MINISTERUL EDUCAȚIEI NAȚIONALE
ROMÂNIA
UNIVERSITATEA DE MEDICINĂ, FARMACIE, ȘTIINȚE ȘI TEHNOLOGIE „GEORGE EMIL PALADE" DIN TÂRGU MUREȘ

ACTA MARISIENSIS, SERIA OECONOMICA
Online:ISSN 2668-3989, ISSN L 2668-3148
Print:ISSN 2668-3148, ISSN L 2668-3148

THE ANALYSIS OF THE MIGRATION OF PRACTICING PHYSICIANS FROM ROMANIA

Maria Cristina Herțeg [1]
Elena Bunduchi [1,2*]
Oğuz Demirel [3]

[1] Faculty of Economics and Law, Economic Sciences ED1 Department, George Emil Palade University of Medicine, Pharmacy, Science, and Technology of Targu Mures, Gheorghe Marinescu, 38, Targu Mures, 540139, Romania
[2] Institute of National Economy – Romanian Academy, Casa Academiei, Calea 13 Septembrie 13, Sector 5, Bucharest 050 711, Romania
[3] Faculty of Business Administration – Düzce University, Konuralp Yerleskesi, Orhangasi Mahallesi, 81620, Düzce, Turkey

Rezumat: *Migrația medicilor specialiști care pleacă din România pentru a lucra în țări mai dezvoltate este un fenomen cunoscut sub denumirea de exodul creierelor. Prin intermediul acestei cercetări am studiat migrația medicilor practicanți din România în perioada 2014-2021 prin analiza a patru variabile, respectiv prin testarea a patru ipoteze de cercetare. Pe baza rezultatelor obținute a fost necesar să renunțăm la analiza a două variabile care nu prezentau o semnificație statistică, respectiv numărul de absolvenți pe specialitatea de medicină și nevoia nesatisfăcută auto-raportată de examinare și îngrijire medicală. Astfel, în cercetare am concluzionat că o creștere a variabilei cheltuieli în sănătate contribuie la o creștere a numărului de medici practicanți din România. Pe de alta parte, cu toate ca au existat creșteri salariale semnificative în perioada 2016-2018, acestea s-au dovedit a fi insuficiente, iar numărul medicilor practicanți a continuat să scadă.*

Cuvinte cheie: *migrație, exodul creierelor, factori push, medici practicanți, cheltuieli în sănătate, salariul în medicină*

Abstract: *The migration of medical specialists leaving Romania to work in more developed countries is a phenomenon known as the brain drain. Through this research, we studied the migration of practicing physicians from Romania during the period 2014-2021 by analyzing four variables respectively by testing four research hypotheses. Based on the results obtained, it was necessary to renounce at the analysis of two variables that did not present statistical significance, namely the number of graduates in the medical specialty and the self-reported unmet need for medical examination and care. Thus, in the research, we concluded that an increase in the variable health care expenditure contributes to an increase in the number of practicing physicians in Romania. On the other hand, although there were significant salary increases during the period 2016-2018, these proved to be insufficient, and the number of practicing physicians continued to decrease.*

Keywords: *migration, brain drain, push factors, practicing physicians, health care expenditure, salary in medicine*

JEL Classification: I10, I12, I18

[*] *Corresponding author: Elena Bunduchi*
e-mail: elena.bunduchi@umfst.ro

1. INTRODUCTION

The migration of medical personnel in Romania has increased significantly with the EU integration process (Sechet et al., 2015). The main migration flow of medical personnel is from less developed to more developed countries, a phenomenon known as "brain drain" (Mullan, 2005). Numerous studies (Boboc & Titan, 2014) have shown that although the main flow is from low- and middle-income countries to high-income countries, in the last decade, a major problem for receiving countries is the retention of competent health workforce.

Among the main factors influencing the migration of doctors are the infrastructure of the medical system and access to the most advanced medical technologies. As a preferred destination for migration, Romanian doctors choose to migrate to Germany and the United Kingdom (Stancu et al., 2024). These countries invest heavily in the healthcare sector, thus registering high salaries and good working conditions (Apostu et al., 2022). Thus, the wage differences between the countries of origin and destination represent the main factor affecting migration (Stilwell et al., 2004). According to the specialized literature, other factors that favor the migration of doctors are unattractive employment opportunities in the country of origin, lack of professional career development and a precarious work environment (Paunica et al., 2017). In addition, other researchers (Boboc, et al., 2015) analyzed panel data to identify macroeconomic factors influencing the brain drain in Romania. Their results showed that low healthcare expenditures level compared to other fields of activity and to other preferred destination states by medical specialists played an important role. Romanian doctors under 35 years declare a probable (40.3%) or certain (17.2%) intention to emigrate, and the declared tendency to emigrate decreases with the doctor's age (Agerpres, 2023). Many doctors complain that they work with outdated technologies, which hinders their ability to provide high-quality care, contributing to their decision to migrate (Romania Insider, 2024). Moreover, this intention in choosing another state to practice medicine is observed not only among active medical specialists, but also among potential doctors. Following a study based on a questionnaire for Romanian graduate students from medical faculties, it emerged that the determining factors of medical students' intention to migrate for studies abroad are the lack of career prospects, the deficient educational system, professional development, the salary differential and the job offer in the destination country (Vasile et al., 2023).

In terms of satisfaction with the way the health system works, Belgians, Swiss and Dutch are the most satisfied with their health systems and consider that they benefit from good access to medicines. In contrast, Romania is in 17th place, with only 39% of respondents satisfied with the national health system (Europa Libera, 2024). As a result, Romania faces a shortage of doctors in certain regions and specializations, despite a relatively large number of medical graduates. Professional migration and the uneven distribution of doctors contribute to this problem. In addition, according to national legislation, a doctor must complete residency studies to become a specialist, and without these, they are not legally allowed to practice in any medical institution (Ministry of Health, 2006). However, the residency system is overburdened, so not all graduates manage to obtain residency places in the desired specializations (Ziarul Financiar, 2024). Thus, the present situation within the Romanian hospitals reveals a persistent impasse, as residents struggle to secure positions in operating rooms while the healthcare system faces a shortage of doctors (Recorder, 2024).

In order to reduce the migration of medical personnel from Romania, a series of measures have been promoted, including significant salary increases for medical personnel, especially for

ACTA MARISIENSIS, SERIA OECONOMICA
Online:ISSN 2668-3989, ISSN L 2668-3148
Print:ISSN 2668-3148, ISSN L 2668-3148

doctors, implemented through Law no. 153/2017 on the remuneration of personnel paid from public funds. Thus, starting with 2018, all categories of doctors have benefited from significant salary increases, and for certain categories (for example resident doctors) the salaries were doubled (Guga, 2022). However, even if salaries have increased substantially, they are still lower compared to those in developed countries of the European Union (Apostu et al., 2022). Consequently, the policy of attracting young graduates through income has not succeeded in stopping the migration of medical personnel from Romania (Vasile et al., 2022).

The purpose of this research is to identify the variables that influence doctors' decision to migrate from Romania to other more developed countries, both in terms of the national healthcare system and the economic context.

2. DEFINIG THE RESEARCH PROBLEM

2.1. Research Methodology

In this article, we used a multiple linear regression model to analyze the impact that a set of four independent variables has on the dependent variable. Thus, the dependent variable used in the research is the number of practicing physicians in Romania, and the four independent variables are:

a) Number of graduates in the medical specialty;
b) Health care expenditure by financing scheme;
c) Average salary in medicine;
d) Self-reported unmet need for medical examination and care by sex.

To assess the influence of independent variables on the number of practicing physicians in Romania, we have established the following hypotheses for our research:

- *H1 – the growth of graduates in the medical specialty contributes to the increase in the number of practicing physicians in Romania;*
- *H2 – the growth in health care expenditure contributes to the increase in the number of practicing physicians in Romania;*
- *H3 – the growth in the average salary in medicine contributes to the increase in the number of practicing physicians in Romania;*
- *H4 – the increase in the unmet need for medical examination and care leads to the increase in the number of practicing physicians in Romania.*

By developing the multiple linear regression model we aim to identify whether there is a direct and statistically significant relationship between the selected variables.

The general model for multiple linear regression has the following form:

$$\boldsymbol{Yi = a + b1 * X1 + b2 * X2 + b3 * X3 + b4 * X4 + ei}$$

where:

- Y_i represents the dependent variable;

- a represents the intercept and indicates the average value of the dependent variable Y when the magnitude of the variable X is 0;
- b1...bn represent the slope of the regression line, illustrating the average change in the dependent variable Y for an absolute variation corresponding to a one-unit increase in the independent variables X1...Xn;
- X_1, X_2, X_3, X_4 represent the independent variables;
- e_i represents the residual variable.

2.2. Data collection and description

The research utilizes data supplied by the National Institute of Statistics of Romania and the Statistical Office of the European Union for the period 2014-2021. According to these two databases, we present below a description of the variables used in the research, as follows:

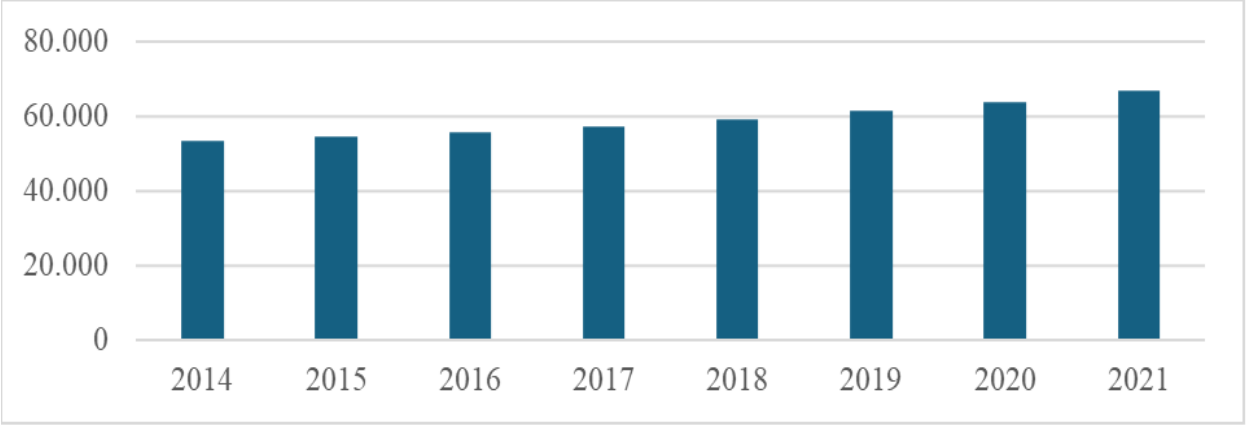
- Practicing physicians provide services directly to patients as consumers of medical services. These services include performing medical examinations and establishing diagnoses, prescribing medicines and treating illnesses, providing specialized medical or surgical treatment for certain diseases, disorders or injuries, applying preventive medical methods and treatments;
- The number of graduates in the medical specialty includes data starting with 2014, under the classification SCL109H. The data regarding university education - bachelor's degree (until 2013) includes only the number of bachelor's degree graduates. A bachelor's degree graduate is a student who has passed the last year of study at a faculty, regardless of whether he/she passed the bachelor's degree exam. The number of graduates is calculated based on data referring to the end of the academic year (after taking the remaining exams in the fall);
- Health care expenditure is recorded in relation to the International Classification of Health Accounts (ICHA). Thus, in the research we used data on health care expenditure by financing scheme (EUROSTAT Code: ICHA-HF) which classifies the types of financing arrangements through which people obtain health services, healthcare financing schemes include direct payments made by households for services or goods and third-party financing arrangements;
- The average salary in medicine represents the average gross monthly nominal salary, under the classification FOM107F. The gross nominal salary includes the gross amounts paid from the salary fund for the time worked by economic agents in the reference month;
- Self-reported unmet need for medical examination and care measures the share of the population aged 16 and over who report unmet need for medical care due to one of the following reasons: “Financial reasons”, “Waiting list” and “Too far to travel”, all three categories being cumulated. Self-reported unmet need refers to a person’s own assessment of whether they need medical examination or treatment (excluding dental care) but did not receive it or did not request it (EUROSTAT Code: SDG_03_60). The indicator is derived from self-reported data, so it is, to some extent, affected by the subjective perception of respondents, as well as their social and cultural background.

Regarding, the number of practicing physicians in Romania there is an increasing by 25%, from 53.720 physicians in 2014, reaching 67.096 in 2021, as shown in Figure 1. However, the number of medical specialties in short supply is still high, including the following categories:

ACTA MARISIENSIS, SERIA OECONOMICA
Online:ISSN 2668-3989, ISSN L 2668-3148
Print:ISSN 2668-3148, ISSN L 2668-3148

anesthesia and intensive care, infectious diseases, cardiology and pediatric surgery, epidemiology, family medicine, emergency medicine, etc. (Ministry of Health, 2023).

Figure no.1 - Evolution of the number of practicing physicians in Romania between 2014-2021, persons



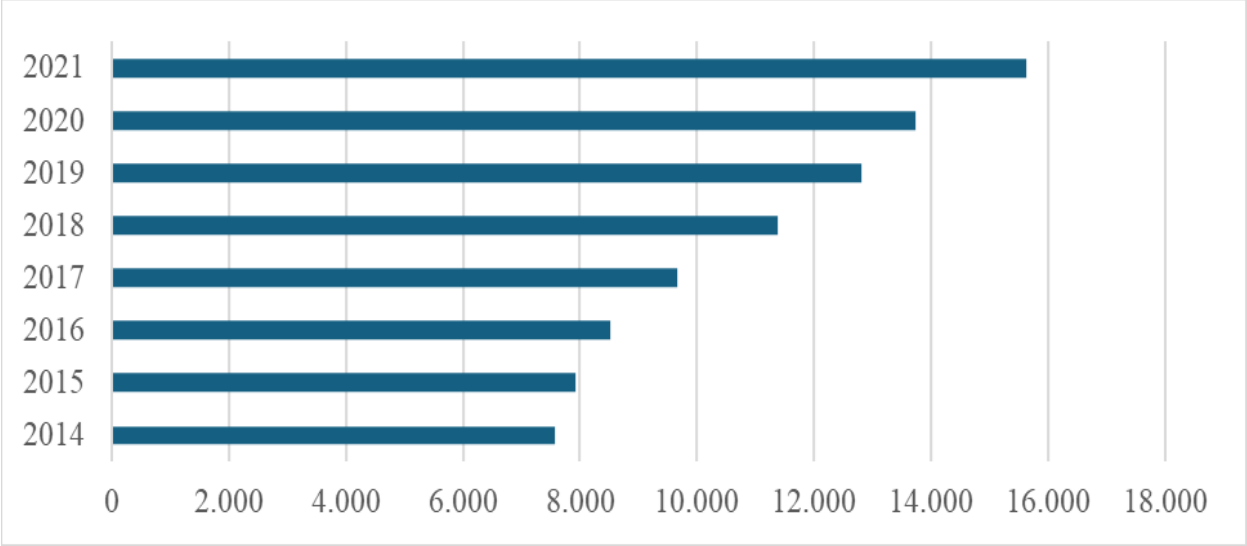
Source: authors' projection based on EUROSTAT data
https://ec.europa.eu/eurostat/databrowser/view/hlth_rs_prs2$defaultview/default/table

As outlined in the European Commission's latest report, "State of Health in the EU," despite an increase in the number of healthcare workers in Romania over the past decade, the number of doctors and nurses per 1,000 inhabitants remains below the EU average. Thus, in 2021 there were 3.5 practicing physicians per 1.000 inhabitants, which indicates a rate among the lowest in the EU, as the EU average is 4.1 per 1.000 inhabitants (European Commission, 2023).

On the other hand, Romania produces a large number of doctors, with an above-average number of medical graduates per 100.000 inhabitants, but the migration of medical personnel (both new graduates and experienced workforce) has contributed to the low number of health professionals currently working in Romania (OECD, 2023). Furthermore, a research on the intention of Romanian students to leave abroad (Coșciug, 2013; Suciu et al., 2017) reveals that over 80% of current medical students express their desire to migrate after graduation. These figures are alarming, given that migration intentions are generally a good predictor of future physician departures (Leone et al., 2015). Regarding the requests for Current Professional Certificates required for working abroad, while precise statistical data is unavailable, it can be concluded that a significant number of graduates migrate after completing their studies to pursue opportunities aligned with their acquired specialties (Vasile et al., 2021).

In terms of health care expenditures, during the analyzed period, they registered a strong upward trend, with an increase of 107%, from the value of 7.568 in 2014 to 15.632 in 2021, according to Figure 2.

Figure no.2 - Evolution of health care expenditure in Romania in the period 2014-2021, mil. euro



Source: authors' projection based on EUROSTAT data

https://ec.europa.eu/eurostat/databrowser/view/hlth_sha11_hf$defaultview/default/table

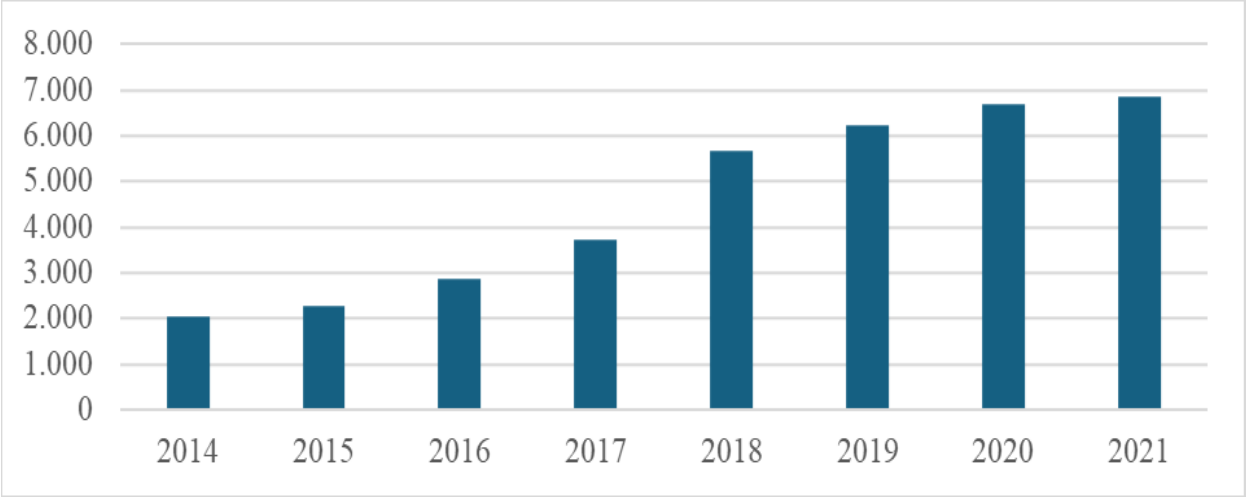
However, health expenditure per capita in Romania remained the lowest among EU countries in 2021. The share of GDP allocated to health at the EU level was 11%, compared to 6.5% in Romania. Thus, Romania spent EUR 1.663 per capita on health in 2021, which is less than half of the EU average of EUR 4.030 (European Commission, 2023). According to the National Institute of Statistics, the distribution of health expenditure by main health financing schemes in 2021 was as follows: central and local government schemes (18.2%), financing schemes with mandatory contributions to the health system (60.1%), direct household payments (21%), and voluntary payment schemes (0.7%).

Public funds are the primary source of financing for health expenditures, which registered a significant increase of 73.4% in 2021 compared to 2017. The second source of financing sources is private sources, of which the most important are payments made by households, which increased in 2021 by 78% compared to 2017 (Health Accounts System, 2023).

As a result, the share of public expenditure on health remained high (78% in 2021), but out-of-pocket expenditure (OOP) as a percentage of total health expenditure was 21%, significantly exceeding the EU average of 15%. Thus, two-thirds of out-of-pocket expenditure in 2021, or 63%, was spent on medicines, compared to the EU average of 24% (OECD, 2023).

ACTA MARISIENSIS, SERIA OECONOMICA
Online:ISSN 2668-3989, ISSN L 2668-3148
Print:ISSN 2668-3148, ISSN L 2668-3148

Figure 3 - Evolution of the average salary in medicine in Romania during 2014-2021, lei



Source: Authors' projection based on data from the National Institute of Statistics

http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table

Regarding the average salary in medicine, the data is presented at a general level, covering all categories of employees in the health sector. Thus, from Figure 3, it can be noted that this variable registered an upward trend throughout the analyzed period, with a significant increase of 52% in the period 2017-2018, from 3.715 lei in 2017 to 5.654 lei in 2018, due to the impact of Law no. 153/2017 on the remuneration of personnel paid from public funds. However, despite the significant increase in doctors' salaries in Romania since 2017, OECD member states have implemented measures that have streamlined the recognition of foreign physicians' professional skills and expedited their integration into the national healthcare system, thus making the option to migrate a tempting alternative for both graduates and doctors (Vasile et al., 2021).

3. PRESENTATION OF RESEARCH RESULTS

To evaluate the influence of the number of graduates in the medical specialty, health care expenditures, the average salary in medicine and the self-reported unmet need for medical examination and care on the number of practicing physicians in Romania, we applied a linear regression model to analyze our research variables. The results are summarized in Table 1.

According to Table 1, we find that the proposed regression model is statistically significant since the Significance F value is below the significance threshold of 0.05%. Thus, the multiple linear regression equation is presented in the following form:

$$\textit{No. of practicing physicians} = 3.65301 + (-0.061) * \textit{No. graduates} + 0.446 * \textit{Health care expenditure} + (-0.108) * \textit{Average salary} + (-0.039) * \textit{Unmet need} + e_i$$

Table 1 - Summary of statistical results

	Coefficients	Standard Error	t Statistic	p-value
Intercept	3.65301	0.27228	13.41597	0.00089
No. of graduates in the medical specialty	-0.06114	0.05131	-1.19161	0.31908
Health care expenditure by financing scheme	0.44606	0.04711	9.46810	0.00249
Average salary in medicine	-0.10830	0.03524	-3.07246	0.05445
Self-reported unmet need for medical examination and care	-0.03951	0.03158	-1.25099	0.29961
Significance F = 0,000560267				

Source: Authors' projection

Based on the results obtained, it was necessary to renounce at the analysis and interpretation of two independent variables, namely the number of graduates in the medical specialty and the self-reported unmet need for medical examination and care, as they do not present statistical significance because the P-value is higher than the reference threshold of 0.05. Thus, we conclude that there is no direct linear relationship between the number of practicing physicians in Romania, the number of graduates in the medical specialty and the self-reported unmet need for medical examination and care.

In the case of the relationship between the number of practicing physicians in Romania and health care expenditure, there is statistical significance since for each increase in health care expenditures by 1 leu, the analyzed model predicts that the number of practicing physicians is estimated to increase on average by 0.446 physicians. Thus, from an economic point of view, the higher the health care expenditures, the more attractive a country becomes for physicians (Bunduchi et al., 2022). Thus, physicians are more attracted to countries characterized by greater economic freedom and higher health care expenditures per capita (Yakovlev & Steinkopf, 2014). Other studies (Bhargava et al., 2011) have demonstrated that the inflow of foreign-trained physicians is higher in OECD countries with high health spending. In addition, another study (Nwaogu, 2016) contributed to the previous literature on the “brain drain” of doctors by amplifying the role that low levels of health care expenditures play in encouraging the emigration of practicing physicians from developing countries.

Regarding the relationship between the number of practicing physicians in Romania and the average salary in medicine, we identified a statistical significance because for each increase in the average salary in medicine by 1 leu, the analyzed model predicts that the number of practicing physicians decreases on average by 0.108 physicians. Although this result obtained in the research could initially be unusual or contradictory, since according to a rational expectation a salary increase should be considered attractive by physicians so that in the end the number of physicians who decide to stay in the country is increasing, not decreasing as in this case. However, analyzing the current context from an economic perspective, our statistical results are validated by other recent studies in the specialized literature. Thus, other authors have demonstrated that salaries, as a "push factor" for migration, although they decreased in intensity after the substantial increase in

ACTA MARISIENSIS, SERIA OECONOMICA
Online:ISSN 2668-3989, ISSN L 2668-3148
Print:ISSN 2668-3148, ISSN L 2668-3148

salaries in the health sector in 2016 and then in 2018, continue to remain a factor for labor migration (Apostu et al., 2022). Therefore, even if doctors' salaries increased in 2018, the difference between salaries in Romania and those in other more developed countries is large (Apostu et al., 2022). Consequently, significant salary increases were not enough to completely stop the migration of Romanian physicians. Moreover, the value close to the threshold of statistical insignificance in the case of the impact of salary on the migration trend may justify the fact that this is not the most important determining factor. This migration trend remains current even though salaries in the medical field have been continuously increasing in recent years, without a direct effect on reducing the migration intention.

4. CONCLUSIONS

The brain drain of Romanian doctors is a phenomenon that reflects the mass migration of medical specialists who leave Romania to work in more developed countries. Those factors that influence the migration of doctors if analyzed from the country of origin, namely Romania, are considered push factors. Thus, following the review of the specialized literature, we identified as the main push factors that influence the migration of doctors difficult working conditions, lack of training and professional development opportunities, low remuneration, instability of the health system, low level of health care expenditure and an economic environment with a low level of development. Although the number of practicing physicians has increased in the analyzed period, the shortage of doctors on the Romanian labor market still cannot be covered. Thus, the medical sector is facing a major shortage of medical personnel in numerous medical specialties.

Therefore, we studied the migration of practicing physicians from Romania during the period 2014-2021, considering in the analysis four variables that we initially considered to be among the main possible factors that could contribute to migration.

The research results indicated that the variable number of graduates in the medical specialty and the variable self-reported unmet need for medical examination and care did not present statistical significance, which is why it was necessary to renounce at the interpretation and analysis of the two variables. Therefore, in the research, we reject the first (H1) and the fourth research hypothesis (H4).

Analyzing the results obtained from the application of the multiple linear regression model, we can conclude the following aspects:

- The second hypothesis to be tested (H2) is accepted both from a statistical and an economic point of view since there is a positive and significant relationship between health care expenditures and the number of practicing physicians. Thus, it was demonstrated that a rise in health care expenditures contributes to an increase in the number of practicing physicians in Romania;
- The third hypothesis to be tested (H3) is not accepted because there is no directly proportional relationship between the salary in medicine and the number of practicing physicians. Therefore, it was demonstrated that although the salary in medicine has increased, the number of practicing physicians in Romania has continued to decrease. This result suggests that the situation in Romania is different and more atypical than in other countries. The main cause that we managed to identify is the significant difference between

the salary level of a physician in Romania compared to the salary that he could obtain in other more developed EU countries. Therefore, although there were considerable salary increases in the period 2016-2018, they proved to be insufficient, and the desire of Romanian physicians to leave still persists due to more attractive salaries in other countries.

In this article, we have demonstrated that health care expenditures, although it has increased significantly, contributing to a reduction in physician migration, is still an important factor contributing to physician migration. Thus, low level of health care expenditures creates a difficult working environment for physicians in Romania, with limited resources and reduced opportunities for professional development. These conditions lead many physicians to migrate to more developed countries where health care systems are better funded and offer superior conditions, both professionally and personally.

In conclusion, the migration of practicing physicians will continue to represent a great loss for Romania that will have effects on the efficiency of the health care system, but also on the economic development of the country, as the loss of the workforce will limit innovation, competitiveness and development capacity.

Bibliography

Vasile, V., Bunduchi, E., Boboc, C. & Vasile, R. (2021). Graduates and the labor market deficit in the Romanian health sector, *CKS 2021-Challenges of the Knowledge Society*, pp. 919-924.

Apostu, S.A., Vasile, V., Marin, E. & Bunduchi, E. (2022) Factors Influencing Physicians Migration—A Case Study from Romania. *Mathematics*, *10*, 505. https://doi.org/10.3390/math10030505.

Vasile, V., Bunduchi, E., Stefan, D., Comes, C.-A., Vasile, R. & Stefan, A.-B. (2023) Are We Facing a Radical Change in the Migration Behavior of Medical Graduates from Less Developed Countries? Demographic Profile vs. Social Push Factors. *Int. J. Environ. Res. Public Health* , *20*, 4894. https://doi.org/10.3390/ijerph20064894.

Sechet, R., Vasilcu, D. (2015). Physicians' migration from Romania to France: A brain drain into Europe?, *Cybergeo-Eur. J. Geogr.*, pp. 743.

Mullan F. (2005). The metrics of the physician brain drain. *New England Journal of Medicine*., pp. 353(17):1810–8.

Guga, S. (2022). Situația personalului sanitar din Romania: O evaluare generala. *Friedrich-Ebert-Stiftung*. *Syndex Knowledge For Action*, pp. 5-18.

Cosciug A. (2013). The Impact of International Student Mobility in Romania, *Europolis*, 7(1), pp. 93-109.

Suciu, Ş.M., Popescu, C.A., Ciumageanu, M.D. & Buzoianu, A.D. (2017). Physician migration at its roots: a study on the emigration preferences and plans among medical students in Romania, *Human Resources for Health*, 15(1), p. 6.

Leone, C., Bruyneel, L., Anderson J.E., Murells, T., Dussault, G., Jesus, E. H., Sermeus, W., Aiken, L. & Rafferty, A. M. (2015). Work environment issues and intention to leave in Portugueses nurses: A cross-sectional study, *Health Policy*, 119(2), pp. 1584-1592.

Boboc, C., Titan, E. (2014). Migration of Medical Doctors, Health, Medical Education, and Employment in Eastern and Central Europe, in Driouchi. In A Labor and Health Economics in the Mediterranean Region: Migration and Mobility of Medical Doctors; Advances in Finance Accounting and Economics; *IGI Global: Hershey*, pp. 158–191.

Stancu, B., Popa, S. L., Ismaiel, A., Turtoi, D. C., Brata, A. M., Duse, T. A. & Puia, I. C. (2024). Physician migration in Romania: a study on the emigration preferences within the Cluj County healthcare system. *Medicine and Pharmacy Reports.*

Benham, L.M., Reder, M.W. (1968). Migration, Location and Remuneration of Medical Personnel: Physicians and Dentists. *Rev. Econ. Stat.*, Vol. *50*, pp. 332–347.

Stilwell, B., Diallo, K., Zurn, P., Vujicic, M., Adams, O., & Dal Poz, M. (2004). Migration of health-care workers from developing countries: strategic approaches to its management. Bulletin of the World Health Organization, Vol. 82(8), pp. 559-636.

ACTA MARISIENSIS, SERIA OECONOMICA
Online:ISSN 2668-3989, ISSN L 2668-3148
Print:ISSN 2668-3148, ISSN L 2668-3148

Păunică, M., Pitulice, I.C., & Ștefănescu, A. (2017). International Migration from Public Health Systems. Case of Romania. *Amfiteatru Econ.*, Vol 19, pp. 742–756.

Boboc, C., Boncea, I. & Manea, D. (2015). The international migration of Romanian physicians. *Economic Computation & Economic Cybernetics Studies & Research*, Vol. 49(4), pp.85-102.

Boboc, C., Boncea, I. & Manea, D. (2015). THE INTERNATIONAL MIGRATION OF ROMANIAN PHYSICIANS. *Economic Computation & Economic Cybernetics Studies & Research*, *49*(4), pp.94.

Bunduchi, E., Vasile, V., Stefan, D., & Comes, C. A. (2022). Reshaping jobs in healthcare sector based on digital transformation. Rom. Stat. Rev, 1, 84.

Yakovlev, P. & Steinkopf, T. (2014). Can economic freedom cure medical brain drain? *J Priv Enterprise*, 29:97-117.

Bhargava, A., Docquier, F. & Moullan, Y. (2011). Modeling the effects of physician emigration on human development., *Econ Hum Biol*, 9(2):172-83.

Nwaogu, U. G. (2016). Physician Brain Drain: Does Health Expenditure Matter?. *Journal of Economic Insight*, *42*(1), 61-80.

OECD. European Observatory on Health Systems and Policies. (2023). *Romania: Country Health Profile 2023*, State of Health in the EU, OECD Publishing, Paris, https://doi.org/10.1787/f478769b-en.

OECD. European Observatory on Health Systems and Policies. (2020). Contribution of migrant doctors and nurses to tackling COVID-19 crisis in OECD countries, *OECD Policy Responses to Coronavirus (COVID-19)*, OECD Publishing, Paris, https://doi.org/10.1787/2f7bace2-en.

Romanian National News Agency Agerpres. (2023). The survey was conducted online, nationwide, between February 12 - March 5, 2023, on a sample of 8.121 responding doctors. AGERPRES (RO - author: Roberto Stan, editor: Mihai Simionescu; EN - editor: Simona Klodnischi), https://www.agerpres.ro/english/2023/06/22/survey-finds-57-5-pct-of-romanian-physicians-aged-less-than-35-consider-emigrating--1128422.

Romania Insider. (2024). Media: Six out of ten young Romanian doctors consider emigrating, din: https://www.romania-insider.com/young-romanian-doctors-emigrate-study-april-2024.

Europa Libera. (2024). Media: Europenii, tot mai nemulțumiți de sistemele naționale de sănătate, din: https://romania.europalibera.org/a/satisfactie-sanatate-europa/33019788.html.

Ziarul Financiar. (2024). Media: Romania, tara care se confrunta cu un exod de medici, este în top cinci tari din UE după numărul absolvenților de medicina. Romania are 26 de absolvenți de medicina la 100.000 de locuitori, peste media UE de 15,5, din https://www.zf.ro/eveniment/romania-tara-confrunta-exod-medici-top-cinci-tari-ue-dupa-numarul-22455398.

Recorder. (2024). Media: De ce ne mai pleacă medicii din tara, din https://recorder.ro/video-de-ce-inca-ne-mai-pleaca-medicii-din-tara-in-romania-rezidentul-e-un-sclav/.

Ministry of Health. Legea Nr. 95/2006 privind reforma în domeniul sănătății. Available online: https://lege5.ro/Gratuit/g42tmnjsgi/legea-nr-95-2006-privind-reforma-in-domeniul-sanatatii?pid=82047636#p-82047636.

Ministry of Health. Legea Cadru Nr. 153/2017 din 28 iunie 2017 privind salarizarea personalului plătit din fonduri publice. Available online: https://lege5.ro/gratuit/ge3dkmzyga3a/legea-cadru-nr-153-2017-privind-salarizarea-personalului-platit-din-fonduri-publice.

Ministry of Health. Ordinul nr. 3304/2023 privind stabilirea specialităților deficitare pentru care se organizează rezidențiat pe post în spitale clinice cu secții clinice universitare, instituite sau centre medicale clinice în sesiunea noiembrie 2023. Available online: https://lege5.ro/Gratuit/ge2danjshaydc/ordinul-nr-3304-2023-privind-stabilirea-specialitatilor-deficitare-pentru-care-se-organizeaza-rezidentiat-pe-post-in-spitale-clinice-cu-sectii-clinice-universitare-institute-sau-centre-medicale-clinic.

Eurostat. Health Personnel (Practicing Physicians). HLTH_RS_PRS2. Available online: https://ec.europa.eu/eurostat/databrowser/view/hlth_rs_prs2$defaultview/default/table.

INS. Absolvenți în învățământul superior, pe grupe de specializări, forme de proprietate, macroregiuni, regiuni de dezvoltare si județe. ISCED-F 2013: Sănătate si asistenta sociala. INS SCL109H. Available online: http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table.

Eurostat. Health care expenditure by financing scheme. HLTH_SHA11_HF. Available online: https://ec.europa.eu/eurostat/databrowser/view/hlth_sha11_hf$defaultview/default/table.

INS. Câștigul salarial nominal brut lunar, pe categorii de salariați, forme de proprietate, activități (secțiuni si diviziuni) ale economiei naționale CAEN Rev. 2 si pe sexe. FOM 107F. Available online: http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table.
Eurostat. **Self-reported unmet need for medical examination and care by sex. SDG_03_60. Available online: https://ec.europa.eu/eurostat/databrowser/view/sdg_03_60__custom_11961492/default/table.**