

Causes of the “brain drain” Problem in Selected Western Balkan Countries

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Abstract: - This paper deals with the identification of the factors that influence the emigration of young and highly educated people from Western Balkan countries. Indicators of the quality of economic, political, and educational systems in Western Balkan countries and target countries were used for this purpose. A comparison of Western Balkan countries with EU countries was provided via a cluster analysis. Cross-sectional and panel data regression point to important indicators affecting emigration. An important finding was that for highly educated people not only economic indicators but also political environment and educational system quality are significant factors, which influence emigration.

Key-Words: - Brain drain, Cluster Analysis, Emigration, Regression Analysis, Western Balkans.

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1 Introduction

The Western Balkans (WB) are characterised by a long history of emigration. Political instability followed by considerable poverty and unemployment rate are one of the reasons for the high interest in moving abroad. The transition from a centralised to an open economy as well as wartime events caused a wave of emigration from this area in the 1990s, [1]. According to, [2], although the countries of south-eastern Europe are characterised by abundant emigration dating back several decades, the change that took place at the end of the last century is that the emigration of unskilled workers has mostly turned into emigration of highly skilled workers.

As a consequence of political instability and an economically underdeveloped society, education in WB countries was also unable to progress to the level of the education systems of European countries. The Bologna reforms and other education reforms, which began in WB countries in the 2000s, depending on the state, mostly only affected legislative changes, while the implementation of these reforms in practice was very inefficient (it remained almost unchanged), [3]. Consequently, ambitious students, who aim to raise their knowledge and skills to a higher level, seek “refuge” in more developed countries to have opportunities for better education systems, training, research, etc. These differences in education

systems called the schooling gap, depend on many factors. The main ones are summarised in, [4], as the level of development, religious fractionalization, geographical distance, and the number of people that have already emigrated and may be considered as a strong pull factor.

In order for a country to economically develop, it requires an educated and highly qualified population. However, due to an inefficient labour market, poor political system, expensive education, etc., fewer young and educated people are interested in participating in the economic development of their country of origin and an increasing number of young people meet their needs for a functional system in other, more developed countries. The paper, [2], states that the emigration of a highly educated population is a serious threat to democracy and elections due to the lack of educated residents in the country. He also describes the brain drain as a consequence of the absence of basic human rights, such as the right to work or the right to an education.

Moreover, there is a two-way causal link between the lag in economic growth and emigration. Due to poor living conditions (poverty, political instability, low wages, etc.), people tend to leave a country, which has a negative effect on development, [5]. Ignoring this problem would only lead to a vicious circle of these two matters. The

work, [6], shows that for WB countries in particular, the main source of GDP growth is external debt increase.

According to, [1], modern theories of endogenous growth, besides human capital, also consider the effect of migration on development. Therefore, emigration of the highly educated population may be detrimental to development by slowing it down. Overproduction of professional manpower is therefore used for the development of already developed countries and thereby slows down the development of underdeveloped countries, [7]. The less developed a country is, the more it is affected by the brain drain.

When asked whether brain drain increases, in, [8], we can read that although skilled migration in absolute terms increases, it grows relatively at the same rate in regard to overall education levels. In, [5], emigration growth to population growth are compared and the conclusion is given that the emigration rate has not increased drastically in the past few decades when population growth is taken into account. However, if only high-skilled migration is considered, it has grown at a much faster pace and may be considered one of the major aspects of globalisation.

In, [1], the authors found high unemployment as a strong push factor and a high number of migrants abroad as a strong pull factor. Both indicators positively affect migration. According to, [8], less populated, religiously fractalised, and politically unstable countries with a low level of human capital have a higher proportion of brain drain (the positive relationship between emigration and political instability and religious fractionalisation was also presented in, [4], while government effectiveness has not proven to be a significant variable). At a micro level, factors that affect emigration are career concerns and lifestyle and family reasons in addition to higher income, [8]. Authors of, [9], came to the conclusion that high wages in developed countries attract migrants from less developed areas. The smaller the wage gap, the lower the motivation to emigrate. Another interesting fact determined in, [4], is that the brain drain is higher in those countries with a lower proportion of natives in the educated population, which is why certain poor regions of Africa and Asia are characterised by high levels of brain drain.

Geographical distance has a negative impact on emigration (although it should be noted that skilled migrants are less sensitive to distance), while former colonies, as well as bilingual states, are more open to migration, [4]. Moreover, [10], came to the conclusion that “Cultural similarities, colonial

legacies, and physical distance are often more important determinants of educational selectivity than wage incentives or selective immigration policy”. Yet, the countries most affected by brain drain are small island states, e.g., [4], [8].

Contrary to the brain drain stands a phenomenon we call brain gain. One idea of how the brain gain effect may be achieved is that not all people who increase their human capital in order to migrate will actually leave their country, [8]. The final effect of this is an increase in the human capital in the home country. This effect would be even stronger if political barriers restricted migration, which is not a common practice nowadays. In, [11], states that remittances, the creation of diasporas, and return migration are appropriate compensation for skilled emigration. Authors of, [12], determine remittances as a significant factor positively affecting the GDP growth rate in WB countries. In, [8], concluded that remittances are large enough to cover the fiscal costs of skilled emigrants. High-skilled migrants that return to their home country are bringing with them newly learned skills and experience (human capital) in addition to the money acquired abroad, [1]. In, [8], takes India as an example of a country that in the past decade experienced the benefits of brain gain through investments and expertise from the Indian diaspora. Brain gain as opposed to brain drain is reported by, [13], in the case of Nepalese students. On the other hand, [7], states that emigrants returning home have already completed their most productive years and are therefore not eligible to participate in development.

The main reason for emigration in almost all WB countries is the high level of unemployment, which is the highest among young residents. It usually takes them several years to find a job, even though the job here is not considered to be the job they were educated for but any job. When it comes to the inability of young people to find employment in their profession, another problem, called brain waste, appears given that this educated population mostly ends up doing jobs that do not require their level of knowledge and qualifications. Unemployment among people aged 15 to 24 reaches 30% in most WB countries and in some countries, it even exceeds this percentage (North Macedonia, Bosnia and Herzegovina (BiH)). In Montenegro, three-quarters of the young population said they feared unemployment and a majority stated that employment is generally not found thanks to qualifications and knowledge but mostly thanks to links to people in power, political party membership, or personal relations, [14].

According to, [15], in Serbia, there is a widespread belief that human rights are not respected. Furthermore, there is party employment, an autocratic political system, and discrimination in the labour market, especially in the case of women, people over the age of 55, persons with disabilities, and other vulnerable groups. Therefore, most people emigrating abroad do not plan their return, at least not before they retire.

Neither minimum nor average wages cover the costs of a respectable lifestyle. Average earnings as well as GDP per capita in the most popular destination countries are several times higher than in WB countries from which people decide to emigrate. These are all push factors that cause emigration.

According to, [16], the high rate of emigration from Vojvodina (the northern province of Serbia) to neighbouring Hungary is due to economic reasons, and especially high unemployment. Although this reduces the unemployment rate, it also has a major negative impact on human capital in the home country, as explained above. In general, destination countries for migration are not only Western European countries but also countries from central and parts of Eastern Europe, where various specifics emerge, see the case of Poland discussed in, [17].

Due to the emigration of young people who have just finished schooling, the state loses most of the money spent on their education. Depending on the level of education achieved, the state invests in the education of a young person for eight to over 20 years and when persons leave the state, this investment, which becomes an expense, turns into an investment in the state that receives these educated people without taking any costs for their education. Furthermore, the reduction in GDP may be seen as another undesirable effect because people who leave no longer contribute to the state budget, both by consuming and paying income taxes, [14]. The long-term effect of education level on GDP is empirically presented in, [18]. However, all WB countries benefit the most from remittances relative to their GDP (from around 6% in North Macedonia to around 14% in BiH), including foreign pensions and other personal and social transfers. Unfortunately, this benefit cannot be used for further development of the economy, given that in all the countries a negligible part of these funds goes to investments. Authors of, [19], studied the effectiveness of migration policy in the context of sustainable development in EU and non-EU countries.

BiH experienced a large wave of emigration during the war period from 1992 to 1995, although

the number of emigrants is still growing. In, [20], made several recommendations for exploiting the potential of the Bosnian diaspora to support brain gain. Firstly, it would be desirable to alleviate legislative barriers for those considering returning to the country so that they are able to enter the labour market unhindered. The diaspora should further be included in all state decision-making bodies concerning them, whose initiatives should be supported by the government. Finally, the authorities should take the necessary steps to attract the diaspora.

As, [1], states, and as may be found in most papers on a similar topic, the lack of data is a serious problem in researching these phenomena in WB countries. This fact may be considered surprising given that these countries have a long history of emigration and do not have enough data on this topic as well as enough research, [21].

On the basis of the conducted literature review, it can be concluded that the brain drain problem is currently being researched and is considered a serious problem in countries where there is an outflow of young and educated people. However, the research is conducted separately for each country and economic sector, focusing only on specific factors. In particular, there is a noticeable lack of comprehensive results for the region of WB countries, which are needed, among other reasons, for the correct formulation of policies for the WB countries as candidates for EU membership.

The aim of this paper is to identify factors that affect the emigration of young people from certain countries of the WB. We will consider persons of the age from 15 to 24, for which the indicator "Not in Education, Employment, or Training" is provided. We will pay most attention to indicators of the political and economic position of these countries. Furthermore, using the appropriate analyses, we will examine the relationships between the proposed indicators, try to determine their influence on migration rates in these countries, and based on these indicators compare them to countries to which people mostly emigrate, and finally compare the WB countries with each other.

The paper is organised as follows: Section 2 introduces the indicators used as potential regressors of emigration and the statistical methods used in the paper. Section 3 provides a comparison of the WB countries with the EU via selected indicators and the results of the selected methods. Finally, Section 4 contains a discussion related to the results achieved by other methods for different countries, and Section 5 provides a conclusion.

2 Material and Methods

The term “Western Balkans” generally refers to Albania and the former Yugoslavia countries excluding Slovenia. These countries are mostly surrounded by EU Member States and are in the initiated process of joining the EU, i.e., Albania, BiH, Croatia, Kosovo, North Macedonia, Montenegro, and Serbia. Since 2013, when Croatia became a Member State, we could exclude it from the WB, but considering the historical background of this country, it is often still included in this group. Although many studies research Kosovo as a separate country, there is a lack of the data we need, so Kosovo will not be included in the further analysis. Given that the most recent reliable migration data are from 2015, we will take other indicators for this year as well.

To gain an insight into the economic position of the WB countries in relation to the EU, several economic indicators will be used. Gross Domestic Product (GDP) per capita, measured in Purchasing Power Standards (PPS), was taken from the European Commission’s database – Eurostat. GDP is one of the primary indicators of a country’s economic activity and is therefore an important representative of the economic development gaps between the examined countries. Expressing GDP in PPS eliminates differences in price levels between countries. The wage level is considered to be one of the major motivations for migration. Two indicators of wage level, statutory nominal gross monthly minimum wage and mean nominal monthly earnings of employees (both converted to U.S. dollars as the common currency in order to make it easier to compare countries), were taken from the International Labour Organization’s database (ILOSTAT). Another group of economic indicators, measuring the underutilisation of the labour supply, which is considered to be a strong push factor when reaching high values, includes total unemployment, the unemployment rate of a highly educated population, and the share of youth not in employed, education, or training (NEET). The unemployment rate of the highly educated population and the share of youth NEET is of particular importance when taking into account the emigration of the young and highly educated population. The values of the unemployment rate and share of youth NEET were also taken from the ILOSTAT database, while the values of the unemployment rate of the highly educated population were taken from the Vienna Institute for International Economic Studies (wiiw) databases concentrating data on central, eastern, and south-eastern Europe.

To include the level of political stability in the possible causes of high emigration rates, two dimensions of the Worldwide Governance Indicators (WGI) were taken: political stability and absence of violence/terrorism, and government effectiveness. These indicators, created as a combination of the views of a large number of surveyed companies, citizens, and experts in over 200 countries and territories, were taken from the World Bank’s database. The measured value of these indicators is expressed on a scale from –2.5 to 2.5 for both.

As explained above, a poor education system may be a strong motive for highly ambitious students to emigrate, so it is necessary to consider some of the indicators of the quality of the education system. For this purpose, the results of PISA tests in reading, science, and mathematics were taken from the Organization for Economic Co-operation and Development (OECD).

In order to measure emigration, several different indicators will be presented. The emigration rate, taken from a database of the Institute for Employment Research (IAB), measures the number of emigrants per 1000 inhabitants of the pre-migration population (age 25+). Emigration rates by education level were taken from the same dataset, where the most attention should be paid to the emigration rate of the highly educated population. However, in order to prohibit emigration rates by the education level from being distorted, we will also take into account the structure of the population according to the level of education, taken from the Eurostat database. The net migration rate is another important migration indicator, which represents the net number of migrants (number of immigrants minus the number of emigrants) per 1000 inhabitants. This indicator, along with the estimates of migrant stock, which stands for the number of people born in a country other than that in which they live (including refugees), was taken from the United Nations database. Another source of data was the database of the Migration Data Portal. One indicator taken from this database is the share of international migrants between 15 and 24 years residing in the country/region at mid-year. This age group is common for the share of youth NEET and hence it is useful to include it in the analysis. The last indicator found, also taken from the same database, is so-called public opinion (data were taken for the year 2016), which stands for the percentage of adult respondents who reported plans to move permanently to another country in the next 12 months, will help us to gain insight on the attitude of citizens towards leaving the country.

Cluster analysis based on the selected indicators will be used with the main aim to find groups of countries that are characterised by similarity within themselves and diversity among countries from other groups (for details [22]). Dividing countries into different clusters will help us to evaluate the current position of the examined countries in relation to EU countries in all the selected areas. For the purposes of this analysis, the computational system MATLAB R2021a will be used. Another statistical method examined will be regression analysis, discussed in detail by, [23]; regression of the cross-sectional data coming from the year 2015 and regression of panel data from 1995 to 2020 with a five-year periodicity. Generally, the maximal model can be described as follows:

$$Y_{it} = \beta_0 + \beta_1 GDPpc_{it} + \beta_2 NE_{it} + \beta_3 GE_{it} + \beta_4 NEET_{it} + \beta_5 PISA_{it} + \beta_6 UN_{it} + \beta_7 UNHE_{it} + \beta_8 PS_{it} + a_i + u_{it},$$

where Y is gradually substituted by different migration characteristics, $GDPpc$ means GDP per capita, NE average nominal monthly earnings, GE government effectiveness, $NEET$ Share of youth NEET, $PISA$ means average PISA results, UN unemployment rate, $UNHE$ unemployment rate of highly educated people, PS political stability, a_i mean the individual effect of countries, and u remains for random error. In order to eliminate spurious regression, the stationarity of residuals is tested by the Im-Pesaran-Shin unit root test. The model was estimated in fixed effects (FE) and random effects (RE) forms and the Hausman test was employed to decide between them. Using this analysis, we will be able to examine the dependence of migration indicators on selected economic, political, and educational indicators. For the regression analysis, the Gretl 2021b program will be used.

3 Results

In order to gain a closer insight into the position of the WB countries in relation to the EU, we will first make a comparison of these countries in several selected indicators that will be further used in the analysis. Croatia is also included in the analysis as a peer country, as this country is an EU Member State but was also considered to be part of the WB until recently, and sometimes is classified as a WB country even today. Figure 1 shows the development of GDP per capita (in PPS) across WB countries in the period between 2010 and 2019.

Even though GDP per capita is growing in the long run in these countries, this growth is very slow, except in Montenegro, which experienced the highest growth in a given period, and values in most WB countries are more than two times lower than the EU average. For the entire period, the highest values were reached by Montenegro (50 in 2019) and the lowest by Albania (around 30 for the entire period). On the other hand, Croatia achieves significantly higher values than all WB countries, even in the period before joining the EU. However, Croatia's GDP per capita is still below the EU average with the highest value of 65 in 2019. Two indicators of wage level: statutory nominal gross monthly minimum wage and mean nominal monthly earnings of employees for 2015 are shown in Figure 2. As it is possible to see from the Figure 2, the wage gap between all WB countries and the EU average is significant. Albania reaches the lowest values, while Croatia is again the closest to the average of the EU.

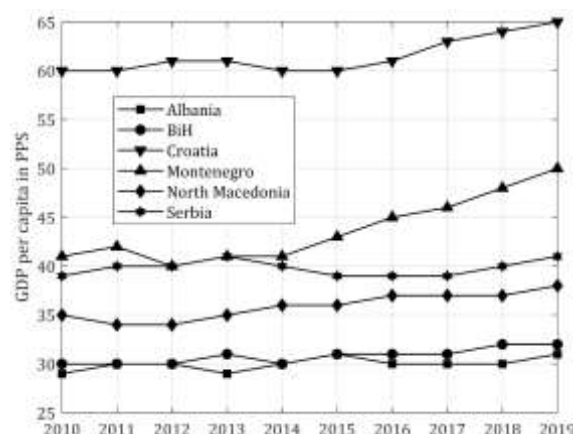


Fig. 1: Development of GDP per capita in WB countries

Source: Data processed from the Eurostat database

Comparisons of the total unemployment rate, the unemployment rate of the tertiary educated population, and the share of youth NEET in WB countries for 2015 are shown in Figure 3. Again, all the surveyed countries achieve far worse results than the EU in all the selected indicators. In 2015, the highest unemployment rate was in BiH (almost 30%), followed by North Macedonia. Croatia, Albania, Montenegro, and Serbia achieve very similar results in terms of the total unemployment rate (about 17%), so, in this case, Croatia is far closer to its neighbouring WB countries than to the EU average (10%).

Two components of the WGI (political stability and absence of violence/terrorism, and government effectiveness) for 2015 are presented in Figure 4. In

terms of these indicators, Croatia again achieves the best results of all the WB countries. The value of political stability in Croatia is very close to the EU average, while the value of government effectiveness is two times lower than the EU average. BiH achieves the worst results, with extremely negative values of both indicators.

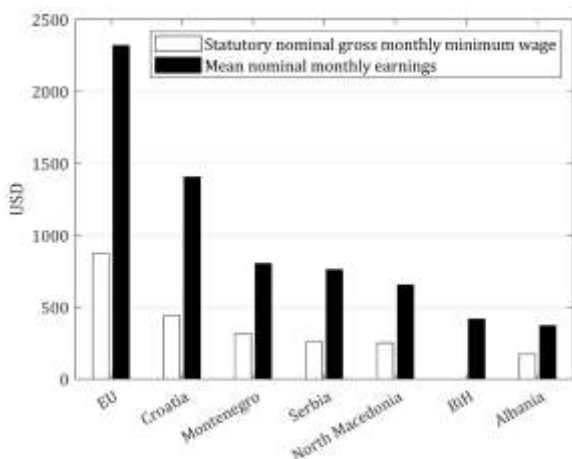


Fig. 2: Wage gap between WB countries and the EU average

Note: For Cyprus, data were taken for 2016; for Croatia, Denmark, Latvia, Malta, Netherlands, North Macedonia, Romania, and Serbia, data were taken for 2014.)

Source: Data processed from the ILOSTAT database

Selected indicators of the quality of the education system (the results of PISA tests in reading, mathematics, and science) in Table 1 show that all the WB countries (excluding Croatia) achieved results far below the EU average in all areas, while Croatia has results closest to the EU average, and even achieved a result of 1 point above the EU average in reading. The correlation coefficients of the PISA results in all EU countries are above 95%, so there is no need to include each of them in the analyses. Instead, we will use the average results of all three subjects.

Table 1. Results of PISA tests held in 2015

	PISA Results Reading	PISA Results Math	PISA results from Science
Albania	405	413	427
BiH	403	406	398
Croatia	487	464	475
Montenegro	427	418	411
North Macedonia	352	371	384
Serbia	439	448	440
EU average	486	488	488

Note: For BiH and Serbia, data were taken for 2018.

Source: Data processed from the OECD database

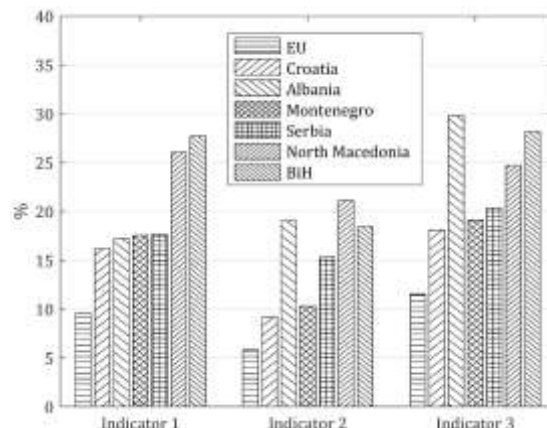


Fig. 3: Indicators of underutilisation of the labour supply

Note: Indicator 1 – Total unemployment rate; Indicator 2 – An unemployment rate of the tertiary educated population; Indicator 3 – Share of youth NEET Source: Data processed from wiiw DATABASES and ILOSTAT

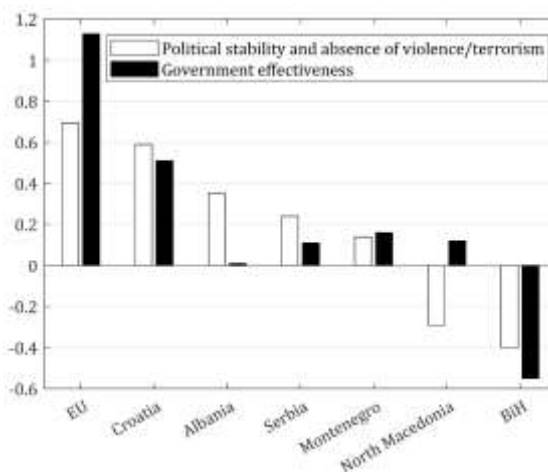


Fig. 4: Worldwide Governance Indicators

Source: Data processed from the World Bank database

We will further graphically present and describe some of the selected migration indicators. Figure 5 shows the population structure and emigration rates by education level in some WB countries for 2015. It should be first noted, that in all the WB countries the highest emigration rates are among the highly educated population. In BiH in 2015, more than 4% of the highly educated population were emigrants.

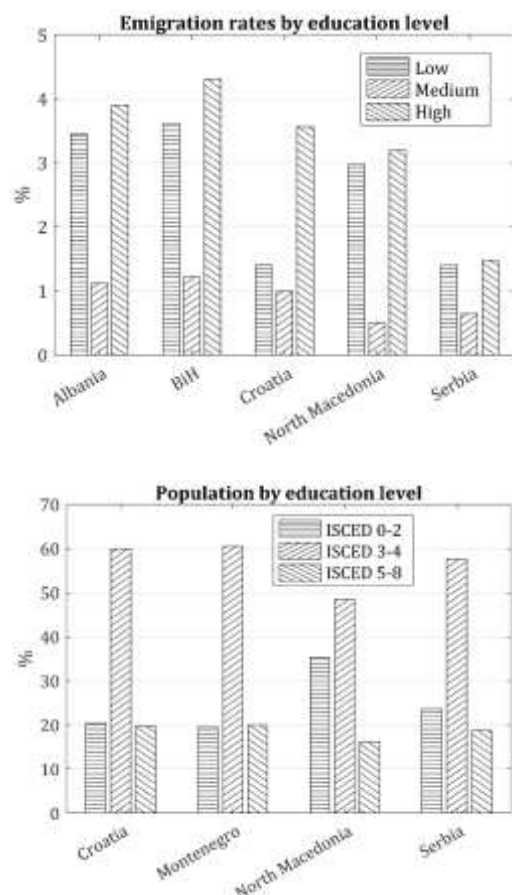


Fig. 5: Emigration rates and population structure by education level

Note: Albania and BiH were excluded from the right plot due to a lack of data. In the illustrated database, the values for Serbia and Montenegro are listed as one country in the left plot.

Source: Data processed from the IAB brain-drain database and Eurostat

These rates are slightly lower in Albania, Croatia, and North Macedonia, while Serbia and Montenegro reach more than two times lower values of this indicator (about 1.5%). The right plot shows the population structure by education level. If the division of the population by levels of education is taken into account, it is possible to state that the emigration rates of each of these groups are somewhat equal. However, this does not diminish the fact that the group of highly educated population is most vulnerable to emigration.

Figure 6 shows the development of the net migration rate and migrant stock in WB countries in the period between 1990 and 2020. Net migration has constantly changed over the given period, varying from country to country. The largest change in this indicator occurred in BiH and Albania in the 1990s. BiH experienced excessive emigration as a result of the largest military conflict of all in this area that lasted four years, while in Albania the biggest reason was the fall of communism.

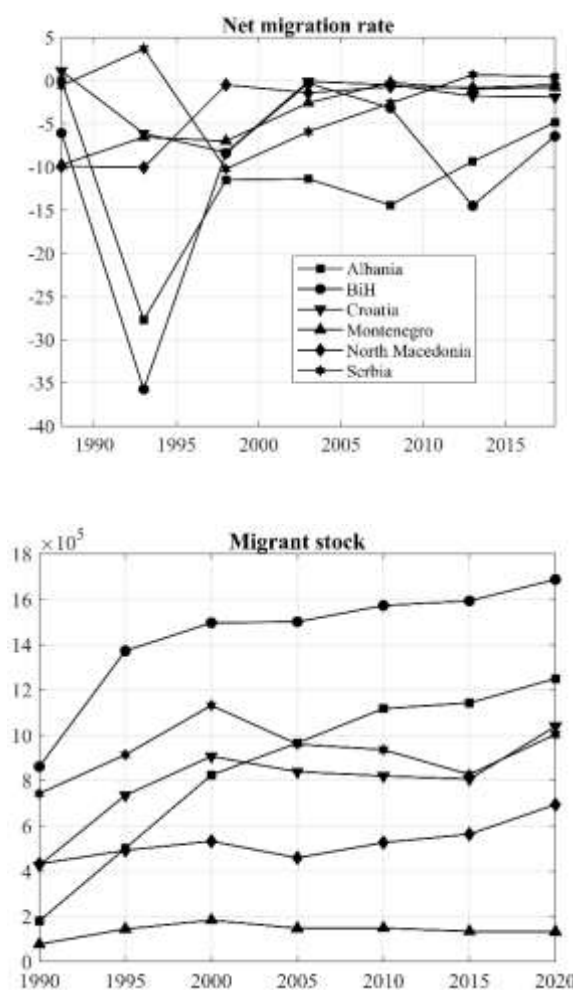


Fig. 6: Development of migration indicators in WB countries

Source: Data processed from the UN database

This growing emigration trend is also pronounced in the right plot, which shows a significant increase in migrant stock in these two countries. In Bosnia, the trend subsided in 1995, when the war ended, while in Albania the migrant stock continued to grow at a slower pace until 2010. In all countries, the migrant stock grew between 1990 and 2000. The reasons for this phenomenon are numerous, but the main one is considered to be the breakup of Yugoslavia and its consequences –

numerous wars fought in this region in the 1990s, hyperinflation, conflicts in Kosovo followed by the bombing of the Federal Republic of Yugoslavia (FRY) in 1999. Since 2000, there has been a significant decline in the migrant stock in Serbia, due to both the end of the wars and the significant changes following the overthrow of Slobodan Milosevic and the socialist regime and the beginning of the rule of democracy. It is also worth noting that despite a comparable population with other countries (except Serbia, which is the most populous of all the countries surveyed), BiH reached the highest migrant stock of all.

The first statistical analysis conducted is hierarchical cluster analysis. EU Member States together with WB countries were included. A standardised Euclidean distance was used due to the difference in the units of measurement, together with the Ward criterion. The clusters were formed as shown in Figure 7.

According to the results of the non-hierarchical cluster analysis using a k-means algorithm, the optimal number of clusters seems to be four or six. The setting of six clusters would lead to the formation of two extra clusters than we obtained, of which one cluster would include only one country; therefore, we will maintain the optimal number of four clusters. Based on the selected indicators, all

the WB countries (except Croatia) were classified in the same cluster, together with their neighbouring countries (Romania, Bulgaria, and Greece). All the other clusters were formed by EU countries only. The results obtained through cluster analysis allow us to describe the position of the WB countries in the EU context, both by directly characterizing the individual clusters and by calculating selected migration indicators for the obtained clusters. Table 2 shows the average values of the indicators of the economic, political, and educational systems. As expected, the cluster formed by the WB countries achieved the worst results in all the selected indicators. In contrast, cluster 2, which consists of the most developed European countries (Scandinavian countries, Luxembourg, Netherlands, etc.) achieved the best results in all the indicators. The other two clusters achieved very similar results; however, differences may be seen in some indicators (cluster 3 reached slightly better results in terms of the unemployment rate, the share of youth NEET, and average PISA, while Cluster 4 reached better results in terms of GDP per capita, mean nominal monthly earnings and political stability).

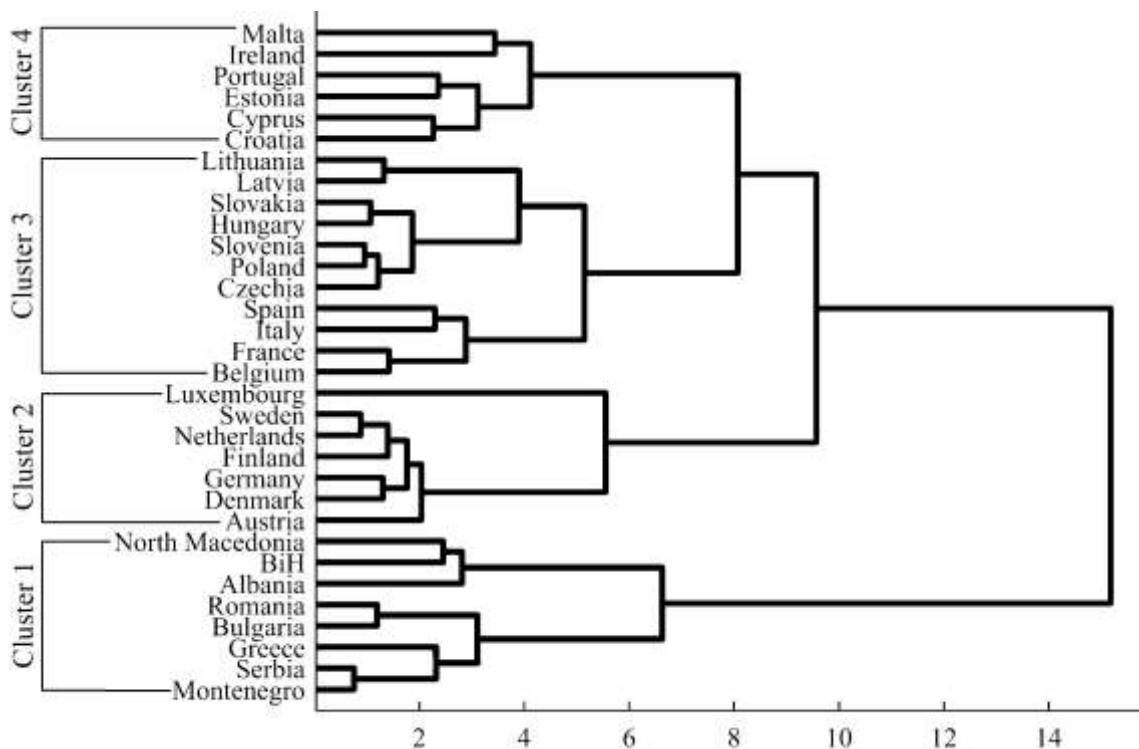


Fig. 7: Dendrogram presenting clustering of the discussed countries
 Source: Own calculation

Table 2. Average values of selected indicators

	GDP per capita in PPS	Mean nominal monthly earnings	Unemployment rate	Political stability and absence of violence/terrorism	Government effectiveness	Share of youth NEET	Average PISA results
Cluster 1	44	645	0.18	0.0	0.0	0.22	423
Cluster 2	147	4174	0.07	1.0	1.8	0.07	502
Cluster 3	86	1733	0.10	0.6	1.0	0.12	489
Cluster 4	96	1882	0.11	0.8	1.0	0.13	485

Source: Own calculation

Table 3. Average values of selected migration indicators

	Emigration rate	Emigration rate of a highly educated population	Net migration rate
Cluster 1	11.1	23.0	-2.3
Cluster 2	5.0	10.0	5.8
Cluster 3	4.3	10.2	-0.7
Cluster 4	18.7	30.6	1.9

Source: Own calculation

Table 3 shows the average results in terms of migration indicators. From this table, we see that the cluster most affected by the emigration of the population is cluster 4. This is even more pronounced when it comes to the emigration of a highly educated population. The average net migration rate in this cluster, however, is not nearly as low, so it is possible to assume that although these countries have a large outflow of population, they also have a high inflow of immigrants. The lowest value of this indicator is reached by the cluster consisting of the WB countries. Cluster immigration rates calculated for immigrants from WB countries only (Albania, BiH, Montenegro, North Macedonia, and Serbia) are shown in Figure 8. These rates are calculated using a standard formula for calculating emigration/immigration rates that divides the number of emigrants/immigrants by the total population of the country (in this case, the cluster of countries). The Figure 8 shows that people from WB countries migrate in large numbers within the Balkans as well, especially in the period between 1990 and 2000 for cluster 1 and in the period between 1990 and 1995 for cluster 4, when major political and military conflicts were taking place in the region. The sharp increase in the number of immigrants in cluster 4 in the early 1990s was mainly caused by the huge number of BiH citizens who emigrated en masse to neighboring Croatia. The high immigration rate in cluster 1 is mainly caused by the large-scale emigration of the Bosnian population to Serbia, but also by the huge number of Albanians who

emigrated to Greece in the same period. This finding is in line with, [24].

Based on the immigration rates in Cluster 2 and Cluster 3, it is possible to conclude that emigrants going to other parts of Europe tend to choose more developed countries, as Cluster 2 is made up of the most developed EU countries. The slight decrease in migrants from WB countries after 2000 in cluster 2 is probably caused by the return of migrants from Serbia (but also from North Macedonia and Montenegro) back home due to the end of the war and regime changes as described above. The significant decline in the number of migrants from Serbia in Germany is also possibly caused by changes in the conditions and methodology for including migrants in official statistics.

The dependence of migration indicators on selected indicators of the economic, political, and educational system was examined using regression analysis on both cross-sectional and panel data. Cross-sectional data models were applied to all EU and WB countries for 2015 data. Due to data limitations and the small number of states, it was not possible to model even one multivariate model.

Table 4 contains univariate models with the net migration rate as the dependent variable. This migration indicator proved to be affected by most of the indicators examined: GDP per capita, average earnings, government effectiveness, and The PISA results had a positive effect on net migration rates, while the share of young people without employment, education, or training, and the overall unemployment rate had a negative effect. The

highest coefficients of determination are achieved for GDP per capita (60% of the explained variability), and average earnings (around 50% of the explained variability).

As another dependent variable, the total emigration rate was used. For this dependent variable, only one univariate model, presented in Table 5, was found for the regressor of the share of youth NEET, which positively affected the emigration rate, with a relatively low coefficient of determination of only 15%. On the emigration rate of the highly educated population, the share of youth NEET proved to have a positive impact, while government effectiveness, PISA results, and average earnings had a negative impact. The results of the models are presented in Table 6.

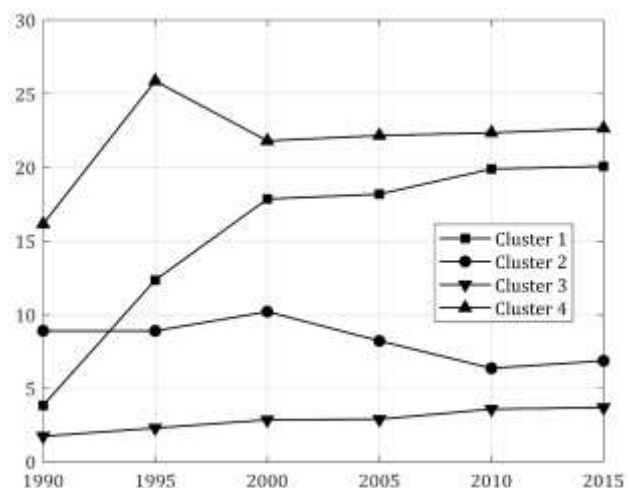


Fig. 8: Immigration rates of clusters – immigrants from WB countries only
Source: Own calculation

Table 4. Regression models of cross-sectional data with the dependent variable: net migration rate

Regressor	Constant	Coefficient	p-value	R ²
Model 1 GDP per capita	-6.38	0.079	<0.001	0.611
Model 2 Mean nominal monthly earnings	-3.881	0.002	<0.001	0.494
Model 3 Government effectiveness	-2.824	3.921	0.002	0.281
Model 4 Share of youth NEET	5.382	-33.281	0.012	0.190
Model 5 Average PISA results	-22.019	0.048	0.039	0.110
Model 6 Unemployment rate	4.070	-28.127	0.037	0.137

Source: Own calculation

Table 5. Regression model of cross-sectional data with the dependent variable: emigration rate

Regressor	Constant	Coefficient	p-value	R ²
Model 1 Share of youth NEET	3.447	39.500	0.026	0.154

Source: Own calculation

Table 6. Regression model of cross-sectional data with the dependent variable: emigration rate of the highly educated population

Regressor	Constant	Coefficient	p-value	R ²
Model 1 Share of youth NEET	4.782	90.200	0.005	0.236
Model 2 Government effectiveness	25.150	-8.579	0.006	0.228
Model 3 Average PISA results	89.170	-0.152	0.006	0.200
Model 4 Mean nominal monthly earnings	23.100	-0.003	0.041	0.132

Source: Own calculation

Table 7. Regression models of cross-sectional data with the dependent variable: public opinion

Regressor	Constant	Coefficient	p-value	R ²
Model 1 The unemployment rate of the highly educated population	0.172	28.300	<0.001	0.339
Model 2 Average PISA results	20.597	-0.038	0.002	0.253
Model 3 Government effectiveness	4.241	-2.056	0.004	0.248
Model 4 Unemployment rate	0.306	17.500	0.019	0.171
Model 5 Political stability	3.708	-2.349	0.029	0.149

Source: Own calculation

Table 8. Comparison of the coefficients of regression models of cross-sectional data

Regressor	Dependent variable			
	Net migration rate	Emigration rate	Emigration rate of highly educated	Public opinion
GDP per capita	0.079			
Mean nominal monthly earnings	0.002		-0.003	
Government effectiveness	3.921		-8.579	-2.056
Share of youth NEET	-33.281	39.500	90.200	
Average PISA results	0.048		-0.152	-0.038
Unemployment rate	-28.127			17.500
The unemployment rate of highly educated				28.300
Political stability				-2.349

Source: Own calculation

Table 9. Regression models of panel data with the dependent variable: net migration rate

	Regressor	Constant	coefficient	p-value	Hausman test: p-value
Model 1	Statutory nominal gross monthly minimum wage	-12.634	0.029	<0.001	0.607
Model 2	Government effectiveness	-3.970	6.911	0.007	0.928

Source: Own calculation

The last indicator of migration for which an influence of the examined variables was found in public opinion. This indicator was shown to be positively affected by the unemployment rate of the highly educated population and the total unemployment rate, and negatively affected by PISA results, government effectiveness, and political stability. Again, the results of the models are presented in Table 7. Table 8 provides a comparison of all the regression models found for the cross-sectional data. The table shows that the indicators that positively affect the net migration rate, which at high values indicates a high attractiveness for migrants, also negatively affect the other three migration indicators, which at high values indicates a high outflow of migrants. Therefore, the results for GDP per capita, average earnings, government effectiveness, and average PISA, which positively affect net migration rates and some of which negatively affect the other three indicators of emigration, confirm that better economics, political conditions, and quality education determine high attractiveness for migrants. On the other hand, the high share of youth NEET and the high unemployment rate point to a high outflow of migrants. Furthermore, public opinion is positively influenced by the unemployment rate of the highly educated population and negatively influenced by political stability, which means that people are more likely to emigrate when the unemployment rate of the highly

educated population is high and less likely to emigrate when the country has better political stability.

For the panel data analysis, only a limited set of variables was available: net migration rate and emigration rate as dependent variables and share of young NEET, political stability, government effectiveness, unemployment rate, minimum wage, and GDP per capita in PPS as regressors. Using these data, two significant regression models were estimated for the WB countries only with the dependent variable of net migration rate. Two regressors were found to have a positive effect on the net migration rate, i.e., minimum wage, and government effectiveness, confirming that higher wages and better government effectiveness make a country more attractive to migrants. In both cases, models with random effects were employed according to the Hausman test, which is shown in Table 9. When using the other migration indicators described above, no regression model was found with either the cross-sectional data or the panel data.

4 Discussion

Similar work on this topic is lacking in the studied region, which is surprising given the extent of the problem of emigration of young people from the WB. The poor availability of data needed for its research certainly contributes to this. In, [25],

provides an overview of the factors, motivations, and trends concerning youth emigration from the WB in relation to other Southeast European countries. The papers, [14], [26], based on sample surveys focused on an examination of the causes of emigration from WB countries lead to a similar conclusion that the main cause of emigration is poor economic and political systems, as well as better education systems in the destination countries. Paper, [27], also used a questionnaire-based survey to examine physician migration between Romania and France. They concluded that mobility is a response to professional goals, but also to the instability of the work situation, as well as to personal and family goals. After snowball sampling, [28], used a factor analysis to identify four main determinants of Lithuanian high-skilled migration: occupational attractiveness abroad, socioeconomic conditions, state academic system and cooperation, and macroeconomic conditions and government policy.

Authors of, [29], used a pooled panel regression model to analyse the factors influencing migration flows from central and eastern European countries to Germany in the period between 1998 and 2016. The author indicated that the GDP gap has a significant impact on the decision of the population to migrate to Germany. The unemployment rate has been shown to be a reason for the decline in migration flows, but this has several reasons (the main one being the economic crisis, during which unemployment rates rose in all EU countries). Other positive influences on emigration were relatively low expenditure on education in the countries of origin, the increase in the diaspora population, and the enlargement of the EU in 2004. Similar results were reached in, [30], where is used regression analysis to arrive at the key determinants of emigration of university-educated people from eastern European countries in the period between 1980 and 2010, which were wages and education expenditures in the sending countries. Results of the paper, [31], point to the fact, that the East-West European migration rate in the period from 2000 to 2017 responds quickly to the changes of GDP per capita and unemployment rate of the young population. The paper, [32], concluded that well-educated people from poorer countries are the most likely to emigrate. Using a regression model, he found that the level of development, captured by GDP per capita, is a negative determinant of emigration, unemployment is negatively correlated with the number of migrants, and average wage is positively correlated with the number of migrants. Authors of, [33], deal with the possibilities of how

to reduce youth emigration and assess the relationship between youth participation in entrepreneurship promotion initiatives and emigration attitudes. A study conducted in the Utena region of Lithuania highly affected by youth unemployment did not show any correlation between the analysed elements.

Another commonly used method for investigating emigration is the gravity model. For example, [34], estimated a gravity model to explore the channels through which OECD countries attract foreign physicians from abroad. The results showed that the main drivers of physician outflows are lower unemployment rates, good salaries, an aging population, and a high level of medical technology in the destination country. Distance has also been shown to have a negative effect on emigration, while colonial relations, language, and EU and Schengen membership have a positive effect. Paper, [24], applied the gravity model for Eastern European countries (including WB countries) and concludes that emigration increases with relatively low income in the country of origin, which is in line with our findings; moreover, results show that emigration from autocracies is significantly higher than from democracies. However, for employing a gravity model, it is necessary to have an appropriate range of countries and data, which precludes the application of this method limited to the countries studied in this paper.

Overall, our results provide new insights based on national-level data for the region of WB countries. The comparisons of the key determinants of brain drain with those for EU countries and the causal relationships suggested by the models add to the knowledge in this area. Comparison of the results with similar work in other countries allows us to conclude that our results are in general agreement with existing research, but also point to facts not reported elsewhere, in particular the considerable impact of differences in education systems and political culture on brain drain.

5 Conclusions

The results of our work show that in most of the selected indicators, there are wide gaps in the WB countries compared to more developed countries (specifically the EU, which is the most popular destination for emigrants from the WB region). GDP per capita in most of these countries is below 50% of the EU average, and the wage gap and unemployment rate are several times higher than the EU average. Political system indicators also lag well behind the EU average and average PISA results are

below the EU average in all the WB countries. Cluster analysis showed that based on selected indicators of economic, political, and educational systems, as well as emigration indicators, the WB countries, together with their neighbouring countries Romania, Bulgaria, and Greece, perform worst in all the selected indicators and have the lowest net migration rates. By using regression analysis, it was shown that the selected emigration indicators are affected by most of the economic, political, and educational system indicators. The results of GDP per capita, mean nominal monthly earnings, government effectiveness, share of youth NEET, unemployment rate, and average PISA has the most significant influences. It was also shown that people from WB countries are more likely to move to more developed countries, but also to countries within the Balkan Peninsula region itself.

An important warning for the WB countries is the finding that the inhabitants of these countries emigrate not only for economic reasons but also because of dissatisfaction with the functioning of the state and the lower level of the education system, which is especially true for emigrants with higher education.

In terms of data collection and processing, the lack of data was generally visible in the WB region, which may be considered a serious problem to overcome. This not only hinders research on this topic but may also cause a distorted picture of the emigration situation in these countries. Therefore, extra attention should be paid to the interpretation of the data and the results themselves. The most important task must be directed to the responsible institutions: collect and process the data properly in the first place and agree on the methodology used for this purpose.

This paper focuses on the causes of the brain drain problem but does not consider the other side of this phenomenon – its consequences. The discussion of the consequences of brain drain goes both ways (positive and negative), showing that emigration may even contribute to a developing country in terms of economic gains (mainly through remittances, which make up a significant percentage of a country's GDP), but also in terms of improved human capital. Further research should focus on assessing brain gain in the WB region and the overall outcome of skilled emigration.

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Conflict of Interest

The authors have no conflicts of interest to declare.

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