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Health Policy Analysis

The Relationship Between the Health Transformation Program and Health Expenditures: Evidence From an Autoregressive Distributed Lag Testing Approach

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ABSTRACT

Objectives: As health expenditure increases every year, countries try to provide accessible health services to society and try to protect individuals from the expenses they cannot overcome by investigating the reason for this increase. Especially with the arrangements made in the health systems in developing countries such as Turkey, it has been tried to take the control of dramatic increases in health expenditure. Based on this issue, in this study, we aimed to evaluate the effect of income per capita, annual inflation, and health reform called as Health Transformation Program on the health expenditure per capita in Turkey.

Methods: This study reflected the effects of income, inflation, and the reform on the total health expenditure through the autoregressive distributed lag. This study covered the years between 1985 and 2016 for Turkey.

Results: As a result of this study, there was a positive relationship between health expenditure and income and a negative relationship with the reform ($P < .05$).

Conclusion: According to the results of this study, it is suggested that health expenditures can be kept under control with improvements such as encouraging individuals to use more primary healthcare services than curative health services and increasing the quality of service without compromising the equity in financing.

Keywords: health expenditure, Health Transformation Program, income, inflation, Turkey.

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Introduction

In terms of developed and developing countries, the increase in health expenditure in every passing year and variation in the health expenditure levels among countries[1] have become an important issue both for health policy makers and planners, and hence, they aimed to identify the factors affecting the health expenditure.[2-4]

There has been a number of studies using different models, data types, and variables to explain such increase in health expenditure, and particularly pursuant to the study by Kleiman[5] and Newhouse,[6] the most significant factor affecting the health expenditure was identified as income.[7-12] With the increase in the income, individuals demand more healthcare and therefore the share allocated to healthcare by household has shown an increase accordingly. When analyzed at the macrolevel, the developed countries tend to have relatively bigger shares than the developing countries.[13,14] Given that income is a vital factor affecting the health expenditure, the discussion whether health expenditure is a necessity or luxury, in other words the level of income elasticity in health expenditure, is on the agenda.[15,16] Although the increase in health expenditure among the countries that classify health expenditure as a necessity (when income elasticity is below 1) means a slower increase than the increase in the income, the increase in health expenditure among the countries classifying health expenditure as luxury is faster than the increase in the income.[17] However, according to most studies, the health expenditure is a necessity in terms of country and country group,[18-20] and pursuant to the opinion considering the health expenditure as a necessity, the share of the public must be higher.[21] In contrast, an optimal level with regard to the amount of health expenditure that countries must spend has not been yet determined given that there are more than one factor affecting health expenditure, and such factors vary depending on the development levels of countries.[22,23]

Inflation is another factor that is considered as affecting the health expenditure together with income. Higher inflation causes negative effects with regard to redistribution of income in favor of capital owners, economic uncertainty, increase in instability, and decrease in long-term investments.[24] The prices of healthcare based on the inflation in healthcare and unique features of healthcare show faster increase than other goods and services,

and mainly it is higher than the general inflation rate.[25] Moreover, the purchasing power of households decreases and consequently the health expenditure decreases respectively.[26] In consideration of the studies analyzing the relationship between health expenditure and inflation, there is negative and 2-way causal relationships between such 2 variables in the long-term.[27,28] Based on such circumstances, countries deal with continuously increasing health expenditure while trying to protect individuals against health expenditure that are difficult to overcome and ensure inclusive and fair health access for each individual in the society. To cope with such situation, the countries realize health reforms that cover a number of regulations.[29]

The increased rate of health expenditure per capita has the tendency to increase in general whereas it is lower in Turkey than other developing and developed countries, and the total health expenditure per capita in 2017 is $1194.[1] At the macrolevel, the great share of health expenditure belongs to the public sector. In 2003, a radical reform process called the "Health Transformation Program" (HTP) was launched to eliminate the problems due to the low perceived health status, insufficient service quality, inequality in the health services access, and inefficiency caused by fragmented financial and provision system.[30] With the main principles as human centrality, sustainability, participation, reconciliation by negotiation, voluntary nature, division of powers, decentralization, and competition in service provision, one of the main purposes of this program is to organize the health services in an efficient, effective, and fair manner.[31] Together with HTP, there have been arrangements in various fields in the Turkish health system. One of the major arrangements launched with HTP is that fragmented public financial systems have been merged under 1 roof. Social Insurance Institution for working class, Pension Fund for public civil servants, Social Security Organization for Artisans and Self-Employed for self-employed, and Green Card practice for poor individuals without any social security were merged under Social Security Institution. One of the other major arrangements launched with HTP is that all individuals have been covered under the General Health Insurance since 2012; namely universal coverage has been ensured. In addition, all public health institutions were brought under the Ministry of Health in 2005.[32,33] One of the other important arrangements was as follows: in 2003 providing free healthcare for the emergency calls, in 2004 making payments to healthcare service providers based on their performances, in 2004 introducing reference based pricing for the pricing of medications, in 2006 outsourcing of Social Security Institution from private hospitals with cost-sharing, in 2006 all primary care services were made free regardless of social security status, in 2008 all healthcare services for the population younger than 18 years were made free regardless of the social security status of parents, in 2010 providing family practice to ensure access to primary healthcare services for whole society, in 2011 establishing specific units for the implementation of activities regarding the improvement of healthcare services and supervision, and in 2012 introducing decentralization in public hospitals to improve their managerial and financial autonomy.[34-38] As in many countries, it can be stated that per capita health expenditures in Turkey have tended to increase with the regulations. However, it can be stated that this initial increase in health expenditures was successfully brought under control with the introduction of the reference pricing system for pharmaceuticals in 2004, the implementation of the positive list for pharmaceuticals in 2005, and the introduction of global budget practices for public hospitals and pharmaceuticals in 2006. Moreover, with the unification of the fragmented financing structure under a single roof, temporary solutions such as the regulation of user contributions were also introduced to control health expenditures.[30] It can also be said that, with HTP, individuals have higher access rates to the health services, and compared with the other countries with similar income levels, individuals in Turkey have encountered with less catastrophic health expenditure.[39-44] Other countries have undertaken similar reforms, particularly to control health expenditures and ensure universal health coverage. For example, in South Korea, both publicly and privately financed national health insurance (single payer) has achieved universal coverage. With these reforms, both the share of households and the share of out-of-pocket expenditures in national health expenditures have decreased over the years.[45] Similarly, with the structural reform in Mexico, the fragmented financing system was unified under a single roof under the name of "Seguro Popular[46]." To both increase access to health services and reduce inequalities in outcomes, Latin American countries such as Cuba, Brazil, and Chile have also implemented reforms aimed at strengthening their health systems. In this context, many countries have introduced universal health coverage and aimed to increase access to health services, especially for poor people.[47]

As mentioned earlier, the health expenditure in Turkey has a tendency to increase, and therefore, it is important to find out the determinants of the increase in health expenditure in Turkey. When the studies on the determinants of health expenditure are analyzed in the literature, it is seen that the variables of income, inflation, and related health reform are taken into consideration by researchers. The relationship between health expenditure and income has been examined both in Turkey and other developing countries, and income has been found to be an important determinant of health expenditure.[48-54] However, the relationship between the inflation and health expenditure has not been clear and a positive correlation has been observed in some studies,[55] whereas some studies has found no relationship.[56,57] This indicates that the effect of the inflation on health expenditure should be investigated with different methodologies. Finally, it has been observed that studies evaluating the impact of health reforms on health expenditure are limited, and with the regulations made, individuals spend less on health and are exposed to less catastrophic expenditure.[39,58-60] The presence of developed databases, especially the Organisation for Economic Cooperation and Development (OECD) and the World Bank, allowed these variables to be examined in the long-term and to make comparisons at the international level,[61] but in the long-term although there are research studies conducted in Turkey in particular,[48,49] the effects of reforms in the health system will be seen after 2013, including the long-term study that could not be found. Therefore in this study, we evaluated the effect of income per capita, annual inflation, and HTP on the total health expenditure per capita in Turkey between the years of 1985 and 2016 through the autoregressive distributed lag (ARDL) approach. This study has higher significance due to the limited number of studies conducted on the health expenditure in Turkey, and the analysis of the effect of HTP as a comprehensive health reform on the health expenditure with ARDL approach is considered to make crucial contributions in the establishment of health policies among similar developing countries.

Literature Review

The global increase in health expenditures has become the focus of health policy makers and health managers. It is very important to determine the factors that cause increases in health expenditures. It is an important issue to reveal both the short-term and the long-term determinants of health expenditures given that examining the factors that affect health expenditures

Table 1. Study variables.

Dependent variables	Abbreviations
Total health expenditure per capita (in US dollars based on the purchasing power parity)	dloghepc
Independent variables	
Income per capita (in US dollars based on the purchasing parity)	dlogipc
Annual inflation rate*	dloginf
Health Transformation Program	HTP

*The annual inflation rate was taken as 1 year lagged given that the effect of inflation for t year was mainly seen in t + 1 year.

only in the short term may cause bias. Accordingly, the ARDL bounds testing approach is frequently used to reveal the long- and the short-term determinants of health expenditures. For example, Chaabouni and Abednnadher[62] investigated the determinants of per capita health expenditure in Tunisia for the period of 1961 to 2008 via an ARDL bounds testing approach, and they used the number of physicians per capita, per capita income, aging population ratio, and nitrogen oxide emission per capita as the independent variables. Murthy and Okunade[63] examined the determinants of per capita health expenditure in the United States for the period of 1960 to 2012, and they used an ARDL bounds testing approach. The authors used income per capita, the aging population ratio, and the research and development expenditures for healthcare services as the explanatory variables. Rezaei et al[54] used the data of 1978 to 2011 period in their study in which they examined the determinants of health expenditure per capita in Iran via a ARDL bounds testing approach. The authors used income per capita, the ratio of aging population, the proportion of the urban population, the illiteracy rate, and the number of physicians per capita as the independent variables. Baharin and Saad[64] investigated the determinants of per capita health expenditure in Malaysia using a ARDL bounds testing approach. The authors used the data for the period of 1995 to 2014. The independent variables used in this study were income per capita, urbanization rate, infant mortality rate, and the ratio of aging population. Zaidi and Saidi[65] used an ARDL bounds testing approach while they were investigating the determinants of per capita health expenditure in sub-Saharan African countries. They used the data for the period 1990 to 2015 and used per capita income and carbon dioxide and nitrogen emission rates as the explanatory variables. Wang et al[66] used an ARDL bounds testing approach in their study, in which they examined the determinants of health expenditure per capita in OECD countries. The authors used per capita income and per capita carbon dioxide emission rate as the independent variables. Li et al[67] examined the per capita health expenditure in Brazil, Russia, India, China, and South Africa for the period of 2000-2019 via an ARDL bounds testing approach. The authors used per capita income and per capita carbon dioxide emissions as the explanatory variables. Nordin and Nordin[68] examined the determinants of health expenditure per capita in China for the period 1970 to 2016 with the help of an ARDL bounds testing approach. The authors used the proportion of aging population, life expectancy at birth, per capita income, and the number of hospital beds as the independent variables.

Methodology

This study reflected the effect of income per capita, inflation, and HTP on the total health expenditure per capita through the ARDL approach. When the relevant literature is examined to reveal the determinants of health expenditures, we can see that income is one of the most important determinants of health expenditures. For instance, Furuoka et al,[3] Di Matteo,[23] Cantarero and Lago-Peñas,[69] and Yetim et al[70] examined the effect of income on health expenditures and they found out that income is an important predictor of health expenditures. Pakdaman et al[71] and Dhoro et al[27] reported a significant correlation between inflation and health expenditures. In addition, Çırakli[72] revealed that inflation statistically significantly reduced the share of private health expenditures in total health expenditures

Table 2. ARDL results.

Selected model: ARDL (1, 0, 0, 0)				
Variable	**β coefficient**	**Standard error**	**t-statistic**	***P* value**
dloghepc (−1)	0.029	0.141	0.205	.839
dlogipc	0.691	0.158	4.386	.000*
dloginf	−0.034	0.040	−0.866	.395
HTP	−0.065	0.025	−2.565	.017*
C	0.069	0.021	3.237	.003*
R-squared	0.461	F-statistic		5.136
Adjusted R-squared	0.374	Probability (F-statistic)		.003
Durbin-Watson (d)	1.638			
Long run				
dlogipc	0.541	0.420	2.386	.001*
dloginf	−0.020	0.101	−0.281	.781
HTP	−0.030	0.056	−2.172	.042*

ARDL indicates autoregressive distributed lag; HTP, Health Transformation Program.
*$P < .05$ level.

Table 3. ECM results (1, 0, 0, 0) (short run).

Variables	β coefficient	Standard error	t-statistic	*P* value
dlogipc	0.693	0.160	4.316	.000*
dloginf	−0.034	0.039	−0.867	.395
HTP	−0.065	0.025	−2.560	.017*
ECM (−1)	−0.021	0.203	−2.491	.031*
C	0.071	0.016	4.376	.000
R-squared	0.472	F-statistic		5.373
Adjusted R-squared	0.385	Probability (F-statistic)		.003
Durbin-Watson stat (d)	1.927			

ECM indicates error correction model; HTP, Health Transformation Program.
*$P < .05$ level.

in long run in Turkey. The author pointed out that Turkey was an important importer of medical devices and supplies and the increased prices of medical goods and services due to inflation significantly restricted individuals' private health expenditures. Albayrak[73] indicated that the short run effect of inflation on health expenditures was statistically significantly negative in Turkey, which implied that inflation reduced health expenditures in short run in Turkey. Moreover, Turgut et al[55] found a significant positive relationship between the total health expenditure growth rate and the inflation growth rate in Turkey, which suggested that causality might be between health expenditures and inflation. Therefore, we included these 2 variables in our study. In addition, we also wondered the effect of HTP on health expenditures and included the HTP in our study. For the HTP variable, we run a dummy variable process and assigned 0 for the time period of 1998 to 2002 and one for the time period of 2003 to 2016.

When the literature is examined, it can be seen that there are various determinants of health expenditures, but only income, inflation, and the HTP were included in this study, which was conducted specifically for Turkey. The main reason for this was the insufficient number of observations in this study. In analyses involving time series, it is important that the number of observations per independent variable is large enough for the analysis results to be reliable. The number of observations used in this study allowed only 3 independent variables.

Before the analyses, for both the short run and the long run, income and HTP were expected to have a statistically significant positive effect on health expenditures whereas inflation was expected to have a statistically significant negative effect on health expenditures in Turkey. These expectations emerged based on the literature, descriptive statistics, and correlation analyses.

This study was a time-series analysis adopting the ARDL approach. This research covered the years of 1985 to 2016 (32 years) for Turkey. The data in this study were obtained from the OECD database because the data in the OECD database are long-term and accessible. In addition, the reason why this study was between 1985 and 2016 is that the data between these years were accessible.

Within the scope of this study, first, the natural data logarithms of variables were created to ensure the normality of the data. Then, the stationarity of the variables was tested. Although there is not any significant statistical relationship between the variables in reality in the time-series analysis, there is a possibility to obtain high R^2 value. This misleading situation is called spurious regression. The related a high R^2 value is generated as a result of the similarity in the trend tendency not due to the real relationship between the variables. The series must be checked whether they are stationary to eliminate this error.[74,75] Therefore, before the ARDL, the stability of the variables, whose logarithms had been taken before the analysis, was tested with the augmented Dickey-Fuller test, and they were found as not stationary. Consequently, the study variables were made stationary by taking their first differences. The first differences were found as stationary for all the variables. According to the ARDL, all variables under the model should be stationary at the level (I[O]) or at the first level (I[1]).[76] From this perspective, the study model can be considered as eligible for ARDL. The explanations regarding the variables used in this study are presented in Table 1.

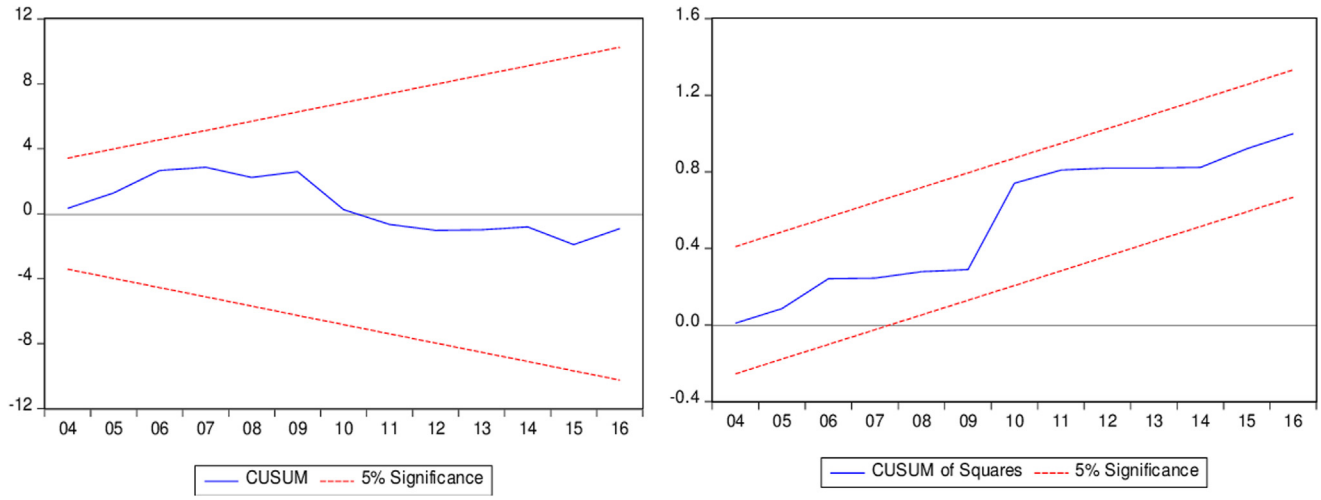
Upon making the stationary of the variables, the lag lengths were identified with vector autoregressive (VAR) model. The

Table 4. Diagnostic tests for ARDL.

Tests on model	Tests, test results, and values	Result
Normality test	Jarque-Bera = 0.26, $P = .87 > .05$	Model is suitable for normal distribution
Autocorrelation test	Breusch-Godfrey LM test F = 1.02, $P = .83 > .05$	No autocorrelation problem
Heteroscedasticity test	ARCH test F = 1.60, $P = .19 > .05$	No heteroscedasticity problem
Ramsey reset test	F-statistics = 3.06, $P = .26 > .05$	Correct model pattern, no identification error

ARCH indicates autoregressive conditional heteroscedasticity; ARDL, autoregressive distributed lag; LM, lagrange multiplier.

Figure 1. ARDL CUSUM and CUSUM-SQ graphics.



ARDL indicates autoregressive distributed lag; CUSUM, cumulative sum; CUSUM-SQ, cumulative sum of recursive residuals of square.

maximum lag length in the VAR analysis was determined as 3 due to the short time series. According to the results of VAR analysis, the maximum lag length of the ARDL model was selected as 2 given that it was the most common lag length among the likelihood ratio, the final prediction error, the Akaike information criterion, the Schwarz information criterion, and the Hannan-Quinn information criterion models. After determining the optimum lag length, ARDL cointegration analysis was run. The Schwarz Criterion was chosen as the model selection criteria in ARDL. According to the results of the analysis, the most suitable model was 1,0,0,0. The analyses were conducted with 95% confidence level.

ARDL is a cointegration analysis that enables to see whether there is cointegration between the variables, and if there is, it is possible to see the long and the short run effects of the independent variables on the dependent variable separately with ARDL. The mathematical formula (1) shows the ARDL cointegration model used in this

$$\Delta loghepc_t = a_0 + \sum_{i=1}^{m} a_{1i}\Delta loghepc_{t-i} + \sum_{i=0}^{m} a_{2i}\Delta \log\, ipc_{t-i} + \sum_{i=0}^{m} a_{3i}\Delta loginf_{t-i} + \sum_{i=0}^{m} a_{4i}\Delta HTP_{t-i} + a_5\, loghepc_{t-1} + a_6\, logipc_{t-1} + a_7\, \log\, inf_{t-1} + a_8 HTP_{t-1} + u_t$$

Formula (1)

As mentioned before, it is possible to see the long and short run effects of the independent variables on the dependent variable separately with ARDL. The mathematical formula (2) shows long run model used in this study.

$$loghepc_t = a_0 + \sum_{i=1}^{m} a_{1i}\, \log\, hepc_{t-i} + \sum_{i=0}^{m} a_{2i}\, \log\, ipc_{t-i} + \sum_{i=0}^{m} a_{3i} loginf_{t-i} + \sum_{i=0}^{m} a_{4i} HTP_{t-i} + u_t$$

Formula (2)

The mathematical formula (3) shows short run model used in this study. Error correction model (ECM) shows short run effects of the independent variables on the dependent variable in the model.

$$\Delta loghepc_t = a_0 + \sum_{i=1}^{m} a_{2i}\Delta loghepc_{t-i} + \sum_{i=0}^{m} a_{3i}\, \log\Delta ipc_{t-i} + \sum_{i=0}^{m} a_{4i}\Delta loginf_{t-i} + \sum_{i=0}^{m} a_{5i}\Delta HTP_{t-i} + a_1 ECM_{t-1} + u_t$$

Formula (3)

Results

The ARDL analysis results with regard to 3 variables (income per capita [logipc], annual inflation [loginf], and [HTP]) that are thought to affect the total health expenditure per capita (loghepc) in Turkey are presented in Table 2.

According to Table 2, the model was significant (F = 5.336; P = .003). Durbin-Watson coefficient (d), which showed whether the model had autocorrelation, was 1.638. Therefore, it was decided that the model had no autocorrelation. It was possible to explain the 46.1% of the variation in the loghepc with through the variables of logipc, loginf, and HTP in terms of cointegration.

When the effects of independent variables on the loghepc were examined, it was seen that the loghepc had a positive and statistically significant relationship with logipc in the long run ($P <$ .05). In addition, it was found that loghepc decreased statistically significantly with the HTP in the long run ($P <$ .05). It was also indicated that the effect of loginf on loghepc was not found to be statically significant ($P >$ .05).

Considering the beta coefficients, the logipc (β = 0.541) had a higher effect on the loghepc than the HTP (β = −0.030) and loginf (β = −0.020) in the long run. These results suggested that 1-unit increase in logipc caused a 0.541-unit increase in loghepc and implementation of the HTP caused a 0.030-unit decrease in loghepc in the long run. The results also suggested that 1-unit increase in loginf caused a 0.020-unit nonsignificant decrease in loghepc in the long run.

ECM was used to show the short run effect of the independent variables on the dependent variable with ordinary least square regression. The analysis results are presented in Table 3.

As seen from Table 3, ECM was negative and statistically significant, which indicated that in the short run, 2.1% of the deviations from the loghepc could be eliminated after one period. According to Table 3, logipc had a statistically significant and positive effect on loghepc whereas the HTP had a statistically significant and negative effect in the short run ($P < .05$). The effect of loginf was found to be negative but not significant in the short run ($P > .05$).

Considering the beta coefficients, the logipc ($\beta = 0.693$) had a higher effect on the loghepc than the HTP ($\beta = -0.065$) and loginf ($\beta = -0.034$) in the short run. These results suggested that 1-unit increase in logipc caused a 0.693-unit increase in loghepc and implementation of the HTP caused a 0.065-unit decrease in loghepc in the short run. The results also suggested that 1-unit increase in loginf caused a 0.034-unit nonsignificant decrease in loghepc in the short run.

The ARDL model of the study was tested with some tests and the test results are presented in Table 4. Hence, the model was suitable for normal distribution; the model did not have autocorrelation and heteroscedasticity problems; the model pattern was correct.

Within the framework of the study, the model of ARDL was checked whether it was stable, and it was found stable with 5% significance level. There was no breakage in the model (Fig. 1).

Discussion and Conclusion

The health expenditure of countries shows an upward trend every year and the countries continuously seek to find a number of ways to tackle with increases in health expenditure. Given that health expenditure has the nature of being investment and consumption expenditure, the reasons for the increases in health expenditure must be analyzed well. From this perspective, there are various socioeconomic reasons for the increase in health expenditure. It is important to address such factors that increase the health expenditure to elaborate a road map for taking measures respectively. Hence, this study aimed to identify the factors that affect the health expenditure per capita in Turkey between 1985 and 2016.

This study, which was conducted to reflect the effects of income per capita, annual inflation, and HTP on the health expenditure per capita in Turkey, showed that the variables other than the annual inflation had a statistically significant effect on the health expenditure per capita. Therefore, the health expenditure per capita increases as the income does, which can be explained as individuals tend to increase the share allocated to healthcare with the increase in their income. Similarly, the study by Chaabouni and Abednnadher[62] performed in Tunisia showed that income had a significant and positive effect on the health expenditure per capita. The study by Nasiru and Usman[77] conducted in Nigeria found that there was a relationship between health expenditure and income. Moreover, the studies by Cantarero and Lago-Penas[69] and Deluna and Peralta[78] indicated that there was a positive relationship between income and health expenditure. According to the study by Sghari and Hammami[79] performed on 30 developed countries, there was a relationship between income and health expenditure among all countries. In contrast, the study by Taşkaya and Demirkıran[56] conducted on OECD concluded no relationship between health expenditure and income.

This study also indicated that the variable affecting the health expenditure per capita at most was the income. Similarly, Gerdtham and Jönsson[80] noted that the economic variable with the highest effect on health expenditure was income. According to the study by Murthy and Okunade[63] conducted on America to identify the variables affecting the health expenditure per capita, income was found as the variable with the highest effect on the health expenditure per capita.

The annual inflation was another variable, which was considered to have an effect on the health expenditure per capita, and was included under the model. Consequently, no relationship was found between health expenditure per capita and inflation. The study by Taşkaya and Demirkıran[56] could not find any relationship between health expenditure and inflation. The study by Nyamwange[57] conducted exclusively in Nigeria could not conclude any relationship between health expenditure and inflation. In contrast, the study by Dhoro et al[27] conducted exclusively on Zimbabwe identified a negative relationship between health expenditure and inflation.

Finally, another finding of this study was the negative effect between HTP and health expenditure per capita, which reflected a declining trend in health expenditure per capita after the introduction of HTP. Such finding showed that the HTP was a successful strategy in dealing with the increasing health expenditure problem and decreasing the health expenditure at the desired level.

According to all the findings, emphasis should be placed on making new investments to increase national income throughout the country, and it should be ensured that the share that individuals will allocate for health increases. According to the results of this study, HTP is a good mechanism to control the health expenditure per capita and therefore HTP needs to be strengthened for years.

Pursuant to the outcomes of this study, there is a statistically significant relationship between health expenditure per capita with income per capita and HTP. Hence, it is a generally accepted fact that people allocate more for healthcare as their income levels increase. The other main finding from this study is the negative effect of HTP on the health expenditure per capita. Given that one of the objectives of the HTP was to improve efficiency and efficiency could be ensured to generate maximum output with minimum input, it is possible to say that the HTP partially accomplished this objective. However, such outcomes might vary with the introduction of new variables or years given that the study outcomes were acquired only with the variables and years included under the scope of this study. Although there are many different variables that can affect health expenditure per capita, the fact that only income and inflation are used in this study is a limitation of this study. For this reason, it is suggested that future studies should include different variables such as capacities of health services, medicine expenditure (number of physicians, number of hospitals, etc), and epidemiological and sociodemographic data. Also in future studies, more years should be included. However, the analytical approach adopted in this study has significant advantages over other approaches used in the literature. Among these advantages are that this approach evaluates the short-term and long-term effects at the same time, that the results obtained from the analysis are stronger due to the high number of preassumptions, and that it reveals the cointegration between the variables better.[76,81,82]

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