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# INSURANCE SECTOR DYNAMICS AND ECONOMIC GROWTH OF INDIA

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## Abstract

The study aims to assess the growth of insurance sector and its contribution to economic growth of India since insurance sector reforms. The study based on secondary data collected from Annual Reports of IRDA, Economic Survey of India and World Bank's development indicators 2018 from 1985 to 2017. Study employed Paired t-test to compare the growth of life and non life insurance sector in pre and post insurance reform period. To assess the contribution of insurance sector, we used regression model of estimation. Results show that both life and non life insurance sector have significant mean difference in post reform period than in pre reform period, it implies that adoption of liberalization policy as part of economic reform make positive significant impact on the growth of life insurance sector. Regression results show that both life and non life insurance sector contributes economic growth of India. The study can be useful to find out the contribution of insurance sector to economic growth of India and impact of reforms on growth of the insurance sector.

**Keywords:** Insurance sector, Economic Growth, Insurance Penetration, Reforms.

**JEL Classification:** G22, O40, P41.

## INTRODUCTION

A well-developed financial market is essential for the economic growth and development of a country. Development of financial market includes banking, insurance, stock market etc. Discussion on influence of financial market development on economic growth has been begun for more than a century. Examining the economic school of thought, the classics, neo-classics and monetarists believed in the funds mobilizing nature of the financial markets and how these funds were allocated into productive activities via the market

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mechanism. Classical school laid the economic foundation for the institution of financial market mechanisms affecting saving and investment in an economy (Wait et.al. 2017). Schumpeter (1912) wrote about how financial market development affects economic activity and hence economic growth. In India economic reforms take place in 1990-91, it makes tremendous changes in all the sectors of the economy especially the financial sector. Financial reforms should be boosting the development of financial sector thus increase the role on economic growth (Puatwoe and Piabuo (2017). Much empirical researches conducted in this area and found positive and negative relation between financial development and economic growth. Studies of Fry (1988), Ikhide (1993), Seck and Nil (1993), Beck, and Levine (2004) found that financial development had positive impact on economic growth. Whereas, studies of Adusie (2013), Gregorio and Guidotti (1995), Bernard and Austin (2012) found negative relation.

Insurance sector is one of the important financial intermediaries in the financial market. Economic development rely on investments which are made out of savings, insurance is a good tool to mobilize savings from people and channelize into investments for economic growth (Rao, 2013; Charumathi, 2012). Insurance market development specifically and financial market development overall seems both to be long run causality factors of economic growth (Pradhan et al 2015). The insurance penetration and density are the two important development indicators which measure the development of the sector. Insurance penetration in India reached 3.69 per cent in 2017 from 2.71 per cent in 2001. The role of insurance sector and its contribution to economic growth is less discussed than banking and other sectors. Verma and Bala (2013), Lee et al (2013), Vadlamannathi (2008) were investigated the relation between insurance sector growth and found significant relationship between the two.

Reforms in insurance sector start in 1999-2000 period based on the Malhotra committee report in 1996. Based on this backdrop, we tried to compare the growth of insurance sector in pre and post liberalization period of insurance sector. Study also reexamines the growth of insurance sector and its contribution to economic growth of India, specifically life insurance and non- life insurance sector.

## **OBJECTIVES OF THE STUDY**

- To examine the growth dynamics of insurance sector in pre and post liberalization reform of insurance sector;
- To examines contributions of insurance sector in economic growth of India.

## **HYPOTHESIS OF THE STUDY**

The study hypothesis that, the insurance sector (life and non- life) start its growth dynamics after post reform period in insurance sector than pre-reform period. Growth of insurance sector positively contributes economic growth, and there exists a long run relationship between insurance sector growth and economic growth of India.

## METHODOLOGY

### Data

The secondary sources of data from the period 1985 to 2017 were used for the study. The data sources of macroeconomic variables like per capita GDP in constant US\$, growth rate of population, national saving rate, rate of growth of inflation, money supply M2 collected from website of World Bank's Development Indicators 2018. Data of Gross Domestic Product of India collected from Government of India Websites. Insurance sector variables like life insurance, non-life and total life insurance premium were collected from IRDA, LIC and GIC websites.

### Research Tools

Paired  $t$  test is used to examine the growth of insurance sector in pre and post reform period of insurance sector. For this purpose, insurance sector is subdivided into two life and non-life insurance sectors and tests have run separately in the study period. Econometric Models constructed to reexamine the contribution of insurance sector to economic growth of India. Before conducting regression analysis we examine the stationarity aspects of the variables, for this Unit Root test is conducted.

Economic growth is considered as a good indicator of economic health of a country. It is because it indicates the growth in economic output, whether measured by GDP (gross domestic product), GVA (gross value added) or any other measure. It is particularly important in developing economies like India and conventionally measured as the percent rate of increase of real gross domestic product, or real GDP, usually in per capita terms. So we considered per capita gross domestic product in constant US\$ as dependent variable.

$$\text{Economic growth} = \text{Real per capita GDP in US\$ constant}$$

Two sets of independent variables are used for the study. The first set includes key independent variables of insurance sector growth. The second set includes control variables includes various macroeconomic and financial sector variables.

To measure insurance sector growth of India in pre and post reform period and its impact on economic growth of a country, the whole sector is subdivided into life insurance non-life insurance sector and analyse the growth of these sectors separately. Insurance penetration and density are the two development indicators of insurance sector of a country. Insurance penetration is measured as the percentage of insurance premium to GDP. Insurance density is calculated as the ratio of premium to population (per capita premium) in a country (IRDA 2016-17).

- (i) Life insurance sector growth: To measure life insurance growth, we considered life insurance penetration as the variable. It is percentage of life insurance premium to GDP.

- (ii) Non- life insurance sector growth: Percentage of non-life insurance premium to GDP i e; Non-life insurance penetration was used to measure growth of non-life insurance sector.

Macroeconomic and financial indicators were use as control variables in the study. (i) Money supply: increase in money supply lower the interest rates leads to more consumption and lending in the economy in the short run but does not exist always. Rate of growth of M2 as percentage of GDP is used to represent money supply. (ii) Savings: average rate of national savings as a control variable. The saving rate shows the proportion of national income which is saved, leading to capital formation thereby economic growth. (iii) Inflation: economic growth and rate of inflation has negative relationship (Vadlamannati, 2008). Rate of growth of inflation is use for the study. (iv) Lending rate: lending interest rate and economic growth has negative relationship (Verma & Bala, 2013). Population growth relationship between population growth and economic growth is controversial. Population growth affect overall economic growth (Wait et.al. 2017). Growth rate of population is use for measuring population growth.

To reexamine the relationship between the insurance sector and economic growth, we construct econometric model. Before conducting regression, test for stationarity is essential because most of the time series data are non-stationary and test will run by using non – stationary data lead to spurious regression (Granger, 1969).Spurious regression will most likely indicates non-existing relationship. The first or second differences terms of most variables will usually become stationary. To check stationarity of data, first we used Dickey-Fuller (DF) Unit Root Test and based on the results performing Augmented Dickey-Fuller (ADF) test.

The DF test is based on the analysis of following regression forms, let  $Y_t$  is the variable:

- a) Without constant and trend:  $\Delta Y_t = \beta Y_{t-1} + \delta_t$  (1)
- b) With constant:  $\Delta Y_t = C + \beta Y_{t-1} + \delta_t$  (2)
- c) With constant ant trend:  $\Delta Y_t = C + \varphi T + \beta Y_{t-1} + \delta_t$  (3)

Testing hypothesis for Unit Root:  $H_0$  : presence of unit root;  $H_1$ : no unit root

Decision Rule: (i). If  $t^* > ADF$  critical value, accept null hypothesis that unit root exists, means data is non-stationary. (ii)  $t^* < ADF$  critical value reject null hypothesis, means unit root does not exists and data is stationary.

Sometimes we may fail to get proper results leads to confuse whether the data is stationary or not, that situations we use ADF test it takes lag values of variable. It mentioned as:

$$\Delta Y_t = C + \varphi T + \beta Y_{t-1} + \sum_i \delta_i \Delta Y_{t-i} + \delta_t \tag{4}$$

To examine the contribution of insurance sector growth and economic growth, we construct a econometric model. The following equation is use to set the relationship between insurance sector and economic growth:

$$EG_t = \beta_0 + \beta_1 LI_t + \beta_2 NLI_t + \sum \beta_i Z_t + u_t \tag{5}$$

where,

- $EG_t$  = Economic Growth in t year
- $LI_t$  = Life insurance in t years
- $NLI_t$  = Non- life insurance in t years
- $Z_t$  = set of important control variables
- $i$  = control variables parameters
- $u_t$  = error term
- $\beta_0$  = constant
- $\beta_1, \beta_2$  = hypothesis variable parameters

**RESULTS AND DISCUSSIONS**

**Growth Dynamics of Insurance sector in Pre and Post Liberalization**

The following section discussed comparative analysis of life and non-life insurance sector in pre and post liberalization period, for this insurance penetration is use as a key variable. To compare the period Paired t- test analysis is used. The purpose of paired t-test is to test significant difference between means of two related observations.

**Life Insurance Sector in Pre and Post Liberalization**

The results (table:1) revealed that mean value of life insurance sector in the post reform period as compared to pre liberalization (which has increased from 0.49 to 3.92 ). The variability in life insurance sector also increased in post reform period as compared to pre liberalization (as measured by standard deviation value increased from 0.28 to 1.46). The results of Kolmogorov – Samirnov and Shapiro-Wilk test confirmed that the sample distribution is normal (K-S value 0.213, p=.001 and Shapiro Wilk test =.817, p= 0.000). The correlation between two conditions was estimated at r=.78, p <.001, suggesting that the dependent sample t-test is appropriate in this case. The null hypothesis of equal development was rejected, t(15)=-10.96, p<.001. It indicates post reform mean was statistically higher than the pre-reform mean. The results revealed that tremendous growth in life insurance sector has been see after the implementation of reforms in insurance sector.

*Table 1. Life and non-life insurance sector in pre and post reform period*

variables	Life Insurance		Non-Life Insurance	
	1985 to 2000	2001-2017	1985 to 2000	2001-2017
	Pre Reform	Post Reform	Pre Reform	Post Reform
Mean	0.49	3.92	0.25	0.84
SD	0.28	1.46	0.12	0.31
K-S Value	0.213		0.154	
S-W Value	0.817		0.909	
Correlation	.78(.000)		.96 (.000)	
Paired t-value	10.96*(.000)		12.28*(.000)	

Source: authors calculation,\*significant at 0.01 level

## Non-life insurance sector in pre and post liberalization

The results (table 1) revealed that there is a slight differences in the scores for pre reform ( $M = 0.25$ ,  $SD = 0.12$ ) and post reform period ( $M = 0.84$ ,  $SD = 0.31$ ). The sample distribution is normal (K-S value 0.154,  $p = .001$  and Shapiro Wilk test  $= .909$ ,  $p = 0.000$ ). The correlation between pre and post reform condition was estimated at  $r = .96$ ,  $p < .001$ , suggesting that the dependent sample t-test is appropriate in this case. The null hypothesis of equal development was rejected,  $t(15) = 12.28$ ,  $p < .001$ . It indicates post reform mean of non life insurance was statistically higher than the pre-reform mean.

Results concluded that mean difference in pre and post liberalization period was higher in life insurance sector than non-life. It indicates that reforms in insurance sector as a whole contributed significant changes in growth of life insurance sector than non-life sector of India. After reform number of competitors increased and struggle for capture market share make more growth in life insurance sector.

## Insurance sector and Economic Growth

Table. 2 of unit root test results shows that the null hypothesis is rejected at 1% and 5% critical value. It means per capita GDP, life insurance, non-life insurance, money supply are stationary at first order difference, and all other variables are stationary at their levels.

Followed by unit root test, correlation matrix conducted to detect the correlation among the variables. Table.3 of correlation matrix shows that real per capita GDP has positive correlation between life and nonlife insurance, saving rate and money supply.

Regression Results ( table 4) show that size of regression coefficient shows the direction of relationship between dependent and explanatory variables. Results of regression model show that positive direction of relation among life and non life sector growth and one period lag of nonlife sector with economic growth. Life insurance sector at current time is significant at 1 percent and 5 percent significant level with p-value 0.0002. Whereas nonlife sector has positive relation but not significant at current time period but the impact of non-life insurance sector on economic growth can be seen after one year lag, significant at 5 percent level (Table 4).

The control variables, lending rate and M2 have significant and negative coefficients at 5 percent confidence level. Growth rate of population, saving rate have positive coefficients but not significant at 5 percent level. Inflation is not significant and has negative relation with economic growth.

R-squared value implies that how much independent variables jointly influence the dependent variable. Here, R-square = 99%, which means 99 percent of variations in economic growth (dependent variable) can be explained by all our independent variables jointly, so the overall regression model is fit. F-statistic talks about joined hypothesis of independent variables that means independent variables jointly can influence dependent variable or not. Here, F-statistic (243.6554), P-

value (0.000) is significant at 1percent and 5 percent confidence interval, implies that, in our model all independent variables can jointly influence the economic growth.

**Table 2. Unit Root Test Results**

variables	T-ADF Statistics	Critical Value	Decision	Intercept and Trend	Durbin Watson
Per capita GDP	0.498599	1% = -2.647120	stationary	Intercept	2.06
		5% = -1.952410			
Life insurance	-3.28252	1% = -3.661661	stationary	Intercept	2.02
		5% = -2.960411			
Non-life Insurance	0.956204	1% = -3.699871	stationary	Intercept and Trend	2.17
		5% = -2.976263			
Growth rate of Money Supply	-3.78333	1% = -4.284580	stationary	Intercept and Trend	1.99
		5% = -3.862882			
We found the series for ' Rate of growth of population, Saving rate, Inflation, and lending rate' stationary at their levels.					

**Table.3. Correlation Matrix**

variables	LogDPC GDP	DLI	DNI	POP	LR	SR	DM2	INFL	LI (-1)	NL(-1)
LogDPC GDP	1									
DLI	0.950	1								
DNI	0.9658	0.9054	1							
POP	-0.9423	-0.9528	-	1						
LR	-0.7852	-0.8122	-	0.8951	1					
SR	0.737	0.861	0.8324	-0.8816	-0.8088	1				
DM2	0.895	0.9762	0.8784	-0.9553	-0.8693	0.9008	1			
INFL	-0.4156	-0.3714	-	0.5365	0.688	-0.3792	-0.4835	1		
LI (-1)	0.9577	0.9048	0.9907	-0.9716	-0.8424	0.7695	0.8884	-0.5638	1	
NL(-1)	0.96074	0.99	0.9194	-0.9529	-0.8064	0.8273	0.9571	-0.3659	0.9208	1

Notes: D = indicators in first difference, DPCGDP = per capita GDP, DLI = Life insurance, DNI = Non life insurance, POP = rate of growth population, LR = Lending rate, SR = National saving rate, DM2 = Rate of money supply, INFL = Rate of inflation, LI(-1) = lag of life insurance, NL(-1) = lag of non life insurance.

Table 4  
Regression Results

Dependent Variable	Log (GDP PER CAPITA)			
Method	Least Squares			
Sample (adjusted)	1986-2017			
Included observations	32 after adjustments			
Variable	coefficient	Std.Error	t-statistic	Prob
constant	4.938742	1.412251	3.497072	0.002
Life insurance	0.36645	0.081456	4.498769	0.0002
Non-life insurance	0.06843	0.292198	0.234192	0.817
Lending rate	-0.03334	0.015322	-2.17594	0.0406
Population	0.901524	0.571858	1.576481	0.1292
Inflation	-0.01322	0.010564	-1.25105	0.2241
M2	-0.01702	0.008018	-2.12307	0.0452
Saving rate	0.010454	0.00896	1.166721	0.2558
Non-life insurance -1	0.779709	0.3591	2.17129	0.021
life insurance-1	-0.01836	0.0626	-0.29327	0.7721
R- squared	0.990067			
Adjusted R-squared	0.986004			
SE.of regression	0.07451			
F-statistic	243.655			
Prob(F-statistic)	0.000			
Durbin-Watson	1.35599			

Testing for serial correlation problem : Breush – Godfrey serial correlation LM Test. Generally, Breush – Godfrey LM test is use to check whether serial correlation occurs in the residuals. “obs\*R-squared is the LM test statistic for the null hypothesis of no serial correlation. The corresponding probability value indicates rejection or acceptance of null hypothesis. Here p-value (0.0673) is more than 5 percent , means acceptance of null hypothesis of no serial correlation in the residuals (Table 5).

**Table 5.** Breush – Godfrey serial correlation LM Test results

F-statistic	2.028144	Prob . F(2,20)	0.1578
Obs*R-squared	5.395728	Prob. Chi-Square (2)	0.0673

## Heteroscedasticity

Heteroscedasticity is occurring when the error terms do not have constant variance. The null hypothesis is homoscedasticity (constant) variance. Breusch-Pagan-Godfrey test is used for test whether there is Heteroscedasticity problem occur in the residuals. The following is the test result of the problem: the obs\*R-squared (9) = 9.36, prob value (0.4047) , means that we accept null hypothesis of homoscedasticity (table 6).

**Table 6.** Heteroscedasticity test results

Heteroscedasticity Test	Breusch - Pagan - Godfrey		
Null Hypothesis	Homoscedasticity		
F-statistic	1.010628	Prob . F(9,22)	0.4611
Obs*R-squared	9.360182	Prob. Chi-Square (9)	0.4047
Scaled explained SS	3.552194	Prob. Chi-Square (9)	0.9383

## CONCLUSIONS

Insurance in India has a deep rooted history. Economic reforms in 1991 thereby insurance sector reforms make growth dynamics in insurance sector as a whole. Based on the test results, we concluded that insurance sector has positive changes and start its dynamics after insurance sector reforms especially in life insurance sector. Study also reexamines the contribution of insurance sector to economic growth of India, results show that there is significant positive long run relationship among insurance sector variables and economic growth, specifically the life insurance sector. Results also supported the studies of Vadlamannathi (2008) and Lee et al (2013). Further scope of the study is to examine the relationship among insurance sector and economic growth including more variables represents insurance sector like impact of FDI.

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