



Financial Performance Assessment based on Efficiency and  
Productivity, using Data Envelopment Analysis  
(Case Study: The Social Security Organization of Iran)

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**ABSTRACT**

This research, using data envelopment analysis (DEA), assesses financial performance based on efficiency and productivity in 36 organizational units of the country's Social Security Organization. For this purpose, the output-oriented DEA model was used. The considered model was estimated using the quantitative indicators of the Social Security Organization during 2019-2020. The results indicated that the average technical and managerial efficiency of organizational units has increased on average in 2018-2019). The obtained average scale efficiency of the organizational units for the years 2018-2019 (0.970) from the study of productivity (scale efficiency) indicates that the understudy units have not been operating at an optimal scale and this situation needs to be improved by adopting new measures. Out of all the organizational units under investigation, scale efficiency in 24 units was below and in 12 units was above the average.

**KEYWORDS:** Performance; Performance assessment; Efficiency; Data envelopment analysis (DEA); The Social Security Organization

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## 1. INTRODUCTION

In order to know the desirability and quality of its activities, especially in dynamic complex environments, continuously improve for proper planning in the future, and communicate with the internal and external environment to prevent the organization's death or demise, and ultimately, achieve excellence, each organization today has an urgent need for a performance assessment system, especially in the financial area. Without examining and knowing the degree of progress and goal achievement and without identifying the challenges facing the organization and obtaining feedback and information on the implementation level of the formulated policies and identifying the instances and areas in need of serious improvement in the performance, the organization improvement will not be possible. Therefore, an effective evaluation system is indispensable (Benar, 2015).

A key indicator of organizational performance is the efficiency and productivity resulting from the use of factors, which measures the ability of each organization to create different amounts of services from a certain amount of input relative to a certain standard level (Alwani et al, 2015). The definition of efficiency in organizations can be defined as the ratio of the minimum possible cost to the realized cost for providing a certain amount of output, in comparison with similar units in that industry. According to this definition, any waste of resources and lack of optimal use thereof, inappropriate structure, unnecessary costs, unbalanced credit policies, excessive regulations, employee dissatisfaction, lack of dynamism of the supervisory system, etc., will reduce efficiency (Alame Tabriz et al, 2009). In general, what is considered as an efficient structure is a structure that provides its services with accuracy and speed and at the minimum cost and fulfills the expectations of the in the best possible way (Qasemi, 2015). In measuring the efficiency of both inputs and outputs of an organization, efficiency and productivity are evaluation criteria. In fact, efficiency measurement evaluates the managerial coefficient (ability) of organizations. That is, the degree of success of the manager in the use of the inputs (facilities, personnel, etc.) to achieve the objectives determines the efficiency and productivity score. More importantly, it shows the performance status of the organization during the evaluation periods and identifies the existing abilities, considering the organization's specific conditions. This helps managers and macro decision makers of organizations in how to pursue macro strategies and correctly understand the functional position of the organization (Golbandi, 2019).

One of the organizations in which the issue of financial performance assessment is of high importance is the Social Security Organization. The Social Security Organization is a non-governmental public institution that on a continuous basis along with generation of income from the collection of insurance premiums must provide the due services to the insured and pensioners. Therefore, considering the present and future economic and social conditions, it should always be thinking of reforming and improving the methods of collecting income and providing services, marketing, budgeting, increasing productivity and efficiency among its units. Continuous evaluation of the performance of the organizational units and paying attention to the results of the evaluation will, in the long run, lead to the organization growth and in the short run, to the optimal allocation of the motivational employee benefits and the creation of a healthy competition between the organization's branches.

In view of the above background and considering the lack of research on the measurement of financial performance in the Social Security Organization from the perspective of efficiency and productivity, the present research was conducted to fill the current research gap in this area. Hence, this study seeks to answer the question as to what the financial performance of the country's social security organization is from the perspective of efficiency and productivity.

## 2. Theoretical framework and research background

Performance means "doing, executing, and completing the ordered or committed work" (Benar, 2015). And performance evaluation is the process of comprehensive assessment of the performance of executive bodies expressed in such terms as efficiency, effectiveness, empowerment and responsiveness, in the framework of scientific principles and management concepts to accomplish organizational goals and tasks and in the form of executive plans (Benar 2015). Productivity is a combination of efficiency and effectiveness. Thus, productivity indicates the ratio between production efficiency per unit of consumed resources, which is compared and applied with a similar ratio of the base period. Productivity is equal to the output part (production amount) divided by the (total) production factors (Prokunpeko, 2013). In a literal sense, efficiency means adequacy, usefulness, performance and return. In simpler terms, efficiency means doing work well or doing work correctly, which refers to the optimal use of resources in order to attain functional goals (Qasemi, 2015).

Soner et al (2004) presented a research paper titled Evaluation and Selection of R&D Projects Using an Integrated BSC-DEA Methodology. In this paper, first, the performance of the projects of a large automobile company in the R&D department was calculated using the balanced scorecard and then, the efficiency of the projects is calculated using the data envelopment analysis (DEA) method, and finally, using the (DEA-BSC) methodology, the projects with maximum efficiency were selected. Asoshe et al (2010) evaluated the performance of the Ministry of Science, Research and Technology of Iran using the integrated model. In this model, the variables cost, time and human resources were considered as the input variables, and the output variables were expressed by the amount of control, security, reliability, customer satisfaction, service availability, meeting the needs of shareholders, process risk, human resources risk, and technology risk. Shojaei (2013) assessed and identified performance measures in Malavan Bandar Anzali football club. After identifying the different measures, each of the measures was examined using a single-sample t-test, and a total of 23 measures were identified as the key contributors to the club's performance.

## 3. Research methodology

This is an applied research conducted with a quantitative approach through a descriptive-analytical design. The units of the Social Security Organization of the country form the statistical population and spatial scope of the present research. For data analysis, data envelopment analysis (DEA) was used whereby the efficiency and productivity in the Social Security Organization were assessed in DEA Master Software. Considering that the application of the data envelopment analysis model requires determining the appropriate input and output for this model, so that the decision-making unit obtains the outputs based on the inputs, the conceptual model is drawn as follows.



**Figure 1.** Research conceptual model (Azar & Momeni, 2004)

#### 4. Findings

Productivity and efficiency (scale efficiency) is obtained by dividing the technical efficiency obtained from the CCR model (under conditions of constant returns to scale) by the efficiency obtained from the BCC model (under condition of the variable returns to scale). The results of the scale efficiency during the years 1394-1398 are presented in table 1. The average scale efficiency of the organizational units during the years 2018-2019 is equal to 0.970. This means that the total units under investigation are not operating at an optimal scale and this situation should be improved by adopting new measures. Out of all the organizational units under investigation, 24 units have less and 12 units have higher than average scale efficiency. The surveys show that none of the organizational units operate at an optimal scale. In this regard, organizational unit 32 has the highest scale efficiency, while organizational unit 9 has the lowest scale efficiency, indicating the disproportionate size of this unit.

**Table 1.** Scale efficiency of the Social Security Organization during 2015-2019

Branch	Year					Average
	2015	2016	2017	2018	2019	
32	0.985	0.977	1.000	1.000	1.000	0.992
14	0.969	1.000	1.000	1.000	0.978	0.989
2	1.000	0.990	0.958	0.977	0.984	0.982
13	0.969	1.000	0.957	0.976	0.978	0.976
31	0.967	0.972	0.958	0.989	1.000	0.977
3	0.968	0.973	0.961	0.975	1.000	0.976
21	0.967	0.971	0.970	0.997	0.977	0.976
12	0.969	0.973	0.957	0.977	0.976	0.970
20	1.000	0.972	0.953	1.000	0.976	0.980
1	0.964	0.972	1.000	0.974	0.977	0.977
6	0.968	0.972	0.958	0.973	0.975	0.969
24	0.966	0.969	0.955	0.976	0.984	0.970
4	0.965	0.974	0.954	0.975	0.976	0.969
18	0.964	0.972	0.954	0.976	0.974	0.968
29	0.961	0.969	0.957	0.977	0.976	0.968
11	0.963	0.972	0.953	0.976	0.974	0.968
23	0.964	0.963	0.956	0.976	0.995	0.971

7	0.967	0.969	0.954	0.974	0.976	0.968
25	0.958	0.971	0.955	0.974	0.978	0.967
16	0.967	1.000	0.951	0.975	0.969	0.972
28	0.959	0.970	0.956	0.975	0.976	0.967
19	0.962	0.969	0.956	0.976	0.974	0.967
5	0.966	0.968	0.952	0.973	0.976	0.967
26	0.960	0.962	0.957	0.975	0.976	0.966
10	0.962	0.973	0.950	0.972	0.974	0.966
34	0.961	0.970	0.956	0.974	0.973	0.967
8	0.964	0.968	0.954	0.973	0.974	0.967
15	0.968	0.970	0.944	0.974	0.972	0.966
30	0.960	0.963	0.955	0.976	0.976	0.966
36	0.958	0.966	0.955	0.975	0.975	0.966
35	0.959	0.961	0.953	0.974	0.978	0.965
22	0.954	0.964	0.953	0.975	0.977	0.964
33	0.961	0.961	0.948	0.975	0.974	0.964
17	0.962	0.966	0.947	0.971	0.973	0.964
27	0.963	0.969	0.950	0.970	0.975	0.965
9	0.958	0.963	0.945	0.968	0.971	0.961
Average	0.966	0.972	0.958	0.978	0.978	0.970
Highest efficiency	1.000	1.000	1.000	1.000	1.000	0.992
Lowest efficiency	0.954	0.961	0.944	0.968	0.969	0.961
Number of efficient units	2	3	3	3	3	-
Percentage of efficient units	5.6%	8.3%	8.3%	8.3%	8.3%	-

According to the results, the average technical, managerial and scale efficiency of the organizational units during the understudy period were 0.86, 0.88 and 0.97, respectively. Due to the fact that the average technical and managerial efficiency is not the same, it can be concluded that all units do not operate at an optimal scale. Also, the high average scale efficiency of the units compared to the average management efficiency shows that the effect of the managerial inefficiency of the units on their technical inefficiency is greater than that of the scale inefficiency on technical inefficiency of these units. Examining the performance of organizational units shows that technical, managerial and scale efficiency have increased over time, which indicates the relative improvement of efficiency in the Social Security Organization.

## 5. Discussion and conclusion

As mentioned earlier, in this research, the performance of 36 administrative units of the country's social security organization during the period of 2018-2019 was assessed using the DEA technique. The results indicate that the average technical efficiency was 0.815, 0.838, 0.867, 0.896 and 0.886 in the years 2014-2018 respectively. Therefore, technical efficiency is increasing over time on average (confirmation of the first research hypothesis). Examining the managerial efficiency of the organizational units shows that during the considered period, the efficiency increased by 7.5% on average (confirmation of the second research hypothesis). The review of productivity (scale efficiency) also indicates that the units have not been operating at an optimal scale and this situation should be improved by adopting new measures. Out of all the organizational units under investigation, 24 units have less and 12 units have higher than average scale efficiency. In this regard, organizational unit 32 has the highest scale efficiency, while organizational unit 9 has the lowest scale efficiency, which indicates the disproportionate size of this unit. Examining the scale efficiency of the organizational units shows that during the understudy period, the efficiency has increased by 1.3% on average (confirming the third research hypothesis). The average technical and managerial efficiency in the Social Security Organization are not equal to each other. Hence, the organizational units do not operate with optimal capacity. The average scale efficiency of the units is higher than the average managerial efficiency, and this shows that the effect of the managerial inefficiency of the units on their technical inefficiency is greater than that of their scale inefficiency (confirmation of the fourth hypothesis of the research).

Based on the results obtained from solving the DEA model, it is possible to plan to increase the efficiency and optimal performance of the inefficient units by introducing the model unit to each of the inefficient units and executive officials, for this purpose, the desired values are precisely determined for each inefficient organizational unit. And if these units can achieve full efficiency by changing the amount of their inputs and outputs to the same set amount.

The management of the organization is recommended to ensure the connection of goals and strategies with key performance indicators and the balance in key performance indicators and all functional aspects of organizational units during planning.

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**ETHICAL CONSIDERATION**

Authenticity of the texts, honesty and fidelity has been observed.

**CONFLICT OF INTEREST**

Author/s confirmed no conflict of interest.