



## A RESEARCH ON PUBLIC HOSPITAL ASSOCIATION MANAGEMENT SYSTEM IN TURKEY

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### ABSTRACT

This study searches the impact of the Public Hospitals Association (PHA) structuring in the on the performance of hospital services. Based on the research findings, it has targeted to discuss the relation between the system change and hospital performances.

The research was made from on the inputs and outputs of eight hospitals connected to the PHA structuring in metropolitan status and three private hospitals and one university hospital in the same province. Malmquist productivity index (MPI) technique was used in order to analyze the total factor productivity (TFP) in the study.

In consequence of the study, it was determined that the PHA structuring provided an increase in the efficiency in hospitals with more than 150 beds but it did not provide any change in district hospitals. It was observed that hospital performance values did not support the decision to change the PHA management system.

**Keywords:** Public Hospitals, Public Hospitals Association, Performance, Malmquist Productivity Index

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## 1. INTRODUCTION

In consequence of the Health Transformation Program (HTP) which was actualized between 2002-2012 in Turkey, important changes were actualized in the organization, finance, and offering of the health services. Family medicine system is being implemented. General health insurance was established. Non-premium health insurance was combined with this system. A significant part of the changes made progressively was actualized within the treatment services. Public hospitals except for university hospitals are connected to the Ministry of Health (MoH). Public hospitals are designed to be managed by the "Public Hospitals Association (PHA)". The legal regulation of PHA was made in 2011 ("DL no. 663," 2011) and started to be implemented in 2012. PHA's implementation lasted six years. In 2017, PHA was removed by a new legal regulation ("DL no. 694," 2017).

Prior to PHA, public hospitals worked in the Ministry of Health, under the General Directorate of Treatment Services and the Provincial Health Directorate in the provinces. The chief physician administered public hospitals. The hospital director and the head nurse were administered by the chief physician. Public hospitals institution was established with the new regulation. In the provinces, the PHA General Secretaries was formed in 2012. These structures were autonomous. Hospitals were appointed to hospital director. Chief physician was the manager of medical services.

Thus, the public hospital management system was made autonomous. PHA was a holding type structure. The general secretary of the PHA was like a kind of CEO. The Secretary-General of the PHA was the highest and autonomous manager of self-connected hospitals in that province. The Secretary General was coordinating the financial, administrative and medical services of the hospitals. The Secretary General was responsible for success or failure. This change was expected to improve the efficiency of public hospitals. Managers in the public hospital system were working based on performance. Performance measurements were made every year. According to law, the performance of managers with low performance would be terminated. Although some problems were expressed in the routine, system was operating. The new system had designed the three-headed health management. Provincial Health Director, Public Hospitals Association, Directorate of Public Health. Especially this structure was criticized.

In the seventh year of the application of the PHA system, the system was suddenly abandoned. A new legal arrangement was made. The system has largely returned to its previous state. What

effect did the PHA management system have on health services and hospitals? This question was not on the agenda. Has PHA structured increased hospital productivity as expected? The PHA system disappeared in the fast-changing country agenda.

This study was produced from a scientific research project. The project was carried out in order to determine how the changes made in the management structure of the MoH hospitals by the name of PHA with the Decree Law (DL) no. 663 and its effects to the health service stakeholders and the hospital service outputs. This study included the analysis of the hospital output of the project with the Malmquist TFP index technique. The main purpose of the project was to analyze the stakeholder evaluations and outputs of the new PHA system. But unexpectedly, policymakers has abandoned from the PHA system in the process of preparing for publication after the project was finished. With the new amendment they made with the DL no. 694, they returned to a similar system to the pre-PHA system. Thus, this study realized the purpose to determine how PHA structuring reflects on the hospital performance, numerical indicators, before the changes was made by the DL no. 694. Today, this work has also become important in the sense of knowing that, at least in its own universe, the system has been altered to have an effect on the performances of hospital service displays. Therefore, it is hoped that this study will contribute to the meaning of the system change, to the sector decision makers, the practitioners and the theoreticians.

## **2. METHOD**

In the literature, in many studies, Malmquist Index (MI) technique was used to measure the performance of hospitals (Kirigia et al., 2008; Pilyavsky and Staat, 2008; Ng, 2011; Ferreira and Marques, 2015; Zhang et al., 2017). Therefore, this study used this technique in the efficiency analysis of hospitals. MPI which is a Data Envelopment Analysis technique was used in order to analyze the TFP in the study (Färe et al., 1992; Färe et al., 1994).

As the DMUs, 13 general hospitals operating in the province of Trabzon were determined. There are 4 public hospitals with 150 and more beds capacity connected to the secretariat of public hospitals, 4 public hospitals with less than 150 beds capacity, 3 private hospitals and 1 university hospital among the hospitals determined. The reason why the public hospitals are separated with the 150 beds limit is the hospitals with less than 150 beds being district hospitals.

In the selection of the working years, the year 2012 was taken as a base because it was the last year before the structuring of the PHA came into force. The years 2013, 2014 and 2015 were

used in the determination of how the management system change was reflected in the services according to this year.

The input and output variables of the model approached in the study were prepared by the authors of the study paying regard to the data obtained considering the study conducted by Şahin (2009). Four variables which are Number of the Doctors, the Number of the Nurses, the Number of Other Medical Staff and the Number of Beds were determined as input. Three variables which are the Number of the Patients Having Ambulatory Treatment, the Number of Operations Made and the Proportion of the Occupation of the Beds were determined as output.

The data of the study were taken from General Secretariat of Trabzon Public Hospitals Association. The data of 2012 before the structuring and the data of the 2013-15 period for the time after the structuring were worked for the analysis. The variable of the Number of Operations among the data obtained was procured in a discrete way according to A, B, C and D categories (Büyükkayıkçı & Şahin, 2000). An output based approach was adopted in the study. DEAP 2.1 package software developed by Coelli (1996) was used for analyzing the data.

### 3. RESULTS

Firstly, some definitive statistical analyses (arithmetic average, minimum and maximum) of the inputs and outputs determined for the 2012-15 period were made. The findings are given in Table 1.

**Table 1: Definitive Statistics for the Input and Output Variables**

Year	Statistics	Input Variables				Output Variable		
		X1	X2	X3	X4	Y1	Y2	Y3
2012	Average	98	200	202	242	363049	2607	73,2
	Standard Deviation	159	188	113	244	273194	3483	19,0
	Minimum	13	60	52	69	150760	137	40,8
	Maximum	596	667	357	780	1111064	12718	101,3
2013	Average	95	201	205	240	374594	2689	68,1
	Standard Deviation	158	174	126	217	283674	3217	16,9
	Minimum	12	63	56	61	133915	300	28,3
	Maximum	593	603	440	780	1155538	11764	93,8
2014	Average	93	202	212	231	388888	3027	77,4
	Standard Deviation	151	174	123	217	277388	3517	20,1
	Minimum	16	61	56	61	130251	354	37,8
	Maximum	569	585	437	780	1098770	11766	107,4
2015	Average	96	208	206	227	385337	2579	82,2
	Standard Deviation	147	186	122	219	265625	3843	24,9
	Minimum	18	64	60	61	141409	370	41,7
	Maximum	556	618	443	780	1042391	14461	126,9

Moreover, in addition to the definitive statistical information, change rates of all variables according to the year 2012 as per cent were regarded (Table 2).

**Table 2: Change Rates of the Input and Output Variables According to 2012 as Per Cent**

Year	Input Variables				Output Variable		
	X1	X2	X3	X4	Y1	Y2	Y3
2013	-3,0	0,4	1,9	-1,1	3,2	3,1	-7,0
2014	-5,1	0,9	5,0	-4,8	7,1	16,1	5,6
2015	-2,7	4,1	2,4	-6,4	6,1	-1,1	12,2

According to Table 2, there is a decrease in the rates of 3,0 % and 1,1 % respectively in the number of doctors and beds for 2013. An increase in the rate of 0,4 % and 1,9 % respectively in the number of nurses and other personnel is seen. When the output variables for the same year are regarded, despite there is a decrease at the rate of 7,0 % in the value of bed occupation, there is an increase at the rates of 3,2 % and 3,1% in the number of ambulative treatments and operations. It can be said that the variables followed the trend of the previous year except for the rate of bed occupation for 2014. According to the table, when there is a decrease at the rates of 5,1 % and 4,8 % in the number of doctors and beds, an increase at the rates of 0,9 % and 5,0 % in the number of nurses and other personnel are observed. When the output variables are regarded, there is respectively 7,1 %, 16,1 % and 5,6 % increase in the variables of the number of the patients having ambulative treatment, number of operations and bed occupation rate. Finally, it was seen that the year 2015 resembled the previous year expect for the variable of number of operations. When the inputs and variables of one year were regarded, increases at the rate of 4,1 % and 6,4 % respectively were seen in the number of nurses and other personnel. Decrease at the rates of 2,7 % and 6,4 % in the number of doctors and beds was seen. Increase in the number of nurses and other personnel at the rates of 4,1 % and 2,4 % was determined.

The results of the TFP change (TFPC) and its components value for the 2012-15 period of the hospitals connected to the Turkish MoH and the other hospitals (university and private) are given in Table 3. Calculations according to both 2012 and the previous year were made while the analysis was being made. Moreover, the averages of the DMUs according to the efficiency types were calculated with geometric average.

**Table 3: Efficiency Analysis Results of the Hospitals for the 2012-15 Period**

Year	Hospitals	According to 2012 Year					According to the Previous Year				
		TEC	TC	PEC	SEC	TFPC	TEC	TC	PEC	SEC	TFPC
2013	≥ 150	1,071	1,092	1,079	0,993	1,169	1,071	1,092	1,079	0,993	1,169
	< 150	0,859	1,102	0,979	0,878	0,947	0,859	1,102	0,979	0,878	0,947
	A	1,000	0,783	1,000	1,000	0,783	1,000	0,783	1,000	1,000	0,783
	B	1,000	0,762	1,000	1,000	0,762	1,000	0,762	1,000	1,000	0,762
2014	≥ 150	1,113	1,217	1,057	1,053	1,354	1,039	1,156	0,980	1,060	1,201
	< 150	0,933	1,087	1,004	0,930	1,015	1,086	1,003	1,025	1,059	1,090
	A	1,000	0,858	1,000	1,000	0,858	1,000	1,052	1,000	1,000	1,052
	B	0,995	0,775	1,000	0,995	0,771	0,995	1,031	1,000	0,995	1,026
2015	≥ 150	1,067	1,060	1,033	1,032	1,131	0,958	0,820	0,978	0,980	0,785
	< 150	0,895	1,093	1,004	0,891	0,978	0,958	0,973	1,000	0,958	0,933
	A	1,000	1,024	1,000	1,000	1,024	1,000	1,160	1,000	1,000	1,160
	B	1,000	0,917	1,000	1,000	0,917	1,005	1,182	1,000	1,005	1,187

≥ 150 : Represents the public hospitals connected to the MoH with 150 and more beds capacity.

< 150 : Represents the hospitals connected to the MoH with 150 and less beds.

A, B : Represents the university hospitals or private hospitals.

When Table 3 is considered, it is seen that there is a 16,9 % increase in the TFP change values of the hospitals with 150 and more beds capacity for 2013 year. There is a 5,3 % decrease in the hospitals under this capacity. When the reason for the increase is regarded, it can be said that is because of the respectively 7,1 % and 9,2 % increase in the Technical Efficiency Change (TEC) and Technological Change (TC) values. As for this increase in the TEC value, it is seen that, despite the 0,7 % decrease in the Scale Efficiency Change (SEC), the 7,9 % increase in the Pure Efficiency Change (PEC) is effective. This situation means that the managerial structure offers more services with the present sources. When the reason of the decrease is regarded, it is seen that although the contribution of the TEC value to the TFPC value is 10,2 %, it is because of the 14,1 % decrease in the TC. It can be said that the factor which diminishes this sharp decrease is the contribution of the technology to the efficiency. It was seen that there was an increase in 2014 compared with 2012 and 2013 years. It was observed that the TFPC value of the hospitals with 150 and more beds capacity was 35,4 %. The change value of the hospitals under this capacity is 1,5 %. When compared to the previous period, it was seen that there was a 20,1 % change for the hospitals with 150 and more beds capacity and there was a 9 % change in the institutions under this capacity. When the factors caused the increase are regarded, hospitals with 150 and more beds become TC in the first degree with 21,7 % with the positive effect of the technology factor and they became TEC with 11,3 % value. When the factors of the TEC change are scrutinized, it can be said that both managerial skills and production at a suitable scale at the rate of 5 % are effective. The reason for the increase in the efficiency of

the hospitals with capacity under 150 is the increase in the TC value (8,7 %) in spite of the decrease in TEC (6,7 %). When they were analyzed for the last period, it was observed that the TFPC value of the institutions with 150 and more beds capacity increased at a rate of 13,1 % when compared to 2012 year. It was also observed that there was a 2 % decrease in the institutions under this capacity. In spite of these values, it was seen that the change when compared to the previous period decreased 21,5 % and 6,7 % respectively. When the reasons for this change are regarded, it can be said that it is because of the 16 to 18,7 % increase seen in the university hospitals or private hospitals.

Finally, the general average values of the hospitals connected to the MoH for the 2013-15 period from on efficiency kinds were calculated (Table 4).

**Table 4: General Average Values of the Hospitals Connected to the MoH for the 2013-15 Period\***

Hospitals	According to 2012 Year					According to the Previous Year				
	TEC	TC	PEC	SEC	TFPC	TEC	TC	PEC	SEC	TFPC
≥ 150	1,083	1,121	1,056	1,026	1,214	1,022	1,011	1,011	1,011	1,033
< 150	0,895	1,094	0,996	0,899	0,980	0,964	1,025	1,001	0,962	0,987
Average	0,975	1,106	1,022	0,953	1,078	0,989	1,019	1,006	0,983	1,008

≥ 150 : Represents the public hospitals connected to the MoH with 150 and more beds capacity.

< 150 : Represents the hospitals connected to the MoH with 150 and less beds.

\* : Calculated with geometric average.

When Table 4 was regarded, it was determined that there was a 21,4 % increase in the TFPC values of the hospitals with 150 and more beds capacity, a 2 % decrease was determined in the institutions under this capacity compared with 2012 year. When the change according to the previous year was analyzed, it was seen that there was a 3,3 % increase in hospitals with 150 and more beds capacity and a 1,3 % decrease was seen in institutions under this capacity. When the general average was regarded, although there was a lapse from the hospitals connected to the MoH to the university or public hospitals, there was an approximately 8 % increase in the TFPC value.

#### 4. DISCUSSION

To summarize the research findings; when the year 2012 is taken as a base, the change rate of the public hospitals with over 150 beds connected to the association of public hospitals in the TFP has increased 16,9 % in 2012. It increased 35,4 % in 2014 and 13,1 % in 2015.

As the reason for the 16,9 % increase in 2013, it was said that the managerial structure served more with the present sources. It was observed that there were the positive effects of the technology factor in the first degree, effect of both the managerial skills and production at the

suitable scale were seen as the factors caused 35,4 % increase in 2014. When this rate was analyzed for 2015, it was determined that it had an increase which decreased when compared to the previous years with 13,1%. It was understood that the university hospitals and private hospitals earned back the patients they lost before considerably. The reason of this situation may be the increase in the service quality in the hospitals. Within the scope of the research, when the reasons of this decrease were discussed with the managers of the association and hospitals, the managers commented that it was because of the uncertainty of two general election processes in 2015. It can be said that public services have a sensitivity against political uncertainty.

The TFP of the public hospitals with less than 150 beds changed -5,3% in 2013, 1,5 % in 2014 and 2,2 % in 2015. No significant changes in the efficiency values of these hospitals can be explained with the narrowness of the service field explained in the method part, limited population and no competition environment.

Beylik et al. (2015) made the activity measurement of 88 PHA in the general of Turkey after the public hospital association structuring. In the study in which the DEA technique was used, 34% according to “Constant Return to Scale” (CRS) of PHA and 45% according to “Variable Return to Scale” (VRS) were found efficient. A similar study was also carried out by Yiğit (2016). Yiğit (2016) in the survey conducted throughout Turkey, has found out that 31% of PHA’s according to CRS and 46% according to VRS were efficient and the average efficiency score was 0,90. In order to compare this situation, the studies conducted before the construction of PHA (2012) was also examined. Şahin (2008) assessed the technical efficiency of 352 general hospitals over 50 beds which were connected to the MoH for the year 2006. According to the results obtained using the DEA technique, general hospitals were found to be 12% efficient compared to the CRS model and 23% efficient on the VRS model. The mean efficiency score of the study-included hospitals was 0,83.

According to the results of the research, Şahin (2008) was found that 12% of the MoH hospitals according to CRS model and 23% of the MoH hospitals according to VRS model were efficient before the PHA structuring. After PHA structuring Yiğit (2016) has calculated that 31% of MoH hospitals according to CRS and 46% of MoH hospitals according to VRS; Beylik et al. (2015) have calculated that according to CRS 34% of the MoH hospitals and according to VRS 45% of the MoH hospitals were efficient. In addition, the average efficiency score of the MoH hospitals was calculated as 0,83 before PHA by Şahin (2008) and 0,90 after PHA by Yiğit

(2016). The findings of these studies supports our work showing that the efficiency of the MoH hospitals increased after the PHA structuring.

## **5. CONCLUSION**

In consequence of the research made in a province in metropolis status in order to determine the contribution of the PHA structuring on the efficiency of the hospital services, it was determined that there was a significant increase in the 2012- 2015 period especially in the efficiency of large hospitals. In small hospitals, the increase in productivity could not be determined. This can be explained by the fact that these hospitals are district hospitals. Since small hospitals are the only hospitals in the region, patient mobility is limited.

Efficiency increase in large hospitals can be said to increase the efficiency of public hospitals as intended by the PHA system. The underlying cause of the sudden replacement of the PHA system is out of hospital efficiency. The reason for changing the PHA system is political or different reasons. The PHA system was a model that could be developed in the management of public hospitals. Unfortunately, the PHA system did not have this opportunity. Again the old system is returned.

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