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THE INTERNATIONAL MIGRATION OF ROMANIAN PHYSICIANS

Abstract. *The brain drain in the health sector attracted the interest of researchers during the last 20 years after the fall of the communist regime. In Romania this phenomenon didn't represent a matter of concern until the accession to the EU, but nowadays the number of physicians going to work abroad increased substantially at the same time with the decrease of the number of practicing physicians. Therefore the effects of this phenomenon on the Romanian population health are even more dramatic.*

The main objective of this paper is to identify the main factors attracting Romanian physicians to emigrate in other EU countries. Regression analysis for panel data is used in order to identify the destination country effect and the significance of pull factors. The most important factors influencing physician's emigration are: proportion of population with higher education, levels of unemployment among young people, health expenditure per capita in the destination countries compared to origin countries.

Key words*: physician's migration, health professionals, Romania.*

JEL Classification: I19, J61

1. INTRODUCTION

The international migration of skilled workers attracted the interest of researchers in the last 60 years and it was usually studied from the perspective of the sending country and its consequences. The brain drain in the health sector is even more dramatic, as its consequences are not only economical, but also social. A growing concern is the change in the migration flows over the past decades, developing

countries becoming the main providers of health professionals to developed countries (Vujicic et al., 2004). Europe faced the brain drain issue in the medical sector since 1940, with the flows of medical doctors from Europe to USA and subsequently, from different countries in Europe to Great Britain (Dodani and Laporte, 2005). Following the enlargement of the European Union and the mutual recognition of diplomas, guaranteed by the EU Directive 2005/36/EC, new migration flows, from East to West appeared.

Romania has been confronting with the emigration of the medical doctors since the fall of the communist regime, but this trend didn't represent a matter of concern until the accession to the European Union. Between 1990 and 2012, the number of practicing physicians decreased from 55000 to less than 40000. If before 2007, about 9.4% of the total number of Romanian medical doctors worked abroad (Astărăstoaie et al, 2014) between 2008 and 2013 a number of 14072 requests of Certificates of Good Standing were deposed at the Romanian College of Physicians (Romanian College of Physicians).

The reasons behind the decision to emigrate among medical doctors can be classified into economic, professional, political, social or personal factors. Literature in this field is mainly based on country case studies and the most used instrument is the survey.

Our objective in this paper is to identify the main push and pull factors in international migration of Romanian physicians. Regression analysis for panel data is used in order to identify the destination country effect and the significance of pull factors. We find that, higher proportion of population with higher education in destination countries compared to origin countries attract the most medical doctors. The lower levels of unemployment among young people and higher values for health expenditure per capita in the destination countries compared to origin countries are contributing too to the emigration decision of Romanian physicians.

The following section is a brief overview of the phenomenon of medical brain drain. The third section presents the evolution in Romanian physicians' emigration. Firstly, we describe the main statistical indicators related to the Romanian medical brain drain and the push and pull factors that might influence the decision to migration. Secondly, we estimate the effect of destination country and the differential in some macroeconomic indicators on the physicians' migration level. Finally, the fourth section concludes the analysis and makes some proposals about future policies in order to reduce the emigration flows of medical doctors.

2. MEDICAL BRAIN DRAIN PHENOMENON: DEFINITION AND DETERMIANTS

a. A brief overview of the concept of brain drain

Brain drain is defined as the permanent emigration of the highly skilled manpower, from a low-income country to a richer country (Bhagwati (1983) in Wolburg, 2001). Starting from this definition, one can conclude that the main determinant of

the decision to emigrate among highly skilled is the economic factor. However, some authors mention the search for better working conditions or research facilities (Pearce, 1981, Rutherford, 1992), better career opportunities or a better life among the main factors of emigration.

Pizarro (1993) defines the brain drain as the emigration of the highly skilled occurring from developing countries, regardless the income level of the destination country. Moreover, the emigration of the intellectuals from European countries to USA is also an example of brain drain (European Parliament), therefore the phenomenon can occur between two countries with a similar level of income (Wolburg, 2001).

The most complete definition of the brain drain is the following: the international migration of skilled workers from one country to another (Bhargava and Docquier, (2007), Beine et al. (2008)). The flow of intellectuals occurs from the sending country experiencing a brain drain, to the receiving country experiencing a brain gain. The first one confronts with the lost of its most valuable intellectuals, which are a source of economic growth, and the investments in their education, in the benefit of the second country. The world is divided between "winners" and "losers" (Beine et al., 2008).

In this context, who can be considered responsible? Can one inquire the ethical behavior of the intellectual, who choose not to work for the country that invested in his education? Or, can one question the morality of the recruitment actions of the developed nations producing, on purpose, fewer intellectuals than their needs and fill the gaps with intellectuals from other countries? The situation is described under the individual responsibility versus global responsibility dilemma or individual rights versus state rights dilemma (Astărăstoaie et al, 2014). The literature does not offer an unanimous answer to these questions. Different solutions were proposed in the attempt of dealing with this issue. A first solution was the taxation of the culprit, no matter it was a person or a state.

The first who mentioned this idea was Adam Smith (1976): ''the person who shall be convicted of enticing any artificer of, or in any of the manufactures of Great Britain, to go into any foreign parts to practice or teach his trade, is liable […] to be fined […] and to imprisonment" (Adam Smith, 1976, Book IV:178, in Wolburg, 2001).

Afterwards, the culpability shifted from individuals to states. Bhagwati mentioned the necessity of a tax (Bhagwati tax, proposed for the first time in 1972) paid by the countries that recruit skilled workforce to the sending countries, as a compensation for the loss of the investment in the education of the intellectuals.

Nowadays' examples emphasize a new way of dealing with the responsibility. Hungary introduced a provision in the study contracts, according to which students must work for the country of origin for a specific period of time following their graduation. Otherwise, they have to return the money invested by the state in their education. This provision, although an unconstitutional one, going against the

freedom of movement, is a new form of taxation, imposed this time to the emigrant, and not to the recruiter.

b. Medical brain drain: facts and figures

The brain drain in the health sector is even more dramatic, as its consequences are not only economical, but also social. A country is responsible for offering access to adequate medical services to its population. The scarcity of health professionals affects the good functioning of the health system. Moreover, the health status of o society affects the social cohesion degree (Astărăstoae et al, 2014: 47).

A growing concern is the change in the migration flows over the past decades, developing countries becoming the main providers of health professionals to developed countries (Vujicic et al., 2004). 16.53% of the medical doctors practicing in UK, have a qualification obtained in India, Pakistan, South Africa and Nigeria (GMC, 2014). On one hand, these countries are already suffering shortages in the health sector and, on the other, they are not able nor to retain the medical doctors trained, neither to offer them incentives for returning.

Europe faced the brain drain issue in the medical sector since 1940, with the flows of medical doctors from Europe to USA and subsequently, from different countries in Europe to Great Britain (Dodani and Laporte, 2005). Following the enlargement of the European Union and the mutual recognition of diplomas, guaranteed by the EU Directive 2005/36/EC, new migration flows, from East to West appeared. Some countries seem to enjoy the benefits of this process more than others. Great Britain and Ireland are, among Europe, the countries with the largest proportion of foreign-trained medical doctors (OECD, 2008) followed by Nordic countries. 36.6% of the medical doctors practicing in Great Britain are foreign trained (GMC, 10 November 2014). 10.3% of the medical doctors practicing in Germany, in 2013 were foreign-trained. In the same year, France reported a percentage of 9.15% foreign-trained active medical doctors.

These countries are also exporting medical doctors. Great Britain receives medical doctors from India, Pakistan, South Africa, Nigeria, Ireland and many other European countries (General Medical Council), and sends medical doctors to Australia, Canada or USA. Germany receives medical doctors from Romania, Greece, Austria, Russia, Syria or Iran (Bundesärztekammer) and sends medical doctors to USA, Great Britain, Switzerland or Sweden. France receives medical doctors from Alger, Romania, Belgium or Italy (Conseil National de l'Ordre des Médecins) and sends medical doctors to Canada or Switzerland. However, imports are by far greater than the exports, the situation being one of brain gain or, at least, brain exchange. At the opposite pole, countries like Estonia, Hungary, Lithuania or Romania (WHO, 2011) are net exporters of health professionals, confronting with the brain drain.

c. Push and pull factors of physicians' emigration

The reasons behind the decision to emigrate among medical doctors can be classified into economic, professional, political, social or personal factors.

Literature in this field is mainly based on country case studies and the most used instrument is the survey. These studies offer information which is valid for a specific population and country, without the possibility of extending the conclusions to broader populations. Some of the studies concluded that the most important factor influencing the decision to emigrate is the income level (Astor et al., 2005). Some other studies concluded that he professional factor is the most important (Benamer et al., 2009, Chikanda, 2010).

Factors influencing the decision to emigrate are divided into push – related to the origin country and pull factors – associated with the destination country. Buchan (Buchan, 2006) identified the main push and pull factors in migration and international recruitment of health workers, as following: low pay, poor working conditions, lack of resources to work effectively, limited career opportunities, limited educational opportunities, impact of HIV/AIDS, unstable/dangerous working environment, economic instability are factors pushing the health workers to migrate, while higher pay/opportunities for remittances, better working conditions, better resourced health systems, career opportunities, provision for post-basic education, political stability, travel opportunities or aid work are attracting the health workers. Some of these factors represent a mirror image of the conditions in the source and destination countries, the more significant the relative or perceived gap is, the stronger effect of the pull factors is. Other factors are specific to some countries or individuals (Buchan, 2006).

All these factors are microeconomic determinants of migration. The majority of the studies in medical brain drain field examine the microeconomic determinants of migration. Most of the country level studies analyze the situation in African countries, which are the most affected of the brain drain in the health sector.

Bhargava and Docquier (2008) analyzed the factors affecting physician's emigration from Sub-Saharan countries to 16 OECD destination countries. The findings are consistent with the literature, according to which, one of the main determinants of the decision to emigrate among medical doctors is the salary. The study concluded that the countries with higher wages for physicians have lower emigration rates. Net enrollment in secondary education is a positive and significant predictor of the medical brain drain, as higher education offers better emigration prospects. The HIV prevalence rate is also a factor affecting physician's emigration. The risk implied by treating patients with HIV/AIDS and the fear that their children can be exposed to contracting HIV push the medical doctors to emigrate (Bhargava and Docquier, 2008)

Vujicic et al. (2004) concluded there is little correlation between wage differentials in the health sector between the origin and destination countries and the supply of health care migrants (both medical doctors and nurses), suggesting that policy options considering just the increase of the salaries are not successful in the attempt of stemming the emigration of health professionals. Improving the working or the living conditions should also be taken into account by policy

makers. Moreover, demand side policies are also very important, cooperation between sending and receiving countries being essential.

Considering Gubert and Nordman's gravity model the most complete in the literature, Steinkopf (2012), used it at groundwork for an analysis in the medical sector, adding the health expenditure per capita and public share of health expenditure as variables.

Gubert and Nordman (2009) investigated the influence of the main determinants of migration from MENA to OECD countries, using both a cross-sectional and a panel data approach. Beside the economic determinants, demographic determinants are strong predictors of migration flows, migration being used as a measure to deal with the population aging phenomenon. The results of the panel data regressions are the following: pull economic factors (GDP per capita, unemployment rate) are not statistically significant once destination and origin countries' fixed effects are controlled for. However, a strong and positive impact has the share of public social expenditure devoted to unemployment compensation. The share of the population aged 15-24 in the destination country has a restrictive effect, while lower degrees of political rights and political instability are also determinants of migration (Gubert and Nordman, 2009).

Steinkopf's conclusions regarding the influence of the variables are different, depending on the type of model: fixed effects or random effects model. Steinkopf argues for the random effects model as being appropriate. The fixed effects model conclude that the healthcare indicators and other variables included are not statistically significant, while the random effects model suggest that higher values for health expenditure per capita in the destination countries attract medical doctors and higher values for public share of health expenditure discourages them (none of the two indicators is significant for the origin country). The GDP per capita in the origin country, the population density and population growth in the destination country are significant at least at the 5% level. The GDP per capita is positively correlated with the emigration of physicians, while the other two variables are negatively correlated. The distance between the country of origin and the country of destination, the common language, the colonial links and the island notion (whether one or both of the countries are islands) are significant. The higher the distance between the two countries is, the lower emigration happens. The common language, the colonial links and the island notion are positively correlated with the emigration of physicians.

Using a panel of country-level data, Hussey (2007) identified the factors influencing the emigration of physicians from every other country to the United States. In the absence of available statistical data regarding the physician's wages, Hussey used the GDP per capita as a proxy for economic development or standard of living. The GDP per capita in the origin country is positively associated with the immigration level, in an inverse U pattern, middle-income countries facing the highest rates of emigration. Another powerful predictor is the geographical proximity. Political and civil liberties are negatively associated with immigration

rates, while the existence of immigrant networks in US is positively associated with immigration rates. The absence of medical schools in the origin countries, as well as the absence of medical instruction in English is also pushing the medical doctors to emigrate. The volume of trade between the destination countries and the armed conflicts are not statistically significant.
Both of the studies (Hussey (2007), Steinkopf (2012) concluded that the contribution of the pull factors has a stronger influence on the decision to emigrate among medical doctors, revealing the impossibility of the origin countries to control the emigration flows, by public policies.

3. ROMANIAN PHYSICIANS' EMIGRATION: EVOLUTION AND MAIN DETERMINANTS

Romania has been confronting with the emigration of the medical doctors since the fall of the communist regime. The outflows after 1990 are associated with ethnic or political migration. However, this trend didn't represent a matter of concern. On one hand, only a few medical doctors emigrated. On the other hand, before 1980, a surplus of medical workforce was created as the investment in health sector was considered attractive and leading to future returns (Ristea and Stegăroiu, 2006).
The accession to the European Union led to an increase in the emigration rate, due to the freedom of movement and mutual recognition of diplomas (EU Directive 2005/36/EC). Romania became one of the main exporters of physicians in Europe. Before 2007, about 9.4% of the total number of Romanian medical doctors worked abroad (Astărăstoaie et al, 2014). Between 2008 and 2013, a number of 14072 requests of Certificates of Good Standing were deposed at the Romanian College of Physicians (Romanian College of Physicians).
France reported an increase of 321% in the number of Romanian doctors registered in 2007, compared to the period before integration in the European Union (Allen, 2009).
Nowadays, the community of Romanian medical doctors represent the biggest community among the foreign doctors working in Germany: 3454 medical doctors registered at 31.12.2013, out of a total of 20388 medical doctors from European Union (Bundesärztekammer) and the biggest community (3580 medical doctors with a diploma obtained in Romania, practicing in France) among the medical doctors with a diploma obtained in an European country in France or the second biggest community after Alger (17.7% of the total number of medical doctors with a foreign diploma) (situation at 1 January 2013, Conseil National de l'Ordre des Médecins).
Latest statistics from General Medical Council (10 November 2014, GMC) show up a number of 2306 medical doctors with a primary medical qualification obtained in Romania registered in United Kingdom, representing 2.9% of the total

number of medical doctors holding a foreign diploma and the fifth community among medical doctors holding a qualification from an EU member state.
At 31.12.2013, a number of 845 Romanian doctors were registered in Belgium, out of 3140 foreign doctors. Romanian doctors are among the largest groups of foreign doctors, after French, Dutch, Spain, Italy and Greece groups (SPF Santé Publique)
In June 2013, a number of 274 medical doctors with a Romanian basic medical qualification were registered within the General Medical Council in Ireland, representing 1.7% of all doctors retained in Ireland.
A number of 343 medical doctors born and trained in Romania were employed within Health Care System in Sweden, in November 2012 (Socialstyrelsen).

a. Push and pull factors for emigration decision

In Romania, literature on this topic is scarce and inconclusive. Some studies identified the level of payment as the main determinant of the decision to emigrate (WHO, 2011, Romanian College of Physicians, 2011, Dragomiristeanu, 2008, Suciu, 2012, Teodorescu et al, 2012), while others concluded that the professional factor is the main driver of emigration (Vasilcu, 2010, Teodorescu, 2011). Other determinants include: the lack of social recognition and low esteem (WHO, 2011), the constant aggression from mass-media and the lack of support from the community (Dragomiristeanu (2008)), family reunification (Teodorescu, 2011), better opportunities for their family members abroad or access to better education systems for their children (Teodorescu et al, 2012).
Also, another factor influencing the decision to emigrate is the perception regarding the superiority of west-European cultures (the individual dignity, the respect for the fundamental rights, stable political systems) (Astărăstoaie et al, 2014).
Language is perceived both as a factor influencing the choice of the destination country and an obstacle against emigration. Some authors (Astărăstoaie et al, 2014) suggest that Latin languages (French) or those learned in school (English) will be decisive in the choice of the destination country, while the ones less studied in school (German) or not studied at all (Nordic languages) will constitute natural barriers against emigration. However, statistics suggest that the largest community of Romanian medical doctors is located in Germany.
The factors presented so far are the results of studies that used as instruments the interview or the questionnaire. These are microeconomic determinants of the decision to emigrate among Romanian medical doctors.
The consequences of medical brain drain in Romania are both economic and social. From an economic point of view, the emigration of the medical doctors is a negative externality for Romania. The investment in the education is lost, if no perspectives for return exist. The investment in educating a medical doctor in Romania is about 11300 Euro (including the expenses for the general training and the specialty). Up to now, the loss of the Romanian State is calculated at 226

million Euros, considering that a number of 20000 medical doctors had left the country (Astărăstoaie et al, 2014).

The emigration of the medical doctors affects the health system and the health indicators. Romania has some of the poorest health indicators among EU countries. Some authors (Chauvet et al, (2008), Clemens (2007)) concluded that there is no relationship between the stock of physicians and the health indicators. However, Bhargava and Docquier (2008) came to the conclusion that mortality rate due to AIDS in Sub-Saharan countries is associated with higher medical brain drain rates. Although there is no empirical evidence, Astărăstoaie et al, (2014) concluded that the emigration of physicians affects the mortality indicators in Romania: the diseases having the highest contribution to the mortality rate are those related to the medical specialties that register the highest emigration rates: Cardilogy, Anaesthetics, Internal Medicine, Emergency medicine and Surgery.

Studying the effects of physicians emigration on human development indicators in developing countries, some authors (Bhargava et al, 2011) concluded that the reduction of the medical brain drain is likely to reduce child mortality and increse vaccination rate in the destination countries. However, this result is valid for a literacy rate situated under the approximate value of 60%.

Poor health indicators are perceived both as determinants of the emigration of medical doctor, but also as effects of this phenomenon. In this context, the idea of a vicious circle is suggested (Bhargava and Docquier, 2008). Medical doctors decide to emigrate because they can't practice their proffesion due to the lack of performant equipment or because they don't want their family to be exposed to some risks. Then, health systems can not perform properly, due to the scarcity of health professionals, which leads to poor health indicators.

Main destination countries for Romanian physicians are Germany, Great Britain, France, Belgium, Ireland, Sweden, Spain and Italy (RCP). Between 2008 and 2013, a number of 14072 requests of Certificates of Good Standing were deposed at Romanian College of Physicians. Between 2007 and 2012, a number of 1818 medical doctors established their permanent residence in the destination countries (INSSE).

The profile of the Romanian medical doctor who emigrates includes young physicians - age group 25-44 years old (INSSE, RCP Cluj), leaving the country at the early stage of their career, before completing their specialty – most of them being resident-physicians at the moment of leaving (RCP Cluj). There are more women than men (RCP Bucharest, INSSE). However, this situation is not surprising, as women are predominant in the medical profession: in 2013, 68.95% of the total practicing doctors in Romania were women (INSSE). The majority of them are specialists: between 2008 and 2013, a number of 7456 specialists and 2402 general practitioners left the country. The most affected specialties are General (internal) medicine, Family medicine, Surgery, Anaesthetics, Obstetrics and gynaecology, Paediatrics and Radiology. The most frequent specialities among

Romanian medical doctors practicing in United Kingdom are: Anaesthetics, General Surgery, Obstetrics and gynaecology (General Medical Council).

In comparison to the main countries of destination, Romania has the poorest health indicators, which push medical doctors to emigrate.

Health expenditure per capita (current US$) registered a descendent trend in Romania, from 2008 to 2013, from 516.47 $ per capita to 419.73 $ per capita. The value registered in 2012 is more than ten times smaller than the value registered in some destination countries (Sweden - 5319.43 $ per capita, Belgium - 4710.63, France - 4689.99, Germany - 4683.18, Ireland - 3708.50, United Kingdom - 3647.47, Spain - 2807.66) (World Bank). The poor financing of the health system leads not only to low salaries, but also to poor working conditions and poor infrastructure, pushing the medical doctors to emigrate.

Public health expenditure (% of toatl health expenditure) is another indicator considered by some authors (Steinkopf, 2012) an important factor in the decision to emigrate. The presumption is that the higher the public health expenditure, the less the attractiveness of the state for the medical doctors. This statement is based on the idea that the public systems are not as efficient as the private ones, offering lower salaries and benefits for the health professionals (Steinkopf, 2012). The value of this indicator was, in 2012, 77.72% for Romania (World Bank). According to the above mentioned statement, Romanian medical doctors should emigrate to countries with a lower percentage of public health expenditure. However, the value of this indicator for the main destination countries doesn't validate this hypothesis: United Kingdom and Sweden registered a higher value (82.5% and 81.69%), while for the rest of the main destination countries, the value of this indicator is very close to the one registered in Romania (World Bank).

The lack of the resources in the health system is one of the main factors influencing the medical doctors to emigrate. A comparison between the medical technology available in Romania and in the destination countries is the easiest way to confirm this statement. In 2012, Romania registered 9.16 Computer Tomography Scanners (in Hospitals and providers of ambulatory health care) per 1 000 000 population, and 3.83 Magnetic Resonance Imaging Units (in Hospitals and providers of ambulatory health care) per 1 000 000 population. In the same year, United Kingdom was the only destination country registering a lower number of CTS (8.66), the values of these indicators for the other countries being higher (Germany: 18.61 CTS and 11.29 MRIU per 100 000 population, UK: 6.81 MRIU, France: 6.81 CTS and 8.65 MRIU, Belgium: 14.29 CTS and 10.6 MRIU, Ireland: 16.79 CTS and 12.43 MRIU, Spain: 17.1 CTS and 14.75 MRIU (Eurostat). Data for Sweden are not available.

Regarding the indicator number of practicing physicians per 1 000 inhabitants, Romania occupies again the last position among the group of countries analysed: 2.39 practicing physicians per 1 000 in 2011. The value for this indicator, in 2012, was as follows: 3.96 for Germany, 2.75 for UK, 3.08 for France, 2.93 for Belgium, 2.71 for Ireland, 3.92 for Sweden (2011), 3.82 for Spain (World Bank, WHO,

Eurostat, OECD). Most of the medical doctors who left Romania declared the exhausting number of hours they have to work, due to the scarcity of resources, as a factor of emigration. This indicator could be a good, although a not complete one, to reflect the pressure put on the medical doctors to replace the lack of human resources. However, the number of medical doctors practicing in Romania followed an ascendant trend, from 45786 medical doctors in 2000, to 54086, in 2013, while the population decreased (INSSE).

Some studies identified the remuneration in the health system as the main determinant of the decision to emigrate. Medical doctors' salaries should be three times more than the average salary in a country. An analysis of the salaries of medical doctors in the destination countries reveal that the salaries of the General Practitioners (self employed) are, on average, 2.7 times higher than the average wage in 4 destination countries (Belgium, France, Ireland, United Kingdom). In Spain, a GPs (salaried) salary is 2 times higher than the average salary. Regarding the salaries of the specialists (salaried), they are, on average, 2.7 times higher than the average salary in 5 destination countries (France, Germany, Ireland, Spain, United Kingdom). The salary of a self-employed specialist in Belgium is 6.2 times higher than the average salary (OECD, 2013).

In February 2014, net national average wage in Romania was 1760 RON, while in the health system (the whole workforce included) the average wage was 1495 RON (INSSE). Adding the newly introduced 200 Euro scholarship for the resident physicians, their net salary is still below 500 Euros. In this context, it is not surprising that they leave the country, in search for better salaries.

Romania's situation in terms of health indicators provides enough reasons for medical doctors to emigrate. One cannot conclude whether the financial, the professional or the personal factor is the most important in the decision to emigrate, or whether the push or the pull factors have a stronger influence. What is sure is that the decision to emigrate is the result of all these factors, which can lead to disastrous consequences, both at social and economic level. In the next section we estimate the impact of macroeconomic indicators on emigration flows of Romanian medical doctors.

b. Are there differences between destination countries in the determinants of emigration of Romanian medical doctors?

Two types of macro-economic indicators are used often in research into societal phenomena. The first type comprises labor market indicators such as unemployment rates, the labor participation of women or the amount of human capital in a country. The second type of indicators pertains to productivity indicators (e.g. GDP or GNP per capita). Effects of both types of macroeconomic indicators on emigration of Romanian physicians are estimated in this study by using regression models for panel data for the most important destination countries

during the period of time 2008-2013. The general form of a regression model for panel data is:

$$y_{it} = \mu + x_{it}\beta + u_{it}, i = 1, \dots, N; t = 1, \dots, T \ \ and \ u_{it} = \alpha_i + \beta_t + \varepsilon_{it}$$

where α_i – is country effect, β_t is time effect and ε_{it} is combined effect of country and time.

In 2013, a number of 2995 requests of Certificates of Good Standing were deposed at the Romanian College of Physicians (Romanian College of Physicians) by doctors willing to work abroad. The most common destinations chosen by Romanian doctors were Western countries such as Germany, France, England, Belgium and Ireland (Table 1). In addition, most physicians who requested professional certificates have the following medical specialization: general medicine, family medicine, general surgery, obstetrics and gynecology, anesthesiology and intensive care (Table 2). Therefore, in the model we have considered as dependent variable the number of requests of Certificates of Good Standing deposed at the Romanian College of Physicians for working in Germany, France, England, Belgium and Ireland as an estimator of Romanian physician's emigration flows to these countries during the period 2008-2013.

Table 1 – **The number of requests of Certificates of Good Standing deposed at the Romanian College of Physicians by destination countries**

Country/Year	2008	2009	2010	2011	2012	2013	TOTAL
England	233	371	981	631	442	377	3035
France	259	262	554	562	247	395	2279
Germany	144	194	494	929	938	729	3428
Italy	40	31	52	53	34	24	234
Belgium	173	185	295	226	167	174	1220
Ireland	38	22	156	211	95	113	635
Spain	42	69	79	65	39	15	309
Sweden	20	21	46	89	93	97	366
Unspecified	117	155	79	68	55	62	536
Other countries	89	91	143	148	350	1009	1830
TOTAL	1155	1401	2879	2982	2460	2995	14072

Source data: *Romanian College of Physicians*

Table 2 – The number of requests of Certificates of Good Standing deposed at the Romanian College of Physicians by medical specialization

Specialization/ Year	2008	2009	2010	2011	2012	2013	TOTAL
General medicine	139	149	304	348	696	766	2402
Family medicine	169	213	396	518	339	327	1862
General Surgery	64	109	208	157	101	200	839
Anesthesiology and intensive care	77	81	158	140	97	98	651
Obstetrics and gynecology	50	48	135	132	84	148	597
Pediatrics	56	62	90	112	89	120	529
Radiology	54	36	78	88	85	50	391
Orthopedics	32	43	91	77	69	58	370
Psychiatry	22	28	78	71	58	144	391
Ophthalmology	23	16	71	66	59	49	284
Cardiology	27	29	70	75	41	39	281
Neurology	27	20	40	51	43	38	219
Dermatology	10	21	41	48	25	27	172
Vascular surgery	12	19	35	29	27	12	134
Urology	13	16	28	34	20	22	133
Plastic surgery	14	19	26	21	26	27	133
Neurosurgery	10	17	39	23	12	19	120
Other	-	-	-	-	-	350	350

Source data: *Romanian College of Physicians*

Among the factors influencing the emigration decision of Romanian physicians is the mean wage of health care workers in origin and destination country as well as the differences in wages between origin and destination countries. As an approximation for these variables, we have used the (log) level of GDP per capita (current US$) and gross average monthly wages (US$ at current exchange rate) in the two countries.

Other pull factors explaining the physicians' emigration decision could be factors related to labor markets security in destination country compared to origin country. A country with low levels of unemployment and youth unemployment is a good environment for ample opportunities for income-earning opportunities. Labor force with higher education is an important engine for development and economic growth, most likely to generate a higher demand for health care professionals. Data on macroeconomic variables comes from World Development Indicators data set

(World Bank) for the period 2008-2013, for the main destination countries of Romanian physicians (Germany, France, England, Belgium, Ireland, Italy, Spain and Sweden).
In a panel data analysis, such as in this paper, unobserved country-specific effects could result in biased estimates. For example, the estimate of the coefficient on the destination country's GDP per capita may be positive. Based on this result, it is not clear whether physicians go to countries with higher wages or, alternatively, whether countries with higher wages have other characteristics attracting them. To solve this problem we have used models for panel data with fixed effects allowing us to control for unobserved country-specific effects which are additive and time-invariant. According to the theory, if the migration policy of a destination country becomes less restrictive, the effect of pull factors should turn more positive.

Therefore, we have estimated several models by using panel data regression analysis in order to identify the main pull factors attracting Romanian physicians in developed EU countries. Table 3 presents the results for these estimations. In interpreting the estimators, notice that the emigration data covers intension of legal emigration of physicians, requests of Certificates of Good Standing being registered.

In regressions 1-3 we explore the role played by pull factors, introducing as explanatory variables the values of macro-economic variables in destination countries (all are log values). According to the estimates in regression 2 and 3, the low level of youth unemployment is a significant pull factor for physician's emigration (significance level at 10%). One explanation could be that the physicians interested in the emigration option are young graduates. Another significant pull factor is the proportion of labour force with higher education (significance level at 1%), young physicians being interested in opportunities for their career development. Long term benefits (career development) are preferred to short term benefits (as high wages). The country fixed effects are significant only for Spain and Sweden, Sweden having lower levels of emigration rates than Italy and Spain higher levels.

In regressions 4-6 we explore the role played by differences between destination countries and origin countries in main macro-economic variables. In this case not only youth unemployment but also the unemployment is an important factor in emigration decisions for physicians. In Romania, the unemployment level is lower compared to most of EU countries but youth unemployment level is higher than in Germany and England. According to the estimates in regression 5 and 6, the physicians are more likely to prefer countries with lower unemployment rates or very close to values registered in Romania and with higher youth unemployment rates than in origin country. Moreover, the differences between destination and

origin country in the proportion of higher educated labour force have a negative effect on the emigration decision of physicians. These results could be explained by the following statement: "physicians prefer destination countries with similar labour market characteristics" but where they could have better opportunities for career development. In equation 5 all country fixed effects are significant with at least 95% significance level.

Table 3 – The determinants of physicians migration

Equation		**1**	**2**	**3**	**4**	**5**	**6**
Dependent variable		Ln(em)	Ln(em)	Ln(em)	em	Em	em
Independent variables	GDP						
	Ln(GDP)	1.62^{NS}	2.67^{NS}				
	DGDP				51.21^{NS}	264.98^{NS}	
	DHealthexp						
	Unempl						
	Ln(unempl)	4.10^{NS}	5.01^{*}	4.78^{NS}			
	DUnempl				-347.45^{NS}	-1004.65^{**}	$-1182,95^{***}$
	YUnempl						
	Ln(YUnempl)	-3.70^{NS}	-5.67^{*}	-5.90^{*}			
	DYUnempl				406.83^{NS}	1297.28^{**}	$1482,37^{**}$
	HExpPC						
	Ln(HExpPC)		-1.99^{NS}	-1.99^{NS}			
	DHExpPC					-128.25^{*}	$-104,34^{NS}$
	HEDLF						
	Ln(HEDLF)		9.21^{***}	9.38^{***}			
	DHEDLF					-1201.54^{***}	$-1164,08^{***}$
	Wage						
	Ln(wage)			2.45^{NS}			
	DWage						$176,79^{NS}$
	Intercept	-10.50^{NS}	-32.64^{NS}	-23.59^{NS}	-288.10^{NS}	2036.82^{*}	$2118,75^{*}$
Fixed effects	Germany	2.23^{***}	0.89^{NS}	0.06^{NS}	579.63^{***}	918.55^{***}	$617,23^{***}$
	England	1.21^{**}	-0.50^{NS}	-1.21^{NS}	232.17^{*}	921.67^{***}	$600,74^{**}$
	France	1.62^{**}	1.85^{***}	1.46^{**}	460.81^{***}	775.44^{***}	$591,78^{***}$
	Belgium	-0.09^{NS}	0.17^{NS}	-0.34^{NS}	764.60^{***}	967.28^{***}	$901,98^{**}$
	Ireland	-1.03^{NS}	-3.10^{**}	-3.83^{**}	260.19^{NS}	1019.90^{***}	$685,89^{NS}$
	Sweden	0.64^{NS}	6.49^{***}	6.37^{***}	19.84^{NS}	-1325.35^{***}	$-1419,00^{***}$
	Spain	-0.86^{NS}	-1.01^{NS}	-1.22^{NS}	372.83^{NS}	757.27^{**}	$706,58^{**}$
R^2		0.78	0.87	0.87	0.66	0.73	0.72
Number of observations		48	40	40	48	40	40
Fvalue (fixed effects)		9.95^{***}	8.53^{***}	12.27^{***}	2.71^{**}	4.19^{***}	4.47^{***}

Source data: Authors own calculations

Note: Panel Data coefficients estimates. * indicates significance at 10%, ** indicates significance at 5%, *** indicates significance at 1% and NS indicates non-significance at 10%.

These results are somehow contradictory with intuitive facts. Therefore, we should conclude that there are many other factors, not taken into consideration that explain better the important factors in emigration decision of physicians.

4. CONCLUSIONS

A key factor in providing medical care is the availability of qualified and motivated health care professionals. The emigration of physicians is an important constraint that limits the satisfaction of the local needs in health care in the origin countries. The empirical evidence suggests that medical doctor's emigration in European Union appears because of poor distribution of physicians, low internal mobility and inappropriate skill mix.

There are three main results obtained from our analysis. The first one is that "Romanian physicians prefer destination countries with similar labour market characteristics" but where they could have better opportunities for career development. Therefore one policy measure conversing brain drain in brain gain and reducing the Romanian emigration would be the increase of competences of health professionals through short-term trainings, knowledge sharing, transfer of knowledge from physicians who returned to home-country, teamwork fostering, and innovation.

Another result obtained from our analysis is that the low level of youth unemployment is a significant pull factor for Romanian physician's emigration, the most interested in emigration option being the young graduates. By offering system support, attractive working environment, adequate remuneration level and the perspective of career development, the migration of young graduates would decrease and the national health care system would be improved.

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