

EMIGRATION FROM EASTERN EUROPE WITH A FOCUS ON BRAIN DRAIN

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Abstract

The objective of this paper is to offer a better understanding of the situation on emigration, with a focus on the emigration of the university-educated individuals, from 6 different Eastern European countries, namely Bulgaria, the Czech Republic, Hungary, Poland, Romania and the Slovak Republic. The period studied is 1980-2010, with a greater emphasis on the last decade, as the emigration from these countries increased sharply especially after their adhesion to the European Union.

A regression analysis was performed, whose purpose is to determine the main factors that influence the brain drain. Data on tertiary educated emigration rates, unemployment rates of the tertiary educated, GDP per capita, wages adjusted for inflation, consumer price indexes and education expenditures were collected for the period 1980-2010 (5 year intervals) and in some cases 2011 as well, for all 6 Eastern European countries. The results showed that Romania and Poland are the most affected by the brain drain. The factors that were significant in shaping emigration were the wages (influenced by GDP) in these countries, as well as the education expenditure (influenced by the inflation).

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1. Introduction

Approximately 3% of the world population lives in a different country from which they were born in. (<http://www.unfpa.org/pds/migration.html>). Usually, people leave their home countries searching for a better life, a better wage and more career opportunities. They leave their comfort zone for a different place, where the culture, the language and many more may be different. The migration process nowadays is not what it used to be. Highly skilled individuals find it easier now to move to a new country, as they could bring a lot more than their skills to the “adoptive” country.

The migration process has a certain impact not only at the individual level, but also on both the origin and destination countries in terms of economic, social, political and cultural implications and this is why the phenomenon of migration has been intensively studied and it has also been an important political topic of discussion throughout the years, especially with regards to the emigration of the university-educated individuals. However, while a lot of focus has been on the least developed countries, and within good reason, since a great majority of them experience a very significant brain drain, there have not been as many studies that would analyze the brain drain phenomenon in Eastern European countries, partially due to the fact that many of them had been under communism domination for many years and therefore emigration only occurred under illegal terms, with a few exceptions, of course. Eastern Europe has started experiencing a more massive brain drain in recent years, especially since some of the Eastern Europe countries joined the European Union in 2004 and 2007.

The objective of this paper is to offer a better understanding of the situation on emigration, with a focus on the emigration of the university-educated individuals, from 6 different Eastern European countries, namely Bulgaria, the Czech Republic, Hungary, Poland, Romania and the Slovak Republic. The period studied is 1980-2010, with a greater emphasis on the last decade, as the emigration from these countries increased sharply especially after their adhesion to the European Union.

The remaining of this paper is organized as follows: section 2 is called “Literature Review”, whose objective is to offer the reader a deeper understanding of the theories, empirical models and perceptions regarding the brain drain phenomenon throughout the years. In section 3, an empirical model is built in order to see what the main determinants of the emigration of tertiary educated people from the 6 countries in question to the OECD region during the period 1980-2010 are. Section 4.1 offers a general overview of the total emigration rates, as well as the emigration rates of the university educated population in all 6 countries throughout the years. Sections 4.2 consists of a more comprehensive description of Romania emigration patterns. Finally, there is the conclusion, whose role is to summarize the ideas and findings gathered in this paper and to offer any further advice on future research.

2. Literature review

According to Rapoport (2002) the term “brain drain” had been used for the first time in the 1950s, referring to the highly skilled scientists that immigrated to the United States from United Kingdom, Canada and the former Soviet Union.

While unskilled migration has been generally considered a positive phenomenon not only for the emigrants themselves, but also for their families and their sending countries, skilled migration has been regarded as a detrimental phenomenon to the sending countries, because they are deprived of their human capital, which is one of their scarcest resources. It is generally believed that if the brain drain were to be eliminated, the inequality across nations would be significantly reduced.

The early economic literature of the 1960 underemphasized the negative externalities imposed on the origin countries.

In the paper written by Grubel & Scott (1966), the focus of the analysis is the changes in income caused by the emigration of high skilled individuals. According to this paper, emigration is beneficial as long as income is maximized. In order for this to happen, two conditions need to be met: the first one is that the emigrant increases its own income and the second condition is that the emigration will not cause a reduction in income for those left behind. The first condition is said to be met as long as emigration is voluntary. The second condition is fulfilled in the case of a market economy where individuals are paid their marginal product. Moreover, externalities are considered of insignificant importance. So the emigrants will only take away the value of their marginal product which they themselves earned anyway. Overall, in the study conducted by Grubel & Scott (1966), it is concluded that the welfare of those left behind is very rarely affected in a negative way by the emigration of the highly skilled. While emigration is likely to cause economic losses in the short run, until replacements for the emigrants can be trained, long run losses in a market economy are small.

During the 1970, the perspective on the brain drain changed.

Bhagwati & Hamada (1974) argue that in the case where government had financed the emigrant’s education in order to recover its investment in taxes afterwards, then emigration means there is no recovery of the investment and this leads to a decrease in welfare. Therefore, in the paper written by Bhagwati and Hamada (1974), the emigration of the educated labor is likely to result in negative effects on national income, per capita income and unemployment. In one of the models constructed in this paper (Emigration-of-our-Joneses), it is assumed that the emigration of skilled labor does not lead in itself to a simultaneous increase in domestic wage for the educated labor. In case the migration does not have any impact on the expected wage, national income remains unchanged. However, per capita income is increased. If migration means the per capita income of the migrants is also improved, the result is that the “brain drain” is beneficial.

The case where emigration increases the wage of the educated labor is also analyzed. This increase in the wage of the educated labor may also trigger an increase in the wage of the uneducated labor (“leap-frogging process”). If emigration increases the wage of the educated labor only, the employment of the educated labor will be reduced. Moreover, if the elasticity of demand for educated labor is smaller than 1, the supply of educated labor will increase and

therefore the unemployment of the educated will increase as well. Therefore, national income is likely to be reduced. In the case where emigration of the educated increases, both the wages of the educated and the uneducated labor in the home country, the employment of the uneducated labor will also be reduced. Therefore the expected wages of the uneducated labor will increase, which might lead to a reduction in the supply of the educated labor. (Individuals would consider an education is not necessary, if the wages of the uneducated labor are expected to increase). However, although the national income will slightly increase because as the supply of the educated labor decreases, the costs of education supported by the governments decrease as well, this increase in the national income will be most likely offset by the reduction in output in both the educated and uneducated labor sectors. Overall, the national income will decrease in most cases when the wages of uneducated and educated labor increase.

Miyagiwa (1991) shows that brain drain has a positive effect on the host countries, namely it increases the host countries' education and income levels because firstly, economies of scale raise the income for those who already have an education and second of all, a higher income provides an incentive for the uneducated to acquire an education and then earn more as skilled workers. As far as the origin countries are concerned, the brain drain can cause a decline in the country's income and it may also have a highly inequitable income distributional effect on the population, especially upon the individuals who have intermediate abilities. The emigration of skilled workers will hurt mostly the skilled workers who did not emigrate, while unskilled workers would be relatively less affected.

Carrington and Detragiache (1998) are the first to provide a quantitative assessment of the brain drain phenomenon. They constructed estimates of the stock of migrants to OECD countries by educational attainment and by country of origin for 61 developing countries. The findings show that the biggest brain drain occurs in the Caribbean, Central America and some African countries.

Beine (2001) also focuses on the impact of the migration on human capital formation and growth in the source countries. The theoretical model is supported empirically (cross-country evidence). However, the authors use data on total migration, instead of skilled migration. This is an issue, considering that migrants from developing countries are mostly unskilled, so their emigration would automatically lead to an increase in the skill level of the population left behind. The approach in this paper is that there are 2 effects associated with the emigration of the highly educated, a potentially positive one and a negative one. The potentially positive effect comes from the fact that the possibility of emigration fosters investments in education in the home country, while the negative effect is the emigration. Whether, overall, the brain drain is beneficial or not depends on which one of the 2 effects dominates.

Beine et al. (2003) use data on migration rates by educational level, in order to provide empirical evidence supporting the beneficial brain drain hypothesis at an aggregate level. In a cross-section of 50 developing countries, migration prospects exert a positive effect on human capital formation. Moreover, it appears that the countries experiencing a beneficial brain drain are those that combine low levels of human capital with low skilled migration rates, whereas the countries that are characterized by high skilled migration rates, that is above 20% and/or high rates of highly educated in the adult population (above 5%)

experience a detrimental brain drain. Although there are more countries experiencing a detrimental brain drain rather than a beneficial one, the countries that do experience beneficial brain drain are also the biggest ones in demographic size. China, India, Brazil, Indonesia and Pakistan all experience a beneficial brain drain.

Faini (2003) focused on the link between skilled migration, education and remittances. The findings are in contrast with the positive approach to the brain drain because the author argues that first of all, there is little evidence that raising the skill composition of migration is beneficial for the educational achievements in the origin countries. The author attributes this result to the choice of would-be migrants to pursue their education abroad. He admits the findings need to be analyzed with caution, due to the fact that they are based on enrollment data, which is known to raise measurement issues. Second of all, higher educated emigrants are associated with lower amounts of remittances so the positive effect of the brain drain is diminished (higher educated emigrants tend to emigrate permanently so their connections to the sending country becomes weaker over the years; they also have a larger propensity to reunify with their family in the host country).

Poutvaara (2004) acknowledges a very important aspect of the brain drain with the help of a theoretical model, namely the fact that, since the possibility of migration provides incentive to investment in education in the origin country, an increasing number of students have the tendency to opt for internationally applicable educations (medicine, nursing, engineering as opposed to law for example) and because of this, individual governments of the European Union distort the provision of public education away from internationally applicable education towards country-specific skills. As a consequence, those countries may end up having too many lawyers or too few engineers. The proposed solution is the introduction of graduate taxes or income dependent loans that would also be paid by emigrants.

Docquier and Bhargava (2007) acknowledge the fact that general emigration rates may hide significant occupational shortages, for example among engineers, physicians, nurses, IT specialists, teachers etc. In many developing countries shortages are particularly severe in the medical sector, as physicians from these countries emigrate mainly to the United States, Canada, the United Kingdom or Australia. The authors collected data on doctors with foreign qualifications working in 16 OECD countries in the period 1991-2004 and computed medical emigration rates. The results showed that even if some countries exhibited moderate total emigration rates, they suffered from significant medical brain drain.

Gibson and McKenzie (2010) provide microeconomic empirical evidence from 5 countries that experience high tertiary educated emigration rates (Tonga, Micronesia, Papua New Guinea, Ghana and New Zealand) on the economic impacts of the brain drain. The authors investigate whether highly skilled emigrants generally engage in knowledge transfers, trade and foreign direct investment or if it is just the case for Chinese and Indian emigrants. The findings show that the migrants benefit from massive gains in income and greater human capital, they usually send remittances to the origin countries, but they rarely engage in trade or foreign direct investment. On the other hand, they engage in knowledge transfer, by helping others learn about the opportunities abroad regarding work or study.

Docquier (2012) assessed the impact of immigration and emigration in the OECD countries in the 1990s on the employment and wage levels of the natives who did not

migrate. Contrary to common belief, the results show that immigration had a positive effect on the wages of the non-college educated people in the host country. It also increased or left unchanged the average native wages and the native employment in all OECD countries in the period 1990-2000. On the other hand, emigration caused a wage decline for the less educated people and contributed to inequality increases within all OECD countries. Therefore, immigration in OECD countries is likely to help native wages and employment, even when it is accounted for the skill downgrading of immigrants.

Docquier (2014) investigates empirically the effect of emigration on the quality of the home country institutions (measured by standard democracy and economic freedom indices), considering that institutions play an important role when it comes to the economic growth of a country. One way migration affects institutions is by providing the population with an exit option and a safety net through remittances, thereby reducing its incentive to protest in case the economic, political or social environment in the home country is in need of a reform. Moreover, emigration increases the home country's exposure to new political values and practices through return migrants or diaspora networks for example. The finding of this paper is that openness to emigration contributes at improving the quality of institutions in the origin countries and that emigration to liberal democracies had important, and for the most part positive implications in determining institutional and political change in the developing countries. The same result is reached by Batista (2010).

3. Empirical Analysis: the Determinants of the Brain Drain

In this section, an empirical analysis will be conducted in order to explain what the determinants of emigration for the 6 European Countries are. The focus will only be on push factors.

The data on tertiary educated emigration rates cover information for 20 OECD destination countries for the years 1980-2010 (5 years intervals).

The source of the data for the emigration rates is Brücker H., Capuano, S. and Marfouk, A. (2013). Education, gender and international migration: insights from a panel-dataset 1980-2010, mimeo. In addition to this, OECD also provided data on emigration rates for the years 2008 and 2010.

The data from Brucker (2013) only cover emigration rates to 20 OECD destination countries, which are Australia, Austria, Canada, Chile, Denmark, Finland, France, Germany, Greece, Ireland, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, and United States.

The emigration rate is defined as the proportion of migrants over the pre-migration population (defined as the sum of residents and migrants in each source country).

The dependent variable is emigration of tertiary educated people from Bulgaria, Czech Republic, Hungary, Poland, Romania and Slovakia to OECD countries in the period 1980-2010.

The independent variables that entered the first model are: the logarithm (10) of wages adjusted for inflation in the origin country, the unemployment of tertiary educated people in the origin country, the logarithm (10) of real GDP per capita in the origin countries, education expenditure as % of Gross National Income, the consumer price indexes with 2005

as a base year, in the origin countries, 4 interaction terms and 6 dummy variables that represent the countries of origin. The data for the independent variables in this regression analysis was collected from various sources, such as OECD, World Bank, United Nations, the International Monetary Fund, Eurostat etc.

Model 1 is:

Emigration_{it} = $\alpha_1 + \alpha_2 * \log.\text{real wage} + \alpha_3 * \text{unemployment of tertiary educated people} + \alpha_4 * \log \text{ real GDP per capita} + \alpha_5 * \text{education expenditure} + \alpha_6 * \text{CPI} + \alpha_7 * \text{education expenditure} * \text{CPI} + \alpha_8 * \text{real wage} * \text{CPI} + \alpha_9 * \text{real GDP per capita} * \text{inflation} + \alpha_{10} * \text{real wage} * \text{real GDP per capita} + \alpha_{11} * \text{Bulgaria} + \alpha_{12} * \text{Czech Republic} + \alpha_{12} * \text{Hungary} + \alpha_{13} * \text{Poland} + \alpha_{14} * \text{Romania} + \alpha_{15} * \text{Slovakia} + \xi$.

The purpose of this enlarged model is just an initial step towards a much reduced model 2. The first model would have too many variables and not enough observations.

Model 2 is:

Emigration_{it} = $\alpha_1 + \alpha_2 * \log. \text{real wage} + \alpha_3 * \text{education expenditure} + \alpha_4 * \text{education expenditure} * \text{inflation} + \alpha_5 * \text{wage} * \text{real GDP per capita} + \alpha_6 * \text{Bulgaria} + \alpha_7 * \text{Czech Republic} + \alpha_8 * \text{Hungary} + \alpha_9 * \text{Poland} + \alpha_{10} * \text{Romania} + \alpha_{11} * \text{Slovak Republic} + \xi$.

All the variables are lagged by 1 year in order to account for information based on which the people decide to emigrate (Pedersen 2004). What this means is that, for example the unemployment rate of tertiary educated people is from year (t-1), whereas the actual emigration year is t.

There are some issues with the model, considering that the model is unbalanced and there are some data missing. The number of observations (44) is rather small for this type of model. Moreover, the results need to be treated with caution, due to the fact that these Eastern European countries lived under communism domination until the year 1989-1990 and as a consequence, the data is not very reliable. The most unreliable data are the ones concerning the unemployment rate because in the communist period, unemployment was considered non-existent. In addition, the emigration rate is also rather unreliable because since emigration was prohibited in the communist countries, with the exception of a very few cases, illegal emigration was a rather common phenomenon.

In addition, the emigration rates of these countries are not fully explained by the variables included in the model. There are very likely other variables that would contribute to better explain the migration rates. Even with these limitations in mind, the results should still be valid.

Table 1 shows the coefficients of the regression for 2 models. The first model has an adjusted R² of 0.868 which implies that 86.8% of the dependent variable is explained by the independent variables included in the model. However, this first model includes variables that are not significant, whereas the second model, which has an adjusted R² of 0.781, contains only the variables that are statistically significant.

This first variable to be insignificant is the unemployment rate of the tertiary educated people in the origin country. Although this variable is insignificant, the results show that if it had been significant, an increase in unemployment would have led to an increase in the emigration rate.

Table 1. Results for Model 1 and Model 2. Dependent Variable: Emigration to OECD countries

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Model 1					
(Constant)	-120.099	84.153		-1.427	0.184
Bulgaria	-9.646	3.31	-0.905	-2.914	0.015
Czech Republic	-14.677	6.916	-1.554	-2.122	0.06
Hungary	-14.596	6.508	-1.545	-2.243	0.049
Poland	-13.173	5.89	-1.521	-2.236	0.049
Slovakia	-15.211	6.557	-1.61	-2.32	0.043
unemployment.tertiary.educated	0.04	0.232	0.033	0.172	0.867
Adjusted savings: education expenditure as % of GNI	-4.385	3.657	-1.124	-1.199	0.258
CPI 2005=100	0.169	0.255	1.857	0.662	0.523
log.real.wage	44.491	18.229	4.518	2.441	0.035
(education expenditure)(inflation)	0.06	0.039	2.553	1.558	0.15
(real wage)(inflation)	-0.042	0.75	-1.029	-0.569	0.582
log real GDP per capita	28.817	25.207	2.429	1.143	0.28
(real GDP per capita)(inflation)	-0.076	0.074	-3.918	-1.033	0.326
(real wages)(real GDP per capita)	-6.898	5.039	-3.442	-1.369	0.201
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model 2	B	Std. Error	Beta		
(Constant)	0.162	2.403		0.068	0.947
Bulgaria	-7.989	1.362	-0.697	-5.868	0.00
Czech Republic	-5.212	1.465	-0.414	-3.557	0.002
Hungary	-1.976	1.778	-0.172	-1.111	0.277
Poland	-1.129	1.464	-0.118	-0.771	0.448
Slovakia	-5.911	1.459	-0.469	-4.051	0.00
Adjusted Savings: education expenditure as % of GNI	-1.486	0.627	-0.353	-2.369	0.026
log.real.wage	12.407	1.613	2.612	7.694	0.00
(education expenditure)(inflation)	0.005	0.002	0.247	2.128	0.044
(real wages)(real GDP per capita)	-1.302	0.173	-2.395	-7.505	0.00

In addition, education expenditure as a % of gross national income in the origin country was insignificant for the first model. However, in the second model, education expenditure is significant, showing that holding all the other variables constant, an increase of 1% in education expenditure as a percentage of gross national income reduces the emigration rate of tertiary educated people by 1.48%.

The consumer price index was also insignificant. The coefficient is positive which means that increasing the inflation rate in the origin country would increase the emigration, which is not surprising.

Wages in the origin country proved to be very significant, since in the first model, holding all the other variables constant, a 1% increase in wage leads to 0.44 increase in the emigration rate. However, in the second model the impact is smaller, since a 1% increase in wage leads to 0.124 increase in emigration rate. The positive relationship between wages and emigration can be due to the fact that, as it shall be seen in the section “Description of the Economies”, the wages in these 6 Eastern European countries are far from reaching the wages in the rest of the European Union, therefore, even if the wages in these 6 countries do increase, they still have not increased enough to discourage emigration. The gap between the wages in Eastern Europe and other developed countries is still very wide.

The interaction term (education expenditure*inflation) only proved significant in the second model. The result implies that an increase in education expenditure contributes more to the emigration of the tertiary educated people in the countries where inflation is higher.

The interaction term (real wage* inflation) did not prove to be significant. The negative coefficient shows that higher inflation contributes less to emigration in countries where the wages are higher.

GDP per capita in the origin country has no significant effect. The positive coefficient shows that if GDP had been significant, an increase of GDP would lead to an increase in emigration. The GDP result may reflect the classic “immigration hump” that many countries go through as their economies develop. The hump-shaped pattern hypothesis refers to a positive correlation between GDP per capita and migration in the case of countries that have relatively low GDP per capita levels. This pattern can be related to migration costs, which can reduce the possibility of migration. This positive relation between GDP per capita and emigration from East European countries has been previously observed by Berthelemy and Maurel (2009).

Another possible explanation is that economic growth might lead to more migration due to a relaxation of financial restrictions. (Beine et al. 2008)

The interaction term (real GDP per capita* inflation) has no significant effect. However, the negative sign means there is a penalty on the GDP effect coming from inflation.

Finally, the interaction term (wage* GDP per capita) has a significant effect in the second model. This implies that there is an additional boost to the wage effect coming from GDP.

From the results, it can also be observed that Romania experiences a bigger brain drain than Bulgaria, the Czech Republic and Slovakia, whereas the difference in emigration rates between Romania and Hungary and Romania and Poland is not significant.

Bulgaria’s brain drain is lower than that of Czech Republic’s, Hungary’s and Poland’s. The difference is significant with 95% confidence. On the other hand, the difference between the brain drain of Bulgaria and that of Slovakia is insignificant. After Bulgaria, Slovakia is the least affected by the brain drain.

The Czech Republic’s brain drain is significantly higher than the brain drain of Slovakia. On the other hand, with 95% confidence, it can be admitted the difference in emigration rates of the highly skilled workers between the Czech Republic and Hungary and respectively between the Czech Republic and Poland is insignificant.

Finally, with the exception of Romania, Poland is the most affected by the brain drain. Moreover, we are 95% confident that the difference in the tertiary educated emigration rates between Poland and Hungary is significant.

In conclusion, 78.1% of the variance in the emigration of the tertiary educated people is explained by country of origin, wages and education expenditure. Moreover, the effect of wages on the emigration is influenced by GDP per capita and the effect of education expenditure on emigration is influenced by inflation. The results of the regression also prove that Romania, followed by Poland are suffering the most from the brain drain in the period 1980-2010. On the other hand, Bulgaria has been the least affected by the brain drain.

4. Migration patterns in Eastern Europe

There is a high degree of international mobility among OECD countries and it is especially focused on the highly skilled, due to the increasing importance of gaining international experience and language skills for professionals. Many students, researchers, professionals look for opportunities beyond the borders of their origin countries and their mobility is facilitated among OECD countries by the existence of free mobility areas, agreements for recognition of foreign diplomas, collaborations between institutions and easier access to visas. (OECD 2008).

Europe’s tertiary educated people’s emigration rate in 2005/2006 was 8.6% (8.3 million people) and they mostly emigrated within the borders of Europe, but also to USA. (Widmaier & Dumont 2011).

The EU enlargement has resulted in a significant increase in labour mobility. More than 99% of migration flows between the newer and older member states have been East-West flows from EU 8+2 to EU15. Despite the fact that many countries from EU15 imposed several restrictions to their labour markets, the stock of emigrants from EU 8+2 to EU15 tripled in the period 2003-2009. (Fic Tatiana et al. 2011).

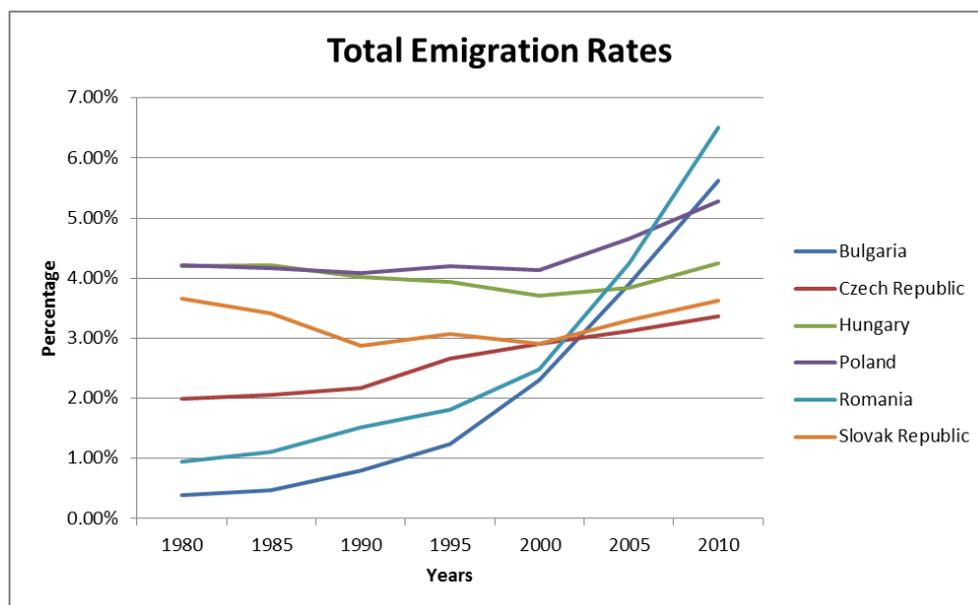


Figure 1. Total Emigration Rates

Source : <http://www.iab.de/en/daten/iab-brain-drain-data.aspx>

As it can be seen from Figure 1, until the year 2005, Poland has always had the highest total emigration rate (calculated as the proportion of migrants over pre-migrant population; pre-migrant population is defined as the sum of residents and migrants in each home country). However, in 2010 already, Poland no longer had the highest total emigration rate. Romania did, followed very closely by Bulgaria. Considering the fact that the emigration rates of these 2 countries before the period 1995-2000 were so low compared to the other 4 countries and that in just 10 years they managed to surpass them, reflects how much this emigration phenomenon has escalated in these 2 countries.

One possible cause for this is that there are higher economic disparities between Bulgaria and Romania and EU15 than respectively between the Czech Republic, Hungary, Poland, Slovakia and EU15, therefore the EU2 population has more incentives to emigrate. It can be seen from the previous graphs, such as the GDP per capita one, that in the year 1990, right after the communism fell, all the 6 countries had more of a similar economic situation than they do at the present. After 1990, Bulgaria and Romania’s economic developments could not keep the pace with the other 4 OECD countries.

About 28% of all EU 8+2 migrants working in EU15 countries are low skilled, 55% are medium-skilled and 17% of them are high skilled. (Fic Tatiana et al. 2011).

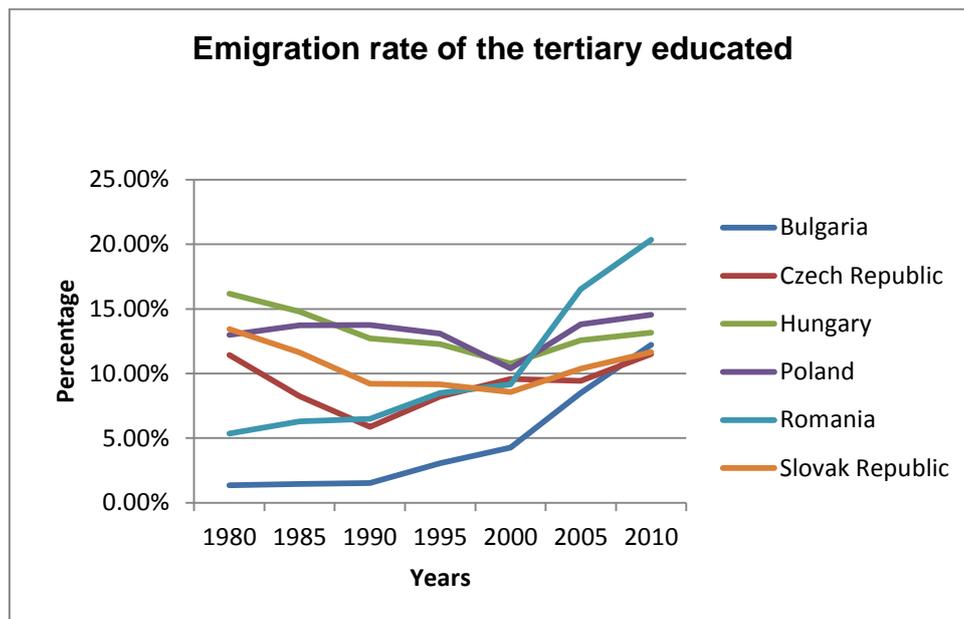


Figure 2. Emigration rate of the tertiary educate

Source : <http://www.iab.de/en/daten/iab-brain-drain-data.aspx>

The situation is however different when it comes to the brain drain phenomenon in these East European countries (see Figure 2). While Romania still remains at the top of the list, by having the highest emigration rate of the tertiary educated (20.36% in 2010), Bulgaria’s tertiary educated emigration rate in 2010 (12.22%) was much closer to that of the Slovak Republic (11.65%), Czech Republic (11.5%) and Hungary (13.16%). Poland’s emigration rate was slightly higher at 14.54% in 2010. Therefore, although all 6 countries are

significantly affected by the brain drain, Romania finds itself in a much worse situation compared to the other 5 countries. Moreover, by taking into account that Bulgaria had a very high total emigration rate, but a low emigration rate of tertiary educated, it means that most of the population emigrating from Bulgaria has medium or low skills.

4.1. Romania's emigration patterns

The results of the Romanian 2011 census reveal a considerable population decline of 7.2% compared to 2002. This issue is not new, considering that the population in Romania in 1992 was 22.81 million, in 2002 it was 21.68 million and in 2012 it reached only 19.04 million. The main contributor to this outcome is external migration. Romania has more than 2 million Romanians registered as residents in other EU countries, out of which 70% of them are located in Spain and Italy, making Romania the European country with the largest outflow of migrants. (OECD 2013).

The people who emigrated from Romania are generally from an urban area, the nature of their departure is labor-oriented, they are mostly working age (46% in the 20-34 age group and 25% in the 35-44 age group) and there are around as many women as men emigrating.

A significant part of the Romanian foreign born population in the OECD area in 2000 worked in the agriculture and industry sector (40.1%), while 31.9% of them worked in the personal and social services sector, 16.3% in distributive services and 11.7% in producer services. (OECD 2008).

In 2005, the highest employment rates for the Romanian immigrants were in Great Britain (around 90%), followed by Portugal and Canada (around 80%) and the lowest employment rates were in France (around 57%). (Widmaier & Dumont 2011).

Considering the fact that Portugal, Canada, UK and Ireland were the countries that registered the lowest gaps in employment rates between the native born and the foreign-born and that France was one of the countries with the highest gap, it is not surprising to see these results. (Widmaier & Dumont 2011).

The largest share of the tertiary educated Romanian immigrants in the OECD area in 2000 had an education in Science and Engineering (48.3%). The rest had an education in Education and health (23.6%) or in Humanities and social sciences (24.2%). (OECD 2008).

Docquier, Lowell and Marfouk's (2008) database show that Romania is among top 30 countries in the world in terms of skilled emigration stocks (migrants with any post-secondary education).

During the Communist period, Romanian authorities exercised restrictive exit policies, severely limiting international travelling. Although emigration was kept under control, it still occurred. The share of emigrant population during the period 1975-1989 was 35.5%. (Suciu 2010).

Temporary emigration for the purpose of education or labor also occurred during the Communist era. However, the emigration was state-managed, meaning that the emigrants' labor activities were strictly regulated and family reunification was forbidden (Suciu 2010).

The highest rate of emigration occurred in 1989 when over 40.000 Romanians emigrated, mostly by applying for asylum in other OECD countries. The migration continued after 1989 and the fall of the Communist party.

The emigration of skilled labor left a negative impact on the Romanian economy. The country's accession to EU was associated with significant increases in migration. (OECD 2009).

The transition from a centrally planned economy to a market economy generated a higher unemployment rate in the Romanian labor market, which was a factor for over 2 million Romanians to seek employment opportunities in the Western European countries. The benefit of this flow of emigration is that the level of money transfers back home has increased from year to year. Remittances to Romania were EUR 4.8 billion in 2007, that is 5.5% of GDP. (OECD 2009).

According to Suciu (2010), in the last decade, emigration has started to become a serious issue, as more and more people emigrate due to the lack of opportunities in Romania. The results of the 2011 Romanian census show a sharp population decline by 7.2% compared to 2002. External emigration is the main contribution of this outcome, considering that 1.91% of the population was reported to be temporarily absent (for a period of less than 12 months) and 3.61% of the population was abroad for a period longer than 12 months. (OECD 2013). Therefore, out of the 7.2% decline in population in 2011 compared to 2002, 5.53% is due to emigration, either on a short term or long term basis. This is considered an undercount by the Romanian National Institute of Statistics.

According to the EUROBAROMETER survey in 2002, 18.6% of Romanian students have a desire to emigrate, compared to only 9.1% in the Czech Republic, Hungary, Slovakia and 13.3% in Poland. The other country with 18.6% of students who wish to emigrate is Bulgaria. Minca (2008).

4.1.1 Main destination countries

Between the years 1980-1989, the main destination countries were Germany, the USA, Hungary, Canada and Israel. (Suciu 2010).

According to Suciu (2010), the dominant migration direction has changed with time. Between the years 1990-1995, the main destination countries were Israel, Turkey, Italy, Hungary and Germany. Then, in the period 1996-2002, Canada and Spain have also become attractive in terms of emigration. Starting from the year 2002 until present, Romanians oriented themselves mostly to Italy and Spain. These are preferred destinations especially for those with vocational or less than secondary education who work in agriculture, construction, housekeeping, hospitality or manufacturing.

70% of all Romanian emigrants in 2005/2006 were in Germany, Spain and Italy. To be more specific, 31.1% of them were in Germany, 24.9% in Spain and 13.9% in Italy. (Widmaier & Dumont 2011).

As far as the share of highly educated Romanian emigrants is concerned, the percentage of highly educated Romanians in Germany remained constant at 18.6% in both 2000 and 2005, whereas in Italy it decreased from 9.8% in 2000 to 6.9% in 2005 and in Spain it increased from 13% in 2000 to 16.6% in 2005. Another important aspect is that far more low skilled emigrants than high skilled ones establish themselves in these 3 destination countries. The number of low skilled emigrants is the most overrepresented in Italy, where the

percentage of low skilled is 31.3% while that of high skilled is only 6.9%. (Widmaier & Dumont 2011).

Romanian immigrants represented 9.3% of the total immigrant population in Spain, making Romania one of the top 5 foreign nationalities in Spain in 2005/2006. Romania was also one of the top 5 foreign nationalities in Italy, Greece and Germany, considering that Romanian immigrants represented 7.9% of the total immigrant population in Italy, 2.9% of the total immigrant population in Greece and 4.9% of the total immigrant population in Germany in 2005/2006. (Widmaier & Dumont 2011).

However, the situation was different in 2000, in the sense that in 2000, Romania was not one of the top 5 foreign nationalities in Italy, Spain or Greece. This has very important significations. It means that in 5 years' time, the number of Romanian immigrants in Italy, Spain and Greece increased to such an extent, that they became top representative as a foreign nationality in these countries. (OECD 2008).

On the other hand, Romanian immigrants were in the top 5 foreign nationalities in the following countries in 2000: Czech Republic, Germany, Hungary and the Slovak Republic. (OECD 2008).

One of the main reasons why most Romanians emigrate to Italy and Spain may be that they are Latin-speaking countries, so learning of the language is easier. As a result of the huge immigration of Romanians and Bulgarians in Italy and Spain in the period 2004-2009, the GDP of these 2 receiving countries has increased by 1 ¼ - 1 ⅓ %.

Concerning the highly skilled Romanian emigrants, they tend to emigrate mostly to France, the UK and Germany and work in IT and business and social service sectors. (OECD 2013).

The highly educated emigrants benefit from the skills, knowledge and experience acquired abroad and those of them that returned home were able to make use of them by increasing their productivity at the workplace or by opening their own businesses. (OECD 2013).

4.1.2. Most affected fields

According to the National Agency for Employment and the Labour Inspectorate, in 2007, about 55,260 persons emigrated from Romania under mediated temporary employment contracts (OECD 2009).

Most of the skilled labor has a university education degree either in medicine or IT. About half of the 5000 graduates of Romanian universities in computer science emigrate each year (Ferro 2004).

Concerning the medical field, Romania ranked 18 as a source country for doctors in the OECD countries with an expatriation rate of 10.9% in 2000 (Preliceanu 2008).

Since Romania joined the European Union in 2007, about 14.000 doctors left Romania.

Over the past 2 years, 30% of resident doctors emigrated, reducing the number of physicians from 20.000 in 2011 to 14.000 in 2013 (Fontanella-Khan 2014).

One of the main reasons why Romanian doctors decide to emigrate is the wage gap. The starting salary of a doctor in Romania is around 300 euros, whereas abroad, in a country such as UK or Germany, they can earn around 3000 euros, that is 10 times more.

The main destinations of emigrants working in the medical field are France, the UK and Germany.

One of the attempts in 2014 at reducing the number of medical staff from leaving Romania has been a salary increase of 20-25%. Last year, there was an increase in the health budget, from 3.7% to 4.3% of GDP (Gillet & Taylor 2014).

The main push-pull factors for emigration have been the search for better job opportunities, the desire to acquire a better social status, discontent with the Romanian society and desire for an experience of another culture, knowledge of the French language, familiarity with the French culture, the existing community of Romanian immigrants in France.

In the case of researchers, a few more factors, besides those already mentioned, were significant, such as the lack of possibilities to conduct research at international level in Romania and the low rate of investment in R&D. (Prelipceanu 2008).

Apart from the skilled emigrants, a big portion of Romanian emigrants have been students, who decided to study abroad, mainly in Western Europe and North America and who afterwards decided to stay there due to more job opportunities in their field of study. Considering that university fees have been significantly reduced for Romanian students since 2007, many youngsters choose to emigrate in order to get a better education and remain abroad after graduation, get a job and remain immigrants for the rest of their lives. The reason why most of them do not come back to Romania after graduation is because they would be overqualified and their income would be lower than what they expected.

4.1.3 Measures taken against the brain drain

In order to stimulate the return of the Romanian emigrants, several information campaigns have been organized multiple times in Italy and Spain in 2008, whose focus have been to inform the Romanian expatriates about job vacancies in Romania, about funding opportunities for starting a new business in Romania, about work rights, obligations and risks, about aspects regarding social security (pensions, unemployment, health) etc. Moreover, a strategy focused on stimulating the return or retention of highly skilled emigrants has been attracting foreign investment into the country, particularly in the automotive industry, but also in IT (Google entered the Romanian market in 2010, Ford opened a new car factory in 2012, whereas Renault opened a new research center near Bucharest in 2010). (OECD 2013).

However, because of the fact that the unemployment rate in Romania continues to be high (7.3% in 2013), especially among youth (15-24 group, 23.7% in 2011) and wages are low compared to the rest of Europe, Romania will continue to be a migrant-sending country, with a low rate of return in the near future.

In conclusion, Romanian emigration has had both positive and negative effects on its domestic situation. As far as the positive effects are concerned, these has been lower unemployment rate, decreased pressure on social protection budgets, the amount of remittances, and the fact that workers abroad facilitate skill transfer.

Regarding the negative aspects of the emigration, these include an unbalanced distribution of the available workforce by sector and geographical area, loss of the investment

in education and a possibly future threat regarding the sustainability of the social protection systems (pension, medical care). In addition, Romania also suffers from distorted wage demand, depopulated regions, inflationary pressure due to remittances, social problems with children left behind by migrant parents to be cared for by relatives, etc. (OECD 2013).

5. Conclusion

This paper's objective was to offer a better understanding of the emigration situation, especially the situation concerning the emigration of tertiary educated individuals, in 6 different Eastern European countries, starting from the year 1980, but with a main focus on the recent times.

In order to achieve this objective, first, a general literature review about the brain drain offered a reader a better perspective on the theories and models that have been around since the 1960s until present and how recent literature points out to the fact that brain drain may not be considered entirely detrimental to the sending countries. The brain drain has been shown to positively affect, among other things the incentive to invest in education in the home countries.

The regression analysis of the emigration of the tertiary educated population from Eastern Europe to the main OECD countries in the period 1980-2010 has revealed that the push factors that have the most impact on the emigration are the wages and the education expenditure in the sending countries. Moreover, the effect of wages on the emigration is influenced by GDP per capita and the effect of education expenditure on emigration is influenced by inflation. The results of the regression also prove that Romania, followed by Poland is suffering the most from the brain drain in the period 1980-2010. On the other hand, Bulgaria has been the least affected by the brain drain.

The results of the regression are confirmed by the descriptive part of this paper. These 6 Eastern European countries are indeed affected by the emigration of their educated population to mainly more developed countries in Europe. The brain drain has created specific shortages in the Romania's labor market, especially in the field of medicine, science and research and IT. The main factor, regardless of the occupation of the emigrants that motivates people to emigrate is the significant wage differential between Romania and other more developed countries. In addition, prestige of the working place, access to the latest technology and research are also great influences.

Accession to the European Union increased the emigration rates from these countries, especially in the case of Bulgaria and Romania and to a lesser extent, Poland. Bulgarians and Romanians are more likely to emigrate compared to the Czech, Hungarian, Polish or Slovak population because the economic and social disparities between Bulgarians and Romanians and the rest of Europe is even greater than those between the other 4 countries and the rest of Europe.

In order to improve the current situation of the labor market in the East European countries, several measures could be taken such as improving the worker skills through reforming the educational system in order to make it more responsive to labor market demands, improving labor supply incentives through reforming the social security systems

for example and least but not least opening the labor market to foreign workers, especially those that have the skills that could fill in the shortages.

Since the brain drain most likely cannot be avoided completely in the Eastern European countries, it is necessary to implement some measures in order to reduce its negative effects. Such measures could be for example creating programs that would encourage the return of highly skilled migrants, investing more in R&D, encouraging diasporas and encouraging investment, which would lead to economic development.

Since education is essential for a knowledge-based country, it is of great importance for countries to preserve their skilled manpower in order to be able to have a future successful development. Therefore, considering the fact that these 6 countries need to keep the pace with the rest of Europe, future research about the causes of the emigration from these countries and possible appropriate policies to prevent the brain drain is necessary. Moreover, a future understanding of the pull factors in the destination countries may also be beneficial in order to better see what could be improved in the origin countries.

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Appendix

Model 1

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.972 ^a	.945	.868	1.28534

a. Predictors: (Constant), (real wages) (real gdp per capita), unemployment.tertiary.educated, Czech.Republic, (education expenditure)(inflation), Poland, Slovakia, log real gdp per capita, Bulgaria, Adjusted savings: education expenditure as % of GNI, Hungary, (real wage)(inflation), log.real.wage, CPI 2005=100, (real gdp per capita) (inflation)

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	283.381	14	20.242	12.252	.000 ^b
	Residual	16.521	10	1.652		
	Total	299.902	24			

a. Dependent Variable: Emigration to OECD countries

b. Predictors: (Constant), (real wages) (real gdp per capita), unemployment.tertiary.educated, Czech.Republic, (education expenditure)(inflation), Poland, Slovakia, log real gdp per capita, Bulgaria, Adjusted savings: education expenditure as % of GNI, Hungary, (real wage)(inflation), log.real.wage, CPI 2005=100, (real gdp per capita) (inflation)

Model 2

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.917 ^a	.841	.781	1.92716

a. Predictors: (Constant), (real wages) (real gdp per capita), Hungary, Slovakia, Czech.Republic, Bulgaria, Adjusted savings: education expenditure as % of GNI, (education expenditure)(inflation), Poland, log.real.wage

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	471.245	9	52.361	14.098	.000 ^b
	Residual	89.134	24	3.714		
	Total	560.379	33			

a. Dependent Variable: Emigration to OECD countries

b. Predictors: (Constant), (real wages) (real gdp per capita), Hungary, Slovakia, Czech. Republic, Bulgaria, Adjusted savings: education expenditure as % of GNI, (education expenditure)(inflation), Poland, log.real.wage