

Solvency Determinants of Public-sector General Insurance Firms in India

Joy Chakraborty

Assistant Professor (Finance),
Alliance School of Business,
Alliance University,
Bangalore

Abstract

In the pre-reform era, the four major public-sector general insurers, carrying on multi-line operations, dominated the Indian general insurance sector with a market share close to 100 per cent. But with the enactment of the Insurance Regulatory and Development Authority of India (IRDAI) Act in 1999, the public-sector general insurers began to face stiff competition from the entry of private and foreign players. Though the four major public-sector general insurers still remains to dominate the Indian non-life insurance market with a collective market share of 50.24 percent at the end of the FY 2014-15, but an abrupt rise in the number of private players has raised concerns about the solvency position of the public-sector general insurance firms from the viewpoint of safeguarding policyholders' interests.

The present study investigated the solvency determinants of the four major public-sector general insurance firms in India. The study has employed the multiple linear regression analysis to establish a relationship between the solvency ratios, as dependent variable, and the firm-specific factors (i.e. Loss Ratio, Operating Expense Ratio, Market Shares, Return on Equity and Liquid Ratio) as independent variables. The study covers a period from 2008-09 to 2014-15, with an emphasis on the post-recessionary phase of developments in the country's general insurance sector. The findings showed that solvency was positively related with return on equity, market shares and liquid ratios. On the contrary, solvency was negatively related with operating expense and loss ratios. The results further emphasized the need for the public-sector general insurers to focus on operational efficiencies and liquidity position for ensuring a sound solvency position.

Keywords: Solvency, General Insurance, Determinants, financial crisis, IRDAI

JEL Classification: C120, G220, L250

Introduction

The country's general insurance business was nationalized with the introduction of the General Insurance Business (Nationalization) Act [GIBNA], 1972 that led to the emergence of four fully-owned subsidiaries under GICI, namely the National Insurance Company Limited, Oriental Insurance Company Limited, New India Assurance Company Limited and the United India Insurance Company Limited. But during the year 2000, the four subsidiaries were delinked from the parent company (GICI)¹, and were restructured as independent general

insurance companies. During the pre-reform period, the four public-sector general insurers dominated the Indian general insurance sector with a market share close to 100 per cent. But the situation drastically changed since the enactment of the Insurance Regulatory and Development Authority of India (IRDAI) Act in 1999. With the IRDAI in place, the country's insurance market was opened up for private and foreign participation. The abrupt rise in the entry of private players in the country's non-life insurance market eventually resulted in a decline in the market shares of the public-sector general insurers during the post-reform period. At the end of the FY 2014-15, there were 28 general insurance companies in India, with 06 public-sector and 22 private-sector firms. Among the 06 public-sector general insurers, while the four public-sector insurance companies carried on multi-line operations, there are two specialized insurance companies: one for credit insurance (ECGC)² and the other for crop insurance (AIC)³. The four public-sector insurers namely the National Insurance Company Limited, Oriental Insurance Company Limited, New India Assurance Company Limited and the United India Insurance Company Limited specializes on all forms of general insurance businesses in India with a collective market share of 50.24 percent at the end of FY 2014-15.

The opening up of the sector, for private participation, eventually raised issues about the solvency position of the general insurance companies and protection of the policyholders' interests. A financially sound insurance firm is believed to meet its obligations towards its customers and society in a better way, and in turn may be able to retain and attract more customers. The IRDAI⁴, in light of its mission statement published in its Annual Report in 2000-01, came out with several guidelines in the interest of healthy growth of the Indian insurance industry, protection of consumers' interest and orderly management of insurance companies. This major area of concern has even prompted the regulatory authority to mandate the Indian insurance companies to maintain a statutory solvency margin of 1.50, by which assets must exceed liabilities at every point of time. The solvency margins of the insurers is calculated as a ratio between the 'available solvency margin' (ASM)⁵ and the 'required solvency margin' (RSM)⁶. Hence, it becomes

necessary to review the solvency position of the general insurance firms in light of their operational and investment-related factors. The present study is an attempt made in this direction to investigate the solvency determinants of the four major public-sector general insurance firms, engaged in multi-line businesses, against the backdrop of the global financial crisis of 2007-08 and the rapid rise in the entry of private players in the country's general insurance market. The present study has identified certain firm-specific factors (i.e. Investment Performance Ratio, Expense Ratio, Market Shares and Reserves to Claims Ratio) in line with the review of past studies in the area of insurance. The influence of these factors upon the solvency position of the selected general insurance firms has been thoroughly reviewed in the present study covering the post-liberalisation period from 2008-09 to 2014-15.

The present study has hence been structured as follows: Section-2 summarises the literature review. Section-3 presents the conceptual framework of the methodology as undertaken in the present study. Section-4 discussed the research objectives, sample selection, data sources and the methodology used to extract and analyse the data. Section-5 reported the findings and analysis of the results as obtained under the present research work. Section-6 highlighted the concluding observations in line with the present study. Section-7 pointed out the limitations of the study and the scope for future research work. A bibliography of the references and materials used has been provided at the end for future references.

Literature Review

The literature review shows that few empirical studies have been previously carried out both in life and non-life insurance industry, though not extensively as in the present study. At the same time, the researcher found no such studies in India or in abroad that comprehensively evaluated the solvency determinants of the Indian general insurance firms during the post-recessionary period, against the backdrop of the global financial crisis of 2007-08. The present study intended to fill that research gap. Some of the literatures covered by the researcher relating to the present study has been summarised below in Table-1.

Table – 1: Summary of Past Studies on Insurance Firms

Sl. No.	Author(s) & Year of Publication	Research Focus	Research Methodology	Period of Study	Area of Work
1	Akotey et. al. (2013)	To evaluate the factors having an impact on the financial performances of 10 life insurance companies in Ghana	Panel Regression analysis	2000 - 2010	Life Insurance
2	Bawa and Chattha (2013)	To evaluate the impact of liquidity, solvency, leverage, size and equity capital on the profitability of 18 (1 public-sector & 17 private-sector) Indian life insurance companies	Multiple linear regression analysis	2007 - 2012	Life Insurance

3	Darzi (2011)	To assess the financial performances of the 12 (4 public-sector & 8 private-sector) Indian non-life insurers; and the factors affecting their solvency position	CARAMELS model; Multiple regression analysis	2004 - 2009	General Insurance
4	Das (2012)	To examine the growth in business of all life ins. players in North-eastern part of India	Method of Least squares and Linear trend analysis	1999 - 2010	Life Insurance
5	Joo (2013)	To examine the solvency position of 12 (4 public-sector & 8 private-sector) Indian general insurance companies; and the factors affecting their solvency position	ISI predictors, Multiple regression analysis	2004 - 2009	General Insurance
6	Malik (2011)	To investigate the determinants of profitability in 35 life and non-life insurance companies in Pakistan	Multiple regression analysis	2005 - 2009	Life & General Insurance
7	Mohandoss and Balamurugan (1999)	To evaluate the factors influencing the financial efficiency of 12 (1 public-sector & 11 private-sector) Indian life insurance companies	Tests of Hypothesis, Multiple regression analysis	2001 - 2011	Life Insurance
8	Mwangi and Iraya (2014)	To investigate the determinants of financial performances of all general insurance companies in Kenya	Multiple regression analysis	2010 - 2012	General Insurance
9	Rajendran and Natarajan (2009)	To compare the financial performances of LICI during the pre and post-LPG period	Method of Least squares and Linear trend analysis	1956 - 2008	Life Insurance
10	Sankaramuthukumar and Alamelu (2012)	To evaluate the performances of all Life and non-life insurance companies in Sri Lanka	Tests of Hypothesis, Corrl. analysis, standard deviation	2000 - 2009	Life & General Insurance
11	Sen (2011)	To analyse the profitability and growth of 18 (1 public-sector & 17 private-sector) Indian life insurers	Percentage analysis, Mean, Anova, Correlations, Linear trend analysis, etc.	2000 - 2010	Life Insurance
12	Venkidasamy (2012)	To assess the productivity and financial efficiencies of 12 (1 public-sector & 11 private-sector) Indian life insurance companies	Trend Analysis, Ratio analysis, Mean, Standard deviation, co-variance and correlation analysis, Multiple regression, Partial productivity of capital, labour & Capital intensity	2001 - 2011	Life Insurance

Source: - Compiled from the Respective Studies

Conceptual Framework

Multiple linear Regression analysis is a statistical technique of deriving a mathematical relationship, in the form of an equation, between a single metric-dependent variable (or, criterion variable) and two or more independent (or, predictor variables).

The study employed a linear multiple regression model which is symbolically given as follows:-

$$\text{SOLVR}_t = \alpha + \beta_1.\text{LOSSR}_t + \beta_2.\text{OEXPR}_t + \beta_3.\text{MKSt} + \beta_4.\text{RER}_t + \beta_5.\text{LQR}_t + \epsilon_t$$

Where, SOLVR_t = Solvency Ratios of the General Insurers at time-period 't' (i.e. Dependent or criterion variable); α = Intercept; LOSSR_t = Loss Ratio; OEXPR_t = Operating Expense Ratios; MKSt = Market Shares; RER_t = Return on Equity Ratio at time-period 't' respectively; β 's (i.e. $\beta_1, \beta_2,$

$\beta_3, \beta_4, \beta_5$) = regression coefficients of the respective predictor variables; and ϵ_t = error term at time-period 't' (that accounts for the probabilistic or stochastic nature of the

relationship). The variables were operationalised as follows, as given in Table - 2:-

Table- 2: List of Variables used for Multiple Regression

List of Variables	Abbreviations Used	Nature of Variables	Description
Solvency Ratios	SOLVR	Dependent	Available Solvency Margin (ASM) ⁷ to Required Solvency Margin (RSM) ⁸
Loss Ratio	LOSSR	Independent	Net Claims Incurred to Net Earned Premiums.
Operating Expense Ratio	OEXPR	Independent	Operating Expenses to Gross Premiums.
Market Shares	MKS	Independent	Share in total Gross Non-life Insurance Premium Income of the sector.
Return on Equity Ratio	RER	Independent	Profit After Tax to Net Worth
Liquid Ratio	LQR	Independent	Liquid (or, Current Assets) to Current Liabilities

Source: - Compiled by the author

The multiple regression analysis explains the strength of the relationship between the dependent and independent variables. The strength of association in multiple regression is measured by the square of the multiple correlation coefficient, i.e. R^2 , also called the 'Coefficient of Multiple Determination'. It varies between 0 and 1 and signifies the proportion of the total variation in the dependent variable that can be accounted for or explained by the combination of all independent variables. The Adjusted R^2 represents the 'Adjusted Coefficient of Multiple Determination' which has been adjusted for the number of independent variables and the sample size to account for the diminishing returns. The F-test helps to show the validity of the model that explains the linear relationship between all independent variables taken together with the single dependent variable.

The choice of the variables was based on the data provided by the IRDAI annual reports related to the solvency margins and the firm-specific factors of the selected public-sector general insurance firms. In the regression model as used in the present study, all independent variables enter the equation at once in order to determine the relationship between the dependent variable and the whole set of predictor variables. The selected variables were tested

beforehand for multi-collinearity and the variable(s) depicting high multi-collinearity were examined based on variance inflation factor (VIF) values exceeding 5 coupled with a tolerance level less than 0.20 (or, 20 percent). With regard to the variable-selection, we must also keep in mind that the sample size 'n' must be greater than the number of independent variables 'k' for proper execution of the multiple linear regression framework.

Research Methodology

Objectives of the Study

The present study has three-fold objectives which are listed as follows:-

- To examine the solvency determinants of the four public-sector non-life insurance companies in India for the period from 2008-09 to 2014-15.
- To determine the nature of relationship between the selected firm-specific factors (i.e. Loss Ratio, Operating Expense Ratio, Market Shares, Return on Equity and Liquid Ratio) with the solvency position of the public-sector general insurance companies during the period under review.

- (c) To identify the areas where the Indian general insurance companies' under review needs to focus upon in improving their long-term solvency position.

Research Hypotheses

In addition, the present study attempts to provide answers to the following hypotheses:-

H0: No significant relationship exists between the dependent variable (i.e. SOLVR) and the five predictor variables (i.e. LOSSR, OEXPR, MKS, RER and LQR).

Against an alternative hypothesis which is defined as follows:-

H1: There is presence of significant relationship between the dependent variable (i.e. SOLVR) and the five predictor variables (i.e. LOSSR, OEXPR, MKS, RER and LQR).

Sample Selection

The objective of the present study is confined only in the post-reform period after the liberalization of the country's insurance sector since the financial year 1999-2000, so the subsequent period of reforms has only been considered. The purposive sampling approach has been employed in the selection of the sample that comprises of 04 public-sector general insurance firms in India, who has been consistently in operation since the nationalization of the general insurance business in India. The US financial crisis occurred during the year 2007-08 and its ripples were even felt in the Indian insurance sector that led to a set-back in the performances of the country's general insurance firms. The reason behind the selection of the time-period from 2008-09 to 2014-15 was to judge the extent of the impact of the global financial crisis upon the performances of the non-life insurance firms under review. Like most of the studies in financial services, data availability for this study is also restricted to the information submitted by the non-life insurers in compliance with the regulatory authority,

IRDAI.

Research Tools

While deciding on the most suitable tool of analysis, the researcher has found that extensive literature review reveals the application of the multiple linear regression as the appropriate model for studies determining the nature of relationship between the dependent and predictor variables. Hence, the present study has adopted the application of the multiple linear regression frameworks, using the statistical software IBM-SPSS, version 20. In this regard, a multiple linear regression analysis has been conducted by taking the solvency ratios of the public-sector general insurers (as published by IRDAI) as the single dependent variable (abbreviated as SOLVR), and the 05 other factors as independent variables (abbreviated as LOSSR, OEXPR, MKS, RER and LQR), based on the inputs obtained from various research studies. Descriptive statistics and tests for multi-collinearity among the independent variables were further presented for proper execution of the multiple regression analysis.

Data Sources

The secondary data for the present research work has been collected from the IRDA Annual Reports from 2008-09 to 2014-15, and from the websites of the respective non-life insurers. The data-sources were based on the financial statements (i.e. Policyholders' Account, Shareholders' Account and the Balance Sheet) of the 04 listed public-sector non-life insurance companies in India for the period under review.

Findings & Analysis

The descriptive statistics, as shown in the following Table – 3, depicted the mean, standard deviation, minimum and maximum values against each of the selected variables in the present study.

Table – 3: Descriptive Statistics of Variables Used

Variables	Mean	Std. Deviation	Minimum	Maximum
SOLVR	2.150	0.730	1.330	3.550
LOSSR	0.844	0.157	0.101	0.997
OEXPR	0.296	0.043	0.192	0.372
MKS	0.170	0.139	0.101	0.875
RER	0.249	0.258	-0.298	0.984
LQR	0.424	0.153	0.211	0.713

Source: - Calculated

The values of solvency ratios (SOLVR) ranged between the minimum and maximum values of 1.330 and 3.550 respectively per year, with a highest mean value of 2.150 per annum. There were wide differences observed between the values of solvency ratios across the sample firms, as indicated from the standard deviation of 0.730 (or, 73 percent) per annum, the highest among all the selected

variables. The loss ratio of the selected firms (LOSSR) grew by a mean of 0.844 (or, 84.4 percent) per year with a standard deviation of 15.7 percent per annum. The operating expense ratio (OEXPR) of the sample firms ranged between the values of 0.192 and 0.372 per year, with a mean close to 30 percent per annum. The lowest standard deviation of 4.3 percent per annum was recorded against the variable

- (c) To identify the areas where the Indian general insurance companies' under review needs to focus upon in improving their long-term solvency position.

Research Hypotheses

In addition, the present study attempts to provide answers to the following hypotheses:-

H0: No significant relationship exists between the dependent variable (i.e. SOLVR) and the five predictor variables (i.e. LOSSR, OEXPR, MKS, RER and LQR).

Against an alternative hypothesis which is defined as follows:-

H1: There is presence of significant relationship between the dependent variable (i.e. SOLVR) and the five predictor variables (i.e. LOSSR, OEXPR, MKS, RER and LQR).

Sample Selection

The objective of the present study is confined only in the post-reform period after the liberalization of the country's insurance sector since the financial year 1999-2000, so the subsequent period of reforms has only been considered. The purposive sampling approach has been employed in the selection of the sample that comprises of 04 public-sector general insurance firms in India, who has been consistently in operation since the nationalization of the general insurance business in India. The US financial crisis occurred during the year 2007-08 and its ripples were even felt in the Indian insurance sector that led to a set-back in the performances of the country's general insurance firms. The reason behind the selection of the time-period from 2008-09 to 2014-15 was to judge the extent of the impact of the global financial crisis upon the performances of the non-life insurance firms under review. Like most of the studies in financial services, data availability for this study is also restricted to the information submitted by the non-life insurers in compliance with the regulatory authority,

IRDAI.

Research Tools

While deciding on the most suitable tool of analysis, the researcher has found that extensive literature review reveals the application of the multiple linear regression as the appropriate model for studies determining the nature of relationship between the dependent and predictor variables. Hence, the present study has adopted the application of the multiple linear regression frameworks, using the statistical software IBM-SPSS, version 20. In this regard, a multiple linear regression analysis has been conducted by taking the solvency ratios of the public-sector general insurers (as published by IRDAI) as the single dependent variable (abbreviated as SOLVR), and the 05 other factors as independent variables (abbreviated as LOSSR, OEXPR, MKS, RER and LQR), based on the inputs obtained from various research studies. Descriptive statistics and tests for multi-collinearity among the independent variables were further presented for proper execution of the multiple regression analysis.

Data Sources

The secondary data for the present research work has been collected from the IRDA Annual Reports from 2008-09 to 2014-15, and from the websites of the respective non-life insurers. The data-sources were based on the financial statements (i.e. Policyholders' Account, Shareholders' Account and the Balance Sheet) of the 04 listed public-sector non-life insurance companies in India for the period under review.

Findings & Analysis

The descriptive statistics, as shown in the following Table – 3, depicted the mean, standard deviation, minimum and maximum values against each of the selected variables in the present study.

Table – 3: Descriptive Statistics of Variables Used

Variables	Mean	Std. Deviation	Minimum	Maximum
SOLVR	2.150	0.730	1.330	3.550
LOSSR	0.844	0.157	0.101	0.997
OEXPR	0.296	0.043	0.192	0.372
MKS	0.170	0.139	0.101	0.875
RER	0.249	0.258	-0.298	0.984
LQR	0.424	0.153	0.211	0.713

Source: - Calculated

The values of solvency ratios (SOLVR) ranged between the minimum and maximum values of 1.330 and 3.550 respectively per year, with a highest mean value of 2.150 per annum. There were wide differences observed between the values of solvency ratios across the sample firms, as indicated from the standard deviation of 0.730 (or, 73 percent) per annum, the highest among all the selected

variables. The loss ratio of the selected firms (LOSSR) grew by a mean of 0.844 (or, 84.4 percent) per year with a standard deviation of 15.7 percent per annum. The operating expense ratio (OEXPR) of the sample firms ranged between the values of 0.192 and 0.372 per year, with a mean close to 30 percent per annum. The lowest standard deviation of 4.3 percent per annum was recorded against the variable

OEXPR. The market shares (MKS) of the sample firms recorded a lowest mean value of 17 percent with a standard deviation close to 14 percent per annum during the period under review. The growth per annum in the mean and standard deviation of the return on equity ratio (RER) stood at 24.9 percent and 25.8 percent respectively, with the lowest value being obtained as (-) 0.298 (or, 29.8 percent) across the sample firms. Finally, the liquid ratios (LQR) recorded a mean value of 0.424 (or 42.4 percent) with a standard deviation of 0.153 (or 15.3 percent) every year during the period under review. Nevertheless, all the mean values depicted a reasonably normal distribution across the values of the variables.

For the application of the model and to ensure an absence of

multi-collinearity among the selected variables, a correlation analysis between the variables has been carried out covering all the years of the study-period. The results of the Pearson correlation matrix among the selected variables are shown in Table – 4. The results indicated a very low to moderate positive relationship between the solvency ratios and the respective independent variables i.e. RER and LQR. The relationship between the solvency ratios and the loss ratios, operating expense ratios and the market shares of sample firms were found to be negative and weak. Moreover, no signs of multi-collinearity existed among the independent variables which provided a favourable platform for the execution of the multiple linear regression analysis.

Table – 4: Pearson Correlation Matrix

Variables	SOLVR	LOSSR	OEXPR	MKS	RER	LQR
SOLVR	1.000	-0.247	-0.358	-0.040	0.043	0.419
LOSSR	-0.247	1.000	-0.116	-0.105	0.044	-0.215
OEXPR	-0.358	-0.116	1.000	0.326	-0.361	0.277
MKS	-0.040	-0.105	0.326	1.000	-0.112	0.040
RER	0.043	0.044	-0.361	-0.112	1.000	-0.436
LQR	0.419	-0.215	0.277	0.040	-0.436	1.000

Source: - Calculated

The results of the multiple regression analysis has been presented below in Tables 5 – 7 representing the model summary, goodness of fit and the regression coefficients respectively, by taking the solvency ratios as the dependent

variable and the other selected factors as the independent variables for the sample firms covering all the years of the study-period.

Table – 5: Model Summary - Regression Results

Variables Entered	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
LQR, MKS, LOSSR, OEXPR, RER	0.690	0.476	0.357	0.585	0.980

Predictors: (Constant): LQR, MKS, LOSSR, OEXPR, RER

All requested variables Entered with Dependent variable being SOLVR

Source: - Calculated

Table – 6: Result of Goodness of Fit – ANOVA

Sources of Variation	Sum of Squares	DF	Mean Square	F	Sig.
Regression	6.853	5	1.371	4.002	0.01
Residual	7.534	22	0.342		
Total	14.387	27			

Dependent Variable: SOLVR

Predictors: (Constant): LQR, MKS, LOSSR, OEXPR, RER

Source: - Calculated

Table – 7:Regression Coefficients

Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig. (p-values)	Collinearity Statistics	
	B	Std. Error	Beta			VIF	Tolerance Level
(Constant)	4.161	1.208	-	3.444	0.002	-	-
LOSSR	-0.831	0.738	-0.179	-1.125	0.273	1.066	0.938
OEXPR	-8.964	2.990	-0.528	-2.998	0.007	1.304	0.767
MKS	0.545	0.859	0.104	0.635	0.532	1.131	0.884
RER	0.349	0.507	0.123	0.687	0.499	1.347	0.742
LQR	2.746	0.846	0.576	3.247	0.004	1.324	0.756

Dependent Variable: SOLVR

Source: - Calculated

The value of R², as shown in Table – 5, shows a value of 0.476 thereby indicating that all the predictors explain almost 50 percent of the variations in the dependent variable (SOLVR) across the sample firms during the period under review. The adjusted R² is 35.7 percent, which accounts for the number of predictors in the model. Both the values indicate that the model fits the data well. Since the R² value is close to the adjusted R² value, the model does not appear to be over-fit and has adequate predictive ability. The Durbin-Watson statistic of 0.980 further indicates the absence of linear autocorrelation among the residuals in the given model. The goodness of fit - Anova results, as provided in Table – 6, further confirms the validity of the model with a reported F-statistic value of 4.002 and is found to be statistically significant (based on P-values < 0.05) at the 5 percent level of significance, thereby indicating the existence of a linear relationship between the dependent and independent variables in the given model.

The results of the regression coefficients of the selected variables at a 5 percent level of significance, as shown in Table – 7, reveals a statistically significant relationship (based on the P-values < 0.05) between the solvency ratios and the respective determinants i.e. operating expense and liquidity ratios. The predictor variable 'market shares' was found to be positively related with the solvency ratios of the sample firms, though not statistically significant ($\beta = 0.545$, p-value = > 0.05). The independent variables 'loss ratio' and 'operating expense ratio' was found to have a negative relationship with the overall solvency status of the public-sector non-life insurance firms. Though loss ratio was found to be statistically insignificant ($\beta = -0.831$, p-value = > 0.05), but the operating expense ratio was found to be a significant determinant ($\beta = -8.964$, p-value = < 0.05) though negatively related with the solvency position of the sample firms. The 'return on equity' ratio was even found to be statistically insignificant ($\beta = 0.349$, p-value = > 0.05) though positively related with solvency. The variance inflation factors (VIF)⁹, as provided in Table – 7, further testifies the absence of multi-collinearity with factor values

not exceeding '5' besides having a tolerance level of more than 20 percent, as obtained against the selected independent variables in the present study. Based on the above findings, it was evident that the null hypothesis was rejected against the independent variables 'OEXPR' and 'LQR' whereas the alternative hypothesis was rejected against the predictor variables (i.e. LOSSR, MKS and RER).

The linear multiple regression model, with the incorporation of the regression coefficients, can hence be simplified as follows:-

$$\text{SOLVR}_t = 4.161 - 0.831 \cdot \text{LOSSR}_t - 8.964 \cdot \text{OEXPR}_t + 0.545 \cdot \text{MKS}_t + 0.349 \cdot \text{RER}_t + 2.746 \cdot \text{LQR}_t$$

Conclusion

The findings of the study contributed towards a better understanding of the factors determining the solvency status of the public-sector non-life insurance firms in India. The findings indicated the operating expense ratio and the liquid ratio as the significant predictors of solvency. The predictor variable 'operating expense ratio', though significant, was found to have a negative impact on solvency and hence can lead to a possible threat on the solvent state of the sample firms. Again, the predictor variable 'loss ratio' was also found to have a negative impact on solvency, which can further threaten the solvent state of the sample non-life insurance firms. The study has further indicated that the solvency position of the sample firms was not significantly predicted by the factors, i.e. loss ratio, market shares and return on equity, and hence would not assist in determining the solvency position. Hence, the results of the study emphasised the need for the four dominant public-sector general insurance firms to focus on operational efficiencies and liquidity position for ensuring a sound solvency position.

Limitations & Scope For Further Research

The data collected for the present study has been derived from the published financial statements of the respective non-life insurers without any emphasis on primary data, and

the same has not been adjusted for inflation. Hence, the study incorporates all the limitations that are inherent in the published financial statements. The study is restricted to a time span of 7 years focussing on the post-recessionary phase of the reform period from 2008-09 to 2014-15. The study included only the four major public-sector non-life insurers who are involved in all forms of general insurance businesses, leaving aside the two specialised public-sector insurers such as ECGC (credit insurance) and AIC (crop insurance) besides the private non-life insurers. In addition, the study has incorporated the multiple regression technique with a single dependent variable and five independent variables. However, it may be useful to consider more number of predictor variables for a longer time-horizon to arrive at more definite conclusions. Hence, the future studies of research in this area could take into account more number of variables, covering all the players in the country's life insurance and general insurance sectors for an extended time-period.

References

- Akotey, J. O., Sackey, F. G., Amoah, L. and Manso, R. F. (2013): "The financial performance of life insurance companies in Ghana", *The Journal of Risk Finance*, 14 (3), pp. 286-302.
- Bawa, S. K. and Chattha, S. (2013): "Financial Performance of Life Insurers in Indian Insurance Industry", *Pacific Business Review International*, 6 (5), pp. 44-52.
- Darzi, T. A. (2011): "Financial Performance of Insurance Industry in Post- liberalization Era in India", Ph.D awarded from the Department of Business and Financial Studies, University of Kashmir, India.
- Das, S. K. (2012): "Performance of Life Insurance Industry in North Eastern Region of India: A Comparative Assessment", *International Journal of Management Research and Review*, 2 (4), pp. 491-507.
- Joo, B. A. (2013): "Analysis of Financial Stability of Indian Non-Life Insurance Companies", *Asian Journal of Finance & Accounting*, 5 (1), pp. 306–319.
- Malik, H. (2011): "Determinants of Insurance Companies Profitability: An Analysis of Insurance Sector of Pakistan", *Academic Research International*, 1 (3), pp. 315-321.
- Mohandoss, K and Balamurugan, M (1999): "A Study on Performance of Insurance Industry in India", *Primax International Journal of Commerce and Management Research*, 1 (1), pp. 94-105.
- Mwangi, M. and Iraya, C. (2014): "Determinants of Financial Performance of General Insurance Underwriters in Kenya", *International Journal of Business and Social Science*, 5(13), pp. 210–215.
- Rajendran, R and Natarajan, B (2009): "The Impact of LPG on Life Insurance Corporation of India (LIC)", *Asia Pacific Journal of Finance and Banking Research*, 3 (3), pp. 41-52.
- Sankaramuthukumar, S and Alamelu, K (2012): "A SWOT Analysis of Sri Lankan Insurance Sector", *Journal of Risk & Insurance*, 9 (1), pp. 27-47.
- Sen, R. G. (2011): "Evaluation of Profitability and Growth of Life Insurance Business in India – A Comparative Study between Public Sector Unit and the Private Sector Units", Ph.D awarded from the Department of Commerce, University of Calcutta, West Bengal, India.
- Venkidasamy, K (2012): "Productivity and Financial Efficiency of Life Insurance Companies in India", Ph.D awarded from the Department of Commerce, Bharathiar University, Coimbatore, Tamil Nadu, India.
- Zikmund, W.G., Babin, B.J., Carr, J.C., and Griffin, M (2010): "Business Research Methods", 8th Edition, Vol. -4, Pgs. 1- 668, South Western College Publishers.
- IRDAI Annual Reports for the FYs 2008-09 to 2014-15.
<https://www.newindia.co.in/index.aspx>
<https://www.nationalinsuranceindia.com>
<https://uiic.co.in/home>
<https://www.orientalinsurance.org.in/>

End notes:

1The General Insurance Corporation of India (GICI) was formed in pursuance of Section 9(1) of GIBNA for the purpose of superintending, controlling and carrying on the general insurance business in India.

2Export Credit Guarantee Corporation of India Limited

3Agricultural Insurance Company of India Limited

4As per section 64 VA of the Insurance Act of 1938, as amended by the Insurance (Amendment) Act of 2002, every insurer is required to maintain the statutory solvency margin, as stipulated by IRDAI

5The term 'Available Solvency Margin' (ASM) refers to the aggregate of the excess in policyholders' funds and the shareholders' funds. (Source: - IRDAI Annual Reports).

6The term 'Required Solvency Margin' is referred to an amount in excess of the value of assets over the amount of life insurance liabilities and other liabilities of

policyholders' fund & shareholders' funds, and should not be less than an amount as prescribed by the IRDAI (Assets, Liabilities and Solvency Margin of Insurers) Regulations, 2000.

7The term 'Available Solvency Margin' (ASM) refers to the aggregate of the excess in policyholders' funds and the shareholders' funds. (Source: - IRDAI Annual Reports).

8The term 'Required Solvency Margin' is referred to an amount in excess of the value of assets over the amount of life insurance liabilities and other liabilities of policyholders' fund & shareholders' funds, and should not be

less than an amount as prescribed by the IRDAI (Assets, Liabilities and Solvency Margin of Insurers) Regulations, 2000.

9Zikmund, W.G., Babin, B.J., Carr, J.C. & Griffin, M. (2010): 'Business Research Methods (8th Edition)', South Western College Publishers.

¹⁰ Multi-collinearity among the independent variables can be expected when the multiple VIF factors approach '5' or 'greater than 5'. (Source: Zikmund et. al. (2010): 'Business Research Methods', 8th Edition)