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Macro-Economic Determinants of Life Insurance Business – Empirical Evidence during 2000-01 to 2015-16

V. V. N. Reddy, S. M. Reddy,P. A. Naidu

ABSTRACT---There is a strong link between an institutional framework of insurance sector and sustainable economic growth. Insurance business has a positive impact on economic development and vice versa. As a developed insurance market stimulates economic growth of a country, the level of its economic growth affects insurance business development in return. In India, regulatory changes commenced since mid-nineties for opening up of insurance markets to private and foreign insurers. After more than one and half decade execution of insurance sector reforms, Indian life insurance business have been witnessed the better growth. In this juncture, the present study focuses on an examination of the role of a macroeconomic environment in the development of life insurance industry in India by using time series data with regression analysis. The study finds that the savings to GDP ratio, banking sector development, expenditure on social security to GDP, gross enrolment ratio and life expectancy are most significant and positive factors in driving the life insurance business during the study period..

I. INTRODUCTION

The sustainable economic growth is strongly influenced by institutional framework and insurance development of respective economy (Dragos el al, 2017). The developed insurance market encourages economic growth of a nation, level of economic growth affects insurance business development in return (Burić et al, 2017). Insurance policies channel the savings of households into capital market and into the real sectors of the economy, enabling economic development and growth (Mathew &Sivaraman, 2017). Numerous theoretical frameworks and models were developed to analyse the impact on economic development on life insurance industry. Several existing empirical studies analyzed economic, demographic and institutional factors that determine life insurance demand. These studies revealed that the various demographic and socio-economic relative indicators are responsible for growth of life insurance industry (Ganesh, 2018).

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* Correspondence Author
Dr. V. V. N. Reddy, Associate Professor, School of Management Studies, LakireddyBalireddy College of Engineering, Mylavaram-521230,Andhra Pradesh, India
S. M. Reddy, Post-Doctoral Fellow, Department of Economics, Andhra University, Visakhapatnam – 530 003, Andhra Pradesh, India
P. A. Naidu, Research Scholar, Department of Economics, Andhra University, Visakhapatnam – 530 003, Andhra Pradesh, India

The growth of insurance market constituting an important part of overall financial sector, it may significantly affect stability of the nation's financial system (Faugere, 2003). It is one of key factors to an economy's development due to its many advantages. The main benefit of insurance is its usefulness in promoting long-term financial stability and security of individuals and businesses (Akinlo&Apanisile, 2014). India is not an exception for this; insurance sector has played a key role for the development of economy of India (Bhatia & Jain, 2018).

Regulatory changes commenced since mid-nineties for opening up of insurance markets to private and foreign insurers. The reforms in insurance sector commenced after the setting up of the Committee on 'Reforms on Life and General Insurance' under the chairman-ship of Dr. R. N. Malhotra. In the year 1994 the committee was submitted recommendations which was accepted ad started implementing from December 1999, which indicates the liberalization in Indian insurance industry(GoI, 1994). The establishment of Insurance Regulatory and Development Authority (IRDA) and allowing investors from foreign, helps to increase up to 26 per cent were the initial achievement in this regards.

It is witnessed that the liberalization in insurance sector helped in developing insurance business effectively by minimizing the operational costs and increasing the productivity.

High Competition is acknowledged to bring a more choice of insurance, with greater coverage of population at economy price to the consumers, effective service to customers, advanced information technology, good returns to the policy holders and so on (Mitra&Ghosh, 2010). In this juncture, the study focuses on an examination of the role of a macroeconomic environment in the growth of Indian Life Insurance Sector.

II METHODOLOGY

To test the effect of the mentioned variables on life insurance demand in India, measured by density, penetration, first year premium amount and total life insurance fund etc, we confined to Multiple Regression Log-linear Model. According to Ghosh (2013) the most common specification in the studies of the determinants of life insurance demand is the log-linear form used by Kakar and Shukla (2010), Mitra&Ghosh (2010), Sen (2008), Sadhak (2006) and Beck and Webb (2003).

The Logarithmic transformation technique allows us to forecast, the volatilities of demand for life insurance. Thus, we can estimate the elasticity in the demand in view to a change in the independent variable. The estimated co-efficient of the corresponding independent variable (Zerriaa et al, 2017). Accordingly, the specification of the models is as follows

$$\ln LID_t = \alpha + \beta_1 \ln ODR_t + \beta_2 \ln YDR_t + \beta_3 \ln LE_t + \beta_4 \ln GER_t + \beta_5 \ln UD_t + \beta_6 \ln PCI_t + \beta_7 \ln PDI_t + \beta_8 \ln SR_t + \beta_9 \ln INF_t + \beta_{10} \ln BSD_t + \beta_{11} \ln IR_t + \beta_{12} \ln SS_t + \varepsilon_t \text{---} (1)$$

$$\ln LIP_t = \alpha + \beta_1 \ln ODR_t + \beta_2 \ln YDR_t + \beta_3 \ln LE_t + \beta_4 \ln GER_t + \beta_5 \ln UD_t + \beta_6 \ln PCI_t + \beta_7 \ln PDI_t + \beta_8 \ln SR_t + \beta_9 \ln INF_t + \beta_{10} \ln BSD_t + \beta_{11} \ln IR_t + \beta_{12} \ln SS_t + \varepsilon_t \text{---} (2)$$

$$\ln LIPM_t = \alpha + \beta_1 \ln ODR_t + \beta_2 \ln YDR_t + \beta_3 \ln LE_t + \beta_4 \ln GER_t + \beta_5 \ln UD_t + \beta_6 \ln PCI_t + \beta_7 \ln PDI_t + \beta_8 \ln SR_t + \beta_9 \ln INF_t + \beta_{10} \ln BSD_t + \beta_{11} \ln IR_t + \beta_{12} \ln SS_t + \varepsilon_t \text{---} (3)$$

$$\ln LIF_t = \alpha + \beta_1 \ln ODR_t + \beta_2 \ln YDR_t + \beta_3 \ln LE_t + \beta_4 \ln GER_t + \beta_5 \ln UD_t + \beta_6 \ln PCI_t + \beta_7 \ln PDI_t + \beta_8 \ln SR_t + \beta_9 \ln INF_t + \beta_{10} \ln BSD_t + \beta_{11} \ln IR_t + \beta_{12} \ln SS_t + \varepsilon_t \text{---} (4)$$

Where

Dependent Variable

LID : Life Insurance Density
LIP : Life Insurance Penetration
LIPM : Life Insurance Premiums
LIF : Life Insurance Fund

Independent Variables

ODR : Old Dependency Ratio
YDR : Younger Dependency Ratio
LE : Life Expectancy
GER : Gross Enrolment Ratio
UD : Urban population
PCI : GDP Per Capita
PDI : Personal Disposable Income
SR : Savings Rate
INF : Inflation rate (Wholesale price index)
BSD : Banking Sector Development
IR : Interest Rate
SS : Social Security

The natural logarithm is explained by *In*, 't' refers to time period in years, and error term is denoted by ε_t. β_1 to β_{12} are the coefficients to estimate from stepwise multiple regression with backward method.

The study examines the impact of various economic variables on growth of life insurance industry. It can be estimated by using time series data with regression analysis. The primary basis of regression analysis is an assumption of a proportionate relationship between the dependent and independent variables. The equation for given straight line is (Hair et al, 2006).

$Y = \alpha + \beta X + \mu$

Y - Dependent variable

α - Intercept (when X=0, the straight line intersect Y and X)

β- Slope (change in Y for every / vast changes in X)

X- Independent variable used to predict Y.

μ- Error of the prediction.

The Stepwise Regression Model with Backward Method was employed in order to evaluate the impact of macro-economic variables on growth of life insurance.

The specified empirical analysis is carried out using annual data for the period 2000-01 to 2015-16. The secondary data has been collected for the study is span of 15 years from 2000-01 to 2015-16. Hence, the study captures the effects of financial liberalization after one and half decade execution of reforms. The detailed information regarding variables along with data sources is presented in Table – 1

Table – 1: Description of Dependent and Independent Variables during 2000-01 to 2015-16

No	Type of variable	Variable name	Acronym	Constant/ current	Base year	Unit of measurement	Source
1	Dependent	Life Insurance Density	LID	NA	NA	In US $	IRDA
2	Dependent	Life Insurance Penetration	LIP	NA	NA	In per cent	IRDA
3	Dependent	Life Insurance Premiums	LIPM	NA	NA	Rs. in crores	IRDA
4	Dependent	Life Insurance Fund	LIF	NA	NA	Rs. in crores	IRDA
5	Independent	Old Dependency Ratio	ODR	NA	NA	In ratio	World Bank Indicators
6	Independent	Younger Dependency Ratio	YDR	NA	NA	In ratio	World Bank Indicators
7	Independent	Life Expectancy	LE	NA	NA	In years	World Bank Indicators
8	Independent	Gross Enrolment Ratio	GER	NA	NA	In ratio	Central Statistics Office
9	Independent	Urban population	UD	NA	NA	in billions	World Bank Indicators
10	Independent	GDP Per Capita	PCI	constant	2011-12	In lakh rupees	Central Statistics Office

11	Independent	Personal Disposable Income	PDI	constant	2011-12	In rupees	Reserve Bank of India
12	Independent	Savings Rate	SR	constant	2011-12	In billion rupees	Central Statistics Office
13	Independent	Inflation rate (Wholesale price index)	INF	NA	NA	index	Reserve Bank of India
14	Independent	Banking Sector Development	BSD	constant	2011-12	In ratio	Reserve Bank of India
15	Independent	Interest Rate	IR	NA	NA	Per cent	Reserve Bank of India
16	Independent	Social Security	SS	NA	NA	In ratio	Reserve Bank of India

III RESULTS AND DISCUSSION

Table – 2 explains the statistics of various regression variables. The averages for GDP per capita and life insurance penetration are Rs. 1.51 lakh and Rs. 1.93 lakh respectively

Table - 2: Summary Statistics of Dependent and Independent Variables during 2000-01 to 2015-16

Type of variable	*Variable name*	*N*	*Mean*	*Std. Deviation*	*Minimum*	*Maximum*
Dependent	Insurance Density	16	32.04	16.52	7.00	55.70
	Insurance Penetration	16	3.08	0.90	1.75	4.60
	Total Premium	16	193187.69	112559.26	34898.00	341903.00
	Life Funds	16	719347.04	474711.21	194009.60	1697452.9
Independent	Old Dependency Ratio	16	7.95	0.42	7.33	8.80
	Young Dependency Ratio	16	49.51	4.25	42.72	56.23
	Life expectancy	16	65.92	1.83	62.98	68.56
	Gross Enrolment Ratio	16	15.09	6.25	5.70	24.50
	Urbanization	16	30.45	1.65	27.92	33.14
	GDP per capita	16	1.51	3.32	0.50	1.69
	Personal Disposable Income	16	57572.07	41123.10	18314.92	139353.39
	Savings Rate	16	30.04	4.00	23.70	36.80
	Inflation rate	16	136.17	27.50	104.47	187.30
	Banking sector development	16	71.84	25.92	36.19	110.74
	Interest rate	16	6.86	1.20	6.00	9.00
	Social security	16	0.42	0.17	0.18	0.70

Source: Table – 1.13

Table - 3 displays the growth (Exponential) for the regression variables during 2000-01 to 2015-16. The growth of all dependent variables have found positive trend and statistically significant except insurance penetration during study period. The life insurance premium has growing at annual growth of 15.6 per cent followed by total life fund (14.6%), insurance density (12.8%) and insurance penetration (2.3%).

The growth of independent variables is showing positive trend and significant excluding young dependency ratio and inflation rate during 2000- 01 to 2015-16. The highest growth has observed in personal disposable income (14.5%) subsequently gross enrolment ratio (9.2%), social security (9.2%), banking sector development (8.0%) and GDP per capita (4.1%). The lowest growth has observed in savings rate (0.04%). Young dependency ratio and inflation rate are showing negative trend i.e., -1.8 per cent and -2.6 per cent respectively

Table - 3: Growth of Dependent and Independent Variables during 2000-01 to 2015-16

Type of variable	*Variable name*	*CV*	*GR*	*t-value*	*p-value*
Dependent	Insurance Density	51.57	12.8	7.051	0.000
	Insurance penetration	29.33	2.3	1.462	0.166
	Total Premium	58.26	15.6	11.920	0.000
	Life Funds	65.99	14.6	71.535	0.000
Independent	Old Dependency Ratio	5.33	1.10	26.190	0.000
	Young Dependency Ratio	8.59	-1.8	-71.192	0.000
	Life expectancy	2.78	0.06	58.338	0.000

	Gross Enrolment Ratio	**41.41**	**9.2**	**20.444**	**0.000**
	Urbanization	**5.41**	**1.1**	**653.863**	**0.000**
	GDP per capita	**28.89**	**4.1**	**2.601**	**0.021**
	Personal Disposable Income	**71.43**	**14.5**	**25.304**	**0.000**
	Savings Rate	**13.32**	**0.04**	**0.493**	**0.629**
	Inflation rate	**20.20**	**-2.6**	**-3.015**	**0.009**
	Banking sector development	**36.09**	**8.0**	**34.325**	**0.000**
	Interest rate	**17.51**	**2.1**	**2.820**	**0.014**
	Social security	**41.89**	**9.2**	**17.530**	**0.000**
Source: Table – 1.13					

IV REGRESSION RESULTS

The correlation matrix is presented in Table – 4 reflecting the correlation between dependent and independent variables, dependent and independent variables are highly correlated with one another. It means that the correlations between explanatory variables increase the risk of multi co-linearity that can give rise to specious results. Thus, the study engaged with stepwise regression analysis to deal with the problem. The independent and dependent variables can be retained in by this model as suitable for study (Gujarati, 2003). The study focused on backward hierarchical selection procedure, contains all the explanatory variables with given specification and then rejecting the variables one at a time.

V DETERMINANTS OF LIFE INSURANCE DENSITY

Table – 5 presents the results of the stepwise regression for the determinants of life insurance density in India. The results in Table show that the variation of life insurance density positively and significantly depends on savings and public expenditure on social security to GDP. The saving rate and public expenditure on social security have a positive and significant influence on life insurance density. The results suggest that a 1% increase in saving rate and public expenditure on social security is associated with an increase of about 2.7 per cent and 1.28 per cent in life insurance density respectively. In the case of economic variables, per capita GDP, interest rate and banking sector development income are positively related to life insurance density. This implies that, as income and banking servers of economy increases, life insurance becomes more affordable but not significant. Among the demographic factors, older dependency ratio and gross enrolment ratio have correlated positively with life insurance density and suggest that an increase in these two factors is accompanying with an increase in density. Based on findings, it can infer that the relationship between personal disposable income and life insurance density is inverse and significant. This means that the higher the yearly change in personal disposable income, the slower the growth of 1.17 per cent in insurance density. Similarly, statistically significant and negative, but on a much smaller scale, is the influence of inflation on life insurance density. With growing rates of inflation, the growth of life insurance density slowed by 0.33 percent. Among the demographic factors, life expectancy has correlated negatively with life insurance density and suggests that an increase in this factor is accompanying with a decrease in density. From Results, it can be seen that the R-square of all steps of the model shows that greater than 90.0 per cent of variations in dependent variable (life insurance density) are explained by the variations in the independent variables included in the model. For overall significance of the model, analysis of variance approach is used and the calculated f- values are significant and indicating that overall model was statistically significant.

VI DETERMINANTS OF LIFE INSURANCE PENETRATION

Table – 6 presents the results of the stepwise regression for the determinants of life insurance penetration in India. As it can be observed in the Table, savings to GDP, banking sector development and expenditure on social security to GDP have a positive and significant impact on life insurance penetration. The growth 1 per cent in savings to GDP, banking sector development and expenditure leads to upswing in insurance penetration by 1.6 per cent, 2.0 per cent and 0.3 per cent respectively. The results show that the variation of life insurance penetration explained by variation in gross enrolment ratio. This implies that the higher level of enrolment contributes to the higher level of life insurance penetration. On the other hand, the specified model has shown that life expectancy has a significant and negative impact on life insurance penetration. Higher the life expectancy leads to the drop in life insurance penetration and indicate that a 1 per cent increase in life expectancy decreases life insurance penetration by 36.0 per cent. Among the economic factors, personal disposable income, per capita GDP, inflation and interest rate have found a negative relationship. Similarly, older dependency ratio has negatively correlated with life insurance penetration. The values of adjusted R^2 for all stages are greater than 0.80 reveals that the model is explaining >80% of variation in the dependent variable (life insurance penetration) by all the independent variables taken together. For overall significance of the model, analysis of variance approach is used and the estimated f- value for all steps are significant ($p<0.01$) and indicating that overall model was statistically significant.

VII DETERMINANTS OF LIFE INSURANCE PREMIUMS

Table – 7 presents the results of the stepwise regression for the determinants of life insurance premiums in India. The results in Table show that the variation of life insurance premium significantly and positively depends on savings and public expenditure on social security to GDP. The saving rate and public expenditure on social security have a positive and significant influence on life insurance premium.

The results suggest that a 1% increase in saving rate and public expenditure on social security is associated with an increase of about 1.03 per cent and 0.44 per cent in life insurance premium respectively. In the case of economic variables, per capita GDP and banking sector development are positively related to premium. This implies that, as income and financial depth of economy increases, life insurance industry earn more but not significant. Among the demographic factors, older dependency ratio and gross enrolment ratio have correlated positively with life insurance density and suggest that an increase in these two factors supplement the life insurance premium. Based on findings, it can infer that the relationship between personal disposable income and life insurance premium is inverse and significant. This means that the higher the yearly change in personal disposable income, the slower the growth of 0.24 per cent in insurance premium. Similarly, statistically significant and negative, but on a much smaller scale, is the influence of inflation on premium amount. With growing rate of inflation, the growth of life insurance premium slowed by 0.15 percent. Among the demographic factors, life expectancy has correlated negatively with life insurance premium and suggests that an increase in this factor is accompanying with a decrease in premium amount. Among the economic factors, interest rate has found negatively with life insurance premium. This means that the higher rates on other saving alternatives would affect insurances premiums adversely. From Results, it can be seen that the R-square of all steps of the model shows that greater than 90.0 per cent of variations in dependent variable (life insurance premium) are explained by the variations in the independent variables included in the model. For overall significance of the model, analysis of variance approach is used and the calculated f-values are significant and indicating that overall model was statistically significant.

VIII DETERMINANTS OF TOTAL LIFE INSURANCE FUND

The results extracting from specified model are presented in Table – 8 and provide information on determinants of life insurance fund in India during 2000-01 to 2015-16.The result shows that life insurance funds, among explanatory variables three variables i.e., life expectancy, per capita GDP and personal disposable income have positive and significant influence on life insurance funds. The results suggest that a 1% increase in life expectancy, per capita GDP and personal disposable income is associated with an increase of 15.5%, 0.70% and 0.19% in life insurance funds respectively. Similarly, older dependency ratio, inflation and public expenditure on social security also have positive influence on insurance funds but not significant. The coefficient of gross enrolment ratio and banking sector development are negatively determines the

life insurance funds at significant level. So 1% increase in gross enrolment ratio and banking services would reduce life insurance funds by 0.12% and 0.58%. As per results, savings to GDP and real interest rate are inversely related with life insurance funds but not significant. The values of adjusted R^2 for all stages are greater than 0.90 reveals that the model is explaining >90% of variation in the dependent variable (total life insurance funds) by all the independent variables taken together. For overall significance of the model, analysis of variance approach is used and the estimated f- value for all steps are significant ($p<0.01$) and indicating that overall model was statistically significant

Table – 4 : Correlation Matrix

	LID	LIP	LIPM	LIF	ODPR	YDPR	LE	GER	UD	PCI	PDI	SRP	INF	BDS	RIR	SSE
LID	1															
LIP	.746**	1														
LIPM	.981**	.619*	1													
LIF	.886**	.371	.956**	1												
ODPR	.826**	.259	.912**	.986**	1											
YDPR	-.858**	-.321	-.937**	-.997**	-.995**	1										
LE	.908**	.421	.969**	.997**	.979**	-.993**	1									
GER	.898**	.429	.957**	.981**	.965**	-.979**	.987**	1								
UD	.883**	.366	.954**	.999**	.990**	-.999**	.998**	.983**	1							
PCI	.835**	.809**	.756**	.585*	.493	-.531*	.610*	.625**	.570*	1						
PDI	.819**	.270	.910**	.987**	.987**	-.994**	.982**	.965**	.989**	.457	1					
SRP	.522*	.795**	.386	.147	.038	-.085	.182	.195	.132	.855**	.003	1				
INF	-.594*	-.314	-.639**	-.619*	-.624**	.620*	-.626**	-.593*	-.628**	-.425	-.616*	-.230	1			
BDS	.919**	.453	.975**	.993**	.970**	-.988**	.998**	.984**	.994**	.618*	.977**	.194	-.626**	1		
RIR	.309	-.146	.430	.588*	.589*	-.610*	.577*	.573*	.587*	-.063	.677**	-.391	-.289	.573*	1	
SSE	.902**	.418	.963**	.993**	.975**	-.990**	.996**	.980**	.994**	.576*	.983**	.139	-.594*	.997**	.591*	1

**. Correlation is significant at the 0.01 level.
*. Correlation is significant at the 0.05 level.

Table –5 : Determinants of Life Insurance Density – Backward Stepwise Regression Results

Eq. No-1	α	YDPR	UD	PCI	IR	ODPR	BSD	GER	LE	PDI	SR	INF	SS	R^2	$\bar{R}^2$	F	p(F)
Step-1	204.936 (0.422)	n.i	n.i	0.061 (0.889)	0.078 (0.867)	4.232 (0.652)	2.001 (0.553)	0.194 (0.684)	-53.433 (0.442)	-0.708 (0.473)	3.975 (0.234)	-0.275 (0.363)	1.359 (0.124)	0.992	0.975	58.529	0.000
Step-2	202.159 (0.381)	n.i	n.i	n.i	0.077 (0.856)	4.331 (0.610)	2.047 (0.502)	0.212 (0.613)	-52.810 (0.401)	-0.743 (0.391)	4.170 (0.133)	-0.270 (0.321)	1.348 (0.091)	0.991	0.979	77.700	0.000
Step-3	190.390 (0.349)	n.i	n.i	n.i	n.i	3.368 (0.578)	1.927 (0.482)	0.218 (0.571)	-49.437 (0.370)	-0.687 (0.356)	4.042 (0.101)	-0.267 (0.286)	1.319 (0.066)	0.991	0.982	10.1.37	0.000
Step-4	98.605 (0.359)	n.i	n.i	n.i	n.i	n.i	0.955 (0.629)	0.192 (0.596)	-24.019 (0.390)	-0.871 (0.180)	3.255 (0.075)	-0.323 (0.147)	1.295 (0.055)	0.991	0.983	126.23	0.000
Step-5	88.659 (0.376)	n.i	n.i	n.i	n.i	n.i	n.i	0.210 (0.543)	-21.147 (0.414)	-0.832 (0.173)	3.577 (0.030)	-0.367 (0.064)	1.523 (0.002)	0.991	0.985	160.59	0.000
Step-6	60.760 (0.475)	n.i	n.i	n.i	n.i	n.i	n.i	n.i	-14.176 (0.523)	-0.869 (0.140)	3.483 (0.027)	-0.336 (0.064)	1.455 (0.001)	0.990	0.986	204.97	0.000
Step-7	6.690 (0.074)	n.i	n.i	n.i	n.i	n.i	n.i	n.i	n.i	-1.171 (0.002)	2.701 (0.001)	-0.336 (0.054)	1.285 (0.000)	0.990	0.986	269.87	0.000

Note: Figures in the parentheses p-values.
p< 0.10 = significant at 10% level, p < 0.05 = significant at 5% level & p < 0.01 = significant at 1% level.

Table –6 : Determinants of Life Insurance Penetration – Backward Stepwise Regression Results

Eq. No-2	α	YDPR	UD	PDI	PCI	ODPR	IR	INF	GER	LE	SR	BSD	SS	R^2	$\bar{R}^2$	F	p(F)
Step-1	105.768 (0.404)	n.i	n.i	-0.107 (0.822)	-0.076 (0.728)	-2.289 (0.623)	-0.123 (0.601)	-0.095 (0.516)	0.254 (0.306)	-25.909 (0.451)	1.352 (0.396)	1.312 (0.438)	0.339 (0.396)	0.941	0.822	7.911	0.017
Step-2	120.843 (0.224)	n.i	n.i	n.i	-0.063 (0.742)	-2.216 (0.600)	-0.141 (0.485)	-0.087 (0.500)	0.259 (0.250)	-29.944 (0.268)	1.524 (0.237)	1.339 (0.385)	0.359 (0.312)	0.940	0.850	10.425	0.005
Step-3	118.411 (0.197)	n.i	n.i	n.i	n.i	-2.352 (0.547)	-0.132 (0.476)	-0.096 (0.413)	0.238 (0.231)	-29.159 (0.242)	1.245 (0.154)	1.279 (0.367)	0.364 (0.269)	0.939	0.869	13.399	0.001
Step-4	165.510 (0.002)	n.i	n.i	n.i	n.i	n.i	-0.052 (0.667)	-0.077 (0.472)	0.240 (0.206)	-42.340 (0.001)	1.656 (0.004)	1.799 (0.109)	0.399 (0.203)	0.935	0.879	16.495	0.000
Step-5	164.803 (0.001)	n.i	n.i	n.i	n.i	n.i	n.i	-0.086 (0.393)	0.236 (0.190)	-42.133 (0.001)	1.771 (0.000)	1.660 (0.100)	0.438 (0.127)	0.934	0.889	21.085	0.000
Step-6	157.353 (0.001)	n.i	n.i	n.i	n.i	n.i	n.i	n.i	0.187 (0.257)	-40.582 (0.001)	1.665 (0.000)	2.038 (0.028)	0.292 (0.178)	0.928	0.891	24.638	0.000
Step-7	139.244 (0.001)	n.i	n.i	n.i	n.i	n.i	n.i	n.i	n.i	-36.053 (0.001)	1.681 (0.000)	1.966 (0.033)	0.276 (0.206)	0.917	0.887	30.447	0.000

Note: Figures in the parentheses p-values.
p< 0.10 = significant at 10% level, p < 0.05 = significant at 5% level & p < 0.01 = significant at 1% level.

Table – 7 : Determinants of Life Insurance Premium – Backward Stepwise Regression Results

Eq. No - 3	α	YDP R	U D	ODPR	IR	BSD	LE	PCI	GER	PDI	SR	INF	SS	R^2	$\overline{R}^2$	F	p(F)
Step -1	30.720 (0.640)	n.i	n.i	0.313 (0.898)	-0.023 (0.854)	0.314 (0.721)	-6.893 (0.699)	0.039 (0.735)	0.062 (0.625)	-0.165 (0.522)	0.965 (0.268)	-0.142 (0.107)	0.414 (0.086)	0.99 8	0.99 3	205.2 8	0.00 0
Step -2	24.174 (0.513)	n.i	n.i	n.i	-0.033 (0.708)	0.244 (0.694)	-5.062 (0.598)	0.040 (0.700)	0.061 (0.595)	-0.168 (0.473)	0.901 (0.159)	-0.145 (0.062)	0.409 (0.057)	0.99 8	0.99 4	272.7 2	0.00 0
Step -3	18.377 (0.553)	n.i	n.i	n.i	n.i	0.176 (0.750)	-3.496 (0.662)	0.044 (0.650)	0.054 (0.607)	-0.211 (0.272)	0.850 (0.140)	-0.153 (0.029)	0.419 (0.036)	0.99 7	0.99 5	348.9 5	0.00 0
Step -4	16.668 (0.560)	n.i	n.i	n.i	n.i	n.i	-2.998 (0.683)	0.045 (0.619)	0.057 (0.563)	-0.203 (0.255)	0.905 (0.082)	-0.161 (0.010)	0.461 (0.001)	0.99 7	0.99 5	448.7 0	0.00 0
Step -5	5.088 (0.001)	n.i	n.i	n.i	n.i	n.i	n.i	0.034 (0.679)	0.043 (0.619)	-0.260 (0.019)	0.810 (0.060)	-0.158 (0.006)	0.428 (0.000)	0.99 7	0.99 6	575.9 9	0.00 0
Step -6	4.992 (0.001)	n.i	n.i	n.i	n.i	n.i	n.i	n.i	0.058 (0.455)	-0.269 (0.010)	0.946 (0.001)	-0.158 (0.004)	0.433 (0.000)	0.99 7	0.99 6	752.6 8	0.00 0
Step -7	4.632 (0.000)	n.i	n.i	n.i	n.i	n.i	n.i	n.i	n.i	-0.238 (0.008)	1.026 (0.000)	-0.149 (0.004)	0.438 (0.000)	0.99 7	0.99 6	975.7 7	0.00 0

Note: Figures in the parentheses p-values.
p< 0.10 = significant at 10% level, p < 0.05 = significant at 5% level & p < 0.01 = significant at 1% level.

Table – 8: Determinants of life insurance Fund – Backward Stepwise Regression Results

Eq. No - 4	α	YDP R	U D	SS	ODPR	SR	IR	INF	LE	GER	PCI	PDI	BSD	R^2	$\overline{R}^2$	F	p(F)
Step -1	- 48.298 (0.168)	n.i	n.i	0.018 (0.859)	0.269 (0.821)	-0.107 (0.788)	-0.022 (0.710)	0.034 (0.382)	12.71 2 (0.181)	-0.136 (0.064)	0.114 (0.085)	0.232 (0.104)	-0.521 (0.253)	0.99 9	0.99 8	696.88	0.00 0
Step -2	- 50.052 (0.104)	n.i	n.i	n.i	0.229 (0.829)	-0.137 (0.674)	-0.025 (0.641)	0.037 (0.247)	13.15 9 (0.116)	-0.139 (0.036)	0.113 (0.058)	0.226 (0.072)	-0.485 (0.184)	0.99 9	0.99 8	922.69	0.00 0
Step -3	- 54.658 (0.009)	n.i	n.i	n.i	n.i	-0.180 (0.464)	-0.032 (0.420)	0.034 (0.201)	14.45 6 (0.009)	-0.139 (0.023)	0.114 (0.038)	0.226 (0.052)	-0.545 (0.013)	0.99 9	0.99 8	1200.8 4	0.00 0
Step -4	- 50.343 (0.006)	n.i	n.i	n.i	n.i	n.i	-0.041 (0.263)	0.042 (0.081)	13.24 2 (0.006)	-0.131 (0.021)	0.093 (0.027)	0.266 (0.010)	-0.526 (0.011)	0.99 9	0.99 9	1444.4 8	0.00 0
Step -5	- 57.280 (0.002)	n.i	n.i	n.i	n.i	n.i	n.i	0.038 (0.111)	15.06 1 (0.001)	-0.139 (0.015)	0.086 (0.035)	0.220 (0.013)	-0.576 (0.005)	0.99 9	0.99 8	1604.2 9	0.00 0
Step -6	- 58.746 (0.002)	n.i	n.i	n.i	n.i	n.i	n.i	n.i	15.53 8 (0.002)	-0.118 (0.037)	0.069 (0.089)	0.189 (0.032)	-0.581 (0.008)	0.99 9	0.99 8	1588.5 6	0.00 0

Note: Figures in the parentheses p-values.
p< 0.10 = significant at 10% level, p < 0.05 = significant at 5% level & p < 0.01 = significant at 1% level.

IX CONCLUSION

The regression results show that the economic variables like per capita GDP, interest rate and banking sector development and income were positively related to life insurance density. Among the demographic factors, older dependency ratio and gross enrolment ratio have correlated positively with life insurance. From the study, it can be observed that savings to GDP, banking sector development and expenditure on social security to GDP have a positive and significant impact on life insurance penetration. The variation of life insurance penetration explained by gross enrolment ratio but not significant. On the other hand, life expectancy has a significant and negative impact on life insurance penetration.

The variation of life insurance premium significantly and positively depends on savings and public expenditure on social security to GDP. The saving rate and public expenditure on social security have a positive and significant influence on life insurance premium. In the case of economic variables, per capita GDP and banking sector development are positively related to premium. Among the demographic factors, older dependency ratio and gross enrolment ratio have correlated positively with life insurance density and suggest that an increase in these two factors supplement the life insurance premium. The regression results for life insurance funds, among explanatory variables three variables i.e., life expectancy, per capita GDP and personal disposable income have positive and significant influence on life insurance funds. Similarly, older dependency ratio, inflation and public expenditure on social security also have positive influence on insurance funds but not significant. The coefficient of gross enrolment ratio and banking sector development are negatively determines the life insurance funds at significant level. As per results, savings to GDP and real interest rate are inversely related with life insurance funds but not significant.

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ABOUT AUTHORS:

Dr.V.V.N.Reddy is a post graduate in management studies.He had Ph.D from Acharya Nagarjuna University, Guntur, Andhra Pradesh,India. Currently working as a Associate professor in the School of management studies, Lakireddy Balireddy College of Engineering, Mylavaram, Krishna Dist, Aandhra Pradesh-521230,India. He is an eminent teacher with 25 years experience at Graduate and Post graduate level. In addition he contributed Twelve research papers in national and international conferences besides participated in 28 workshops and FDPs conducted by various institutions of repute in the country. He also is serving as a member in Professional bodies like ISRD and IAENG. Dr.V.V.N.Reddy is a prolific writer and published a text book titled " Human Resource Development an in depth study" .Published Ten chapters in various ISBN indexed books and also Published Dozen research articles in referred journals of National and International standard. His interested areas are Marketing, Human Resource Management and Business Environment ..

Dr. S.M.Reddy has obtained Ph.D. in Economics from Andhra University. He is currently working as Post-Doctoral Fellow in Andhra University. His teaching areas are Macro Economics, Financial Economics and specialized in Economics of Insurance. He has published research papers in various national and international refereed journals.

Peela Appala naidu is a Research Scholar in Department of Economics, Andhra University, Visakhapatnam. He graduated from Andhra University with B.A. and M.A. Degrees. He published research papers in various journals and participated at different conferences/seminars.