DETERMINANTS OF HEALTH EXPENDITURES IN THE WORLD: A PANEL DATA ANALYSIS

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ABSTRACT

Health expenditure is the main indicators used by policy makers in the macro and micro environment. This study, it is aimed to reveal the determinants of health expenditures of all countries in the world.No sample selection was made within the scope of the study. The data of all the countries of the world were tried to be accessed. Data collection was carried out with the World Bank database. 2010-2016 panel data of 163 countries were used The obtained data were subjected to Least Squares (OLS) regression analysis, which is a multivariate analysis type. EViews pro19 and SPSS programs were used for analysis. According to the results of these studies health expenditures increase as income, population age over 65, unemployment rate, and urbanization rate increase. It was observed that inflation did not have a statistically notable effect on health expenditures. Developing policies to change the lifestyles of individuals in terms of preventing unemployment in countries, proportional distribution of health services to urban and rural populations and reducing chronic diseases is of great importance in terms of improving health outcomes.

Keywords: Health Expenditure; Unemployment, GDP; Inflation; Elderly Population

JEL Classification Codes: I15, H30, E62

DÜNYADA SAĞLIK HARCAMALARININ BELİRLEYİCİLERİ: PANEL VERİYE DAYALI BİR ANALİZ

ÖZ

Sağlık harcamaları, makro ve mikro ortamda politika yapıcılar tarafından kullanılan temel göstergelerdir. Bu çalışmanın amacı dünyadaki tüm ülkelerin sağlık harcamalarının belirleyicilerini ortaya koymaktır. Araştırma kapsamında örneklem seçimi yapılmamıştır. Tüm dünya ülkelerinin verilerine ulaşılmaya çalışılmıştır. Veri toplama, Dünya Bankası veri tabanı ile gerçekleştirilmiştir. 163 ülkenin 2010-2016 panel verileri kullanılmıştır. Çalışmada elde edilen veriler, çok değişkenli bir analiz türü olan En Küçük Kareler (OLS) regresyon analizine tabi tutulmuştur. Analiz için EViews pro19 ve SPSS programları kullanılmıştır. Gelir, 65 yaş üzeri nüfus oranı, işsizlik oranı kentleşme arttıkça sağlık harcamaları da artış göstermektedir. Enflasyonun sağlık harcamaları üzerinde istatistiksel olarak anlamlı bir etkisinin olmadığı görülmüştür. Sağlık politikası yapıcıların ülkelerindeki işsizliğin önüne geçmesi, kent ve kırsal nüfusta sağlık hizmetlerinin orantılı dağıtılması ve kronik hastalıkların azaltılması yönünde kişilerin yaşam tarzlarını değiştirmeye yönelik politikalar sağlık sonuçlarının iyileştirilmesi açısından büyük önem arz etmektedir

Anahtar Kelimeler: Sağlık Harcamaları, GSYİH, Enflasyon, İşsizlik, Bağımlı Nüfus, Kentsel Nüfus

JEL Sınıflandırma Kodları: I15, H30, E62

1. INTRODUCTION

Although the health systems of countries differ, it is seen that the expenditures for health tend to increase. When the historical change in health expenditures is examined, it has increased from 3% of the share in GDP in 1948 to 7.9% in 1997 (Self and Grabowski, 2003) and 10% in 2017 (WHO, 2019). Health expenditure is increasing faster than GDP in many countries (Rana, 2020). After the economic crisis in 2009, the World Health Organization (WHO) carried out various studies in order to keep the investments made in health and health expenditures under control (Mihalyi, 2012).).

One of the most important reasons for the increase in health expenditures in the national health insurance program is the use of services. Many studies prove that a free healthcare service increases the use of services and consequently increases health expenditure (Taubman et al., 2014; Finkelstein et al ., 2012; Wherry and Miller, 2016). In studies by Kleiman (1974) and Newhouse (1977), it has been revealed that income is defined as the most main factor explaining dissimilar between countries in terms of the level and growth of health expenditures. Apart from income, he has been involved in other studies in the literature that address variables that increase health expenditure. The aging of the population is shown as the main factor among the reasons for the difference in health expenditures between countries (Culyer, 1988, Leu, 1986). Although the relationship between the aging of the population and health expenditures has been discussed in many different areas, a common idea has still not been reached. (Meijer et al., 2013; Payne et al, 2007).

Moreover, the number of surgical procedures and specific medical stuff. (Baker and Wheeler, 1998 ;Weil, 1995); research and development expenditures specific to healthcare services (Okunade and Murthy, 2002); infant deaths and life expectancy at birth (Kiross et al. 2020,Dregen and Reimers, 2005); and the development of technology (Newhouse, 1992 Jones, 2004; García and Manrique, 2012) were involved in studies as determinants of health expenditures. Apart from these, urbanization can be considered as a determinant of access to modern and high-budget health services (Blomqvist, 1997) other health centers and Hospitals providing quality health services are found in the cities. As a result, people can use more health services if they live in cities (Zhou and Tian, 2011).

Most of the studies on the subject have focused on OECD countries and have examined their health expenditure from an economic perspective. Few studies have provided a global perspective using a vast country case (Baltagi and Moscone 2010; Hartwig 2008; Rana, 2020). In this study, differently, all countries in the world were examined and the determinants of health expenditures were emphasized. In this sense, the aim of this study was to reveal the determinants of health expenditures in all the countries.

2. LITERATURE REVIEW

When the literature on health expenditures was examined, a search was made in the Web of Science database as of February 21, 2021 with the keywords "health expenditure" and "health spending" and it was seen that there were "984" studies.
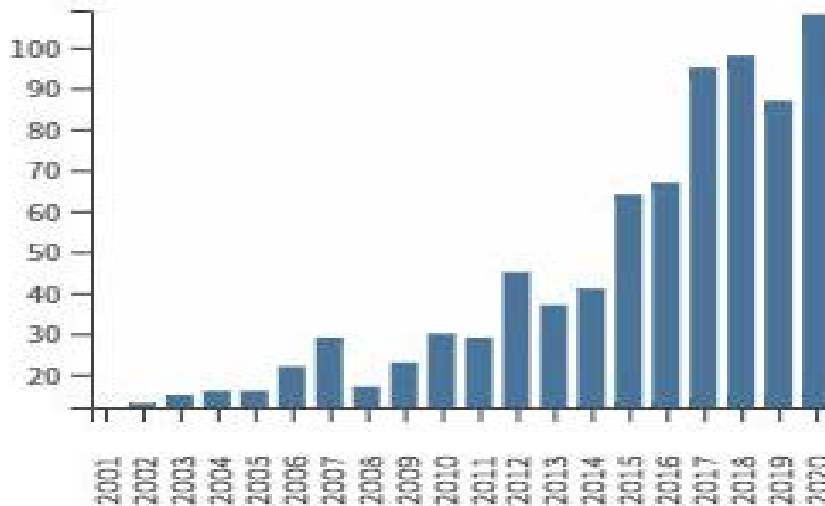

Figure 1 Distribution of Publications by Years

Figure 1 shows the increased rates of the publications over the years. Accordingly, it has become a popular subject by showing an increasing trend especially after 2015. Among these studies, with the most cited study "1010", Xu et al. (2003) examined household catastrophic health expenditures with multiple analysis methods. Catastrophic health expenditure is the financial contribution of a household to the health system that exceeds 40% of the remaining income after their livelihood needs are met. As a result of the study, the disastrous spending rates were found to be the highest in transition and some Latin American countries in countries. Health insurance, low payment capacity and availability of healthcare services that require payment are three important factors that create catastrophic expenditures. They also found that people, especially those living in poor households, can avoid catastrophic health expenditures by providing greater financial risk protection and minimizing a health system's dependence on out-of-pocket payments.

Another study with the most citations was made by Hall and Jones (2007). In the results of study, It reveals that health expenditure is a superior commodity whose income elasticity is well above one. The marginal benefit of consumption is the result of the increase and enrichment of people's consumption habits over time. It paves the way for the growth in health expenditures in order to extend the life expectancy of people or to make them better quality.

In the study conducted by Hitiris and Posnett (1992), they revealed that income elasticity and GDP are factors affecting health expenditures.

Gerdtham and Jönsson (2000) found that the use of primary health care services reduces health expenditures and physicians' pricing method affects health expenditures. In addition, they stated that the payment method made per service causes higher expenses than the payment method made per person.


Figure 2 Journals with the Most Publications

"Health Affairs" is the journal that has the most publications on health expenditures. This comes from the Lancet, Value in Health, International Journal for Equity in Health and Plos One.

When studies based on factors affecting health expenditures are examined, there are income, inflation, dependent population and unemployment. Study countries examining these factors are included in Figure 2.
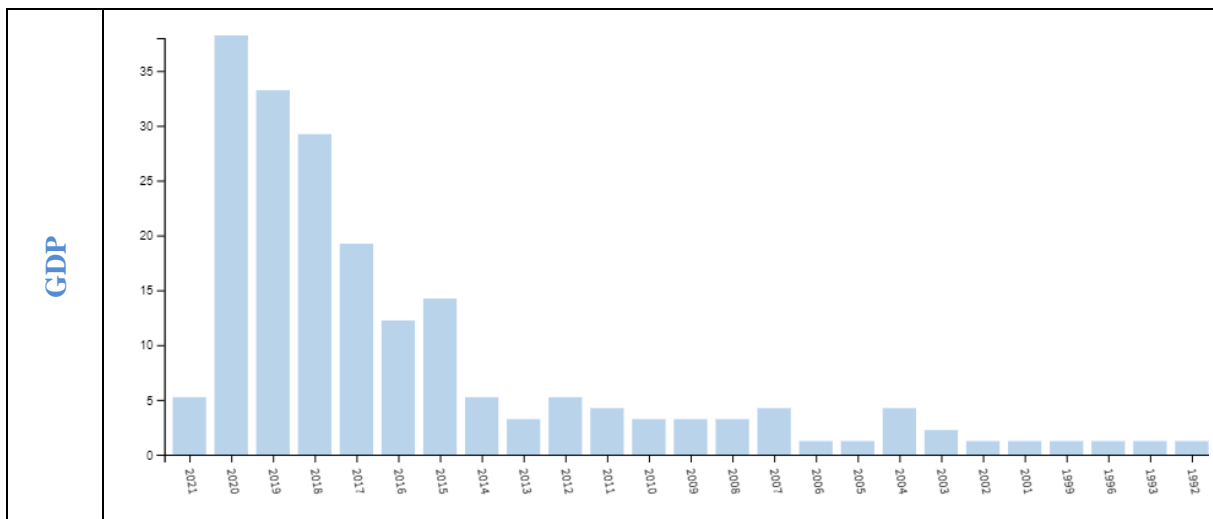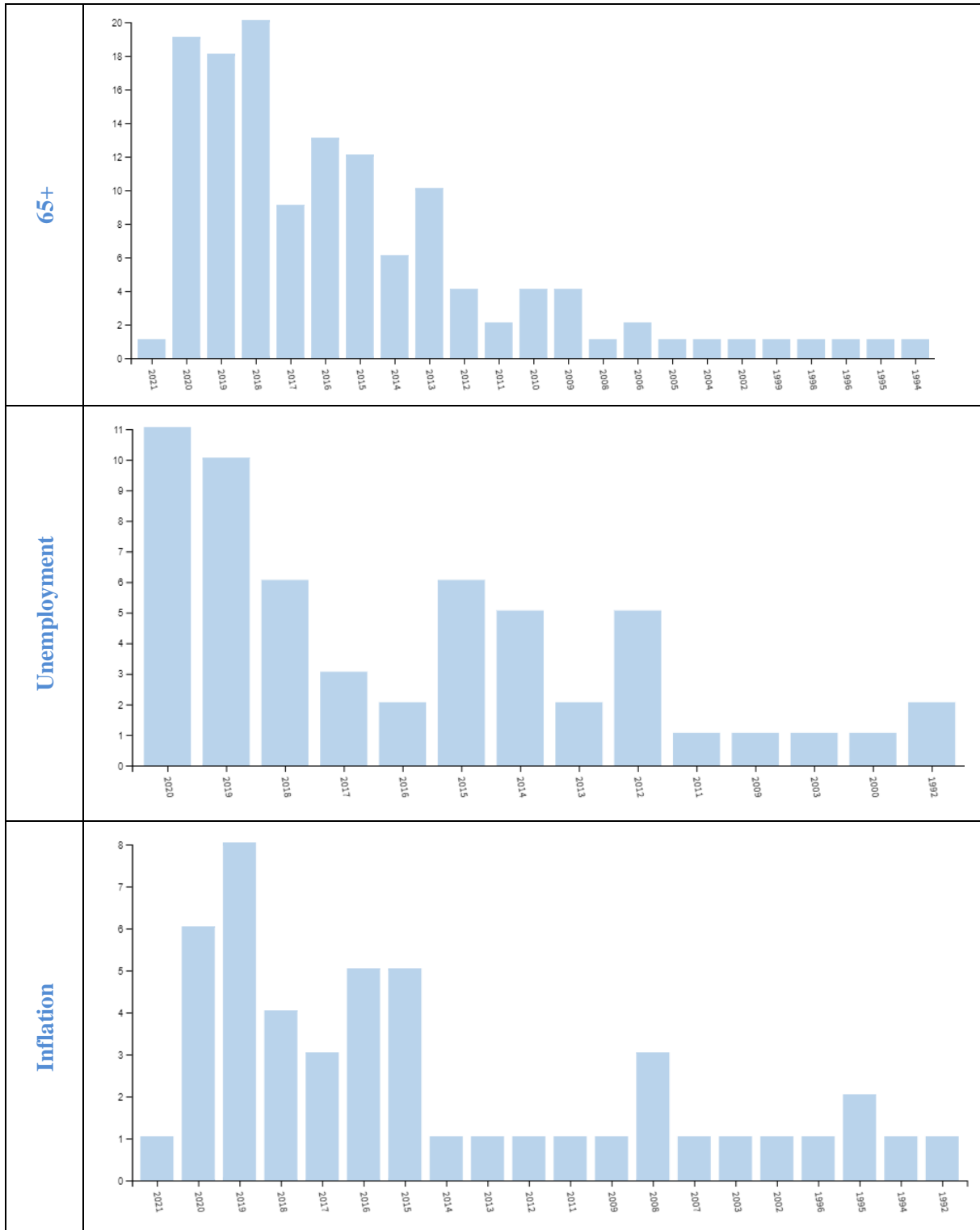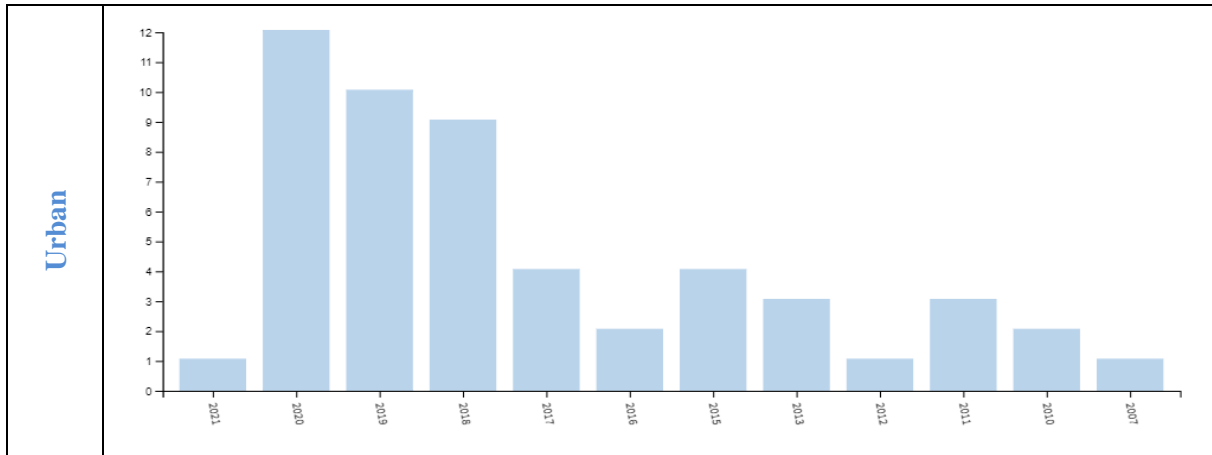
Studies on income began to be published in 1992, studies on the population aged 65 and over in 1994, studies on unemployment in 1992, studies on inflation in 1992, and studies on urbanization in 2007.

In addition, the most studies on income, Unemployment and Urbanization were carried out in 2020, on Inflation in 2019, and on 65+ in 2018.

3. METHOD

In this part of the research, the aim of the research, the universe and its sampling, data collection method, research variables, and data analysis will be discussed.

3.1. Aim of the Study

This study aimed to reveal the determinants of health expenditures of all countries.

3.2. The Population and Sample of the Study

Study data was collected through OECD and World Bank databases.

3.3. Study Variables

Within the scope of this research, the GDP, unemployment rate, urban population, population over 65 as the independent variables, and deaths due to health expenditure as the dependent variable were determined. Data cover the years 2010-2016. The reason for this is that complete and regular data are available between these years in terms of study variables. Also, logarithmic transformation was applied to the variables. In this way, the normality of the variables is guaranteed (Moody, 2009: 13). Annotated information about the study variables is presented in Table

Table 1. Explanations on Variables

Variables	Description
Independent variables	
LogGDP	Gross domestic product per capita ($)
Logurban	Population living in urban area (%)
Loginflation	Annual inflation based on consumer prices (%)
Logunemployment	Unemployed rate in total workforce (%)
Log65+	Proportion of the population over 65 (%)
Depented Variables	
Logexpenditure	Total health expenditure per capita ($)

2.4. Data Analysis

In the study, it was tried to reach the aims of the study by using panel ordinary least squares regression (OLS) reach to achieve the aims of the study. SPSS 22 and Eviews Pro19 statistic programs were used for analyzing.

4. FINDINGS

In this section, descriptive statistics, correlation coefficients, and OLS regression analysis results related to the variables used in the study will be given.

Table 2. Descriptive Statistics for Variables (N = 163 * 7 = 1141)

	Logexp.	**Loginflation**	**LogGDP**	**Log65+**	**Logunemp.**	**Logurban**
Mean	6.323147	0.998976	9.225259	1.817268	1.754743	3.934833
Standard deviation	1.356034	1.203130	1.189914	0.743341	0.864289	0.490634

In Table 2, the mean (Mean) and standard deviation (SS) values of the variables are given. Accordingly, the average health expenditures was found to be 6.32 ($\pm$ 1.35).

Table 3. Descriptive Statistics for Variables (N = 163 * 7 = 1141)

Variables	Loginflation	LogGDP	Log65+	Logunemp,	Logurban
Loginflation	1,00				
LogGDP	-0,38	1,00			
Log65+	-0,34	0,60	1,00		
Logunemp.	-0,07	0,22	0,38	1,00	
Logurban	- 0,27	0,75	0,45	0,29	1,00

When Table 3 is examined, the highest correlation coefficient was 0.75. In this case, it was observed that no situation would cause multiple connection problems between the variables.

Table 4. OLS Regression Analysis

Variables	**Std. Beta Coef.**	**t**	**P**	**VIF**	**F**	**p**	**Adj. R^2**	**Durbin-Watson**
Loginflation	-0.001473	-0,12	0,905	2,32	1687,18	0,000	0,880	2,03
LogGDP	0.833240	42,12	0,000	2,11				
Log65+	0.379426	15,43	0,000	1,79				
Logurban	0.170111	5,75	0,000	1,07				
Logunemp.	0.100144	3,98	0,000	1,10				

In Table 4, the results of the OLS regression analysis revealing the status of the variables affecting health expenditures are given. Accordingly, the regression model established was found to be statistically significant (F=1687.18; p<0.05).

The model made a statistically significant contribution to the population, the population rate over 65 years, the urban population rate, and the unemployment rate (p <0.05). In other words, as income, population rate over 65, urbanization and unemployment increase, health expenditures also increase. Also, it was observed that inflation important effect on health expenditures (p> 0.05).

 It was demonstrated by the VIF statistics, which there was no multicollinearity problem between the variables and by the Durbin-Watson statistics, in which there was no autocorrelation

problem. Scores for both statistics ranged within normal ranges (Durbin-Watson: 1.50-2.50; VIF: 1.00-10.00). In this direction, the fixed effect model has been used.

5. DISCUSSION AND CONCLUSION

This study aimed to reveal the determinants of health expenditures of all countries. According to the results of these studies health expenditures increase as income, population age over 65, unemployment rate, and urbanization increase. It was observed that inflation did not have a statistically important impact on health expenditures. When the literature is examined, it is seen that there are studies alike to the results of this research. Information on these studies is presented below.

In the studies carried out by Hitiris and Posnett (1992); Erdil and Yetkiner (2009); Gerdtham and Löthgren (2000); Gerdtham and Löthgren (2002); Di Matteo (2005); Mehrara et al. (2012); Murthy and Okunade (2009); Acemoğlu et al. (2013); Pakdaman et al. (2019); Samadi and Rad (2013); Furuoka et al (2011); Lai (2018); Rahman (2008), it was found as the most important determinant of income health expenditure. So health expenditure is lower in low-income countries than in high-income countries. In a study by Gerdtham (1998), it was revealed that the use of preventive healthcare services reduced health expenditures. Moscone Tosetti (2010) found that Since healthcare is a necessity, demand elasticity is almost absent.

In a study by Blazquez-Fernández et al. (2017) they concluded that there was a significant relationship between unemployment and health expenditures supporting this study. As unemployment increased, health expenditure also increased. In the studies carried out by Sposato and Saposnik (2012); Yetim et al. (2020) no significant difference was found between health expenditures and unemployment.

It is a fact that People living in urban areas have higher access and usage rates to health services than those living in rural areas. This reveals that health spending is higher in urban areas. In the studies by Samadi and Rad (2013); Leu, and Schaub (1985); Gbesemete and Gerdtham (1992); Jiménez-Rubio (2011) It has been observed that there was a positive relationship between urbanization and health expenditures. In a study by Gerdtham and Jönsson (1991), they concluded that this relationship was negative.

Chronic diseases increase with aging. This causes an increase in health expenditures. It has been revealed that there is a positive relationship between increases in health expenditures in high- and middle-income countries where aging is rapidly increasing (Samadi and Rad, 2013). Besides, in a study by Noy (2011); Pascual-Saez et al. (2017) found a significant relationship between aging and health expenditure. Hakkinen et al. (2008) found that the total expenditures of the elderly on health and care increase with age. It has been observed that there is a positive relationship between age and health expenditures for psychiatric service and health center patients.They also stated that health expenditures could result from changes in long-term care and the tendency to switch to medical technology, rather than just gender and age (Hakkinen ve diğerleri, 2008).

Dhoro et al. (2016) Orphan et al. (2020) revealed a negative relationship between inflation and health expenditures. Apart from that, Boachie et al. (2014); Taskaya and Demirkiran (2016) Nyamwange (2012); They could not find a significant relationship between health expenditures and inflation.This supports the findings of this study.

Health expenditure is the main indicators used by policy makers in the macro and micro environment. In many countries, health expenditures are increasing more than income.

Policies to change people's lifestyles are of great importance in terms of improving health outcomes to prevent unemployment in the country of health policymakers, distributing health services proportionally in urban and rural populations, and to reduce chronic diseases.

As this study has reflected the indicators of 163 countries, the results and scope are considered to be generalizable and can help policymakers make long-term decisions with this study. It is believed that studies on cost-effectiveness analysis are needed to manage increasing health expenditures.

This study, which provides various contributions to the literature, has some limitations. First, the results obtained here are evaluated according to the independent and dependent variables discussed in this study. It may be possible to achieve other results with other variables. This study was carried out

based on data from 2010-2016. Taking these limitations into account in new studies may increase the scope of the studies and the generalizability of the results.

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