



Do The Giants in Public Sector General Insurance Differ in Efficiency? **Evidence From Data Envelopment Analysis**

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Abstract

Insurance sector in India plays a vital role in the welfare of any economy. It significantly increases the prospects for savings amongst the individuals and safeguards their future. Through which insurance sector form a massive pool of funds which can be highly subsidized to the capital markets resulting large infrastructure developments in India. During liberalization the insurance sector had undergone significant transformation. The globalization brought new investments from global investors which resulted in better penetration and density. It also paved way for the establishment of Insurance Regulatory and Development Authority of India (IRDAI) during 1999 to regulate the insurance industry in India. Further, the insurance sector was opened to private players. Consequently a sound insurance sector with healthy competition emerged. This benefitted the general public with the availability of variety of policies at affordable cost. However, the entry of many private players in industry resulted in underwriting losses for Indian public and private insurers. Against this backdrop, present paper focused to study the technical efficiency and scale efficiency of Public Sector General Insurance India using Data Envelopment Analysis. Since general insurance is made available to all informally this study focused on measuring the efficiency of insurers' state wise and Union Territory wise. DEA accepts the variables as inputs and outputs, Number of Claims settled, Amount of Claims settled and No of Policies issued are considered as inputs and Number of Persons Covered and Gross Direct Premium were taken as output. The findings show that Mizoram, Nagaland and Sikkim are



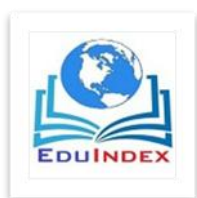
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most efficient in terms of Technical and Scale Efficiency meaning their scale of operation and management of resources were far better than their counterparts. Out of the Union Territories, Andaman Nicobar and Lakshadweep are proved their efficiency in operation.

Keywords: Liberalization, Public Sector, General Insurance, Technical Efficiency, Scale Efficiency

Introduction

In the history of the Indian insurance sector, a decade back LIC was the only life insurance provider. On the other hand, public sector companies like the National Insurance, United India Insurance, Oriental Insurance and New India Assurance provided non-life insurance in India. However, with the introduction of new private sector companies, the insurance sector in India gained a momentum in the year 2000. At present, there are 24 life insurance companies and 33 non-life insurance companies which are aggressive enough to rule the insurance sector in India (IBEF, 2019). A landmark was achieved when the nation decided to privatize the industry along with essential policies. The industry served under a monopoly for several spans thereafter. However, other problems emerged such as limited reach and dissemination of enterprise and diminishing servicing standards. Indian insurance industry was liberalized in 2001. The biggest insurance companies entered into India after 2001 which have taken tactical view on India being one of the opt most emerging markets. FDI in insurance continues a widely disputed and frenzied issue in India's economic and political ecosystem. Changes in the regulatory atmosphere had path-breaking impact on the development of the industry. While the insurance industry still strives to move out of the shades cast by the challenges and ambiguities of the last few years, the strong fundamentals of the industry predict well for a roadmap to be drawn for sustainable long-term growth. At this back drop, this paper aims to measure the Technical Efficiency & Scale Efficiency of non-life insurers'. This article is framed with following sections, section 2 presents



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the review of previous studies, section 3 describes the data and methodology, section 4 presents the analysis and interpretation and finally conclusion and discussion.

Review of Literature

The efficiency measurement for the fiscal sector is one of the most promptly growing literatures in the market. A number of efficiency studies for the insurance sector, in particular, have been conducted and primarily employed two different approaches, namely, the parametric and non-parametric approach. There are a number of studies measuring the efficiency of the insurance industry at a country level. The following are some of the literatures reviewed for the present study.

- Jaiyeoba Haruna Babatundea, (2015) Have made an attempt to find out the technical efficiency of Nigerian Insurance Companies with the help of Data Envelopment Analysis and found that Nigerian Insurance industry is less efficient due to low level of technical efficiency and this is also confirmed by Latent Growth Curve Modeling. They also found that some of the leading insurance companies are doing well in terms of performance especially lead way insurance company.
- Pakira, (2015) was found that the empirical results of descriptive analysis reveal that public sector non-life insurer is pleasing when compared to private sector non-life insurer. However in terms of management of growth performance of private sector is better in few variables like Net direct premium, Commission, Expenses of Management, Net profit after tax etc. this was due to lower variability in the above said variable.
- Sangeetha , (2013) it was found that there is a difference in the performance of both public and private insurers in India during the study period. It was measured by using seven parameters like Growth in number of officer, Growth in number of individual agents, Average number of individual policies sold by individual agents, Average individual new business premium by individual agents, Growth in number of corporate



agents working life insurance, Average number of individual policies sold by corporate agents and Average individual new business premium by corporate agents.

- T. Chandrashekara., (2017) Had found that the general insurance companies failed to control the risk in terms of incurred claims. But there is a significant increase in the ratio of premium which shows there is always a need for increasing premium income so that the incurred claims can be controlled to sustain in the performance.
- Chakraborty, (2016) have used CARMEL model to analyse the financial efficiency of general insurance in India and they found that United India Insurance company performed well in the study period. He also found that liquidity ratios were increasing but there is a serious issue in terms of claims, NPAs and operating expenses. The insurance companies need to take steps to reduce these costs are determinant for the profitability in the long run.
- Jerene, (2016) analyzed the panel data (cross sectional and time series) using Fixed Effect Model (FEM) and found that the capital adequacy and GDP positively affecting the profit and inflation & liquidity negatively affecting the profit.
- Teklit Atsbeha Berhe, (2017) it was found that the size of the insurance, capital adequacy, liquidity ratio and growth rate of GDP were major determinants that influence the profitability of the insurance companies. On the other hand leverage ratio, loss ratio, market share and inflation rate were found insignificant in measuring the profitability of the Insurance Companies.
- Mathew & Sangeetha, (2013) it was mentioned that 40 % to 50% of public sector banks were performed below the mean score efficiency during the study period. It was also found that out of 26 public sector banks which are considered for the study, Corporation Bank, State bank of India and IDBI performed 100% efficiently.
- Bawa, (2013) have analyzed the financial performance of life insurers after considering financial ratios in respect of liquidity, profitability. Leverage and solvency. The study



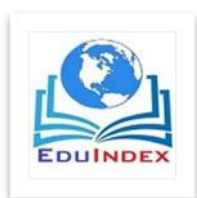
also used multiple linear regression models to measure the extent to which these parameters affect the financial stability. He found that profitability of life insurers is influenced by liquidity and size and negatively related to capital. But the profitability of life insurers will not show any relationship with solvency and insurance leverage.

- Singh, (2011) analyzed the overall performance of life insurance industry between pre and post reform era. Data analyzed using T test and Anova. They found that there is a tremendous growth in the performance of Indian life insurance industry and LIC due to the policy of LPG. It also observed that the industry is improved due to the emergence of private sector and foreign players. There is an increasing trend towards the investment in stock market by LIC from 60% to 93% from 1980 to 2009 due to the effective regulation of SEBI and increasing transparency of stock market.
- Sinha, (2017) they have evaluated the potential gains from merger of public sector General Insurance companies using Data Envelopment Analysis for the years 2012-13 and 2013-14. They found that the overall potential gain from the merger is negative for both years due to strong negative scale effect. They calculated overall efficiency gains and decomposes the same into learning, scale and scope effects.

Based on the above reviews it is identified that, the technical and scale efficiency of state wise performance is not studied so far. So this paper is focusing on state wise performance with special reference to the variables like Number of Claims settled, Amount of claims settled, No of Policies issued and Number of Persons Covered and Gross Direct Premium.

Data and Methodology

Data for the study is collected from the Handbook of Insurance Statistics published by IRDA and the Descriptive statistics is used to check the relationship between the variables. Technical efficiency of Public sector insurers was analyzed using Data Envelopment Analysis. DEA



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Analysis and Interpretation

For the purpose of the analysis, Statewise Gross Direct Premium earned, Number of Claims settled, Amount of claims settled, No of Policies issued and Number of Persons Covered are taken for the year 2018-19.

TABLE 1.1 Performances of Public Sector Non-life Insurers State wise – Descriptive Statistics

S.No	Name of the State	Gross Direct Premium	No of claims settled	Amount of Claims settled	No of policies issued	No of Persons Covered
1	Andhra Pradesh	62454	113863	41591	378443	3413
2	Arunachal Pradesh	191	1944	806	561	612
3	Assam	9480	15471	4656	90577	396
4	Bihar	11193	29486	5774	101049	386
5	Chhattisgarh	50852	878124	40223	115802	20486
6	Goa	14325	70429	14296	29129	2620
7	Gujarat	213325	553085	171577	1823479	23011
8	Haryana	157126	394819	122611	590824	5875
9	Himachal Pradesh	2836	43644	3153	18728	1613
10	Jammu & Kashmir	3149	7000	1774	31277	79
11	Jharkhand	9197	34076	4787	71175	376
12	Karnataka	365422	1208721	335888	888818	38546
13	Kerala	121566	1017237	99006	812507	17602
14	Madhya Pradesh	50341	88578	27083	514151	1803
15	Maharashtra	1181235	4138053	1039009	3395588	150012



16	Manipur	374	379	67	2092	219
17	Meghalaya	6168	50612	6007	2025	755
18	Mizoram	1445	12142	634	239	2
19	Nagaland	253	36	16	704	21
20	Orissa	31347	351312	25416	143540	31936
21	Punjab	48704	136250	32149	332195	9386
22	Rajasthan	122588	1211044	86134	354169	34691
23	Sikkim	268	161	62	1644	8
24	Tamil Nadu	466874	1718871	364175	1128535	74129
25	Telangana	117227	241591	76251	464649	5519
26	Tripura	2048	3873	1663	12912	61
27	Uttar Pradesh	131579	321370	85385	783502	4684
28	Uttarakhand	14209	22578	8113	105266	426
29	West Bengal	189831	985749	148190	1129435	44019
30	Andaman & Nicobar Is.	140	185	60	968	3
31	Chandigarh	10979	72959	8917	43724	235
32	Dadra & Nagar Haveli	1123	5199	1574	4605	344
33	Daman & Diu	5267	34144	4421	29427	252
34	Delhi	297076	778245	261591	1309434	8361
35	Lakshadweep	169	719	262	105	36
36	Puducherry	2500	2787	1082	18478	68
	Total	3702863	14544736	3024404	14729756	481987
	Mean	102857.25	404020.44	84011.19	409159.89	13388.47
	Standard Deviation	216108.61	780433.46	188403.3	685326.73	28646.95

Table 1.1 describes Gross Direct Premium (GDP) collected in various States and Union Territories. From the table 1.2 it is understood that the mean GDP of all the states considered for the analysis is 1,02,857. The standard deviation depicts huge deviation from the mean due to minimum GDP of 140 in Andaman Nicobar and maximum of 11, 81,235 in Maharashtra. Overall Gross Direct Premium collected during 2017-18 is 37, 02,863.



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Out of the selected variables, Number of Claims Settled has high standard deviation i.e. 780433.46. The reason for the same may be huge deviation in minimum (36 in Nagaland) and maximum no of claims settled (4138053 in Maharashtra).

The main intention of this paper is to measure the efficiency of the states with regard to general insurance through four public sector insurance company. Hence Data Envelopment Analysis which is commonly used to measure the efficiency is used considering dependent variable (Gross Direct Premium) as output and independent variable (No of Policies issued, No of Persons covered, No of claims settled and the Amount of Claims) as input.

Table – 1.2 Technical Efficiency of Public Sector Insurers India

S.No	Name of the State	Technical Efficiency	Pure Technical Efficiency	Scale Efficiency	Scale
1	Andhra Pradesh	0.750	1.000	0.750	drs
2	Arunachal Pradesh	0.345	0.450	0.767	drs
3	Assam	0.641	1.000	0.641	drs
4	Bihar	0.666	1.000	0.666	drs
5	Chhattisgarh	0.414	0.996	0.416	drs
6	Goa	0.698	0.928	0.752	drs
7	Gujarat	0.469	0.996	0.471	drs
8	Haryana	0.985	1.000	0.985	drs
9	Himachal Pradesh	0.244	0.526	0.464	drs
10	Jammu & Kashmir	0.802	0.995	0.806	drs
11	Jharkhand	0.614	1.000	0.614	drs
12	Karnataka	0.779	1.000	0.779	drs
13	Kerala	0.346	0.821	0.422	drs
14	Madhya Pradesh	0.671	1.000	0.671	drs
15	Maharashtra	0.678	1.000	0.678	drs
16	Manipur	0.477	1.000	0.477	drs
17	Meghalaya	0.885	1.000	0.885	drs
18	Mizoram	1.000	1.000	1.000	-
19	Nagaland	1.000	1.000	1.000	-
20	Orissa	0.344	0.806	0.427	drs
21	Punjab	0.378	0.917	0.412	drs
22	Rajasthan	0.463	1.000	0.463	drs



23	Sikkim	1.000	1.000	1.000	-
24	Tamil Nadu	0.718	1.000	0.718	drs
25	Telangana	0.940	1.000	0.940	drs
26	Tripura	0.863	0.938	0.920	drs
27	Uttar Pradesh	0.807	1.000	0.807	drs
28	Uttarakhand	0.829	1.000	0.829	drs
29	West Bengal	0.361	0.913	0.395	drs
30	Andaman & Nicobar Is.	1.000	1.000	1.000	-
31	Chandigarh	0.721	1.000	0.721	drs
32	Dadra & Nagar Haveli	0.451	0.614	0.735	drs
33	Daman & Diu	0.567	0.722	0.786	drs
34	Delhi	0.975	1.000	0.975	drs
35	Lakshadweep	1.000	1.000	1.000	-
36	Puducherry	0.917	1.000	0.917	drs
37	Total	0.536	1.000	0.536	drs
Mean		0.685	0.936	0.725	

TE: Technical Efficiency PTE: Pure Technical Efficiency SE: Scale Efficiency

The results of DEA are show in table 1.3 Technical efficiency with Constant Return to Scale (CRS), Technical Efficiency with Variable Return to Scale (VRS) and Scale Efficiency (SE). Having analyzed the impact of independent variable on the dependent variable, it is better to know the efficiency of the states in terms of premium collected. Hence DEA is used to measure the efficiency considering dependent variable as output and independent variable as input.

The mean of Technical Efficiency with Constant Return to Scale (CRS) is 0.685, Technical Efficiency with Variable Return to Scale (VRS) is 0.936 & Scale Efficiency (SE) is 0.725. Out of the states, Sikkim, Mizoram and Nagaland are operating under Constant return to scale. On the other hand Andaman and Nicobar islands and Lakshadweep have been operating under Constant return to scale out of the Union Territories.

Discussion and Conclusion

The primary purpose of insurance is to act as a risk transfer instrument to provide peace of mind and protect against losses. (Sabbir, 2002). Insurance schemes utilize the combination method by



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persuading a largenumber of individuals to pool their risk into a large group to minimize overall risk. (Ali, 2000).The insurance companies which are functional under the public sector were selected for the study. Thus 4 companies were selected and the secondary data of the companies was taken from the Handbook of Insurance Statistics published by IRDA. The inputs taken for the study are: No of claims settled, Amount of Claims settled, No of Policies Issued, Number of Persons Covered and Gross Direct Premium outputs studied.From the statistical analysis of state wise variables, it can be concluded that DEA Shows in respect of the states Sikkim, Mizoram, Nagaland & with respect to UTs Andaman & Nicobar and Lakshadweep are efficient enough in terms CRS.

In terms of VRS the following states showing efficiency Andrapradesh, Assam, Bihar, Haryana, Jharkhand, Karnataka, MP, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Rajasthan, Tamilnadu, Telangana, UP, UK & With respect to UTs except Dadra & Nagar Haveli, Daman & Diu.

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