

**EXAMINATION OF THE ROLE OF HEALTH EXPENDITURES ON ECONOMIC GROWTH:  
EMPIRICAL EVIDENCE FROM TURKEY**

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**Abstract**

**Objective:** Human capital plays a major role in intrinsic growth models. Because health expenditures reinforce the human capital stock of a country and thus play an important role for growth and development. Therefore this study examines the role of health expenditures on economic growth in Turkey between 1975 and 2014.

**Methodology:** In this study, real per capita gross domestic product (RPGDP) representing economic growth and real per capita health expenditure (RPHE) representing health expenditures were used. The unit root tests, the Johansen cointegration test and the Granger causality test were employed.

**Findings:** According to the results of study, there is a long-term relationship between RPGDP and RPHE and it was concluded that there is a Granger causality in one direction from the DRPHE variable towards the DRPGDP variable after the Granger causality test applied.

**Keywords:** Health expenditures, economic growth, causality

**SAĞLIK HARCAMALARININ İKTİSADİ BÜYÜME ÜZERİNDEKİ ROLÜNÜN İNCELENMESİ: TÜRKİYE  
ÖRNEĞİ**

**Özet**

**Amaç:** Beşeri sermaye, içsel büyüme modellerinde önemli bir rol oynamaktadır. Çünkü sağlık harcamaları, ülkenin beşeri sermaye stokunu güçlendirerek iktisadi büyüme ve kalkınma için önem arz etmektedir. Bu sebeple, çalışmada Türkiye’de 1975-2014 dönemi için sağlık harcamalarının iktisadi büyüme üzerindeki rolü incelenmeye çalışılmıştır.

**Yöntem:** Bu çalışmada iktisadi büyümeyi temsilen kişi başına reel gayri safi yurtiçi hasıla (RPGDP) ve sağlık harcamalarını temsilen ise kişi başına reel sağlık harcaması (RPHE) değişkenleri kullanılmıştır. Çalışmanın amacı doğrultusunda geleneksel birim kök testleri, Johansen eşbütünleşme testi ve Granger nedensellik testi uygulanmıştır.

**Bulgular:** Çalışmada ulaşılan sonuçlara göre, RPGDP ve RPHE arasında uzun dönemli bir ilişki olduğu tespit edilmiş olup; uygulanan Granger nedensellik testi sonrasında DRPHE’den DRPGDP’ye doğru tek yönlü Granger nedenselliği olduğu sonucuna ulaşılmıştır.

**Anahtar Kelimeler:** Sağlık harcamaları, iktisadi büyüme, nedensellik

## Introduction

Human capital plays a major role in intrinsic growth models and is defined as a key input for the generation of new products and ideas that form the basis of technological advancement (Barro, 1991). This has lead policy makers to focus on the composition of public expenditures. It is indicated that education and health expenditures increase economic growth, support income distribution equality and reduce poverty (Gupta et al., 2002). In other words, education and health expenditures reinforce the human capital stock of a country and thus play an important role for growth and development.

Although the relationship between human capital and economic growth has been studied with respect to education expenditures and economic growth, it is also known that health expenditures play a major role in increasing human capital stock. Health status of people is important for them to get quality education and contribute to value added economic activities. Therefore, health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (World Health Organization (WHO),2016). In this respect, it indicates that health expenditures have got a positive impact on human capital since health expenditures complement education and increase the rate of participation in education. In addition to this, it is also possible to talk of the positive impact of health expenditures on labor productivity. This is thanks to the fact that curative and preventive health expenditures lead to higher participation of manufacturing individuals in labor force (Erdil and Yetkiner, 2009). Therefore, health expenditures are one of the priority items on the agendas of many countries in recent years.

With a view to improve health services in Turkey, the Health Transformation Program was initiated as a program that follows global developments, that is in line with the socioeconomic facts of Turkey and that could be further developed and made sustainable (Akdağ, 2008). The purpose of this program is to organize, finance and provide health services in an effective, efficient and fair manner. Some of the basic principles taken into consideration during this process are being people-oriented, sustainability, continuous quality improvement, participation and creating competition among service providers (Republic of Turkey Ministry of Health, 2003). It is thanks to this transformation process that although Turkey is classified under the middle-high income group countries by the WHO, Turkey's health indicators have reached the level of being compared to those of the high income group countries. According to the World Bank data, life expectancy at birth were 55,3; 71,5 and 75,1 for the years 1975, 2003 and 2014 respectively, whereas the infant mortality rate was 108,8; 26,5 and 12,3 per mille for the same years. When other health indicators such as per capita health expenditures, proportion of total health expenditure to gross domestic product, number of beds in health institutions and number of people per health staff are examined, the improvements achieved could be observed. In addition to these data, the satisfaction level with health services were both 62% in 2003 and 2011 respectively in the European Union whereas the level of satisfaction was 39,5% and 76% for the same years in Turkey (Akdağ, 2012).

The relationship between health expenditures and economic growth for the period 1975- 2014 is going to be examined in this study. A summary of the studies that examine the relationship between health expenditures and economic growth is going to be provided in the first part of the study. The second part is going to concentrate on the dataset and empirical findings and the last part is going to concentrate on the conclusions.

## 1.Literature Summary

When the studies that investigate the relationship between economic growth and human capital are examined, it is seen that they concentrate on the relationship between "health" and "education" which are the components of economic growth and human capital. However, as individuals can only improve their knowledge and capabilities to the extent that their state of health allows them to do, health is considered as the one of the most important assets that one could have. Protection of this asset is considered as a fundamental right and also as one of the main tasks of the state within the framework of social state principles (Aydm et al., 2004). In addition to this, Barro (1996) regards health as an asset acting as the catalyst of economy and that generates capital. Therefore, in order for individuals to be healthy and to ensure that it is sustainable, it is important to generate health services. Health expenditures have increased in recent years due to factors such as technological advancements and increasing access to institutions and enterprises that offer health services. This has also raised problems with respect to financing health services (Altay, 2007). When these issues are taken into consideration, it becomes even more important to analyze the relationship

between health expenditures and economic growth. There are various studies available in literature examining the relationship between the variables in question focusing on the Turkey example.

Kar and Taban (2003) examines the relationship between health expenditures and economic growth through the cointegration analysis by using the annual data covering the period 1971 – 2000. The findings show that health expenditures have got a negative impact on economic growth. The adverse effect of health spending on growth is result of the inefficiency of spending on this area. Therefore it is suggested that health expenditures should be realized in more productive areas.

Kar and Ağır (2006) analyses the relationship between human capital and economic growth emphasized by intrinsic growth models by using the data covering the period 1926 - 1994. The share of health expenditures and education expenditures within GDP was used to represent the relationship between human capital and economic growth and per capita GDP was used to represent economic growth. The Johansen cointegration test and the Granger causality test were employed in this study. The findings show that there is a long-term relationship between health expenditures and economic growth and the direction of causality is from economic growth towards health expenditures.

Taban (2006) conducts an empirical study to investigate the relationship between health and economic growth in the study entitled “The Causality Relationship between Health and Economic Growth in Turkey”. The health indicators are variables such as life expectancy at birth, number of beds in healthcare institutions, number of healthcare institutions and the number of people per healthcare staff. The study focuses on the annual data covering the period 1968 - 2003 and the Johansen cointegration test and the Granger causality tests are employed. The findings show that there is a causality relationship in two directions between the variables other than the number of healthcare institutions and economic growth.

Tıraşoğlu and Yıldırım (2012) examines the relationship between health expenditures and economic growth covering the period January 2006 - March 2012. To this end, the Gregory- Hansen cointegration test is applied and a long-term cointegration relationship between health expenditures and economic growth is identified. In other words, the study concludes that health expenditures have got a positive impact on economic growth.

Akar (2014) examines the relationship between health expenditures, the relative price of health expenditures and the economic growth in Turkey. The dataset of the study covers the period January 2004 - March 2013 and monthly observations are made use of. The Johansen cointegration test and the Granger causality test are applied to analyze the relationship between the variables in question. The findings show that there is a significant relationship between health expenditures, the relative price of health expenditures and economic growth in the long-term but such a significant relationship does not exist in the short-term.

Cebeci and Ay (2016) examines the effect of health on economic growth by a panel data analysis. This study consists of data from Brazil, Russia, India, China, South Africa (BRICS) countries and Turkey during the period 2000-2014. To this end, gross domestic product and health expenditures were used. Firstly, unit root tests were applied and then variables are not stationary at level. Then the panel cointegration test is applied. As a result of this test, there exists a cointegration relationship between health expenditure and economic growth in long run.

## **2.Data and Empirical Findings**

This part of the study analyzes the relationship between health expenditures and economic growth between 1975 and 2014. To this end, real per capita gross domestic product (RPGDP) representing economic growth and real per capita health expenditure (RPHE) representing health expenditures were used. These data were obtained from the databases of The Organization for Economic Co-operation and Development (OECD) and The World Bank and the currency used for variables is the US dollars.

The stationarity of the variables was examined in order to be able to decide on which methodology to be employed to analyze the relationship between variables. The Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) unit root tests were employed. The null hypothesis of these tests is that the unit root exists in the series. The results of the unit root tests applied in order to investigate the stationarity of the series are tabulated in Table 1.

**Table 1:** The Results of Unit Root Tests

Variable	ADF Test	PP Test
RPGDP	-1,92	-1,85
DRPGDP	-5,99*	-5,99*
RPHE	-1,78	-1,98
DRPHE	-4,41*	-4,48*

\*indicate rejection of the null hypothesis of unit root at the 5%.

As it can be seen in Table 1, the null hypothesis cannot be rejected when the test statistics calculated for the RPGDP and RPHE series and the critical values of 5% significance are compared. As it was found out that the series investigated are not stationary, the relationship between variables were analyzed using the Johansen cointegration test. Cointegration could be expressed as the statistical presentation of the long-term relationship between economic variables. In other words, it shows the presence of a relationship of balance in which non-stationary variables act together for a long period of time (Sevüktekin and Çınar, 2014).

First of all, it is necessary to identify the appropriate lag length in order to investigate the long-term relationship between two non-stationary variables. For this reason, the appropriate lag length was determined as 3 taking into consideration the Akaike Information Criterion (AIC) and the Final Prediction Error (FPE) value. The trace and the maximum self-value statistics were employed in order to decide on the co-integration number. The Johansen co-integration test results are tabulated in Table 2 for trace and maximum self-value statistics.

**Table 2:** Results of Johansen cointegration test

Null Hypothesis	Statistic	5% Critical Value
<b>Maximum Eigenvalue Test</b>		
$r = 0$	40.53*	25.88
$r \leq 1$	6.75	12.51
<b>Trace Test</b>		
$r = 0$	33.78*	19.39
$r \leq 1$	6.75	12.51

Note: r is the number of cointegrating relations.

\* denotes rejection of hypothesis at 5% significance level.

When the Johansen cointegration test results tabulated in Table 2 is examined, the null hypothesis that shows that there is no cointegration between variables with statistical significance of 5% as a result of the trace and maximum eigenvalue statistics calculated is rejected. The hypothesis rejected is the first hypothesis of the test statistics in question. Therefore, it was concluded that there is a cointegrated relationship between the RPGDP and RPHE variables. In other words, the number of cointegration vector is 1. The long-term elasticity was found based on the normalized co-integrating vectors of the long-term relationship estimation obtained.

$$\widehat{RPGDP}_t = 3,89RPHE + 106,01Trend \quad (1.1)$$

When the equilibrium (1.1) is examined, the slope coefficient is found as statistically significant and a one unit increase in the RPHE creates more than one unit increase in RGDP.

Although a long-term relationship was found in the variables examined, there could be an imbalance within these variables in the short-term. This imbalance turns into a balance with the help of the error correction mechanism. It, therefore, offers the opportunity to make use of the short and long-term knowledge in the series examined. The error correction model was estimated to this end and the equilibrium is given in (1.2).

$$D(RPGDP) = 170,31 + 0,08D(RPGDP(-1)) + 0,19D(RPGDP(-2)) + 0,61D(RPHE(-1)) - 8,88D(RPHE(-2)) - 0,42\lambda \quad (1.2)$$

The model given in equilibrium (1.2) is statistically significant with significance levels of 1% and 5% and the error correction symbol  $\lambda$  is negative and significant. This indicates that the error correction mechanism operates. In other words, the imbalances in the short-term will be balanced in the long-term.

The RPGDP and RPHE variables known to have a long-term relationship were used in the study and the Granger causality test was applied based on the VECM model and the results are tabulated in Table 3.

**Table 3:** Results of Granger Causality Test

Source of Causation	Lag Length	P-Value
DRPGDP → DRPHE	2	0.24
DRPHE → DRPGDP	2	0.00*

\* denotes rejection of hypothesis at 5% significance level.

When Table 3 is examined, the causality relationship in unidirectional between the DRPGDP and DRPHE variables that were made stationary by taking the difference was identified. Although the null hypothesis that states that the first difference of the DRPGDP variable with a statistical significance of 5% is not the Granger reason for the DRPGDP variable cannot be rejected, the null hypothesis that states that the DRPHE variable is not the Granger reason for the DRPGDP variable can be rejected.

The results showed that there is a long-term relationship between RPGDP and RPHE and it was concluded that there is a unidirectional causality from the DRPHE to the DRPGDP variable after the Granger causality test applied.

## Conclusion

Global health expenditures increase rapidly due to factors such as spread of chronic diseases with increasing and aging population, increase in per capita income in developing countries and technological advancements in the healthcare industry. This, as a result, causes problems with respect to funding the provision of healthcare services in an effective and efficient manner. The objective of the people-oriented “Health Transformation Program” initiated in 2003 is to offer accessible and quality healthcare services to everyone. Significant progress has been achieved since then within a short period of time with the reforms completed. This positive picture could also be observed in various health indicators such as the number of beds in hospitals, the capacity and equipment of intensive care units, the length of waiting time, the length of diagnosis and treatment periods, the number of people per healthcare staff, the life expectancy at birth and the infant mortality rate. Turkey has even become an important player in global health tourism with its high-tech medical devices and qualified physicians.

This study aims to investigate the role of healthcare expenditures on economic growth in Turkey and the real per capita health expenditure (RPGDP) was used to represent economic growth and the real per capita health expenditure (RPHE) was used to represent health expenditures. The study covers the period 1975 - 2014 and the annual observation values were used for the variables in question. The findings showed the presence of a long-term balance relationship between health expenditures and economic growth. It was also concluded that the error correction model could be used to balance short-term imbalances in the long-term. According to the result of the Granger causality test, there is a causality relationship in one direction from health expenditures towards economic growth.

In short, based on the findings of this limited period, it could be said that economic growth can be accelerated through health expenditures which are also referred to as productive investment. Researchers can conduct measurements on work life quality of healthcare staff per institution and regional patient satisfaction to make some recommendations with respect to service delivery in order to increase efficiency.

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