

Beyond Borders: Socio-Economic Dynamics and Demographic Profiles Shaping Migration Patterns of Romanian Doctors Across EU



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ABSTRACT: Healthcare professional migration has emerged as a global phenomenon, underscoring the need to comprehend migrant doctors' patterns and characteristics for effective policymaking and workforce planning. The paper analyses medical practitioners' migration across European countries. Through a quantitative survey, it unveils socio-demographic and professional attributes specific to Romanian doctors. The study explores correlations between the demographic and professional attributes of Romanian migrant doctors and the socio-economic traits of destination countries. Employing clustering analysis, the research identifies four distinct clusters, revealing variations in medical specialisations, income levels, marital statuses, and durations of stay across different European countries. These findings provide a comprehensive understanding of migration patterns among Romanian doctors. More research is needed to investigate factors influencing Romanian doctors' migration decisions and experiences and compare their profiles to those of migrant doctors from other countries. Understanding these patterns can help healthcare workforce planning, recruitment strategies, and policy development.

KEYWORDS: Romania, migration, doctors, cluster, European Union

I. INTRODUCTION

Healthcare professional migration has become a critical global phenomenon, significantly impacting healthcare systems worldwide (Grignon et al., 2013; Wickramasekara, 2014). Factors such as career advancement, improved working conditions, and a better quality of life have propelled doctors to migrate between countries, presenting a complex challenge with profound implications for healthcare. Like many other countries, Romania has experienced a substantial outflow of doctors (Apostu and Vasile, 2020). The migration of Romanian doctors to other European countries has raised concerns about the potential impact on Romania's healthcare system and access to healthcare services. Investigating migration patterns and researching Romanian doctors' socio-demographic and professional characteristics in their host countries is critical for informed policymaking and strategic workforce planning.

Despite existing literature on the migration of Romanian doctors (Apostu et al., 2020; Botezat and Moraru, 2020; Boboc et al., 2015; Roman and Goschin, 2014), there remains a considerable gap in comprehensive data regarding their detailed socio-demographic and professional information about migrating doctors, including destinations, specialities practised abroad, and length of stay, is often limited. Understanding these features is critical for assessing the potential impact of migration on various demographic groups. Moreover, detailed information on migrating doctors' professional knowledge and expertise, including their specialities and years of experience, is often limited. This scarcity inhibits accurate assessments of the magnitude and trends of doctors' migration.

Existing studies (Brennan et al., 2023) highlight the need for detailed insights into migrating doctors' socio-demographic and professional profiles for informed policymaking. Understanding these features is crucial for assessing the potential impact of migration on various demographic groups and evaluating the loss of specialised medical skills.

This article aims to cluster socio-demographic and professional factors to understand better Romanian doctors' migration patterns in the European Union. Hypotheses posit intrinsic links between macroeconomic, social, and health system characteristics and the observed differences among the number of migrant doctors. Key research questions delve into socio-economic influences on migration patterns and destination countries' demographic/professional characteristics and socio-economic features.

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The primary aim of this article is to scrutinise and compare the distinctions and resemblances between European countries concerning the migration of Romanian doctors within the European Union. Despite discernible disparities, the variations are in part attributed to macro-level influences. According to our hypothesis, there are intrinsic links between macroeconomic, social, and health system characteristics and the observed differences among the number of migrant doctors. The research questions are:

1. How do various demographic and professional characteristics of Romanian migrant doctors (age, number of years abroad, medical speciality) contribute to forming different clusters among Romanian doctors practising medicine in other European Union countries? This question explores how socio-economic differences and personal socio-demographic factors affect Romanian doctors' movement throughout various European nations, aiming to identify potential patterns considering factors such as income levels, years spent abroad, and professional experiences.
2. Can the application of cluster analysis unveil nuanced patterns among Romanian doctors abroad? This question explores the relationship between a country's socio-economic conditions (GDP per capita, GNI per capita, percentage of GDP allocated to the healthcare system) and attractiveness to Romanian doctors, focusing on the number of doctors and healthcare system funding.

This research seeks to analyse the complex interplay between socio-economic dynamics and personal socio-demographic factors influencing the migration patterns of Romanian doctors within the European Union. By understanding the migration patterns and factors influencing Romanian doctors' decisions, policymakers can develop targeted interventions to address the challenges associated with healthcare workforce mobility. This may include initiatives to improve working conditions, enhance career opportunities, and promote retention strategies for doctors in Romania.

The article's structure is organised systematically. Commencing with an emphasis on the role of institutions in shaping doctors' mobility, the subsequent section outlines our methodological approach and data sources. Following this, we comprehensively analyse the clusters identified among Romanian doctors abroad, detailing the demographic and professional characteristics contributing to their distinct groupings. This includes an in-depth examination of age distributions, duration of stay abroad, and medical specialities shaping these clusters. Our exploration delves into the nuanced patterns revealed by cluster analysis, shedding light on the intricate relationships between a country's socio-economic conditions, healthcare system attributes, and their impact on Romanian doctors' migration choices. Through these analyses, our article aims to offer a comprehensive understanding of the multifaceted dynamics influencing the migration patterns of Romanian doctors within the European Union. Finally, the article concludes with insightful reflections and proposes a future research agenda to further deepen understanding in this field.

A. Literature Review: Migration of Romanian Doctors

The global migration of skilled healthcare workers, particularly physicians, has become widespread, driven by economic disparities between countries (Adovor et al., 2021; Grignon et al., 2013). This migration significantly affects source and destination countries' healthcare systems. The "medical carousel phenomenon" concept illustrates the cyclic movement of doctors seeking better living or healthcare standards, creating trends where professionals move from one country to another in pursuit of improved conditions (Schumann et al., 2019; Wickramasekara, 2014).

Theoretical frameworks, including chain migration, network theory, and institutional theory, have been crucial in understanding migration patterns in general (De Haas, 2021; Massey et al., 1993). However, the push and pull factors framework has emerged as particularly insightful for interpreting the complex dynamics of healthcare professionals' migration. Push factors encompass elements within a health system or country that compel healthcare workers to seek opportunities elsewhere, while pull factors attract them toward destinations with more favourable conditions.

The literature extensively explores the multifaceted dimensions of push and pull factors, categorising them into financial, professional, and general sociopolitical considerations (Czaika and Reinprecht, 2022). The push and pull factors influencing physicians' migration encompass a wide spectrum of considerations and can be broadly categorised into three primary dimensions: financial, professional, and general sociopolitical factors. Additionally, facilitators and barriers to mobility influence physicians' migration decisions (Brennan et al., 2023). Understanding the interplay between these multifaceted pushes and pull factors, alongside facilitators and barriers to mobility, is essential in comprehensively assessing and addressing the complexities surrounding physicians' migration decisions. The role of social networks among migrating physicians is acknowledged but still needs to be explored, acting as crucial channels for support, information exchange, and positive role modelling. Beyond mere information exchange, these social networks contribute to forming a collective identity and shared beliefs, establishing a unique culture centred around the theme of migration.

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Healthcare personnel migration has undergone scrutiny, encompassing a spectrum of determinants ranging from macrostructural influences to individual-level factors. These interconnected factors typically encompass low wages, inadequate working conditions, safety apprehensions, governance challenges, restricted educational and professional prospects, and pressures from the global health labour market.

Despite the significance of these factors, recent literature on the migration of Romanian doctors reveals a lack of comprehensive data on migration patterns, hindering accurate assessments of the magnitude and trends of migration (Apostu et al., 2020; Apostu and Vasile, 2020; Boboc et al., 2015; Botezat and Moraru, 2020). Detailed socio-demographic and professional information, like age, gender, marital status, educational background, medical specialties practised abroad, and years of experience, is often limited.

A noticeable gap exists in the literature concerning the data on Romanian doctors' migration patterns, destinations, and professional characteristics. Existing data limitations hinder a nuanced understanding of the potential loss of specialised medical skills and the impact on healthcare service provision in Romania. The socio-demographic details crucial for assessing the diverse impacts on different demographic groups are often overlooked.

This study aims to contribute to existing knowledge by addressing the identified gaps in the literature. By conducting a comprehensive analysis of socio-demographic and professional profiles of migrant Romanian doctors within the European Union, this research seeks to bridge the existing knowledge deficit. The study draws on existing theoretical frameworks while emphasising the unique socio-demographic and professional aspects specific to Romanian doctors, linking the research to the broader context of healthcare professional migration.

II. METHODOLOGY

This study adopts a comprehensive approach, encompassing macro and micro data analyses to explain the migration patterns of Romanian doctors within the European Union (EU). The methodology employed in this research is structured around a multilayered analysis strategy, incorporating cluster analysis of microdata obtained via a structured questionnaire specifically designed for Romanian doctors practising abroad complemented by a nuanced examination of statistical analyses of macro data sourced from Eurostat and OECD databases.

The data analysis comprised two distinct phases. The microdata underwent a cluster analysis based on variables encompassing destination countries, migration duration, demographics, and medical specialisations. Subsequently, the descriptive analysis of macro data outlines socio-economic landscapes within the EU, highlighting potential influences on migration patterns. This multifaceted approach aimed to uncover and typify migration patterns among Romanian doctors across the EU. The study comprehensively understands migration patterns among Romanian doctors by employing both cluster analysis and descriptive analysis of macro data. Combining these two approaches allows for a nuanced exploration of various aspects of migration, demographics, and socio-economic factors, providing a more holistic view. The integration of different analysis methodologies adds robustness to the study's findings. Corroborating micro and macro analysis results can validate and reinforce conclusions, enhancing the study's credibility.

The cluster analysis phase focuses on identifying patterns within the microdata related to variables like destination countries, migration duration, demographics, and medical specialisations. This helps group doctors based on similar characteristics and experiences, revealing distinct migration typologies among Romanian doctors across the EU. In k-means clustering, the data $x_i \in R^m$ are considered to originate from a mixture density, much like in model-based clustering. The data points are assumed to belong to K distinct clusters, where the user predetermined or specified its centroid, or mean point, represents K. Its centroid, or mean point, represents each cluster. Mathematically, it can be expressed as a partitioning of the data:

$$x_i \in C_k, \text{ where } k=1,2,\dots,K,$$

where C_k denotes the k-th cluster, each data point x_i is assigned to a specific cluster.

The objective is to minimise the sum of squared distances between data points and their respective cluster centroids. The algorithm iteratively assigns data points to the nearest cluster centroid and updates the centroids until convergence. This process aims to create well-separated clusters by minimising the within-cluster sum of squares. Unlike model-based clustering, k-means does not assume any underlying probability distribution for the data. Instead, it focuses on partitioning the data into distinct clusters based on distances to cluster centroids.

Typically, the normal or Gaussian distribution represents each component within the K-model. Parameters define these distributions: the mean μ_k and the covariance matrix Σ_k . Their probability density function is described as:

$$f(x|\mu_k, \Sigma_k) = 1/(2\pi)^{n/2} |\Sigma_k|^{-1/2} \exp(-1/2(x-\mu_k)^T \Sigma_k^{-1} (x-\mu_k))$$

Where:

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- $f(x|\mu_k, \Sigma_k)$ represents the probability density function for the k-th component.
- x denotes the multivariate random variable.
- μ_k stands for the mean vector of the k-th component.
- Σ_k is the covariance matrix of the k-th component.
- n represents the dimensionality of the data space.
- $|\Sigma_k|$ indicates the determinant of the covariance matrix.
- T denotes the transpose of a vector, and $^{-1}$ represents the matrix inverse.

This function describes the likelihood of observing the data point x given the parameters μ_k and Σ_k of the k-th Gaussian component within the mixture model. Data generated through mixtures of multivariate normal densities exhibit distinctive clusters centred around the means μ_k , showcasing higher density for points in proximity to these means. The surfaces representing constant density for these clusters take on an ellipsoidal shape. These clusters' geometric attributes, such as shape, volume, and orientation, are governed by the covariance matrices Σ_k , which can also be parameterised to enforce constraints across different components. Statistical analyses were conducted using the Statistical Package for Social Sciences (SPSS v. 26). The clustering analysis utilised K clustering algorithms, while evaluation measures included visual inspections and statistical assessments.

The microdata focused on soliciting insights from Romanian doctors practising in various EU countries, covering diverse aspects related to migration, demographics, and medical specialisation. Microdata was collected using a structured questionnaire in May-June 2020. The profile of Romanian migrant doctors was assessed with 36 questions, including reasons to migrate, the probability of return, the reason for intention to stay back and general questions on the perception of the changes to determine the return of medical practitioners. The survey was designed specifically for research on the migration of Romanian doctors and aimed to gather comprehensive data on various aspects of doctor migration. The target population for the study was Romanian doctors practising abroad, specifically in European Union countries. The researchers aimed to gather data from Romanian doctors who migrated from Romania to various EU countries, like Germany, France, Belgium, Italy and Spain. The questionnaire was administrated online and disseminated via a snowball approach. We also used social media to distribute the questionnaire to more participants.

The analysis included the following variables:

- **Country of Migration:** This variable represents the country where the respondents have migrated from Romania. It captures the specific destination countries where Romanian doctors are currently practising.
- **Years since migration:** This variable measures the years the respondents have lived and practised outside of Romania. It provides insight into the length of time the doctors have been away from their home country.
- **Gender:** This variable captures the respondents' gender, distinguishing between male and female doctors. It allows for understanding any potential differences or patterns based on gender.
- **Age:** The age variable represents the age of the respondents, providing information about the age distribution among Romanian doctors practising abroad.
- **Marital Status:** This variable identifies the marital status of the respondents. It helps in examining the relationship between marital status and doctor migration.
- **Presence of Children:** This variable indicates whether the respondents have children or not. It enables the analysis of the impact of having children on doctor migration decisions and experiences.
- **Medical speciality:** The medical speciality variable identifies the respondents' specific medical specialisation or field of expertise. It allows for analysing the distribution of doctors across different medical specialities.
- **Net income, self-declared.**

These variables were selected based on their relevance to the research objective of clustering the typologies of Romanian doctors practising abroad. They provide valuable insights into the demographic characteristics, migration patterns, and factors influencing the migration decisions of the respondents. By examining the relationships and patterns among these variables, the analysis can uncover distinct clusters or typologies of Romanian doctors based on their characteristics and experiences related to migration.

The descriptive analysis of macro data within the EU context helps contextualise the socio-economic landscapes. This step sheds light on broader factors influencing migration patterns, such as economic conditions, healthcare systems, or policy landscapes. Understanding these macro-level influences adds depth to the interpretation of the microdata clusters. The macro data consisted of socio-economic indicators sourced from Eurostat databases, a resource that provides annual data (all data is presented in the Annex). The analysis included the following variables:

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- **The proportion of Population Aged 65 and Over:** This demographic factor provides insights into the ageing population in the destination country, which often demands more healthcare services and specialised medical attention, potentially impacting physicians' decisions to migrate.
- **Life Expectancy at Birth:** This metric reflects the overall health status and longevity of the population in the destination country. Higher life expectancy might indicate better healthcare systems and different demands on healthcare professionals.
- **Real GDP per Capita:** Economic prosperity, as measured by GDP per capita, influences the resources available for healthcare infrastructure, salaries, and medical facilities, potentially influencing physicians' migration decisions.
- **Unemployment Rate:** A higher unemployment might signal job availability or economic stability challenges, influencing healthcare resources and professionals' employment opportunities.
- **Percentage of GDP Spent on Health:** This factor assesses the country's prioritisation of healthcare. A higher percentage indicates more investment in healthcare infrastructure and services, potentially attracting or retaining healthcare professionals.
- **Health Personnel per Hundred Thousand Inhabitants:** This metric measures the density of healthcare professionals, reflecting the availability and distribution of doctors and healthcare staff, which may impact workloads and job prospects.

The research recognised potential biases and limitations, such as self-selection bias in survey responses and the inherent constraints of selected variables in clustering analysis. The statistical analyses uncover relationships and variations among clusters, providing a comprehensive understanding of migration typologies among Romanian doctors within the EU. However, the study's limitations underscore the need for a nuanced interpretation of the findings, considering the potential biases and contextual factors.

In summary, this methodology integrates micro and macro data analyses to comprehensively explore the migration dynamics of Romanian doctors within the EU while acknowledging the inherent limitations and potential biases within the research design.

III. RESULTS

In this study, clustering analysis enables the identification of typologies based on the available factors without imposing any preconceived categories. The macro-level analysis of EU migration patterns among healthcare professionals is a foundational context that enriches and contextualises the subsequent cluster analysis. This entails a comprehensive review of socio-economic indicators, labour market conditions, and healthcare sector dynamics across various EU member states. Factors such as GDP per capita, employment rates, and healthcare infrastructure shape the migration decisions of healthcare professionals. This comprehensive view helps capture the multidimensionality of migration patterns and provides a nuanced understanding of the typologies of Romanian doctors abroad. Cluster analysis was selected due to the interrelated nature of the socio-demographic variables under investigation, known for their substantial associations. The use of clustering analysis is justified as an appropriate method to achieve the research objective of identifying and understanding the typologies of Romanian doctors abroad. We have identified the following clusters:

Table no. 2: Final Cluster Centers

	Clusters			
	1	2	3	4
Country of residence	Belgium Italy France Germany	Belgium France Germany	Sweden Netherland Spain Portugal	Belgium Italy
How many years have you been away from Romania?	91% Over 5 years	42% Over 5 years 23% Under 1 year	79% Over 5 years	19% Between 1-3 years 62% Over 5 years
What is your gender	66% women	68% women	58% women	69% women
Age	50	34	41	42
What is your current marital status?	70% Married	45% Married	62% Married	64% Married

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Do you have children	79% yes	32 % yes	58% yes	68 % yes
What speciality do you practice as a doctor?	40% Medical specialist, 22% Surgical specialist	57% Medical specialist	38% Medical specialist 21% Surgical specialist	47% Medical specialist 15% Surgical specialist
How many hours do you work as a doctor on average per week (without guards)	44	44	40	19
What is your net monthly income (after tax)	81% over 4000	21% between 3000- 4000 euros 40% over 4000	55 % over 4000	23% between 1000- 2000 euros 52% over 4000

Source: Data collected and analysed by the authors

Cluster 1, predominantly represented by healthcare professionals in Belgium, Italy, France, and Germany, exhibits distinctive demographic and professional characteristics. Notably, a significant majority—91%—have been away from Romania for over five years, signifying a prolonged professional commitment abroad. This cluster predominantly comprises women, comprising 66% of its population. The average age of approximately 50 suggests a more mature and experienced demographic subset within the medical workforce studied. Moreover, family-centric attributes emerge within this cluster, with around 70% of individuals identifying as married and a substantial 79% reporting having children. This demographic orientation underscores the presence of established family structures among these healthcare professionals.

Regarding professional profiles, the cluster showcases a diverse range of medical expertise, with 40% practising as medical specialists and an additional 22% specialising in surgical fields. This suggests a broad spectrum of specialised medical knowledge and skills within this cohort. Working hours vary significantly, ranging from 15 to 40 hours per week. Moreover, the income distribution is diverse, with the majority earning a monthly net income exceeding 4000 euros. All four countries in the cluster have relatively higher proportions of elderly populations compared to some other nations listed. While the exact percentages vary slightly, they fall within a relatively close range, reflecting an ageing demographic. Italy, France, and Germany showcase notably high life expectancies, surpassing 80 years. Belgium follows closely behind, with a life expectancy of 81.8 years, indicating a generally high quality of life and healthcare within these nations. These countries' real GDP per capita is similar, signifying a relatively robust economic status. While there are differences, they share a range that denotes a certain level of economic development. France, Germany, and Belgium allocate a higher percentage of their GDP towards healthcare expenditure than many other countries. Italy also dedicates a substantial share, indicating a commitment to healthcare investment. While there are variations, all four countries have a relatively high number of practising physicians per hundred thousand inhabitants. This suggests a well-developed healthcare infrastructure with a substantial workforce to cater to the population's healthcare needs. These similarities point toward a common trend of socio-economic development, a focus on healthcare infrastructure and services, and demographic characteristics, such as an ageing population, contributing to their overall profiles.

Cluster 2 is dominated by individuals from France, comprising 124 cases, followed by Germany with 93 cases and Belgium with 28 cases. Other countries like Austria, Czech Republic, Ireland, Italy, Latvia, and Malta contribute to this cluster. It stands out for having the highest total number of cases, with a significant number of individuals who have been away from Romania for a shorter period. Notably, 42% of individuals have spent over five years away from Romania, while a significant subset, 23%, has been abroad for less than a year. This duality in migration duration highlights diverse experiences among the studied professionals.

Moreover, the gender distribution is notably skewed, with 68% of this cluster comprised of women. A distinct characteristic of this cluster is its relatively youthful profile, with an average age of approximately 34 years. This signifies a cohort of early or mid-career professionals, contrasting with other clusters that exhibit a more mature demographic. Family and work characteristics in this cluster depict a relatively balanced distribution across marital status, primarily comprised of individuals without children. Around 45% of individuals identify as married, and 32% report having children. This profile suggests a comparatively lower prevalence of established family structures among these healthcare professionals. The medical specialisation is diverse, covering various medical specialities; 57% practising as medical specialists, showcasing focused expertise within their respective fields.

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Working hours are quite varied, and the income distribution spans different categories. Financially, 61% of individuals in this cluster earn a net monthly income exceeding 3000 euros, with a significant 40% earning above 4000 euros. Unlike Cluster 1, this cohort portrays a shorter period of absence from Romania, a more balanced marital status distribution, a diverse array of medical specialisations, and a variable spectrum of working hours and income categories.

Cluster 3 predominantly comprises individuals from Spain (12 cases) and Sweden (24 cases), with lower representation from other countries. The distribution of duration away from Romania is relatively balanced across different categories. This cluster displays a balanced distribution across marital status categories, although the total number of cases is lower. While specific information about medical specialisation is not provided, it potentially represents a diverse range of medical specialities. This cluster exhibits relatively high life expectancies, with values consistently above 81 years. This reflects a commitment to healthcare, lifestyle factors, and social welfare systems that contribute to longer and healthier lives for their populations. Spain, Portugal, and the Netherlands allocate a significant share of their GDP towards healthcare expenditure, signifying a commitment to maintaining and improving healthcare systems. While lower than the other three, Sweden still dedicates a substantial portion of its GDP to healthcare, indicating a strong emphasis on public health. Each of these countries has a relatively notable proportion of their population aged 65 and over. This demographic trend indicates a similar challenge regarding an ageing population, leading to shared concerns regarding healthcare provision and pension systems.

Moreover, Sweden, the Netherlands, and Spain demonstrate relatively higher real GDP per capita figures, indicating a comparatively robust economic status within these nations. Portugal's GDP per capita is slightly lower but still within a range that signifies a certain level of economic development. All four countries maintain a relatively high number of practising physicians per hundred thousand inhabitants, indicating a well-developed healthcare infrastructure and a considerable healthcare workforce to serve their populations. Generally, these countries exhibit moderate unemployment rates, contributing to stable labour markets and relatively healthy economic conditions. These countries share high life expectancies, significant healthcare expenditure, an ageing population, relatively strong economies, well-developed healthcare systems, and moderate unemployment rates, collectively contributing to their social and economic profiles.

Cluster 4 is led by individuals from France (35 cases) and Germany (7 cases), with Belgium contributing 11 cases. Other countries have varying lower representations in this cluster. Regarding family and work characteristics, there is a mix of countries and a balanced distribution across marital status. Additionally, this cluster has a higher proportion of individuals with children compared to Cluster 2. Similar to Cluster 3, specific information about medical specialisation is not meaningful, but it potentially represents a mix of medical specialities. The distribution of working hours is balanced across different categories, and the income distribution spans various ranges, including a significant number in the 1000-2000 euro range and over 4000 euro range. The wider income range, including concentrations in lower income brackets, aligns with the typical remuneration structures for individuals starting their careers in the healthcare sector.

Our understanding of European physicians' migration patterns remains relatively limited despite being among the EU's most mobile, highly skilled professionals (Eurostat, 2023). Studies primarily focusing on Eastern European medical doctors (Wismar et al., 2011) and broader examinations of EU health professionals (Glinos, 2014; García-Pérez et al., 2007) offer initial insights into physicians' motivations and the temporal aspects of their migration projects. Specialist training often acts as a key incentive for migration, driven by job availability, higher income opportunities, and improved medical resources that enhance working and training conditions. As observed in previous research on intra-EU migration, physicians' motives for migrating have diversified. Furthermore, intentions to settle in a new location may rise if there is a risk of losing attained achievements upon returning to their home country.

Figure 1 illustrates the expanding presence of Romanian-trained doctors in various destinations from 2010 to 2020. This substantiates the evolving motives for migration among physicians, indicating a consistent outward flow driven by diversified motives and the potential risk of losing acquired progress upon returning home. From 2010 to 2020, there was a general rise in the presence of Romanian-trained doctors across most destinations, highlighting a consistent outward migration of medical professionals. This trend is particularly evident in countries like Germany, France, and Sweden, where the number of Romanian doctors has notably increased, showcasing a preference for these nations among Romanian medical professionals seeking career opportunities abroad. However, fluctuations in the figures for certain years might indicate variations in the desirability of particular destinations or changes in migration policies. For instance, occasional drops or plateaus in numbers might coincide with shifts in economic conditions, changes in healthcare policies, or alterations in immigration regulations within these countries.

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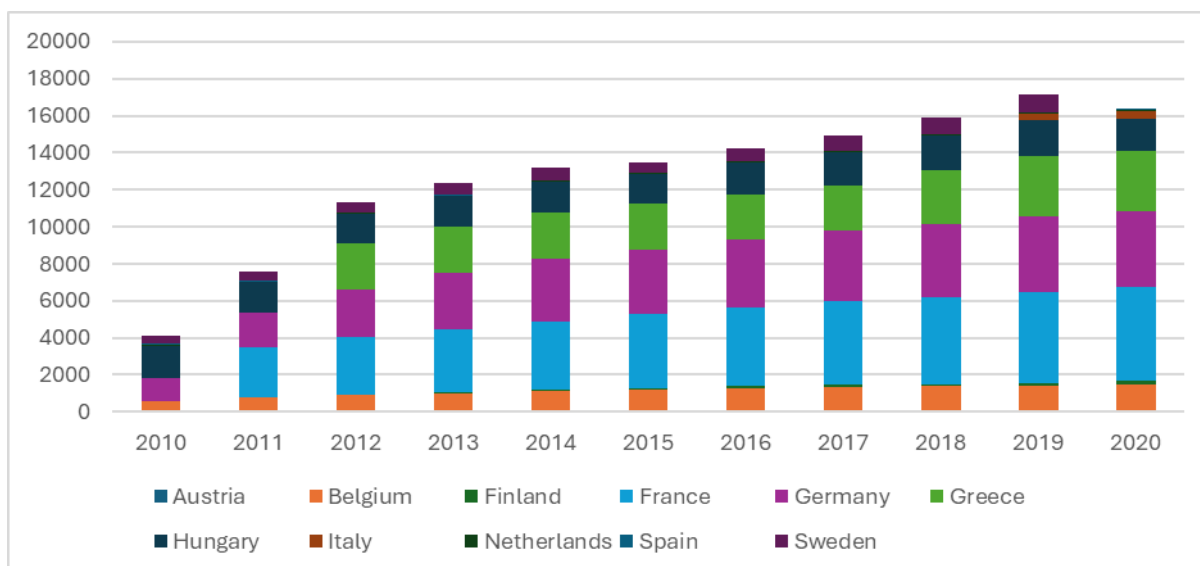


Figure no. 1: Foreign-trained doctors - Stock in EU-selected countries (country of origin Romania)

Source: OECD; EUROSTAT, Health Workforce Migration

B. Discussion

Based on macro data, the most popular destinations to which doctors from Romania migrate are countries with high incomes, especially France and Germany. Previous studies have revealed the existence of three poles of the attraction and exchange of professionals: Great Britain and Ireland, Germany and France-Belgium (Botezat and Moraru, 2020; Boboc et al., 2015). The survey data collected based on the questionnaire confirm these poles of attraction for doctors: France (40%), Germany (22%), Belgium (8%), Italy (9%), and Ireland (5%). While some differences exist between the healthcare systems in France, Germany, and Belgium, they share many common characteristics, including universal health coverage, social health insurance, and high-quality primary care. France, Germany, and Belgium all spend a relatively high percentage of their GDP on healthcare compared to other countries. This reflects a commitment to providing all citizens and residents with high-quality healthcare services. The countries of residence of the respondents to the questionnaire are consistent with the results of further analyses and studies on the destination of migrant doctors from Romania. The clusters' geographic distribution highlights the varying attractiveness of different countries for Romanian doctors seeking opportunities abroad. France and Germany emerged as popular destinations, followed by Belgium, and Sweden.

The fact that most respondents were women (66%) could affect the generalisation of our findings to the wider population. At the national level, in 2021, INSSE registered 68,760 doctors, of whom 48,527 were women (70.5%). The percentage of men and women in the sample is similar to the ratio of men and women among all doctors in Romania; this would suggest that the sample is representative of the overall population of doctors in the country. Our study's largest group of respondents were between 30 and 39, comprising 38.1% of the total respondents. We also recorded a substantial percentage of people aged 40-49 (35.6%). The average age of the respondents is 41 years. The analysis of age groups indicates that an important part of doctors working abroad are in the early stages of their professional careers as specialist doctors, considering that a resident doctor may undergo specialisation training for 3 to 6 years after completing their undergraduate studies. Still, there are some differences if we separately analyse the average age distribution of men vs. women. In the case of women, 47% are aged 33-38 years, while in the case of men, 47% are aged 39-48 years. If we look at the average age of the groups, women have an average age of 40, while men are 42. The clusters' age distribution reflects doctors' diverse career stages and migration patterns. It highlights the presence of experienced professionals, mid-career doctors, and those who migrated early in their careers.

The interpretation of marital status and the presence of children among the clusters reflect the diversity in the personal lives and priorities of the migrated doctors. Some have established families, while others focus more on their careers or personal independence. These factors can influence the doctors' decisions to migrate and their ability to adapt to their new countries.

The medical specialities that are most prevalent among foreign doctors may reflect the specific needs and demands of the healthcare system in the country where they are working. Most doctors who migrate from Romania are specialists; relatively few are family doctors. The recorded data is based on the responses recorded in the questionnaires. Medical and surgical specialities are the most frequently mentioned specialities. It is worth mentioning here that these specialities correspond to the Ministry of

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Health's evaluation regarding Romania's shortage of specialists. Most respondents work in medical (46.9%) or surgical (21.5%) specialities. These specialities are also identified as relevant in other studies.

The analysis of salary level provides important insights into the socio-economic status and financial well-being of our target group. Most doctors who migrated from Romania have a net income of over 4000 euros/month (56,56%), significantly surpassing the average income they would have earned in Romania, which tends to be notably lower.

The contrast between destination countries like France, Germany, Belgium or Sweden compared to Romania encompasses several pivotal factors that significantly differentiate these destinations, ultimately influencing the migration preferences of Romanian doctors. The healthcare infrastructure shows advanced healthcare services, providing an appealing environment for doctors seeking enhanced resources to improve their medical practice. Economic stability emerges as another distinguishing factor, as destination countries boast stronger economic foundations, evident in their higher real GDP per capita. This stability offers Romanian doctors promising prospects of better incomes, higher living standards, and increased financial security—a magnet for professionals seeking improved economic conditions. Moreover, quality of life indicators in these countries denote more favourable societal conditions and constitute a compelling pull for healthcare professionals looking to enhance their lifestyles for themselves and their families.

CONCLUSION: TOWARDS INFORMED POLICY AND PRACTICE

By combining macro data analysis with quantitative surveys, this article endeavours to illuminate the nuanced migration trends of Romanian doctors within the EU. The insights gleaned from this comprehensive approach can guide policymakers, healthcare institutions, and stakeholders toward informed decisions and strategies. Understanding Romanian doctors' driving forces, challenges, and integration processes within the broader EU healthcare framework is instrumental in fostering a more robust and cohesive healthcare ecosystem across Europe.

The first research question aims to uncover correlations between the demographic and professional characteristics of Romanian migrant doctors and the socio-economic traits of their destination countries. The study employs clustering analysis to reveal typologies based on various factors, offering a comprehensive understanding of migration patterns among Romanian doctors across Europe. Four distinctive clusters emerged from the analysis: Cluster 1, characterised by a higher representation of individuals practising in surgical specialities and earning a net income exceeding 4000 euros, highlights a group primarily settled in Belgium and France for an extended duration. Conversely, Cluster 2 presents a larger and more diverse cohort, prominently located in France and Germany, with a notable number away from Romania for a relatively shorter period. This cluster showcases a spectrum of medical specialisations and income ranges between 3000 and 4000 euros. Cluster 3 demonstrates a more balanced distribution across marital statuses and comprises individuals from a broader spectrum of European countries. While offering less specific insight into medical specialities, this cluster denotes various characteristics reflecting a diverse group with balanced representations. In contrast, although Cluster 4 shares similarities with Cluster 2, it notably exhibits a higher proportion of individuals with children and a more dispersed representation across countries. The income distribution spans various ranges, including many within lower income.

The second research question delves into the influence of socio-economic factors on the geographic distribution of Romanian migrant doctors across Europe. The analysis explains the complex relationship between a country's socio-economic conditions and its allure to Romanian doctors, emphasising factors like the number of doctors and healthcare system funding. Over the last decade, there has been a noticeable upward trajectory in the presence of Romanian-trained doctors across various destinations in Europe, indicative of a consistent outward migration trend among medical professionals from Romania. Countries such as Germany, France, and Sweden witnessed substantial increases in Romanian doctors, underscoring these nations' attractiveness for career prospects among Romanian medical practitioners. Nonetheless, intermittent fluctuations in the figures across certain years could hint at shifts in destination desirability, potentially influenced by economic conditions, healthcare policies, or access to the regulated professions within these countries.

These clusters offer insights into Romanian doctors' diverse characteristics and European migration patterns. The typologies exhibit variations in age, marital status, presence of children, professional specialities, and income levels. For instance, while Cluster 1 and 3 share similarities in possessing medical specialisations and higher incomes, they differ in geographic dispersion and the duration of stay in destination countries. Meanwhile, Cluster 2 represents a younger cohort with a significant representation of married individuals and specialised medical skills, predominantly in France and Germany.

The findings underscore the complex interplay between socio-economic factors, demographic characteristics, and professional attributes in shaping the migration patterns of Romanian doctors within Europe. They provide valuable insights into the nuanced

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relationships between these variables, offering a foundation for further research into the underlying determinants influencing the migration decisions of medical professionals.

The article aims to illustrate the migration trends of Romanian doctors, providing valuable insights that enhance our understanding of the factors influencing the healthcare landscape in the EU. Future research should focus on filling the existing data gaps to provide a more detailed understanding of Romanian doctors' migration patterns. This includes exploring destinations, medical specialities practised abroad, length of stay, and socio-demographic and professional details. Additionally, there is a need for in-depth exploration of the role of social networks in facilitating migration among physicians.

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Annex: EUROSTAT socio-economic indicators

Country	The proportion of the population aged 65 and over	Life expectancy at birth	Real GDP per capita	Unemployment rate (%)	Health care expenditure as a share of GDP	Practicing physicians per hundred thousand inhabitants
Belgium	19,50	81,80	37.040	5,70	10,93	324,78
Bulgaria	21,70	74,30	7.680	4,10	8,56	429,55
Czechia	20,60	79,10	18.460	2,30	9,49	425,59
Denmark	20,30	81,30	51.660	4,90	10,63	437,66
Germany	22,10	80,70	36.010	3,00	12,88	452,97
Estonia	20,40	78,20	16.250	5,30	7,56	343,22
Ireland	15,00	82,40	77.430	4,40	6,60	402,45
Greece	22,70	80,70	18.710	11,60	9,18	629,20
Spain	20,10	83,20	24.910	13,00	10,60	448,66
France	21,00	82,30	33.180	7,20	12,30	318,34
Croatia	22,50	77,70	14.660	6,70	8,07	371,10
Italy	23,80	83,00	28.220	7,90	9,21	410,47
Cyprus	16,50	81,70	27.490	7,10	9,08	490,81
Latvia	20,90	74,80	13.280	6,60	9,11	335,79
Lithuania	20,00	76,00	15.100	6,10	7,78	447,47
Luxembourg	14,80	83,00	86.130	4,80	5,66	298,49
Hungary	20,50	76,20	14.350	3,80	7,38	329,83
Malta	19,20	82,70	24.320	2,90	10,39	434,30
Netherland	20,00	81,70	43.800	3,50	11,10	389,91
Austria	19,40	81,10	38.080	4,90	12,12	540,91
Poland	19,10	77,40	14.620	2,80	6,44	344,11
Portugal	23,70	81,70	19.310	6,70	11,07	562,00
Romania	19,50	75,30	10.080	5,60	6,47	350,88
Slovenia	21,10	81,30	21.860	3,50	9,48	334,38
Slovakia	17,40	77,20	16.340	6,00	7,76	368,00
Finland	23,10	81,20	37.780	7,30	10,14	432,50
Sweden	20,30	83,10	46.250	7,50	11,20	432,00

Source: Eurostat



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