Migration Determinants and Potential Impact of Brexit on Migration from the CEE Countries to the UK

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Abstract: The aim of this study is to identify the determinants of migration from the selected Central and Eastern European (CEE) countries to the UK and to measure the potential effects of Brexit on the migration from these states. The inclusion of CEE countries (Poland, Latvia, Lithuania, Bulgaria, Romania, Czech Republic, Cyprus, Slovakia, Hungary) into the EU has increased the number of the UK immigrants, on average, by almost 1300% over 2004-2015, as compared to Turkey, Russia and Ukraine. There is high uncertainty regarding the future UK policies on migration and consequently, regarding the number of immigrants from the CEE countries, but some models were built under two hypotheses: restrictions and no restrictions in the UK immigration. Mixed-effects Poisson models were built under the hypothesis that the CEE migrants will be treated as in the period before their EU entrance. The empirical findings indicate that, after Brexit, the number of the UK immigrants from the mentioned CEE countries might decrease by 2 times, until 2020. Under the hypothesis of no restrictions for the EU immigration, the number of immigrants from the EU in the sample might increase by 4 times until 2020, according to the Bayesian ridge regressions. In this context, the UK should focus on policies that promote immigration of a high-skill labor force and do not limit the number of low-skill immigrants in those fields where there is a deficit of UK-born workers. In case of a decline in the immigration, from the CEE countries, economic issues related to labor productivity, economic growth and government expenditures might appear.

Keywords: immigrants; economic integration; Brexit; CEE countries; migration policy

1   Introduction

In the UK, most of the immigrants came from non-EU countries, but in the course of the Brexit debates, its supporters frequently mentioned EU membership among the causes to leave the Union. Migrants coming from the Central and Eastern European (CEE) countries are perceived as a threat for the UK economy, and this idea has already found some reflection in media. However, the empirical studies suggest that the post-2004 workers' mobility improved economic growth, increased employment rate, and reduce labor shortages in the EU-15 countries. CEE immigrants in the UK contributed to the welfare system in the host country more than they spent using public services. In this sense, Petroff highlighted the contribution of migrants to the public budget which accelerates economic growth [28]. The EU immigrants to the UK did not harm salaries, public services or jobs. Moreover, they alleviate the issue of population ageing. The real cause of the output decrease in the UK was the global financial and economic crisis which started in 2008 and not the EU immigrants' inflow.

There is a high uncertainty regarding UK migration policies after Brexit. Knowing that the migration issue was one of the arguments for Brexit, lower immigration from the EU states, CEE especially, is expected in the coming years. The UK restrictions on the EU migration will have consequences for British economy that might experience lower economic growth and more government's expenses for public services [46] [44].

In this paper, the main objective is to measure the impact of economic integration and of Brexit on the migration process from the selected CEE countries to the UK. We will identify some economic and social determinants of migration from the CEE countries to the UK. Moreover, the increase in the number of the UK immigrants due to the EU membership will be analyzed, making also comparisons with those CEE countries that are not EU members. Only the CEE countries with a large number of immigrants in the UK were included in this analysis. The specific nature of data allows us estimating Poisson models to assess the impact of the EU membership on the UK immigration and to predict the possible effects from Brexit on the UK immigration. Moreover, the impact of the EU membership on migration was assessed by comparison with other non-EU countries like Russia, Turkey and Ukraine that have been also sending migrants to the UK quite actively. According to difference-in-difference estimations, if no policies of reducing migration will be applied, until 2020 the number of immigrants coming from the mentioned CEE countries after Brexit could decrease twofold. The current immigrants could choose to come back to their countries of origin or, most probably, they will migrate to other EU countries. In case no migration restrictions are applied, the same economic and social factors will continue attracting migrants to the UK, thus, their number will continue to increase by 4 times until 2020, as compared to 2017.

The paper is structured as follows. After this Introduction, a brief literature review is provided, highlighting the main directions in research on the issues of migration from the CEE countries to the UK. Next two sections provide a methodological framework and empirical results on the economic and social determinants of migration in the UK and the EU membership on migration. Based on these empirical results, two types of scenarios are provided concerning the number of the UK immigrants after Brexit. The last section concludes.

2   Literature Review

The literature review will focus on few directions of research related to migration from CEE countries to the UK:

- The economic and social determinants of the migration from less developed countries in the Central and Eastern Europe to the UK, highlighting the importance of the EU membership for migration in case of some CEE countries

- The issue of immigrants from EU countries as argument for Brexit

- The potential impact of Brexit on the number of immigrants in the UK, especially immigrants from CEE countries [39]

The labor resources migration to a destination country might be described by the neo-classical approach that explains the decision to migrate by the structural determinants at macroeconomic level and the individuals' decisions at microeconomic level that act in a rational way for improving the living conditions [1] [2]. The unequal geographical distribution of labor force and capital is the main cause of migration. The macroeconomic determinants of migration (differences in income and unemployment rate between origin and destination country, social welfare and life cost in the receiving country compared to origin state) are connected with microeconomic determinants (the individual decision based on the comparison between costs and benefits of migration). The migration is justified only if the benefits in the destination country are higher than in the origin country [18].

If we focus on the determinants of migration to the UK, the economic reasons are the most important cause for migrating to the UK. The macroeconomic determinants from neo-classical theory apply also for the UK together with individual decisions based on better living conditions. The economic determinants for moving in the UK refer to output per capita, unemployment and wage differentials as well as consistent economic disparities between regions as Simionescu showed [38]. Contrary to previous studies from literature [15] [28] [41] in this empirical study, the economic and social determinants of migration to

the UK were determined for each EU member state in the CEE. Actually, a specific profile of macroeconomic determinants for each origin country of migrants was built.

Galgóczi et al. indicated that the decision of migration from CEE countries to the UK is related to the need of a job [15]. Initially, the decision of migrating is freewill and with the intention to stay a limited period, but, after leaving the origin country, the emigration might become permanent. Unlike the non-EU citizens, the EU migrants from Central and Eastern Europe intend to stay only few weeks or months.

According to Springford (2013), the welfare gap is one of the main reasons of migration for migrants from CEE states. Therefore, the migrants are interested in receiving a job in the UK. Springford showed that only 0.8% of the EU immigrants have unemployment benefits one year after their arrival in the UK [41]. 71% of immigrants from EU countries chose to come in the UK for jobs. 6% of the EU migrants from UK are unemployed, but they do not ask for allowance support [28].

Unlike the previous period of communist regime, when migration reasons were related to the issues of transition economy and poverty pressure, after joining the EU, migrants from CEE countries were driven by the desire for a better life.

The migration decision to the UK of migrants from A10 countries might also be explained by the dual labor market approach. Before third EU enlargement, the UK had a lot of jobs in sectors with intensive physical work and low productivity that were not wanted by natives. Therefore, the United Kingdom was one of the countries that agreed with the EU enlargement from 2004 and was one of the few countries that did not impose high restrictions to migrants from CEE countries, as Cini and Borragán explained [6]. Before enlargement, the UK had the right to control its borders and it was exempt from a few asylum regulations and common standards on immigration in relation to CEE countries migrants [42].

The migration networks also contributed to a large immigration during the last ten years. For example, the Poles had a big community in the UK even before Poland's integration in the EU and after 2004 a climate of enthusiasm encouraged the Poles movement to the UK, as Salt and Okólski showed [35]. Actually, Poland is the country with the largest community of migrants in the UK. The higher wages in the UK than those in Poland attracted many Poles, even if illegal migrants have lower salaries than the minimum level in the UK. Drinkwater et al. [9] and Pollard et al. [29] used regression models to show that Polish migrants emigrated in the UK for economic reasons like: high unemployment and low salaries in Poland and slow economic growth in the origin country. Even if some Poles are high skilled, they make unqualified work, because they receive more money than in Poland [23] [24]. According to Clark and Drinkwater and Scott, even the other high-skilled migrants from CEE countries accepted unqualified jobs [8] [36]. The empirical results based on surveys among Polish immigrants

identified the following determinants of migration: few opportunities in Poland, financial issues and high aspirations for personal and professional development [7]. Moreover, English is the second more spoken language in Poland which encouraged Poles to choose the UK as destination country [35].

This large number of immigrants from Poland and other CEE countries represented a strong argument for Brexit. In this context, the migration control was proposed after Brexit. Indeed, Ebell and Warren proved that EU membership had a positive impact on the number of UK immigrants, because of free capital movement and because of free goods and services trade, including labor mobility and pass porting that transformed the UK is a favorite destination country for emigrants in the entire Europe [12]. Moreover, the recent studies from literature do not underline the large number of immigrants from A10 countries, but also the negative attitude of media regarding some communities from CEE countries [10] [13] [22] [33] [37] [40]. For example, Spigelman (2013) showed that the negative attitude regarding Poles in the period 2004-2008 was not consistent with reality. The British media and population consider that uncontrolled immigration will negatively influence the Britons' salaries, jobs and even the life quality [4]. On the other hand, the economists showed the benefits of the EU immigrants for the UK economy. The immigrants use services and goods that stimulate demand and bring more jobs opportunities. Many recent studies in literature [11] [31] [46] showed that the immigration growth did not have a significant impact on the number of jobs and on the wage levels of the UK-born workers. Wadsworth et al. observed that the regions with high increase in the number of EU immigrants did not have greater fall in the number of jobs and in wage levels for the UK-born people [46]. After 2008, the wages decreased because of the global financial crisis.

The extra resources brought by the UK immigrants could be used for growing the spending on local health and education for the UK-born people. The EU migrants brought more resources for public services than their expenditure for education and health. The reduction of EU immigration would bring greater austerity. Geay et al. did not find any significant impact of immigration on education expenditure [16] while Wadsworth showed a lower usage of medical services by the UK immigrants from EU countries, because most of the EU immigrants are younger than non-EU ones [47].

According to empirical researches, the EU immigrants brought also other benefits to the UK economy. Ortega and Peri and Ottaviano et al. identified a positive effect of high-educated migrants on the labor productivity in the UK [25] [26]. Moreover, Felbermayr et al. concluded that the increase in the immigrants' stock by 10% generates, in average, an increase in the income per capita by 2.2% [14].

In this empirical study, we assess the impact of immigration from some EU countries in the CEE on some macroeconomic indicators (real economic growth, employment rate, health and education expenditure). In this case, we use a Bayesian approach that was not employed before in literature, but that is suitable for small time series.

The evaluation of the impact of Brexit on EU migrants in various studies from literature takes into account the number of immigrants after Brexit and, consequently, the effects of changes in immigration on the UK economy. In case of restrictions on immigration from CEE countries, our empirical findings are in line with other studies from economic literature. Portes and Forte and Vargas-Silva anticipated a decrease in the number of EU immigrants in the UK, because of the possible restrictive migration policies after Brexit [31] [43]. On the other hand, the young people from 1.5 generation, living in the UK and coming from Central and Eastern Europe, do not intent to leave this country after Brexit and they feel they belong in Britain [43].

However, none of the previous research focused only on CEE countries immigrants. Actually, the real problem of Brexit supporters was the migrants from CEE states and not from all EU countries.

It is possible that more restrictions on these specific countries, will be imposed, in terms of migration policies, after Brexit. In this context, the UK policies should focus on the attraction of new immigrants. According to Woodford, government policies should concentrate on skills and not on workers' origin countries [48]. This type of policy might increase the productivity. After Brexit, fewer workers with low salaries might exist.

Other restrictions for reducing the number of migrants from CEE countries will not be in the benefit of the UK economy. In case of a significant decrease in the number of EU immigrants, the benefits of even highly-skilled sectors are doubtful [3] [4]. The high decrease in the number of migrants will have damaging effects in sectors like manufacturing, health, food processing, cleaning and tourism [4].

The Brexit supporters expect a control of EU migration, but if the UK will chose trade agreements with the EU (European Economic Area or European Free Trade Area), it should ensure free labor movement for EU citizens like Switzerland and Norway [42]. If Norway model is taken, more EU immigrants than wanted will be received in the UK. If the Switzerland model will be followed, the access to the Single Market is partial, but the EU immigration is not controlled [34]. According to Vargas-Silva, a restriction might appear when the UK asks for a more relaxed trading agreement, having more trade costs [45].

In our empirical research, we also considered a scenario after Brexit when no restrictions on migration are taken into account. A liberal policy on migration might grow the GDP until 2030 [3]. Chu showed that a lower decrease in the UK economic performance will be achieved after Brexit in case of a low decrease in the EU immigration [5]. In our opinion, the UK should receive the EU immigrants from CEE countries in order to cover the necessity of low-skilled jobs. This will stabilize the GDP and will ensure a growth in income per capita [3].

In the case of a post-Brexit points system, the UK should implement a temporary migration scheme or a preferential treatment for the EU migrants [34]. Another solution could be some bilateral agreements with certain EU countries.

Considering the possible effects of Brexit on the number of EU immigrants and on the UK economy, we consider some post-Brexit scenarios for the number of migrants from some EU countries in the central and Eastern Europe. Moreover, some policy measures are indicated in order to alleviate the negative consequences of migrant decline on the UK economy. These scenarios after Brexit were considered by taking into account macroeconomic determinants of migration to the UK (optimistic scenario with no restrictions on migration) and EU membership (pessimistic scenario with restrictions on migration).

3 EU Membership as Determinant of Migration to the UK and a Pessimistic Scenario for the Number of Immigrants after Brexit

The mixed-effects Poison regression models are used to estimate the number of CEE countries immigrants in the UK. In general, mixed-effects Poison regression model are employed for describing the expected counts number in a period when certain events are registered. The event in this study reflects the entrance of a CEE country in the EU and it takes place in a certain year (2004 or 2007). The count data for dependent variable allows the use of the Poisson models.

We considered 7 countries that entered EU in 2004 (Poland, Latvia, Lithuania, Czech Republic, Cyprus, Slovakia, Hungary), 2 states that became members of the EU in 2007 (Bulgaria, Romania) and 3 countries out of the EU (Turkey, Russia and Ukraine).

The differences-in-Differences (DD) estimation is used to make comparisons between groups of elements after a certain treatment or intervention. In our case, the entrance into the EU is the event and the groups are represented by countries that entered the EU and countries that are not in the EU. In this case, there are two groups of countries: countries in treatment (those that entered into the EU at a certain moment) and control countries for years before and after the European economic integration. Y_{ist} is the outcome for country i from group s (country s) by moment t, being represented by the number of immigrants. A dummy variable I_{st} is added for marking the effect of the intervention (entrance in the EU) of that group at a certain time.

$$Y_{ist} = A_s + B_t + cX_{ist} + \beta I_{st} + e_{ist}$$

A_s, B_t - fixed effects

X_{ist} - individual control

e_{ist} - error

The dependent variable in the approach based on difference-to-difference estimator is represented by the number of immigrants from the 10 mentioned CEE countries. The explanatory variables will refer to: the quality of EU member (it takes the value 1 in case of EU membership and 0 else), the year when the entrance in the EU took place and a variable computed as a product of the previous two variables. The impact of the intervention (the entrance in the EU) is measured by the estimate of β.

In this empirical research, only some particular CEE countries were chosen from a representative sample of 60 countries that have a large number of emigrants in the UK. For the rest of the CEE countries, the data are not available or the number of emigrants is not significant. In the mixed-effects Poisson models, several explanatory variables were considered: real wage, real GDP per capita and unemployment rate in these origin countries of the migrants, distance between London and the capital of each country. We introduced a dummy variable (denoted by EU member) to show the countries that are EU member states in a certain year. The models use panel data for the mentioned 12 countries and the period 2004-2015. Poland, Latvia, Lithuania, Czech Republic, Cyprus, Slovakia, Hungary entered the EU in 2004. Bulgaria and Romania became EU member state in 2007. The data for the number of immigrants were provided by the Office for National Statistics in the UK. The distances between London and the capital of each state were provided by http://www.distancefromto.net/, being measured in kilometers and they refer to air distances. The data for the other variables are taken from the World Bank database.

Table 1

Mixed-effects Poisson models for explaining the number of the UK immigrants from selected countries (2004-2015)

Variable	M1			M2		
	Coefficient	z-computed	P>|z|	Coefficient	z-computed	P>|z|
Wage	0.011	80.88	0.000			
GDP per capita	-0.0004	-77.55	0.000	-0.00005	-22.26	0.000
Unemployment rate	-0.09	-26.55	0.000	-	-	-
EU member	10.178	40.26	0.000	6.5253	28.75	0.000
Distance	-	-	-	0.0073	0.74	0.000

Constant	2.770	11.47	0.000	-1.6367	-6.05	0.000
Random effects parameter						
EU member: independent	Estimate					
sd(ln(distance))	0.0022	0.0012	-	0.0014	0.0007	-
sd(constant)	$3.89 \cdot 10^{-9}$	0.0415	-	$2.23 \cdot 10^{-8}$	0.0430	-

As expected, the M1 model indicated that the EU membership encouraged the emigration from selected countries to the UK. The EU countries sent by 2 times more migrants in the UK compared to the non-EU countries. The results are consistent with expectations. Most of the EU states imposed restrictions to migrants from new EU members, excepting Cyprus and Malta, because of the concerns about negative impact of migration on labor market. Only the UK with Ireland and Sweden opened the labor market immediately after 2004 [20] [58] and attracted many migrants eager to work. The only restriction imposed by the UK referred to the adoption of a scheme requiring the registration of the EU-28 workers with the Home Office.

The changes in the GDP per capita in the selected CEE countries had a very low and negative impact on the emigration process towards the UK. As expected, states with low GDP per capita send more migrants to developed countries like the UK. The fall in GDP per capita is associated with higher poverty and less jobs opportunities. All the CEE countries have lower GDP per capita than UK and some migrants from CEE countries choose the UK as destination country. This behavior of the migrants explained by economic reasons is in line with other conclusions from literature. For example, Hatton and Wiliamson showed the correlation between GDP per capita changes in host country and the migration flow in the richer destination country for more continents [17]. If the GDP per capita in West Europe grows by 10 percent, then the migration to the US decreases by 12.6 percent. In our case, if the GDP per capita in a CEE country doubles, the number of migrants to the UK decreases by only 0.04 percent. If we compare the results with the previous ones for EU membership, we can conclude that CEE migrants were stimulated more to come to the UK by the free movement of workers than by the poverty in the origin country.

Contrary to expectations, unemployment rate had a negative impact on the number of the UK immigrants belonging to the mentioned countries and the wage had a positive impact. An explanation for these results might be the fact that the CEE emigrants are not necessarily represented by people that do not have any job in the origin country. They were looking for a higher salary in the UK, the wage in the origin country being not satisfactory. The recent economic literature focused on the brain drain phenomenon in the Central and Eastern Europe [19]. The high skilled labor resources go to developed countries where the salaries are better. The public policies in the origin countries are not in the favor of qualified adults and

the brain drain represents an important capital loss. On the other hand, the brain drain might have long run positive effects in terms of remittances sent to origin countries [21].

In the case of Brexit, the number of immigrants in the UK from EU countries in the sample might decrease by 99.9%, according to M1 model. Moreover, the negative impact of unemployment has to be cautiously considered, because there are a lot of low-skilled immigrants in the UK from CEE countries. Many of these migrants are not considered when the unemployment rate in the origin country is computed, because as low-skilled people they are part of the underground economy.

The results based on second mixed-effects Poisson model (M2) were similar with those based on the first model. The reasons for these findings are exactly the same as for the previous model. The M2 model showed again that the EU membership positively influenced the UK immigrants from CEE countries, because of the labor market openness after the 2004 EU enlargement. The distance did not have a significant impact on the emigration from CEE countries to the UK. This empirical finding is similar with the conclusion of Pytlikova who indicated that distance has a low influence in selecting emigrants' destination country in the last decades [32]. The fall in the GDP per capita in the origin country is not a strong argument for migration in the case of CEE emigrants that come to the UK. This result is contrary to the expectation of Hatton and Wiliamson for the migration between continents [17]. The correlation between migration and GDP per capita is negative, but not so strong. A possible explanation could be the fact that the underground economy still could ensure jobs in the origin country. In the case of Brexit, the conclusion is similar with that based on the previous model. According to M2 model, the number of UK immigrants in the UK from EU countries in the Central and Eastern Europe might decrease by 99.8%.

A second approach supposes a comparison between EU states from Central and Eastern Europe and Turkey, Russia and Ukraine. A type of counterfactual analysis (difference-to-difference estimator) measures the impact of the intervention (CEE countries integration in the EU).

Table 2

The approach based on difference-to-difference estimator for explaining the number of the UK immigrants (M3 model) from selected countries (2004-2015)

Variable	Coefficient	t-computed	P>|z|
Year	1.2664	1.72	0.089
EU member	-25934.96	-2.38	0.019
Year x EU member	12.9453	2.38	0.019
Constant	-2514.32	-1.70	0.092

Prob. > chi-square=0.000
Source: own calculations

According to the approach based on difference-in-difference estimator, the integration of some CEE countries in the EU had a positive impact on the number of UK immigrants. The coefficient corresponding to variable *year* is not significant at 5% level of significance. Therefore, we can state that even before the integration in the EU, many migrants from CEE countries chose the UK as destination country. Actually, the political context after 1990s when CEE states made the transition from communist regime to a market economy and a democratic society changed the migration behavior. Since 1990 these CEE countries sent many emigrants to developed states from the West of Europe. The 2004 EU enlargement intensified the labor mobility from seven of the CEE countries to the UK. The 2007 enlargement increased the number of immigrants from Romania and Bulgaria in the UK [27].

Being in the EU, the number of the CEE countries emigrants to the UK increased, in average, by almost 13 times during 2004-2015 compared to the group of countries represented by Turkey, Russia and Ukraine. This group of non-EU countries has some migrants in the UK, but their behavior was influenced a long time by the political context in their origin countries. Most of the Turkish people in the UK came from Northern Cyprus because of the economic issues and of difficult political context with Greek Cypriots. Many Russians came to UK from Baltic countries after their entrance in the EU. Large groups of Ukrainian people were moved to UK after the end of the Second World War. From this moment until the mid-1980s, because of the restrictions regarding emigration from the USSR, only few Ukrainians came to the UK. The number of Ukrainian people in the UK increased only after the liberalization of the political system in the second part of the 1980s.

So, it is more than likely that the Brexit will have a high impact on the number of the UK immigrants from the CEE countries that are already EU member states. Possible restrictions of the UK regarding the free access of foreign people on the labor market will bring changes in the number of CEE immigrants. Some of them could orient to the remained developed countries from the EU [38].

4   Economic and Social Determinants of Migration to the UK and an Optimistic Scenario for the Number of Immigrants after Brexit

For each country in the selected sample, we check the empirical determinants of emigration from that country to the UK. Among potential determinants several macroeconomic indicators registered for UK economy were considered: real economic growth, health expenditure (% of GDP), employment to population ratio (%), adjusted net national income per capita (constant 2010 US$), GDP per person

employed (constant 2011 PPP $), expenditure on education as % of total government expenditure (%). Some Bayesian ridge regressions were estimated and the significant explanatory variables were identified. The dependent variable that is explained is represented by the number of the UK immigrants from each country. The coefficients of the ridge regressions follow a normal distribution and the errors' variance follows an inverse gamma distribution. An explanatory variable in the regression is significant if PP1SD (Posterior probability that the standardized coefficient is within 1 standard deviation of 0) is less than 0.5.

For Cyprus and Turkey, none of the proposed macroeconomic determinants did not influence the number of UK immigrants. In case of Poland, the migrants were attracted by health expenditure, income per capita and expenditure on education in the UK. All these indicators reflect a better standard of living in the UK compared to CEE countries. So, the immigrants were attracted by the high expenses on public services meaning a better quality of public services and by better living conditions. Our results are more close to the conclusions of Ciżkowicz et al. (2007) based on surveys that consider the high aspirations of Poles for personal development an important determinant for migration in the UK [7]. Health expenditure and income per capita were the main determinants for Lithuanian migrants.

In case of Romania, Czech Republic, Slovakia, Bulgaria and Latvia, the migrants were attracted by health expenditure, income per capita and GDP per person employed in the UK. This shows that the migrants from these countries are more interested in the living conditions. Beside these indicators, migrants from Ukraine are also attracted by employment opportunities, while migrants from Hungary take also into account the expenditure on education. Russian migrants are only interested in the employment opportunities in the UK. Our empirical findings confirmed previous studies from literature that show that the main cause of the migration from CEE countries to the UK is the welfare gap [41]. Moreover, our empirical results are a step forward, because the causes of migration in the UK are identified separately for each CEE country. Russians and Ukrainians are focused on employment compared to the EU countries in the sample that look only for a better standard of living.

Table 3

Macroeconomic determinants of immigration in the UK from mentioned countries (2004-2015)

Country	Coefficient of (PP1SD in brackets):						Determinants:
	Real GDP growth	Health expenditure	Employment rate	Income per capita	GDP per person employed	Expenditure on education	
Poland	-6.544 (0.66)	164.696 (0.048)	18.533 (0.638)	138.388 (0.124)	13.363 (0.643)	-48.350 (0.434)	-health expenditure -income per capita -expenditure on education
Lithuania	5.262	31.778	-2.061	36.294	-9.043	-7.958	-health expenditure

	(0.634)	(0.128)	(0.658)	(0.103)	(0.539)	(0.562)	-income per capita
Czech Republic	0.288 (0.6010	8.753 (0.022)	0.387 (0.658)	8.952 (0.027)	-2.421 (0.363)	-0.747 (0.624)	-health expenditure -income per capita -GDP per person employed
Romania	-0.803 (0.603)	52.172 (0.14)	20.253 (0.51)	65.422 (0.082)	29.765 (0.285)	-8.542 (0.617)	-health expenditure -income per capita -GDP per person employed
Cyprus	-0.296 (0.658)	0.884 (0.621)	-0.557 (0.646)	0.905 (0.619)	1.066 (0.602)	-0.679 (0.638)	-
Bulgaria	2.765 (0.625)	18.887 (0.041)	4.665 (0.543)	15.199 (0.13)	-6.718 (0.341)	-4.253 (0.501)	-health expenditure -income per capita -GDP per person employed
Slovakia	-3.031 (0.559)	7.979 (0.216)	-1.043 (0.649)	8.219 (0.23)	6.133 (0.262)	-0.573 (0.658)	-health expenditure -income per capita -GDP per person employed
Hungary	3.678 (0.635)	25.249 (0.076)	12.014 (0.375)	28.65 (0.059)	-14.626 (0.159)	-7.396 (0.446)	-health expenditure -income per capita -GDP per person employed -expenditure on education
Latvia	5.745 (0.599)	23.474 (0.121)	4.944 (0.609)	26.292 (0.104)	-10.621 (0.376)	-5.456 (0.567)	-health expenditure -income per capita -GDP per person employed
Turkey	0 (0.663)	0 (0.663)	0 (0.663)	0 (0.663)	0 (0.663)	0 (0.663)	-
Ukraine	-0.743 (0.536)	1.433 (0.313)	1.272 (0.346)	1.748 (0.246)	1.152 (0.338)	-0.018 (0.663)	-health expenditure -income per capita -GDP per person employed -employment rate
Russia	1.248 (0.592)	1.822 (0.531)	-1.973 (0.501)	3.089 (0.355)	1.157 (0.557)	-1.13 (0.607)	-employment rate
EU member states in the sample	-1.198 (0.663)	345.586 (0.058)	71.895 (0.586)	359.788 (0.065)	-73.585 (0.539)	-94.773 (0.459)	- health expenditure -income per capita -education expenditure

In case the UK will chose to eliminate any restriction for migration of the people from the mentioned EU member states (Bulgaria, Poland, Romania, Latvia, Lithuania, Hungary, Slovakia, Czech Republic and Cyprus), the number of immigrants from these countries might increase by 4 times. This is an optimistic scenario under the assumption that free movement of people from EU countries

will not be restricted. If we take all the EU member states in the sample, education and health expenditure as well as income per capita are the main causes of migration. Therefore, we will consider only these three determinants as seen in the equation (2), being the most relevant from the set of six potential determinants. The Bayesian regression based on these predictors will be used to forecast the number of UK immigrants from these countries until 2020. We will keep the same public expenditures like in 2015, while the income per capita will have the value of the World Bank's prediction for 2020:

Immigrants= 292.239 x health_expenditure+ 302.549 x income_per_capita − 68.4 x education_expenditure (2)

The previous equation will be used to predict the number of immigrants from the EU member states in the sample after Brexit until 2020, under the hypothesis that the UK will not put any restrictions to migration from EU countries.

The empirical results based on a Bayesian approach (Bayesian ridge regression models) showed that the number of immigrants from the seven countries that became EU member states after the second enlargement had a significant, but low impact on employment rate and health expenditure. When the immigration from these countries increased, the employment rate decreased, because many of these migrants work in black market. When the number of immigrants increased, the health expenditure also increased, but very low. A similar result was presented by Wadsworth who measured a low positive impact of EU immigration on the health spending [46]. A possible explanation could be that EU immigrants are younger and do not need special medical care.

Table 4

The impact of immigrants on various economic variables (2004-2015) (immigrants from Poland, Hungary, Slovakia, Czech Republic, Lithuania, Latvia, Cyprus)

Dependent variable	Coefficient of immigrants	PP1SD
Real GDP rate	0	0.663
Employment rate	-0.272	0.32
Health expenditure	0.4	0.013
Education expenditure	-0.004	0.646

The immigrants from the selected countries did not have a significant impact on the UK economic growth or on the education expenditure. Our empirical results are in line with Geay et al. (2013) who showed no impact of the UK immigrants on education expenditure. Therefore, we can state that our empirical results are in line with the previous studies from literature [11] [30] [46], that do not consider the immigrant issue as a correct argument for Brexit.

Conclusions

In this paper, some macroeconomic determinants of migration from CEE countries to the UK were identified and possible impact of Brexit on the number of migrants

from these countries was assessed. As expected, the EU membership of some countries had a significant and positive impact on the number of the UK immigrants. In the case of Brexit, the number of EU states from Central and Eastern Europe might decrease by 2 times until 2020, according to results based on mixed-effects Poisson models. Compared to Russia, Turkey and Ukraine, the number of CEE migrants in the UK increased, in average, by 13 times in the period 2004-2015 just because of the EU membership.

If we strictly consider the macroeconomic determinants of migration to the UK, the better living conditions attracted many CEE migrants as the results of Bayesian ridge regressions indicated. In case no restrictions on migration will be considered for A10 countries, the number of immigrants from these countries might continue to increase by 4 times until 2020. On the other hand, our empirical results confirmed the previous studies and CEE migrants did not affect the education expenditure or the jobs of natives [30] [46].

This empirical research is limited by the data availability for some indicators. For the other CEE countries, the Office for National Statistics did not provide the number of the UK immigrants. A lower number of migrants from CEE countries in the UK could be explained by the expected restrictions of the UK Government for migration from these countries. The decrease in the number of EU immigrants was also predicted by Portes and Forte [31].

Two important migration policies should be taken into account after Brexit. The UK imposed a cap of 20,700 Tier 2 visas for each year. If this measure is applied to EU nationals, the number of EU workers will dramatically decrease. Moreover, another policy stated that most non-EU nationals with Tier 2 visas could stay permanently in the UK only if they earn a minimum of £35,000 per year. With some exceptions, the migrants who earn less than this threshold could not stay more than 6 months in the UK. Most of the actual EU nationals do not earn this money and if the rule is applied, they have to leave the UK or temporary stay here (Vargas-Silva, 2016). So, the current migration policies of the UK indicated a clear decrease in the number of EU immigrants.

After Brexit, a policy that controls immigration would lower the economic growth, even if the impact on the output per capita GDP could not be so significant. The UK has many policy options after Brexit. The Switzerland or Norway models will promote free movement, but some bilateral agreements with several states will negatively affect the UK economic performance. In case the UK will not choose policies for a limited reduction in the number of EU immigrants, the labor market flexibility and labor productivity will decrease and the UK economy could have more frequent recessions. A good recommendation could refer to policies that take more into account the labor market flexibility after Brexit than measures for limiting migration in the origin countries of the immigrants.

This study could be continued by selecting other determinants of immigration in the UK. The poverty that affects the CEE countries could explain the orientation towards an economically developed country as the UK, but a long data series for poverty rate is not available for all the CEE states. In the context of restrictions on migration after Brexit, the emigrants from CEE countries should consider other destination countries from EU. The number of the existing UK immigrants could be affected by the policy measures after Brexit, but stable immigrants have low chances to leave the UK.

Our empirical results have some limitations, being affected by the uncertainty regarding the future UK policies on immigration after the exit from the UK. In the first scenario, we work under the assumptions that all the advantages of EU members in terms of migration before Brexit will be dropped. We made this hypothesis because migration issue was brought as a strong argument for Brexit. Vargas-Silva also considered that free movement of workers will be an unpopular option, because the migration issue as Brexit argument [46]. If the UK government will not impose significant restrictions, regarding labor market mobility of the CEE countries migrants, the number of immigrants from these states will not be significantly affected. In the second scenario, free movement is promoted, as in the period after the A10 integration in the EU. In this case, the number of immigrants will continue to increase.

Acknowledgement

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