

INTERNATIONAL MIGRATION OF ROMANIANS. A GRAVITY MODEL ANALYSIS.

Ecaterina TOMOIAGA

Faculty of Economics and Business Administration, Babeş-Bolyai University of Cluj-Napoca, Romania

ecaterina.tomoiaga@econ.ubbcluj.ro

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Abstract:

Migration at international level is an important aspect to be known for every country in the world, either it is a generator of migrants or a receiver. For this reason, we chose to analyse the international migration for Romania. Romania is a country with high levels of emigration since the communism regime has fallen and, also, after becoming a member of European Union when labour mobility became free. The period of analysis is 2000-2020. In this period of time in the top preferences of destinations for Romanians were Germany, Italy, Spain, and United Kingdom. For the empirical part it was used Poisson Pseudo Maximum Likelihood estimator with fixed effects (PPML with fixed effects) on a gravity model. Results show that Romanians migration is driven by pull effects, rather than push effects. So, people are leaving for better conditions: more available jobs and higher wages in the destination country. In addition, the results are robust when we introduce a dummy variable, for the crisis in the years 2008 and 2020.

Key words: international migration, Romania, OECD, gravity model, PPML

JEL classification: F22, C23

1. INTRODUCTION

Migration can be internal or international. Migration at the internal level is represented by the people's decision to move from rural areas to urban areas, from urban to rural, from rural to rural areas, or from urban to urban areas in the same country. On the other side, international migration is the movement of labour force from one country abroad (Bailey 2010).

Regarding international migrants there exists economic migrants, political migrants, and environmental migrants. Economic migrants are those people who usually live in poverty or who want to have a higher income. In this sense, they move abroad for the rest of their lives, or just for a temporary period. Those people who go to another country for a short period have the intention to save money in order to come back to their home country to invest their money in a new business, or to build a house. Moreover, there are migrants who are migrating seasonally, every year. They work mostly in agriculture (Hunter 2011).

Political migrants include refugees who have been forced to move due to political reasons or conflict (Koser 2007). And environmental migrants are those people who choose to leave when they are confronted with droughts, floods, sea level rise, and other disasters or climate change factors (Hunter 2011).

The implication of migration depends on whether a country is accepting immigrants or experiencing emigration. More precisely, if it is the country of destination or the origin country. One positive effect on the origin country is represented by remittances, the money sent home by the migrants to their families.

Another positive part of migration includes an enhanced flow of trade between the country of destination and the origin country. Moreover, the origin country can benefit of people's experience and new skills gained in the receiving country when they decide to come back home.

If we refer to the emigration of high skilled labour force, this is named in the literature brain drain and it has a negative effect of migration. However, brain drain can be followed by brain gain, which means that immigrants come back to their origin countries after achievements of good quality education abroad. This is a positive effect.

Another positive effect is that migration contribute to population growth. Immigration can lead to economic growth in the receiving country through the demand for products and services made by immigrants and, also, by taxes paid by them. However, the increase of population as a result of migration may lead to higher unemployment rates.

One negative part of immigration for the destination country can be the migrants' integration. But there exist two ways of integration: assimilation and multiculturalism. The first one refers to the adoption of culture, language and social norms of the receiving country. The second method consists in letting migrants not to change their cultural norms. Another negative aspect is that the immigrants take the jobs from the residents, because they accept to work for less money (Bailey 2010). This overlaps with the positive effect of population growth. So, economists should decide which effect is stronger, the positive one (the growth of population) or the negative one (integration of migrants).

In this study, we want to analyse the international migration from Romania to thirty two destination countries from the Organization for Economic Cooperation and Development (OECD). Romania is a country which is characterized by emigration, people leaving in more developed countries. In general, migration occurs due to economic reasons. For example, people migrate abroad because in the origin country there are shortages in what regards the available jobs. Or another reason can be the differences in wages received in the host country compared to the sending one. Bălan and Olteanu (2017) obtained through a descriptive analysis that Romania is through the most affected countries from the East part of Europe by the brain drain phenomenon.

Romania was taken into consideration across time by researchers to study the migration flows from this country. For example, Ciuciu (2017) analysed the international migration from Romania. The migration affects both the origin and the destination countries. In the origin the positive part of migration comes from the fact that people who are working abroad send money home, to the rest of the members of the family remained home. Moreover, the origin country can benefit from skilled labour, when people decide to come back in the origin. One negative aspect of emigration can be a social one, which consists in the degradation of the relationship between the member gone abroad and the rest of the family from home. Regarding the destination country, immigrants help at covering the gap existing in the labour market. Also, the level of population is rising, which is beneficial for the destination country. In addition, the social aspect is improved in the destination through the fact that people bring with them their culture. By a descriptive analysis it was obtained that the preferred destination countries were Italy, United Kingdom, Spain, Germany, Belgium, Austria, Denmark, France, Sweden, and Netherlands (this order is valid for the year 2015). Moreover, Romanians has gone, also, outside the European Union, in countries like: Norway, Switzerland, Canada, United States, and Moldova.

Another approach on the same subject was made by Andrica et al. (2019). After the fall of communism regime, Romania confronted with a serious decline of population, through emigration. It was observed that mostly young people migrate. The main reason of migration for Romanians is the financial factor. The average wage in Romania is very low compared to other countries from European Union (approximately 530 euros per month). People are migrating in order to find better paid jobs.

There exists one recent study which analysed empirically the international migration from Romania, made by Pripoaie et al. (2022). As destinations there were used countries from European Union. The interval of time used for the analysis was 2000-2020. By employing linear regressions and vector autoregression it has been reached the following conclusion: Romanians migrate mostly because of economic reasons. Moreover, the emigration level has been on a continuous rise in the period analysed, except of the years 2007 and 2008 where the financial crisis affected the entire world, and also the year 2020 when a pandemic occurred. The number of emigrants from 2020 was smaller compared with the number of emigrants from the 2019. As future research it is recommended to study the migration from Romania to see its tendency after the pandemic time. More precisely, to find out if after the negative effects of pandemic the migration have a general

decrease in time or the low level of emigration in 2020 was exclusively determined by the pandemic.

Our paper comes and update the research of international migration from Romania for the period 2000-2020. Our main objective is to see how the distance between origin and destination countries, the gross domestic product (GDP), and the unemployment rate influence the decision of Romanians to migrate. Our contribution relies on testing the gravity model based on Poisson-Pseudo Maximum Likelihood (PPML) estimator with fixed effects, fact that differentiates us of the related literature. By focusing on push (characteristics of the origin country) and pull (the attractiveness of the destination country) factors that arise from the gravity model itself in the case of Romania, we come up with an important conclusion which may lead to some policy implications. Moreover, we extend the database by including more destination countries. We include 32 destination countries, which are members of OECD.

The present paper contains five sections, including this one with some introductory aspects. The next section reviews some relevant studies from the literature on the topic of international migration. Section 3 presents the model used in the study. In section 4 we describe the data and discuss the empirical results. The last section comprises some conclusions.

2. LITERATURE REVIEW

International migration is an important aspect to be known in the case of every country across the globe. In what follows we present some studies which are focused on international migration for different origin and destination countries.

Manzoor, et. al. (2021) studied the international migration from Brazil, Russia, India, China, South Africa (BRICS) countries to OECD countries. The analysed period was 2000-2013. Following a gravity model and applying panel fixed effects and Poisson Pseudo Maximum Likelihood estimator it was obtained that people from BRICS countries migrate because of differences in GDP levels between origin and destination countries. In addition, they migrate in order to receive a higher wage. The corruption is another factor that can determine migration. Moreover, the unemployment level in the destination country discourages people to come in that country because people think they will not find a job. Also, there exists a positive connection between migration, trade, and foreign direct investments.

Otrachshenko and Popova (2014) studied the intention to migrate of people from Central and Eastern Europe (CEE). More specifically, how life satisfaction influences the decision of migration. The database used in the study consisted of a Eurobarometer survey applied in the time period October-November 2008. By following a two-level regression analysis, it was obtained that people are more likely to migrate when they are not satisfied with their life. Moreover, the socioeconomic and macroeconomic factors influence the decision of migration through life satisfaction. For example, the satisfaction of life of individuals increases when are registered high level of GDP, low levels of unemployment rate, and low inequality between individuals. But CEE countries are characterized by low level of GDP. So, people are less satisfied.

Di Maio, et. al. (2023) used Libya as a case study for researching both internal and international migration from this country. This country is characterized by conflict and political instability. Libya is a country from Africa which has the biggest rate of migration in relation to the total population and it is an important generator of migrants for Europe. The authors used data for the following time period: January 2017-May 2018 and applying Separable Temporal Exponential Random Graph was reached the conclusion that mostly men migrate. The most preferred international destination countries were Italy, Germany, France, and Egypt (for 2017) and for the year 2018 the order of preference was Italy, France, Germany, and Egypt. Moreover, it was obtained that internal migration is more encountered in the case of Libya, rather than international migration.

Karemera et al. (2000) studied the international migration from 17 European countries, 16 African countries, 16 Asian countries, 3 Central American countries, 3 Caribbean countries, and 12

South American countries into North America. The period analysed was 1976-1986. Following a modified gravity model of migration and by using pooling technique it was obtained that migration to the United States of America (USA) is influenced by the income, the population, and the localization of the origin country. Moreover, political factors have an important contribution in explaining the flows of migration. The distance is another relevant aspect taken into consideration by people when they decide to migrate. Closer countries like the Central and Latin American countries are the most important generators of migrants to United States.

Some countries from Asia were, also, taken into consideration for studying the international migration. For example, Dharmadasa and Herath (2020) studied the migration from Sri Lanka to South-East Asian countries and to European countries. The analysed interval of time was 2007-2015. Through a gravity model and by applying PPML with destination-year fixed effects it has been obtained that gross domestic product per capita and unemployment rate make people from Sri Lanka to migrate (namely push factors), and the population size from destination and dependency ratio attract migrants (the so called pull factors).

Another research was realised by Agbola and Acupan (2010) in the case of Philippines to 24 destination countries. They wanted to find out what factors are influencing international labour migration from Philippines. The data used in the study were for the interval of time 1975-2005. By applying Ordinary Least Square method it has been obtained that the following factors determine the migration of people from Philippines: the adult literacy rate, unemployment rate, population density, and political instability.

Authors such as Ciuciu (2017), Andrica et al. (2019), Pripoaie et al. (2022) analysed the case of Romania. We focus also on Romania and we apply the extended gravity model as in Wajdi et al. (2017). To the best of our knowledge, this model has not been applied before for the case of Romanians' international migration. By focusing on push versus pull factors, we believe that Romania may be an interesting case study since it is known as main generator of immigrants.

3. THE MODEL

People try to constantly maximize their welfare. Those individuals who are potentially migrants compares the benefits of both countries (origin and destination) and choose one of them, which offer more benefits. The flow of migration is dependent of some characteristics of the destination country, the origin country, and by the migrants' own characteristics (Karemera et al., 2000).

An existing model which uses factors of the host and origin countries is the gravity model. So, the migration flow from origin country to the destination country in year t (M_{ijt}) will be expressed as a function of the population from origin country in year t (P_{it}), the population from destination country in year t (P_{jt}), and the distance between origin and destination countries (D_{ij}):

$$M_{ijt} = \frac{P_{it}^{\alpha_1} \cdot P_{jt}^{\alpha_2}}{D_{ij}^{\alpha_3}} \quad (1)$$

The equation 1 is the basic form of the gravity model. After we logarithm the equation 1 we have the linear form of the model (Zipf, 1946):

$$\ln M_{ijt} = \alpha_0 + \alpha_1 \ln P_{it} + \alpha_2 \ln P_{jt} + \alpha_3 \ln D_{ij} + \varepsilon \quad (2)$$

However, there are other factors that can influence labour migration. So, there exists extended versions of the gravity model which incorporate different pull and push factors which drive migration of people. For example, some economic factors like gross domestic product per capita and unemployment rate can be included in the basic form of the model. The equation will be as follows:

$$\ln M_{ijt} = \alpha_0 + \alpha_1 \ln P_{it} + \alpha_2 \ln P_{jt} + \alpha_3 \ln D_{ij} + \alpha_4 \ln X_{it} + \alpha_5 \ln X_{jt} + \varepsilon \quad (3)$$

where X_{it} - variables specific to the origin country

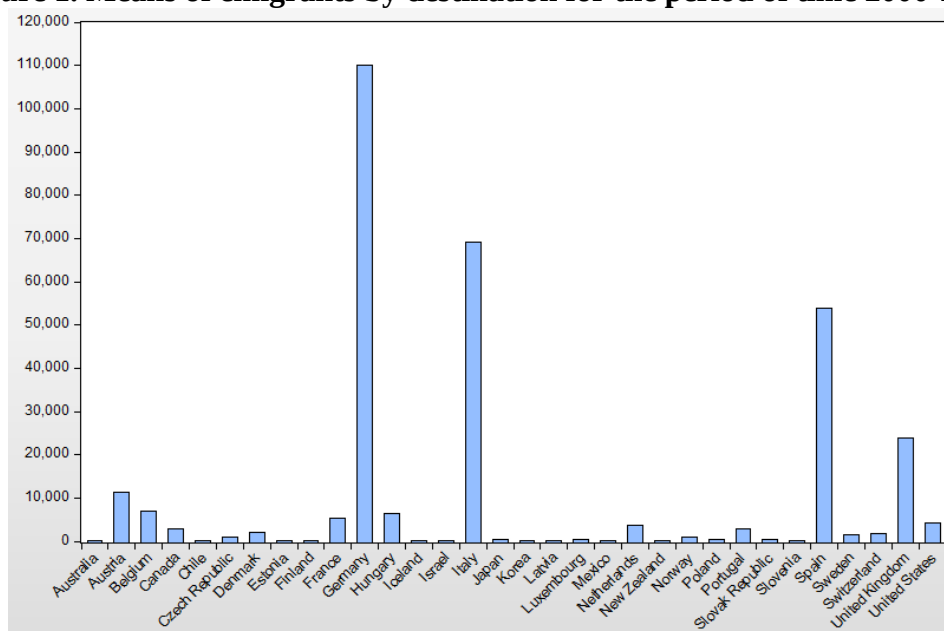
X_{jt} - variables specific to the destination country

In our estimation we will use as proxy for size of the country the GDP.

4. DATA DESCRIPTION AND EMPIRICAL RESULTS

According to data availability, we analyse international migration from Romania to some OECD destination countries: Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Iceland, Israel, Italy, Japan, Korea, Latvia, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom, the United States. In figure 1, we have the representation of the mean of emigrants for the period of time 2000-2020, from Romania to every OECD destination taken into consideration. We can easily observe that in the analysed interval of time in the top preferences of Romanian emigrants were the following countries: Germany, Italy, Spain, the United Kingdom. A possible motivation for choosing these countries is that all countries are in Europe. Moreover, these countries are members of European Union, Romania is also a member of European Union since 2007 and since then the labour mobility became free.

Figure 1. Means of emigrants by destination for the period of time 2000-2020.



Source: Author's own representation using data from OECD

For the empirical part we constructed a balanced panel database for the interval of time 2000-2020. As dependent variable we use the number of Romanian migrants, and as explanatory variables we use the following variables: the distance between origin country and destination country (measured in kilometers), the level of gross domestic product (GDP), the unemployment rate from both origin and destination countries. All variables were extracted from OECD and World Bank databases.

We follow the basic and an extended version of the gravity model. To test it empirically it is indicated to apply the Poisson Pseudo Maximum Likelihood estimator (PPML) with fixed effects, in order to avoid the problem of heteroskedasticity. This problem is common for the gravity model. Moreover, PPML is suitable to be used compared to Ordinary Least Square (OLS) because we use non-linear data. Also, OLS can create sample selection problems, because it can't deal with the presence of zero values (Arif 2022).

Firstly, we test the basic gravity model (see table 2) by applying PPML with fixed effects. This involves to take as dependent variable the number of emigrants from Romania to every destination taken into consideration. As explanatory variables we include the distance between

origin country and destination country, the GDP from both origin and destination countries. We obtained the following variables as significant from the statistical point of view: the distance and the GDP from destination country. For the coefficient of the distance we obtained a negative sign, as expected. This means that the level of emigration will decrease when the distance between origin and destination countries increases. Regarding the GDP coefficient we obtained a positive coefficient for the destination country, as expected. This imply that Romanians are attracted to destinations with higher level of GDP.

Table 1. Empirical results (part one).

<i>Variable</i>	<i>Coefficient</i>
Lndistance	-1.95787*** (0.1704657)
lngdp_origin	0.1787419 (0.1364794)
lngdp_destination	1.384003*** (0.0864665)
C	-19.12522*** (4.15236)
Pseudo R2	0.6456
Observations	672

Source: Author' own calculation in STATA.

Standard errors in parentheses.

*** - p-value<0.01

Secondly, we test an extended version of the gravity model, by including the unemployment rate in the model. We also employ on this model PPML with fixed effects. The distance between origin and destination countries has a negative coefficient and it is statistically significant. Also, the GDP from the destination country have a positive sign and it is significant. When the level of GDP in the destination is high, then the emigration level from Romania will increase. So, Romanians' migration is characterized by pull factors, rather than push factors. Unemployment rate is not significant neither in destination nor in origin country.

Table 2. Empirical results (part two).

<i>Variable</i>	<i>Coefficient</i>
Lndistance	-1.953636*** (0.1777913)
lngdp_origin	0.1169026 (0.151239)
lngdp_dest	1.393133*** (0.0865403)
unemployment_origin	-0.069043 (0.0773894)
unemployment_dest	0.0296626 (0.0233275)
C	-17.60647*** (4.39131)
Pseudo R2	0.6483
Observations	672

Source: Author' own calculation in STATA.

Standard errors in parentheses.

*** - p-value<0.01

For the robustness check, we add a dummy variable for the years with crisis (2008 and 2020) to the basic and to the extended gravity model. For both models, we reached robust results,

which show that Romanians migration is determined by pull factors. For them better conditions from the destination country when they are deciding to migrate are more important.

Table 3. Robustness check.

Variable	Robustness (basic model)	Robustness (extended model)
Lndistance	-1.958015*** (0.1698786)	-1.954559*** (0.1767663)
lngdp_origin	0.2227387 (0.1436862)	0.1468195 (0.1523361)
lngdp_destination	1.38365*** (0.0858212)	1.393045*** (0.0854673)
Dummy_crisis	-0.2390731 (0.289615)	-0.2476481 (0.3002504)
unemployment_origin		-0.0777796 (0.0745112)
unemployment_destination		0.0285109 (0.0232434)
Pseudo R2	0.6470	0.6498
Observations	672	672

Source: Author' own calculation in STATA.

Standard errors in parentheses.

*** - p-value<0.01

5. CONCLUSIONS

Romania has been characterized by emigration across time. People leave in more developed countries mostly by economic reasons. The preferred destination countries for Romanian migrants were Germany, Italy, Spain, and the United Kingdom in the interval of time 2000-2020. This study consisted in analysing the international migration from Romania to almost all countries from OECD, by following the basic and an extended version of the gravity model. The conclusion reached after applying PPML with fixed effects estimator is that migration from Romania is driven more by pull factors, rather than push factors. More specifically, we obtained that Romanians are more attracted to countries with higher GDP. Also, the distance between the origin and destination countries is relevant for Romanian migrants. They prefer to migrate in closer and more developed countries. Although conditions inside the country seem not to matter enough to influence their decision to migrate, it is clear that better conditions in destinations are an attraction for people who intend to migrate.

We found out as an important reason why people migrate from Romania to the main destinations of OECD countries. The higher incomes attract migrants, which means that richer countries attracts more immigrants. In what concerns unemployment rate it is obtained that in the decision to migrate this variable counts neither in origin nor in destination. As future research we recommend using more factors that may have an influence upon migration, such as social ones. Also, there can be employed comparative analysis between Romania and similar countries in order to see how different results may be obtained.

REFERENCES

1. Agbola, Frank W., and Acupan, Angelito B. (2010), An Empirical Analysis of International Labour Migration in the Philippines, *Economic Systems* 34 (4), pp. 386–96.
2. Andrica, Nicoleta, Giurgiu, Adriana and Fora, Andreea-Florina (2019), International Migration. Case Study: Romania, *The Annals of the University of Oradea*, pp.217-225
3. Arif, Imran (2022), Educational Attainment, Corruption, and Migration: An Empirical Analysis from a Gravity Model, *Economic Modelling*, pp. 1-14.
4. Bailey, Rayna (2010), *Immigration and Migration*, Infobase Publishing.

5. Bălan, Mariana, and Olteanu, Cosmin (2017), 'Brain drain in the globalization era: the case of Romania', *Annals of 'Constantin Brancusi' University of Targu-Jiu. Economy Series*, pp. 26-35.
6. Ciuciu, Monica (2017). 'Romania And The International Migrations Flows'. *The Annals of the University of Oradea*, pp. 73-80.
7. Dharmadasa, Sampath and Herath, Thaksila (2020), 'A Gravity Model Analysis of International Migration from Sri Lanka to South-East Asian and European Countries'. *Economic Research*, pp. 590-616.
8. Di Maio, Michele, Sciabolazza, Valerio Leone and Molini, Vasco (2023), 'Migration in Libya: A Spatial Network Analysis', *World Development*, pp. 106-139.
9. Hunter, Nick. 2011. *Immigration*. Heinemann-Raintree Library.
10. Karemera, David, Oguledo, Victor Iwuagwu and Davis, Bobby (2000), 'A Gravity Model Analysis of International Migration to North America', *Applied Economics*, pp. 1745-55.
11. Koser, Khalid (2007) *International Migration: A Very Short Introduction*, Oxford University Press.
12. Manzoor, Wajiha, Safdar, Nabeel and Mahmood, Hafiz Zahid (2021), 'A Gravity Model Analysis of International Migration from BRIC to OECD Countries Using Poisson Pseudo-Maximum Likelihood Approach', *Heliyon* 7, pp. 1-12.
13. Otrachshenko, Vladimir, and Popova, Olga (2014), 'Life (Dis) Satisfaction and the Intention to Migrate: Evidence from Central and Eastern Europe', *The Journal of Socio-Economics*, pp. 40-49.
14. Pripoaie, Rodica, Cretu, Carmen-Mihaela, Turtureanu, Anca-Gabriela, Sirbu, Carmen-Gabriela, Marinescu, Emanuel Ștefan, Talaghir, Laurentiu-Gabriel, Chițu, Florentina and Robu, Daniela Monica (2022), 'A Statistical Analysis of the Migration Process: A Case Study—Romania', *Sustainability*, pp. 1-27.
15. Wajdi, Nashrul, Adioetomo, Sri Moertiningsih and Mulder, Clara H. (2017), 'Gravity Models of Interregional Migration in Indonesia', *Bulletin of Indonesian Economic Studies*, pp. 309-332.
16. Zipf, George Kingsley (1946), 'The P 1 P 2/D Hypothesis: On the Intercity Movement of Persons', *American Sociological Review*, pp. 677-786.