Is Health Care Necessity or Luxury Good? Panel Data Analysis on the Example of the SEEHN Countries

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The main goal of this paper is oriented on examining the potential link between economic growth and health expenditure in the South-Eastern European Health Network (SEEHN) countries over the period 1995–2014 by applying panel econometrics. The panel co-integration testing approach and panel VECM are used to investigate the long- and short-run causality between the economic growth, health expenditure and life expectancy (trivariate model). The empirical results show that there is a long-run relationship between the observed variables. It was confirmed that health is a luxury good in the long term, while it is a necessity product in the short term. Finally, it should be noted that economic policy in these countries should be directed to the targeted increase in expenditure on health care, in order to increase overall economic activity. Also, the economic policy should be oriented to adequate combination of public and private financing in health care.

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Introduction

Health has been a clear objective since the founding of the United Nations, when the Universal Declaration of Human Rights set striving to achieve 'the highest attainable standard of physical and mental health' (Sachs 2014). In many segments of the world, this goal has not been fully realized. Making progress in the area of health and economic development represents major challenges of modern times. Health issues are very sensitive in every society. Providing good health services in budget-conscious environments, such as South East European countries, presents

the question of a great importance. According to SEE 2020 Strategy (Regional Cooperation Council 2013), sustainable growth will only become a reality if there is a strong expenditure in human capital, such as health. On the basis of numerous theoretical and empirical studies, which will be mentioned further in this paper, health is seen as a significant factor that has a great positive effect on the economic growth. On the other hand, the growth of economic activities improves the material conditions of life, and thus should have a positive impact on health. In order to promote health, governments of South Eastern Europe countries formed SEEHN (South-Eastern Europe Health Network) forum. Despite notable improvements in health care, SEEHN has identified a lot of weaknesses, such as lack of financial sustainability, demographic ageing, and so on. Modernization of health care policy in the SEEHN countries is one of the prerequisites for further integration process. These are the reasons why the countries of South-Eastern Europe Health Network will be discussed in this analysis. Regarding the foregoing, the main goal of this study is to investigate the relation between health expenditures and economic growth on the sample of SEEHN countries in the period 1995–2014.

Contribution of the paper is as follows. Firstly, the current study for the first time has used the panel data covering the SEEHN countries for revealing the nature of relation between health expenditure and economic growth. Secondly, this study employs Pesaran second generation panel unit root test to determine the order of the integration of panel series. Thirdly, we use simultaneously Pedroni and newly developed Westerlund co-integration analysis to confirm the test results. The findings of this study may also serve as a form of tutorial to the other small open economies with similar health challenges. Also, to the best of the author's knowledge, there is no study which tested the empirical regularity on the long-term relationship between health care and economic growth on the sample of SEEHN countries. This article is organized in five sections: apart from the introductory remarks, the second section provides recent literature overview of links between health expenditures and economic growth. In the third section, we introduce the data and starting from the model, in which it is assumed that economic growth and health expenditure are two-way related, the basic econometric tests that will be used in the work are shown. In the fourth section, the results of the research and discussion are presented. Finally, the fifth section presents the concluding remarks and policy implications.

Literature Review

Pioneer research into the relation between the economic growth and health expenditure is present in the studies of Kleiman (1974) and Newhouse (1977). Specifically, they found a positive relation between health variables and economic growth. Theoretically speaking, it can be said that higher output means more money, which among other things means greater expenditure in health care (Fuchs 1998). Because of the significant expenditure in healthcare during the last four decades, Elk et al. (2010) pointed out that it is important to get more insights about the role of health as a determinant of growth. According to Lucas (1988), health care can be seen as the engine of growth, since the expenditure in health care involves the investment in human capital, which provides workers with better health, higher productivity and ultimately, a higher level of output (Barro 1991). These statements about the potential relations between health and economic growth are clearly related to a positive relationship between these two variables. Conversely, it is important to point out the research conducted by Acemoglu and Johnson (2006), which showed that an increase in the life expectancy leads rather to a larger increase in the total population than in the economic growth, which ultimately reduces output per capita. So, here we have a negative relation between the variables. However, Acemoglu and Johnson (2006) stated certain limitations of this result, among which stands out the fact that the results relating to a period of more than 60 years may not be applicable in today's environment. Ye and Zhang (2018) highlighted that in order to improve the quality of national health, life quality and happiness, OECD countries should actively look to optimize policy related to health care expenditure, such as by enhancing the efficiency of health costs to promote sustainable economic development. Wang and Lee (2018) showed that economic growth stimulates health expenditure growth, but health expenditure growth reduces economic growth. The above-mentioned theoretical attitudes found their place in empirical studies too, on the basis of which it is possible to distinguish four key types of causal relations between health expenditure and economic growth. Each of these relations carries with itself certain policy implications. Therefore, in accordance with the results of previous studies, the causal relations between these two variables are categorized into the following groups:

- Growth hypothesis implies unidirectional causality from health expenditure to economic growth. The implication of this result is eco-

nomic growth dependence from the investments in health expenditure. Among others, the results in accordance with this hypothesis are obtained in the researches of Devlin and Hansen (2001), Bloom and Canning (2008), Bukenya (2009), Magazzino (2011), Majdi (2012). Also, Erdil and Yetkiner (2009) show that one-way causality runs from health to income in high-income countries.

- Growth detriment implies unidirectional causality from the economic growth to health expenditure. This direction of causality can also be called the 'income view.' With this result, the economic growth is a key determinant of growth in health expenditure. This hypothesis is in accordance with the empirical results of Hartwig (2010), Chen et al. (2013), Ozturk and Topcu (2014), Khan et al. (2016), Halici-Tuluce, Dogan, and Dumrul (2016).
- Feedback hypothesis implies a two-way causality between health expenditure and economic growth. The increased investment in health expenditure leads to creating a healthier environment, increased productivity and higher output. On the other hand, a higher level of output will involve a higher demand for the health care system. The implications of this hypothesis are related to the fact that excessive control of costs in the health system may limit the economic activity. The empirical results in accordance with this hypothesis can be found in the studies of Pradhan (2010), Tang (2011), Chen, Clarke, and Roy (2014).
- Neutrality hypothesis implies the absence of a causal relation between these two variables. Newhouse (1977) gives the explanation of this result, noting that in this case, the formation of the appropriate health care policy should not depend on the economic activity. This result was confirmed in the studies of Cetin and Ecevit (2010), Balaji (2011).

In contrast to afore-mentioned findings, Chen (2015) pointed out that none of these four types of causality are valid for USA over the entire period of 1934–2010. It is evident that in the empirical studies that have examined the relation between health expenditure and economic growth, ambiguity of the results exists. The results are not consistent. The reason should be sought in the fact that during the study of the connection between the variables, several approaches were used while modelling this connection. Gerdtham and Lothgren (2000) distinguish the following econometric approaches, which are most commonly used: cross-section

bivariate regressions, cross-sectional multivariate regressions, panel data models and cointegration analysis. By applying the panel cointegration analysis, Gerdtham and Lothgren (2002) indicate that health expenditure and GDP are cointegrated around linear trends. The panel data were also used in the following studies: Hitiris and Posnett (1992), Barros (1998), Roberts (1999), Baltagi and Moscone (2010).

With the implementation of the appropriate economic policy, it is important to calculate the income elasticity for health care as well. This is very important for the financing model itself as well as for the health care resource distribution. If the income elasticity of health care is greater than one, then health expenditures will be considered as a luxury good. This implies that the health expenditures increase faster than income. Proponents of the idea that healthcare is a luxury good feel that it should be treated like any other good and should be left to the functioning of market forces. On the other hand, health care expenditures could be a necessity good. This suggests income increases faster than health expenditures. Proponents of the idea that this good is necessary for life, support the idea of the government intervention in the healthcare sector of a country (Di Matteo 2003).

In previous studies, as well as in the case of establishing causality between the variables, there is no agreement between the authors whether the healthcare is a luxury or a necessity good. Blazquez-Fernandez, Cantarero, and Perez (2014) revealed increasing income elasticity over time along with huge heterogeneity across OECD countries. Chen, Lin, and Chang (2009) indicate that health care is necessity for countries with per capita income lower than $ 1920 per year and is luxury for other countries. According to Kleiman (1974), Newhouse (1977), Leu (1986), Gerdtham et al. (1992), Schieber and Maeda (1999), Getzen (2000), Musgrove, Zeramdini, and Carrin (2002), Murthy and Okunade (2009), Hassan et al. (2014), Khan and Mahumud (2015), healthcare is a luxury good, while Freeman (2003), Sen (2005), Yu and Chu (2007), Baltagi and Moscone (2010), Narayan, Naeayan, and Smith (2011), Farag et al. (2012), Yavuz, Yilanci, and Ozturk (2013), Khan et al. (2016), Pattnayak and Chadha (2016), Abdullah, Siddiqua, and Huque (2017), consider it as a necessity good.

Data and Methodology

In accordance with the primary objective of this study, the following hypotheses will be tested:

H1 *There is a long-run relationship between the economic growth and health expenditures.*

H2 *Health expenditures generate the economic growth.*

H3 *The rate of economic activity largely determines health expenditures.*

In that sense, three variables will be used: Gross domestic product (GDP), health expenditure (HE) and life expectancy (LE). This study uses gross domestic product and health expenditure as variables of interest, while life expectancy is used as a control variable. To test the potential link between the variables, we used a sample of the SEEHN countries (Albania, Bulgaria, Bosnia and Herzegovina, Croatia, FYR Macedonia, Moldova and Romania) and panel data set from 1995 to 2014. Information on the movement of the variables is taken from the World Bank website (http://www.worldbank.org), that is, World Development Indicators. Economic growth is expressed by the gross domestic product (GDP), which is measured by the purchasing power parity in the international prices (constant 2011$), while for the healthcare expenditure, indicator Health expenditure (HE) is used as well, measured by the purchasing power parity in the international prices (constant 2011$). Life expectancy is measured at birth, total (years). The values of GDP and HE variables are displayed per capita, while for statistical reasons, the values of all indicators are shown in logarithmic form (ln). The total number of observations is 140 (20 time periods in 7 countries). Table 1 shows the descriptive statistics in these countries during the mentioned period of time. The South Eastern Europe countries differ in their overall level of the economic development. According to the World Bank country classification (see http://www.worldbank.org), Moldova belongs to lower-middle income economy, Albania, Bosnia and Herzegovina, Bulgaria, FYR Macedonia and Romania are upper-middle income countries, while Croatia is high-income economy. Also, the highest level of health expenditure is realized in Croatia, and the lowest in Moldova. Moreover, the life expectancy in Moldova is lower than in all other observed countries. Visually speaking, HE is in line with the level of GDP per capita.

Numerous theoretical assumptions listed above, emphasize the importance of investing in health care to increase the economic growth, and the impact of total output on variations in the health care expenditure. Expenditure in health care should enable the absence of chronic diseases and should increase labour productivity, by which the economic prosperity can be affected, as well. A higher level of the economic growth implies

TABLE 1 Descriptive Statistics in the SEEHN Countries (1995–2014)

Category	Country	Mean	Std. Dev	JB*
GDP per capita	Albania	6977.756	2213.898	1.726
	Bulgaria	12298.23	3116.458	2.406
	B&H	7354.182	2265.241	2.652
	Croatia	17995.38	2846.805	1.813
	FYR Macedonia	9707.933	1567.024	2.096
	Moldova	3249.976	800.479	1.568
	Romania	14166.81	3476.459	2.312
HE per capita	Albania	389.335	135.739	1.884
	Bulgaria	721.440	364.756	1.303
	B&H	562.655	276.251	1.679
	Croatia	1137.250	427.876	2.233
	FYR Macedonia	636.351	132.717	1.350
	Moldova	290.697	148.864	2.340
	Romania	568.916	335.862	2.190
LE	Albania	75.491	1.783	1.694
	Bulgaria	72.559	1.386	0.973
	B&H	74.733	1.352	2.71
	Croatia	74.879	1.809	1.856
	FYR Macedonia	73.879	0.981	1.141
	Moldova	68.218	1.637	2.601
	Romania	71.951	1.902	0.867

NOTES * Jarque and Bera (1980).

a higher income, too, and thus the expenditures in health care should be increased. On this basis, it could be said that there is a positive two-way causality between these variables. Accordingly, we assume that the connection between the economic growth and health expenditure can be summarized as follows:

$$\ln(\text{GDP})_{it} = \theta_i + \beta_1 \ln(\text{HE})_{it} + \beta_2 \ln(\text{LE})_{it} + \varepsilon_{1,it}, \quad (1)$$

$$\ln(\text{HE})_{it} = \gamma_i + \alpha_1 \ln(\text{GDP})_{it} + \alpha_2 \ln(\text{LE})_{it} + \varepsilon_{2,it}, \quad (2)$$

where $i = 1, 2, \ldots, N$ is the index of the country, $t = 1, 2, \ldots, T$ is the time index, $\beta_1, \beta_2, \alpha_1$, and α_2 indicate the long-term effects of the independent on the dependent variable, and θ_i and γ_i are country-specific fixed ef-

TABLE 2 Cross Section Dependency Test

H0: No cross-section dependence in residuals	Probability
Breusch-Pagan LM test	0.0000

fects, while $\varepsilon_{1,it}$ and $\varepsilon_{2,it}$ are error terms. Taking into account that potential existence of common shocks among selected countries could result in creating contemporaneous correlation, it is very important to specify cross-sectional dependencies. Breusch and Pagan (1980) LM test for cross-equation correlation is used for testing cross-sectional dependence, because the number of time periods (T) is larger than cross-sectional units (N). The result of the cross-sectional independence test is reported in table 2. Probability value is below the 0.05, the effect is statistically significant. The Breusch-Pagan LM test strongly rejects the null hypothesis of no cross-sectional dependence. In that sense, the second generation panel unit root test should be used. The second generation tests imply that there is a correlation between individual units of panel. Since existence of the correlation between cross-sectional data is already shown, this study applies the test developed by Pesaran (2007).

In order to determine long-term relationship, Pedroni (1999) test of co-integration in a panel has been used here. The null hypothesis that variables are not co-integrated is tested against the alternative hypothesis that variables in a panel are co-integrated. The Pedroni panel co-integration test can be presented in the following form:

$$y_{it} = \theta_i + \rho_i t + \beta_{1i} x_{1it} + \cdots + \beta_{Mi} x_{Mit} + \varepsilon_{it}, \tag{3}$$

where M is the number of regressors, β_M is the coefficient, θ_i and ρ_i represents deterministic components. Pedroni defines seven types of such tests. The first four tests (within groups) are based on the separate evaluations of models for individual units. By grouping the obtained results, the variable dimension is formed, according to which co-integration is evaluated. The second group of tests (between the groups) implies that evaluation is being performed for each separate unit, and then relevant value of test statistics is formed according to the mean value of Dickey Fuller statistics for all i units. The next test that will be used to examine the cointegration is Westerlund (2007). Based on the error correction model (ECM), this test implies four panel cointegration tests (Ga, Gt, Pa and Pt). These four test statistics are normally distributed and based on structural dynamics rather than residuals dynamics. Also, they do not include any common factor restriction, and these tests are general enough

to be robust against heterogeneity and cross section dependence. Westerlund (2007) cointegration test is appropriate for small-sample and it is possible to get reliable results. Also, this test has a power relative to other popular residual-based panel cointegration tests. The null hypothesis is tested by determining whether error correction is present for individual panel members and for the panel as a whole. If the null of no cointegration is rejected, then co-integration between the variables exists. Taking into account that all the variables are integrated of order 1, cointegration test assumes the following data generating process:

$$\Delta y_{it} = \delta_i' d_t + \alpha_i y_{i(t-1)} + \pi_i' x_{i(t-1)} + \sum_{j=1}^{m_i} \alpha_{ij} \Delta y_{i(t-j)} + \sum_{j=0}^{m_i} \phi_{ij} \Delta x_{i(t-j)} + \omega_{it}, \quad (4)$$

where $d_t = (1 - t)'$ holds the deterministic components, δ_i' represents the associated vector of parameters, while α_i is the speed adjustment term. If $\alpha_i < 1$ then cointegration exists, while if $\alpha_i = 1$, there is no cointegration. After testing cointegration, evaluation of the long-run parameters is carried out with the help of the panel Dynamic Ordinary Least Square (DOLS) developed by Pedroni (2001). This approach allows greater flexibility in the case of presence of heterogeneous cointegration vectors. Kao and Chiang (2000) have emphasized that DOLS is less biased in respect to FMOLS while Pedroni (2000) has indicated that there is a lower degree of distortion in DOLS than in FMOLS. Dynamic OLS in the panel model can be shown in the following form:

$$y_{it} = \alpha_i + \beta x_{it} + \sum_{j=-p_i}^{p_i} \phi_{ij} \Delta x_{it-j} + \varepsilon_{it}, \quad (5)$$

where ϕ_{ij} represents the coefficients of the lead and lag differences, which accounts for possible serial correlation and endogeneity of the regressor(s), thus yielding unbiased estimates, while $\pm p_i$ is the number of lags and leads. DOLS generates unbiased estimates for cointegrating variables, even with endogenous regressors, which is very important feature of this procedure. To determine the direction of long-run causality and to examine short-run dynamics between the variables, the panel VECM model is used, that is, the residual from DOLS long-term relation will be included:

$$ec_{it} = y_{it} - [\widehat{\alpha}_i + \widehat{\beta}_i x_{it}] \quad (6)$$

TABLE 3 Results of the Panel Unit Root Test

Series	PESCADF (constant & trend)					
	Levels			First difference		
	t-bar test	cv5	cv1	t-bar test	cv5	cv1
$\ln(\text{GDP})_{it}$	−2.716	−2.880	−3.150	−3.912	−2.880	−3.150
$\ln(\text{HE})_{it}$	−2.477	−2.880	−3.150	−3.753	−2.880	−3.150
$\ln(\text{LE})_{it}$	−1.856	−2.880	−3.150	−4.497	−2.880	−3.150

NOTES cv5 and cv1 are critical value at 5 and 1%, respectively.

and error correction terms (ECT) is included in a simple panel VECM model as follows:

$$\begin{bmatrix} \Delta y_{it} \\ \Delta x_{it} \end{bmatrix} = \begin{bmatrix} c_{1i} \\ c_{2i} \end{bmatrix} + \sum_{j=1}^{k} \Gamma_{j=1} \begin{bmatrix} \Delta y_{it-j} \\ \Delta x_{it-j} \end{bmatrix} + \begin{bmatrix} \alpha_1 \\ \alpha_2 \end{bmatrix} ec_{it-1} + \begin{bmatrix} \varepsilon_{1it} \\ \varepsilon_{2it} \end{bmatrix}, \tag{7}$$

where c_{1i} and c_{2i} are fixed effects, ec_{it-1} represents an error or deviation from the equilibrium, while α_1 and α_2 represent the adjustment coefficients and show how dependent and independent variables react to deviations from the equilibrium relationship. Statistically significant result for ECT involves long-run causality, as well as the long-term endogeneity of the variables (Hall and Milne 1994). To determine the short-term causality, the coefficients standing with the independent variables will be used, noting that the independent variables will be displayed with an appropriate lag length. Also, both variables will be converted to a first difference, due to the assumption that they are stationary after converting into the first difference.

Empirical Results

The table 3 presents the results of the stationarity for the variables. Following the stationarity test (Pesaran 2007), the null hypothesis about the existence of unit root in all the variables in level cannot be rejected. After the variable conversion into the first difference, they became stationary (the null hypothesis about the unit root is rejected) and the obtained result is statistically significant.

The results of Pedroni panel cointegration test based on within dimension and between dimension PP and ADF statistic are reported in the table 4. In the table, $\ln(\text{GDP})_{it}$ is presented as a dependent variable. In such case, we consider $\ln(\text{HE})_{it}$ and $\ln(\text{LE})_{it}$ as independent variables. According to Pedroni (1999) test, the null hypothesis of no cointegration is

TABLE 4 Panel Co-Integration Tests, Series $\ln(\text{GDP})_{it}$, $\ln(\text{HE})_{it}$ $\ln(\text{LE})_{it}$

(1)	Test statistics	Statistic	Probability	Weighted stat.	Probability
(a)	Panel PP-statistics	−2.140	0.016**	−2.058	0.019**
	Panel ADF-statistics	−3.480	0.000*	−3.018	0.001*
(b)	Group PP-statistics	−2.104	0.018**	–	–
	Group ADF-statistics	−3.181	0.000*	–	–
(2)	Test statistics	Value	Z-value	Probability	
	Gt	−2.660	−3.227	0.001*	
	Ga	−6.359	−0.259	0.398	
	Pt	−4.279	−1.354	0.088***	
	Pa	−6.214	−2.005	0.023**	

NOTES (1) Pedroni (1999) cointegration test, null hypothesis: no cointegration; (2) Westerlund (2007) ECM cointegration test, null hypothesis: no cointegration; (a) within dimension; (b) between dimension. *, ** and *** refer to 1%, 5% and 10% of the test significance.

rejected by the panel PP statistic, panel ADF statistic, group PP statistic and group ADF statistic. In line with the statistically significant results, it can be said that there exists cointegration between variables. Also, the results of Pedroni cointegration test, when $\ln(\text{HE})_{it}$ is seen as a dependent variable, are reported in the table 5. We consider $\ln(\text{GDP})_{it}$ and $\ln(\text{LE})_{it}$ as independent variables. The same outcome, in terms of the statistical significance of the results, as in the first case, points to the existence of the cointegration between the variables. To check the robustness of Pedorni's cointegration results, we also employ Westerlund (2007) for both cases, and the results are shown in the table 4 and table 5. For testing the cointegration when $\ln(\text{GDP})_{it}$ is considered as a dependent variable, the null hypothesis of no cointegration was rejected by 3 (out of 4) statistics of Westerlund (2007). In the specification when $\ln(\text{HE})_{it}$ is considered as a dependent variable, 3 among 4 statistics of Westerlund (2007) were found to be statistically significant.

For assessment of the long-run effects of economic growth on health expenditures and vice versa, DOLS method is used. As in the case of cointegration testing between the variables, two cases are also examined here. Table 6 contains the estimation results of long-run relationship among the economic growth, health expenditure and life expectancy. Firstly, the economic growth is considered as a dependent variable. It is evident that there is a positive and statistically significant relationship between the

TABLE 5 Panel Co-Integration Tests, Series $\ln(\text{HE})_{it}$, $\ln(\text{GDP})_{it}$, $\ln(\text{LE})_{it}$

(1)	Test statistics	Statistic	Probability	Weighted stat.	Probability
(a)	Panel PP-statistics	−1.822	0.034**	−2.369	0.009*
	Panel ADF-statistics	−2.673	0.004*	−3.035	0.001*
(b)	Group PP-statistics	−2.575	0.005*	–	–
	Group ADF-statistics	−3.319	0.000*	–	–
(2)	Test statistics	Value	Z-value	Probability	
	Gt	−2.498	−2.818	0.002*	
	Ga	−5.118	0.342	0.634	
	Pt	−6.031	−2.673	0.004*	
	Pa	−5.544	−1.644	0.050**	

NOTES (1) Pedroni (1999) cointegration test, null hypothesis: no cointegration; (2) Westerlund (2007) ECM cointegration test, null hypothesis: no cointegration; (a) within dimension; (b) between dimension. *, ** and *** refer to 1%, 5% and 10% of the test significance.

economic growth and health expenditure. The income elasticity coefficient, in respect to health expenditure, varies from 0.371 to 0.498. In fact, this result can be justified by the observation that the economic growth of the SEEHN countries depends largely on the investments in health care (human capital). Furthermore, in case when the economic growth is a dependent variable, the coefficient which stands for life expectancy is 1.863 which means that health improvement has a significant influence on the economic growth. This result is in agreement with theoretical views that increased investments in healthcare prolong the anticipated life expectancy of people, which ultimately affects the economic growth.

And in the second case, when the health expenditure is a dependent variable, the positive long-run statistically significant relation between the health expenditures and economic growth is also evident. This result can be explained by the fact that with the accomplishment of the economic activity in the SEEHN countries, more funds will be available to public and private institutions, which will enable the increase of the share of resources that is allocated to the health sector. In the present case, the elasticity coefficient of health expenditure with respect to income varies from 1.014 to 1.573. The Wald test was observed to be significant in two (out of three cases), which means that the elasticity coefficient is greater than unity. Thus, the health expenditure in the SEEHN countries can be argued as a luxury good. Since this is a test on the sample of 7 countries,

TABLE 6 Dynamic Ordinary Squares Least Estimator Results

Dep. var.	Variable	Pooled		Weighted		Grouped	
$\ln(\text{GDP})_{it}$	$\ln(\text{HE})_{it}$	0.435*	(9.444)	0.371*	(9.357)	0.498*	(5.222)
	$\ln(\text{LE})_{it}$	−0.032	(−0.028)	1.863**	(0.040)	−0.933	(−0.504)
$\ln(\text{HE})_{it}$	$\ln(\text{GDP})_{it}$	1.573*	(8.635)	1.344*	(7.477)	1.014*	(3.907)
	$\ln(\text{LE})_{it}$	7.191*	(3.532)	8.797*	(4.140)	11.319*	(3.314)
Wald test†	t-statistic	3.147*		1.914**		0.053	
	χ^2 statistic	9.904*		3.663**		0.003	

NOTES †Ho: Coefficient of $\ln(\text{GDP})_{it}$ is not greater than unity (equal to one). * Significant at 1% levels. ** Significant at 5% levels. t-statistics are reported in parentheses.

the reassessment of DOLS regression is made, in the way that in each of the subsequent evaluation one country was excluded, and the previously excluded was returned. Strong impact of economic growth on the health expenditure is not a result of outliers. The obtained values of coefficients, as well as the corresponding values of t-statistics are shown in table 7. When the panel pooled is the estimation method, the coefficients are statistically significant in all seven situations, and they range from 1.178 (when Croatia is excluded) to 1.857 (when Bulgaria is excluded). In the second case, when panel weighted is the estimation method, the results vary from 1.1 (when Croatia is excluded) to 1.527 (when Bulgaria is excluded). As it can be seen, the obtained coefficients are always statistically significant and greater than unity. Such results indicate that health care is a luxury good, and this is not the result of possible outliers.

Table 8 presents results of VECM model. The t-statistic for error correction term when the economic growth is a dependent variable indicates that the null hypothesis can't be rejected at the 5-percent level. On the other hand, when the health expenditure is considered as a dependent variable, the t-statistic for error correction term indicates that the null hypothesis can be rejected at the 1-percent level. From this, it can be concluded that the statistical long-run causality is unidirectional, and it runs from the economic growth to health expenditure. Also, in the short-run, there is one-way causality between the health expenditure and economic growth, and it runs from the economic growth to health. Elasticity of the health expenditure with respect to the income is 0.419. In other words, 1% of increase in the economic growth increases the health expenditures for 0.419 percent. In contrast to the long-term results, health care is a necessary product and not a luxury. The results suggest that there exists a pos-

TABLE 7 Dynamic Ordinary Least Square Regression When One Country Is Excluded from the Analysis

Excluded	(1)	(2)	(3)	(4)
Romania	1.515	10.072	1.347	8.247
Moldova	1.526	7.998	1.236	6.910
FYR Macedonia	1.620	8.844	1.401	7.567
Croatia	1.178	6.271	1.100	7.167
B&H	1.606	8.027	1.513	6.938
Bulgaria	1.857	7.594	1.527	6.252
Albania	1.634	8.517	1.496	7.915

NOTES Column headings are as follows: (1) coefficients on health expenditure (pooled), (2) *t*-statistics of the coefficients, (3) coefficients on health expenditure (weighted), (4) *t*-statistics of the coefficients.

TABLE 8 Panel Vector Error Correction Model: Long Run Causality and Short Run Dynamics

Independent variables	Dependent variables			
	$\Delta\ln(\text{GDP})_{it}$		$\Delta\ln(\text{HE})_{it}$	
ec_{it-1}	−0.011	(−1.097)	0.059*	(2.920)
$\Delta\ln(\text{GDP})_{it-1}$	0.329*	(5.399)	0.419*	(3.270)
$\Delta\ln(\text{HE})_{it-1}$	0.029	(0.708)	−0.093	(−1.084)
$\Delta\ln(\text{LE})_{it-1}$	1.353	(1.416)	−1.126	(−0.561)
Constant	0.016*	(2.951)	0.061*	(5.479)
	$R^2 = 0.347$; DW = 2.152		$R^2 = 0.128$; DW = 1.784	

NOTES * indicates significance at the 1% level. *t*-statistics are reported in parentheses.

itive relationship between the health expenditure and economic growth in the long and short run. Furthermore, we also observed unidirectional causality between the health expenditure and economic growth.

Conclusion and Policy Implications

This paper employs the panel data econometrics to investigate a link between the health expenditure and economic growth in the SEEHN countries. Although many studies have recently been used conducted on the health care spending-economic growth nexus, there is no study that has investigated this relationship in SEHHN. Thus, this paper intends to fill the gap in the empirical literature in this tradition. Recently, these countries have invested a lot of efforts to improve the health care policy. Pol-

icy makers started to consider the growth of economic activity as an appropriate tool which can generate improvements in health expenditures. Also health, as a part of human capital, has been recognized as one of the key drivers of economic growth.

The three main outcomes could be summarized as follows. First, there is co-integration among the economic growth, health expenditures and life expectancy. This suggests that there is a long-run relationship between the economic growth and health expenditure which is in accordance with the hypothesis number one. Second, in the long run, health expenditures cause positive changes in the economic growth. This result is in line with the second hypothesis. The third outcome is that in the long run, elasticity of the health expenditure with respect to the income is greater than unity. Therefore, health care can be considered as a luxury good. It can be pointed out that this finding is not the result of possible outliers. Nevertheless, in the short run, elasticity of the health expenditure with respect to income is less than unit, which means that health care is a necessary product. The third premise of the study is confirmed by a positive effect of the economic growth to health expenditure in the long and short-run.

Finally, on the basis of these outcomes, it is possible to suggest policy implications for these countries. It is essential for policymakers to formulate a long-run oriented policy, which will be directed towards the targeted increase of investment in health care, in order to increase the overall economic activity. It is necessary to strengthen the delivery of high-quality health promoting services at all levels of care. Also, it is of great importance to harmonize the cross border public health legislation and enable a Free Trade Area from the public health perspective. Strengthening of the institutions and improving of inter-sectoral governance of the health sector at all levels, including health information infrastructure and regional cross-border information exchange, present very specific goals for these countries.

Since the empirical results confirmed that health is a good that is necessary for life in the short-run, an important role for this sector should be performed by the government. In contrast to the short-run, the long-run result implies that consumers' preferences drive the health expenditure above the economic growth. This suggests that public financing should play a subsidiary role. Consequently, the adequate combination of public and private financing will be needed to improve the health care policy in order to ensure that the SEEHN countries can benefit from the growth.

These countries are lagging behind in the level of the income per capita, compared to the EU average. Due to the positive and statistically significant impact of the economic growth on health expenditure, it can be concluded, that shocks that have a negative impact on the economic growth to a large extent affect reduction of the health expenditure, too. For this reason, it is necessary for these countries to achieve a higher income in order to increase the investment in health care.

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