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COMPARISON OF EUROPEAN COUNTRIES' HEALTH INDICATORS AND HEALTH EXPENDITURES BY CLUSTERING ANALYSIS

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Abstract

The main purpose of health systems is to ensure citizens utilize the health services by adequately and effectively. As the quantity and the quality of health services are improved, health indicators such as quality of life and life expectancy at birth are also improved. Health indicators and health care expenditures allow policy makers to compare health systems and to monitor and evaluate the current situation of the health systems. The main reason behind the international comparison of health indicators and expenditures is to enable countries to benchmark successful health systems. In this context, the aim of this study was to compare health indicators and health expenditures of 28 European Union (EU) countries, 6 EU candidate countries and 3 European Free Trade Association (EFTA) countries by cluster analysis method. As a result of the clustering analysis, the countries were grouped under 3 clusters. The public, private and out-of-pocket health expenditure per capita averages of the first cluster, which Turkey was included in, was the lowest among three clusters. It was determined that the cluster in which Turkey was placed falled behind other two clusters in terms of life expectancy at birth, number of physicians and nurses, maternal mortality rate, and smoking ratio health indicator averages.

Keywords ***:*** *Health Indicators, Health Expenditures, Cluster analysis, Turkey.*

Jel Classification ***:*** *I10, I15.*

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AVRUPA ÜLKELERİNİN SAĞLIK GÖSTERGELERİ VE SAĞLIKHARCAMALARININ KÜMELEME ANALİZİ İLE KARŞILAŞTIRILMASI

Öz

Sağlık sistemlerinin temel amacı, vatandaşların sağlık hizmetlerini yeterli ve etkin bir şekilde kullanmalarını sağlamaktır. Sağlık hizmetlerinin niceliği ve kalitesi arttıkça, yaşam kalitesi ve doğumda yaşam beklentisi gibi sağlık göstergeleri de iyileşmektedir. Sağlık göstergeleri ve sağlık harcamaları, politika yapıcıların sağlık sistemlerini karşılaştırmasına ve sağlık sistemlerinin mevcut durumunu izlemesine ve değerlendirmesine olanak tanır. Sağlık göstergeleri ve harcamalarının uluslararası düzeyde karşılaştırılmasının arkasındaki temel neden, ülkelerin başarılı sağlık sistemlerini referans almalarına olanak sağlamaktır. Bu kapsamda bu çalışmanın amacı, AB'ye üye 28 ülke, 6 aday ülke ve EFTA üyesi 3 ülkenin sağlık göstergeleri ve sağlık harcamalarının kümeleme analizi yöntemiyle karşılaştırılmasıdır. Kümeleme analizi sonuçlarına göre çalışma kapsamındaki ülkeler 3 grup altında toplanmıştır. Aralarında Türkiye'nin de bulunduğu birinci grupta yer alan ülkelerin kamu, cepten ve özel sağlık harcamaları ortalamaları üç grup arasında en düşüktür. Türkiye'nin de içerisinde bulunduğu birinci kümenin; hekim ve hemşire sayısı, doğumda beklenen yaşam süresi, anne ölüm hızı ve sigara tüketimi gibi sağlık göstergeleri ortalamalarının diğer iki kümenin gerisinde kaldığı belirlenmiştir.

Anahtar Kelimeler *: Sağlık Göstergeleri, Sağlık Harcamaları, Kümeleme Analizi, Türkiye.*

Jel Sınıflandırılması *: I10, I15.*

INTRODUCTION

Living under favorable conditions is considered to be the right of every individual member of a society. One of the most important elements of favorable living conditions is benefiting from health services adequately and effectively (Çelebi & Cura, 2013: 48), which is under responsibility of health systems. Health systems include all activities conducted for the purpose of improving, developing or sustaining health and have important roles about enabling individuals to benefit from health services adequately and effectively (World Health Organization, 2000: 5). Health systems have responsibilities such as protecting individuals' health, curing diseases and ensuring equity in financing (Uğurluoğlu & Çelik, 2005: 7), and it is possible to find out whether health systems fulfill their responsibilities through performance measurements.

One of the ways to measure performance in health systems is making comparisons between national health systems. The main reason behind the comparison of health systems of different countries is determination of what can be learned from the other countries with best results and outcomes and what practices can be taken as reference (Navarro, 2000: 1598). It is important to compare homogeneous countries while making health systems comparisons. Despite similar income and education levels, health indicators in countries may vary. This is partly because of the performance of health systems in different countries. In order to reveal this difference in the performance of health systems, countries perform performance measurements (Murray & Frenk, 2000: 717). Performance measurements in health systems enable to determine the reasons for injustice in financing, to find out if health systems meet the expectations, and to determine the reasons of failure in health systems (De Silva, 2000). In health system performance measurements, variables such as access to health services, appropriateness of the provided services and technical competence, patient satisfaction, health expenditures and health indicators (expected life expectancy at birth (LEB), infant mortality rate, maternal mortality rate, deaths from preventable diseases, number of health workers, etc.) are used (Pransky et al., 2001: 296).

Health performance measurements may lead to detection and identification of deficiencies or better aspects of health systems and thus contribute to development of policies. In health system

performance measurements, different methods such as factor analysis, clustering analysis, multidimensional scaling analysis and data envelopment analysis are used (Boz & Sur, 2016: 29; Teleş et al., 2018). In this study, European Union (EU), EU candidate and European Free Trade Association (EFTA) countries are divided into clusters in terms of health indicators and then the health expenditures of these countries are assessed and analyzed with one-way analysis of variance (ANOVA). These countries are also called as EU Cycle countries. In the Human Development Index and Indicators report, published by the United Nations Development Program (UNDP) in 2018, it was stated that countries in the EU Cycle placed in very high and high human development clusters and the human development score of the majority of EU countries was among the top 50 countries of the world (UNDP, 2018: 22–23). In a report prepared by the Legatum Institute Foundation in 2018, performances of countries according to health indicators, health systems, disease and risk factors were measured. According to the results of health performance measurement by the Legatum Institute Foundation, it was determined that the majority of the EU cycle countires were among the top 50 countries of the world (Legatum Institute Foundation, 2018: 8–9).

This study aimed to compare health indicators and health expenditures of EU Cycle countries. Before the comparison of health indicators and health expenditures of countries, clustering analysis was performed to group countries with similar characteristics together and to differentiate countries with different characteristics from each other. ANOVA was used to determine the difference between groups and the Tukey Honestly Significant Difference (HSD) test was used to determine which group was the source of difference.

I. DATA AND METHODOLOGY

The universe of the study contained 28 EU member countries (Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Latvia, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom), 7 EU candidate countries (Turkey, Albania, Montenegro, Serbia, Macedonia, Bosnia Herzegovina, Kosovo) and 4 EFTA countries (Iceland, Norway, Switzerland, Liechtenstein), all of which were placed in EU Cycle (EFTA, 2018; EU, 2018). Since the data related to Liechtenstein and Kosovo could not be obtained, remaining 37 countries were included in the sample of the study. In addition, although the United Kingdom, consist of England, Wales, Scotland, and Northern Ireland, had decided to leave the EU in June 2016 with a referendum, this country had not left the EU yet when the study was conducted. Therefore, the United Kingdom was also included in the study.

The data used in the study was taken from Organisation for Economic Co-operation and Development (OECD) Database and World Bank Database. The data of the year 2016 was used in the study. For the countries that did not have the data for the year 2016, the data of the nearest year was taken.

In clustering analysis, right selection of variables is required to ensure that the clusters remain homogenous inside the clusters and heterogeneity is obtained between the clusters. As a result of the literature survey, it was determined that the most widely used variables in the comparison of health indicators and clustering analysis were number of physicians, nurses and beds per population, expected LEB, average duration of hospitalization (ADH), maternal mortality rate, infant mortality rate, alcohol consumption ratio, smoking ratio, the share of health expenditures in the gross domestic product (GDP), public, private and out-of-pocket health expenditure per capita, and immunization coverage (Yıldırım, 2005: 20; Wendt, 2009: 436; Klomp & de Haan, 2010: 436; Muntaner et al., 2012: 4; Çelik, 2013: 178; Alptekin & Yeşilaydın, 2015: 144; Teleş et al., 2018: 819). In this study, the number of physicians, nurses, and beds per 1,000 people, smoking ratio, LEB, ADH, and maternal mortality rate were used for clustering analysis. After the clustering analysis, public, private, and out-of-pocket health

expenditure per capita by purchasing power parity was used in the ANOVA test to make comparisons between the clusters (Table 1).

Table 1: Variables and Explanations Used in the Study

Variables	Explanations
Number of Physicians	Per 1,000 people (in 1 year)
Number of Nurses	Per 1,000 people (in 1 year)
Bed Number	Per 1,000 people (in 1 year)
Smoking Ratio	Percentage of population over the age of 15 that consume tobacco every day (%) (in 1 year)
Life Expectancy at Birth (LEB)	Average number of years that a new born is expected to live
Average Duration of Hospitalization (ADH)	Average number of days that an individual is stayed in hospital (in 1 year) (except rehabilitation services and long-term palliative care services)
Mother Mortality Rate (MMR)	Mother Mortality Rate for every 100,000 live birth
Public Health Expenditure	Per capita health expenditure made by public in 1 year (purchasing power parity - $)
Out-of-Pocket Health Expenditure	Per capita out-of-pocket health expenditure (patient share, patient contribution, drugs etc.) made by individual in 1 year (purchasing power parity - $)
Private Health Expenditure	Per capita health expenditure made by private enterprises (private insurance funds, third party institutions etc.) in 1 year (purchasing power parity - $)

Statistical Package for Social Sciences (SPSS) version 23.0 was used in the analysis of the data. Ward Technique, which is one of the hierarchical clustering methods, was chosen while clustering the countries according to the health indicators and Euclidean distance was used for measurement of the distance. Clustering analysis allows to cluster unclustered data by their similarity. Clustering analysis is used frequently to evaluate clusters rather than evaluating data itself. As a result of the clustering analysis, it is expected that the homogeneity of the clusters in itself and the heterogeneity between the clusters will be high. As a result, if the classification was successful, the objects in the cluster would be geometrically close to each other and the different groups would be distant from each other (Kaufman & Rousseeuw, 2009: 1; Kalaycı, 2010: 349).

Hierarchical clustering method is one of the most used clustering analysis techniques. In the hierarchical clustering method, all data are collected in a single group by creating a tree-like structure. Then the data is divided into clusters until clusters become indivisible (Aronson & Iyer, 2013: 176). Clusters are created using the connection methods used to calculate the mathematical distance measure between the data points and possible clusters. The Ward Technique is one of these connection methods (Clatworthy et. Al., 2005: 332). In the Ward Technique, the average distance from the observations in the same cluster is based on the observation that falls in the middle of a cluster. Total deviation squares are used in the Ward Technique (Kalaycı, 2010: 359). Dendogram graph is obtained as a result of the analysis. Using this graph, the number of clusters is decided.

After the clustering analysis, parametric or nonparametric tests can be used to determine whether the heterogeneity is achieved between clusters (Dunn et al., 2018: 1667). In this study, ANOVA test was used to compare the averages. In ANOVA, it is assumed that the values of a variable for each group is normally distributed and that the variances of the groups are homogeneous (Kalaycı,2010: 133). In this study, after clustering analysis, ANOVA test was used for comparing health expenditures. Tukey HSD test was used to determine the difference between the clusters.

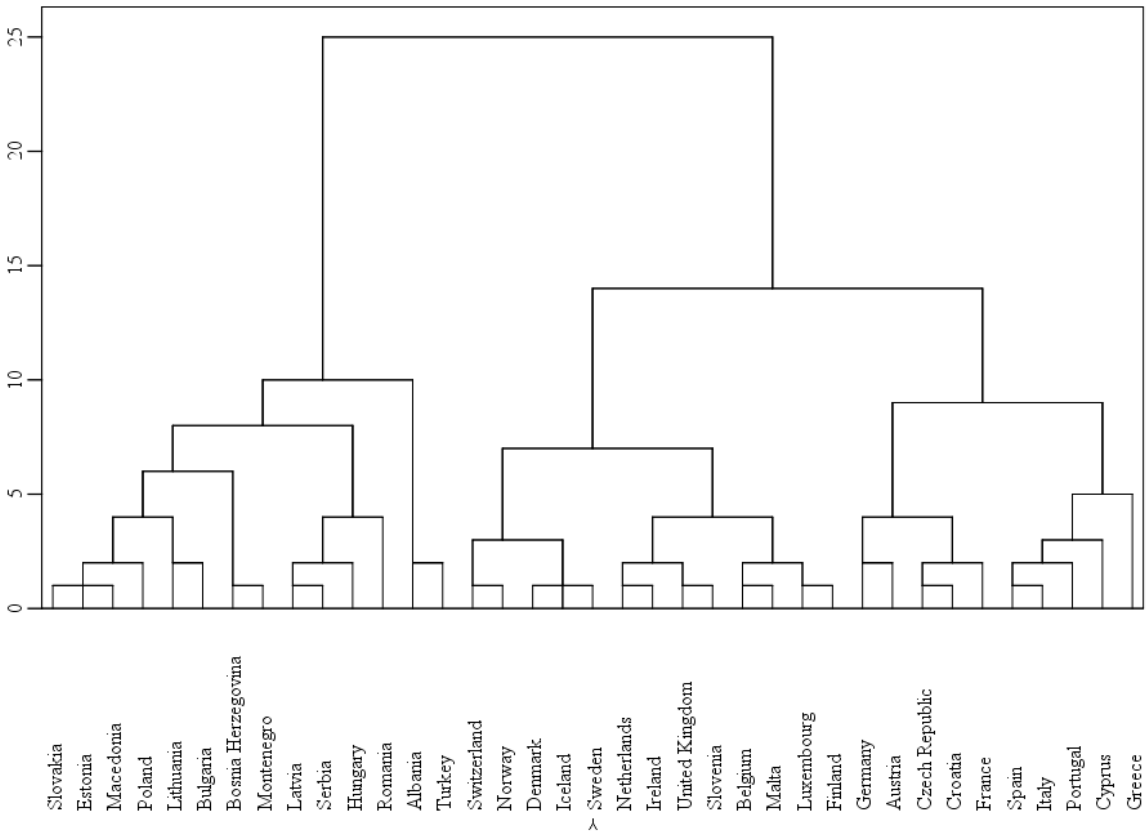
II. RESULTS

The descriptive statistics of the variables in the study are presented in Table 5 (Appendix). According to the Table 2, average valuesare 3.5±0.98 in the number of physicians, 8.6±4.3 in the number of nurses, 4.7±1.63 in the number of beds, 29±7.06 in the smoking ratio, 79.6±2.91 in the LEB, 7.5±1.44 in the ADH and 9.1±6.44 in the MMR.

Data regarding the health expenditure of the countries is presented in Table 6 (Appendix). According to the Table 3, average values are 2,388±1,563 in the public health expenditure, 658±372 in the out-of-pocket health expenditure and 166±188 in the private health expenditure.

The groups formed as a result clustering analysis with respect to health indicators of countries included in the present study is provided in Figure 1 in the form of Dendogram.

Figure 1: Dendogram Clustering Analysis Results of the Clustering Analysis of Countries



According to Figure 1, it can be seen that the countries included in the study can be divided into at least 2 groups. It is possible to divide the countries into 3 groups in order to ensure equal distribution of groups.

The clusters formed by countries are presented in Table 2. According to clustering analysis results, it was determined that the first cluster consists of 14 countries, the second cluster consisted of 13 countries and the third cluster consisted of 10 countries.

Table 2: Clusters Formed by Countries in EU Cycle

Clusters	Countries	Number of Observations in Clusters
1	Slovakia, Estonia, Macedonia, Poland, Lithuania, Bulgaria, Bosnia Herzegovina, Montenegro, Latvia, Serbia, Hungary, Romania, Albania, Turkey	14
2	Norway, Switzerland, Denmark, Iceland, Sweden, Netherlands, Ireland, United Kingdom, Slovenia, Belgium, Malta, Luxembourg, Finland	13
3	Germany, Austria, Czech Republic, Croatia, France, Spain, Italy, Portugal, Cyprus, Greece	10
	Total	**37**

Average and standard deviation (SD) values were provided in Table 3 for better comparison of the health indicators of the identified clusters. In a clustering analysis, the homogeneity inside of the clusters and heterogeneity among clusters are expected to be high. When the variables are examined, it can be seen that in the variables of number of nurses, smoking ratio, LEB and MMR, there are statistically significant differences between the clusters according to the ANOVA test results ($p<0.05$).

Table 3: ANOVA Test Results Regarding Health Indicators of the Clusters

Health Indicators	1. Cluster (n=14)	2. Cluster (n=13)	3. Cluster (n=10)	F	p*
	Average ±SD	Average ±SD	Average ±SD		
Number of Physicians	2.89 ± 0.88^{a}	3.53 ± 0.59^{ab}	4.23 ± 1.04^{b}	7.396	0.002
Number of Nurses	5.42 ± 1.36^{a}	12.96 ± 3.51^{b}	7.26 ± 3.13^{a}	26.479	<0.001
Bed Number	5.25 ± 1.59^{a}	3.78 ± 1.03^{b}	5.12 ± 1.92^{ab}	3.624	0.037
Smoking Ratio	33.10 ± 5.49^{a}	22.39 ± 3.65^{b}	31.97 ± 6.24^{a}	16.778	<0.001
LEB	76.36 ± 1.43^{a}	81.94 ± 0.76^{b}	81.22 ± 1.70^{b}	69.295	<0.001
ADH	7.41 ± 1.59^{a}	6.96 ± 1.27^{a}	8.28 ± 1.14^{a}	2.595	0.089
MMR	13.78 ± 8.22^{a}	6.53 ± 2.40^{b}	5.90 ± 2.28^{b}	8.446	<0.001

*Significance level is selected as 0.05
There no significant difference is present between groups in same rows and groups with the same letters (a-b-c)

The Tukey HSD test was performed to determine which clusters were the source of differences according to health indicators. According to the test results, a significant difference was found between the first and third clusters in terms of the number of physicians. A statistically significant difference was found between the first and the second clusters and the third and the second clusters in terms of the number of nurses and smoking ratio. It was determined that in the second cluster, the average number of nurses was higher, and the average of smoking ratio was lower. There was a statistically significant difference between the first and the second clusters in terms of the number of beds and it was determined that the difference was related to the first cluster. The first cluster related significant difference was determined in terms of LEB and MMR and it was determined that the LEB was lowest and MMR was highest in the first cluster.

The results of the ANOVA test, which compared the health expenditures of the countries in the EU Cycle, are provided in Table 4. According to the ANOVA tests results, the presence of a statistically significant difference ($p <0.05$) between the clusters in terms of public, out-of-pocket and private health expenditures was determined. According to the results of the Tukey HSD Test conducted for the determination and the identification of the difference, the average public health expenditure of the three

clusters showed a statistically significant difference ($p < 0.05$). It was determined that the second cluster ($\bar{x}$ = 3,858.2) had the highest average public health expenditure where the first cluster ($\bar{x}$ = 958.1) which included Turkey had the lowest average public health expenditure. When the source of differences between the out-of-pocket and private health expenditures were examined, it was found that the difference between the first and the second groups was significant and the averages of both out-of-pocket and the private health expenditure ($\bar{x}$ = 874.0, 290.8) of the second cluster were higher than the first cluster. It was determined that first cluster which included Turkey had the lowest public, private and out-of-pocket health expenditure compared to other clusters.

Table 4: ANOVA Test Results Regarding Health Expenditure of the Clusters

Health Expenditures	1. Cluster (n=14)	2. Cluster (n=13)	3. Cluster (n=10)	F	p*
	Average ±SD	Average ±SD	Average ±SD		
Public Health Expenditure	958.1±394.2[a]	3858.2±1102.9[b]	2480.1±1269.9[c]	31.020	<0.001
Out-of-Pocket Health Expenditure	441.1±169.6[a]	874.0±482.5[b]	682.0±242.9[ab]	5.840	0.007
Private Health Expenditure	34.1±34.2[a]	290.8±241.2[b]	188.4±108.1[ab]	9.360	0.001

*Significance level is selected as 0.05
There no significant difference is present between groups in same rows and groups with the same letters (a-b-c)

DISCUSSION AND CONCLUSION

Health systems are the systems that perform activities and develop policies in order to optimize health indicators and health expenditures. The performance evaluation studies carried out for this purpose enable comparisons to be made between countries (especially countries with developed health indicators) and revealing the deficiencies. In this study, health indicators and health expenditures of the countries in the EU Cycle were compared.

As a result of the clustering analysis, the countries in the EU Cycle were grouped under 3 clusters. Some of the countries in Cluster 1 were among the former Eastern Bloc countries, as a result they could be said to have similar health indicators. In addition, it can be concluded that countries that joined EU in the latest enlargements of the EU and EU candidate countries had similar health indicators according to the results of clustering analysis. It was also determined that similar countries were placed in the same cluster in another study where LEB, physician and bed number, infant mortality rate, fertility rate, public and private health expenditures of EU countries were compared in the extent of a clustering study (Öz et al., 2009: 20). In another study conducted by Girginer (2013) where also health indicators of EU countries and Turkey was compared, it was determined that Turkey was placed in the same cluster with countries including Hungary, Lithuania, Latvia, Poland, Romania, and Bulgaria. When these countries are examined, it is seen that they mostly have similar levels of development.

When the results of clustering analysis are examined, it is determined that Germany, Italy, and France, three of the founding members of the EU, were found to be placed in the third cluster with the Czech Republic, Cyprus and Croatia which joined the EU after 2004 and 4 other members of EU (Austria, Spain, Portugal, Greece). When the EU member countries which constitute the second cluster are examined, it is determined that second cluster contains EFTA members (Switzerland, Iceland, and Norway), 3 founding countries of EU (Luxembourg, Belgium, the Netherlands) and 7 countries (Denmark, Sweden, Ireland, United Kingdom, Slovenia, Malta, Ireland, Finland) which joined the EU after 1973 and before 1995. In a study conducted by the Legatum Institute Foundation in which health performance of 149 countries was assessed, it was determined that EU member countries in the second

cluster were among the countries with the best health performance in the world and these countries are followed by the countries in the third cluster (Legatum Institute Foundation, 2018: 8–9). The cluster obtained in another study conducted by Timor and Lorcu (2010) in which health system performances of EU member countries are assessed, are similar with clusters obtained in this study. Although the countries in the EU Cycle have their own health policies, resource allocation and health service delivery, the main objective of the countries is to improve public health (European Commission, 2017). When the main objective is evaluated in terms of the variables used in this study, it is seen that there are significant differences between the countries in the EU cycle. While the countries in the EU cycle are expected to display a homogeneous aspect, it can be said that this situation has not been realized due to reasons such as income level, health system financing structure, management structure, health system environment and demographic structure of the country.

It is determined that the cluster which Turkey is placed in is behind of the other two cluster in terms of LEB, number of physicians and nurses, MMR, and smoking ratio health indicator averages. The countries in the first cluster have a better average in terms number of beds against other clusters and also have a better average in terms of ADH (higher ADH is not a desired situation) with respect to third group. It was found that the countries in the second cluster had the best values in terms of number of nurses, LEB, smoking ratio and ADH. In the third group, the variables of average number of physicians and MMR were found to be better compared to the other groups. It is obtained from our study that for 6 out of 7 health indicators of the EU member states which joined EU prior to 2004 and all of the EFTA countries has better values than the cluster which Turkey is included. In a study conducted by Erkekoğlu (2007) in which comparisons were made on health indicators of LEB, number of beds and MMR of EU member states, it is found that the health indicator averages of Turkey and countries joined to EU after 2004 are worst with respect to EU members joined EU prior to 2004 in terms of LEB and MMR and also it is found that the health indicator averages of Turkey and countries joined to EU after 2004 is are average with respect to EU members joined EU prior to 2004 in terms of bed number. In other studies conducted under same topic, it is determined that the cluster which Turkey is included is lagging behind other clusters in terms of MMR, LEB, ADH, physician number and nurse number (Lorcu et al., 2012: 975–976; Teleş et al., 2018: 822). The reasons underlying the fact that the health indicators of the member states of the EU which joined EU prior to 2004 and EFTA member countries are better than the countries in the first cluster are that former countries having strong health systems, higher level of socio-economic development, political and economic developments, effective implementation and management of health and social policies, adaptation to rapid developments in technology and higher level of health expenditures (Turanlı et al., 2006: 106–107; Erkekoğlu, 2007: 47; Öz et al., 2009: 24).

The public, private and out-of-pocket health expenditure per capita averages of the first cluster which Turkey is included in, is lowest among three clusters. The reason that the health expenditures of the countries placed in the second and third clusters are higher than the countries placed in the first cluster can be related and attributed to increasing the demand for health services, the increase in the LEB and the increase in the percentage of elderly population with relation with the aforementioned fact (LEB), the changes in technology and the increase in costs, the long lasting duration of chronic diseases and increment of occurrence of chronic diseases, the geographical structure of the country and the distribution of health institutions, the size of the gross domestic product and the characteristics of the health system (Mazgit, 2002: 413; Turanlı et al., 2006: 105–106; Ke et al., 2011: 17–20; Boz & Sur, 2016: 25–27).

Health, which is an important indicator of the development of societies and individuals, is one of the most important issues emphasized by all countries. Countries make investments and expenditures for promotion of the health of society. Expenditures can make important and positive changes in health indicators. One of the significant outcomes and finding of this study where health indicators and 372ealth expenditures of Countries in the EU Cycle is evaluated, is that health indicators and health expenditures of EU candidate countries including Turkey and EU member states which joined EU after 2004 is quiet lagging behind EU members which joined EU prior 2004. It was determined that the

countries in the EU cycle did not show a homogenous appearance according to the result of clustering analysis, and significant differences were present among these countries. The main purpose of comparing health systems is perform comparisons with better health systems and improve the existing lagging behind health systems, thus the countries placed in second and third clusters are important examples for the countries placed in first cluster including Turkey despite the social, cultural and political differences.

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APPENDIX

Table 2: Health Indicators of the Countries

Countries	Number of Physicians	Number of Nurses	Number of beds	Smoking ratio	LEB	ADH	MMR
Germany	4.2	13.8	8.1	30.6	81.1	8.9	6.0
Albania	1.3	4.0	2.6	28.7	78.3	5.5	29.0
Austria	5.1	8.3	7.4	29.6	81.7	8.2	4.0
Belgium	3.1	10.8	5.7	28.2	81.5	7.5	7.0
United Kingdom	2.8	8.4	2.6	22.3	81.2	7.1	9.0
Bosnia Herzegovina	1.9	5.9	3.5	38.9	76.9	7.2	11.0
Bulgaria	4.1	5.3	7.3	37.0	74.6	5.4	11.0
Czech Republic	3.7	8.4	6.9	34.3	79.1	9.3	4.0
Denmark	3.7	17.0	2.6	19.1	80.9	5.4	6.0
Estonia	3.5	6.4	4.8	31.3	77.8	7.7	9.0
Finland	3.2	15.0	4.0	20.4	81.5	8.6	3.0
France	3.1	10.6	6.1	32.7	82.4	10.1	8.0
Cyprus	3.8	4.1	3.4	36.4	80.5	6.4	7.0
Croatia	3.2	6.5	5.5	37.0	78.0	8.8	8.0
Netherlands	3.5	10.5	3.6	25.8	81.6	5.0	7.0
Ireland	2.9	12.4	3.0	24.3	81.8	6.0	8.0
Spain	3.8	5.3	3.0	29.3	83.4	7.3	5.0
Sweden	4.3	11.9	2.3	18.8	82.4	5.8	4.0
Switzerland	4.3	18.2	4.6	25.7	83.7	8.3	5.0
Italy	4.0	5.8	3.2	23.7	83.3	7.8	4.0
Iceland	3.9	16.3	3.1	14.7	82.3	6.2	3.0
Montenegro	2.5	5.7	3.9	45.9	77.1	8.5	7.0
Latvia	3.2	4.9	5.7	37.0	74.7	8.3	18.0
Lithuania	4.5	8.0	6.7	28.8	74.3	8.0	10.0
Luxembourg	2.9	12.3	4.8	23.5	82.8	9.1	10.0
Hungary	3.2	6.6	7.0	30.6	76.2	9.5	17.0
Macedonia	2.9	3.8	4.4	31.4	75.7	7.9	8.0
Malta	3.8	9.1	4.7	25.3	81.8	7.9	9.0
Norway	4.5	17.8	3.7	20.5	82.5	6.9	5.0
Poland	2.4	5.7	6.6	28.0	78.0	7.1	3.0
Portugal	4.8	6.4	3.4	22.7	81.2	9.0	10.0
Romania	2.8	6.4	6.8	29.7	75.0	7.3	31.0
Serbia	2.9	4.7	5.6	38.9	75.2	10.0	17.0
Slovakia	3.5	6.0	5.8	30.1	77.3	7.4	6.0
Slovenia	3.0	8.8	4.5	22.5	81.3	6.8	9.0
Turkey	1.8	2.6	2.8	27.2	78.0	4.0	16.0
Greece	6.6	3.4	4.2	43.4	81.5	7.0	3.0
Average	**3.5**	**8.6**	**4.7**	**29.0**	**79.6**	**7.5**	**9.1**
Standard deviation	**0.98**	**4.30**	**1.63**	**7.06**	**2.91**	**1.44**	**6.44**

Number of physicians: The year of data related to countries other than 2016: Albania 2013, Bosnia-Herzegovina 2013, Czech Republic 2013, Denmark 2015, Finland 2014, Sweden 2015, and Macedonia 2015.
Number of nurses: The data and year of date of the countries other than 2016: Albania 2013, Bosnia-Herzegovina 2013, Bulgaria 2014, Denmark 2014, Finland 2014, Cyprus 2014, Croatia 2014, The Netherlands 2014, Ireland 2011, Sweden 2014, Portugal 2014, and Romania 2013 belongs to 2015 and all the data is obtained from World Bank.
Hospital bed number: The data and year of date of the countries other than 2016: Albania 2012, Bosnia-Herzegovina 2014, and Italy 2015.
Smoking ratio: All data is from the year of 2016 and obtained from World Bank.
LEAB: Data related to France is of year 2015.
ADH: The year of data related to countries other than 2016: France 2015, Greece 2012, Albania 2013, Bosnia Herzegovina 2015, Bulgaria 2014, Croatia 2014, Cyprus 2014, Montenegro 2014, Lithuania 2014, Macedonia 2013, Malta 2014, Romania 2013, and Serbia 2014.
MMR: All data is from the year of 2016 and obtained from World Bank.

Table 3: Health Expenditures of the Countries

Countries	Public Health Expenditure	Out-of-Pocket Health Expenditure	Private Health Expenditure
Germany	4,612	677	163
Albania	327	440	7
Austria	3,908	998	367
Belgium	3,672	739	249
United Kingdom	3,312	630	222
Bosnia Herzegovina	757	315	30
Bulgaria	762	711	19
Czech Republic	2,034	373	75
Denmark	4,269	696	110
Estonia	1,504	451	33
Finland	3,042	875	213
France	3,957	466	350
Cyprus	910	938	289
Croatia	1,272	251	133
Netherlands	4,239	600	396
Ireland	3,796	684	787
Spain	2,320	776	161
Sweden	4,466	815	67
Switzerland	4,912	2,313	599
Italy	2,554	792	83
Iceland	3,430	710	68
Montenegro	643	305	9
Latvia	866	719	12
Lithuania	1,235	601	39
Luxembourg	5,643	783	547
Hungary	1,303	584	79
Macedonia	549	305	3
Malta	2,105	1,288	78
Norway	5,257	897	21
Poland	1,246	409	129
Portugal	1,846	772	165
Romania	848	232	10
Serbia	764	537	23
Slovakia	1,753	387	30
Slovenia	2,014	333	424
Turkey	857	180	55
Greece	1,388	777	98
Average	**2,388**	**658**	**166**
Standard deviation	**1,563**	**372**	**188**

Public Health Expenditure: The data related to Albania, Bosnia Herzegovina, Bulgaria, Cyprus, Croatia, Montenegro, Lithuania, Macedonia, Malta, Romania and Serbia is of year 2015 and obtained from OECD. The data related to other countries is of 2016 and obtained from OECD.

Out-of-Pocket Health Expenditure: The data related to Albania, Bosnia Herzegovina, Bulgaria, Cyprus, Croatia, Montenegro, Lithuania, Macedonia, Malta, Romania and Serbia is of year 2015 and obtained from OECD. The data related to other countries is of 2016 and obtained from OECD.

Private Health Expenditure: The data related to Albania, Bosnia Herzegovina, Bulgaria, Cyprus, Croatia, Montenegro, Lithuania, Macedonia, Malta, Romania and Serbia is of year 2015 and obtained from OECD. The data related to other countries is of 2016 and obtained from OECD.

Etik Beyanı : *Bu çalışmanın tüm hazırlanma süreçlerinde etik kurallara uyulduğunu yazarlar beyan eder. Aksi bir durumun tespiti halinde ÖHÜİİBF Dergisinin hiçbir sorumluluğu olmayıp, tüm sorumluluk çalışmanın yazarlarına aittir.*

Bu çalışmada kullanılan veriler, herkesin kullanımına açık şekilde paylaşıldığından ve etik kurul izni gerektiren araştırmalar içerisinde bulunmadığından etik kurul izni alınmamıştır.

Yazar Katkıları : *Birinci yazar, çalışmada bütün bölümlere ve süreçlere katkı sağlamıştır. İkinci yazar, yöntem ve bulgular bölümleri ile veri toplama ve analiz süreçlerine katkı sağlamıştır. Üçüncü yazar, giriş, tartışma ve sonuç bölümlerine katkı sağlamıştır. Bütün yazarların katkısı eşit orandadır.*

Çıkar Beyanı : *Yazarlar arasında çıkar çatışması yoktur.*

Ethics Statement : *Authors declare that ethical rules are observed in all preparation processes of this study. If a contrary situation is detected, Academic Review of Economics and Administrative Sciences (OHUIIBFD) has no responsibility and all responsibility belongs to the authors of the study.*

Since the data used in this study is shared publicly and does not include research requiring ethics committee approval, ethics committee approval has not been obtained.

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