IMPORTANCE OF INVESTMENTS IN SCIENCE AND TECHNOLOGY IN SERBIA AND SEE COUNTRIES[8]

Jovan Zubović[9], Marija Reljić[10], Bojana Novović[11], Marko Jeločnik[12]

Abstract

The importance of investments in research and development in recent years for sustainable growth and development of the economy is becoming widely recognized. Several authors have confirmed its importance in specific countries in the environment of rapid globalization. In this paper we are aiming to identify the correlation between investments in Science & Technology (S&T) and growth of GDP in South Eastern European (SEE) countries. In the analysis we cover the economies of Albania, Bosnia and Herzegovina, Bulgaria, Montenegro, Croatia, Greece, Macedonia FYR, Moldova, Romania, Serbia and Turkey and compare the results with EU countries. Regarding the research methodology we estimate the investments in S&T over indicators the number of researchers per million people and tertiary enrolment rate, while the economic growth is measured by change in the real GDP per capita. The results show that improved indicators have significant impact on growth of real GDP in SEE countries.

Key words:
Investments, Science, R&D, Correlation

JEL: O38, O47, E22

Introduction

Scientific activity is considered as the creative activity of scientific discovery, application and use of the results of science, training

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9 Jovan Zubović, Ph.D., Research Associate, Economics Institute, Kralja Milana 16, Belgrade, Serbia, Phone: +381 66 357 000, E-mail: jovan.zubovic@ecinst.org.rs

10 Marija Reljić, M.Sc., Research Assistant, Economics Institute, Belgrade, Serbia.

11 Bojana Novović, B.Sc., Junior Researcher, Economics Institute, Belgrade, Serbia.

12 Marko Jeločnik, M.Sc., Research Assistant, Institute of Agricultural Economics, Volgina 15, Belgrade, Serbia, E-mail: marko_j@iep.bg.ac.rs

researchers for scientific research and training of researchers. The importance of science and technology is widely accepted. According to EC (2012), the European Commissioner for Research, Innovation and Science Máire Geoghegan-Quinn claims that "If Europe wants to continue to compete in the 21st century it needs to support research and innovation that will generate growth and jobs, now and in the future."

Petrovic (2013) states that science is an important factor in recovery of the industry and that a small country can also develop high technology. World experiences show those countries which have continuously invested in research and education more successful and resilient to the crisis.

According to data published by the European statistical agency Eurostat (2013) EU seeks to total consumption of public and private sector research and development to grow up to 3% of GDP by 2020 year, compared to 2.03% recorded in the 2011. In comparison to that based on the data SVOS (2013) share in the state budget in 2013 in Serbia reached only 0.9%.

The growing influence of science in the process of competition in the domestic and foreign markets in the knowledge era will force all countries to increase investments in research. An increasing number of countries have introduced subsidies for S&T, which may increase innovative activities. For transitional countries investments in research and development is very important.

According to research conducted by UNESCO (2013), the expenditures on research and development in the period 2002-2010 in 114 countries shows that the SEE countries are ranked as follows: Montenegro 31st, Serbia 36th, Turkey 38th, Croatia 40th, Greece 50th, Bulgaria 52nd, Romania 57th, Macedonia 80th, Albania 92nd and finally Bosnia and Herzegovina 113th. This shows that there is a lot of place for improvement in SEE countries.

One of the most important resources of today certainly is a quality higher education and scientific research, both in the fields of high technology as well as in all areas of human activity. Therefore in this research we will focus on two indicators of S&T which include number of researchers per million inhabitants and gross tertiary enrolment rate.

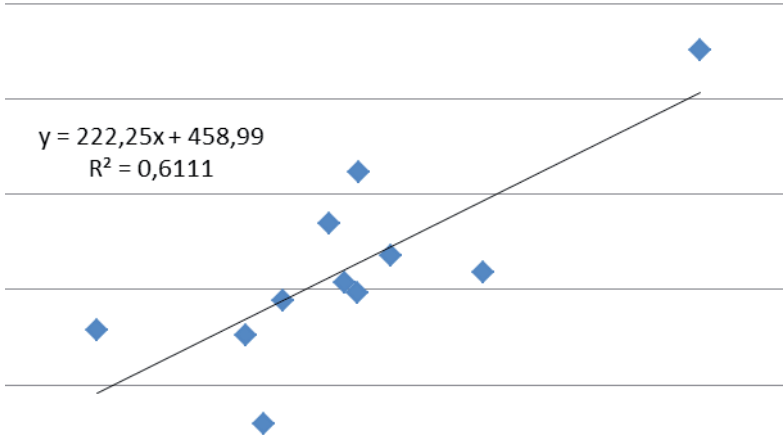
Results and Discussion

In the following section we will present the results of the research conducted on the secondary data available from UNDP (2013). We

will compare the results from the 11 CEE countries (Albania, Bosnia & Herzegovina, Bulgaria, Croatia, Greece, Macedonia, Moldova, Montenegro, Romania, Serbia, Turkey) and 24 EU countries (EU27 – minus Greece, Bulgaria, and Romania which belong to SEE).

In the Figures 1 and 2 there are shown the relationships between the gross tertiary enrolment ration and GDP measured by Purchasing Power Parity in 2011.

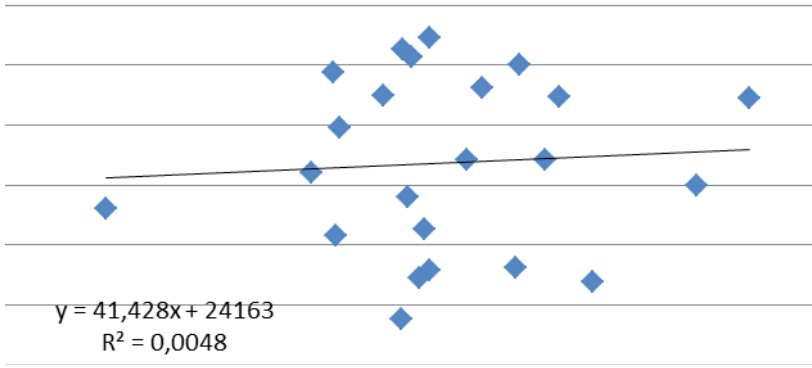
Figure 1 – Gross tertiary enrolment ratios vs. PPP per Capita in SEE Countries, in 2011



The linear regression in Figure 1 and 2 shows that the growth in gross tertiary enrolment ratio of 1% of GDP per capita increases by PPP by 222 US$ in SEE countries. There is a direct linear regression between these two parameters. The coefficient of determination is very high and it is 0.6111, which means that a 61% change in GDP per capita explained the RACI.

As compared to SEE countries, in EU member states, the effect of 1% increased enrolment is smaller and it accounts for a modest growth of PPP by 41 US$.

Figure 2 – Gross tertiary enrolment ratios vs. PPP per Capita in selected EU Countries, in 2011

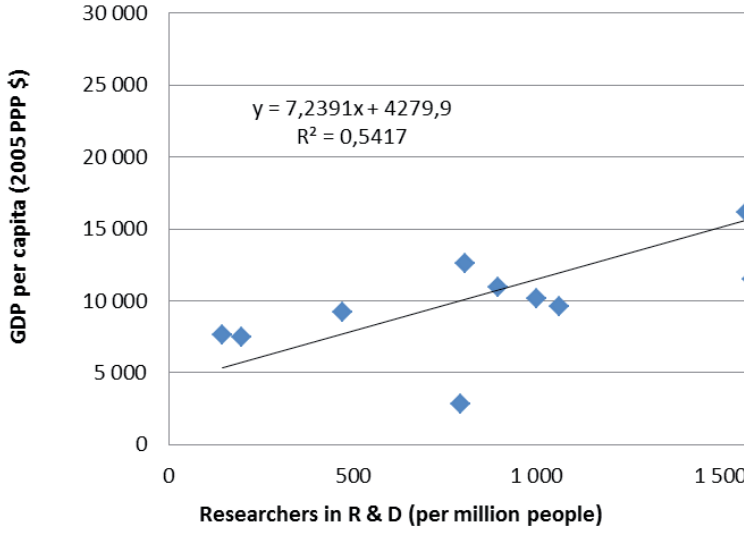


This difference in impact of enrolment ration can be explained by the fact that enrolment rates in SEE countries is in average 48% compared to 64% in other EU member states.

In figures 3 and 4 there are shown the relationships between the number of researchers employed in R&D sector per million inhabitants and GDP measured by Purchasing Power Parity in 2011.

The linear regression shows that there exists direct relationship between GDP per capita and the number of researchers. An increase in number of researchers by one in SEE countries has the effect on the growth PPP by 7 US$. The coefficient of determination is 0.5417, which means that 50% change in GDP per capita is explained by this indicator. As expected, the increase of number of researchers in EU countries has much smaller effects on PPP with an expected growth of around 3 US$.

Figure 3 – Number of Researchers (per million people) vs. PPP per Capita in SEE Countries, in 2011

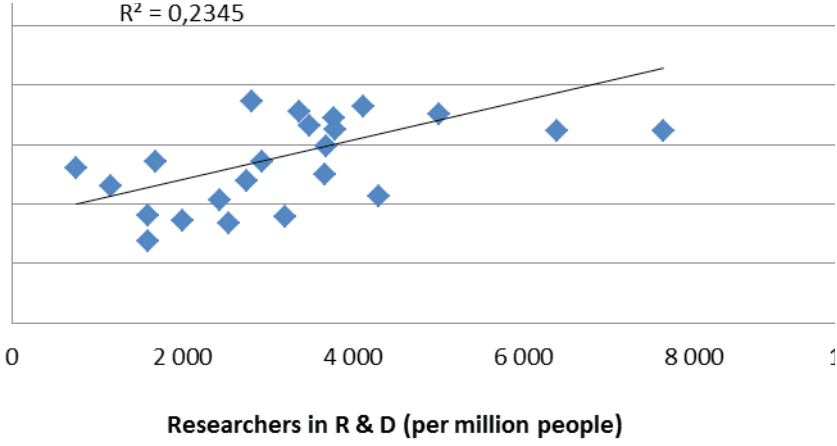


Conclusions

Hodzic (2011) notes that the nature of science and technology is such that at a time when the cost of S&T occurs is impossible to measure future economic benefits. Then one can only assume that the long-term economic benefits are just the result of research and development costs.

However, by the results presented in this paper, we may conclude that SEE countries should use its research and development capabilities in order to achieve a competitive position in the global market based on knowledge and innovation. The effectiveness of increase in tertiary education enrolment rates is higher in SEE countries than in EU member states. This means that any investment in improvement of enrolment rates is more likely to bring positive results shown in PPP growth.

Figure 4 – Number of Researchers (per million people) vs. PPP per Capita in Selected EU Countries, in 2011



SEE countries should through fiscal policies in a form of tax breaks, subsidies, grants program promote investments in S&T. This would contribute to economic growth, job creation and international competitiveness of developing countries. It can therefore be concluded that improved investments in S&T are critical for future growth.

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THE ROLE AND IMPORTANCE OF FORAGE CROPS PRODUCTION IN SUSTAINABLE DEVELOPMENT OF THE LOWER DANUBE REGION[13]

Marijana Jovanović, Slavica Arsić, Bojana Bekić[14]

Abstract

This paper will show natural resources for the production of important forage crops in the municipalities of the Lower Danube. Importance of forage crops production on individual farms reduces the cost of manufacturing high quality forage, reduce the losses and

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14 M.A. Marijana Jovanović, research trainee, M.A. Bojana Bekić, research assistant, M.A. Slavica Arsić, research assistant, Intitute of Agricultural Economics, Volgina 15 Street, 11060 Belgrade, Serbia. Corresponding author: Marijana Jovanović, marijana_j@iep.bg.ac.rs