ANALYSIS OF REGIONAL MIGRATION DISPARITIES IN ROMANIA

Andreea STROE[*]

Andreea-Oana ENACHE[**]

Abstract

Migration is a complex phenomenon, highly studied globally. Thus, the analysis of the population mobility process is performed using an interdisciplinary approach, with strong links in sociology, history, economics, geography, demography and even psychology. All disciplines involved in the analysis of the phenomenon target different aspects of population migration, define the decision underlying the migration of individuals and build the image of the impact that the phenomenon has on the actors involved.

Emigration and immigration became important aspects of the Romanian society in the last decade. The present paper focuses on the regional migration phenomenon in Romania, between 1991 and 2019. The objective of the research is to characterize from a quantitative point of view the migration flows in and from Romania. Moreover, ARDL models are used to analyse the impact of the GDP in the migration decision.

This analysis highlighted the fact that people who decide to emigrate are from all age groups and their decision is based on socio-economic considerations, these categories being attracted by well-paid jobs. The link between the number of emigrants and the evolution of GDP in Romania made with the help of a regression equation, which showed that there is a weak link between these variables, confirms once again that the evolution of gross domestic product did not change the decision of emigration to Romania.

Keywords: *migration, emigration, immigration, globalization, regional disparities.*

JEL Classification: *F22, K37, O15, R22, F60.*

1. Introduction

In Europe, the last ten years have been characterized by significant flows of international migrants. Dealing with the development of the migration phenomenon has proven to be a challenge for many countries. The mobility of people and the workforce has played a particularly important role in moderating the rate of demographic aging and slowing it down, especially in Europe. Economic aspects have attracted labor force from countries with lower levels of economic development to Western European countries, which have received the largest inflows of migrants in recent years.

Aspects of the demographic problem are still relevant today, given that the human factor is the only common element that can be subject to all risks at local, regional or global level, being influenced by political or social conflicts, ethnic or religious inequities, as well as natural disasters or health crises.

Since the second half of the 1990s, discussions have intensified about the effects of international migration on the migration of highly skilled workers. The brain drain from Central and Eastern Europe to Western Europe was marked by the fall of the Berlin Wall and the fall of socialist regimes in 1989. These countries have taken steps to facilitate the entry of highly qualified people, especially IT specialists, to face a global competition for such employees.

The demand for highly skilled workers can be met to a large extent by developing countries, with the direct benefits of "brain migration" still highly valued. However, an increase in the reverse flow of specialists from rich to less developed countries can be predicted as a result of the reduction in the demand for highly qualified personnel due to the increase in economic efficiency in developed countries.

The link between demographic change and migration policies, including the migration of highly qualified people, will be an important issue in the near future. It is expected that some Member States will prefer the migration of specialists and develop regulations and procedures to facilitate it. OECD migration statistics show that in recent years the number of foreign workers has risen in most developed European countries (OECD, (2001). Immigrant workers are, on average, younger than the rest of the labor force and are distributed in a wide range of activities in the economy: agriculture, construction and

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[*] Lecturer, PhD, Faculty of Economics and Business Administration, "Nicolae Titulescu" University of Bucharest (e-mail: stroeandreea@univnt.ro).

[**] PhD, Institute of National Economy, Romanian Academy (e-mail: enache_oanaa@yahoo.com).

civil engineering, light industry, tourism, the hotel and catering sector, domestic activities or various services, including computer science.

Starting from these premises, a first objective of the paper is to make a descriptive analysis of Romania's migration in the European context based on statistical data from 1991-2019. We also used the Gini-Struck concentration coefficient to analyze the degree of homogeneity and concentration for analyzes performed by age groups, gender, etc. This analysis highlighted the fact that people who decide to emigrate are part of all age groups and their decision is based on socio-economic considerations, these categories being attracted by well-paid jobs.

Identifying a link between the number of emigrants and the evolution of GDP in Romania is another step in this study, which will be done using ARDL models, which will describe whether the decision to emigrate Romanians is influenced by economic considerations.

2. Literature review

The current trends of the migratory phenomenon need, for a good understanding , not only analysis tools from a single scientific branch, but from many more scientific sources, which would define the phenomenon in its complexity. The formation of solid theories in this field has been one of the main problems of the last century even today being a debated topic.

Vasile (2012) shows that in less developed countries, a main concern is not so much the external mobility of workers, but the migration of those with higher education, known as "brain drain". Countries with high migratory flows are trying to find more leverage to maintain and create new jobs of interest to generations of graduates with higher and long-term education, so that they can be given the chance to grow, evolve and develop prosperous in their own country (Vasilescu, 2020).

The comparative disadvantages in terms of the level of development, the remuneration of the labor force and the existence of attractive jobs, as well as the structural deficit between the supply of the education system by fields of training and specializations, but also the demand of the labor market, motivate the predisposition towards international labor mobility (Begu, 2021).

Begu (2019) and others argue that developed countries create opportunities for people with a high professional level in order to attract "brains" that would increase the economic potential of the destination country. The people included in this category will be the first to benefit from the recruitment, proving specific qualities and professional expertise above the average level registered in the destination country.

Boboc et al. (2014) consider that the current conditions should also be taken into account: people' mobility is much more flexible and volatile. For employment this is obtained mainly through fixed-term contracts, for certain occupations. Staying in the host country after the initial employment contract had ended is less likely for people with a strong background than for the ones with a medium level who carry out routine activities.

The main negative effect of migration for the country of origin is the loss of a significant proportion of highly skilled labor. On the one hand, the country of origin has not been able to benefit from its investment in human resources, on the other hand, the emigration of specialists can lead to a reduction in technological development, economic growth, wages and employment in certain economic sectors (Vasile, 2014).

Diaconescu (2019) argues that a decisive factor in the choice of people to migrate is the development of the labor market, which is a point of attraction for those who have a training in a particular field and also a catalyst for economic and social development for developing countries. The researcher draws attention to a form of discrediting migrant citizens, by assigning unattractive, poorly paid jobs among compatriots. However, given the economic aspects underlying the migration decision, they accept the job offers because they come from areas with an economic level well below the standards encountered in the host country. The paper also highlights that well-paid job offers, which require training in the field concerned and which offer a certain status from a social point of view, are addressed especially to the local population and only to a small extent can be addressed by migrants. The latter are subjected to difficult tests of analysis and differentiation, having to prove their skills through language certificates, diplomas and certificates recognized internationally, but also to pass a series of internal exams, within the structure that organizes the competition. From these considerations, it can be concluded that the phenomenon of migration can also have negative consequences due to capitalist governance and technological advancement, if we take into account the aspects described in the work of world systems theory (Enache, 2019).

This paper contributes to the enrichment of the specialized literature with a socio-economic analysis of the migration situation in Romania.

3. Description of the migration phenomenon in Romania after the fall of the communist regime

This research analyzes the migration phenomenon in close connection with the influencing factors in the economic, social and political environment. All these factors generate a wide range of problems globally, in terms of international migration. The effects of these factors generate positive and negative effects for both the host and the destination country. In Romania, the migratory phenomenon presents significant evolution in socio-economic dynamics, and these problems will be tackled in what follows.

During the communist regime in Romania, the migration of the population was kept under strict control, and after the 1990s, this phenomenon was in a continuous expansion, in terms of migratory flows, but also in terms of the destination countries. The universally valid reasons behind the decision to migrate were socio-economic.

In the second half of the 1980s, Romania was one of the major source countries in the Eastern European migration system. The determining factors of this phenomenon were the onset of an extensive economic crisis, associated with a major lack of resources, isolation of the country from Western currents and accentuation of the lack of credibility of the communist regime (Eke and Kuzio, 2000; Gabanyi, 2000; Georgescu, 1995).

The number of Romanian emigrants seeking refugee status in Western countries increased from 2,864 asylum seekers in 1980 to 14,864 in 1989 (UNCHR, 2001).

After the fall of the communist regime and the opening of borders to various developed and evolving states, the number of Romanian migrants increased considerably. As such, between 1990 and 1993, out of a population of 22 million, 190,687 Romanian citizens emigrated legally (CNS, 1995), and 338,132 applied for asylum in Western countries (UNCHR, 2001).

Over time, the countries of refuge for Romanian migrants begin to no longer grant political asylum and thus, many migrants participate in illegal migration. During the 1990s, marked by the collapse of the Romanian economy, the number of illegal migrants increased, although their primary purpose was no longer to settle permanently in another country, but to work (Sandu, 2000a, 2000b). For this reason, during the last 15-16 years, massive waves of Romanian workers have gone abroad. In 2006, their number was estimated at 2.5 million (Sandu, 2006).

Over time, the socio-demographic structure of the population engaged in the migration process has also changed. At the beginning, migrants from Romania were typically highly qualified, qualified or urban specialists. Nowadays, most migrants are young, poorly or under-qualified, from rural areas, where about half of the country's population lives.

From the perspective of the descriptive analysis of the migration phenomenon, between 1991 and 2019, Romania registered important international migration flows with oscillating evolutions of both the number of immigrants and the number of emigrants, becoming a significant phenomenon for the Romanian society. (Figure no. 1)

Figure 1: Romania's international migration between 1991 and 2019
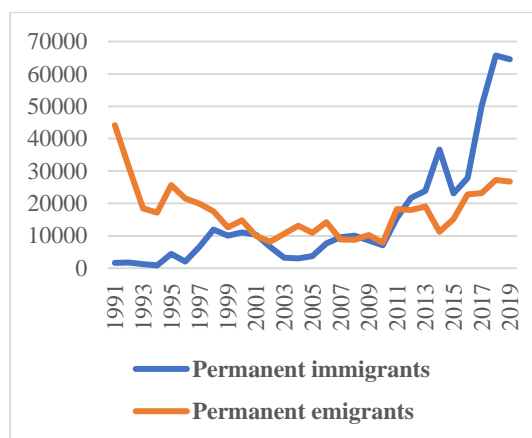
Source: The author's calculation, data collected from the Statistical Yearbook of Romania - Time Series (1990-2019), 2021 Edition

At the same time, internal migration was impacted by these different developments, in terms of urban development, followed by legislative changes in the economic field and attracting foreign direct investment. Thus, large cities become recipients of labor in all counties of the country and abroad, by adding immigrants to the labor market.

With a population of about 20 million inhabitants on July 1, 2020, international migration in Romania has a share of about 0.5%, plus the clandestine migratory flows (Sandu, 2006). The geographical position of the country is very attractive for illegal migrants, Romania being a transit country between refugees and their destination countries. Because of this, in connection with the problems related to the fulfillment of the criteria of the Maastricht Treaty, our country joined the European Union much later.

4. Data and Methodology

4.1. Data

For the descriptive analysis, the data source was the National Institute of Statistics in Romania. The following variables were used in the analysis:

➤ Permanent emigrants by sex, macro-regions, development regions and counties of departure, number of people, 1990-2020, Romanian National Institute of Statistics

➤ Definitive emigrants by age groups, macro-regions, development regions and counties of departure, number of people, 1990-2020, Romanian National Institute of Statistics

➤ Permanent immigrants by sex, macro-regions, development regions and counties of arrival, number of people, 1991-2020, Romanian National Institute of Statistics

➤ Permanent immigrants by age groups, macro-regions, development regions and counties of arrival, number of people, 1991-2020, Romanian National Institute of Statistics

Definitive emigrants by sex, macro-regions, development regions and departure counties represent, according to the Romanian National Institute of Statistics definition, persons (of Romanian citizenship) who emigrate abroad. Emigration is the action by which a person renounces his domicile in Romania and establishes his domicile on the territory of another state.

Definitive immigrants (immigrants with change of residence) by sex, macro-regions, development regions and counties of arrival represent, according to the Romanian National Institute of Statistics definition, persons (of Romanian citizenship) who immigrate to Romania. Immigration is the act by which a person renounces his domicile on the territory of another state and establishes his domicile in Romania.

In order to determine a socio-economic connection of the migration phenomenon in Romania, we presented, in the second part of the quantitative analysis, how the number of Romanian emigrants is influenced by the evolution of GDP (in millions of euros, constant prices since 2010).

4.2. Methodology

In order to study the dynamics of the migration phenomenon, we used the Gini-Struck concentration coefficient to analyze the degree of homogeneity and concentration for the analyzes performed on age groups, gender etc. (Begu, 2009).

$$G = \frac{\sum_i \sum_j |x_i - x_j|}{2 \sum_i \sum_j x_i} \quad (1)$$

Unit root tests are applied for the GDP, Emigrants and Immigrants series in order to establish the stationarity of the data series. The ADF test (Augmented Dickey-Fuller, Dickey & Fuller, 1981) is designed to test if the series have unit-root thus being non-stationary.

ADF test equation: $\Delta_{y_t} = \varphi y_{t-1} + \sum_{j=1}^{p} \delta_j \Delta_{y_{t-j}} + \varepsilon_t$ (2)

where we admit that the variable ε_t is white noise the null hypothesis (existence of the root unit) means φ

= 0, thus the hypotheses of the test are $H_0: \varphi = 0$, $H_1: \varphi < 0$.

The null hypothesis of the KPSS test is that the analyzed time series is stationary, around a constant (β) or a linear deterministic trend ($\beta + y_t$). KPSS writes the time series y_t as a sum between a deterministic trend, a random process (r_t) and error (ε_t) which is supposed to be stationary (Jula, 2019):

KPSS test equation: $y_t = yt + r_t + \varepsilon_t$, (3)

where $r_t = r_{t-1} + e_t$ and e_t is a white noise process.

5. Results and discussions

5.1. Descriptive analysis of the emigration flows from Romania

Following the collection of data from the database of the National Institute of Statistics of Romania, several forms of migration from Romania can be analyzed, on the two major segments, emigrants and immigrants, and each segment will be analyzed in terms of several factors.

The first considered segment of migration in Romania is that of emigrants. They can be permanent emigrants - Romanian citizens who have established their permanent residence abroad or temporary emigrants - Romanian citizens who have moved abroad during the reference year, for a period of at least 12 months.

For the category of permanent emigrants, we analyzed the evolution by age groups, in the period 1990-2019. The analysis is performed on the 6 age groups found in the time series provided by Romanian National Institute of Statistics. To determine if there is a degree of concentration on certain age categories, several moments in time are analyzed, using the Gini-Struck Coefficient. Thus, we chose the years 1990, 1995, 2000, 2005, 2010, 2015 and 2019, all these years representing certain key moments in the country's history.

1. 1990: the first year after the Revolution, when the restrictions of the communist regime no longer apply;

2. 1995: Romania applies to join the European Union;

3. 2000: is the first year of the 21st century, a year with privatizations and major changes in the country's economy;

4. 2005: is the year of pre-accession to the European Union;

5. 2010: a year of austerity, all revenues are diminished following negotiations with the International Monetary Fund;

6. 2015: is a year of economic growth and financial stability on the Romanian market;

7. 2019: most recent year with available data.

Table 1: Definitive emigrants by age groups

Number of people	1990	1995	2000	2005	2010	2015	2019
Under 18	25298	5137	4372	765	1062	2610	5234
18-25 years	13570	4180	1513	1408	1074	2853	4017
26-40 years	25589	10875	5717	6359	3955	6378	9522
41-50 years	9790	2803	1551	1355	1156	2223	5255
51-60 years	11311	1245	657	545	406	714	2004
61 years and over	11371	1435	943	506	253	457	743

Source: The author's calculation, data collected from the Statistical Yearbook of Romania - Time Series (1990-2019), 2021 Edition

Following the data processing with the help of the Gini Struck Coefficient, the following values resulted:

Table 2: Gini-Struck coefficient for permanent emigrants, by age groups

Years	1990	1995	2000	2005	2010	2015	2019
Gini Struck coefficient	0,184	0,341	0,345	0,505	0,417	0,342	0,280

Source: The author's calculation, data collected from the Statistical Yearbook of Romania - Time Series (1990-2019), 2021 Edition

We know from theory that a value of the Gini-Struck Coefficient closer to 1, shows a higher degree of concentration on one condition, in our case on one age group (Begu, 2009). As can be seen in Table 2, permanent migrants are distributed relatively evenly across all six age groups in almost all years analyzed, except in 2005 and 2010, when the concentration level is focused on the 18-25 age segments, 26-40 years and 41-50 years.

Regarding the category of temporary emigrants, the data search is performed over a shorter period of time, due to the lack of data, namely for the period 2008-2019. The analysis is also performed on age groups, this time on several groups, in order to draft a socio-demographic profile of the migrants.
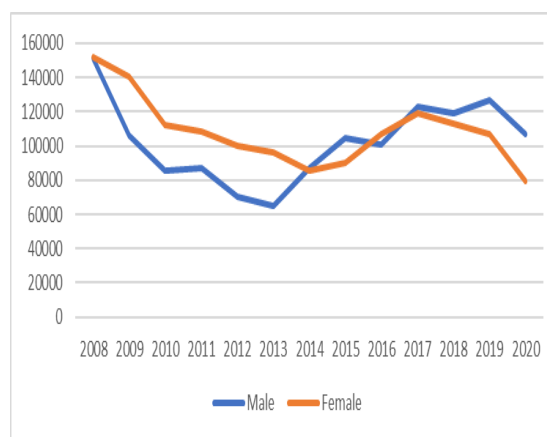
Figure 2: Temporary emigrants by age groups
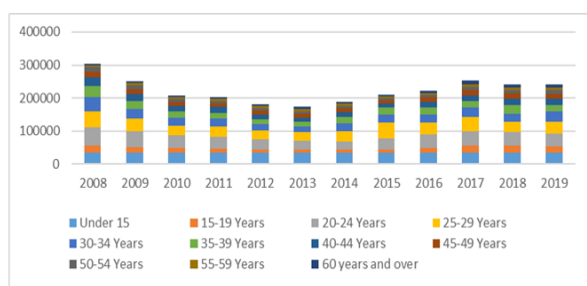
Source: The author's calculation, data collected from the Statistical Yearbook of Romania - Time Series (1990-2019), 2021 Edition

Also, data processing can be done on the gender of individuals, this being another socio-demographic factor.

Figure 3: Temporary emigrants by age groups

Source: The author's calculation, data collected from the Statistical Yearbook of Romania - Time Series (1990-2019), 2021 Edition

As can be seen from Figure 3, the segment under 15 years and between 15-19 years, presents relatively uniform data over the entire duration of the analysis. This segment is represented by the children of families who decide to move their residence abroad for a period of less than one year. We might consider, regarding the segment under 15 years, in relation to the following three age segments analyzed (20-24 years, 25-29 years and 30-34 years) that they can be young families with one, two or more children minors in care, with low incomes and without high financial possibilities, who decide to go abroad for a short period of time in order to apply for seasonal jobs.

If we look at the segment between 15-19 years old, in relation to the following three age segments (35-39 years old, 40-44 years old and 45-49 years old) we can assume that it may be families with teenage children, looking for places working together. The dropout rate among young people is quite high in Romania and as a rule, these people go abroad with their family to find work. The last three age groups, 50-54 years old, 55-59 years old and 60 years old and over, are the most vulnerable age groups, as these people usually do not have a qualification that allows them to be employed in well paid jobs and can be exploited for undeclared work.

The analysis can continue with the study of Figure 3, which shows that females predominate until 2014, compared to males. Between 2014 and 2016, there are fluctuations in the gender distribution of temporary emigrants, and in 2017 there is a balance of the gender distribution. The results of this analysis are in line with the events produced in Romania, in the analyzed years, considering that between 2008 and 2010 Romania was

affected by the global economic crisis. It is known that in Romania the distribution of incomes is uneven, the lowest incomes per household being registered in rural areas and following the national austerity, these financial imbalances have deepened (Statistical Yearbook of Romania, 2021).

5.2. Descriptive analysis of the immigration flows in Romania

The second part of the migration in Romania is represented by the segment of immigrants, which can be permanent, these being persons who established their domicile in the country during the reference year or temporary- persons with foreign, Romanian or stateless citizenship who have established their habitual residence in Romania during the reference year, for a period of at least 12 months. For both permanent and temporary immigrants, the data will be structured according to their country of origin.

For the category of permanent immigrants, the data analysis is performed for the period 1991-2019, by age groups. The same 6 age groups are proposed, and in order to determine if there is a degree of concentration on them, several moments of time are analyzed, with the help of the Gini-Struck Coefficient. Thus, we chose the years 1991, 1995, 2000, 2005, 2010, 2015 and 2019, all these years representing key moments in the country's history as mentioned above.

Table 3: Definitive immigrants by age groups

Number of people	1991	1995	2000	2005	2010	2015	2019
Under 18	318	541	1743	554	951	1716	9141
18-25 years	183	775	1893	426	975	4335	11368
26-40 years	622	1822	3588	1410	2382	10269	27527
41-50 years	176	633	2017	649	1264	3548	9767
51-60 years	115	343	908	376	878	2198	4734
61 years and over	188	344	875	289	609	1027	1942

Source: The author's calculation, data collected from the Statistical Yearbook of Romania - Time Series (1990-2019), 2021 Edition

Following the data processing with the help of the Gini Struck Coefficient, the following values resulted:

Table 4: Gini-Struck coefficient for permanent immigrants by age groups

Years	1991	1995	2000	2005	2010	2015	2019
Gini Struck coefficient	0,285	0,305	0,220	0,270	0,217	0,357	0,339

Source: The author's calculation, data collected from the Statistical Yearbook of Romania - Time Series (1990-2019), 2021 Edition

The role of the Gini-Struck Coefficient is to determine the degree of concentration on one or more age groups. As can be seen in Table 4, the final immigrants are distributed relatively evenly across all six age groups in all the years analyzed, with values ranging from 0, 21994 and 0.35745, which shows that

those who settle in Romania usually come with the family.

Table 5: Definitive immigrants by country of origin

Country of origin	1995	2000	2005	2010	2015	2019
Austria	536	84	76	111	129	184
Canada	74	60	153	230	299	398
France	460	110	117	149	202	300
Germany	739	227	238	438	465	984
Israel	162	57	134	108	142	141
Italy	133	70	216	1274	1315	1123
Republic of Moldova	1019	9146	1917	1973	14340	38205
Spain	28	10	21	77	695	1091
Syria	27	15	13	135	99	79
US	325	161	311	434	477	584
Turkey	52	22	33	398	49	136
Ukraine	24	649	27	39	1221	6196
Hungary	280	173	74	294	227	202
Other countries	599	240	374	1399	3433	14856

Source: The author's calculation, data collected from the Statistical Yearbook of Romania - Time Series (1990-2019), 2021 Edition

If we refer to the country of origin of immigrants who establish their permanent residence in Romania, we can see that most come from the Republic of Moldova, Romania's neighboring country, followed by Germany, Ukraine, Hungary and France. In Transylvania and especially in the western part of the country, there are many communities of people who are part of the aforementioned countries, established for many years.

Regarding the category of temporary immigrants, the data search is performed over a shorter period of time, due to the lack of data, namely for the period 2008-2019. The analysis is also performed on age groups, this time on several groups, in order to perform a psychological analysis that is the basis for the decision to go abroad.

Figure 4: Temporary immigrants by age groups
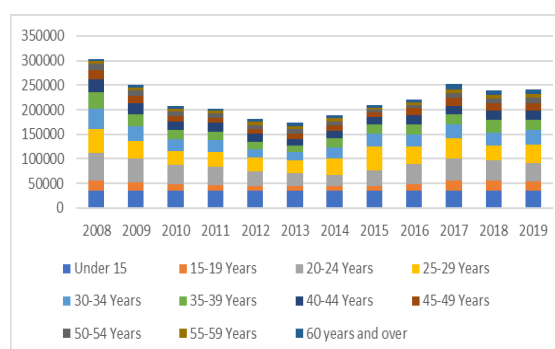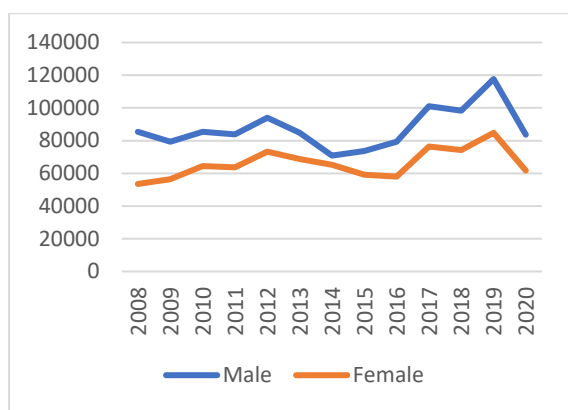

Source: The author's calculation, data collected from the Statistical Yearbook of Romania - Time Series (1990-2019), 2021 Edition

Also, data processing can be done on the gender of individuals, this being another factor that can be analyzed from a psychological point of view.

Both processes denote the nature of the immigration decision and, as can be seen in Figure 4,

all age groups show relatively uniform data over the entire duration of the analysis. Both the age groups of children and young people, as well as those of middle age and second age, are distributed evenly over the entire time period analyzed. Thus, we can assume that people who establish their domicile in Romania, but for a period of less than 1 year, are people who are either seconded to work at the branch of a company in our country and take their family with them, or have relatives and settled in our country and decide to live for a year. Another category could be represented by the ones who come to study in Romania or are absorbed in the labor market, in seasonal jobs, such as in construction, in the field of hospitality, and others.

Figure 5: Temporary immigrants by gender

Source: The author's calculation, data collected from the Statistical Yearbook of Romania - Time Series (1990-2019), 2021 Edition

The analysis continues with the study of Figure 5, which shows that there the immigrant men outnumber the immigrant women over the entire time period analyzed.

5.3. Analysing the stationarity of the underlying series

Another way of approaching the factors that influence migration is to analyze how the gross domestic product influences both the number of emigrants and the number of immigrants.

Thus, we considered the analysis period between 1995 and 2019 (table 2-Appendix). We considered the gross domestic product as an independent factor and emigration, immigration and the balance of migration as dependent factors.

Based on the above data, we determined the extent to which the number of Romanian emigrants is influenced by the evolution of GDP (in millions of Euro, constant prices 2010).

To specify the model, we tested the stationarity of the GDP-euro 2010 series, Emigrants and Immigrants. The results are described in the following table:

Table 6: Unit root tests for the GDP, Emigrants and Immigrants series

Test				Data series			
------	------	------	------	GDP€ 2010	Emigrants	Immigrants	Balance
				GDP€ 2010	Emigrants	Immigrants	Balance
ADF	Level series	t-statistics		0.2860	-1.8763	0.0715	-1.7931
		critical value		-2.9862	-2.9810	-2.9919	-2.9810
	The first difference series	t-statistics		-3.0032	-5.8628	-1.2280	-5.2859
		critical value		-2.9919	-2.9810	-2.9919	-2.9810
	Conclusion			I(1)	I(1)	I(2)	I(1)
KPSS	Level series	t-statistics		0.7225	0.2495	0.5688	0.6420
	The first difference series	t-statistics		0.1274	0.1111	0.1118	0.1930
	critical value			0.4630			
	Conclusion			I(1)	I(0)	I(2)	I(1)

Caption: ADF - "Augmented Dickey-Fuller test"
KPSS - "Kwiatkowski-Phillips-Schmidt-Shin test"
The critical value is for the 5% threshold.
Source: Calculations in EViews based on the data in Table 2-Appendix.

For the GDP€ 2010 series (gross domestic product in millions of euros, constant 2010 prices), the tests suggest a type I (1) structure - the series is non-stationary in level and stationary in the first difference. For the "Emigrants" series, the ADF test indicates a type I (1) structure, while the KPSS test does not reject the stationarity assumption, I (0), at the significance threshold of 5%. For the "Immigrants" series, the tests suggest a type I (2) structure - the series is non-stationary in the level and in the first difference and is stationary in the second difference. The unit root test that admits the level break rejects the unit root hypothesis, for an interruption in 2016: the value of the ADF test is -4.8778 below the critical threshold -4.4435 (for the significance level of 5%). This information will be used in specifying the models (Jula & Jula, 2019).

5.4. Modeling the link between the number of emigrants and the gross domestic product

Since the unit root tests for the "Emigrants" series are not match (ADF does not reject the unit root hypothesis, and KPSS - does not reject the stationarity hypothesis) we built an ARDL model - Distributed Lag Autoregressive. The ARDL is built in order to test the relationship between GDP and Emigrants. The advantage of this type of model is that it can be applied even when the series do not have the same integration order and, through the Pesaran test, it indicates the type of connection (between the series in level, or through an Error Correction type model).

In the ARDL model we took as an explanatory variable GDP lagged with on year:

$(Emigrants)t = f(GDP_{t-1}, X, e)$ (4)

where X symbolizes other influencing factors, and e - the error variable. This choice is motivated by the fact that the hypothesis of a contemporary link between GDP€ 2010 and the number of emigrants is rejected by the model with the probability of 69.25%. Also, considering the graphical form of the "Emigrants" series, we introduced a polynomial time function as an exogenous variable. As a method of selecting the

number of lags in the ARDL model, we opted for AIC (the default option in EViews). We also selected at 4 the maximum number of lags for the dependent variable (as well as the value suggested by EViews) and the maximum lag = 5 for the dynamic regressor. The results are presented in the following tables:

Table 7: The ARDL model of the link between the number of emigrants and the gross domestic product

Selected Model: ARDL (4, 5).
Method AIC
Data: 1995 – 2020

Dependent variable: (Emigrants)t	Coefficient	Std. Error	t-Statistics	Prob.*
(Emigrants) t-1	-0.228876	0.143384	-1.596249	0.1491
(Emigrants) t-2	0.025231	0.139143	0.181329	0.8606
(Emigrants) t-3	0.117915	0.141708	0.832094	0.4295
(Emigrants) t-4	-0.311025	0.126626	-2.456245	0.0395
(GDP€2010) t-1	-0.451096	0.127003	-3.551860	0.0075
(GDP€2010) t-2	-0.066987	0.156603	-0.427751	0.6801
(GDP€2010) t-3	-0.143743	0.156415	-0.918985	0.3850
(GDP€2010) t-4	0.133864	0.162812	0.822197	0.4348
(GDP€2010) t-5	0.411148	0.154095	2.668142	0.0284
(GDP€2010) t-6	-0.770538	0.126187	-6.106310	0.0003
t2	111.3451	13.65713	8.152896	0.0000
C	75359.16	10380.98	7.259349	0.0001

Source: Calculations in EViews based on the data in Table 2- Appendix.

The test method using the ARDL model, presents another way of economic analysis between the two factors, emigration and gross domestic product.

The long run equation for this model is:

$$Emigrants_t = X_t + \delta_1 Emigrants_{t-1} + \delta_2 GDP_{t-1} + e_t \qquad (5)$$

The cointegration coefficient is negative (-1.3968) and significantly different from zero (associated t-statistic is -9.9737). The value of the F-Bounds statistic is 24.95472, and the Pesaran-Shin-Smith limits are I (0) = 6.027 and I (1) = 6.76, for the 1% threshold. Since the F-statistic value = 24.95472 is higher than the threshold I (1) it results that the probability attached to the hypothesis that states the absence of a cointegration relationship between "Emigrants" and "GDP€ 2010" is less than 1%. We therefore accept the alternative hypothesis: the existence of a long-term relationship.

The relationship is:

$$EC : (Emigrants)_t = -0.6353 \cdot \underset{(0.1025)}{} $$
$$(GDP_{€\,2010})_{t-1} + \underset{(7660.928)}{53952.9818} \qquad (6)$$

(under estimators, in parentheses, standard deviation).

This means that, in the long run, real GDP growth attenuates the emigration trend of the population. In the short term, the relationship between emigrants and economic growth is influenced by economic factors. The long-term negative link is in line with economic theory: the trend of emigration is attenuated by economic growth in the country of origin and is accentuated by economic development in the destination country (those countries with a higher level of development than the country of origin are sought).

5.5. Modeling the relationship between the number of immigrants and gross domestic product

For immigrants, we considered the GDP of our country as a factor of influence and the number of immigrants as a dependent variable. For GDP € 2010, the stationarity tests do not reject the unit root hypothesis for the level series and reject the respective hypothesis for the series calculated by simple differentiation - the series is I (1), as described in Table 6. For the "Immigrants" series, standard unit root tests suggest a type I (2) structure, and the unit root test that admits level break (in 2016) rejects the unit root hypothesis. Given these results, we have built an ARDL model of the link between Immigrants and GDP € 2010. We have included in the model two dummy variables, for the years 2015 and 2017. The results are presented in the following table:

Table 8: The ARDL model of the link between the number of immigrants and the gross domestic product

Selected Model: ARDL (2, 0).
Method AIC
Data: 1995 – 2020

Dependent variable: (Immigrants)t	Coefficient	Std. Error	t-Statistics	Prob.*
(Immigrants)t-1	1.291550	0.227191	5.684868	0.0000
(Immigrants)t-2	-0.769621	0.239697	-3.210808	0.0044
(GDP€2010)t	0.142857	0.075374	1.895317	0.0726
D2015	-15879.10	7238.969	-2.193557	0.0403
D2017	19212.53	7254.836	2.648238	0.0154
c	-9791.643	7517.279	-1.302551	0.2075

Source: Calculations in EViews based on the data in Table 2- Appendix .

The coefficient of integration is negative (-0.4781) and significantly different from zero (the associated t-statistic is -3.5572). The value of the F-Bounds statistic is 7.0586, and the Pesaran-Shin-Smith limits are I (0) = 5.395 and I (1) = 6.35, for the 5% threshold. Since the value F-statistic = 7.0586 is higher than the threshold I (1) it results that the probability attached to the hypothesis stating the absence of a cointegration relationship between "Emigrants" and "GDP € 2010" is less than 5%. We therefore accept the alternative hypothesis: the existence of a long-term relationship. The relationship is:

$$Eq : (Immigrants) = \underset{(0.1091)}{0.2988} \cdot (GDP_{€\,2010})$$

(7)

(under the estimator, in brackets, the standard deviation)

This means that, in the long run, real GDP growth has a positive effect on immigration. In the short term, the relationship between immigrants and economic growth is influenced by economic factors.

The positive connection, stable in the long run, is in line with economic theory: the immigration trend is accentuated by economic growth in the destination country.

5.6. Modeling the link between the external migration balance and the gross domestic product

We built an ARDL model to analyze the link between Romania's GDP and the migration balance. The results are as follows:

Table 9: The ARDL type model of the link between the external migration balance and the gross domestic product

Selected Model: ARDL (1, 0).
Method AIC
Data: 1995 – 2020

Dependent variable: $(Balance)_t = (Immigrants)_t - (Emigrants)_t$	Coefficient	Std. Error	t-Statistics	Prob.*
$(Immigrants)_{t-1} - (Emigrants)_{t-1}$	0.463746	0.193152	2.400938	0.0257
$(GDP€2010)_t$	0.670100	0.314842	2.128371	0.0453
$(GDP€2010)_{t-1}$	-0.494551	0.335047	-1.476063	0.1548
C	-20750.65	11593.25	-1.789891	0.0879

Source: Calculations in EViews based on the data in Table 2-Appendix.

The cointegration coefficient is negative (-0.5362) and significantly different from zero (the associated t-statistic is -2.7763). The value of the F-Bounds statistic is 2.9522, and the Pesaran-Shin-Smith limits are I (0) = 4.09 and I (1) = 4.66, for the 5% threshold. Since the value F-statistic = 2.9522 is lower than the threshold I (0) it results that the probability attached to the hypothesis that states the absence of a level relationship between "Balance = Immigrants - Emigrants" and "GDP€2010" is less than 5%. Consequently, we reject the hypothesis of a cointegration relationship and accept the hypothesis of a level relationship, of the type described in this relationship:

(Immigrants)t - (Emigrants)t = –20750.6453 + 0.4637·(Immigrants)t - (Emigrants)t-1   (8)

+ 0.6701·(GDP€2010)t – 0.4945·(GDP€2010)t

(t-statistic associated with estimators is shown in Table 9). The steady state equation is:

(Immigrants)t - (Emigrants)t = –38695.5341 + 0.3274·0.6701·(GDP€2010)t   (9)

This means that, in the long run, macroeconomic dynamics have a positive effect on the flow of external migration: the positive impact on migration outweighs the negative effect on emigration.

6. Conclusions

As a result of the descriptive analyzes carried out previously, we find that in Romania migration is encountered on a large scale, after the fall of the communist regime, this becoming a significant phenomenon. According to the Romanian National Institute of Statistics, after the 1989 revolution and as a result of the opening of the country's borders, Romania registered increased values of international migration. In the first part of the period, migrants had causes related to nationality: the largest share of migration is made up of emigrants, who are largely ethnic Germans, Hungarians or Jews. Later, the restrictions imposed on Romania's borders regarding the introduction of visas and work permits, led to a decrease in the rate of permanent migration, in contrast to the rate of temporary migration which has experienced an unprecedented explosion, which could turn into a worrying phenomenon, with major social, economic and psychological implications.

Analyzing the dynamics of the migration phenomenon in terms of the Gini-Struck coefficient, we can deduce that people who decide to emigrate are from all age groups, whether we are talking about people in the category of children or adolescents, young people or people of second and third age. Based on socio-economic considerations and attracted by well-paid jobs, our country offers abroad both highly trained people, who stand out abroad and bring prestige to Romania's image, but also less qualified staff, who integrate into the labor market from the host country, in areas of activity less sought after by the local population.

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Appendix

Table 1: Internal migration determined by the change of domicile, by means of residence

Years	Immigrants		Emigrants	
	To the urban area	To the rural area	From the urban area	From the rural area
1990	691803	94668	170381	616090
1991	185459	77444	79670	183233
1992	186172	107010	111471	181711
1993	144994	95237	96084	144147
1994	149712	117033	117368	149377
1995	148333	141158	135833	153658
1996	152585	140294	148902	143977
1997	144034	158545	156622	145957
1998	132472	143682	150470	125684
1999	131138	144561	157758	117941
2000	105614	138893	140552	103955
2001	148066	136266	157556	126776
2002	154801	166018	179497	141322
2003	167395	164352	190880	140867
2004	174447	195445	214001	155891
2005	136840	135764	157377	115227
2006	176100	157925	194749	139276
2007	175666	198490	213668	160488
2008	185948	203306	232105	157149
2009	166853	163819	193120	137552
2010	236502	222493	273353	185642
2011	164019	160607	194248	130378
2012	181194	191003	225107	147090
2013	182393	168163	211080	139476
2014	189956	181721	222203	149474
2015	183170	177913	211939	149144
2016	191484	197889	229822	159551
2017	198689	181513	220995	159207
2018	203988	182286	223153	163121
2019	211928	191293	231407	171814

Source: The author's calculation, data collected from the Statistical Yearbook of Romania - Time Series (1990-2019), 2021 ed.

Table 2: Romania's gross domestic product, the number of emigrants and the number of immigrants in the period 1995-2020

Years	GDP (million euros 2010)	Emigrants (people)	Immigrants (people)	Balance (people)
1995	83899.5	25675	4458	-21217
1996	87178	21526	2053	-19473
1997	82950.7	19945	6600	-13345
1998	81267	17536	11907	-5629
1999	80960.8	12594	10078	-2516
2000	82953.5	14753	11024	-3729
2001	87282.1	9921	10350	429
2002	92259.8	8154	6582	-1572
2003	94419.8	10673	3267	-7406
2004	104266	13082	2987	-10095
2005	109133.3	10938	3704	-7234
2006	117895.4	14197	7714	-6483
2007	126423.7	8830	9575	745
2008	138190.5	8739	10030	1291
2009	130566	10211	8606	-1605
2010	125472.3	7906	7059	-847
2011	127863.9	18307	15538	-2769
2012	130473.2	18001	21684	3683
2013	135393.3	19056	23897	4841
2014	140279.2	11251	36644	25393
2015	144422.6	15235	23897	8662
2016	151214.8	22807	27863	5056
2017	162282.9	23156	50199	27043
2018	169544.3	27229	65678	38449
2019	176542.2	26755	64479	37724
2020	169728.8	21031	32250	11219

Source: GDP€ 2010: Eurostat, GDP and main components (output, expenditure and income) [table nama_10_gdp - Gross domestic product at market prices, Chain linked volumes (2010), million euro.

Emigrants: National Institute of Statistics, Tempo Online, table POP309A (Definitive emigrants by sex, macro-regions, development regions and counties of departure).

Immigrants: National Institute of Statistics, Tempo Online, table POP310A (Definitive immigrants by sex, macro-regions, development regions and counties of arrival).

Balance: The migratory balance is calculated as the difference between Immigrants and Emigrants, for each year.