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Impact of High-Skilled Migration to the UK on the Source Countries (EU8) Economies

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Abstract. *The majority of studies into the economic effects of high-skilled migration focus on aggregate impact on the economic output in the countries of destination. The economic impact of migration of the highly qualified on the economies of the countries of their origin has been examined less. This qualitative research aims to address that gap by identifying the economic effects of high-skilled migration on Central and Eastern Europe, the region which faces many long-term challenges to its economic development. We use the available data from the UK International Passenger Survey for the 2004-2016 period to test whether the outflow of highly qualified workers from the EU8 countries to the UK is detrimental or beneficial for the growth of sending economies in the short and long term. In order to test these hypotheses, econometric time series analysis methods of structural vector autoregression and cointegration were applied. Our results have shown a positive short-term effect of brain outflow on regions' GDP and wage growth as well as unemployment; on the other hand, we presented empirical evidence in support of the hypothesis of the negative long-term effect of high-skilled migration on EU8 countries' GDP and wage growth as well as unemployment. These results are fairly robust to imply that a negative view on high-skilled migration from EU8 is broadly consistent with the previous findings of "harmful brain drain" scholars.*

Keywords: *high-skilled migration, economic growth, EU8 migration, UK immigration*

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Introduction

Movement of the highly educated across international borders for better opportunities abroad as a significant part of global migration flows has become an increasingly discussed topic among policy makers and researchers (Iredale, 2005; Breinbauer, 2007; Agrawal et al., 2011). It poses a challenging question in terms of economic growth. In addition, facing shortages in skilled workers in some professions and rapid ageing of the societies are the issues likely to gain more importance in the future. While there is a preexisting notion that immigration of skilled professionals is not the most effective method of solving demographic issue of ageing societies (Segendorf & Theobald, 2019), it may have a positive effect on reducing average age structure in receiving countries and expanding of the workforce. Therefore, ageing populations in the developed countries cause competition for skills and talent from abroad in order to sustain existing levels of innovation and entrepreneurship as well as to keep the welfare systems intact (Huber et al., 2010). Developing countries, on the other hand, may face labour shortages due to the increased demand in foreign labour markets for such labour force. As a result, 'human capital flight' requires changes in the policy area – facilitation and effectiveness of skill transfer among countries (with the ultimate goal of brain circulation) is taking up an important part of policy agenda in developed and developing nations and the EU in general.

The central contribution of this paper to the literature in the field is that current research is one of the few studies that consider the impact of emigration on the particular set of sending countries. The aim of the present paper is to examine the effects of high-skilled migration to the United Kingdom on sending countries' (EU8) main economic indicators – GDP per capita, wage growth, and unemployment.

1. Modern approaches to the economic implications of brain mobility

In this section, we review the body of literature that helps contextualize our approach. Historically, since the 1960s, in order to reflect the phenomenon of international highly educated labor force mobility, the terms of "brain drain", "brain gain", and "brain waste" came into academic, political and public discourse (Docquier, 2014). These migration concepts describe labor force mobility as bipolar and long term (as it was the case in South-North migration), also as a zero-sum game process, leading to new asymmetries and inequalities between sending and destination countries, where developing countries lose their human capital and are deprived of economic development, whereas developed countries acquire human capital and continue with economic growth. The most commonly used term "brain drain" refers to the international transfer of "human capital resources", mainly in the sense of the migration of highly educated individuals from less to more prosperous countries (Beine, Docquier & Rapoport, 2008).

In the rapidly growing literature on the relation between migration and economics, it is argued that nowadays brain migration is somewhat different – it is a complex,

non-unidirectional and not necessarily long-term process (Breinbauer, 2007; de Haas, 2010). Due to the weakening of labor market constraints and more flexible immigration policies, high-skilled migration may no longer be the subject of one-sided benefits for the receiving country. On the contrary, many researchers believe that migration of highly educated individuals could result in both the sending and receiving countries being better off if brains "circulate" (Iredale, 2005; Saxenian, 2005; Teferra, 2005; Velema, 2012). According to the European Commission (2005), "brain circulation" is the process when the sending country experiences positive effects due to return migration or diaspora networks if qualified professionals acquire the skills and know-how abroad and invest (or encourage investments) in their countries of origin therefore generating spillover effects on the whole developing economies.

Naturally, such different views of "migration pessimism" in the sixties and "migration optimism" three decades later pose a question of whether there is empirical evidence of economic costs and benefits to a country of origin from high-skilled migration. Grubel and Scott (1966) and Berry and Soligo (1969) were the first researchers confronting the negative and positive implications of the brain drain for the sending countries. It should be noted that relationship between high-skilled migration and economic indicators was investigated through a range of disciplinary lenses, the notion of coevolution from evolutionary economics is highly relevant to address; recently, it also attracted a considerable amount of attention (Simandan, 2019; Saviotti, & Metcalfe, 2018).

Factors in donor/sending countries affected by brain migration include economic growth, wages, unemployment, remittances, knowledge sharing from current migrants to home country governments or businesses, transnational networks, involvement in trade, foreign direct investments.

Beine, Docquier and Rapport (2008) find a *negative* relationship between brain emigration and GDP per capita due to reduction in human capital. Moreover, emigration could also have detrimental effects on demography of a sending country if young talent migration is prominent, thus decreasing GDP per capita (Marchiori, Shen & Docquier, 2012). The authors distinguish technological process as a mechanism through which high-skilled emigration could affect GDP change in a negative manner. The authors suggest that total factor productivity could decrease as a result of lost talents who otherwise would innovate and adopt technologies in their countries of origin.

Positive effect of brain migration could be also found in the scientific literature. Sending countries might nevertheless benefit from highly qualified emigration through remittances, reduced level of unemployment (and associated spending), transnational networks or knowledge transfer. Saxenian (2005) argues that some brains are particularly prone to circulation and beneficial brain drain, such as engineers and entrepreneurs, who armed with linguistic and cultural know-how might adopt business models or attract foreign direct investment (FDI) in their home countries, where there is information asymmetry for foreign investors. Estimates by other authors find a positive effect on reduced information asymmetry and increase in FDI flows (Docquier &

Lodigiani, 2010). Valema (2012) discusses that circulation of scientists and academics has significant spillover effects on home scientific communities and helps create the institutional framework where science and research could prosper and economies grow in the long term. Empirically, Lodigiani (2008) calculations found a positive impact in terms of externalities on productivity as high-skilled migrants abroad might be essential in technology diffusion from more advanced economies to their less developed domestic economies. The economic indicator that might be affected by high-skilled migration is wages. Iravani (2011) has proposed that there is a negative relationship between high-skilled migration and wages in sending economies and suggests that such effect is the most prominent in countries exporting massive amounts of human capital. The author attributes the negative relationship to "demonstration effect of foreign salaries that artificially inflates local salaries" in spite of lower productivity that exists in a local economy (Iravani, 2011, p. 288). In some cases, the wages could also be kept low on purpose by employers who avoid overinvesting as they are expecting a professional worker to emigrate. Other authors claim the opposite to be true: as Elsner (2013) and Dustmann et al. (2015) claim, wages should increase because of a negative supply shock in human capital – as human capital becomes scarce and a bargaining power of professionals increases. Lastly, the effects of unemployment on the labour market should be considered. Iravani (2011) and Vojtovich (2013) suggest that high-skilled migration should decrease the unemployment if there is surplus brain, overproduction of brain or brain waste in sending countries with high unemployment. Interestingly, Iravani (2011) and Vojtovich (2013) claim that in general, labour force emigration "solves" unemployment problem more efficiently than economic growth does, thus making emigration a non-problematic phenomenon contrary to common beliefs.

Such diverse findings require further investigation of economic consequences of emigration and an update in existing ones using different sample countries and time periods.

It should be noted that the complex impact of high-skilled migration has been investigated through a range of various disciplinary lenses. The notion of co-evolution from evolutionary economics helps to understand competitive move-countermove dynamics, and it is highly relevant to address the phenomenon under discussion (Simandan, 2019; Saviotti, & Metcalfe, 2018).

This paper contributes to a more than 50 years' worth of literature on the link between migration of the high-skilled and economic development.

2. Data and Methodological Approach

In this section, we describe our data and actions to be taken to empirically investigate our research problem.

Despite an increasingly negative public and political discourse around the influx of large numbers of migrants, it is generally agreed that highly qualified workers who come

to the UK are the most economically valuable migrants and often fill skills shortages faced by particular sectors and employers (Hopkins & Levy, 2012). Moreover, migrant groups with higher levels of education are more likely to have higher rates of employment in the UK. However, one important aspect is that the interest in the topic gained its momentum when the countries were considered as potential new EU member states and right after they joined the EU. Numerous researchers have analysed flows and patterns of migration to the UK. A large body of research after 2004 was dedicated to finding out the causes of EU8 migration to the UK (and other EU countries in the West) and applying general migration theories to this particular migration flow (Dobson, 2009; Kurekova, 2011), whereas only some concentrated on analyzing determinants of brain migration from some of the CEE countries (Ienciu & Ienciu, 2015). Despite a rapidly growing scholarly interest in push and pull factors behind the individual migration decisions of skilled workers which are well established (such as salary, economic environment, availability of job and/or career opportunities, quality of life, working and living conditions, the size of diaspora communities etc.), consequences of CEE migration, especially high-skilled, have been less explored. Researchers have mainly been interested in particular Eastern European countries' cases but not so much in the implications on a rather homogenous region of EU8 (Kaczmarczyk, 2006; Brzozowski, 2007; Anniste et al., 2012; Kasnauskiene & Budvytyte, 2013). Considering some shortages in the EU8 migration literature, this article contributes to the field of research by analyzing consequences of migration in a particular set of sending countries (EU8) and focuses precisely on the outflow of high-skilled labour force.

EU8 region is considered to be a suitable sample due to several reasons. Firstly, all countries (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia) became EU member states during the third EU enlargement in 2004, which guaranteed free movement of the labour force to the Western EU countries. Secondly, after the enlargement, these Central and Eastern European countries witnessed a negative net migration making such sample highly relevant in testing migration effects. The last reason is the destination country – the United Kingdom has become one of the most attractive places for EU8 immigrants since these countries joined the EU. Due to data constraints, identifying the impact of the skilled migration on welfare and development in originating countries is complex (Docquier, 2014). Unfortunately, official data sources offer a very weak basis for an analysis of the highly skilled mobility and its economic impact. An additional problem is associated with identifying "the highly skilled". Different approaches to defining and measuring the highly skilled can be found in the literature. Generally, the most commonly used way of establishing that somebody is highly skilled consists in verifying whether they have a tertiary education diploma. In our study, skilled migration data are based on one of the most politicized and publicized statistics of current times in the UK, that is International Passenger Survey (IPS). The IPS is a voluntary survey of passengers travelling to and from the United Kingdom, which allows for extracting immigration numbers from EU8 to the UK by occupation

for 2004 – 2016 (Office for National Statistics, 2017). These data need to be treated cautiously; skilled migration is reflected by occupation category "managerial and professional workers". There are four main problems associated with IPS data:

- Firstly, methodological concerns are that IPS asks persons moving to the UK about their intentions to stay; those who indicate their intention to stay for at least 12 months are classed as movers, and these intentions might not materialize.
- Secondly, obviously, some immigrants holding a tertiary education diploma are not recognized as managerial and professional workers and do not fall into the high-skilled category.
- Thirdly, the existing EU8 immigration data are insufficiently detailed and do not allow separating the migration flows by smaller regions or countries.
- Fourthly, two broad types of variability associated with migration estimates from the IPS exist. These are: variability because of the many different samples that could have been drawn during the interview period (known as "sampling error"); and variability due to other factors ("non-sampling error").

These caveats must be always taken into account. Economic variable statistics for EU8, such as GDP per capita, unemployment rate and average monthly wage, are provided by Eurostat and country-specific statistical data authorities.

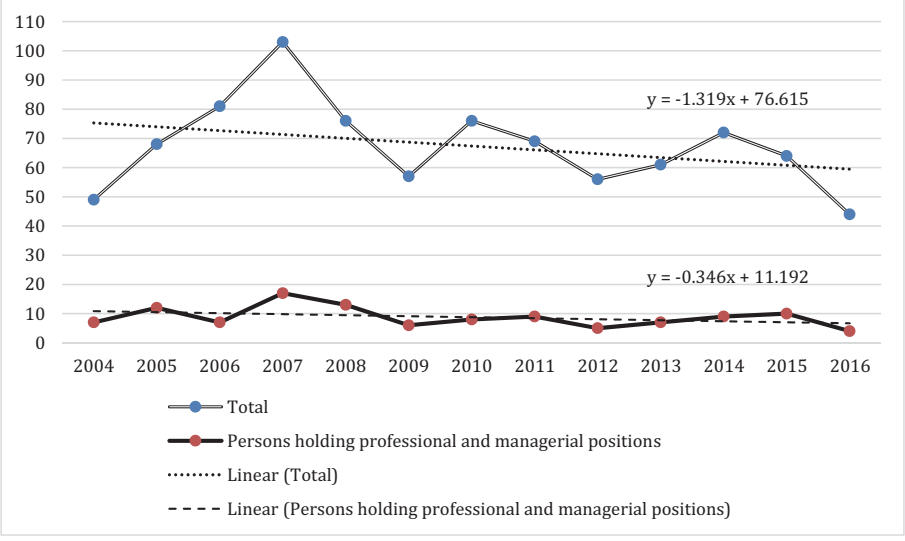

FIGURE 1. **Number of immigrants from EU8 to the UK, total and persons holding professional and managerial positions before migration, 2004-2016, thousands**

Source: compiled by the authors from Office for National Statistics, 2017

Figure 1 illustrates the importance of the subject matter. It shows that the number of EU8 movers (total and managerial and professional workers) to the UK between 2004 and 2007 increased; in 2008-2013, overall migration levels remained broadly stable followed by a significant decrease since 2014. Yet, the figure reflects negative trends over the period of 13 years; the number of total immigrants and managerial and professional workers entering the UK has yearly decreased on average by 1319 and 346 persons, respectively. However, recently published data in the UK indicated that over the last year 7,000 more EU8 citizens left the UK than arrived following the result of the UK referendum on leaving the EU, which was held in June 2016 (Office for National Statistics, 2019).

Our objective in this article is to test whether the emigration of highly qualified workers from the EU8 countries to the UK is detrimental for growth in sending economies. R software was used to achieve the results.

Our conceptual methodological approach, based on a 'pessimistic' outlook on the impact of the outflow of the high skilled on the sending countries, is expressed in the form of the two hypotheses, H1 for short-term emigration, and H2 for long-term emigration, further broken down to denote their impact on GDP, unemployment and average monthly wages.

Specifically, we hypothesize that:

H1: *Emigration of the high-skilled has a negative impact on EU8 economies in the short term.*

H1a: *Emigration of the high-skilled has a negative impact on EU8 GDP per capita in the short term.*

H1b: *Emigration of the high-skilled has a negative impact on EU8 unemployment in the short term.*

H1c: *Emigration of the high-skilled has a negative impact on EU8 average monthly wages in the short term.*

H2: *Emigration of the high-skilled has a negative impact on EU8 unemployment in the long term.*

H2a: *Emigration of the high-skilled has a negative impact on EU8 GDP per capita in the long term.*

H2b: *Emigration of the high-skilled has a negative impact on EU8 economies in the long term.*

H2c: *Emigration of the high-skilled has a negative impact on EU8 average monthly wages in the long term.*

The modelling methodology employed describes a goal-oriented procedure; it is commonly used in recent empirical migration analysis. The methods and sequence used for statistical data analysis are the following econometric time series models: a structural vector autoregression (SVAR), impulse-response analysis (IRF), forecast error variance decomposition (FEVD) and cointegration analysis – the Johansen procedure (Enders, 2014).

Structural vector autoregressive model is chosen for empirical analysis as it examines the impact of short-term structural shocks (innovations) in one variable (migration) to other ones (socio-economic variables) or vice versa. Partridge and Rickman (2006) have used SVAR model in explaining the impact of migration shocks to the labor market in the US. Other researchers considered implementing SVAR model for analyzing socio-economic determinants of net in-migration among US states (Cebula & Alexander, 2006). Vector autoregressive model is also used in constructing impulse-response functions and forecasts error variance decomposition. Correspondingly, these models are helpful in forecasting the influence of migration shocks on economic variables over time and accounting for explained variance in other economic indicators. Cointegration has been widely used in empirical testing of theoretical general equilibrium models with various socio-economic variables. Fromentin (2013) has used the Johansen cointegration test in order to find out the economic implications of immigration on labour market in France; Agbola and Acupan (2010) and Altaf (2015) have implemented the same analysis method to determine long-run migration determinants using developing countries' cases of the Philippines and Pakistan; Akkoyunlu and Siliverstovs (2009) aimed at using the Johansen cointegration test to investigate general equilibrium relationship between migration growth and trade. In this paper, the Johansen procedure is essential in answering the research question of how economic variables of GDP per capita, wages and unemployment respond to emigration in the long run.

The study is prone to certain limitations and assumptions. Due to the nature of data for emigration variable, which had yearly frequency, conversion to quarterly data was performed (Sax & Steiner, 2013). This means emigration variable is an approximation rather than the real emigration values. Nevertheless, the conversion procedure allowed for keeping quarterly time series similar to yearly in terms the way values change over time and should not disrupt the overall findings. Another limitation is the limited number of observations and time interval at hand (2004 – 2016), which means that the results should be interpreted cautiously. This is due to the fact that this study considers the effects after the structural change, i.e. joining the EU, and the data set used provides immigration statistics only from 2004. Lastly, the available migration data required the assumption that EU8 countries are homogeneous and interpretion of results is applicable for all. While the countries are indeed similar in terms of high emigration rates and joining the EU together, in fact the effects of migration on the economy may vary, based on specific country cases. Regardless of these data limitations, our estimates are sufficiently accurate and point to the empirical magnitude of brain movement.

3. Results

Our models are used to investigate the interactions between the emigration of the highly skilled from the EU8 countries and main economic variables. That is, two hypotheses stated in the previous section are tested:

H1: *outflow of highly qualified workers from the EU8 countries to the UK has a negative impact on the growth in sending economies in the short term and*

H2: *migration of the highly skilled from the EU8 region to the UK has a negative impact on the growth in sending economies in the long term.*

The main results are presented in Tables 1 and 2. The findings of structural vector autoregression indicate that in a short term 1% increase in high-skilled emigration growth rate is associated with an increase in GDP per capita growth rate by 0.09 percentage point and average monthly wage growth rate (0.007 percentage point) and decrease in unemployment rate (-0.49 percentage point) in EU8 countries (see Table 1).

TABLE 1. **SVAR coefficients for simultaneous effects**

	Emigration	GDP per capita	Unemployment	Average monthly wage
Emigration	1	-	-	-
GDP per capita	0.092	1	-	-
Unemployment	-0.499	-11.533	1	-
Average monthly wage	0.007	0.347	-0.001	1

Source: authors' calculations

Impulse response functions suggest that 1% increase in emigration growth rate results in 0.09 percentage point increase in GDP per capita growth rate in the initial period. In the next periods, forecasted reaction of 1% shock in emigration rate to GDP per capita remains positive but decreasing. Similar effect is seen among emigration and average monthly wage variables – initially, 1% increase in emigration growth rate translates to 0.04 percentage point increase in EU8 average monthly wage. Positive response in the variable is seen in periods ahead as well. Unemployment rate is decreasing by 1.56 percentage point due to 1% shock in emigration growth rate in the first period. Future period forecasts suggest the same reaction of reduction in unemployment due to emigration. Forecast error variance decomposition, showing how much variance emigration explains in economic variables, provides the following results: emigration explains 2% of variance in GDP per capita and only 1% of the variance in an average monthly wage and unemployment. There is empirical evidence to conclude that hypotheses H1a, H1b and H1c are rejected at the 5 percent level of significance, i.e. in the short term, emigration of the highly skilled from EU8 to the UK has a positive impact on GDP per capita, average monthly wages and unemployment level.

Significant effects are shown by the Johansen procedure findings, which are used to identify cointegration, i.e. long-term relationship between variables (see Table 2). Two

cointegrating vectors imply that high-skilled emigration has a negative effect on two economic variables, the GDP per capita and an average monthly wage. Correspondingly, 1% increase in brain emigration rate results in 1% long-term reduction in an average monthly wage by 0.55 percentage point, whereas the effect on GDP per capita is 0.63 percentage point reduction. In consequence, the results of empirical analysis show that hypotheses H2a, H2b and H2c are not rejected at the 5 percent level of significance; in the long term, emigration of the highly skilled from EU8 to the UK has a negative impact on main economic indicators. Hence, we may conclude that the departure of skilled workers from the EU8 region does not show damaging results right away; rather, it takes time to produce any significant economic effects.

TABLE 2. **Johansen procedure: parameters of cointegrated vectors**

	β_1	β_1
Average monthly wage	1.000	0.000
GDP per capita	0.000	1.000
Unemployment	- 0.091	- 0.099
Emigration	- 0.553	- 0.629
Constant	12.056	13.992

Source: authors' calculations

Our empirical findings suggest a "pessimistic view" of high-skilled migration from EU8 to the UK. Long-term effects, shown by cointegration analysis, paint a gloomy picture of decreasing GDP per capita and an average monthly wage due to a positive shock in emigration rate. The results are compatible with previous findings of aforementioned authors Beine, Docquier and Rapport (2008), Iravani (2011), Marchiori, Shen and Docquier (2012). GDP per capita reduction could be explained by the loss of human capital and changes in the demographic structure in EU8 due to high-skilled emigration. Wage decrease might be associated with brain overproduction and high unemployment in EU8, as with negative brain supply shock one professional is easily replaced with the other, thus bargaining power and wages do not increase. Brain waste (professionals not employed in sectors according to their education) or (and) brain surplus (overproduction of professionals) might be the case in EU8 countries, where relatively cheap education and high unemployment exist.

Discussion and conclusion

Free movement of people as one of the EU fundamental rights has led to a significant out-migration of their highly educated workforce to the advantage of other regions. For

the countries of origin that experience long-term periods of human capital loss, emigration of skilled labor represents a serious concern, and the evidence base is very limited. According to the World Bank (2019), shrinking working-age populations in Central Europe and the Baltics, partly reflecting migration of brains to Western Europe in recent years, limit growth prospects.

However, determining the size of the effects and whether they are positive or negative remains controversial among economists (Docquier, 2014). Our findings provide a new perspective on the ongoing discussion about the nexus between high-skilled migration and economic development, which remains a disputed topic over the past decades. This paper empirically fills the gap in the knowledge on the impact of outflow of most qualified individuals on economic growth in a particular set of source countries (EU8). We develop the models and use them to revisit the main economic implications of the brain drain. Two hypotheses are tested using a unique IPS dataset. Our evidence shown in the previous section clearly indicates that, firstly, our hypothesis on the negative economic impact of emigration of high-skilled professionals in the origin EU8 countries in the short-time period has been rejected and, secondly, our claim on the negative economic impact of emigration of high-skilled professionals in the long term has been supported empirically in our study. That is, overall, despite the prominence of beneficial brain migration effects in academic discussion and literature, the findings of our study imply a negative long-term impact of high-skilled labor force migration from EU8 to the UK on GDP per capita and average monthly wages in the source countries. In fact, a long-term equilibrium relationship between economic variables and emigration is compatible with previous findings mentioned in previous sections (Beine et al., 2008; Iravani, 2011; Marchiori et al., 2012). The present results do not contradict the conclusions reached by comparable studies on brain drain from some of EU8 countries carried out by Brzozowski (2007) and Ionescu (2015).

Obviously, despite the lack of harmonized international data on migration by country of origin and education level and analytical limitations, our results confirm that policy implications require cautious considerations. The range of push and pull forces behind migration is too strong to be overcome with simple restrictive policies (World Bank, 2019). This issue is beyond the scope of this study, although it might be worth examining the possibility of fresh thinking in the legal and institutional framework development in the sphere of EU8 countries migration policy (holding, attracting, and stimulating a return of educated professionals and facilitating knowledge transfer). That will enable the region to take advantage of the gains generated by mobility of brains. International cooperation aiming at more brain circulation is also very much needed.

On a final note, this paper also highlights the urgent need for a good quality data on migration of high-skilled professionals allowing to look more closely at the reasons that base the decision to migrate and consequences for the origin countries and the recipient countries' economies.

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