Panel Analysis in Function of Measuring the Impact of Higher Education on International Competitiveness of the Western Balkan Countries

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Abstract: An important aspect of the development and perspectives of the development of the socio-economic community refers to the level of coverage of the labor market with adequate staff in terms of expertise and competencies, which largely derive from the results of the educational process. Expressing and measuring the results of the educational process is a continuous and complex process, and requires the application of adequate methodology, such as a panel analysis model. The aim of the researchers is to examine the impact of higher education on appropriate macroeconomic indicators countries of the Western Balkans, which are not yet members of the European Union. The practice of such research has been formalized in Western European countries, where researchers have adequate access to the empirical material on which research is based, but also a standardized procedure for presenting appropriate indicators, which is not the case in the selected geographical area. The context of the educational process since the period of introduction and adoption of the determinants defined by the Bologna Declaration, is going through a turbulent process of transformation. The next turning point in the education system is justified by the pandemic caused by the COVID - 19 virus.

Keywords: econometric model, economic growth, international competitiveness, panel analysis, crisis management

Introduction

Educational activities shape the individual development of each inhabitant. The level of state development is directly related to the educational structure. The level of education represents personal, but also general intangible capital, and it is important to pay significant attention to it on a personal and general level.

It is a common that the level of education correlates with social status, employment opportunities and the acquisition of material goods. The benefits of education do not remain on a personal level, but are reflected in the wider community. Education requires material investments by the individual, and by the social community, or the state as well. The amount of investment in the educational process determines its quality, and the future rate of return through the achieved result in the educational process.

Higher education throughout history has been considered the privilege of selected individuals. Over time, the aim has been to expand the circle of educated people through measures that facilitate access to the higher education system. Measures that have significantly facilitated access to the higher education system are investments in that system. Investments in the education system have different forms and amounts, and whose effects are not explicit in terms of contribution to the social system.

The research is based on a panel analysis whose task is to provide information on the impact of the higher education system on the international com-

petitiveness of the countries covered by the research.

The analysis refers to the Western Balkan countries, such as Albania, Bosnia and Herzegovina, Montenegro, Kosovo, North Macedonia and Serbia, and it covers the period from 2007 to 2020.

LITERATURE OVERVIEW

Human capital is the basic driving force for every socio-economic system, with education being considered an important element. The educational process is realized in a formal and informal way. It is conditioned by technological development and it is justified to consider it as a continuous need of each individual.

The pandemic caused by the COVID - 19 virus, which in a short period of time introduces changes in the functioning of all segments of business and social activities in the socio - economic community in general. [1]

Numerous research projects have treated the problems of conditionality of the educational process results, and their impact on macroeconomic indicators, such as GDP and GDP per capita. Research has proven the fact that the positive effect of higher education correlates with the degree of technological development. [2].

Eurostat points to the fact that government spending in the higher education segment in the period from 1995 to 2019 was decreasing; it was stagnant in the pre-pandemic period, while in the same period investment in primary and secondary education was above the higher education investment. [3]

The impact of income inequality[1] on GDP per capita has been proven by the construction of panel models by Brueckner and Lederman. The authors proved the conditionality of the contribution to the level of development of the country. [4]. It is important to note that researchers have proven that the inequality coefficient makes a significant contribution to transitional growth, while in the long term it has a negative impact on GDP per capita.

It has been proven that the highest degree of inequality is present in underdeveloped and developing countries, and that the impact of innovation on

income inequality is dominant in relation to other factors. [5].

Research confirms that there is a positive relationship between wealth inequality and real GDP growth per capita, but this relationship is not robust to different model specifications. [6]

The impact of income inequality on the development of intellectual capital, and on long-term economic growth, is negative, and is reflected in the investment decline in the education and health systems. [7]

The educational process and business orientation institutions in the field of higher education often focus on formal processes, and unduly neglect the importance and potency of non-formal educational patterns. [8]

The fact that the number of higher education consumers is decreasing, both in our country and in the countries of the European Union and America, has been confirmed. [9] Research showed that, comparing to the previous year, the number of students dropped between 3 and 9% in the academic year 2018/2019.; in Bosnia and Herzegovina in the period from 2017/18. until 2021/22 a significant decline has been registred year by year, decreasing by 31, 11, 7.8 and 32.5% in the observed comparing to the previous year. [10]

The importance of non-formal education in ensuring employee's satisfaction in the workplace is a characteristic that is qualified among the four non-economic factors that ensure raising the level of business efficiency. [11]

ANALYTICAL FRAMEWORK OF RESEARCH

Analytical approach requires prior insight and valid knowledge of the economic prosperity of the countries covered by the survey, and this should be observed in the context of economic growth indicators of the countries surveyed, but also by comparing their growth in relation to other countries, which is done here in relation to countries that were part of the former socialist bloc and are now members of the European Union (CEE), European Union countries (EU27) and the World Bank (WB). In the period from 2019 to 2023, following the current growth trend, in the conducted estimating model, Kosovo, Serbia and Montenegro have growth that is higher compared to other observed territorial units. (Figure 1)

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[1] Inequality is most often measured by the GINI coefficient and refers to income inequality

Growth rates, 2019-22f, percent

CEE: Bulgaria, Croatia, Czech R., Hungary, Poland, and Romania. Source: World Bank (Global Economic Prospects January 2021), WEO October 2020, national statistical offices, World Bank estimates.
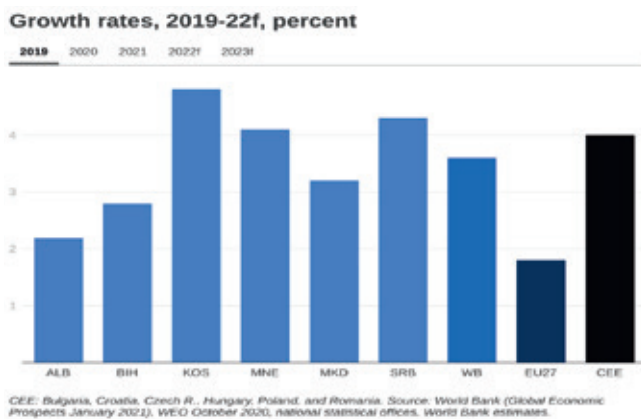
Figure 1. [12]

Considering that economic growth is a complex category, conditioned by many indicators, special attention will be paid to the category of gross domestic product growth per capita conditioned by a selected spectrum of macroeconomic indicators, which include the dimension of investment in education as one of the factors in the selected territory and time period.

Educational Structure and Employment in the Western Balkan Countries

The development of the modern state and its key aspects are related to unemployment, educational needs and the ability of the educational system to respond to them in an adequate way. Considering the fact that there is a correlation between unemployment and the level of education, the European Commission identified a key problem related to the transition of young people from the educational process to a specific work environment [13]. It was noticed that the support for the young population when entering and staying on the labor market positively correlated with economic growth and living conditions.

The sensitivity to business cycles is higher among young population compared to the older working population, and an additional challenge relates to the lack of work experience among young people, which significantly complicates their employment. In the period from 2008 to 2013, youth unemployment increased, and after reaching its peak 2013, it began to fall until the corona virus crisis. The unemployment rate was 16.9% in the European Union, 17.2% in the Eurozone, and 35% in the Western Balkans [14].

In the Europe and the Western Balkans labor market, there is a phenomenon of "overeducation" which refers to the fact that there is a mismatch between the needs of the labor market and workers's education, where knowledge and skills are above the demands and real needs of the labor market, which leads to a decline in the cost of labor of workers who accept jobs below their abilities, but also a low level of job satisfaction. The phenomenon of "brain drain" means the migration of highly skilled and educated young people from poor, developing and less industrialized countries to richer, more developed ones that provide them with better working and / or living conditions than those they can achieve in their home country.

Problems can be overcome by changing the approach to the youth labor market without or with limited work experience, by enabling young people to gain work experience within the profession for which they are educated, and thus increase personal competitiveness in the labor market.

THEORETICAL MODEL FROM EMPIRICAL OBSERVATION

The intention and task of the specific research project were to clarify the conditionality of investments in the higher education system on the economic development of the Western Balkan countries that were not (yet) members of the European Union. The time frame of the research was from 2008 to 2020, and the empirical material was taken from the database on the World Bank's website. (World_Bank, Global-economic-prospects, 2021)

Dynamic Approach to Empirical Analysis of Concrete Indicators

Empirical analysis and measuring the impact of investment in higher education on the selected indicator of economic development with respect to the teritory and time component is possible and efficient by using the methodology of panel (data) analysis. Panel analysis is a complex and relevant econometric technique, the results of which clarify a number of complex research issues. The quality of the panel data results is conditioned by the adequacy of the empirical material used for their generation.

Panel data models allow the dependent variable to be expressed as a function of a number of independent variables, taking into account the influence of the teritory and time component. Depending on whether the value of a variable depends on its value in previous periods or not, panel data models can be static and dynamic. For a large number of real economic processes, such as the analyzed problem, it is optimal to apply a dynamic panel data model whose general form can be written by the relation:

$$y_{ij(+gdppc)} = a + y_{i,j-1(+gdppc)} + b_1 x_{ij(+bi)} + b_2 x_{ij(GINIko)} + b_3 x_{ij(izvo)} + b_4 x_{ij(uvos)} + m_i + \varepsilon_i$$

The meaning of the variables in the model can be illustrated by the following table.

Table 1. [15]

Variable	Variable type	Model mark
Annual growth of gross domestic product per capita expressed as a percentage for the i-th country in the j-th time period	Dependent	Y_{ij}
Annual growth of gross domestic product expressed as a percentage for the i - th country in the previous year in relation to the year preceding the observed	Independent	$Y_{i,j-1}$
Annual growth of gross investment expressed as a percentage for the i - th country in the j - th time period	Independent	$X_{ij(+BI)}$
The value of the inequality indicator, or the GINI coefficient, which expresses the inequality expressed in the form of percentage annual growth in relation to per capita income for the i-th country in the j-th time period	Independent	$X_{ij(+GINIko)}$
Share of allocations for higher education in total allocations for education for the i-th country in the j-th time period	Independent	$X_{ij(IZVO)}$
Percentage share of highly educated population in working age population for i - th country in j - th time period	Independent	$X_{ij(UVOS)}$

a, b_1, b_2, b_3, b_4 - the model parameters whose value we determine using the appropriate panel data model;
m_i, ε_{it} - constant and residual of the model, where:
$i = 1, 2, ..., n$;
$j = 1, 2, ..., m$;
n - indicates the number of spatial units;
m - indicates the number of time units;

RESEARCH RESULTS AND DISCUSSION

The panel model adequacy for expressing the results is conditioned by the multicollinearity in the model, which is checked by determining the intercorrelation between pairs of independent variables in the model.

Table 2. [15]

Variable	Y_{ij}	$Y_{i,j-1}$	$X_{ij(+BI)}$	$X_{ij(+GINIko)}$	$X_{ij(IZVO)}$	$X_{ij(UVOS)}$
Y_{ij}	1	0,260*	0,142	0,151	-0,104	0,211
$Y_{i,j-1}$		1	0,402**	0,172	-0,122	-0,278*
$X_{ij(+BI)}$			1	0,126	-0,350	0,304*
$X_{ij(+GINIko)}$				1	-0,140	-0,095
$X_{ij(IZVO)}$					1	-0,196
$X_{ij(UVOS)}$						1

Correlation is significant at the 0.05 level (2-tailed).*
Correlation is significant at the 0.01 level (2-tailed).**

The results in the previous table indicate that there are no pairs of variables whose correlation exceeds 0.5, so they can be considered suitable for panel analysis.

Table 3. [15]

Variable	Value
Constant	5,4836 ± 1,4347
$Y_{i,j-1}$	0
$X_{ij(+BI)}$	- 0,1052 ± 0,0655
$X_{ij(+GINIko)}$	0,6888 ± 0,2848
$X_{ij(IZVO)}$	-0,1618 ± 0,0823
$X_{ij(UVOS)}$	-0,0514 ± 0,0333
Residual	3,5394
F – test	0
Selected model	Model with fixed predictor
Observations	72

Three panel models were constructed for research purposes, as follows:
- Model without predictor;
- Model with fixed predictor and
- Model with variable predictor.

Considering the collected empirical material, adequate theoretical assumptions and checking the suitability of the model, we have a panel model suitable for quantitative presentation of regular average ratio which shows the average annual change in GDP per capita in the i-th country for the j-th year depending on the average change of other indicators covered by the model, and previously described in detail, we illustrate the following table.

itable for

$$y_{ij(+gdppc)} = (5,4836 \pm 1,4347) + 0 \cdot y_{i,j-1} - (0,1052 \pm 0,0655)x_{ij(+bi)} + (0,6888 \pm 0,2848)x_{ij(GNIko)} - (0,1618 \pm 0,0823)x_{ij(izvo)} - (0,0514 \pm 0,0333)x_{ij(uvos)} \pm 3,5394$$

There is a part of the variability in GDP growth per capita that cannot be explained by the country covered by the survey and that percentage averages 5.48% with an average deviation of 1.43%, as well as an increase in the inequality coefficient, where increasing the inequality coefficient by 1%, increases GDP per capita by 0.69% with an average deviation of 0.28%.

Average growth of gross investment reduces GDP per capita growth by 0.11% with an average deviation of 0.07%, and allocations for higher education as well, which, with an increase of 1% lead to an average decline in GDP per capita by 0.16% with an average deviation of 0.08%.

The modeling results show that GDP growth per capita in the previous period did not have a statistically significant impact on the same indicator in the observed time period.

The variation in the change in GDP per capita in the observed countries for the observed period not covered by the model is 3.54%, whereby additional research justifies subsequent determination of the origin and causes of this variability or confirms that there are no indicators that can not cover the model.

Empirical data that are the basis for generating this information indicate the facts that need to be taken into account in the process of planning economic policy and economic development, and can be expressed in the form of the following conclusions:
   - Regardless of the level of GDP per capita in a certain period, its value in the following period can be composed in the desired direction based on the value and impact of other indicators;
   - The growth of gross investment does not allow the growth of GDP or GDP per capita in the initial phase, because the effects of investment are prolonged to periods that involve the investment exploitation;
   - Allocations for higher education affect the creation of GDP and GDP per capita in the same way as the previous indicator, because current investments show effects only in the coming period;
   - The indicator that the share of highly educated population affects the reduction of GDP per capita

indicates the impossibility of adequate exploitation of intellectual capital in the covered territory.

CONCLUDING REMARKS

Research on the processes that affect the competitiveness and international economic position of a particular territorial unit is a complex and dynamic process, which must be continuously reviewed and analyzed in order to cover the highest possible variation in GDP per capita. The research shows that the impact of GDP per capita from the previous period has no statistically significant impact on GDP per capita in the observed period when it comes to the Western Balkans that are not yet members of the European Union, and the inequality coefficient is the only that has a positive impact on it, while the increase in gross investment, allocations for higher education and the share of the population with higher education in the total working age population has a negative impact on the increase in GDP per capita. The research and analysis results prove that the period of establishing investments, as well as investments in higher education do not give results in the period in which they are realized. The benefits of investing in higher education are possible only after the person who acquires marketable knowledge and competencies is involved in the work process that corresponds to the specific educational profile. In addition, the research and analysis results prove that the share of the population with higher education in the working age population has a negative impact on the value of GDP per capita. This fact can be objectively related to the structure of the business environment, which does not provide an opportunity for adequate engagement of highly educated workforce. Concrete measure proposals that would need to be implemented in the analyzed countries would be the development of business environment in terms of creating the need to engage a highly educated workforce.

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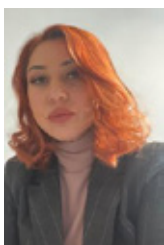
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