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Labour market efficiency and emigration in Slovakia and EU neighbouring countries

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ABSTRACT

Slovakia has experienced a six-year period of decreased labour market efficiency during a post-crisis period and growing emigration flows before and after a post-crisis period. There is also the concurrent issue of the lack of sufficient business activities in the southern, northern and eastern regions, and the economic development of some of the Slovak regions lacks diversification. We have analysed labour market conditions and emigration trends in Slovakia and EU neighbouring countries. The analysis of emigration trends has shown that among EU neighbouring countries, the Slovak migrant population tends to migrate mostly to the Czech Republic. We conducted regression analysis with the use of the ordinary least squares method to identify the main drivers affecting emigration from Slovakia to the Czech Republic as the primary destination country for Slovak migrants. The analysis has revealed that unemployment rates in both countries, labour market regulation which was introduced in the Czech Republic as well as EU enlargement in 2004 are the most significant triggers for emigration in Slovakia. Based on the results obtained, we have discussed possible ways to stimulate economic growth and prevent future emigration from Slovakia.

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1. Introduction

Emigration from the Slovak Republic has decreased during the past years but it is still high. At the same time, there is also the issue of high disparities in the regional development of the country and the lack of sufficient business activities in the southern, northern and eastern regions. Only half of the regions in Slovakia are characterised by low unemployment rates. Most of the growth and an increase of high-value added business activities are concentrated in the western regions, predominantly, in the Bratislava region.

Between 2000 and 2008, Slovakia was characterised by one of the highest GDP per capita growth rates among European countries and within V4 countries, stimulated

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largely by increases in labour productivity. Since the 2008 crisis, growth rates of the Slovak economy have slowed down significantly, due to diminished labour productivity growth and increased unemployment rate. There is still a substantial productivity gap between the Slovak economy and more developed European economies. This gap is largely associated with differences in productivity rather than the allocation of labour across industries as labour allocation across industries is identical to that of the more developed EU countries (Biea, 2016).

The literature on emigration trends in Slovakia emphasises that there are limited instruments to preclude undesired emigration. Findings indicate the need to create a favourable economic environment for attracting a qualified labour force (Bolečeková & Olejárová, 2018; Grenčíková & Španková, 2016; Klamár & Gaval'ová, 2018). Among the driving forces of migration in the country, the level of average wages explains both foreign and internal migration flows. Sira and Dubravská (2015) highlighted that in the period from 2009 to 2013, a higher average wage level in the western Slovakia, mainly in Bratislava, explained higher migration flows to this region. Another important driver is the level of unemployment, which is also lower in the western regions of the Slovak Republic. The wage development in Slovakia shows that during the period from 2013 to 2018, the main determinant of wage development was a labour shortage and that its influence is growing from year to year (Národná banka Slovenska, 2018). These tendencies mean that there is a sustained market disequilibrium between supply and demand in which the amount of workers demanded exceeds the supply available and willing to work at the prevailing wage and working conditions at a specific place and point in time.

In light of these issues, there is the need to consider labour market efficiency and emigration trends in Slovakia at the national level and review, in more detail, the disparities in economic development among the Slovak regions. The aim of the research is to outline the areas of policies to focus on that will help to prevent emigration of the working Slovak population to neighbouring countries.

This paper contributes to the findings in the field of research on the labour market conditions in Slovakia and the determinants affecting emigration from Slovakia to its neighbouring countries.

This paper is structured as follows. In the second section, we review post-crisis labour market conditions in Slovakia and EU neighbouring countries. The third section provides a theoretical review on the determinants affecting emigration from Slovakia to the Czech Republic. The fourth section considers determinants of international migration. The fifth section deals with a regression analysis of the main drivers triggering emigration from Slovakia to the Czech Republic. The sixth section considers regional disparities in economic development of Slovakia. The last section provides discussion and conclusions on the results of the research.

2. Post-crisis labour market conditions in Slovakia and EU neighbouring countries

2.1. Employment development

The post-crisis period has indicated two features of employment development in the Slovak Republic. In 2008, there was a recorded historical peak of the number of

employed persons. Because of the crisis, the employment dropped in 2009 and recovered only in 2015–2016 reaching a number higher of the number recorded in 2008 by 1.6% (2.5 million) in 2016. The average annual growth of employment was 2.6%, in absolute terms, 61,000 persons y-o-y in 2015, the number of employed persons reached a level of 2.4 million. It was, for the second time in Slovak history post 2008, classified as the most successful year, which brought the employment recovery to (almost) pre-crisis levels (Statistical Office of the Slovak Republic, 2019). However, it should be noted that employment in the post-crisis period decreased to around 13,600 persons and was concurrently accompanied by an increase in the number of economically active persons, to around 55,000 between the end of 2008 and 2015 (Statistical Office of the Slovak Republic, 2019).

The post-crisis period has also pointed to another vital feature of employment. After the second half of the 1990s, economic development in Slovakia was followed by relatively high values of so-called ‘employment threshold’. Weak linkage between economic growth and the rise of employment resulted in the high rates of economic growth needed to sustain an increase in employment, might be common for economies that are closing their productivity gap (Chikanda & Crush, 2018). Nevertheless, in the case of Slovakia, the link between economic development and employment has failed to meet the ‘employment threshold’, which reflected labour intensity of economic growth, was 4% higher than a decade before the crisis of 2008. When compared to the other central and eastern European countries, the ‘employment threshold’ in Slovakia was higher.

Since 2008, there has been a labour productivity gap between the Slovak economy and more developed economies of Europe. The growth rate of the Slovak economy has declined significantly after the 2008 crisis with a yearly average of about 1.2% between 2008 and 2014 (Biea, 2016). Before the 2008 crisis, three main drivers triggered growth in Slovakia. First, labour productivity increases which contributed about 4.3 percentage points to GDP per capita growth each year. Second, an increase in employment rates contributed to 1.4 percentage points each year to GDP per capita growth. Third, age structure changes of the population contributed around 0.6 percentage points each year to GDP per capita growth. This was associated with an increase in the share of people of working age between 15 and 64 from 69% in 2000 to 72% in 2008 (Biea, 2016). Currently more than 60% of employment is provided by the services sector, followed by industry with nearly 37% of the employment. Only 2.7% are employed in agricultural sector.

Economic growth in Slovakia was particularly influenced by the sectors with high productivity levels rather than by employment or labour intensive sectors. During the transition period, the tradable sector experienced a significant productivity growth. Employment rate was negatively influenced by the changes in import intensity of production and export performance of key sectors that resulted in the shift to increased share of export-intensive production. Nonetheless, since 2012, there has been an observed closing gap between growth rates of GDP (Lubyová & Štefánik, 2016). However, in comparison with EU neighbouring countries, Slovakia still ranks as a country with a higher than average unemployment rate (Figure 1). In the first half of 2018, the unemployment rate in Slovakia was somewhat lower than the EU28 average

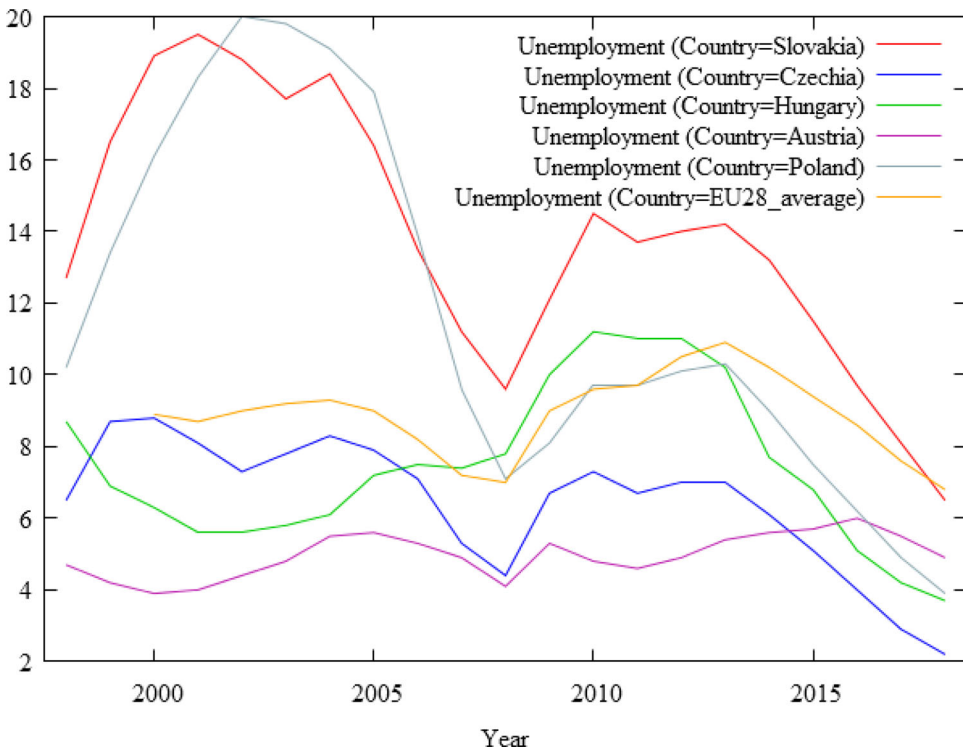


Figure 1. Unemployment rate in Slovakia, EU neighbouring countries and EU average. Source: Author based on (Eurostat, 2018c).

unemployment rate. This position was achieved for the first time since joining the EU and to a large extent, caused by negative demographic growth, accompanied by expansion of labour demand.

2.2. Labour market efficiency

The World Economic Forum assesses labour market efficiency through 10 indicators. In Table 1, we compared labour market efficiency in Slovakia and EU neighbouring countries in terms of these indicators.

From Table 1, it can be observed that comparative to Polish, the Slovak labour market efficiency is better only in terms of two indicators, in particular, *pay and productivity* and *reliance on professional management*. Slovakia and Poland have the same rank in three indicators, in particular, in *cooperation in labour-employer relations*, *redundancy costs (weeks of salary)* and *female participation in the labour force (ratio to men)*. If compared to Austria, the situation is similar, Slovakia is better only by two indicators – *flexibility of wage determination* and *hiring and firing practices*. On *effect of taxation on incentives to work*, Slovakia and Austria have the same rank. In comparison with the Czech Republic, Slovakia is better only in terms of *redundancy costs (weeks of salary)*. On *female participation in the labour force (ratio to men)*, Slovakia and the Czech Republic have the same rank. In comparison with Hungarian, the Slovak rank is higher in terms of *flexibility of wage determination*, *pay*

Table 1. Labour market efficiency.

Indicators of labour efficiency	Slovakia	Poland	Austria	Czech Republic	Hungary
Cooperation in labour–employer relations	75 (4.3)	79 (4.3)	13 (5.6)	34 (4.8)	77 (4.3)
Flexibility of wage determination	60 (5)	24 (5.5)	136 (2.3)	10 (5.9)	68 (4.9)
Hiring and firing practices	118 (3.1)	97 (3.4)	124 (3)	108 (3.3)	27 (4.5)
Redundancy costs (weeks of salary)	80 (18.8)	80 (18.8)	4 (2)	86 (20.2)	53 (13.4)
Effect of taxation on incentives to work	130 (2.7)	128 (2.8)	130 (2.7)	113 (3.1)	88 (3.6)
Pay and productivity	44 (4.4)	58 (4.2)	30 (4.5)	21 (4.7)	85 (3.7)
Reliance on professional management	55 (4.5)	72 (4.2)	24 (5.4)	26 (5.4)	98 (3.8)
Country capacity to retain talent	125 (2.5)	89 (3.2)	35 (4.3)	51 (3.7)	126 (2.4)
Country capacity to attract talent	130 (2)	113 (2.5)	40 (3.9)	74 (3.3)	112 (2.5)
Female participation in the labour force (ratio to men)	67 (0.82)	63 (0.82)	38 (0.89)	64 (0.82)	62 (0.83)

Notes: Slovak rank is worse than EU neighbouring country. Slovak rank is better than EU neighbouring country. Slovak rank is the same as in EU neighbouring country. Rank and score (in parentheses).

Source: Author based on Global Competitiveness Report 2017–2018 (Schwab & Xavier, 2017).

and productivity, reliance on professional management and country capacity to retain talent. On the indicator of cooperation in labour–employer relations, Slovakia and Hungary have the same rank. Thus, it can be concluded that Slovakia's best positions in comparison with neighbouring EU states are in flexibility of wage determination, pay and productivity and reliance on professional management. Slovakia ranked the worst on country capacity to retain talent and country capacity to attract talent.

The post-crisis period was characterised by the decreased labour market efficiency for both Slovakia and EU neighbouring countries (Figure 2). Between 2009 and 2010, Slovakia, Poland, Hungary, Austria and the Czech Republic reached their peak values of labour efficiency. Since 2010, it had been decreasing until 2013–2014 after which recovery has been observed. However, only Slovakia has experienced a decline in labour efficiency after 2013. The country has experienced some recovery since 2016.

2.3. Emigration trends

During the period from 1998 to 2016, the lowest emigration flows in Slovakia were observed in 1999 (Figure 3). Since that time, emigration has been increasing constantly and in 2015, it reached its maximum point. Since 2016, emigration has been decreasing. From Figure 3, it is clear that the largest emigration flows go to the Czech Republic and the trend of emigration for the Czech Republic increased during the period from 1998 to 2016, as well as for Austria.

In the next section, we discuss in more detail, the determinants affecting emigration from Slovakia to the Czech Republic.

3. Determinants of emigration from Slovakia to the Czech Republic

As considered above, among all the neighbouring countries, the migrant population in Slovakia gives preferences mostly to the Czech Republic. Slovak migrants are ranked second among migrants with residence permits in the Czech Republic (Table 2).

One of the most striking economic determinants attracting migrants from Slovakia to the Czech Republic is the very low unemployment rate. It should be noted that since 2013, the economic growth of the Czech Republic has hastened as a result of

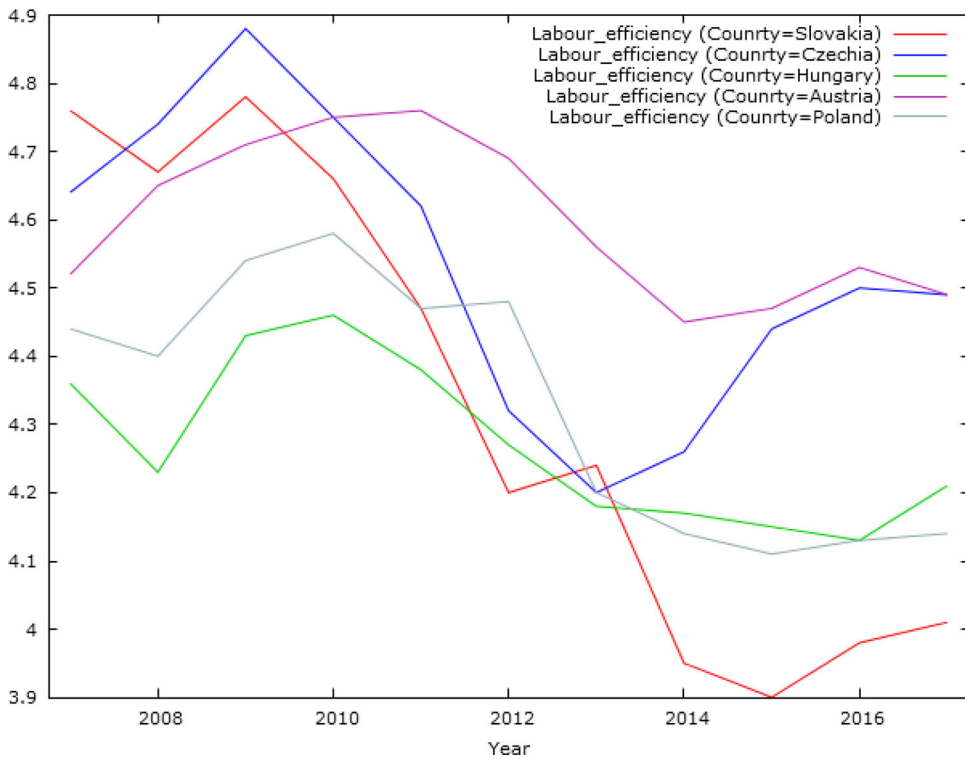


Figure 2. Labour market efficiency of Slovakia and EU neighbouring countries, index.
Source: Constructed by the author based on World Bank (2019).

significant export dynamism that boosted the country's competitiveness (Hudcovský et al., 2017; Simionescu et al., 2018). The key driver of growth has been public investment financed by EU structural funds, especially in 2015 (Halka & Szafranski, 2018; Markus, 2018; OECD, 2018; Posta, 2018; Škuflić & Vučković, 2018; Waehning et al., 2018). Public expenditure on research and development, which has doubled in the preceding 15 years, triggered infrastructure modernisation, healthy public budgets, improvement of an investment climate characterised by higher security and openness and productivity-oriented wage development, which ultimately triggered a decrease in the unemployment rate. The Czech labour market was already exceptionally tough even in times like the severe recession of 2009. In Slovakia, unemployment doubled in the crisis years 2009 (12.1%) and 2010 (14.5%) (Bittorf, 2017).

Current and previous economic trends indicate that among all the EU countries, the Czech Republic is characterised by the strongest job market, especially since the end of 2015. When comparing Germany, Europe's economic power with a reputation for effectiveness and low unemployment rates, the Czech Republic appears to be even more powerful in terms of the labour market. In 2018, the Czech Republic recorded its lowest unemployment rate – 2.2% compared to the German rate of 3.4% and average EU rate of 6.8%. Other EU countries with low unemployment rates are Hungary and Malta – 3.7%, the Netherlands – 3.8% and Poland – 3.9% (Eurostat, 2018c). When comparing working conditions in the Czech Republic and Slovakia, Dubček (2018) has identified that from 2007 through 2015, variation coefficients for

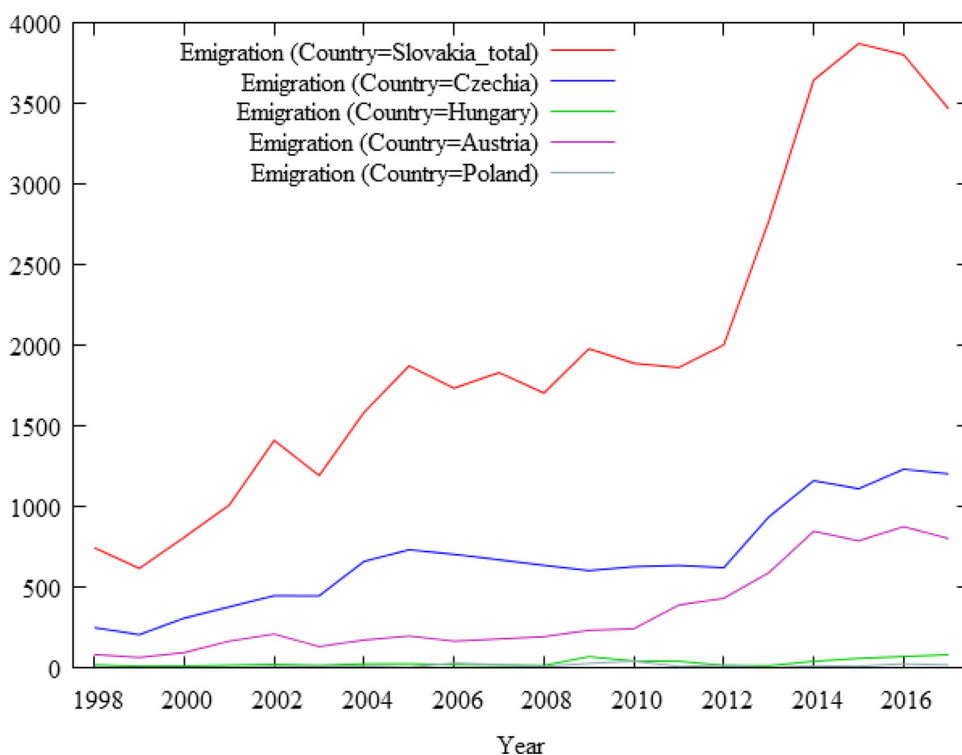


Figure 3. Emigration flows from Slovakia to its neighbouring EU countries, number.

Source: Author based on Eurostat (2019b).

Table 2. Top countries of citizenship of permanent and long-term residence permit holders in the Czech Republic, 2017.

Country of citizenship	Number of migrants
Ukraine	117,000
Slovakia	112,000
Vietnam	60,000
Russia	37,000
Germany	21,000
Poland	21,000
Bulgaria	14,000
Romania	13,000
United States	10,000

Source: Author based on (Czech Statistical Office, 2019a).

maximum, minimum and average employment rates were higher in Slovakia than in the Czech Republic due to the lower minimum employment rate in Slovakia. In 2007 the minimum employment rate in Slovakia was 45.7% and the Czech Republic was 51.8%, and in 2015, it was 49% and 52.8%, respectively.

At the same time, the Czech Republic is characterised by low labour costs if compared to other EU countries. In 2018, labour costs in the Czech Republic were 12.6 EUR which is considerably below the EU average – 27.4 EUR. However, cheap labour is not attributed to the low unemployment rate in the Czech Republic as in other countries, where labour costs are even lower, in particular, Bulgaria – 5.4 EUR, Latvia – 9.3 EUR, Lithuania – 9 EUR but, with higher unemployment rates

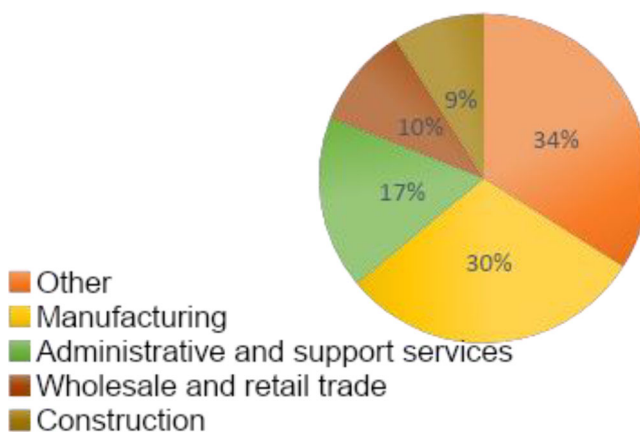


Figure 4. Migrant employment in sectors, the Czech Republic, 2017.

Source: Author based on (Czech Statistical Office, 2019b).

(Eurostat, 2018b). Net annual earnings in the Czech Republic if compared to Slovakia are slightly higher, in particular, in 2017 when they were 7189 EUR and 6089 EUR and in 2018 – 7867 EUR and 6428 EUR, respectively (Eurostat, 2019a). Earnings, thus, are not a relevant determinant pushing people to migrate from Slovakia to the Czech Republic.

Another remarkable feature of the Czech economy is its highly developed manufacturing. Their effective investment climate has contributed to high attractiveness for foreign direct investment, which was particularly noticeable in the automotive and engineering industry, space technology, aeronautics and electronics. It should be noted that the manufacturing industry in the Czech Republic accounts for the biggest share of its economy compared to other EU members, and represents more than a third of all employment. The manufacturing of cars, by Hyundai, Peugeot, Citroën, Toyota and Škoda is now an essential element in the Czech economy (Figure 4). In some manufacturing industries, like machinery and transport equipment, electrical and optical and textiles, participation in global value chains maintains more than 75% of jobs (OECD, 2018).

Implemented labour market measures in the Czech Republic from 2013 to 2014 have significantly contributed to an increase in labour market efficiency in the country and as a result, increased the number of migrants. The number of migrants from Slovakia has increased by more than 50% in 2013, with further increasing by 24% in 2014.

In particular, in 2013, the Czech government implemented the project titled Fast Track Procedure for Granting Residence Permits to Foreigners – Foreign Students from Third Countries. The project was targeted at student migration, specifically, foreign scholarship holders. The primary goal of the project was to facilitate the entry process for foreign students, who had been granted entry for studying in the Czech Republic as participants of specific scholarship programmes that were established on international treaties or decisions by the government of the Czech Republic. In terms of this project, while in this fast track program, this category of migrants was issued a long-term visa or a long-term residence permit for the purpose of study (European Migration Network, 2014).

In 2014, the so-called Employee Cards were introduced under the Act No 101/2014 Coll. aimed at regulating residency of foreign nationals in the Czech Republic for the purpose of employment which came into force on 24 June 2014. This regulation is an execution of Directive 2011/98/EU on a single application procedure for a single permit for third-country nationals to reside and work in the territory of a Member State and on the common set of rights for third-country workers legally residing in the Member State (European Commission, 2019). The Directive is a basic instrument in the EU immigration policy for third country nationals permitted to work or working in the 25 Member States where the Directive applies. The Employee Cards replaced long-term visas, long-term residence permits and Green Cards which were granted for the purpose of employment. Another important improvement of regulation in the area of legal migration and mobility was realising the migration project Facilitation of Procedures for Entry and Stay of Economically Significant Partners. The project intended to track migration procedures by means of preferred treatment of applications for residence permits of foreign nationals.

There have also been enhanced measures in the area of integration policy, which plays a vital role in regulating legal migration. In 2014, the State Integration Programme (SIP) was implemented and during the same year, the Czech Government allocated 25 million CZK for the integration of foreign nationals. The programme targeted people who had been granted international protection in the form of subsidiary protection or asylum. The number of migrants from Slovakia has remained steady since 2014.

On 1 January 2014, new legislation came into force which entirely left the principle of single citizenship and established the possibility of obtaining multiple citizenships. This resulted in a substantial spike in the amount of persons applying for and being granted citizenship. (European Migration Network, 2014).

The research of Grenčíková and Španková (2016) has shown that the Czech Republic is more attractive for educational purposes than Slovakia and that the Slovak economy suffers from the issue of brain drain as a systematic problem that continues to persist.

In the section below, we define by employing regression analysis drivers affecting emigration from Slovakia to the Czech Republic.

4. Related literature on the determinants of international migration

4.1. Determinants of international migration

It should be noted that the determinants of migration contain some features of the source and host countries that either simplify or dampen international migration flows between them. These features contain the characteristics of a source country, which may influence emigration levels, bilateral relations between countries, which may affect the direction of migration, and the features of host countries, which either simplify or dampen immigration to them. The general approach for analysing the effect of different determinants on migration includes the so-called 'push' and 'pull', 'stay' and 'stay away' factors (Table 3).

Table 3. The emigration decision.

Source country	Costs of moving?		Destination country
'Push' factors	Transport costs		'Pull' factors
Famine	Dangers of the voyage		High wages
Poverty	Time of travel		Employment
Low wages	Lost income during move		Property rights
Unemployment	Formal exit barriers	Formal entry barriers	Personal freedom
Overpopulation	Exit visa	Entry visa	Economic freedom
High taxes	Exit tax	Quota	Law and order
Discrimination	Prohibition	Prohibition	Peace
Religious persecution	Imprisonment	Imprisonment	Religious freedom
Civil war	Penalties on family	Fines	Educational opportunity
Violence and crime			Social mobility
Forced military service			Low taxes
Social immobility			Family reunion
'Stay' factors			'Stay away' factors
Family ties			Language barriers
Friendships			Cultural barriers
Social status			Discrimination
Cultural familiarity			Low social status
Employment			Unemployment
Property			Low wages
Familiarity			Lack of political rights
Certainty			Unfamiliarity
Political privileges			Uncertainty
			War
			Crime

Source: Bodvarsson and Van den Berg (2013).

It is considered that individuals evaluate their life circumstances via a cost-benefit analysis and will move to another country if the anticipated benefits are higher than the costs associated with movement to another country. There is still no well-established convergence between academic studies on a single migration model. The most challenging to migration researchers is to form hypothetically relevant determinants into one explicit theoretical framework which would make it possible 'to specify their interaction with each other in empirically testable form and thereby serve as a guide to future research' (Bodvarsson & Van den Berg, 2013).

While analysing migration flows, the economic development of a country as well as its labour market conditions are considered. Variances in economic opportunities between the source and the host countries are critical drivers of international migration movements. In particular, they include GDP per capita and its growth and unemployment rates (Barbas et al., 2018; Beine et al., 2016, 2019; Ortega & Peri, 2013).

It should be noted that most findings reveal a non-linear relationship between economic development and migration. Generally, migration initially increases and then decreases with a country's economic development that is consistent with the mobility transition and migration hump theories, which define an reverse U-shaped association between migration and development (Bove & Elia, 2017; OECD, 2010; Peterson, 2017). Non-linear relationship is shown by the fact that in middle income countries, rising GDP per capita is related to higher migration levels while in high income countries, higher GDP per capita is related to lower migration levels. The lack of a substantial association in the case of low income countries reflects the fact that in primary stages of development, minor changes in GDP play only a minor role in

influencing decisions to migrate. However, unlike the overall association between migration and economic development, lower GDP per capita is associated with higher levels of asylum migration. Thus, poverty is not just a limitation hampering migration.

Beine et al. (2016, 2019) have identified a converse association between unemployment and the attractiveness of the potential host country. Unemployed individuals are more likely to make the decision to migrate abroad when compared to employed individuals. The effect of the increase in the unemployment rate on the decision to migrate can be diminished by the existence of unemployment advantages, as recently arrived immigrants are not entitled to unemployment advantages, migration behavior, and thus could be more sensitive to changes in the rate of unemployment in the host country rather than in the source one (Hudcovský et al., 2017).

Another important determinant of migration is the education level in the host and origin country. Generally, emigrants are more educated and the youngest individuals in the adult population.

Highly educated individuals also tend to be more likely to prepare to move than those with lower levels of education (Bernard & Bell, 2018; Bonin, 2017; Borgonovi & Pokropek, 2019; Wirén, 2013).

The presence of networks is usually considered one of the most relevant determinants of international migration (Bertoli & Ruysen, 2018; Haug, 2008; van Meeteren & Pereira, 2018). A proxy for networks can be the existence in the host country of immigrants from the same origin. In current research, we considered the effect of diaspora.

An important determinant of migration in the EU countries is the *EU enlargement*, which according to the studies had a substantial impact on migration flows from new to old member states. According to Kahanec and Zimmermann (2009) there are different forms of migrant diversion to those old member states that accepted the open-door policy, countries like Germany or Austria, which maintained national measures for the second phase of 2004 EU enlargement agreement, have also experienced substantial inflows of migrants from the new member states. The authors have also found out that more open economies attracted more educated and younger migrants. Other findings also confirm the positive association between migration and the EU enlargement (Barreiro Carril, 2015; Kahanec, 2015; Kahanec & Zimmermann, 2009, 2016; Light & Young, 2009).

We also note that, as we mentioned above, the period from 2014 through present day incorporates the effect of several important labour market regulations introduced in the Czech Republic simultaneously in 2014. Thus, starting from 2014, the effect that resulted from the introduction of the Fast Track Procedure coincides with the effect of these that cannot be analysed and observed separately due to the same year of introduction.

4.2. Limitations of research

The limitations of our research arise from two issues. First, the associations underlying the results are supposed to be interpreted as causal associations. Reverse links

between emigration flows and determinants cannot be omitted. In particular, in our research we have analysed the predictive power of unemployment in both Slovakia and the Czech Republic, though, migration flows between the countries also influenced unemployment rates. According to Škuflić and Vučković (2018), if higher unemployment causes the increase in emigration, the negative effect of emigration on unemployment would then be underestimated. Social networks between previous and current migration flows are vital determinants of migration, thus, the correlation between past and present migration with present and past emigration could directly influence the current unemployment rate due to lags in labour market reactions to economic shocks.

A second issue is associated with the fact that the effect of other potential determinants of migration has not been analysed in our research due to the lack of the data or conceptual issues. In particular, we have not investigated the effect of a language barrier as a 'stay away' factor, wages and family reunion as a pull factor and family ties as a stay factor.

Other limitations of our research are linked to the difficulty of measuring migration data itself. While migration is more responsive to short-term economic fluctuations than other demographic changes, fast data on migration changes does not exist. An approach that is more appropriate is to use monthly data; however, it is only available in very few EU countries and, due to its fast and principal character, does not always link to the annual figures that are available later. Moreover, even if monthly data on migration is available, it is still not possible to conduct sufficient analysis as monthly data are not available for most of the other key indicators that have an effect on migration.

It should be also noted that different sources of data frequently discount some groups of migrants or fail to record some effects even if all the relevant groups are involved. These reasons may be classified into two groups: changes in legal or administrative measures, in particular, changes in the recording of illegal migrants, or changes in the statistical methodology, for example, the use of new definitions and data sources (Herm & Poulain, 2010). These breaks in series and changes can easily be reflected in migration tendencies and misrepresent the investigation of the effect of many economic determinants.

Thus, the choice of the variables used in current research is motivated by the literature findings reflecting the effect of the structural factors of the source and host countries, such as their socio-economic and demographic characteristics. However, the choice of the determinants was also affected by technical considerations, in particular data availability, quality and limitations considered above.

5. Regression analysis of the drivers triggering emigration from Slovakia to the Czech Republic

5.1. Data and method

For analysing drivers of migration from Slovakia to the Czech Republic, we employed the ordinary least squares (OLS) method and cross-sectional data during the period between 1998 and 2018 from available data on annual migration flows from Eurostat. Based on the above, we considered determinants having considerable impact on migration flows from Slovakia to the Czech Republic and utilised the Raymer model

Table 4. Description of variables.

Variable	Description	Source	Expected sign of the influence on emigration flow
In_Migration_SK_CZE: dependent variable	Log of emigration flow from Slovakia to the Czech Republic, thousands persons	Eurostat, (2019b)	
In_GDP_PPS_SK	Log of GDP in PPS in Slovakia, euro per capita	Eurostat (2018a)	-
In_GDP_PPS_CZE	Log of GDP in PPS in the Czech Republic, euro per capita	Eurostat (2018a)	+
Unempl_SK	Total unemployment rate in Slovakia, percentage	Eurostat (2018c)	+
Unempl_CZE	Total unemployment rate in the Czech Republic, percentage	Eurostat (2018c)	-
Exp_edu_SK	Expenditure on education in Slovakia, percentage of GDP	Eurostat (2019c)	+
Exp_edu_CZE	Expenditure on education in the Czech Republic, percentage of GDP	Eurostat (2019c)	+
In_Diaspora	The number of population with Slovak citizenship living in the Czech Republic, thousands persons	Eurostat (2019b)	+
Enlargement_EU	Dummy variable indicating the EU enlargement in 2004 for both Slovakia and the Czech Republic (0,1)	European Union (2019)	+
Labour_regulation	Dummy variable on the labour market regulation: Introduction of Fast Track Procedure (0,1)	European Migration Network (2014)	+

Source: Compiled by the author.

approach of analyzing drivers of migration in EU countries (Raymer et al., 2013) and used the regression model below. Table 4 contains, in more detail, data on indicators used in regression models, their measure and source. The variables were tested on presence of unit root (stationarity) and normal distribution, $\ln_Migration_SK_CZE = \text{const} + \ln_GDP_PPS_SK + \ln_GDP_PPS_CZE + Unempl_SK + Unempl_CZE + Exp_edu_SK + Exp_edu_CZE + \ln_Diaspora + Enlargement_EU + Labor_regulation + \varepsilon.(1)$

Thus, according to the considered effects above on international migration determinants, we test the following hypotheses.

H1: there is a negative association between GDP per capita in Slovakia, emigration to the Czech Republic and positive association between GDP per capita in the Czech Republic and emigration to the Czech Republic.

H2: there is a positive association between the unemployment level in Slovakia and emigration to the Czech Republic and a negative association between unemployment in the Czech Republic and emigration to the Czech Republic.

H3: there is a positive association between expenditure on education in Slovakia and emigration to the Czech Republic and positive association between expenditure on education in the Czech Republic and emigration to the Czech Republic.

H4: there is a positive association between diaspora – the number of people with Slovak citizenship living in the Czech Republic and emigration to the Czech Republic.

H5: there is a positive association between the EU enlargement and emigration to the Czech Republic.

Table 5. Summary statistics.

Variable	Mean	Median	Standard deviation	Minimum	Maximum
I_Migration_SK_CZE	6.433	6.458	0.5187	5.338	7.117
I_GDP_PPS_SK	11.3	11.43	0.3272	10.77	11.71
I_GDP_PPS_CZE	12.18	12.28	0.2412	11.76	12.54
I_Unempl_SK	13.84	13.70	3.684	6.500	19.50
I_Unempl_CZE	6.370	6.850	1.856	2.200	8.800
Exp_edu_SK	4.023	4.075	0.3606	3.050	4.590
Exp_edu_CZE	4.074	4.050	0.2490	3.560	4.510
I_Diaspora	10.99	11.18	0.5133	10.06	11.62
Enlargement_EU	0.7143	1.000	0.4629	0.000	1.000
Labour_regulation	0.2381	0.000	0.4364	0.000	1.000

Source: Author's calculations.

H6: there is a positive association between labour regulation since 2014 and emigration to the Czech Republic.

It should be noted that most authors, when conducting a regression analysis of migration flows, as with Raymer, also include indicators such as common borders (Haas et al., 2018; Helbling & Leblang, 2019), international trade (Metelski & Mihi-Ramirez, 2015) and indicator variables for countries sharing the same language family (Helbling & Leblang, 2019; Ortega & Peri, 2013). In our research, we did not include the above mentioned indicators as we employed cross-sectional data only on emigration flows from Slovakia to the Czech Republic, which have a common border, engaged in EU trade treatments and share the same Indo-European language family. Indicator of distance was also not included due to specificity of data.

5.2. Results

Table 5 provides a summary of statistics on the variables included in the regression analysis, and Table 6 provides the regression results of a pooled OLS. Tests for heteroskedasticity and normality of residuals are presented in Table 7. The collinearity test is presented in Table 8.

Test results on collinearity (Table 8) have shown that there is a collinearity problem in the basic model (Model 1). Thus, we have modified the basic model and omitted some variables from Model 1. The modified model contains the variable on GDP in PPS in Slovakia, the unemployment rates in Slovakia and the Czech Republic and two dummies, in particular, a dummy on the EU enlargement of 2004 and a dummy on the introduction of the Fast Track Procedure. As can be seen from Table 5, that among five included variables, four appeared to be significant, in particular, unemployment rates in Slovakia and the Czech Republic, the dummy on EU enlargement in 2004 and the dummy on the introduction of the Fast Track Procedure.

According to our expectations, there is a negative association between GDP in Slovakia and emigration from the country. However, the regression analysis has shown that the GDP indicator is not a significant driver of emigration from Slovakia to the Czech Republic. Our result is also consistent with the results of other authors (Barbas et al., 2018; Rodríguez-Pose et al., 2015). The authors researched drivers of migration in EU regions and found that there was no significant impact of this indicator on migration in most EU regions.

Table 6. Regression analysis: OLS.

Variables	Model 1 Basic model	Model 2 Modified model
Dependent variable: I_Migration_SK_CZE		
constant	−13.2562 (41.1924)	1.37400 (3.12811)
I_GDP_PPS_SK	(0.897366)	0.367459
I_GDP_PPS_CZE	(3.69790)	(0.276885)
Unempl_SK	1.58740 (6.68892)	0.105524*** (0.0279808)
Unempl_CZE	−0.0544961 (0.101348)	−0.184843** (0.0624881)
Expend_edu_SK	0.191779 (0.217605)	0.749492*** (0.172756)
Expend_edu_CZE	0.0409736 (0.181369)	0.373846*** (0.116954)
I_Diaspora	−0.444761 (0.317958)	21 0.956571
Enlargement_EU	−0.807113 (0.522259)	0.936831
Labour_regulation	0.118413 (0.608758)	
Observations	0.356593 (0.300384)	
R-squared	21	
Adjusted R-squared	0.946913	
	0.787652	

Note: Standard errors in parentheses.

*** $p < 0.01$. ** $p < 0.05$. * $p < 0.1$.

Source: Author's calculations.

Table 7. Heteroskedasticity test and normality of residual test.

Tests/models	Model 1 Basic model	Model 2 Modified model
Breusch–Pagan test for heteroskedasticity	10.7012 (0.296746)	2.38133 (0.304019)
Test statistic for normality of residual test	7.63884 (0.46952)	1.71686 (0.423826)

Note: p -values are in parentheses. RBS – robust standard errors.

Source: Author's calculations.

Table 8. Collinearity test: variance inflation factors.

Variables/models	Model 1 Basic model	Model 2 Modified model
I_GDP_PPS_SK	441.047	8.041
I_GDP_PPS_CZE	586.979	
Unempl_SK	49.707	7.624
Unempl_CZE	27.417	9.088
Expend_edu_SK	1.830	
Expend_edu_CZE	2.686	
I_Diaspora	24.296	
Enlargement_EU	16.062	5.754
Labour_regulation	5.234	2.237

Source: Author's calculations.

The impact of unemployment rates in Slovakia and the Czech Republic appeared to be significant drivers of migration during the analysed period which confirmed our expectations. With the increase in the unemployment rate in Slovakia, emigration

from the country to the Czech Republic increases by 10.5% whereas the decrease in unemployment rate in the Czech Republic is associated with 18.4% increase in migrant population.

The impact of the EU enlargement in 2004 and the introduction of the Fast Track Procedure also confirmed our expectations and had a positive influence on migration flows to the Czech Republic. Our results have shown that the EU enlargement was associated with a 0.749 thousand persons increase of the migrant population and with the introduction of the Fast Track Procedure, there were 0.172 thousands persons more of the migrant population. Thus, it can be concluded that the very low unemployment rate as well labour market regulations introduced by the Czech Republic are indeed strong pull factors attracting the population from Slovakia. In the next section, we attempted to figure out the most striking disparities in regional development in Slovakia as a way of finding out whether the development scenario of the Czech Republic can be also applied in Slovakia.

6. Discussion and conclusions

Since 2008, there has been a labour productivity gap between the Slovak economy and more developed economies of Europe. The growth rate of the Slovak economy has declined significantly after the 2008 crisis, with a yearly average of about 1.2% between 2008 and 2014. Before the 2008 crisis, three main drivers triggered growth in Slovakia: labour productivity, high employment rates and an increase in the share of working-age people.

The post-crisis period was characterised by the decreased labour market efficiency for both Slovakia and EU neighbouring countries. According to the World Economic Forum, which assesses labour market efficiency through various indicators, in particular: cooperation in labour–employer relations, flexibility of wage determination, hiring and firing practices, redundancy costs (weeks of salary), effect of taxation on incentives to work, pay and productivity, reliance on professional management, country capacity to retain talent, country capacity to attract talent and female participation in the labour force (ratio to men). Slovakia's best positions in comparison with EU neighbouring states are only in flexibility of wage determination, pay and productivity and reliance on professional management. Slovakia ranks the worst on country capacity to retain talent and country capacity to attract talent.

The analysis of emigration trends has shown that among EU neighbouring countries, the Slovak migrant population tends to migrate mostly to the Czech Republic. Our regression analysis has demonstrated that the most significant determinants affecting emigration from Slovakia to the Czech Republic are the low unemployment rates in Czech Republic, the labour market regulations introduced in 2013 and the EU enlargement in 2004. According to the latest World Economic Forum assessment on labour market efficiency, the Czech Republic ranks better than Slovakia on most of the labour efficiency indicators, in particular, on cooperation in labour–employer relations, flexibility of wage determination, hiring and firing practices, effect of taxation on incentives to work, pay and productivity, reliance on professional management, country capacity to retain talent and country capacity to attract talent.

Furthermore, when compared to other EU neighbouring countries, the Czech Republic, is more attractive for Slovak citizens due to their quick language adaptability.

Our research aimed at analysing current labour market conditions and emigration trends in Slovakia. Our regression analysis has undeniably revealed that public expenditure on research and development in the Czech Republic, which triggered infrastructure modernisation, healthy public budgets, and an improvement of an investment climate, greatly contributed to their recovery after the crisis and significantly decreased their unemployment rate that, in turn, attracted many migrants. A striking feature of the Czech economy is also their high development of manufacturing which, to great extent, provides high employment rates. In recent years, Slovak dependency on manufacturing has also increased. However, it seems as a particularly less than desirable path of economic development for Slovakia in the long run. Progressively developing manufacturing imposes the risk of job losses from automation. Advanced automation and robotisation means that companies will need to quickly adapt to a changing environment and trigger the process of retraining workers to ensure they are able to face future challenges. Furthermore, when manufacturing share in the economy is high, it results in a decrease in labour productivity due to domination of low-skilled workers which are mainly needed for manufacturing.

The main challenge for the Slovak economy remains, thus, in increasing productivity in the tradable sector, which would also trigger nominal productivity in the non-tradable sector. One of the ways to increase productivity is to increase investment in equipment, which has a great impact on growth and development. We also stressed the significance of diversification across industries, the lack of which could cause high vulnerability of the Slovak economy to industry-specific shocks. Additionally, we emphasised the need for investments in human capital, in particular, in the development of the education system. The creation of high-skilled jobs, namely by improving the education system could be also a way to increase the transformation of R&D in innovation. Our analysis has shown that only three regions in Slovakia, among eight, are educational centres, in particular, Bratislavský region, however, mainly Bratislava, Žilinský region and Banskobystrický region. Training provisions could also substantially increase the employment rates in Slovakia. Providing accessible, publicly financed training to jobseekers during unemployment periods and ensuring a real choice for a change in their present career path as well upskilling within the present one could substantially increase labour market efficiency.

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