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THE EFFECT OF HEALTH EXPENDITURES ON ECONOMIC GROWTH: AN ECONOMETRIC ANALYSIS

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ABSTRACT

All countries in the world aim to create a society composed of healthy individuals. Because for a country's economy to be strong and sustainable, a society consisting of healthy individuals is necessary. Health expenditures for the development of health services affect economic growth through human capital. An increase in health expenditures; It also affects economic growth by increasing people's life expectancy, life expectancy and quality of life. How health spending affects economic growth has always been explored. The aim of this study is; It is the analysis of the effects of health expenditure and household consumption expenditure on economic growth in OECD countries using panel data regression model. For this;, 37 OECD countries were examined, between 2011 and 2020. Hausman Test results show that fixed effects model should be accepted among models used in panel data analysis. In the obtained fixed effects model; It has been observed that there are different variances, autocorrelations and correlations between units. After all; It has been found that health expenditures and household consumption expenditure variables have a negative effect on economic growth. An increase of 1% in health expenditures reduces economic growth by 0.08%.

Keywords: Health Expenditures, Household Consumption Expenditure, Economic Growth, Panel Data Analysis, OECD Countries.

SAĞLIK HARCAMALARININ EKONOMİK BÜYÜME ÜZERİNE ETKİSİ: EKONOMETRİK BİR ANALİZ

ÖZET

Dünyadaki tüm ülkeler, sağlıklı bireylerden oluşan bir toplum oluşturmayı hedeflemektedir. Çünkü; bir ülke ekonomisinin güçlü olması ve sürdürülebilirliği için, sağlıklı bireylerden oluşan bir toplum gereklidir. Sağlık hizmetlerinin gelişimi için yapılan sağlık harcamaları, beşeri sermaye yoluyla ekonomik büyümeyi etkilemektedir. Sağlık harcamalarında ortaya çıkan bir artış; insanların hayat süresini, hayat beklentisini ve hayat kalitesini artırarak ekonomik büyümeyi de etkilemektedir. Sağlık harcamalarının, ekonomik büyümeyi ne yönde etkilediği her zaman araştırılmıştır. Bu çalışmanın amacı; OECD ülkelerinde sağlık harcaması ve hane halkı tüketim harcamasının, ekonomik büyüme üzerindeki etkilerinin panel veri regresyon modeli kullanılarak analiz edilmesidir. Bunun için 2011-2020 yılları arası 37 OECD ülkesi incelenmiştir. Hausman Testi sonuçları, panel veri analizinde kullanılan modellerden sabit etkiler modelinin kabul edilmesi gerektiğini göstermektedir. Elde edilen sabit etkiler modelinde; farklı varyans, otokorelasyon ve birimler arası korelasyon olduğu görülmüştür. Sonuçta; sağlık harcamalarının ve hane halkı tüketim harcaması değişkenlerinin, ekonomik büyüme üzerinde negatif etkisinin olduğu bulunmuştur. Sağlık harcamalarındaki %1'lik artış, ekonomik büyümeyi %0.08 azaltmaktadır.

Anahtar Kelimeler: Sağlık Harcamaları, Hane Halkı Tüketim Harcaması, Ekonomik Büyüme, Panel Veri Analizi, OECD Ülkeleri.

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1. INTRODUCTION

Health is one of the most important assets and indispensable values of human beings. The survival of people depends on the growth of healthy generations and their economic efficiency. Healthy people; They can learn better, improve their skills and increase their level of welfare with higher income by increasing their productivity. However, while doing all of these requires being healthy, protecting and sustaining one's health, it also requires some expenditure for this. It is emphasized in the literature that health expenditures contribute significantly to economic growth by increasing the health level of the individual and society (Bloom et al. 2001; Mayer 2001; Sab and Smith 2001). But; There are also studies that find that health expenditures have a negative effect on economic growth in different periods in some countries.

Economic growth defined as the increase in the amount of goods and services produced in a country over time. It is one of the issues that all countries of the world are closely interested in. The search for economic growth has led to the emergence of new approaches that try to explain how growth occurs and what policies affect growth. The most important of these has been the Endogenous Growth Model. While the Endogenous Growth Model emphasizes the importance of the sectors that affect the growth of an economy, it emphasized that physical capital was given much importance for many years. Moreover, it has been revealed that the main factor of production is human capital in terms of long-term growth (Kibritcioglu, 1998: 224). Human capital concept; It is used to express all concepts such as knowledge, skills, abilities, health status, place in social relations and education level that a person or society has (Woodhall, 1987: 21). Although the main source of human capital is education, the health level of the society is another factor that contributes significantly to the development of human capital.

The effect of health expenditures on economic growth is increasing day by day and maintains its importance. It is known that the health sector also affects economic growth through human and physical capital accumulation. In order for societies to survive, they must raise a healthy generation. Healthy workforce is one of the main factors of production in the growth and rapid development of societies. It is observed that health indicators are better in countries that prioritize health expenditures more. Therefore, since a healthy society will be formed in these countries, the possibility of high increases in production levels is more.

Grossman (1972), Bloom and Canning (2000) explain that healthy individuals assimilate information more effectively and as a result, a higher level of productivity is achieved. Hamoudi and Sachs (1999) emphasize that there is a simultaneous cycle between health and wealth. According to the World Bank (1993), health problems are important obstacles to economic development. The main conclusion of the said health report is that the relationship between health and economic growth should be addressed with its broad dimensions. On the other hand, Bloom, Canning and Sevilla (2001) state that human capital should be defined not only in terms of abilities but also in terms of health, and they emphasize the concept of health as one of the main dynamics of growth.

The OECD places emphasis on human capital for the development of sectors that provide basic economic growth and for those who are sustainable to generate higher income by producing higher added value. In addition, it prefers to include the issue of education and health expenditures to be made in the long term into the government policies instead of the income that can be obtained in the short term as a result of short-term collaborations (Sarıgul, 2019: 35).

The main purpose of this study is to test the relationship between health expenditures and economic growth in OECD countries between 2011 and 2020 with panel data analysis. For this purpose, in this study; GDP was used as the dependent variable, the share of health expenditures in GDP and household consumption expenditures were used as independent variables. In practice, the Hausman Test was applied to the variables. The following sections of this study are organized as follows. In the second part, there is a domestic and foreign literature research on the subject. In the third chapter, general information about the methodology of the study is explained. In the fourth section, where the application is included, the data set and variables used and the findings obtained from the analyzes are presented in tables. In the fifth chapter, there are conclusions and general evaluations.

2. LITERATURE

When the literature is examined; It is seen that there are many studies investigating the relationship between health expenditures and economic growth. In the studies, three different relationships emerge between health expenditures and economic growth. The first of these is the studies that found no relationship between the variables. Second, it states that there is a negative relationship between the variables. The third is; revealed a positive relationship between the variables. Some of these, especially some of the studies carried out in recent years, are given below in historical order.

Bloom and Canning (2000), as a result of their study based on 70 countries from Asia and outside of Asia, found that health expenditures in the period of 1965-1990 positively affected economic growth and welfare. Snow and Bottom (2003) studies, using annual data for the period 1971-2000 in Turkey, the impact on economic growth of health spending found that it is negative. Brempong and Wilson (2004) examined the relationship between health and economic growth for 21 Sub-Saharan Africa and 23 OECD countries. 1975-1994 period for Sub-Saharan African countries; They used 1961-1995 data sets for OECD countries. As a result of the analysis, it is seen that the health expenditures of the countries in two different groups have a positive effect on economic growth. Koying and Young-Hsiang (2006) used data for the period 1975-2001 in their study, and 21 OECD countries were included in the group of countries. In line with the results obtained, it was determined that the increase in health expenditures caused an increase in economic growth.

Yumusak and Yildirim (2009), using data from the years 1980-2005 with health indicators in Turkey has tried to explain the relationship between economic growth cointegration method. In this study, the effect of economic growth of health spending in Turkey has reached the conclusion that the minimum and negative. Baltagi and Moscone (2010) found in their study that there was no statistically significant relationship between health expenditures and economic growth in 20 OECD countries observed between 1971 and 2004. Cetin and Ecevit (2010), in their study covering 15 OECD countries, tested the relationship between health expenditures and economic growth between 1990 and 2006 using the panel data method. According to the findings obtained from the study, although a weak positive relationship was detected between health expenditures and economic growth, they concluded that this relationship was not statistically significant.

Mohammadi et al. (2012), six countries (Iran, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan and Turkey) operating in the 1995-2009 period covering the relationship between health spending and economic growth were examined in the framework of the Solow model. At the end of the study,

they concluded that health expenditures had a significant but negative effect on growth. Sammut (2013) discussed Malta in the period of 2000-2012 and analyzed the relationship between health expenditures and economic growth with the Granger Causality Test. As a result of the analysis, no causal relationship between health expenditures and economic growth was found for Malta. Simsir et al. (2015), using data for the period 1975-2012 the health impact of Turkey's economic growth is investigated by the ARDL bounds testing approach. As a result, it has been determined that there is a negative relationship between health indicators and economic growth in the long and short term. Baltagi et al. (2017) examined the long-term relationship using health expenditures and income data for the period 1995-2012 for 167 countries. The conclusion of this study is that there is a long-term relationship between health expenditures and income.

Rodriguez and Nieves Valdes (2018) examined the long-term relationship between health expenditures and income for the period 1995-2014 for Latin America, the Caribbean and OECD countries. According to the results obtained in the study, a causality relationship from changes in health expenditures to GDP could not be reached. Cima and Almedia (2018) examined the relationship between GDP and health expenditures between 1993 and 2015 for 25 OECD countries. Using the panel data model, they concluded that there was no strong link between health spending and GDP growth. Kirilmaz et al. (2019), in which Turkey is also found in the work they have done with the five countries studied the relationship between health and economic growth. According to the findings obtained from the study, it was determined that there was no significant relationship between health and economic growth.

Ozturk and Kusmez (2019) in their study with data from the 1995 to 2004 period, including Turkey takes place as the BRICS-T countries, health spending, GDP, female mortality rates have used the male death rate and aging population variables. As a result, it was concluded that there is a significant two-way causality relationship between the dependent variable, GDP, and the independent variables. Acar (2020), health expenditures for 1975-2017 period, using economic growth and life expectancy at birth has done a review of data for Turkey. VAR and Granger causality analyzes were used in the study. A causality relationship from life expectancy at birth and infant mortality rate to growth has been identified.

3. METHODOLOGY

Relationships of economic variables with each other statistically and econometrically; It can be examined with panel data sets consisting of time series, cross-section data and a combination of both. Panel data can be defined as cross-section data with time dimensions or time series belonging to many sections (Grene, 2003: 612).

3.1. Prediction of Panel Data Regression Models

Panel data regression model can be created for the 'k' variable as follows:

$$y_{it} = \beta_{1it} + \beta_{2\,it} + \ldots + \beta_{kit}\, X_{kit} + \varepsilon_{it} \qquad (1)$$

In the equation (1); t = 1,2, ..., n represents the time period and i = 1,2, ..., G represents the section unit. In addition, it is assumed that the mean of the non-probabilistic error term "ε" is zero and has a constant variance. So, E $[\varepsilon_{it}] = 0$ and shown as Var $[\varepsilon_{it}] = \sigma_{\varepsilon}^2$. The slope coefficients from

$\beta_{2\,it}$ to $\beta_{k\,it}$ are unknown response coefficients. These may differ for different time periods and different units. However, while the model is estimated; It is also possible to make various assumptions about the constant term, error term and slope coefficients of the model (Judge et al., 1985: 515). In addition, Judge et al. (1985) and Gujarati (2003), panel regression models; They have been classified into two types as Fixed Effects Model (FEM) and Random Effects Model (REM).

3.1.1. Fixed Effects Model

In panel data models, one of the ways to include the change in the model due to differences between units or differences over time between units is to assume that the current change will cause the change in the coefficients in the regression model. Models that assume that the coefficients vary according to units and time or units are called "Fixed Effect Models". Fixed Effects Model can be expressed as:

$$Y_{it} = a_i + a_2 D_{2i} + \cdots + a_N D_{Ni} + \beta_{1i} X_{1it} + \beta_{2i} X_{2it} + \cdots + \beta_{Mi} X_{Mit} + e_{it} \quad (2)$$

The expression D_{Ni} in the equation numbered (2) takes the value 1 for the Nth section and 0 for the others. Thus, while the constant of the first section is the term a_1, the constant for the second section is $(a_1 + a_2)$ (Sarac, 2009: 6).

3.1.2. Random Effects Model

The biggest advantage of the Random Effects Model, which is the model in which the data to be used in the model are selected randomly, is to prevent the risk of losing the degree of freedom in the fixed effect model (Turhan and Taşseven, 2010: 142). Random Effects Model can be expressed as follows;

$$Y_{it} = a_1 + \beta_{1i} X_{1it} + \beta_{2i} X_{2it} + \cdots + \beta_{Mi} X_{Mit} + w_{it} \quad (3)$$

The term w_{it} in equation (3); it consists of the individual error term μ_i and the combination of the time series and the common error term e_{it}. When the equations of the Random Effects Model and the Fixed Effects Model are examined, the main difference between these two models; while the constant a_i in the Fixed Effects Model indicates that each unit is a separate constant parameter, the a_1 expression in the Random Effects Model shows that it is a common constant for all sections in the model.

4. ECONOMETRIC ANALYSIS

4.1. Data Set and Descriptive Statistics

In this study, analyzes were carried out using data from 37 OECD countries between 2011-2020. In the study, GDP as dependent variable; the share of health expenditures in total GDP and household consumption expenditure were used as independent variables. The data set used in the analysis is annual and obtained from the OECD Data Bank database. The variables and explanations about the variables used in the analysis are shown in Table 1.

Table 1: Explanations on the Variables Used in the Analysis

Variables	Explanation	Source
GDP	Gross Domestic Product (%)	OECD Data Bank
SE	Health Expenditures / GDP (%)	
HCE	Household Consumption Expenditure (%)	

The variables and descriptive statistics used in the study are included in Table 2. The cross-sectional dimension is 37 countries and the time dimension is 10 years. There are 370 observations for each variable.

Table 2: Descriptive Statistics Regarding the Variables

Variables	Number of Observations	Mean	Standard deviation	Min	Max
GDP	370	2.140	2.214	11.01	22.18
SE	370	53.117	7.415	29.20	70.12
HCE	370	7.874	2.014	3.01	15.04

4.2. Findings

In OECD countries, the share of health expenditures in GDP and the relationship between household consumption expenditure and economic growth was analyzed using a panel regression model. For this purpose, the models of the Fixed Effects Model method obtained are given in Table 3. Hausman Test shows that Fixed Effects Model, which is one of the models used in panel data analysis, should be accepted. In addition, Table 3 also includes the Modified Wald Test, which shows whether there is a variance from the Fixed Effects Model hypothetical tests, the Baltagi-Wu LBI test that tests autocorrelation, and the Pesaran test analysis results that test the correlation between units.

Table 3: Fixed Effects Model Estimation Results

	Fixed Effects Model		
Variables	**Coefficient**	**Z Value**	**Possibility**
SH	-.084	-3.12	0.000*
SE	-.401	-4.16	0.000*
HCE	370		
Time period	10		
Wald $\chi 2$	40.05		0.000*
F test	5.12		0.000*
Hausman test statistic	45.17		0.000*
Different variance test Değiştirilmiş Wald test- $\chi 2$	5192.11		0.000*
Otokorelasyon testi			

Baltagi-Wu LBI	1.491		
Birimler arası korelasyon Pesaran test	15.34		0.000*

When Table 3 is examined; According to the Fixed Effects assumptions, it is understood that the Modified Wald Test probability value is less than 5% probability value and the variance varies according to the units. The fact that the Baltagi-Wu LBI test result, which is one of the autocorrelation tests, is less than 2 indicates that autocorrelation is important. In addition, when the Pesaran Test results of the Fixed Effects Model Inter-Units Correlation Test are examined, it can be said that there is a correlation between units because the probability value is less than 5% probability value. Therefore, it is seen that there is different variance, otcorrelation and inter-unit correlation in the obtained fixed effects model.

According to the findings obtained from the Fixed Effects Model, a statistically significant relationship was found between health expenditures and economic growth. Bloom and Canning (2000), Şimşir et al. (2015), Baltagi et al. (2017) found findings consistent with this result in their research. However, the result of our research states that there is no relationship between health expenditures and economic growth; It contradicts the studies of authors such as Baltagi and Moscone (2010), Cetin and Ecevit (2010), Kirilmaz et al. (2019).

The effect of the share of health expenditures in total GDP and household consumption expenditure variables on the economic growth variable is negative. A 1% increase in health expenditures reduces economic growth by 0.08%. Kar and Taban (2003), Yumusak and Yildirim (2009), Mohammadi et al. (2012) and Şimsir (2015) have reached similar results in the studies. Wahab (2011) found in his study that public consumption expenditures do not have a significant effect on growth, while it is clearly seen from the analysis that the increase in household consumption expenditure also affects economic growth negatively in this study. In addition, a 1% increase in household consumption expenditure reduces economic growth by 0.4%.

5. CONCLUSION

Being healthy and living healthy is one of the most basic rights and indispensable wishes of people. Health expenses; These are all expenditures made in order to protect, improve and maintain people's health. While health expenditures increase the health level of the individual and society, it also affects the economic growth with its contributions to human capital. A healthy society is, in a sense, qualified human resources and is of great importance for economic growth. In order to be able to say that the society consists of healthy individuals, the health services provided must meet the needs of individuals.

Human capital investments are an important item in the expenditures of developed countries, and they are the main source for developing countries to keep pace with the global economy. If it is desired to develop long-term strategies to develop and protect human and social capital in the society, it is imperative to prioritize health policies. Even if there is a negative relationship between health and economic growth; Effective health policies should still be implemented in order to achieve the most basic gains that a social state is obliged to offer to its citizens, such as the right to a good life, freedom and equality.

Developed countries spend more on health because of their good economic conditions. Thus, health indicators are much better than other countries. However, on the basis of this, it cannot be said that every additional health expenditure will necessarily result in an improvement in health. The fact that developed countries have close health indicators versus different health expenditure levels among themselves can be shown as proof of this.

The aim of this study is; It is the analysis of the share of health expenditures in GDP of 37 OECD countries between 2011-2020 and the relationship between household consumption expenditure and economic growth using panel regression model. The findings of the research show that the share of health expenditures in total GDP and household consumption expenditure variables have a negative effect on the economic growth variable. Increasing health expenditures negatively affect economic growth.

As a result of the analysis, a statistically significant relationship was found between health expenditures and economic growth, but the direction of the relationship was negative. This situation can be interpreted in the context of both econometrics and economic policy. Dependent and independent variables preferred in econometric studies, analysis methods used, different cross-section and / or time dimensions can be effective in obtaining different results or not reaching the desired result. In addition, one of the reasons for the negative relationship between health indicators and economic growth may be insufficient health expenditures due to population growth. Another reason may be that despite the quantitative increase in health indicators, they are not sufficient in terms of quality. Therefore; Policies aimed at achieving both qualitative improvements and the quantity to meet the needs of population growth in health indicators should be followed. Another opinion; argues that the traditional role of the state in health services should change. Thus, the state should carry out the functions of planning, supervision and regulation rather than the delivery and financing of health services. In addition, public and private partnerships should be established in the health sector. So it can generate more resources and activities than each can provide on its own.

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