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EVALUATION OF HEALTH EXPENDITURES IN TURKEY AND EU COUNTRIES: A CLUSTER ANALYSIS*

TÜRKİYE VE AVRUPA BİRLİĞİ ÜLKELERİNDEKİ SAĞLIK HARCAMALARININ DEĞERLENDİRİLMESİ: KÜMELEME ANALİZİ

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ABSTRACT

Significance value of the study is to show the concept of social state in Turkey and designate if it has reached the level of the developed countries in the EU. To accomplish this purpose, study evaluates 28 different European Union countries' and Turkey's health expenditures, which are ratio of total health expenditures in gross domestic Product, ratio of private health expenditures in gross domestic product, ratio of public health expenditures in gross domestic product, by rate and amount thus, specify the position of Turkey in European Union countries. Cluster analysis is one of methods being used in data mining to classify variables by their similarities and differences consideringly characteristic features. In this context, share of total health expenditures in gross domestic product, share of private health expenditures in gross domestic product and share of public health expenditures in gross domestic product were analyzed via cluster analysis.

Keywords: Health Expenditures, Cluster Analysis, Data Mining

ÖZ

Çalışma Türkiye'deki sosyal devletin durumunu tasvir etmesi ve Türkiye'nin gelişmiş Avrupa Birliği ülkeleri seviyesine ne derecede ulaştığını göstermesi bakımından önem arz etmektedir. Bu amacı gerçekleştirmek üzere çalışma, 28 Avrupa Birliği ülkesi ve Türkiye'de yapılan sağlık harcamalarını gayrisafi yurtiçi hasıla içindeki toplam sağlık harcamalarının payı, gayrisafi yurtiçi hasıla içindeki özel sağlık harcamalarının payı, gayrisafi yurtiçi hasıla içindeki kamu sağlık harcamalarının payı özelinde miktar ve oran bakımından inceleyerek Türkiye'nin Avrupa Birliği ülkeleri arasındaki yerini belirlemektedir. Kümeleme analizi veri madenciliğinde kullanılan bir analiz olup değişkenlerin karakteristik özelliklerini dikkate alarak benzerlik ve farklılıklarını sınıflandırmaya yarayan bir yöntemdir. Bu bağlamda çalışmada gayrisafi yurtiçi hasıla içindeki toplam sağlık harcamalarının payı, gayrisafi yurtiçi hasıla içindeki özel sağlık harcamalarının payı, gayrisafi yurtiçi hasıla içindeki kamu sağlık harcamalarının payı kümeleme analiziyle incelenmektedir.

Anahtar Sözcükler: Sağlık Harcamaları, Kümeleme Analizi, Veri Madenciliği

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1. Introduction

This study analyses the health-related social expenditures of Turkey and EU countries as part of being social states, and this study is significant in that it underlines the relative position of Turkey in comparison to the EU countries. Whether Turkey belongs to the cluster of the EU countries is checked via cluster analysis and the concept of social state in Turkey will be studied to designate if it has reached the level of the developed countries in the EU.

The aim of this study is to evaluate the health expenditures of Turkey and 28 EU countries in terms of amount and ratio, and to designate Turkey's position with regard to the EU countries. Hierarchical cluster analysis, a method used in cluster analysis, was utilised in this study and the data of Turkey and the EU countries were analysed using SPSS. The goal here was to evaluate the characteristic properties of the data and merge them at certain levels, and to identify which EU countries was in the same category with Turkey. In order to realise this goal, the Ward's method, which provides a reliable analysis by minimising variance differences between variables, was chosen and a dendrogram analysis was undertaken. In addition, the square Euclidean distance method, which is the most common method used to measure similarity distance, was implemented.

The study comprises 28 EU countries and Turkey. The health expenditures the EU countries, which are Germany, Austria, Belgium, England, Denmark, Finland, France, Holland, Ireland, Spain, Sweden, Italy, Luxembourg, Portugal, Greece, Czech Republic, Estonia, Southern Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovakia, Slovenia, Bulgaria, Romania and Croatia, and Turkey made were analysed by limiting the time range. For the relevant variables, the most up-to-date data sets were analysed. Cluster analysis was utilised on health expenditures for the period of 1995-2014. Accordingly, the ratio of total health expenditures in gross domestic product, the ratio of private health expenditures in gross domestic product and the ratio of public health expenditures in gross domestic product were analysed via cluster analysis.

2. Literature Review

Konuk (2011) carried out a study to analyse public health expenditures, and he studied the progress of this expenditure for the decade between 2000 and 2010. He found that public spending increased constantly and Social Security Institution's ability to compensate for its own expenditures declined in this period. In addition, the reform efforts to promote the private sector were observed to have a positive effect while insufficiencies were observed in the efficiency and sustainability of the public health sector.

In his study, Sağlam (2011) studied the situation of social state and the development of social rights for the period from 1924 and onwards in terms of the constitutional amendments, and he aimed to show the role and significance of the social state in realising basic rights such as the right to health and the right to work.

In his study, Özcan (2004) studied the Atatürk period and post-Atatürk period with regard to the principal of social welfare state which includes housing, health and social security, and he especially focused on the period after 1945 to see to what extent Atatürk's contemporary and social state ideology was reflected upon government policies.

In his study, Özcan (2009) studied Turkey, Germany, England and Holland in terms of the

evolution of the social welfare state with the phenomenon of globalisation. Moreover, the applicability of the social state mentality mentioned in the constitutions were evaluated and the transfer expenditures, social security expenditures, health expenditures and the increase in health expenditures were compared with the OECD countries.

In his study, Günaydın (2011) underlined the fact that attempts to privatise health services increased after the 80s as a result of the neo-liberal policies, and he studied the effects of globalisation on health policies in social states. Accordingly, he analysed the Project of Transformation in Health, which was enacted in 2002.

Koçak and Tiryaki (2011) studied the first time the welfare state emerged and how it developed in addition to its implementation types. Then they studied the extent of health expenditures in the context of the social welfare state in developed countries and Turkey. Finally, they evaluated people's views on health services in the context of Yalova province in Turkey.

Özdemir (2010) stated that, especially in the 20th century, states' shares in economy and public expenditures increased and the idea of social state showed a significant increase until the start of the globalisation. However, Özdemir (2010) maintained that after this stage, the increasing expenditures became a problem and it led countries to crisis. After the 1970s, economic growth rates slowed down in general, budget deficits and unemployment increased while retirement and the budget of health expanded.

By studying the income and life conditions of people who were 25-80 years old in 18 European Union countries, Dahl (2013) implemented a logistic regression analysis considering gender. The study concluded that there was a correlation between health expenditures and low health service quality, and this situation was found to be more dominant for males compared to females. Moreover, Dahl (2013) stated that low health inequalities were found to increase social expenditures in health services.

Artazcoz et al. (2016) checked whether there was a correlation between long working hours and the state of health in Europe for 13.518 males and 9.381 females in the context of the fifth European Working Conditions Survey, which was carried out in 2010. The results suggested that long working hours led to negative issues such as the worsening of health and psychology.

Eikemo et al. (2008) analysed European Social Surveys of 2002 and 2004 by explaining the perception of health in European countries from the perspective of regime characteristics in welfare states, and they cancelled individual and regional changes. The study which was carried out with 65.065 individuals (aged 25 and over) in 218 regions and 21 countries assessed health at individual levels for 90% of the time while health was linked to national welfare state characteristics for 10% of the time.

Kim et al. (2012) analysed 104 articles for the period of 1988-2010 and studied whether the effects of the differences between welfare states on health led to unstable employment. The results demonstrated that the welfare states were found to make policies in issues related to employment and the study suggests that future studies should be carried out at a macro level, and they should focus on factors at country level and specific issues such as the history of individual employment should be studied.

3. The Comparison of Health Expenditures Using Cluster Analysis

The EU countries and Turkey were compared via cluster analysis, which examined the ratio of total health expenditures in gross domestic product, the ratio of private health expenditures in gross domestic product and the ratio of public health expenditures in gross domestic product.

3.1. Cluster Analysis

Cluster analysis is a multivariate statistical analysis method which is used to classify variables that show similarity. By assessing the characteristics of the data, cluster analysis enables the formation of classes/groups and it sorts the data in accordance with their similarity. In other words, cluster analysis is used to classify data which have not been classified before and it divides them into clusters depending on similarity (Kavılı, 2016: 5).

Cluster analysis, which is used in such fields as Biology, Psychology and Archaeology, is used to classify the data which are in a mess and to make them meaningful. Cluster analysis is a method that is commonly used especially in the field of health (Yalçın, 2013: 2) and cluster analysis is composed of different stages.

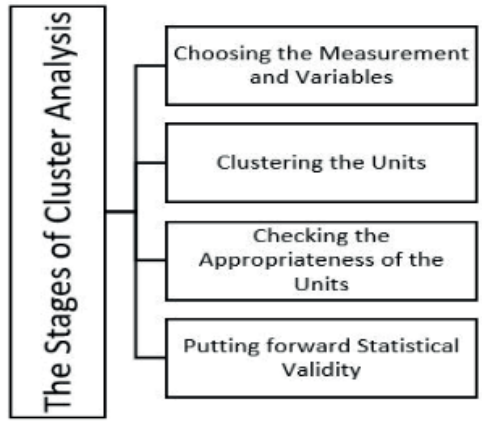

Figure 1. The Stages of Cluster Analysis

According to this figure, first, the measurements and variables should be identified to unearth similarity among units. Then according to the identified similarity measurements, the data are clustered, and the appropriateness of the formed clusters is checked (Gül, 2014: 39).

Basically, there are two types of cluster analysis which are hierarchical and non-hierarchical clustering methods.

Hierarchical cluster analysis is used in an analysis which has smaller samples, with data sets less than 250 observations. In hierarchical cluster analysis, how the clusters, which will be formed depending on the similarities and differences of the variables, will be merged or separated should be decided before the analysis starts. In cases where the number of groups in the data set to be analysed is not known, hierarchical cluster analysis is used, and it enables the researcher(s) to find new characteristics which have not been observed before. Various cluster analysis algorithms are used to associate the data. These are explained below.

• **Single Linkage/Nearest Neighbour Method:** In this method, the data that have the nearest values are merged and firstly, the nearest two variables are identified. By assessing this cluster via another variable, the position of a third variable is included into the cluster if its distance is smaller than the other variables.

• **Complete Linkage Method/Farthest Neighbour Method:** This is the process of forming a new cluster in which the cluster that is formed by the two farthest variables is merged with the other clusters that have other distant variables. The farthest distance of a variable in the first cluster to another variable in another cluster defines the inter-cluster distance.

• **Average Linkage Method:** This is the method in which the clusters that were formed by the nearest and farthest variables are ignored. Accordingly, this model does not include extreme values and the distance between the clusters is calculated by calculating the arithmetic mean of the variables in the clusters.

• **Ward's Linkage Method:** In order to assess the homogeneity of variables at the highest level possible, this model minimises error sum of squares and it is called the least variance difference method. The Ward's Correlational Clustering Method aims to realise homogeneity in a cluster while maximising heterogeneity between clusters by merging the clusters that have the least error sum of squares.

• **Centroid Linkage Method:** It is a method in which the differences between the cluster centres are created by the averages in that cluster. The difference is used to detect the similarity between clusters (Yalçın, 2013: 9-14).

In non-hierarchical clustering method, the number of clusters are decided before the analysis starts as the researcher already has the knowledge related to the analysis he/she is going to do (Yalçın, 2013: 15-16). Some instances of the distance measurements are the Euclidean distance, the Gower's distance and the Canberra distance. The Euclidean distance, which is an instance of the most frequently used distance measurements, equals to the sum of the squares of the differences and it is formulated as seen below (Gül, 2014: 56). The Gower's distance, which can be applied to both categorical and constant data, is formulated as seen below (Kavılı, 2016: 10). The Canberra distance is calculated by the division of the absolute value of the difference between two observations by the absolute value of all the observations. It is formulated as seen below (Kavılı, 2016: 11).

Cluster analysis is implemented on different health values see the countries which are close to each other and which are far from each other via dendrogram figures. Dendrogram figure forms different clusters and each of those clusters consists of different countries according to the linkage method (in case of this study, it's Ward's linkage method) used. Reason of the usage of Ward's Linkage Method is that, it shows the highest possible homogeneity of variables, thus, this method is quite popular with cluster analysis. Tables that show square euclidean distances and clusters are constituted from dendrogram figures, to make it clear and more understandable as a table. Below 28 different European Union countries' and Turkey's health expenditures, which are ratio of total health expenditures in gross domestic product, ratio of private health expenditures in gross domestic product, ratio of public health expenditures in gross domestic product, are examined using cluster analysis which consists of dendrogram figures and square euclidean distance tables.

4. The Ratio of Total Health Expenditures in Gross Domestic Product

For the period of 1995-2014, the ratio of total health expenditures of Turkey and the EU countries in gross domestic product was presented in Table 1. According to these findings, when the averages were considered for the mentioned period and countries, the country which had the highest ratio of health expenditures in gross domestic product was France with 10,5% while Romania had the lowest ratio with 4,8%. In the mentioned period, Turkey's health expenditure ratio was 4,9%.

Table 1. The Ratio of Total Health Expenditures in Gross Domestic Product

	1995	2000	2005	2010	2011	2012	2013	2014
Turkey	2,51	4,95	5,45	5,61	5,29	5,24	5,38	5,41
Belgium	7,61	8,12	9,24	10,17	10,42	10,54	10,57	10,59
Bulgaria	4,75	6,07	7,08	7,24	6,88	7,11	7,93	8,44
Croatia	6,74	7,66	6,89	8,25	7,80	7,80	7,83	7,80
Cyprus	4,74	5,77	6,37	7,23	7,54	7,44	7,46	7,37
The Czech Republic	6,69	6,31	6,93	7,43	7,50	7,55	7,49	7,41
Denmark	8,13	8,70	9,77	11,08	10,87	10,98	11,25	10,80
Estonia	6,32	5,28	5,02	6,25	5,83	6,36	6,48	6,38
Finland	7,85	7,22	8,43	9,05	9,01	9,30	9,55	9,68
France	10,11	9,77	10,60	11,20	11,33	11,44	11,56	11,54
Germany	9,43	10,10	10,52	11,25	10,93	10,99	11,16	11,30
Greece	8,27	7,60	9,36	9,18	9,77	9,24	9,26	8,08
Hungary	7,22	7,06	8,28	7,85	7,84	7,74	7,53	7,40
Ireland	6,44	6,03	7,27	8,76	8,15	8,32	8,01	7,78
Italy	7,10	7,91	8,71	9,42	9,27	9,28	9,22	9,25
Latvia	5,76	6,00	6,37	6,55	6,10	5,91	5,67	5,88
Lithuania	5,37	6,46	5,83	7,09	6,86	6,67	6,59	6,55
Luxemburg	5,57	7,48	7,95	7,68	7,34	7,18	7,10	6,94
Malta	5,66	6,83	8,83	8,30	9,60	9,95	9,89	9,75
Netherlands	7,44	7,42	9,60	10,48	10,53	11,01	11,04	10,90
Poland	5,36	5,50	6,20	6,88	6,70	6,62	6,40	6,35
Portugal	7,42	9,14	9,98	10,44	10,07	9,74	9,55	9,50
Romania	3,22	4,33	5,47	5,83	5,53	5,48	5,60	5,57
Slovakia	6,06	5,50	7,04	8,51	7,96	8,15	8,00	8,05
Slovenia	7,46	8,26	8,50	9,07	9,08	9,37	9,29	9,23
Spain	7,44	7,21	8,12	9,56	9,48	9,39	9,10	9,03
Sweeden	7,96	8,18	9,06	9,47	11,70	11,80	11,97	11,93
Austria	9,55	10,06	10,53	11,17	10,94	11,17	11,14	11,21
The United Kingdom	6,69	6,94	8,24	9,51	9,34	9,41	9,34	9,12

Source: World Development Indicators 2017

The graphic of the ratio of total health expenditures in gross domestic product for the period of 1995-2014, which was analysed by dendrogram analysis, is presented in Figure 2. In the dendrogram analysis of total health expenditures in gross domestic product for the period of 1995-2014, the creation of 6 clusters were found to be appropriate. The clusters that were formed

in accordance with the analysis are as follows: Cluster 1: France, Germany and Austria, Cluster 2: Denmark, Sweden, Portugal, Belgium and Netherlands, Cluster 3: Bulgaria, Latvia, Cyprus, Estonia, Lithuania and Poland, Cluster 4: Hungary, Ireland, Croatia, Slovakia, Luxembourg and the Czech Republic, Cluster 5: Greece, Slovenia, Italy, Finland, Spain, the United Kingdom and Malta, Cluster 6: Romania and Turkey.

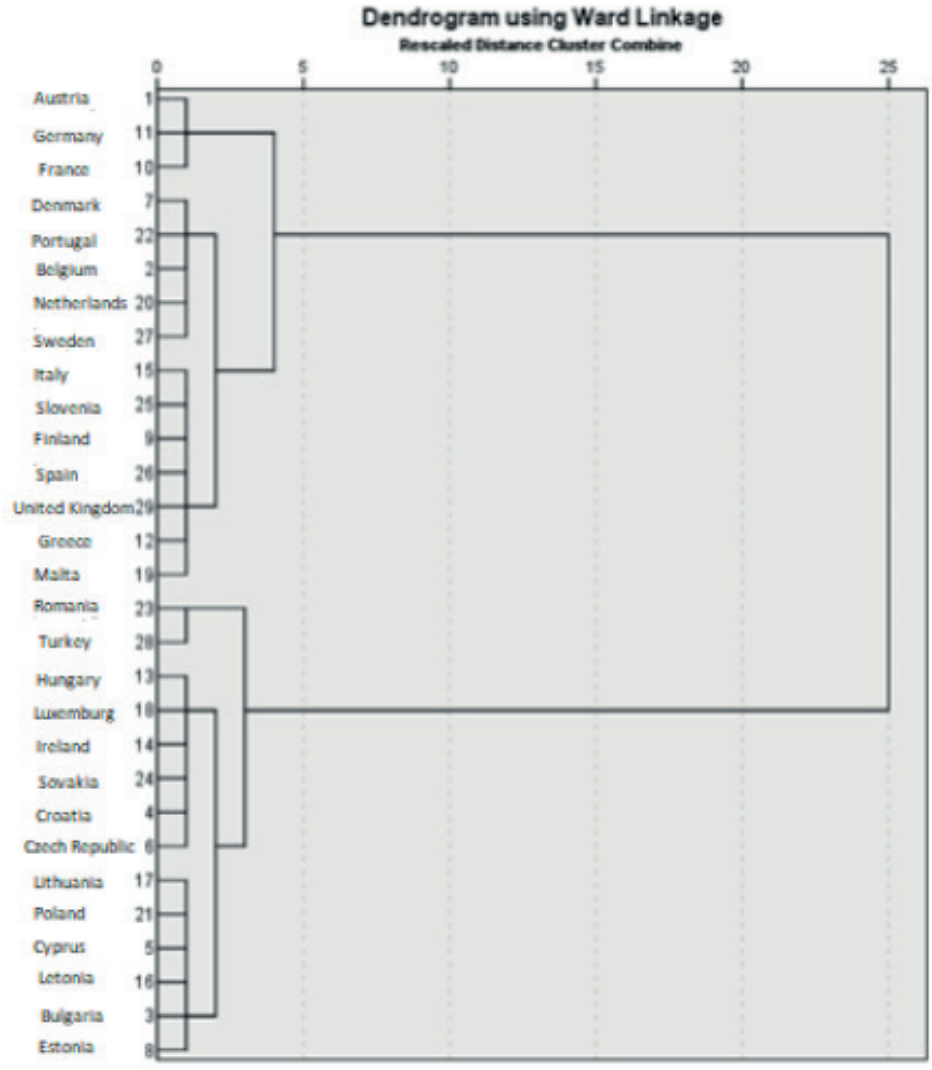

Figure 2. The Dendrogram Analysis for The Ratio of Total Health Expenditures in Gross Domestic Product

When the square Euclidean distances of the clusters which were prepared to assess the ratio of the total health expenditures Turkey and the EU countries in gross domestic product for the

period of 1995-2014 were considered, according to the 6th cluster that was formed by Romania and Turkey, Turkey's distance from Romania was 5,967018. The nearest country to Turkey after Romania was Poland with a distance of 41,0713. The farthest country to Turkey was France with a distance of 641,0977.

Table 2. The Square Euclidean Distances and Clusters for the Ratio of Total Health Expenditures in Gross Domestic Product

Country	Square Euclidean Distance	Cluster
Turkey	0	6
Romania	5,967018	6
Poland	41,0713	3
Lithuania	48,53455	3
Estonia	49,49884	3
Cyprus	49,78047	3
Latvia	50,23881	3
Bulgaria	58,53471	3
The Czech Republic	90,95124	4
Luxemburg	95,56814	4
Slovakia	100,406	4
Croatia	115,3711	4
Ireland	122,4655	4
Hungary	145,1886	4
Malta	194,2641	5
The United Kingdom	202,7634	5
Spain	225,3177	5
Finland	241,3767	5
Italy	246,5224	5
Slovenia	259,5673	5
Greece	300,4699	5
Netherlands	346,5017	2
Belgium	358,8779	2
Portugal	361,1839	2
Sweden	423,6597	2
Denmark	459,2472	2
Austria	613,6358	1
Germany	619,2774	1
France	641,0977	1

5. The Ratio of Private Health Expenditures in Gross Domestic Product

For the period of 1995-2014, the ratio of private health expenditures of Turkey and the EU countries in gross domestic product is presented in Table 3. According to these findings, when the averages were considered for the mentioned period and countries, the country which had the highest ratio of health expenditures in gross domestic product was Cyprus with 3,6% while the Czech Republic had the lowest ratio with 0,8%. In the mentioned period, Turkey's health expenditure ratio was 1,3%.

Table 3. The Ratio of Private Health Expenditures in Gross Domestic Product

	1995	2000	2005	2010	2011	2012	2013	2014
Turkey	0,74	1,83	1,75	1,20	1,08	1,09	1,16	1,22
Belgium	1,77	2,06	2,13	2,27	2,42	2,35	2,35	2,34
Bulgaria	1,24	2,37	2,77	3,21	3,12	3,11	3,81	3,84
Croatia	0,91	1,06	0,96	1,18	1,54	1,43	1,43	1,41
Cyprus	3,04	3,37	3,71	3,78	4,00	3,99	3,94	4,04
The Czech Republic	0,61	0,61	0,88	1,21	1,19	1,21	1,17	1,15
Denmark	1,42	1,40	1,52	1,65	1,60	1,56	1,65	1,65
Estonia	0,65	1,19	1,15	1,27	1,12	1,25	1,34	1,35
Finland	2,22	2,07	2,21	2,31	2,26	2,26	2,34	2,39
France	2,05	2,02	2,33	2,52	2,46	2,48	2,50	2,52
Germany	1,75	2,10	2,51	2,68	2,63	2,63	2,60	2,60
Greece	3,96	3,04	3,73	2,96	3,07	2,96	3,12	3,10
Hungary	1,16	2,07	2,48	2,73	2,81	2,83	2,62	2,52
Ireland	1,77	1,56	1,75	2,66	2,62	2,70	2,68	2,64
Italy	2,07	2,21	2,06	2,16	2,31	2,29	2,25	2,26
Latvia	1,94	2,74	2,74	2,46	2,08	2,17	2,13	2,17
Lithuania	1,39	1,96	1,88	1,95	1,90	2,08	2,09	2,11
Luxemburg	0,34	1,12	1,20	1,09	1,08	1,19	1,16	1,12
Malta	1,84	2,09	2,84	3,08	3,14	3,33	3,34	3,01
Holland	2,15	2,74	2,93	1,39	1,44	1,48	1,43	1,42
Poland	1,45	1,65	1,90	1,95	1,96	2,01	1,87	1,84
Portugal	2,77	2,95	2,99	3,27	3,37	3,50	3,32	3,34
Romania	0,82	0,81	1,05	1,14	1,15	1,08	1,08	1,09
Slovakia	0,70	0,58	1,80	2,71	2,31	2,47	2,22	2,21
Slovenia	1,66	2,15	2,28	2,34	2,40	2,56	2,62	2,61
Spain	2,07	2,05	2,24	2,38	2,48	2,65	2,59	2,63
Sweeden	1,06	1,24	1,71	1,75	1,79	1,85	1,91	1,91
Austria	2,41	2,53	2,70	2,77	2,72	2,75	2,77	2,48
The United Kingdom	1,00	1,42	1,58	1,57	1,57	1,61	1,56	1,54

Source: World Development Indicators 2017

The graphic of the ratio of private health expenditures in gross domestic product for the period of 1995-2014, which was analysed by dendrogram analysis, is presented in Figure 3. According to the dendrogram analysis of private health expenditures in gross domestic product for the period of 1995-2014, the creation of 7 clusters were found to be appropriate. The clusters that were formed in accordance with the analysis are as follows: Cluster 1: Austria, Belgium, Finland, France, Germany, Hungary, Italy, Latvia, Slovenia, Spain, Cluster 2: Bulgaria, Malta, Portugal, Cluster 3: Croatia, the Czech Republic, Estonia, Luxembourg, Romania, Cluster 4: Cyprus, Greece, Cluster 5: Denmark, Ireland, Lithuania, Poland, Sweden, Turkey, the United Kingdom, Cluster 6: Netherlands, Cluster 7: Slovakia.

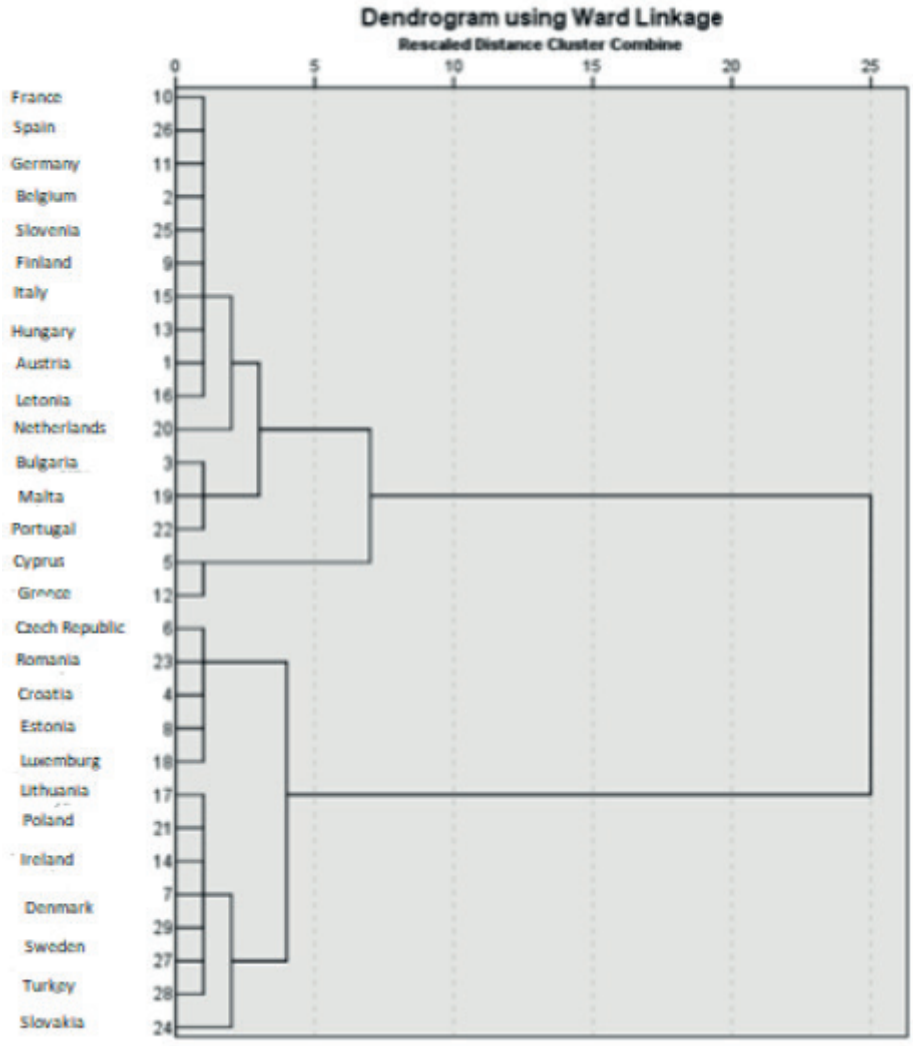

Figure 3. The Dendrogram Analysis for The Ratio of Private Health Expenditures in Gross Domestic Product

When the square Euclidean distances of the clusters that were prepared to assess the ratio of the private health expenditures of Turkey and the EU countries in gross domestic product for the period of 1995-2014 were considered, according to the 5th cluster that was formed by Denmark, Ireland, Lithuania, Poland, Sweden, Turkey and the United Kingdom, Turkey's distance from the United Kingdom was 2,190696. The nearest country to Turkey after the United Kingdom was Denmark with a distance of 3,449809. The farthest country to Turkey was Cyprus with a distance of 111,5106.

Table 4. The Square Euclidean Distances and Clusters for the Ratio of Private Health Expenditures in Gross Domestic Product

Country	Square Euclidean Distance	Cluster
Turkey	0	5
The United Kingdom	2,190696	5
Denmark	3,449809	5
Estonia	3,487494	3
Sweden	4,140385	5
Croatia	5,152897	3
Luxemburg	6,177452	3
Romania	6,687022	3
Lithuania	6,793541	5
Poland	6,916824	5
The Czech Republic	9,565241	3
Belgium	15,5736	1
Italy	16,07151	1
Ireland	17,04307	5
Finland	17,54135	1
Slovenia	18,60729	1
Slovakia	19,75957	7
Spain	19,92031	1
France	20,23291	1
Hungary	20,3517	1
Germany	22,34142	1
Holland	22,34233	6
Latvia	30,47101	1
Austria	35,04084	1
Malta	39,07449	2
Bulgaria	42,98412	2
Portugal	59,74877	2
Greece	95,57337	4
Cyprus	111,5106	4

6. The Ratio of Public Health Expenditures in Gross Domestic Product

For the period of 1995-2014, the ratio of private health expenditures of Turkey and the EU countries in gross domestic product is presented in Table 5. According to these findings, when the averages were considered for the mentioned period and countries, the country which had the highest ratio of health expenditures in gross domestic product was France with 8,2% while Cyprus had the lowest ratio with 2,7%. In the mentioned period, Turkey's health expenditure ratio was 3,5%.

Table 5. The Ratio of Public Health Expenditures in Gross Domestic Product

	1995	2000	2005	2010	2011	2012	2013	2014
Turkey	1,76	3,11	3,70	4,41	4,21	4,15	4,23	4,19
Belgium	5,85	6,06	7,11	7,90	8,01	8,19	8,23	8,25
Bulgaria	3,52	3,70	4,31	4,03	3,76	4,00	4,12	4,61
Croatia	5,83	6,60	5,93	7,06	6,26	6,36	6,40	6,39
Cyprus	1,70	2,40	2,66	3,43	3,51	3,41	3,47	3,33
The Czech Republic	6,08	5,70	6,05	6,22	6,31	6,34	6,31	6,26
Denmark	6,71	7,30	8,25	9,43	9,27	9,42	9,59	9,16
Estonia	5,67	4,08	3,85	4,93	4,63	5,12	5,14	5,03
Finland	5,63	5,14	6,22	6,74	6,75	7,04	7,20	7,29
France	8,06	7,76	8,27	8,68	8,73	8,83	8,91	9,02
Germany	7,68	8,00	8,01	8,58	8,31	8,36	8,57	8,70
Greece	4,30	4,56	5,63	6,22	6,68	6,27	6,07	4,99
Hungary	6,07	4,99	5,80	5,12	5,03	4,91	4,91	4,88
Ireland	4,67	4,47	5,52	6,10	5,53	5,62	5,33	5,14
Italy	5,02	5,70	6,64	7,26	6,97	6,99	6,97	6,99
Latvia	3,82	3,27	3,64	3,94	3,87	3,58	3,54	3,72
Lithuania	3,99	4,50	3,95	5,02	4,74	4,35	4,31	4,45
Luxemburg	5,15	6,36	6,75	6,59	6,26	5,99	5,94	5,82
Malta	3,82	4,74	6,00	5,22	6,46	6,63	6,55	6,74
Holland	5,29	4,68	6,67	9,08	9,09	9,53	9,62	9,48
Poland	3,91	3,85	4,30	4,90	4,71	4,58	4,53	4,51
Portugal	4,65	6,19	6,99	7,17	6,70	6,24	6,23	6,16
Romania	2,40	3,51	4,40	4,69	4,38	4,40	4,52	4,47
Slovakia	5,37	4,92	5,24	5,80	5,64	5,68	5,79	5,84
Slovenia	5,79	6,12	6,21	6,73	6,67	6,80	6,67	6,62
Spain	5,37	5,17	5,88	7,17	7,00	6,73	6,50	6,40
Sweeden	6,90	6,94	7,35	7,72	9,91	9,96	10,05	10,02
Austria	7,14	7,54	7,83	8,40	8,21	8,42	8,37	8,73
The United Kingdom	5,61	5,52	6,66	7,94	7,77	7,80	7,78	7,58

Source: World Development Indicators 2017

The graphic of the ratio of private health expenditures in gross domestic product for the period of 1995-2014, which was analysed by dendrogram analysis, is presented in Figure 4. According to the dendrogram analysis of the public health expenditures in gross domestic product for the period of 1995-2014, the creation of 5 clusters were found to be appropriate. The clusters that were formed in accordance with the analysis are as follows: Cluster 1: Austria, Denmark, France, Germany, Sweden, Cluster 2: Belgium, Netherlands, the United Kingdom, Cluster 3: Bulgaria, Cyprus, Latvia, Romania, Turkey, Cluster 4: Croatia, the Czech Republic, Finland, Italy, Luxemburg, Portugal, Slovenia, Spain, Cluster 5: Estonia, Greece, Hungary, Ireland, Lithuania, Malta, Poland, Slovakia.

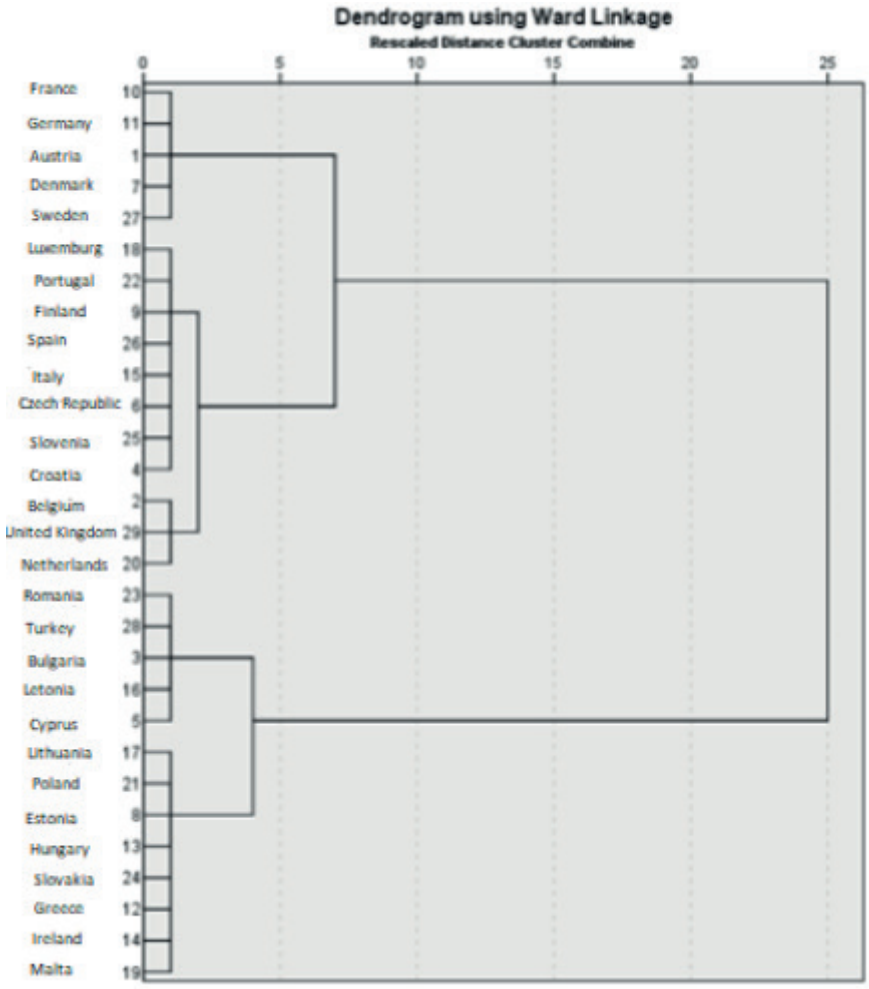

Figure 4. The Dendrogram Analysis for The Ratio of Public Health Expenditures in Gross Domestic Product

When the square Euclidean distances of the clusters that were prepared to assess the ratio of the private health expenditures of Turkey and the EU countries in gross domestic product for the period of 1995-2014 were considered, according to the 3rd cluster that was formed by Turkey, Cyprus, Latvia, Romania and Bulgaria, Turkey's distance from Romania was 3,692839. The nearest country to Turkey after Romania was Bulgaria with a distance of 12,21101. The farthest country to Turkey was France with a distance of 446,4689.

Table 6. The Square Euclidean Distances and Clusters for the Ratio of Public Health Expenditures in Gross Domestic Product

Country	Square Euclidean Distance	Cluster
Turkey	0	3
Romania	3,692839	3
Bulgaria	12,21101	3
Latvia	12,90321	3
Cyprus	18,28511	3
Poland	19,0452	5
Lithuania	26,22887	5
Estonia	52,23038	5
Greece	62,34076	5
Ireland	63,32339	5
Malta	68,1459	5
Slovakia	76,79299	5
Hungary	81,84002	5
Spain	117,7238	4
The Czech Republic	129,7778	4
Luxembourg	134,1451	4
Finland	134,5892	4
Croatia	135,0844	4
Portugal	137,9636	4
Italy	144,9564	4
Slovenia	150,0412	4
The United Kingdom	184,0073	2
Belgium	233,0488	2
Holland	251,792	2
Austria	366,2414	1
Sweden	378,4872	1
Denmark	425,0717	1
Germany	426,732	1
France	446,4689	1

7. Conclusion

In this study, the health expenditures in 28 EU countries and Turkey were compared and analysed via hierarchical cluster analysis. Accordingly, the health expenditures were studied to unearth the similarities between Turkey and the EU states. Significance value, as well as literature contribution of the study is to show health values of Turkey and european countries, and compare the statistical results each other by forming different country groups via cluster analysis to see if Turkey has reached the developed countries' level in case of health expenditures.

The results that were obtained from the comparison of the health expenditures of Turkey and the EU countries are as follows;

According to the ratio of total health expenditures in gross domestic product, Turkey and Romania are in the same group. According to the cluster analysis, the country that is the nearest to Turkey after Romania is Poland and the one which is the farthest is France.

According to the ratio of private health expenditures in gross domestic product, Denmark, Ireland, Lithuania, Poland, Sweden, Turkey and the United Kingdom are in the same group. According to the cluster analysis, the country that is the nearest to Turkey after the United Kingdom is Denmark and the one which is the farthest is Cyprus.

According to the ratio of public health expenditures in gross domestic product, Bulgaria, Cyprus, Latvia, Romania and Turkey are in the same group. According to the cluster analysis, the country that is the nearest to Turkey after Romania is Bulgaria and the one which is the farthest is France.

Consequently it could be seen that Turkey has not reached the level of developed countries in terms of health expenditures, thus, social state not only should spend more for health but as well as, it should focus on increasing the quality of the spendings.

References

Artazcoz, L., Cortes, I., Benavides, F., G., Aguır V., E., Bartoll, X., Vargas, H., & Borrell, C. (2016). Long Working Hours and Health in Europe: Gender and Welfare State Differences in a Context of Economic Crisis. Health & Place, 40, 161-168.

Dahl, E., & Wel, K., A. (2013). Educational Inequalities in Health in European Welfare States: A Social Expenditure Approach. Social Science & Medicine, 81, 60-69.

Eıkemo, T., A., Bambra, C., Judge, K., & Rıngdal, K. (2008). Welfare State Regimes and Differences in Self-Perceived Health in Europe: A Multilevel Analysis. Social Science & Medicine, 66, 2281-2295.

Gül, Y. (2014). 2008 Yılı Küresel Ekonomik Kriz Sürecinde Türkiye'nin Maastrich Kriterlerine Yakınlaşmasının Kümeleme Analizi Yöntemiyle İncelenmesi [Examining the Approach of Turkey to Maastricht Criteria by a Cluster Analysis Method During the Global Economic Crisis Period of the Year 2008]. Unpublished Master Thesis. İnönü University, Institute of Social Sciences, Malatya, Turkey.

Günaydın, D. (2011). Küreselleşmenin Refah Devleti Sağlık Politikalarına Etkileri: Türkiye Örneği [The Impact of Globalization on Welfare State Health Care Policies: The Turkish Case]. Unpublished Doctorate Thesis. Marmara University, Institute of Social Sciences, İstanbul, Turkey.

Kavılı, H. (2016). Bulanık Kümeleme Analizi ve Gençlerde Sigara İçme Eğilimi Üzerine Bir Uygulama [Fuzzy Clustering Analysis and an Application on Prevalence of Youth Tobacco Use]. Unpublished Master Thesis. Yıldız Technical University, Institute of Physical Sciences, İstanbul, Turkey.

Kım, I., Muntaner, C., Shahıdı, F., V., Vıves, A., Vanroelen, C., & Benach, J. (2012). Welfare States, Flexible Employment, and Health: A Critical Review. Health Policy, 104, 99-127.

Koçak, O., & Tiryaki, D. (2011). Sosyal Devlet Anlayışında Sağlık Politikalarının Önemi ve Sağlıkta Dönüşüm Programının Değerlendirilmesi: Yalova Örneği [The Importance of Health Policies in Social States and Evaluation of Transformation in Health Program: The Case of Yalova Province]. İstanbul Ticaret Üniversitesi Sosyal Bilimler Dergisi, 10 (19), 55-88.

Konuk, A., N. (2011). 1980'den Günümüze Değişen Sosyal Devlet Anlayışı İçerisinde Sağlık Harcamaları ve Politikaları [Health Expenses and Policies in the Framework of the Concept of Welfare State That Has Changed Since 1980]. Unpublished Master Thesis. Marmara University, Institute of Social Sciences, İstanbul, Turkey.

Özcan, A. (2004). Türkiye Cumhuriyeti Hükümet Programlarının Sosyal Devlet İlkesi Açısından Konut, Sağlık, Sağlık ve Sosyal Güvenlik Konuları Üzerinden Karşılaştırılması [Comparison of Government Programs of the Turkish Republic in terms of Housing, Health and Social Security Issues with respect to Social State Principle]. Unpublished Master Thesis. İnönü University, Institute of Social Sciences, Malatya, Turkey.

Özcan, G. (2009). Türkiye'de Kamu Harcamalarının Sosyal Refah Devleti Anlayışı Açısından Değerlendirilmesi [The Evaluation of Public Expenditure in Turkey According to the Social Welfare State Approach]. Unpublished Master Thesis. Dokuz Eylül University, Institute of Social Sciences, İzmir, Turkey.

Sağlam, Ö. (2011). Sosyal Devlet ve İnsan Hakları [Social State and Human Rights]. Unpublished Master Thesis. Maltepe University, Institute of Social Sciences, İstanbul, Turkey.

Yalçın, N. (2013). Kümeleme Analizi ve Uygulaması [Cluster Analysis and its Application]. Unpublished Master Thesis. Fırat University, Institute of Physical Sciences, Elazığ, Turkey.