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

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Abstract-*This study aimed to examine 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. Multiple regression analysis was carried out in order to see independent variables impact on the solvency margin of insurance companies. The outcome of the study revealed that firm size, liquidity ratio and reinsurance & actuarial issue affect solvency margin were found positively and significantly affects the solvency margin of insurance companies whereas the other variables were found statistically insignificant. The national regulator should develop a clear directive regarding the reinsurance arrangement of the insurance company and set the minimum level insurance premium for each class of business.*

Key Words: *Actuarial and resinsurance, Expense ratio, Firm size, Operating margin, Premium growth and Solvency margins.*

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I. Introduction

Owing to the many benefits of insurance to individuals and to national economies at large, measures must be put in place to ensure insurance businesses survival in the financial market and to monitor their financial health in order to prevent insolvencies at one side and protect policyholders in today's increasingly competitive markets on the other side Asare (2015). Hence, it is imperative to have a resilient and a well-regulated insurance industry that provides adequate incentives for efficiency and fairness to safeguard the interests of the policyholders Simpson & Damoah (2008) and also regulators need to upgrade their systems and practice to address financial and systemic stability

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 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.

II. Literature Review and Hypotheses Development

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).

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 paid, premium obtained, provisions paid 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).

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.

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. As far as the review of literature we made, 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 researchers to put their own contribution on the topic (issue).

III. Research Methodology

a) Research Context

In the history of the Ethiopian financial sector, so far, there is no insolvent (bankrupt) insurance company to date. But there is no guarantee that a solvent or profitable insurance company could never go insolvent forever. Particularly, during these days, where a growing unethical competition is a phenomena in this insurance industry in Ethiopia such as a deliberate huge slash or undercutting in premium rate and unprincipled underwriting and marketing practices on one hand and the tendency to open the sector to the Ethiopian Diaspora and to join world trade organization on the other hand are triggering factors.

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.

b) Research Methods

To achieve the objectives 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. Accordingly, the research design of this study is based on the measurement and analysis of causal relationships between variables (explained and explanatory).

c) Data and Sampling

To meet the objective, the study used secondary data which were obtained from annual reports of individual insurance companies from the year 2008 to the year 2017 and NBE that are open to the public scrutiny. With regard to the unit of analysis, the study includes nine private insurance companies which are selected using purposive sampling that could furnish financial data during the study period.

d) Choice of variables and their measurement

The study identified both dependent variable and independent variables. Accordingly, based on previous studies noted in the literature review, the dependent variable and independent variables were identified and expressed mathematically as hereunder.

i. Dependent variable:

Solvency margin: is measured by total admitted asset less total admitted liabilities.

ii. Independent Variables:

- Operating Margin: is measured by Operating income divided by net sales or premium earned.
- Liquidity ratio: is measured by stated liabilities divided by liquid assets
- Loss ratio: is measured by claims incurred divided by net earned premium
- Reinsurance and Actuarial issues: is measured by net underwriting premium divided by gross underwriting premium.
- Premium Growth: is measured by current year premium minus prior year premium divided by prior year premium.
- Expense ratio: is measured by total expense divided by net earned premium
- Firm size: is measured by natural logarithm of total assets

iii. Model specification

To decide between fixed effect and random effects regression, running the Hausman test is required.

Hence, to conduct the Hausman 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). 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) explained 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 found appropriate for the study and the baseline model of our study could be specified as follows:

$$ASM_{it} = \beta_0 + \beta_1 FZ_{i,t} + \beta_2 LR_{i,t} + \beta_3 LQR_{i,t} + \beta_4 OM_{i,t} + \beta_5 ER_{i,t} + \beta_6 PG_{i,t} + \beta_7 RIAI_{i,t} + \varepsilon_{i,t}$$

Where:

ASM= Available Solvency Margin
FZ = Firm Size
LR = Liquidity Ratio
LOR = Loss Ratio
OM = Operating margin
ER = Expense ratio
PG = Premium Growth
RIAI = Reinsurance and Actuarial Issue

β_0 = intercept coefficient.

$\beta_1, \beta_2, \beta_3, \ldots . \beta_7$ = are parameters to be estimated

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

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

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

IV. Empirical Results and Discussions

a) Descriptive Statistics

The statistical summary of the variables collected from the nine insurance companies for the period 2008 – 2017 are presented in table 1 below.

Table 1 Descriptive Statistics

Variable	N	Mean	Std. Dev	Min.	Max
ASM	90	103.21	84.02	6.911	391.02
FSZ	90	361.11	254.35	23.24	1056.85
LQR	90	0.97	0.22	0.26	1.63
RIAI	90	158.4	103.43	9.35	417.39
OM	90	8.66	14.73	-30.33	52.03
PG	90	0.22	0.24	-0.09	1.62
LR	90	0.66	0.13	0.27	1.09
ER	90	0.3	0.23	0.11	2.33

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) which notes 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.

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.

b) Regression Diagnostics Tests

To ensure that the data fits the basic assumptions of classical linear regression model, the diagnostic tests of normality, hetroscedatticity and multicolliniearity were carried out.

i. Normality:

Normality test is made 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 stata also gave us the chi2 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 (see annex Ia).

ii. 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. Chi2 of 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 (see annex Ib).

iii. Multicollinearity

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) 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 2 below.

Table 2 Test for Multicollinearity

Variable	VIF	1/VIF
FSZ	6.16	0.16227
LQR	1.39	0.72102
RIAI	6.59	0.15168
OM	1.89	0.52812
PG	1.14	0.87358
LR	2.02	0.49624
ER	1.16	0.86281
Mean VIF	**2.91**	

Source: Stata Output

As it is indicated in Table 2 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.

iv. Regression Results

The ANOVA Table 3 presented below presents the results estimated by the regression model which shows 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.

Table 3 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.

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 the 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 + ε

Accordingly, the regression result from table 3 shows that, firm size (FS), liquidity ratio (LQR) and reinsurance & actuarial issue (RIAI) 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.

V. 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.

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a. Normality Test

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

b. 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

ANNEX II Other Tests

. 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

. 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

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