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ORIGINAL PAPER

Investment in Health and Economic Inclusion of South Eastern European Countries

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Abstract
Contrary to the well-recognized and studied causality running from economic growth to health, this study presents evidence of the reverse causation – from health to economic growth. The study tries to analyze the processes and connections that trigger the relationship between investment in health and the achievement of economic growth. This paper goes through a review and an analysis of the effects that health investment has on economic growth and the economic rationale for investing in health. The focus of this research paper is finding out how better health serves as a predictor of economic growth and the degree to which economic growth is explained by health expenditures in South Eastern European countries. Regression analysis, used in identifying the relation between health expenditure per capita and GDP per capita for SEE countries are based in the data of World Bank for years 2000-2011. Based on the findings, there exist a strong relationship between investment in health and economic growth in all SEE countries. By comparing the regression's results of the SEE countries, it can be concluded that health expenditures per capita in Albania, as a measure of investing in health, explain slightly more of the variation in GDP per capita than in the other countries. On the other hand, Macedonia and Albania are the countries where health expenditure has the highest impact on economic growth. To sum up, SEE countries have to consider investment in health sector as a crucial instrument for achieving both, economic and social inclusion.

Keywords: *Health, Investment, GDP per Capita, Economic Inclusion*

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Introduction

Health is an invaluable asset for human beings. Being healthy and living a long life are the most important goals of every individual. Good health has a significant importance for human existence and is a very important source of well-being. It is a key factor in a person's ability to develop his skills and knowledge and allows individuals to fully live their lives, without shortcomings or deficiencies. Health problems prevent people from performing their daily activities and are reflected as obstacles in the development of individual's potential during their entire lives.

According to economic theories, health is directly related to education and vice-versa. Meanwhile both, health and education are much correlated to the investments done in these sectors. On the other side, investments are related to the economic capacities of countries. Based on this perspective, rich countries are supposed to invest more and par consequence to have healthier population and skilled labor force, which means additional possibilities for investing more and more. Conversely, poor countries are supposed to have serious problems in investing for health and education and par consequence they suffer from different issues related to these two sectors.

In individual context, health is seen as a predictor for personal and economic development of everyone that possesses it. It is considered as basic factor in worker's productivity and individual's capacity to learn and grow intellectually. In economic context, health and education are the foundations of human capital, which is the basis of an individual's economic productivity (Shultz, Becker, 2001).

The macroeconomic evidence confirms that countries with the weakest conditions of health and education have a much harder time achieving sustained growth than do countries with better conditions of health (World Health Organization, 2001). Therefore, investment in health is an important strategic action for poverty reduction and a contributor to the general well-being of the population, leading to higher levels of economic growth in the long run.

This paper will study the causality from health investment to economic growth. The following sections will provide a review of the literature related to this topic and evidence of the causality from health investment to economic growth. The performance of a regression analysis of GDP per capita in SEE countries run on health expenditure per capita over the period 2000-2011 is taking place, in order to better understand how and at what extend GDP per capita varies with the changes in health expenditure per capita. The countries used in this regression analysis are: Albania, Bosnia and Herzegovina, Croatia, Former Yugoslav Republic of Macedonia, Montenegro and Serbia, excluding Kosovo since there are no available data. After analyzing the ANOVA table with the respective results, a brief conclusion of the research is being summarized.

Literature Review

One of the main issues in the field of health economics is to establish the direction of the causality between health and income. An informal explanation of this causality is: "a lot of people who otherwise wouldn't be poor are, simply because they are sick; however, few people who otherwise would be healthy are sick because they are poor" (Harold, 1978). There are several benefits that result from good health. Good health can enhance educational outcomes, both through school attendance and performance (Bloom, Canning, 2000; Schultz, 1999; Baldacci et al., 2004). Investing in health can improve individual productivity; healthy individuals are more likely to be efficient at assimilating knowledge, have stronger mental and physical capabilities and, in consequence, obtain

higher productivity levels, and hence higher incomes (Strauss and Thomas, 1998). Healthy populations tend to have higher productivity due to their greater physical energy and mental clearness (Bloom, Canning, 2000). There is a general agreement among authors that better health can increase labor supply and productivity, ultimately leading to an increase in income (Muysken, Yetkiner, Ziesemer, 2003).

In the analysis of the impact of health on economic growth, Sorkin (1977) concluded that health, seen through reductions in mortality, had an important impact on economic growth during the early twentieth century. The relation between health expenditures and gross domestic product was studied by Heshmati in 2001 in a research through generalized Solow model. The variable representative of health status in the growth function was health expenditure.

After analysis, he concluded that health expenditures have a positive and significant impact on gross domestic product growth. A more general explanation of health impact on growth is given by Robin Swift. He argues that the improved health can positively impact economic growth via several channels, which include the rise in total GDP, but more significantly, through long term increases in both human and physical capital that in turn stimulate productivity and GDP per capita". There are two main approaches that the economists try to find some results. The first one is the effect of GDP in the health expenditure in a certain country. The other one is the amount of the health expenditure and its impact on the GDP growth on an economy. This study deals with the second issue, the observation of health expenditure in the overall GDP of a country.

Contribution of Health to Economic Growth

It is well recognized that economic growth leads to better health, because wealth means better nutrition and increased capability to invest in health. Anyway, this relation also runs in the other direction, which means better health contributes to economic growth. Investment in health is increasingly seen as a means of achieving economic growth. Good health, which results from health investments, contributes to the achievement of economic growth through: better efficiency or high labor productivity of healthy employees, reduced treatment burden, higher incentive to invest in education and training to obtain better skills, improved human capital, higher domestic saving and investment, higher rates of foreign investment and lower "dependency ratio".

Healthy employees are more efficient and productive in their work than others that suffer from diseases. The output per hour worked of healthy employees is higher compared to unhealthy ones. This is due to better physical and mental abilities of healthy employees and their reduced incentives to take days off work. As a result, better health leads to increased production as well as profitability of the firms. An indirect positive impact in the worker's productivity has the improved health of family members, which allows for less time devoted to caring for dependants and more time to work.

As people become healthier, their motivation to continue education and being equipped with better skills increases. Healthy individuals have better abilities to learn because of reduced diseases and better nutrition, generally miss fewer days from school and complete higher levels of education compared to unhealthy ones. What's more, if good health is a predictor of higher life expectancy, healthier individuals would have more incentive to invest in education and training, as the rate of depreciation of the gains in skills would be lower (Strauss, Thomas, 1998). Motivation by better health, better skills and education contribute to a growth in the human capital base which is a determinant of

economic growth. Consequently, investment in health is an important predictor of economic growth.

The health status of an individual has potential impacts on the income level and its distribution between consumption, savings and investment. Healthier individuals will be more encouraged to save because of the expectation of a higher life expectancy. They also have more resources available to save, since they devote a small amount of resources to their health and usually save for their retirement.

These savings are a potential fund for investment. In addition to this, companies are more likely to invest when workforces are healthier or better educated. Investments in health with the target to prevent illnesses or treat them in the early stages are an efficient way to avoid larger expenses related to the illnesses and their possible complications. Individuals and also governments would be able to spend less for illnesses if investments to prevent them would have been made. This would provide more capital available for different investment purposes. Better health, increased labor productivity and control of diseases encourage foreign investment. Health improvements attract higher levels of foreign investment due to lower health risks for employees and higher growth opportunities for the companies. Increases in the level of foreign investment positively impact economic growth.

One way reduced poverty can be achieved is by investments in sexual and reproductive health. These investments result in demographic changes that could favorably lead to economic growth. The outcomes of these investments are generally smaller sized families due to lower fertility rates and a reduction of the "dependency ratio", which is the ratio of active workers to dependants. This allows for increased saving for individuals and increased investment opportunities to get higher profits. In the population level, increased national savings enhance economic growth by providing funding for investment.

Methodology

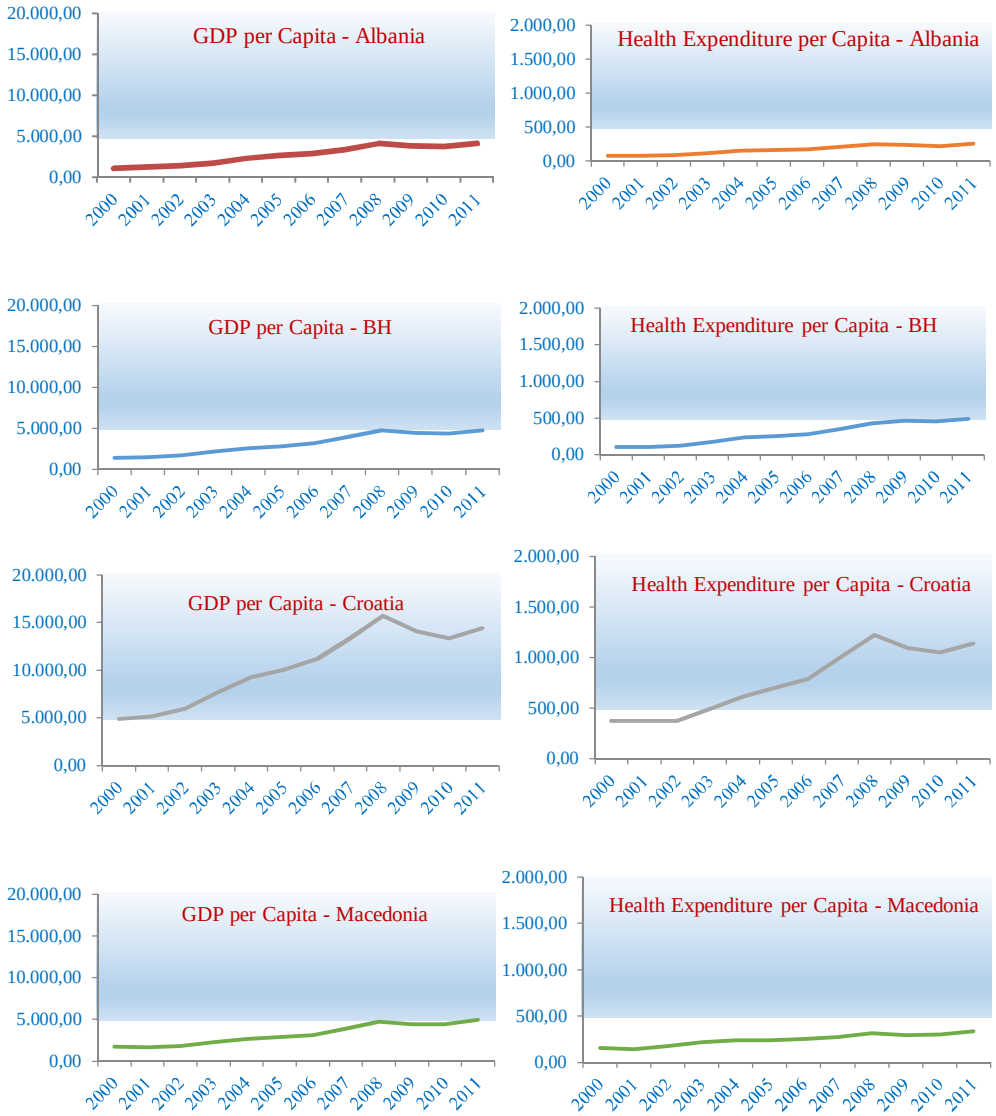
This study investigates the relation between health expenditure per capita and GDP per capita in South Eastern European Countries over the period 2000-2011. The goal is to infer the effect of health expenditure per capita on GDP per capita. It is important to know the effect that an increase in health expenditure per capita has on GDP per capita, while holding all other factors fixed. A regression of GDP per capita on health expenditure per capita is run in order to explain the first in terms of the second or in studying how GDP per capita varies with changes in health expenditure per capita. The data for the regression are taken from World Bank database.

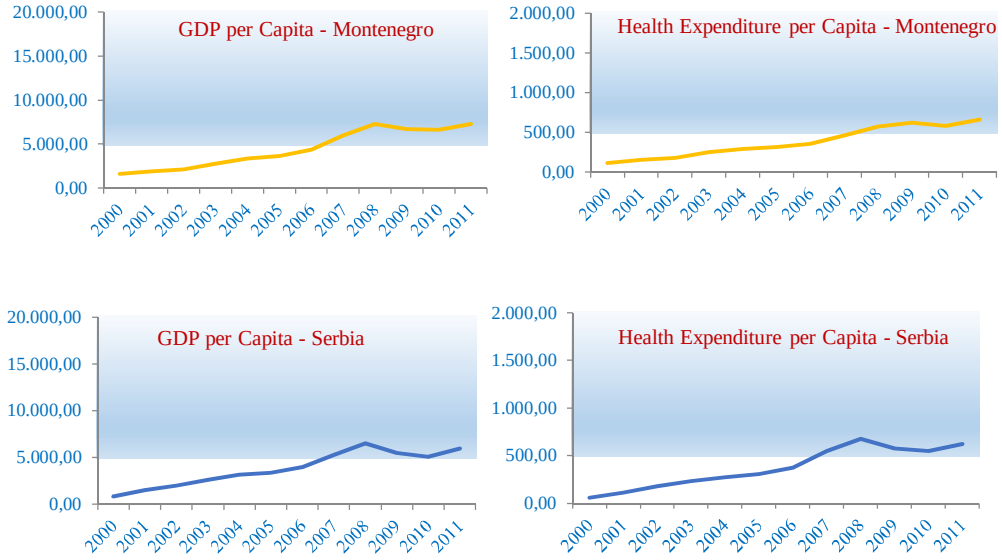
Regression Analysis

Rivera and Currais estimated the relationship between health and economic growth of The Organization for Economic Co-operation and Development (OECD) member countries over the period 1960-1990 and showed that countries with higher health expenditures had higher economic growth. Other authors have also made research on the impact of health expenditures on economic growth. A study in thirty-three developing countries over the period 1990-1998, using the generalized Solow growth model and panel data model, resulted in a positive and significant impact of health expenditure on economic growth (Mojtahed, Javadipour, 2004). Based in the previous studies, higher levels of health expenditure per capita are associated with higher levels of GDP per capita. This study also expects the same relationship between the variables for the South Eastern

European Countries. It is of great importance the analyses of both variables' trend for each country, which has been drawn in the graphs below. Albania, Bosnia and Herzegovina, the Former Yugoslav Republic of Macedonia, Montenegro and Serbia show the same trend of GDP per capita. They experience a constant increase from year to year for the period 2000-2008 and a decrease after 2008 followed by an increase in 2011. But it is not exactly the same trend for Croatia. It has experienced rapid and larger increases in GDP per capita from 2000 to 2008, and a higher fall during 2008-2010. The health expenditure per capita trend is almost the same for all SEE countries as that of GDP per capita.

Graph 1. Variables trend for South Eastern European Countries (2000-2011)

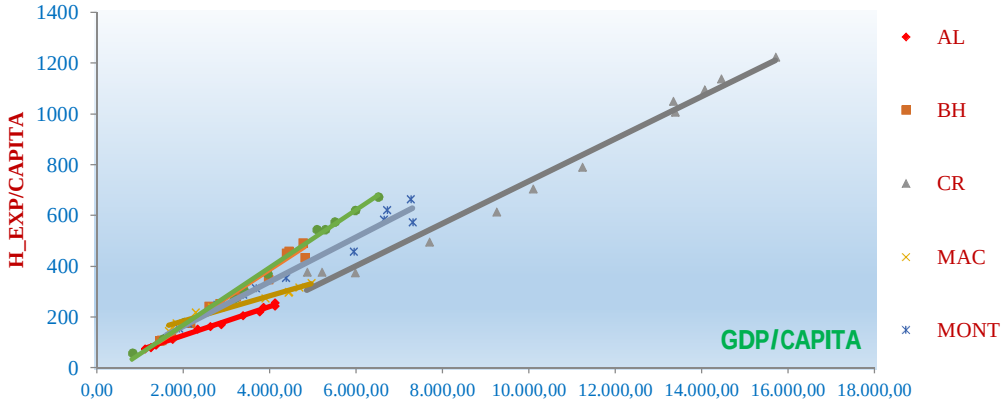




Source: data processed by the author based on the information provided by the World Bank database

The Scatterplot of GDP per capita and health expenditure per capita shows the picture of this relationship for years 2000-2011 for South Eastern European Countries. All these countries show positive relationship between health expenditure per capita and GDP per capita. The main conclusion based on this graph is that there exists a "unification" of these countries in health expenditure per capita - GDP per capita relationship. Croatia shows a quick recover of its economy which has been reflected as huge amounts of expenditure in health sector.

Graph 2. Scatterplot of GDP per Capita and Health Expenditure per Capita for SEE countries (2000-2011)



Source: data processed by the author based on the information provided by the World Bank database

The other countries of the region show positive trends through years, theirs economy has been recovering. Even if the GDP of Albania, Bosnia and Herzegovina, Macedonia, Montenegro and Serbia have increased from 2000 to 2011, this growth rate was very slow and par consequence, the health expenditure in these countries is seen to be slow too. Meanwhile, all these countries show almost the same trend by showing that they have almost the same performance and they belong to the same region, having the same difficulties and challenges.

Next, the research demonstrates the regression equations and its' results. The regression equation is as follow:

$$y = \beta_0 + \beta_1 x + \mu \quad \text{(eq. 1)}$$

Where:

y- is the depended or explained variable, in this case GDP per capita in current US $.

β_0- is the intercept parameter, sometimes called the constant term; it is the predicted value of y when x=0.

β_1- is slope parameter in the relationship between y and x, holding the other factors in u fixed; it measures the predicted change in y for one-unit change in x.

x- is the independent or explanatory variable, in this case health expenditure per capita in current US $.

μ - is the error term or disturbance in the relationship, represents factors other than x that affect y. It stands for the "unobserved".

This equation is used for all the SEE countries data. It has been applied for each country in specific. The results founded help us comparing the countries with each other. The regression tries to explain the relation between GDP per capita and the independent variable, health expenditure per capita. Health expenditure per capita is expected to be statistically significant and have positive coefficients. An increase in this independent variable should increase the GDP per capita. The regression results are founded in table below.

Table 1. OLS Regression of GDP per Capita on Health Expenditure per Capita

	AL	*BA*	*HR*	*MR*	*SR*	*MK*
Health Expenditure						
Coefficient:	*17.24*	*8.80*	*11.74*	*11.12*	*8.77*	*19.14*
P-value:	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
	(43.41)	*(20.98)*	*(23.91)*	*(20.15)*	*(38.59)*	*(14.52)*
R2_adj.	*0.99*	*0.98*	*0.98*	*0.97*	*0.99*	*0.95*
Note: The values in brackets are t-values						

Regression results and output tables for each country are founded in Appendix. Each table is statistically called an ANOVA table. The variation in the dependent variable is separated into two components: the explained variation and unexplained variation.

The total degrees of freedom for each equation is $(n - 1) = 11$ since totally there are 12 observations. The degree of freedom for regression is *k*, the number of independent

variables. The degrees of freedom associated with the error term is $n - (k + 1) = 10$. The SS refers to the sum of squares, or the variation.

$$\text{Total variation } = SS\ total = \Sigma\left(Y - \bar{Y}\right)^2$$

$$\text{Error variation} = SSE = \Sigma\left(Y - \hat{Y}\right)^2$$

$$\text{Regression variation} = SSR = \Sigma\left(\hat{Y} - \bar{Y}\right)^2 = \left(SS\ Total - SSE\right)$$

MS refers to the mean square and is obtained by dividing the SS term by the *df* term. Thus, MSR, the mean square regression, is equal to SSR/*k*, and MSE equals SSE/ $[n - (k + 1)]$.

It is likely that the estimation can include some error. The error in the predicted value of the dependent variable is measured by the ***multiple standard error of estimate***.

$$s_{y.12\ldots k} = \sqrt{\frac{\sum\left(Y - \hat{Y}\right)^2}{n - (k + 1)}} = 14.305$$

Another measure of the effectiveness of the regression equation is the ***coefficient of multiple determination***, which is the proportion of the variation in the dependent variable, *Y*, that is explained by the set of independent variables x_1, x_2, x_3,…x_k

The coefficient of multiple determination, R^2, take the values from 0 to 1, which is the percent of the variation explained by the regression. The closer R^2 is to 1, the stronger the association between Y and the set of independent variables, x_1, x_2, x_3,…x_k .

The ANOVA table is used to calculate the coefficient of multiple determination. It is the sum of squares due to the regression divided by the sum of squares total.

$$R^2 = \frac{SSR}{SSTotal} = 0.981$$

As the number of independent variables in the regression model increases, the coefficient of multiple determination increases. Even if the additional independent variable is not a good predictor, its inclusion in the model decreases SSE which in turn increases SSR and R^2. In this case R^2_{adj} is used to measure the effectiveness of multiple regression models.

$$R^2_{adj} = 1 - \frac{\frac{SSE}{n - (k + 1)}}{\frac{SSTotal}{n - 1}} = 0.976$$

The overall ability of the independent variables X_1 ,X_2, . . . X_k , to explain the behavior of the dependent variable *Y* can be tested. Two tests of hypotheses are considered. The first one is called the ***global test***, which investigates the possibility that all the regression coefficients are equal to zero.

It tests the overall ability of the set of independent variables to explain differences in the dependent variable. The null and the alternative hypothesis are as below:

H_0: $b_1 = 0$

H_1: b_1 is not = 0

The test statistic used is the *F* distribution is calculated to be the following:

$$F = \frac{MRS}{MSE} = \frac{SSR/k}{SSE/[n-(k+1)]} = 208.76$$

By comparing F-stat to critical value of F, the null hypothesis is rejected,

Health expenditure per capita is found to be statistically significant for all the countries. In all of the cases related to the regression analysis, P-value is found to be less than 5 percent, showing the significance of the "health expenditure" variable in the respective equation. R square adjusted is another indicator showing that Gross Domestic Product is explained by health expenditure exactly by the amount of that value. For example, GDP of Albania and Serbia are 99 percent explained by "health expenditure" variable, GDP of Bosnia and Herzegovina and Croatia are 98 percent explained by "health expenditure" variable, GDP of Montenegro and Macedonia are explained by 97 percent and 95 percent respectively by "health expenditure" variable. There is a strong positive relationship between these two variables for all countries. Health expenditure per capita in Albania, as a measure of investing in health, explains slightly more of the variation in GDP per capita than in the other countries. On the other hand, Macedonia and Albania are the countries where health expenditure has the highest impact on economic growth. For the Albanian case, one percent increase in health expenditure, the GPD of this country increases by around 17 percent, while the GDP of Macedonia is affected by 19 percent. Croatia and Montenegro have an increase of GDP by 11 percent for a one percent increase of health expenditure. Meanwhile, Bosnia and Herzegovina and Serbia remain the countries less affected by the health expenditure; one percent increase in the health expenditure shows around 9 percent increase in their GDP.

Conclusion

Research indicated that health can actually drive or lead to economic growth. Good health is important both at individual and economic context. At the individual context, good health is a determinant of economic productivity. At the economic context, it is a determinant of human capital, which positively affects productivity and economic growth. As the review of the literature indicated, the impact of health in economic growth is extensively analyzed by many authors and there is a general agreement among them that better health effects positively the economic growth of a country. Investments in health contribute to the achievement of economic growth in a variety of ways, such as by higher labor productivity of healthy employees, reduced treatment burden, improved human capital, higher domestic saving and investment, higher rates of foreign investment and lower "dependency ratio". The study of the data for the South Eastern European Countries case supports the theory that health investment leads to economic growth. Research results reveal that there is a statistically significant positive relationship between health expenditure per capita and GDP per capita. The relationship between health expenditure per capita and GDP per capita is found to be slightly stronger in Albania, followed by Serbia with a very small difference. The findings of this study suggest that policy-makers interested in promoting the economic growth of a country should consider

the role that health investment plays in it. The more contribution to the health sector, the more the GPD of South Eastern European Countries is supposed to be enhanced.

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Appendix: E-views Outputs

Albania

Dependent Variable: Y
Method: Least Squares
Date: 01/15/14 Time: 14:12
Sample: 1 12
Included observations: 12
Y=C(1)+C(2)*X

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-175.9593	71.03645	-2.477029	0.0327
C(2)	17.24291	0.397252	43.40548	0.0000

R-squared	0.994720	Mean dependent var	2707.588
Adjusted R-squared	0.994192	S.D. dependent var	1143.518
S.E. of regression	87.14557	Akaike info criterion	11.92405
Sum squared resid	75943.50	Schwarz criterion	12.00487
Log likelihood	-69.54429	Durbin-Watson stat	2.657200

Bosnia and Herzegovina

Dependent Variable: Y
Method: Least Squares
Date: 01/15/14 Time: 14:31
Sample: 1 12
Included observations: 12
Y=C(1)+C(2)*X

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	583.1715	135.0020	4.319725	0.0015
C(2)	8.800493	0.419361	20.98546	0.0000

R-squared	0.977797	Mean dependent var	3139.561
Adjusted R-squared	0.975577	S.D. dependent var	1289.851
S.E. of regression	201.5773	Akaike info criterion	13.60124
Sum squared resid	406334.3	Schwarz criterion	13.68205
Log likelihood	-79.60741	Durbin-Watson stat	1.163349

Croatia

Dependent Variable: Y
Method: Least Squares
Date: 01/15/14 Time: 14:40
Sample: 1 12
Included observations: 12
Y=C(1)+C(2)*X

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	1376.965	408.0474	3.374523	0.0071
C(2)	11.74771	0.491241	23.91434	0.0000

R-squared	0.982815	Mean dependent var	10430.05
Adjusted R-squared	0.981096	S.D. dependent var	3837.021

S.E. of regression	527.5553	Akaike info criterion	15.52540
Sum squared resid	2783146.	Schwarz criterion	15.60621
Log likelihood	-91.15238	Durbin-Watson stat	0.436508

Macedonia

Dependent Variable: Y
Method: Least Squares
Date: 01/15/14 Time: 14:47
Sample: 1 12
Included observations: 12
Y=C(1)+C(2)*X

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-1476.947	332.6863	-4.439459	0.0013
C(2)	19.13914	1.318370	14.51727	0.0000

R-squared	0.954700	Mean dependent var	3215.173
Adjusted R-squared	0.950170	S.D. dependent var	1223.475
S.E. of regression	273.1115	Akaike info criterion	14.20865
Sum squared resid	745898.9	Schwarz criterion	14.28947
Log likelihood	-83.25189	Durbin-Watson stat	0.692166

Montenegro

Dependent Variable: Y
Method: Least Squares
Date: 01/15/14 Time: 14:54
Sample: 1 12
Included observations: 12
Y=C(1)+C(2)*X

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	250.1458	233.3168	1.072130	0.3089
C(2)	11.12278	0.551981	20.15064	0.0000

R-squared	0.975964	Mean dependent var	4470.322
Adjusted R-squared	0.973561	S.D. dependent var	2190.841
S.E. of regression	356.2340	Akaike info criterion	14.74006
Sum squared resid	1269027.	Schwarz criterion	14.82088
Log likelihood	-86.44039	Durbin-Watson stat	1.374570

Serbia

Dependent Variable: Y
Method: Least Squares
Date: 01/15/14 Time: 13:41
Sample: 1 12
Included observations: 12
Y=C(1)+C(2)*X

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	523.7757	96.85058	5.408080	0.0003
C(2)	8.770967	0.227282	38.59067	0.0000

R-squared	0.993330	Mean dependent var	3813.941
Adjusted R-squared	0.992663	S.D. dependent var	1858.165
S.E. of regression	159.1641	Akaike info criterion	13.12876
Sum squared resid	253332.0	Schwarz criterion	13.20958
Log likelihood	-76.77256	Durbin-Watson stat	1.025289

y- GDP per capita in current US $ (2000-2011)
x- Health expenditure per capita in current US $ (2000-2011)

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