Research Article / Araştırma Makalesi

Evaluation of the Effect of Health Indicators on Life Expectancy at Birth and Years of Life Lost in European Union Countries and Türkiye: A Panel Data Analysis.

Türkiye ve Avrupa Birliği Ülkelerinde Doğumda Beklenen Yaşam Süresi ve Ölüme Bağlı Kaybedilen Yıllar Üzerine Etkili Sağlık Göstergelerinin Belirlenmesi: Bir Panel Veri Analizi

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Abstract: The aim of the study is to evaluate the effect of selected health indicators on life expectancy at birth (LEAB) and years of potential life lost (YPLL) in Türkiye and European Union (EU) countries with data of 2000-2017 period. The study is an ecological research with panel data analysis (PDA). Four panels are modeled as health care use, health equipment, health resources and health risks. LEAB and YPLL which are in health status category were considered as dependent variables. It was found that an increase in the child vaccination rates, number of Magnetic Resonance Imaging devices (MRI), health spending, number of doctors and number of nurses had an increasing effect on LEAB, while an increase in the child vaccination rate, length of hospital stay, hospital discharge rates, number of Computed Tomography (CT) devices and MRIs, health spending and number of doctors had a decreasing effect on YPLL. In addition, an increase in smoking prevalence rate, alcohol consumption and obesity prevalence rate had a decreasing effect on LEAB, while an increase in smoking prevalence rate and obesity prevalence rate had an increasing effect on YPLL. Analyzing the data of health indicators with modern statistical approaches such as Panel Data Analysis (PDA) can help to guide for determining interventions, strategies and projections in health services.
Keywords: Health Indicators, Panel Data Analysis, Health Status

Özet: Çalışmanın amacı, 2000-2017 dönemi verileri ile Türkiye ve Avrupa Birliği (AB) ülkelerinde seçilmiş sağlık göstergelerinin doğuşta beklenen yaşam süresi (DBYS) ve ölüme bağlı kaybedilen potansiyel yıllar (YPLL) üzerindeki etkisini değerlendirmektir. Çalışma ekolojik nitelikte bir panel veri analizi (PVA) araştırmasıdır. Sağlık hizmeti kullanımı, sağlık ekipmanları, sağlık kaynakları ve sağlık riskleri olmak üzere dört panel modellenmiştir. Sağlık durumu kategorisinde yer alan DBYS ve YPLL bağımlı değişkenler olarak kabul edilmiştir. Bulgulara bakıldığında çocuk aşılama oranları, Manyetik Rezonans Görüntüleme (MRI) cihazı sayısı, sağlık harcamaları, doktor ve hemşire sayısındaki artışın DBYS üzerinde artırıcı bir etkiye sahip olduğu; çocuk aşılama oranı, hastanede kalma süresi, hastane taburculuk hızı, Bilgisayarlı Tomografi (BT) cihazı ve MRI sayısı, sağlık harcamaları ve doktor sayısındaki artışın ise YPLL üzerinde azaltıcı bir etkiye sahip olduğu saptandı. Bununla birlikte sağlık riskleri panelindeki sigara içme prevelans hızı, alkol tüketim miktarı ve obezite prevelans hızındaki artışın DBYS üzerinde azaltıcı etkisi olduğu; sigara içme prevelans hızı ve obezite prevelans hızındaki artışın ise YPLL üzerinde artırıcı etkiye sahip olduğu saptandı. Sağlık göstergelerine ait verilerin Panel Veri Analizi (PVA) gibi modern istatistiksel yaklaşımlarla analiz edilmesi sağlık hizmetlerinde müdahale, projeksiyon ve stratejileri belirlemede yol gösterici olabilir.
Anahtar Kelimeler: Sağlık göstergeleri, Panel Veri Analizi, Sağlık Düzeyi

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1. Introduction

The importance of organisation and planning to maintain the health status of community has been clearly understood in today's world. Health policy makers are also in search of accurate and reliable health indicators in order to reveal the health status and to make projections for the future.

Determining the health levels of populations with multifactorial structure has become much more difficult in terms of data collection, analysis and interpretation because a health indicator may measure a certain cituation directly, it may suggest the fact relatively and also interact with other indicators and co-factors. In this respect, identifying health indicators in the targeted area and investigating their impact on health outcomes is a process that needs to be carefully planned and executed. Also it is important using well confirmed, valid and reliable indicators as reference in both of identification of population health studies and development of new indicators studies (1-3).

In this context, two of important health indicators among health planners for determining health status are "Life Expectancy at Birth" (LEAB) and "Years of Potential Life Lost" (YPLL). Life expectancy at birth which includes the entire life course is a key criterion for assessing community health (4,5). YPLL is an estimate of the average number of years of a person who would have lived if he or she had not died prematurely. Therefore, it is a measure of premature mortality (6-8). In today's world, mortality and rates tend to evaluate the most common causes of death in the elderly. On the other hand, since YPLL also gives due weight to deaths among younger people so this makes it a valuable the indicator among those who wish to highlight to causes of death that occur throughout the population regardless of age (6-9).

The aim of the study is to evaluate the health indicators determined by international organizations that may be associated with life expectancy at birth and the years lost due to premature death in Türkiye and European Union countries with Panel Data Analysis (PDA) in a multivariate model.

2. Materials and Methods

This is an ecological study with Panel Data Analysis (PDA) of selected health indicators of EU countries and Türkiye using the Organization for Economic Cooperation and Development (OECD), Our World in Data and The Institute for Health Metrics and Evaluation Global Health Data Exchange (IHME-GHDx) platform's databases between 2000-2017 (10-12). Ethical approval was obtained from Eskişehir Osmangazi University Non-Invasive Clinical Researches Ethics Committee dated 06/08/2019 and with decision number 20.

2a.Determination of Health Indicators

The dependent and independent variables of the study are determined on the basis of OECD Health Data classification pattern (10). The OECD Health data classifies the health indicators in 5 main topics and each topic includes various variables. While modelling the panels, the first 4 main topics with given parameters are defined as independent variables and the last one (Health Status) including 2 parameters is defined as dependent variables as it is seen in below.

- ***Health care use:*** Child vaccination rates, length of hospital stay, hospital discharge rates (10).
- ***Health equipment:*** Hospital beds, Computed Tomography (CT) scanners, Magnetic Resonance Imaging (MRI) units (10).
- ***Health resources:*** Health spending, number of doctors, number of nurses (10).
- ***Health risks:*** Smoking prevalence rate, alcohol consumption, obesity prevalence rate (10).

- ***Health status:*** Life Expectancy at Birth (LEAB), Years of Potential Life Lost (YPLL) (10).

According to this map, the panels were configured to investigate the effect of selected independent variables on LEAB and YPLL dependent variables respectively.

2b. Variable Definitions and Details

Life Expectancy at Birth: The LEAB data were taken from the OECD Health Database (13,14). It is defined as the average number of years a person can expect to live if they experience the age-specific mortality rates prevalent in a given country and a given year. This indicator is measured as years (13,14).

Years of Potential Life Lost: The YPLL data were obtained from the IHME-GBDx database. The source defines it as: *"YPLL or YLL is the years lost due to premature death and is calculated by subtracting the age at death from the longest possible life expectancy"* (15). This indicator can be expressed in hundreds of thousands and even millions but presented with its eigenvalue in the relevant table and included in PDA as logarithmic transformation value so the results as interpreted as amount of percentage.

Child Vaccination Rates: In the OECD Health Database, child vaccination rate is presented under two subheadings: one for "measles" and one for "diphtheria-pertussis-tetanus"(16). In this study, data for the diphtheria-pertussis-tetanus were used and the unit of the indicator is percentage of children at around age 1. (16).

Length of Hospital Stay: This parameter refers to the average of days patients stay in hospital. *"The total number of days stayed by all inpatients during a year divided by the number of patients admitted or discharged"* is the explanation of measuremet (17). It is highlighted that day cases are excluded (17). There are two separate data sets for acute care cases and for childbirth without complications (17). The data for acute care cases were used in this study.

Hospital Discharge Rates: Hospital discharge rates reflects the number of patients who has spent at least one night in hospital and left after threatment or receiving care (18). The details about indicator is explained as "*the deaths that occur in hospital after inpatient care is included but same-day discharges are usually excluded. This parameter is measured per 100,000 inhabitants"* (18).

Hospital Beds: According to source of this data, curative (or acute) care beds, rehabilitative care beds, long-term care beds and other beds in hospitals are components of total hospital beds (19). The unit of parameter is total hospital beds per 1000 inhabitants (19).

Computed Tomography (CT) Scanners: It is presented as a total and also 2 sub-categories which split between hospitals *(primarily inpatient facilities)* and ambulatory care providers *(primarily outpatient facilities).* The measure for this indicator is the number of equipment per 1,000,000 inhabitants (20). The data of total is used in the study.

Magnetic Resonance Imaging (MRI) Units: The measure for this indicator is the number of equipment per 1,000,000 inhabitants. It is presented as a total and also 2 sub-categories which split between hospitals *(primarily inpatient facilities)* and ambulatory care providers *(primarily outpatient facilities)* (21). The data of total is used in the study.

Health Spending: In OECD Health Database, this parameter is seperated into government/compulsory, voluntary and out-of-pocket payment subcategories and also there is the total category. The data of total category with the unit defined as *"percentage of health expenditures in gross domestic product (GDP)"* are used in the study (22).

Number of Doctors and Nurses: The measure unit of these indicators are the number of doctors per 1000 inhabitants and the number of nurses per 1000 inhabitants (23,24).

Smoking Prevalence Rate: Smoking status is defined as the population aged 15 years and older who report smoking every day (25). In the study, data on this indicator were obtained from Our World in Data and the total category is used (25).

Alcohol Consumption: Data on alcohol consumption are taken from the OECD database (26). The age group of this indicator is people who are 15 or older and indicator reflects the annual sales of pure alcohol in liters per person in defined age group (26).

Obesity Prevalence Rate: The data for this indicator were obtained from Our World in Data database and the data of people who are 18 years or older in the population were used (27).

2c. Derivation of Data and Missing Data Assessment

Missing data is an important problem for researches and there are various methods to deal with it (28,29). For this reason, the countries and categories with minimum missing data were determined. If an indicator or country contains huge missing data which limits the use of other indicators or countries in same panel, that country or indicator was excluded. Also if there is no data for Türkiye in a category it is excluded from the relevant panel concept as well. In the study, 18 observations for the period 2000-2017 constitute the time series of the countries, and countries with more than one third (33%) of these (i.e. 7 or more missing value) were excluded from the study. For countries with 6 or less missing observation, the missing data were completed by taking into account the location and sequentiality of the missing data and the country's course for that parameter in related period. So the data used in PDA are consisted of complete or completed with suitable methodology like overall mean, nearest neighbour mean, increasing or decreasing trend of segmental part or overall. The data of smoking prevalence rate were obtained from Our World in Data platform, where the data between 2000 and 2010 are presented as three-point data for 2000, 2005 and 2010 years. In the completion of the data between the years 2000-2005, the missing data were completed by dividing the change amount between these two points by the number of years, and the data between 2005-2010 were similarly calculated by dividing the change amount between these two points by the number of years. Since the United Kingdom was an EU country during the study period, it was included in the panels.

2d. Constructing the Panels

It was given the numbers from 1 to 4 to the panels due to category name based on independent variables which are configured coherent with OECD Health Database pattern. For each panel, if the dependent variable is LEAB, it is added “A” label and if the dependent variable is YPLL, it is added “B” label.

At this point, the Panel 1 includes child vaccination rates, length of hospital stay, hospital discharge rates as independent variables and the panel which investigates the effect of these independent variables on LEAB dependent variable is named as Panel 1A, the panel which investigates the effect of these parameters on YPLL dependent variable is named as Panel 1B. Same configuration applied to all other panels too. Panel 2 includes hospital beds, Computed Tomography (CT) scanners, Magnetic Resonance Imaging (MRI) units as independent variables. It is named as Panel 2A for LEAB and Panel 2B for YPLL as dependent variable. Panel 3 includes health spending, number of doctors, number of nurses as independent variables. It is named as Panel 3A for LEAB and Panel 3B for YPLL as dependent variable. Panel 4 includes smoking prevalence rate, alcohol consumption, obesity prevalence rate as independent variables. It is named as Panel 4A for LEAB and Panel 4B for YPLL as dependent variable.

2e. Statistical Analysis

Time series data refers to data collected on a variable or situation based on a time period such as days, months, years, seasons (30-34). The horizontal cross-sectional data refers to the type of data formed by combining data obtained from different units at a certain point in time (30-34). In these two approaches, analyses are conducted separately and the results can not be interpreted as single common and blended result. Panel data is a type of data that combines both the data of

units and time series. Panel Data Analysis (PDA) is a 2-dimensional analysis in which these two are evaluated together. The advantage of this analysis is that the data belonging to a certain number of units in a certain time interval can be evaluated together in a single analysis and the results can be interpreted in a single common way (30-34).

In the study, time series data of countries are presented as descriptive statistics in the form of mean, standard deviation, median, minimum-maximum values and range *(Appendix 1 to 6)*. For the PDA, which constitutes the core of the study, a decision tree was adopted after an extensive literature review. The analysis consists of 5 steps and is given below respectively:

Step 1: It is tested the correlation between units in the panel data and the homogeneity/heterogeneity of the time series in the panel data. Swamy S test was used to test homogeneity and Pesaran CD Test was used to test correlation.

Step 2: The stationarity of the panel data was tested with unit root tests according to the result of the previous step.

Step 3: It is performed cointegration test in the panel data. Before the cointegration test, some steps were applied to analyse correlation in the whole dataset. After this process, the Westerlund (2016) Cointegration Test was used for cointegration test.

Step 4: Unobserved effects, fixed/random effects, correlation, autocorrelation and heteroskedasticity tests were performed in the panel data.

Step 5: Based on the previous findings, the process of determining the results with the appropriate estimator was performed. Parks-Kmenta estimator, Arellano Froot and Rogers estimator or Driscoll-Kraay estimator were used as estimators under matching conditions.

PDA was performed by R for Windows version 3.6.3 (35). In all steps of PDA, $p \leq 0.05$ was considered statistically significant based on 95% confidence interval and 5% margin of error.

3. Results

When the data of countries in the study are evaluated with LEAB perspective, the average with standard deviation (±SD) of 24 countries for the 2000-2017 period was 78.36 (±3.22) years. The top value for LEAB was observed in Spain with 83.40 years in 2016 and 2017, while the lowest value was observed in Latvia with 69.90 years in 2000. The country with the widest range recorded between 2000 and 2017 in Estonia with 7.30 years, followed by Türkiye with 7.00 years. At this point, the narrowest range belongs to Sweden with 2.80 years. *(See Appendix 1)*

When the 24 countries in the panels were evaluated with YPLL perspective, the average of the countries with SD for the 2000-2017 period was 3,466,956.63 (±3,837,599.77). The top value for YPLL was observed in Germany in 2000 with 14,283.797 and the lowest value belonged to Luxembourg in 2008 with 60,347. In the selected time period of 2000-2017, Türkiye has the widest range with 3,068,115, while Luxembourg has the narrowest range with 7885. *(See Appendix 1)*

Panel 1

The model constructed with the independent variables of child immunization rates, length of hospital stay and hospital discharge rate. The effect of these variables on each of the LEAB and YPLL dependent variables in Panel 1 is given in Table 1. The Panel 1 consists of 21 countries, 18 observations for each country for the period 2000-2017 and 378 values in total. *(See Appendix 2)*

Table 1. Parks-Kmenta Estimator results for Panel 1A and Panel 1B.

Panel 1A (Parks-Kmenta Estimator)				**Panel 1B (Parks-Kmenta Estimator)**			
Dependent Variable: LEAB **Observations:** 378 – **Countries:** 21				**Dependent Variable:** YPLL **Observations:** 378 – **Countries:** 21			
Independent Variable	**Coefficient**	**SE***	**Probability p**	**Independent Variable**	**Coefficient**	**SE***	**Probability p**
Child Vaccination Rates	0.030465	0.013059	**0.020**	Child Vaccination Rates	-0.023018	0.000219	**<0.001**
Length of Hospital Stay	-0.109689	0.096915	0.258	Length of Hospital Stay	-0.043226	0.005736	**<0.001**
Hospital Discharge Rates	-0.000036	0.000039	0.346	Hospital Discharge Rates	-0.000036	1.80e-07[a]	**<0.001**
Probability of Model (p) = 0.035				**Probability of Model (p)= <0.001**			

* *Standard Error*
a: 1.80x10^{-7}

The model is significant in both Panel 1A (p=0.035) and Panel 1B (p<0.001). In the Panel 1A each 1-unit value increase in the child vaccination rates variable shows an increase of approximately 0.03 units value in LEAB. In Panel 1B, a 1-unit value increase in the number of child vaccination rates variable leads to a decrease of approximately 0.02% in YPLL, and a 1-unit value increase in the length of hospital stay variable leads to a decrease of approximately 0.04% in YPLL, a 1-unit value increase in the hospital discharge rates variable leads to a decrease of approximately 0.00004% in YPLL.

Panel 2

The model is created with the independent variables which are hospital beds, Computed Tomography (CT) scanners, Magnetic Resonance Imaging (MRI) units. The effect of these parameters on each of the dependent variables of LEAB and YPLL in Panel 2A and 2B is given in Table 2. The Panel 2 consists of 20 countries, 18 observations for each country for the period 2000-2017 and 360 values in total. *(See Appendix 3)*

Table 2. Arellano-Froot and Rogers estimator results Panel 2A and Panel 2B.

Panel 2A (Arellano-Froot and Rogers Estimator)				**Panel 2B (Arellano-Froot and Rogers Estimator)**			
Dependent Variable: LEAB **Observations:** 360 - **Countries:** 20				**Dependent Variable:** YPLL **Observations:** 360 – **Countries:** 20			
Independent Variable	**Coefficient**	**SE***	**Probability p**	**Independent Variable**	**Coefficient**	**SE***	**Probability p**
Hospital Beds	-0.533810	0.315653	0.107	Hospital Beds	0.045875	0.040408	0.107
Computed Tomography (CT) Scanners	-0.071940	0.059144	0.239	Computed Tomography (CT) Scanners	-0.112106	0.036694	**0.002**
Magnetic Resonance Imaging (MRI) Units	0.187039	0.659370	**0.011**	Magnetic Resonance Imaging (MRI) Units	-0.034273	0.013404	**0.011**
Probability of Model (p)= <0.001				**Probability of Model (p)= <0.001**			

* *Standard Error*

The model is significant in both Panel 2A ($p<0.001$) and Panel 2B ($p<0.001$). In the Panel 2A each 1-unit value increase in the number of Magnetic Resonance Imaging (MRI) units variable leads to an increase of approximately 0.19 units of value in LEAB. In Panel 2B, a 1-unit value increase in the number of Computed Tomography (CT) scanners variable leads to a decrease of approximately 0.11% in YPLL, and a 1-unit increase in the number of Magnetic Resonance Imaging (MRI) units variable leads to a decrease of approximately 0.03% in YPLL.

Panel 3

The model is created with the independent variables which are health spending, number of doctors and number of nurses. The effect of these parameters on each of the dependent variables of LEAB and YPLL in Panel 3A and 3B is given in Table 3. The Panel 3 consists of 20 countries, 18 observations for each country for 2000-2017 period and 360 values in total. *(See Appendix 4)*

Table 3. Results of Driscoll-Kraay estimator for Panel 3A, Arellano-Froot and Rogers estimator for Panel 3B.

Panel 3A (Driscoll-Kraay Estimator)				**Panel 3B (Arellano-Froot ve Rogers Estimator)**			
Dependent Variable: LEAB **Observations: 360 - Countries: 20**				**Dependent Variable: YPLL** **Observations: 360 - Countries: 20**			
Independent Variables	**Coefficient**	**SE***	**Probability p**	**Independent Variables**	**Coefficient**	**SE***	**Probability p**
Health Spending	0.351369	0.136035	**0.019**	Health Spending	-0.183185	0.944482	**0.050**
Doctors	3.217506	0.253237	**<0.001**	Doctors	-0.413797	0.131901	**0.002**
Nurses	0.244775	0.070105	**0.003**	Nurses	0.004583	0.097868	0.963
Probability of Model (p)= <0.001				**Probability of Model (p)= <0.001**			

** Standard Error*

The model is significant in both Panel 3A ($p<0.001$) and Panel 3B ($p<0.001$). In the Panel 3A each 1-unit value increase in health spending variable shows an increase of approximately 0.35 units of value in LEAB, each unit value increase in the number of doctors variable shows an increase of approximately 3.22 units of value in LEAB and each unit increase in the number of nurses variable leads to an increase of approximately 0.25 units value in LEAB. In Panel 3B each 1-unit value increase in health spending leads to a decrease of approximately 0.18% in YPLL and each 1-unit value increase in the number of doctors leads to a decrease of approximately 0.41% in YPLL.

Panel 4

The model is created with the independent variables which are smoking prevalence rate, alcohol consumption, obesity prevalence rate. The effect of these parameters on each dependent variables LEAB and YPLL in Panel 4A and 4B is given in Table 4. The Panel 4 consists of 24 countries, 18 observations for each country for the period 2000-2017 and 432 values in total. *(See Appendix 5)*

Table 4. Parks-Kmenta estimator results Panel 4A and Panel 4B.

Panel 4A (Parks-Kmenta Estimator)				**Panel 4B (Parks-Kmenta Estimator)**			
Dependent Variable: LEAB **Observations** 432 - **Countries:** 24				**Dependent Variable:** YPLL **Observations:** 432 – **Countries:** 24			
Independent Variables	**Coefficient**	**SE***	**Probability p**	**Independent Variables**	**Coefficient**	**SE***	**Probability p**
Smoking Prevalence Rate	-0.02607	8.74e-06[a]	**<0.001**	Smoking Prevalence Rate	0.022265	0.006824	**<0.001**
Alcohol Consumption	-0.00030	0.000029	**<0.001**	Alcohol Consumption	-0.009134	0.008150	0.262
Obesity Prevalence Rate	-0.00158	0.000020	**<0.001**	Obesity Prevalence Rate	0.237553	0.011680	**0.042**
Probability of Model (p)= <0.001				**Probability of Model (p) = 0.007**			

a: 8.74x10^{-6}
** Standard Error*

The model is significant in both Panel 4A ($p<0.001$) and Panel 4B ($p=0.007$). In the Panel 4A each 1-unit value increase in the smoking prevalence rate leads to a decrease of approximately 0.026 units of value in LEAB, a 1-unit value increase in the amount of alcohol consumption leads to a decrease of approximately 0.0003 units of value in LEAB, and a 1-unit value increase in the obesity prevalence rate leads to a decrease of approximately 0.0015 units value in LEAB. In Panel 4B each 1-unit increase in the smoking prevalence rate variable leads to an increase of approximately 0.02% in YPLL and each 1 unit increase in the obesity prevalence rate leads to an increase of approximately 0.24% in YPLL.

4. Discussion

In the study, the determination of health indicators that may be associated with the LEAB and YPLL was based on data from European Union countries and Türkiye. It was found that the increase in child immunization rates, number of MRIs, health spending, number of doctors and nurses parameters were associated with the increase on LEAB, whereas the increase in smoking prevalence rate, alcohol consumption, obesity prevalence rate parameters were inversely associated. On the other hand, it is detected that increase in child immunization rates, length of hospital stay, hospital discharge rates, number of CT and MRIs, health spending, number of doctors parameters were associated with the decrease on YPLL, while increase in smoking prevalence rate and obesity prevalence rate parameters were associated with the increase on YPLL. Considering the overall, it is understood that the health indicators which may be associated with LEAB and YPLL overlap in most areas.

Vaccination is a proven tool for controlling and eliminating life-threatening infectious diseases, and childhood vaccination against vaccine-preventable diseases is considered one of the most cost-effective programs to reduce child mortality and morbidity worldwide. In Panel 1 of the study, the child vaccination rate indicator was found to prolong LEAB and decrease YPLL. In a PDA conducted by Mohan et al. with data of OECD countries between 1990 and 2002, it was reported that an increase in the vaccination rates of children in terms of measles have relation with increasing the LEAB and decreasing the infant mortality (36).

The interpretation of length of stay is complex situation. The evaluation of relationship between length of stay and quality of care is not easy because length of hospital stay is determined by an intertwined, multiple network of supply and demand that operates

at macro and micro levels (37,38). In Panel 1 of the study, the effect of length of hospital stay on LEAB could not be demonstrated, but its effect on YPLL was significant and an increase in length of hospital stay leads to a decrease in YPLL. It can be interpreted that diseases with long diagnosis and treatment processes require longer hospital stays, and therefore, as the time spent in the hospital increases, it can be interpreted as having a decreasing effect on the YPLL by allowing both accurate diagnosis and adequate treatment for these diseases. In the literature, it could not seen a study that addresses the effect of this parameter on health outcomes with PDA using a similar model to our study.

The hospital discharge rates variable which is also located in Panel 1 represents valuable data and is used in many fields including various government agencies, individual health service providers, consumer organizations, health insurers, policy makers, researchers and the private sector (39). In the study, no significant finding was found on the effect of hospital discharge rate on LEAB, but when the effect on YPLL was analyzed, it was found that an increase in hospital discharge rate leads to a decrease YPLL.

CT and MRI devices have been introduced to the health service as a result of the development and successful partnership between technology and medical science and they managed to decrease the time gap between diagnosis and treatment in some conditions . In Panel 2, it was found that the increase in the number of MRIs per capita leads to an increase LEAB, while the increase in the number of CT and MRIs per capita leads to a decrease YPLL. In a PDA study conducted by Mohan et al. using data from OECD countries between 1990 and 2002, it was reported that there is significant relation between the use of CT and increase in LEAB (36).

In Panel 3 of the study, it was found that the increase in health spending leads to an increase in LEAB and decrease in YPLL. It was reported that health expenditures had a significant positive relationship with LEAB using 2006-2010 data from 108 developing countries by Hassan et al. (40). In a PDA study conducted by Makuta et al. using data from 43 sub-Saharan African countries between 1996 and 2011, it was reported that public health expenditures had a significant effect on infant mortality and LEAB (41). Rahman et al. reported that total health expenditures, public health expenditures and private health expenditures did not have a significant relationship with LEAB in their PDA study conducted with data from 1995-2014 for 15 countries in South and South East Asia (42). In the PDA study conducted by Novignon et al. in 44 sub-Saharan African countries with data for the period 1995-2010, it was reported that health expenditures have relation with increasing the LEAB, decreasing the infant mortality and overall mortality (43). In a PDA study conducted by Rad et al. in Eastern Mediterranean Countries with data for the period 1995-2010, it was reported that there was a relation between health expenditures and reducing infant mortality (44).

Also in Panel 3, it was found that the increase in the number of doctors and nurses lead to an increase the LEAB. On the other hand, an increase in the number of doctors leads to a decrease the YPLL, but there was no significant relationship between the number of nurses and YPLL. In the literature, the effects of health workforce on health outcomes are also examined and the positive effect of the number of physicians and nurses per a certain number of people on health outcomes is emphasized (45-49). As an ecological finding, it has been suggested that a 1% increase in the supply of primary care physicians can reduce mortality by 0.08 per 100,000 population (47). In the PDA study conducted by Mohan et al. in 25 OECD countries with data from 1990-2002, it was reported that the number of physicians per 1000 persons had a significant effect on LEAB and mortality (36).

In the study it was found that increase in smoking rate leads to a decrease LEAB and increase YPLL. In a PDA study conducted by Kennelly et al. with data from 19 OECD countries, smoking was reported to have an

effect on LEAB and mortality (50). In a PDA study conducted by Poças et al. with 1980-2004 data from 17 OECD countries, it was reported that smoking was reported to have a negative effect on life expectancy (51). In another study conducted by Poças et al. on life expectancy at the age of 65 years and older, using PDA data from 20 EU countries for 1990-2016, smoking was reported to have a negative effect on life expectancy at the age of 65 years and older (52).

In the study, it is found that increase in alcohol consumption leads to a decrease LEAB but no significant relationship was found between it and YPLL. In a PDA study conducted by Kennelly et al. it was reported that alcohol use had a negative effect on LEAB in men, but there was no significant relation between alcohol use and LEAB in women (50). In a PDA study conducted by Poças et al. using 1980-2004 data from 17 OECD countries, it was reported that alcohol use negatively affected life expectancy (51). In another study which is conducted by Poças et al. with a PDA on life expectancy at the age of 65 years and older, this time using 1990-2016 data from 20 EU countries, it is reported that alcohol use had a negative effect on life expectancy at the age of 65 years and older (52). In a PDA study conducted by Mohan et al. with data from OECD countries between 1990 and 2002, there was no significant relation reported between alcohol use and LEAB (36).

In the study, it was found that the increase in the obesity rate in individuals aged 18 years and over, leads to a decrease in LEAB and an increase YPLL. Although there are many studies in the literature showing the effects of obesity on LEAB and YPLL using different methodologies, it could not be found a study examining the situation with PDA method as in our study.

5. Conclusions

The results show that despite the great and rapid progress in technology and medical science, the number of doctors is the factor that has the greatest impact on both LEAB and YPLL. This finding once again shows the indispensability and importance of the health professionals and human labor force. Another important result is the demonstration that cost-effective interventions like child immunization rates, fight against smoking, decrasing alcohol use and obesity prevalence can prolong LEAB and reduce YPLL.

Limitations

The study has some limitations depending on the research category and the methodology. The first of these is missing data issue. Obtaining the data which represents the whole of a country on a subject is a very challenging process, so even the reports presented by international organizations like WHO, OECD contain missing data. While forming the panels in the study, some countries or variables had to be left out of the panel due to missing data. This situation negatively affected the representation or reflection capacity of the PDA results in terms of the both some countries and variables.

On the other hand, the fact that these data are presented through multiple steps as a result of comprehensive and complicated studies by international organizations causes the data presented to be one or a few years behind. For this reason, 2017 data could be used as the most up-to-date and completed data for parameters included in the study period.

Before considering the results in total, it should be taken into account that the study was conducted in EU countries and Türkiye, which are at a better level of development than some of other continents or regions of the world.

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Ethics

Ethics Committee Approval: The study was approved by Eskişehir Osmangazi University Non-Invasive Clinical Researches Ethics Committee (Decision no: 20, Date: 06.08.2019).

Informed Consent: The authors declared that it was not considered necessary to get consent from the patients because the study was an ecological research with panel data analysis (PDA) and data is derived from databases of international organizations and platforms**.**

Author Contributions:

Idea/concept: E.A., S.M., F.Ç., Design: E.A., S.M., F.Ç., E.A., Data Collection: E.A., S.M., F.Ç., Data Processing: E.A., S.M., F.Ç., E.A., Analysis/Comment: E.A., S.M., F.Ç., E.A., Literature research/review: E.A., S.M., F.Ç., E.A., Writing: E.A., S.M., F.Ç., E.A.

All authors discussed the results and contributed to the final manuscript.

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Appendix 1. Descriptives of Life Expectancy at Birth (LEAB) and Years of Potential Life Lost (YPLL) dependent variables for the 24 countries between 2000 and 2017.

Countries	Life Expectancy at Birth (Years)						Years of Potential Life Lost					
	Mean	SD	Median	Min	Max	Range	Mean	SD	Median	Min	Max	Range
Austria	80.25	1.14	80.45	78.20	81.70	3.50	1215052.00	36548.99	1197520.50	1180700.00	1307087.00	126387.00
Belgium	79.86	1.23	80.00	77.80	81.60	3.80	1673634.33	59701.85	1665433.00	1590582.00	1794854.00	204272.00
Czechia	77.18	1.41	77.35	75.10	79.10	4.00	1931649.50	98742.38	1917968.00	1805074.00	2096597.00	291523.00
Denmark	79.02	1.46	78.90	76.90	81.20	4.30	882403.00	64569.39	885232.00	794794.00	977005.00	182211.00
Estonia	74.61	2.57	74.70	70.90	78.20	7.30	327689.72	55278.23	323677.00	258510.00	414710.00	156200.00
Finland	79.92	1.26	80.00	77.70	81.70	4.00	832226.78	27196.65	836775.00	779662.00	884470.00	104808.00
France	81.22	1.28	81.45	79.20	82.80	3.60	8631339.00	312429.82	8594607.50	8223334.00	9149309.00	925975.00
Germany	79.95	0.98	80.25	78.20	81.20	3.00	13482094.80	383896.30	13321593.00	13023853.00	14283797.00	1259944.00
Greece	80.26	0.93	80.35	78.60	81.50	2.90	1685472.28	24183.21	1684146.50	1642284.00	1738660.00	96376.00
Hungary	74.19	1.40	74.30	71.90	76.20	4.30	2514487.11	216994.57	2531290.50	2135071.00	2844750.00	709679.00
Ireland	79.83	1.64	80.25	76.60	82.20	5.60	518882.50	27179.95	514040.50	491745.00	587815.00	96070.00
Italy	81.67	1.10	81.65	79.90	83.30	3.40	8425276.56	293445.53	8385271.00	8004592.00	8992530.00	987938.00
Latvia	72.27	1.86	72.30	69.90	74.80	4.90	625835.11	91038.10	622944.00	501394.00	742503.00	241109.00
Lithuania	72.91	1.45	72.50	70.90	75.60	4.70	865335.94	88383.70	869485.00	736464.00	1018124.00	281660.00
Luxembourg	80.31	1.69	80.65	77.80	82.80	5.00	63802.33	2394.11	63672.50	60347.00	68232.00	7885.00
Netherlands	80.30	1.28	80.65	78.20	81.80	3.60	2244285.28	102953.21	2195613.00	2140679.00	2426415.00	285736.00
Poland	76.00	1.34	75.75	73.80	78.00	4.20	7512011.61	262580.71	7601766.50	7088683.00	7931141.00	842458.00
Portugal	79.44	1.54	79.60	76.90	81.50	4.60	1721984.83	126794.51	1708036.00	1550211.00	1946096.00	395885.00
Slovakia	75.26	1.33	75.15	73.40	77.30	3.90	1048081.28	45434.76	1068117.50	972249.00	1100287.00	128038.00
Slovenia	78.89	1.84	79.20	76.10	81.30	5.20	333426.89	25754.93	330043.50	296797.00	371803.00	75006.00
Spain	81.60	1.42	81.70	79.30	83.40	4.10	5912087.67	221795.61	5932984.00	5630693.00	6367578.00	736885.00
Sweden	81.26	0.91	81.40	79.70	82.50	2.80	1300653.17	46718.97	1304179.00	1242777.00	1378603.00	135826.00
Türkiye	74.51	2.44	74.00	71.10	78.10	7.00	10244071.30	937490.13	9745364.00	9495542.00	12563657.00	3068115.00
United Kingdom	79.94	1.20	80.10	77.90	81.40	3.50	9215176.17	435016.51	9176545.50	8636537.00	10039307.00	1402770.00
Total	78.36	3.22	79.20	69.90	83.40	13.50	3466956.60	3837599.77	1663399.50	60347.00	14283797.00	14223450.00

SD: Standart deviation, Min: Minimum, Max: Maximum

Appendix 2. Descriptives of child vaccination rates, length of hospital stay and hospital discharge rates independent variables for the 21 countries forming Panel 1 between 2000 and 2017.

Countries	Child Vaccination Rates (%)						Length of Hospital Stay (Days)						Hospital Discharge Rates (Per 100,000 inhabitants)					
	Mean	**SD**	**Median**	**Min**	**Max**	**Range**	**Mean**	**SD**	**Median**	**Min**	**Max**	**Range**	**Mean**	**SD**	**Median**	**Min**	**Max**	**Range**
Austria	86.96	4.83	85.50	81.00	98.00	17.00	6.81	0.38	6.75	6.40	7.60	1.20	26777.61	966.30	26814.50	24926.00	28115.00	3189.00
Belgium	97.38	1.61	98.00	95.00	99.00	4.00	7.41	0.54	7.30	6.60	8.20	1.60	16752.50	408.12	16931.00	16003.00	17242.00	1239.00
Czechia	97.71	1.11	97.95	95.80	99.00	3.20	6.86	0.83	6.70	5.80	7.90	2.10	20878.27	795.66	20609.50	19814.00	22366.00	2552.00
Estonia	94.03	0.87	94.00	92.80	95.90	3.10	6.08	0.51	6.00	5.50	7.30	1.80	17696.22	1011.18	17636.00	15639.00	19554.00	3915.00
Finland	97.38	2.65	98.00	89.00	99.00	10.00	6.92	0.24	7.00	6.40	7.20	0.80	18868.61	1673.82	18637.50	16424.00	21349.00	4925.00
France	97.93	1.00	98.00	96.10	99.00	2.90	5.73	0.18	5.70	5.40	6.10	0.70	17444.88	813.22	17193.50	16363.00	18954.00	2591.00
Germany	95.31	2.25	96.00	90.00	98.00	8.00	8.43	0.83	8.25	7.50	10.10	2.60	23276.11	2020.49	23464.50	19961.00	25686.00	5725.00
Greece	96.88	3.28	99.00	89.00	99.00	10.00	5.61	0.28	5.55	5.20	6.20	1.00	16838.22	3695.54	18171.00	8270.00	20636.00	12366.00
Hungary	99.86	0.08	99.80	99.80	100.00	0.20	6.12	0.55	5.90	5.50	7.10	1.60	22243.94	2331.79	21091.50	19494.00	25330.00	5836.00
Ireland	91.56	4.25	93.35	83.00	95.50	12.50	6.11	0.31	6.10	5.60	6.50	0.90	13500.94	312.12	13572.50	12863.00	14026.00	1163.00
Italy	94.66	2.26	95.40	87.00	97.00	10.00	6.79	0.11	6.80	6.70	7.00	0.30	14305.94	1990.00	14382.00	11597.00	17713.00	6116.00
Luxembourg	98.94	0.23	99.00	98.00	99.00	1.00	7.42	0.15	7.40	7.20	7.80	0.60	17030.55	1259.67	17167.00	15050.00	18859.00	3809.00
Netherlands	96.47	0.97	96.70	93.90	97.80	3.90	6.66	1.24	6.55	5.00	9.00	4.00	10389.61	1016.94	10064.00	9125.00	12219.00	3094.00
Poland	98.46	0.66	98.65	96.40	99.00	2.60	7.33	0.50	7.40	6.60	7.90	1.30	15397.64	1694.33	15549.00	13259.00	18152.00	4893.00
Portugal	96.70	1.83	98.00	93.20	98.60	5.40	8.72	0.24	8.75	8.30	9.40	1.10	8866.77	304.78	8914.00	8453.00	9271.00	818.00
Slovakia	98.41	1.16	99.00	96.00	99.40	3.40	7.04	0.60	6.95	6.20	8.40	2.20	19142.77	501.22	19116.00	18368.00	20252.00	1884.00
Slovenia	94.91	1.64	95.00	91.00	97.00	6.00	6.28	0.52	6.50	5.50	7.10	1.60	16794.50	1244.33	17004.00	14392.00	18457.00	4065.00
Spain	96.56	0.91	96.60	94.80	98.00	3.20	6.46	0.38	6.45	6.00	7.10	1.10	10461.77	352.34	10456.00	9906.00	11099.00	1193.00
Sweden	98.16	0.61	98.00	97.00	99.00	2.00	6.03	0.38	6.15	5.60	6.60	1.00	15762.00	585.18	15930.50	14014.00	16251.00	2237.00
Türkiye	90.64	9.29	96.00	68.00	98.00	30.00	4.61	0.77	4.10	3.90	5.80	1.90	12908.33	3445.00	13687.50	7712.00	17115.00	9403.00
United Kingdom	92.94	1.66	92.50	91.00	95.00	4.00	6.55	0.67	6.25	5.90	7.90	2.00	13064.22	181.63	13050.50	12767.00	13354.00	587.00
Total	**95.80**	**4.16**	**97.00**	**68.00**	**100.00**	**32.00**	**6.67**	**1.05**	**6.60**	**3.90**	**10.10**	**6.20**	**16590.55**	**4591.69**	**16831.00**	**7712.00**	**28115.00**	**20403.00**

SD: Standart deviation, Min: Minimum, Max: Maximum

Appendix 3. Descriptives of the number of hospital beds, Computed Tomography (CT) scanners, Magnetic Resonance Imaging (MRI) units independent variables for the 20 countries forming Panel 2 between 2000 and 2017.

Countries	Hospital Beds (Per 1000 inhabitants)						Computed Tomography (CT) Scanners (Per 1,000,000 inhabitants)						Magnetic Resonance Imaging (MRI) Units (Per 1,000,000 inhabitants)					
	Mean	**SD**	**Median**	**Min**	**Max**	**Range**	**Mean**	**SD**	**Median**	**Min**	**Max**	**Range**	**Mean**	**SD**	**Median**	**Min**	**Max**	**Range**
Austria	7.67	0.14	7.68	7.37	7.95	0.58	28.87	1.23	29.36	26.09	30.02	3.93	17.45	3.36	18.24	10.98	22.96	11.98
Belgium	6.19	0.32	6.20	5.66	6.72	1.06	15.76	4.89	13.84	10.50	23.92	13.42	9.10	2.18	10.49	6.03	11.78	5.75
Czechia	7.22	0.43	7.25	6.63	7.80	1.17	13.67	1.71	13.78	9.65	16.12	6.47	5.23	2.53	5.37	1.66	9.44	7.78
Estonia	5.49	0.59	5.43	4.69	7.04	2.35	12.49	5.56	14.97	4.62	19.78	15.16	6.92	4.60	7.86	1.24	13.68	12.44
Finland	5.99	1.33	6.41	3.28	7.54	4.26	18.38	4.00	19.42	13.27	24.51	11.24	17.84	5.34	15.67	9.85	27.05	17.20
France	6.84	0.66	6.78	5.98	7.97	1.99	11.66	3.38	10.96	7.01	17.36	10.35	6.91	3.92	6.24	1.65	14.21	12.56
Germany	8.41	0.32	8.29	8.00	9.12	1.12	31.00	3.50	31.19	24.61	35.34	10.73	24.69	6.47	24.37	14.32	34.71	20.39
Greece	4.59	0.26	4.73	4.20	4.93	0.73	29.92	4.60	31.14	22.97	36.13	13.16	19.03	5.29	20.88	11.86	26.91	15.05
Hungary	7.41	0.44	7.18	6.98	8.16	1.18	7.34	0.93	7.25	5.68	9.19	3.51	2.88	0.68	2.79	1.76	4.70	2.94
Ireland	4.13	1.46	3.91	2.54	6.13	3.59	13.76	3.62	14.62	8.08	19.14	11.06	10.28	3.32	10.43	5.75	15.18	9.43
Italy	3.77	0.49	3.74	3.17	4.71	1.54	29.73	4.30	31.40	21.13	34.71	13.58	19.66	6.91	20.82	7.76	28.66	20.90
Latvia	6.93	1.16	7.25	5.57	8.77	3.20	24.41	10.54	24.78	8.87	39.13	30.26	6.64	4.90	7.18	0.52	13.90	13.38
Lithuania	7.41	0.56	7.25	6.56	8.83	2.27	15.78	6.21	14.94	6.57	23.76	17.19	5.51	4.41	4.61	0.29	12.37	12.08
Luxembourg	5.64	0.69	5.52	4.66	6.86	2.20	24.18	3.68	25.14	16.77	28.38	11.61	10.61	3.69	11.87	2.26	14.06	11.80
Netherlands	4.16	0.49	4.29	3.28	4.92	1.64	9.60	3.35	10.57	4.57	13.75	9.18	9.61	2.96	10.67	5.80	13.02	7.22
Poland	6.62	0.09	6.63	6.42	6.80	0.38	11.45	4.62	11.63	4.42	17.33	12.91	3.92	2.60	3.32	0.79	7.93	7.14
Slovakia	6.55	0.70	6.56	5.75	7.86	2.11	13.24	3.35	13.76	7.84	17.88	10.04	5.53	2.67	6.13	1.11	9.56	8.45
Slovenia	4.74	0.26	4.64	4.49	5.40	0.91	11.24	2.21	11.95	7.63	15.00	7.37	7.12	2.53	6.90	3.00	11.61	8.61
Türkiye	2.59	0.11	2.60	2.45	2.81	0.36	10.23	3.84	11.15	4.16	14.77	10.61	6.41	3.96	8.29	0.56	11.01	10.45
United Kingdom	3.27	0.56	3.29	2.54	4.08	1.54	8.11	1.42	7.57	5.35	10.82	5.47	6.24	1.01	6.00	4.54	7.79	3.25
Total	**5.79**	**1.72**	**5.96**	**2.45**	**9.12**	**6.67**	**17.04**	**8.84**	**14.43**	**4.16**	**39.13**	**34.97**	**10.08**	**7.18**	**8.58**	**0.29**	**34.71**	**34.42**

SD: Standart deviation, Min: Minimum, Max: Maximum

Appendix 4. Descriptives of health spending, number of doctors and number of nurses independent variables for the 20 countries forming Panel 3 between 2000 and 2017.

Countries	Health Spending (% of GDP)						Number of Doctors (Per 1000 inhabitants)						Number of Nurses (Per 1000 inhabitants)					
	Mean	**SD**	**Median**	**Min**	**Max**	**Range**	**Mean**	**SD**	**Median**	**Min**	**Max**	**Range**	**Mean**	**SD**	**Median**	**Min**	**Max**	**Range**
Austria	9.89	0.42	9.88	9.20	10.37	1.16	4.60	0.43	4.64	3.85	5.18	1.33	6.29	0.45	6.41	5.55	6.85	1.30
Belgium	9.66	0.87	9.93	8.00	10.56	2.56	2.93	0.07	2.92	2.83	3.08	0.25	9.55	0.91	9.37	8.27	11.22	2.95
Czechia	6.72	0.61	6.74	5.72	7.81	2.09	3.75	0.42	3.57	3.37	4.89	1.52	8.00	0.11	8.03	7.61	8.11	0.50
Denmark	9.58	0.76	9.81	8.10	10.67	2.57	3.54	0.38	3.61	2.91	4.10	1.19	9.66	0.27	9.69	9.29	10.03	0.74
Estonia	5.61	0.68	5.74	4.70	6.62	1.92	3.21	0.20	3.27	2.78	3.47	0.69	6.10	0.22	6.15	5.64	6.41	0.77
Finland	8.64	0.87	8.72	7.14	9.77	2.64	2.87	0.31	2.77	2.50	3.39	0.89	13.11	1.29	13.48	10.71	14.44	3.73
France	10.75	0.69	10.85	9.58	11.58	2.00	3.32	0.03	3.32	3.26	3.37	0.11	8.33	1.20	8.05	6.66	10.48	3.82
Germany	10.62	0.51	10.59	9.89	11.37	1.49	3.69	0.35	3.58	3.25	4.25	1.00	11.38	1.02	11.27	9.99	13.13	3.14
Hungary	7.30	0.41	7.23	6.78	8.12	1.34	3.06	0.20	3.09	2.68	3.34	0.66	6.08	0.35	6.20	5.28	6.51	1.23
Latvia	5.75	0.29	5.71	5.40	6.24	0.84	3.06	0.17	3.13	2.69	3.23	0.54	4.90	0.34	4.87	4.51	5.61	1.10
Lithuania	6.25	0.44	6.19	5.51	7.36	1.85	3.97	0.31	3.88	3.63	4.56	0.93	7.48	0.14	7.50	7.25	7.71	0.46
Luxembourg	6.27	0.76	6.32	5.20	7.35	2.15	2.64	0.26	2.71	2.15	2.98	0.83	10.52	1.61	11.07	7.38	11.97	4.59
Netherlands	9.54	0.88	9.63	7.71	10.58	2.88	2.99	0.41	2.89	2.44	3.79	1.35	11.66	0.71	11.66	10.29	12.83	2.54
Poland	6.13	0.35	6.21	5.30	6.59	1.29	2.26	0.09	2.23	2.14	2.43	0.29	5.11	0.16	5.17	4.75	5.28	0.53
Slovakia	6.73	0.83	6.87	5.30	7.95	2.65	3.34	0.10	3.35	3.04	3.47	0.43	6.20	0.53	6.06	5.65	7.44	1.79
Slovenia	8.21	0.37	8.14	7.51	8.74	1.23	2.49	0.28	2.40	2.15	3.10	0.95	8.02	0.82	7.95	6.85	9.92	3.07
Spain	8.29	0.91	8.66	6.77	9.17	2.40	3.58	0.27	3.61	3.13	3.88	0.75	4.76	0.60	4.88	3.54	5.74	2.20
Sweden	9.19	1.35	8.35	7.37	10.98	3.61	3.69	0.39	3.71	3.02	4.27	1.25	10.57	0.43	10.76	9.62	10.94	1.32
Türkiye	4.81	0.42	4.93	4.14	5.53	1.40	1.60	0.18	1.62	1.30	1.87	0.57	1.48	0.35	1.43	1.06	2.07	1.01
United Kingdom	9.14	0.93	9.50	7.28	10.05	2.77	2.50	0.27	2.60	1.98	2.81	0.83	8.39	0.44	8.38	7.83	9.15	1.32
Total	**7.95**	**1.91**	**7.93**	**4.14**	**11.58**	**7.44**	**3.16**	**0.71**	**3.21**	**1.30**	**5.18**	**3.88**	**7.88**	**2.86**	**7.74**	**1.06**	**14.44**	**13.38**

SD: Standart deviation, Min: Minimum, Max: Maximum

Appendix 5. Descriptives of smoking prevalence rate, alcohol consumption and obesity prevalence rate independent variables for the 24 countries forming Panel 4 between 2000 and 2017.

Countries	Smoking Prevalence Rate (%)						Alcohol Consumption (Liters per Year)						Obesity Prevalence Rate (%)					
	Mean	SD	Median	Min	Max	Range	Mean	SD	Median	Min	Max	Range	Mean	SD	Median	Min	Max	Range
Austria	37.88	6.37	37.02	28.49	49.10	20.61	12.52	0.41	12.50	11.90	13.70	1.80	17.13	2.05	17.10	14.00	20.58	6.58
Belgium	32.21	3.05	32.00	27.74	37.40	9.66	10.63	0.77	10.45	9.40	12.20	2.80	19.65	1.69	19.65	17.00	22.45	5.45
Czechia	34.25	0.06	34.30	34.10	34.30	0.20	11.77	0.24	11.80	11.40	12.10	0.70	23.52	1.77	23.40	21.00	27.08	6.08
Denmark	27.12	6.32	26.50	18.30	38.30	20.00	11.10	1.61	10.70	9.10	13.10	4.00	16.95	1.89	16.90	14.00	20.11	6.11
Estonia	35.07	2.73	34.98	31.05	39.60	8.55	11.73	1.46	11.85	9.00	14.80	5.80	19.30	1.27	19.25	17.40	21.34	3.94
Finland	24.49	3.06	24.34	19.92	29.70	9.78	9.38	0.67	9.30	8.40	10.50	2.10	19.37	1.82	19.45	16.40	22.20	5.80
France	33.66	0.73	33.68	32.58	34.90	2.32	12.67	0.79	12.55	11.60	14.10	2.50	18.83	1.92	18.80	15.80	22.01	6.21
Germany	32.50	1.77	32.47	28.01	35.30	7.29	11.54	0.57	11.35	10.80	12.90	2.10	19.40	2.02	19.35	16.30	22.73	6.43
Greece	47.81	3.25	47.53	43.40	53.50	10.10	8.01	0.95	8.25	6.40	9.20	2.80	21.83	2.13	21.80	18.50	25.34	6.84
Hungary	35.23	3.46	35.06	30.05	41.10	11.05	11.91	1.04	11.65	10.60	13.30	2.70	22.97	2.34	22.85	19.60	26.92	7.32
Ireland	30.22	4.38	29.93	24.23	37.80	13.57	12.35	1.38	11.95	10.60	14.50	3.90	20.79	3.13	20.70	16.00	25.98	9.98
Italy	24.96	0.94	24.90	23.55	26.50	2.95	8.08	0.99	7.75	7.00	9.80	2.80	17.61	1.64	17.65	15.00	20.22	5.22
Latvia	37.51	0.50	37.35	36.92	38.80	1.88	9.89	1.68	10.15	6.70	12.60	5.90	21.47	1.46	21.40	19.30	23.91	4.61
Lithuania	31.94	2.35	31.79	28.43	35.90	7.47	12.91	1.48	13.20	9.70	14.70	5.00	24.00	1.58	23.95	21.60	26.63	5.03
Luxembourg	28.36	3.77	28.11	22.30	34.70	12.40	12.12	0.66	11.95	11.30	13.40	2.10	19.39	2.27	19.40	15.80	23.07	7.27
Netherlands	31.01	3.84	30.75	25.80	37.70	11.90	9.23	0.62	9.50	8.20	10.10	1.90	16.98	2.47	17.05	13.00	20.89	7.89
Poland	33.49	4.19	33.13	27.40	40.70	13.30	9.79	0.94	10.20	7.80	10.80	3.00	20.36	1.88	20.30	17.50	23.50	6.00
Portugal	24.10	1.07	24.03	22.54	25.90	3.36	11.30	1.01	11.50	9.50	12.80	3.30	17.46	2.38	17.45	13.70	21.29	7.59
Slovakia	30.59	0.60	30.40	30.05	32.10	2.05	10.38	0.45	10.20	9.70	11.20	1.50	18.03	1.68	17.95	15.50	20.87	5.37
Slovenia	24.45	1.40	24.39	22.26	26.80	4.54	11.10	0.99	11.00	9.50	13.50	4.00	17.69	1.71	17.65	15.10	20.57	5.47
Spain	33.84	3.37	33.98	28.77	39.50	10.73	10.70	0.99	10.75	9.20	12.40	3.20	21.19	1.83	21.15	18.30	24.17	5.87
Sweden	24.69	4.46	24.39	18.17	32.30	14.13	6.96	0.34	7.00	6.20	7.40	1.20	17.69	2.02	17.60	14.60	21.03	6.43
Türkiye	32.12	3.71	31.88	26.64	38.40	11.76	1.42	0.10	1.40	1.20	1.60	0.40	27.34	3.35	27.25	22.20	32.80	10.60
United Kingdom	29.14	5.28	28.73	21.36	38.20	16.84	10.37	0.76	10.25	9.40	11.60	2.20	23.41	3.06	23.35	18.60	28.38	9.78
Total	**31.53**	**6.27**	**31.51**	**18.17**	**53.50**	**35.33**	**10.33**	**2.58**	**10.80**	**1.20**	**14.80**	**13.60**	**20.10**	**3.35**	**19.80**	**13.00**	**32.80**	**19.80**

SD: Standart deviation, Min: Minimum, Max: Maximum