911462	391.0223
fs	90	361.1146	254.3523	23.23585	1056.849
lqr	90	.9693415	.2181381	.2625542	1.631958
riai	90	158.4029	103.4285	9.347917	417.39
om	90	8.662212	14.72731	-30.32994	52.02541
pg	90	.2237826	.2357452	-.0979944	1.623396
lr	90	.6550301	.1320571	.2688974	1.087682
er	90	.3033512	.2305616	.1145895	2.334809

. correlate asm fs lqr riai om pg lr er
(obs=90)

	asm	fs	lqr	riai	om	pg	lr	er
asm	1.0000							
fs	0.9516	1.0000						
lqr	-0.0554	-0.1731	1.0000					
riai	0.7899	0.8917	-0.3358	1.0000				
om	0.1947	0.1531	0.2805	0.0496	1.0000			
pg	-0.3240	-0.3060	0.0228	-0.2268	-0.0717	1.0000		
lr	-0.1203	-0.0573	-0.2654	0.1087	-0.6564	0.0920	1.0000	
er	-0.0677	-0.1041	0.2240	-0.1670	-0.1044	-0.1057	0.1404	1.0000

. correlate fs lqr riai om pg lr er

	fs	lqr	riai	om	pg	lr	er
fs	1.0000						
lqr	-0.1731	1.0000					
riai	0.8917	-0.3358	1.0000				
om	0.1531	0.2805	0.0496	1.0000			
pg	-0.3060	0.0228	-0.2268	-0.0717	1.0000		
lr	-0.0573	-0.2654	0.1087	-0.6564	0.0920	1.0000	
er	-0.1041	0.2240	-0.1670	-0.1044	-0.1057	0.1404	1.0000

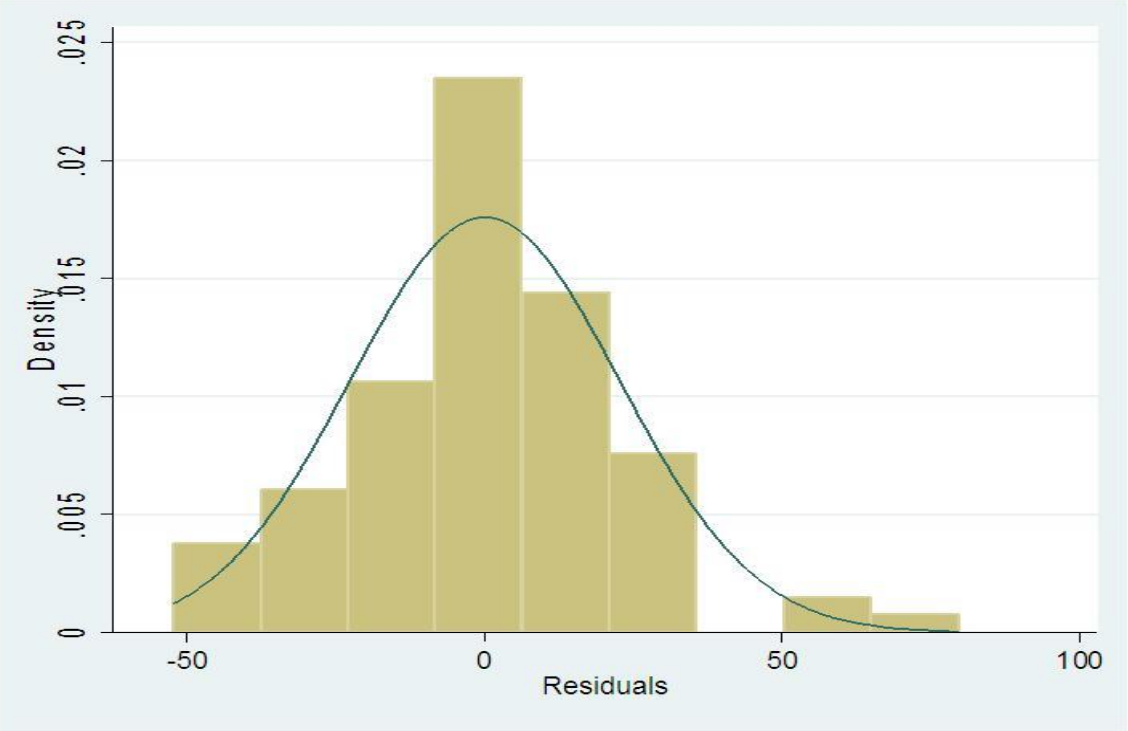
. reg asm fs lqr riai om pg lr er

Source	SS	df	MS	Number of obs =	90
Model	582395.603	7	83199.3719	Prob > F	= 0.0000
Residual	45819.6427	82	558.77613	R-squared	= 0.9271
				Adj R-squared	= 0.9208
Total	628215.246	89	7058.59827	Root MSE	= 23.638

asm	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
fs	.3780933	.024455	15.46	0.000	.3294444	.4267421
lqr	26.55225	13.52752	1.96	0.053	-.3582972	53.46279
riai	-.172054	.0622038	-2.77	0.007	-.2957972	-.0483108
om	.0156696	.234118	0.07	0.947	-.4500658	.4814049
pg	-7.928707	11.37184	-0.70	0.488	-30.55092	14.6935
lr	-6.028813	26.93498	-0.22	0.823	-59.61107	47.55344
er	-.0416126	11.69982	-0.00	0.997	-23.31627	23.23305
_cons	-26.20715	23.19143	-1.13	0.262	-72.34228	19.92799

. predict r, resid

. histogram r, normal



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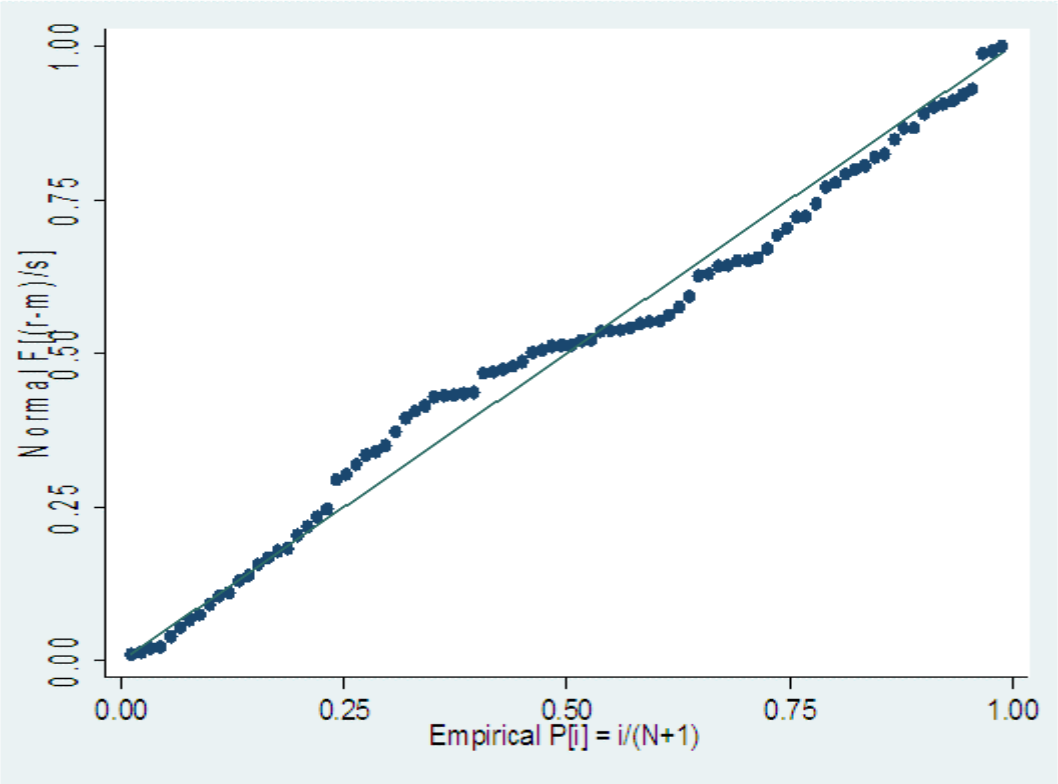
. graph save Graph "F:\Habtamu\histogram.gph"



sktest r

Skewness/Kurtosis tests for Normality

------- joint ------

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob>chi2
r	90	0.3092	0.0407	5.14	0.0767

. pnorm r

. estat imtest, white

White's test for Ho: homoskedasticity

against Ha: unrestricted heteroskedasticity

chi2(35) = 48.11
Prob > chi2 = 0.0690

Cameron & Trivedi's decomposition of IM-test

Source	chi2	df	p
Heteroskedasticity	48.11	35	0.0690
Skewness	11.87	7	0.1050
Kurtosis	1.47	1	0.2259
Total	61.45	43	0.0337

. vif

Variable	VIF	1/VIF
riai	6.59	0.151682
fs	6.16	0.162271
lr	2.02	0.496239
om	1.89	0.528119
lqr	1.39	0.721022
er	1.16	0.862812
pg	1.14	0.873576
Mean VIF	2.91	

```
. gen time=_n

. tsset time
      time variable:  time, 1 to 90
              delta:  1 unit

. reg asm fs lqr riai om pg lr er

      Source |       SS           df       MS                      Number of obs =      90
-------------+------------------------------------------------------------------------------
       Model |  582395.603         7  83199.3719                   Prob > F      =  0.0000
    Residual |  45819.6427        82   558.77613                   R-squared     =  0.9271
-------------+------------------------------------------------------------------------------
       Total |  628215.246        89  7058.59827                   Root MSE      =  23.638

------------------------------------------------------------------------------
         asm |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          fs |   .3780933   .024455    15.46   0.000     .3294444    .4267421
         lqr |    26.55225  13.52752     1.96   0.053     -.3582972   53.46279
        riai |   -.172054   .0622038   -2.77   0.007     -.2957972   -.0483108
          om |   .0156696   .234118     0.07   0.947     -.4500658   .4814049
          pg |  -7.928707   11.37184   -0.70   0.488     -30.55092   14.6935
          lr |  -6.028813   26.93498   -0.22   0.823     -59.61107   47.55344
          er |  -.0416126   11.69982   -0.00   0.997     -23.31627   23.23305
       _cons |  -26.20715   23.19143   -1.13   0.262     -72.34228   19.92799
------------------------------------------------------------------------------

. estat bgodfrey, lag(88)

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
   lags(p) |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
        88 |         89.835              88                      0.4256
---------------------------------------------------------------------------
                  H0: no serial correlation

. ovtest
Ramsey RESET test using powers of the fitted values of asm
       Ho:  model has no omitted variables
                F(3, 79) =      2.34
                Prob > F =      0.0793

. clear

. exit, clear
```