

## REGIONAL DIFFERENCES IN THE CONTEXT OF LABOR MIGRATION IN THE HEALTH SECTOR

<sup>a</sup>SIMONA HYŽOVÁ, <sup>b</sup>MAGDALÉNA TUPÁ

<sup>a</sup>Alexander Dubček University in Trenčín, Faculty of Social and Economic Relations, Študentská 3, 911 50 Trenčín, Slovakia

<sup>b</sup>Alexander Dubček University in Trenčín, Faculty of Social and Economic Relations, Študentská 3, 911 50 Trenčín, Slovakia

email: <sup>a</sup>simona.hyzova@tmuni.sk <sup>b</sup>magdalena.tupa@tmuni.sk

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**Abstract:** The change in the age structure of the population is causing a global problem - the aging of the population. The aging of the population is linked to many areas of life. It is certainly necessary to think about the area of social care and health care, where it will be necessary to ensure a sufficient number of workers. In recent years, the Slovak Republic has been characterized by an increase in the number of migrant workers. The Slovak Republic is also characterized by large regional differences. That is why the aim of the presented study will be a detailed analysis of the current state of employment of medical staff, migration of medical workforce from Slovakia to abroad, as well as an analysis of regional differences in the migration of medical staff.

**Keywords:** migration, labor force, healthcare

### 1 Introduction

Migration is mostly understood as a positive phenomenon, which is caused by the natural development of society. Identifying the development and monitoring of labor migration should be a priority for each country in order to maintain the positive impact of migration on society.

Migration within European countries has increased in the last two decades. International migration over the last half century has significantly affected individual states in Europe (Lanari, Bussini and Minelli, 2018). This is also confirmed by Triandafyllida (2018), who claims that migration has intensified and diversified over the last 25 years.

In the Slovak Republic, labor migration increased mainly after the accession to the European Union in 2004 and intensified even more with the entry of Slovakia into the Schengen area in 2007 (Bahna, 2011; Tupá, Vojtovič, Strunz, 2018). The development of migration in Slovakia can be understood in two directions. On the one hand, Slovakia is a country from which more and more workers are migrating abroad, but on the other hand it suffers from labor shortages in some sectors, which makes Slovakia interesting for immigrants from other countries (Vojtovič, Tupá, 2016).

Labor migration has recently become very resonant throughout society. The demographic changes in the age structure of the population, which have lasted for several years, when the population of the Slovak Republic is aging, and the current situation regarding the outbreak of the global Covid-19 pandemic is an increasingly resonant topic of labor shortages in the health sector.

Not only the current situation associated with the outbreak of a global pandemic but also the demographic development of countries where the main phenomenon today is considered to be the aging of the population emphasizes the need to address the issue of providing health care with sufficient labor. Several authors discuss the need to address the health sector under the influence of an aging population, such as Jakovljević (2017) and Colombier (2018).

With the aforementioned stagnation of the population, the future greater need for labor is expected, especially in the field of health care, with a connection to the current global shortage of health workers, Slovakia's security may be in danger. The previous statement is also confirmed by Dobriansky, Suzman, Hodes (2007) who claim that high unemployment, outflow of labor due to population aging or migration causes cracks and a

shortage of workers in the labor market. There are concerns that caring for a growing aging population that is ill and dependent on support will not be possible (Jayawardana, Cylus, Mossialos, 2019).

The shortage of health professionals on a global scale has long been addressed by several authors such as Bradby, 2014 or Hardy, 2016. It has only become known in the Slovak Republic recently. According to Tupá (2020), the shortage of workers in the healthcare sector has far-reaching consequences, it draws attention to the daily encounters of people looking for either general or specialized doctors.

Trends in international migration also affect the migration of health workers. Healthcare migration is not a new trend. Nurses and doctors have been looking for and are looking for employment abroad for many reasons, including high unemployment in the healthcare labor market in their home country or a lower income compared to other countries. It can be said that more developed countries take the workforce, especially in the health sector, from the poorest countries in the world (Bach, 2003). This is confirmed by Wojczewski et al (2015) who argue that the unequal distribution of health workers contributes to the inefficient functioning of health services in many low-income countries, while several high- and middle-income countries benefit from the migration of skilled health workers.

Labor migration is closely related to regional disparities (Zudelova, Urbancikova, 2014). The goal of almost every country is to reduce the differences in individual regions. In the Slovak Republic, regional differences have already been addressed in various respects by several authors (Grmanová, Kostrová, 2019; Kostrová, 2018; Kordoš, Krajňáková, 2018; Privara, Rievajova, Dziura, 2018; Masarova, Koiso, 2017).

Although in the Slovak Republic there are already partial analyzes of the migration of the medical workforce abroad, the research lacks a focus on regional disparities in the labor force. That is why the aim of the presented study will be a detailed analysis of the current state of employment of health workers, migration of the health workforce from Slovakia to abroad, as well as an analysis of regional differences in the migration of health workers since 2010.

### 2. Aim, Data and Research Methodology

The aim of the presented study will be a detailed analysis of the current state of employment of health workers, migration of the health workforce from Slovakia to abroad, as well as an analysis of regional differences in the migration of health workers since 2010.

Sub-goals are:

- 1) detailed analysis of the development of workers in the health sector in individual NUTS 3 regions of Slovakia,
- 2) a detailed analysis of labor migration from the Slovak Republic with regard to the migration of health workers at the national level,
- 3) a detailed analysis of the migration of the health workforce at regional NUTS 3 level,
- 4) to find out whether there is convergence or divergence in the number of migrant workers in the health sector in the NUTS 3 regions in the Slovak Republic.

In analyzing the development of the number of employed in the health sector, the number of migrant workers at the national and regional NUTS 3 level, we used data from the DataCube database of the Statistical Office of the Slovak Republic (2020), Health Statistics Yearbook of the Slovak Republic from 2010 to 2018 and Quarterly statistical documents Labour force sample survey from 2010 to 2018 issued by the Statistical Office of the Slovak republic.

To meet the main goal and all partial goals, it was necessary to use the statistical method Beta convergence and the correlation diagram.

$\beta$ -convergence is one of the methods for measuring convergence, resp. divergence of regions. It is based on the assumption that regions converge if regions that initially had low values grew faster than regions that initially had higher values. If the data in the regions are moving away in a given time horizon, then we are talking about divergence. In our case, the individual NUTS 3 regions of the Slovak Republic are considered regions.

From the given data we construct a scatter plot, where we plot the logarithms of the initial values with the horizontal axis and we apply the logarithms of the average growth coefficients to the vertical axis, the units represent points in the plane. Subsequently, the least squares method determines the equation of the regression line with the dependent and independent variable in the form  $y = a + b * x$ , where  $y$  is the logarithm of the average growth coefficients and  $x$  is the logarithm of the initial values.

The dependent variable is the logarithm of the average growth factors and the independent variable is the logarithm of the initial values. If the function of linear regression is decreasing, we speak of convergence. If the linear regression function is increasing, we speak of divergence.

An important step is to calculate the value of the coefficient of determination in percent. It explains how many percent of the total variability is explained by the model. If the value of the coefficient of determination is close to 100, it is considered significant; if it is close to 0, it is considered insignificant (Minařík, Borůvková and Vystřil, 2013).

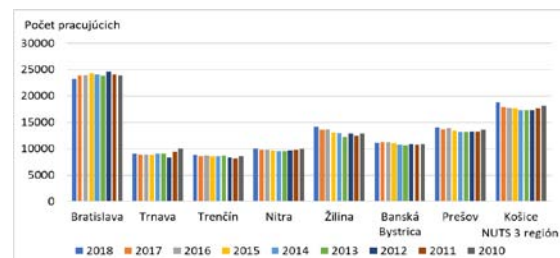
If the results of convergence are insignificant, a correlation diagram is used, which divides the observed regions into four quadrants using two lines. The first line, horizontal, passes through the arithmetic mean of the logarithms of the average growth coefficients. The second line, vertical, passes through the arithmetic mean of the logarithms of the initial values.

### 3 Research results and discussion

#### Number of workers in the health sector in the Slovak Republic

The number of workers in the health sector accounts for approximately 7.2% of the total number of workers. In the Slovak Republic, the number of employees according to the SOSR (2020) in the health sector increased by more than 28,000 persons over a period of nine years. We show how many health workers worked in individual NUTS 3 regions of the Slovak Republic in Graph 1.

Graph 1 Number of employees in the health sector in NUTS 3 regions in Slovakia republic



Sours: Data - Health Statistics Yearbook of the Slovak Republic 2010-2018 (2020)

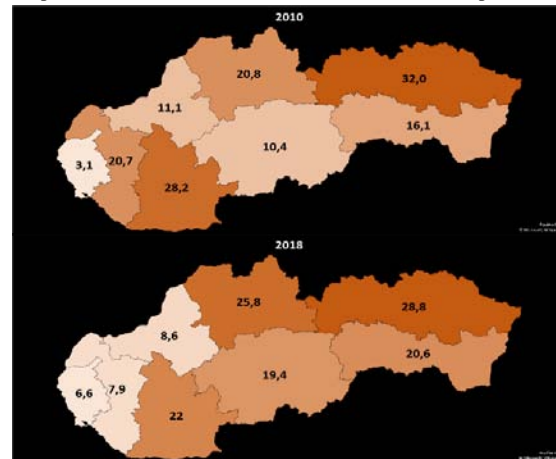
The largest number of health professionals worked in the NUTS 3 region of the Bratislava region, followed by the Košice region and the third place from 2010 to 2017 was the Prešov region. In 2018, the Žilina Region was in third place. While in the Bratislava and Trnava regions the number of workers in the health sector decreased in the other NUTS 3 regions of Slovakia their number increased. We will analyze whether the increasing emigration of the labor force from these regions contributes to

the decline in workers in the health sector in the following part of the study.

#### Number of workers abroad from the Slovak Republic

In 2018, more than 139,000 inhabitants migrated from the Slovak Republic than in 2010. The number of labor migrants from individual regions can be observed in Graph 2.

Graph 2 Number of workers abroad from the Slovak republic



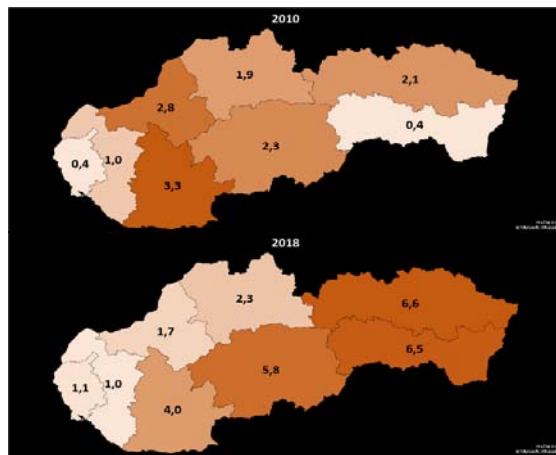
Sours: Data - Quarterly statistical documents Labour force sample survey 2010 – 2018. (2020)

Most people working abroad were in the NUTS 3 region of the Prešov Region during the entire period under review. From the NUTS 3 region, the Bratislava Region worked the least working abroad during the entire monitored period. The reason why the Bratislava Region emigrates the least from the NUTS 3 region for work abroad is that the capital of the Slovak Republic is located in this region, many entrepreneurs are concentrated here to carry out their business activities and thus there are many job opportunities.

#### Number of workers abroad from the Slovak Republic in the health sector

The development of the number of workers abroad from the Slovak Republic in the health sector had a fluctuating development, but from 2010 to 2018 the number of emigrant health workers increased by almost 15,000. The number of migrant workers from individual regions can be observed in Graph 3.

Graph 3 Number of workers abroad from the Slovak republic in health sector



Sours: Data - Quarterly statistical documents Labour force sample survey 2010 – 2018. (2020)

In the emigration of the labor force, we can observe large regional differences within the territorial division of NUTS 3. As

we can see in Graph 3, in 2010 most workers abroad in the health sector came from the Nitra region. The number of migrant health workers from Slovakia in individual NUTS 3 regions almost exactly copies the differences within the total labor migration in NUTS 3 regions.

In 2018, the emigration of workers in the health sector reflects the overall economic situation within NUTS 3 regions. While in the west of Slovakia fewer workers from the NUTS 3 region emigrate from the health sector in the eastern NUTS 3 regions, the number of emigrant health professionals is noticeably higher. This is mainly due to the economic situation in Slovakia, where the western regions have better conditions on the labor market, better infrastructure, more job opportunities and higher wage rates have been developed.

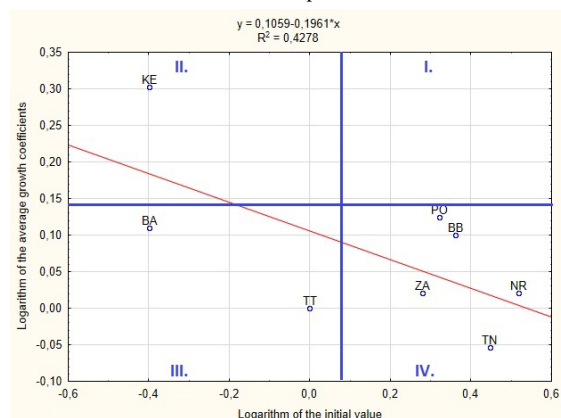
From 2010 to 2018, the number of emigrant workers in the health sector from the NUTS 3 region of the Košice Region increased the most, where their number increased by more than 6,000. The only region where the number of emigrant health workers decreased in the monitored period is the NUTS 3 region Trenčín Region, where from 2010 to 2018 the number of health workers working abroad decreased by more than 1100 workers.

We analyze whether the individual NUTS 3 regions are approaching or receding in the number of emigrant health professionals in the following section.

#### Convergence of working population abroad in the health sector in NUTS 3 regions of the Slovak Republic

The average growth rate of the number of employees abroad in the health sector was 1.1954. The function of the regression line had the form:  $y = 0.1059 - 0.1961x$ . It follows from the above that the function of the regression line decreases, thus converging, ie converging regions. The coefficient of determination has a value of 42.78%, which means that 42.78% of the total variability is explained by the model. Because the value of the coefficient is closer to 0, convergence is considered insignificant. In case of insignificance, a correlation diagram is used, which divided the NUTS 3 regions of the Slovak Republic into four quadrants, but the NUTS 3 regions are located in only three quadrants (Graph 4).

Graph 3 Beta- convergence and correlation diagram of number of workers abroad from the Slovak republic in health sector



Sours: Data - Quarterly statistical documents Labour force sample survey 2010 – 2018. (2020)

In the first quadrant there is not one of the NUTS 3 regions of the Slovak Republic. The Košice Region is located in the second quadrant, ie this region has a below-average initial value and an above-average growth rate. It tends to move into the first quadrant. The Bratislava Region and the Trenčín Region are located in the third quadrant, ie in the quadrant where the NUTS 3 regions are located, which lag behind the other regions. These regions have a below-average initial value and a below-average growth rate. In the fourth quadrant there are the most NUTS 3 regions in the Slovak Republic. The regions of Prešov, Banská Bystrica, Žilina, Nitra and Trenčín are located here. There are

NUTS 3 regions of the Slovak Republic, which have above-average initial values and below-average growth values. They tend to move to the third quadrant.

#### 4 Conclusion

The aim of the presented study was to analyze in detail the current state of employment of health care workers, the migration of the health workforce from Slovakia to abroad, as well as to analyze regional differences in the migration of health care workers since 2010.

Based on our analyzes, we can say that in the Slovak Republic from 2010 to 2018, the number of employees in the health sector increased by more than 28,000 people over a period of nine years. While in the Bratislava and Trnava regions the number of workers in the health sector decreased in the other NUTS 3 regions of Slovakia their number increased.

In 2018, more than 139,000 inhabitants migrated from the Slovak Republic than in 2010. During the entire period under review, the majority of people working abroad were in the NUTS 3 region of the Prešov Region, the least in the Bratislava Region.

The development of the number of workers abroad from the Slovak Republic in the health sector had a fluctuating development, but from 2010 to 2018 the number of emigrant health workers increased by almost 15,000. In labor emigration, we can observe large regional differences within the territorial division of NUTS 3. The number of migrant health workers from Slovakia in individual NUTS 3 regions almost exactly copies the differences within the total migration of labor in NUTS 3 regions. From 2010 to 2018, the number of emigrant workers in the health sector from the NUTS 3 region of the Košice Region increased the most, where their number increased by more than 6,000. The only region where the number of emigrant health workers decreased in the monitored period is the NUTS 3 region Trenčín Region, where from 2010 to 2018 the number of health workers working abroad decreased by more than 1100 workers.

NUTS 3 regions of the Slovak Republic had a tendency to converge in our observed period, ie there was a convergence of regions. NUTS 3 regions are located in three quadrants. Although convergence is taking place, large regional disparities are still visible and this issue should be constantly addressed by experts and efforts should be made to reduce regional disparities even more.

This paper can serve as a basis for further scientific research in the context of labor emigration and also as a basis for addressing the issue of investigating the causes and effects of migration of doctors and nurses to work abroad.

#### Literature:

1. Bahna, M. Migrácia zo Slovenska po vstupe do EU. 1. vyd. Bratislava: Veda, 2016, 219 s. ISBN 9788022411967
2. Bach, S. International migration of health workers: labour and social issues. Geneva: Sectoral Activities Programme, International Labour Office. 2003. [online]. [cit. 2020-10-11]. Available on: <https://www.hrhresourcecenter.org/node/154.html>
3. Bradby, H. International medical migration: A critical conceptual review of the global movements of doctors and nurses. Health. [online]. 2014; 18 (6): [cit. 2020-11-10]. Available on: <https://doi.org/10.1177/1363459314524803>.
4. Colombier, C. Population ageing in healthcare – a minor issue? Evidence from Switzerland. In Applied Economics. 50(15). 2018. pp. 1746-1760. ISSN 0003-6846.
5. Database of Statistical office of the Slovak republic DataCube[online]. 2020. [cit. 2020-10-11]. Available on: <http://datacube.statistics.sk/>
6. Dobriansky, P. J., Suzman, R. M., Hodes, R. J. Why Population Aging Matters. In A Global Perspective. National Institute on Ageing, National Institute of Health, 2007. 32 p.

7. Hardy, J. et al. Scaling the mobility of health workers in an enlarged Europe: An open political economy perspective. *European Urban and Regional Studies*. [online]. 2016; 23 (4): [cit. 2020-11-10]. Available on: <https://doi.org/10.1258/j.srp.2012.012018>.
8. Jakovljević, M. Population ageing alongside health care spending growth. In *Serbian archives of medicine*. 145(9-10). 2017. pp. 534-539. ISSN 0370-8179.
9. Jayawardana, S., Cylus, J., Mossialos, E. It's not ageing, stupid: why population ageing won't bankrupt health systems. In *European Heart Journal - Quality of Care and Clinical Outcomes*. 2019. 5(3). pp. 195-201.
10. Kordoš, M., Krajňáková, E. Significance of innovation in Slovak regions - issues and challenges In: *Ad alta-journal of interdisciplinary research*, 8(1). 2018. pp. 137-141. ISSN 1804-7890.
11. Kostrová, J. Regional disparities in context of working migration in the Slovak Republic In: *RELIK 2018 : Reproduction of human capital - mutual links and connections. The 11th international scientific conference. - Prague : University of Economics*, 2018. p.163-172. ISBN 978-80-245-2281-4.
12. Lanari, D., Bussini, O., Minelli, L. The Effects of Immigrant Status and Age at Migration on Changes in Older Europeans' Health. In *International Migration Review*, 52 (4). 2018. pp. 1218-1249. ISSN 0197-9183.
13. Masárová, J., Koišová, E. Identification of the conditions (potential) for the development of potential clusters in the conditions of regions of the Slovak Republic. In *AD Alta Journal of interdisciplinary research*, 7(2). 2017. pp. 103-107. ISSN 1804-7890.
14. Minářík, B., Borůvková, J., Vystrčil, M. *Analýzy v regionálním rozvoji. Příbram: Professional Publishing*, 2013. 244 p. ISBN 978-80-7431-129-1
15. Privara, A., Rievajová, E., Džjura, B. Unemployment Aspects of Regional Development (The Cases of the Czech and Slovak Republics) In *Advanced Science Letters*, 24(9). 2018. pp. 6320-6322(3). ISSN 1936-6612.
16. Statistical Office of the Slovak Republic. *Health Statistics Yearbook of the Slovak Republic 2010- 2018*. [online]. [cit. 2020-11-10]. Available on: <https://slovak.statistics.sk/>
17. Statistical Office of the Slovak Republic. *Quarterly statistical documents Labour force sample survey 2010 – 2018*. [online]. [cit. 2020-11-10]. Available on: <https://slovak.statistics.sk/>
18. Triandafyllidou, A. *Handbook of migration and globalisation. United Kingdom: Cheltenham*. 2018. 487 p. ISBN 978-1-78536-750-2.
19. Tupá, M. Personálne zabezpečenie systému zdravotníctva v Slovenskej republike kvalifikovanými sestrami v kontexte pracovnej emigrácie. In *Zdravotnícke listy*. 8(1). 2020. pp. 38-46. ISSN 1339-3022.
20. Tupá, M., Vojtovič, S., Strunz, H. Zmeny na trhu práce v SR a migrácia pracovnej sily. In *Zborník odborných príspevkov z medzinárodnej vedeckej konferencie Vplyv Industry 4.0 na tvorbu pracovných miest*, 2018. s. 209-216. ISBN 978-80-8075-837-0.
21. Vojtovič, S., Tupá, M. Evaluation of Economic Benefits from Migrated Labour Force. In: *3rd International Multidisciplinary Scientific Conference on Social Sciences and Arts SGEM 2016: Political Sciences, Law, Finance, Economics and Tourism*, 2(8). 2016. pp. 229-236. ISBN 978-619-7105-76-6.
22. Wojczewski, S. et al. Diaspora engagement of African migrant health workers – examples from five destination countries. In *Global Health Action*. 8 (1). 2015. ISSN 1654-9716.
23. Zudelova, M., Urbancikova, N. Labour migration and mobility in the districts of the Slovak Republic. In *5th Central European Conference in Regional Science (CERS)*. 2014. Pp. 1198-1208.

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