Compare the Performance of Private and Public Insurance Companies in Using Data Envelopment Analysis

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Abstract: In this study using linear programming to examine and compare the technical efficiency, allocation and economic public and private insurance companies has been in Iran. the linear programming method of data envelopment analysis (DEA) and using software Software Performance DEAP2 public and private insurance companies for the years 87-1383 has been calculated. the method of DEA, the model results based on BCC)) Banker, chames and cooper axis inputs with variable returns to scale (VRS) Variable Return to Scale Have been investigated. The results indicate significant differences in average technical efficiency, allocation and economic public and private insurance companies are.

Key words: Technical Efficiency ∙ Allocative Efficiency ∙ Economic Efficiency ∙ DEA (Data Envelopment Analysis)

INTRODUCTION

Increased efficiency in financial institutions, major economic institutions of each country are considered. One of the key steps in the direction of economic development countries insurance institutions according to the role that the community’s economy can maintain that national wealth and financial indemnity and guarantee supply and large investments in the community and their development and growth. Whole set of economic development will lead the country. In fact insurance industry by attracting the premium received and the funds flowing to efficiently collect and move their investments could be appropriate to provide economic development. performance of insurance companies in the private group And government, in the absence of activity in the field for the private sector to some extent provided the necessary action appears.

The first attempts to assess the performance of units and by Kvpmn Dbvr (copman and debreu) was performed. Kvpmn define technical efficiency and can be expressed and Dbvr indicator to measure the technical efficiency presented. But the basic and applied for the detection performance Farrell [1] did in 1957. He estimates the first performance of the proposed parametric method and conjecture rather than production functions and output data values observed and border units to consider that the border frontier production function is an indicator for measuring performance is considered In fact, the best performance and firms in the industry shows that the performance of other firms it is compared. His first producer of economic efficiency into two components can be divided into technical efficiency and allocation. Farrell completion method, Charnz, Cooper and Rhodes [2] In 1978 the initial analysis of the single input and single output to multiple inputs and multiple output modes extended. The method according to the first letter of their names were called CCR method, article based PhD theses courses to guide the Edward Rhodes Charnz Cooper and academic achievement in America was conducted. Then Brikr, Charnz and Cooper (Banker, chames and cooper, 1984) in 1984 with the CCR model, BCC completed methods were introduced.

Data envelopment analysis is a nonparametric method and a plan to create one dimensional efficient frontier is to input and output combinations that all companies in the sample covers. Input and output components companies are efficient performance on the border while the input and output combinations under boundary inefficient firms are efficient [3]. (Eling-Luhnen).

Kara border following a series of related points given that the most effective units formed and according to the combination of inputs and output is obtained by analysis. This selection procedure similar units with the highest slope for input data and is discussed. In fact, technical efficiency represents the ability of a decision unit (DMU)
to maximize output given set of inputs is given [4]. In other words a single decision maker is a converter that takes inputs and converts the output [5].

DEA a powerful and valuable tool that is identified through sensitivity analysis helps enterprises efficiently and that these firms how to allocate its resources to achieve greater efficiency and improve their productivity. This technique is a method based on that experience, assumptions and limitations need to measure performance is traditionally the time of the introduction, this method extensively in all organizations, both profit and nonprofit... Is used and DEA in recent years increasingly common in management and widely found in many businesses and areas like operations research, service industries, insurance companies and banks has been used, in [6] (Choi.) efficient frontier curve in this way a series of spots that formed around the same firm are efficient and all deviations from the efficient frontier curve resulting from the units is not efficient [7].

Parametric methods require a mathematical function that is based on the use of the independent variables, dependent variables is estimated. In addition, assumptions about the distribution function data models with constraints must also be considered. But the data envelopment analysis requires assumptions to obtain the distribution function and it is not. This general approach combining all the units under review a virtual unit created with the highest performance and inefficient units with R or measures [8].

Using the cost function can be in addition to technical efficiency, allocation and economic efficiency as well be measured in Chinhshy state enterprises are also used. Since the cost function, complete information on prices of production factors and product is efficient allocation of economic efficiency, can be calculated [9].

Research Background: Van, van Kappa, [10] to estimate the cost function and efficiency of insurance have paid 14 European countries. Their study showed that in the period studied (2001 - 1995), most of Europe's insurance cost reduction stage act (increasing returns to scale) as well as firm size and domestic market share on a significant determinant of economic performance is. Larger firms and those greater share of the market at their disposal, to accept greater levels of spending tend deficiency.

Sahv tons [11] to measure the efficiency and scale efficiency in Indian life insurance companies using data envelopment analysis are discussed. Results of the study a significant heterogeneity in the cost efficiency scores in a 19-year period shows.

Michael Anderson [12] in an article in the title insurance industry performance Scandinavian countries have the industry's performance in four countries: Denmark, Finland, Norway and Sweden for a five-year period (1997-1993) is reviewed. His comprehensive analysis of data for the study and chose the side of Malm Kvyst index to measure productivity used. Output. The results of this review states that the national insurance markets in the countries studied differ widely than was previously anticipated that, so that national economic and political factors and other fundamental differences between countries and also between their insurance companies and the important factors affecting the markets every country.

Noel Yuri Persian month Dey in their research performance of various telecommunication companies in America between the years 1988 to 1998 was reviewed and investigated. In his research, he used the DEA technique. Input variables that a researcher in his research to pay them, were labor, capital and materials. Researcher in his research using the BCC model and the efficient use of telecommunications companies in 19 different years was compared and ultimately efficient companies in different years to determine. The average performance in the different years was achieved in 1989 this figure was the highest value. So telecom companies in America this year, more efficient than other years were identified.

Research Method: The aim of the study and application of descriptive methods after event (using past data) is. Investigation period from 1383 to 1387 has been. Statistical community, including selection of insurance companies under the Central Insurance of active separation of public and private insurance is. Including public insurance companies in Asia, Alborz and Dana and private insurance companies Parsian Razi, Avicenna and people are entrepreneurs.

In most studies on effectiveness have been conducted in the insurance industry, labor, services, materials and equity as inputs are used.

In this study, input and output are:
Input: number of branches and administrative forces of each company
Output: the number of insurance policies issued, the amount of insurance policies issued, the number of payments and the amount of damage compensation payments.

Also the way DEA, the price of inputs that we need prices, we calculate the following ways:
• Cost (price) branches: the division of tangible fixed assets (including items such as buildings, equipment, etc.) is obtained on the number of branches.
• Cost (price) Employees: Share of personnel costs (including staff wages and benefits, insurance and pensions, the end reward employees and other service personnel costs) on the number of insurance companies comes from its staff.

In this article BCC input oriented model with variable returns to scale (VRS) will use. Any insurance companies in each of the years reviewed research as a separate decision unit acts after study, including Decision Unit is 40. Nonparametric Wilcoxon method (Wilcoxon error at 05 / = 0a use. That this test method, a DEA nonparametric methods (nonparametric Tests) is the perfect match.

**Test Assumptions:** A minor theory: technical efficiency than private insurance companies with state insurance companies using DEA is a significant difference.

\[ H_0 = \text{Technical efficiency of public and private companies are not significantly different between} \]
\[ H_1 = \text{Technical efficiency of public and private companies are significantly different} \]

As we consider the mean technical efficiency for public companies 85/6 percent for private companies 66/9 percent are. Sig obtained with the Wilcoxon test 0/046 lower than levels that cause error \( \alpha = 0.05 \) is \( H_0 \) is rejected, so the first sub-hypothesis is confirmed by the results we test with the technical efficiency of private insurance companies compared to public insurance companies using DEA method is significantly different.

**Sub Hypothesis 2:** Efficiency Appropriations private insurance companies compared to public insurance companies using DEA method is significantly different.

\[ H_0 = \text{Efficiency Appropriations private companies and government are not significantly different between} \]
\[ H_1 = \text{Efficiency Appropriations private companies and government are significant differences} \]

As we see average allocation for public performance \( 1 / 85 \) percent for private companies 57/1 percent are. Sig obtained with the Wilcoxon test 0/023 lower than levels that cause error \( \alpha = 0.05 \) is \( H_0 \) is rejected, so the second sub-hypothesis is confirmed by the test results with this performance we Appropriations private insurance companies compared to public insurance companies using DEA method is significantly different.

**Secondary 3 Hypotheses:** the economic performance of private insurance companies compared to public insurance companies using DEA method is significantly different.

\[ H_0 = \text{Economic efficiency of private and public companies are not significantly different between} \]
\[ H_1 = \text{Economic efficiency of private and public companies are significantly different} \]

As we see average economic efficiency for public \( 74/9 \) percent for private companies 44/7 percent are. Sig obtained with the Wilcoxon test 0/023 lower than levels that cause error \( \alpha = 0.05 \) is \( H_0 \) is rejected, so the second sub-hypothesis is confirmed by the results we test with the economic performance of private insurance companies compared to public insurance companies using DEA method is significantly different.

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<th>Table 1: Descriptive Statistics</th>
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<td>State-Privacy 2.272 0.023</td>
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<td>Asymp. Sig. (2-tailed)</td>
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990
Main Hypotheses: A private insurance company performance compared with state insurance companies using DEA method is significantly different.

\[ H_0 = \text{Efficiency of public and private companies are not significantly different between} \]
\[ H_1 = \text{Efficiency of public and private companies are significantly different.} \]

According to the results of sub-hypotheses 1, 2 and 3 in Table 4 are the main theory is confirmed that: private insurance companies performance compared to public insurance companies using DEA method is significantly different.

RESULTS

- Average technical efficiency achieved in the public company 85/6 percent and private companies 66/9 is that this percentage represents better performance in this type of companies the government. Private insurance companies in control process are thus since 1383 to 1385 the average technical efficiency declined until 1385 but since 1387 has increased.

- Average allocation efficiency in state-owned companies gained 85/1 percent and private companies 57/2 percent. According to studies completely upside trend seen in the average performance of public companies are Appropriations. But in private companies, the pattern did not see in these years. But these conclusions can be reached that total average allocation has increased efficiency so that the value of 55/6 percent in 1383 to 58/9 percent reached in 1387.

Due to these subjects can be concluded public companies in terms of allocation efficiency are better performance.

- The average number of economic efficiency witnessed 74/9 percent state-owned companies and 44/7 percent are in private companies. In public companies with the regular process in the years studied there in total, however, the average economic performance in 1387 compared to the year 1383 the basic research has increased.

In private companies, from 1385 onwards witnessed increasing trend and economic efficiency that we can issue due to uptrend in average technical efficiency in these years is because a unit affected by the economic performance of technical efficiency and allocation and the average unit is its economic efficiency represents the ability to participate in the optimal allocation of resources according to the price of inputs [13].

CONCLUSION

According to the analysis made in this study, the higher value of performance control for state insurance companies than private companies are. Although state insurance companies have higher than average performance lead in most cases the overall decline in We mean value performance. This shows that public companies not only in this years trend and progress in the correct input and output management and cost, but they have not, process control irregular and even decline in some cases these factors are. On the other hand, the private insurance companies falling over time and place such insurance companies on the market (especially
from 85 years onwards), in most cases the overall progress and the growing trend toward performance in a variety of early years. That we can issue a logical justification for the trend toward privatization in the insurance industry in Iran.

REFERENCES

13. Iran Insurance Statistical Yearbook years (1383 to 1387).