

# CHARACTERISTICS OF THE POPULATION OF ROMANIA DURING 1990–2013

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## **Abstract**

The population of Romania has known a distinctive dynamics, especially after 1990. In this article we intend to analyze the evolution of several demographic indicators, emphasizing the main causes of these evolutions – negative natural increase, international migration. Moreover, certain determinants of these variations such as demographic aging of population, changes in the age structure of population and by age groups are described. Social movements, political changes, economic growth and decline are reflected in the population demographics of a country, hence in the evolution of birth rates and fertility, mortality, marriages and divorces and of the internal and external migration. In time, the evolution of these demographic phenomena leads to a more or less articulated change of the population pyramid of the resident population.

In this article we present the population pyramid of the resident population of Romania in the years 2002 and 2013, highlighting four distinct phases of the demographic evolution.

**Keywords:** demographics of Romania, migration, population structure.

## 1. Introduction

Demographic change is a prominent phenomenon of the present society, having major implications at social and economic level. Phenomena like the ageing of the population, decrease of fertility rates or international migration represent widely debated issues in demographic studies (Coleman and Rowthorn, 2011).

The population of Romania has known a great dynamics after the political changes from 1989 which had major implications at social and economic level (Muresan and Rotariu, 2000). During this time period, the main causes of the demographic evolutions recorded have been the negative natural increase (Ghețău, 2012) as well as international migration (Ghețău, 2005; Sandu, 2010). The negative natural increase has not been characteristic only for the population evolution of Romania, but also for other countries (Lesthaeghe and Willems, 1999). However, since 1989 Romania has one of the lowest total fertility rate worldwide (Rotariu, 2006b). International migration, which also had an influence on the dynamics of the population, has been recorded not only in Romania, but also in the neighboring countries (Aliu, 2013). Thus, in 2004 it has been estimated that after the year 1989 approximately 15% of the total population from the Western Balkans has been part of the migration process due to various reasons – ethnic or economic reasons (Baldwin-Edwards, 2004). Migration, especially among working age population, may lead to the situation in which companies from Romania have to employ immigrants from other regions of the world (Silasi and Simina, 2007) due to reduced access to labor force on the local labor market.

After 1989, the demographic evolutions have generated other phenomena with socio-economic implications, namely aging of population (Rotariu, 2006a). A perpetuation of the current demographic trends might lead to a considerable decrease of the population of Romania. It is estimated (Ghețău, 2004) that by 2050 the population might decrease under 16 million inhabitants.

The structure and dynamics of the population, the aging of population and the migration phenomena are widely studied by Rotariu (2009) and Ghețău (2012) while international migration is analyzed by Sandu (2010), Ghețău (2012), Rotariu and Mezei (1999) and Kurkó (2011).

The present study covers several characteristics of demographic changes in Romania. Hence, the second section covers the evolution of the population of Romania during 2002-2013, highlighting the determinants which led to decrease in population. The third section describes the population pyramid in 2002 compared to 2013, emphasizing four important phases in the evolution of the population of Romania. Section four presents the structure by gender of the population of Romania in 2002 in contrast to 2013, while the fifth section focuses on international migration emphasizing the difficulties in estimating its evolution in time. The present study ends with a series of conclusions which point out the main demographic changes during 1990-2013.

## 2. General characteristics of the population

The resident population of Romania at 1<sup>st</sup> of January 2013 has been 20.02 million inhabitants (out of which 9.76 million males and 10.26 million females), being approximately equal to the population registered on the 1<sup>st</sup> of July 1969 (20.01 million persons, out of which 9.8 million males and 10.2 million females) (INS, 2013b).

The high level of international migration recorded after 1989 has generated major difficulties in estimating the resident population of Romania between the two Population and Housing Censuses (PHC). For 2002 to 2013 INS has determined the resident population according to international methodology and regulation in this field. Therefore, the resident population 'includes all the persons who have the habitual residence in Romania for at least 12 months' (INS, 2014b). Through this approach, the data have been estimated based on the final result of the Population and Housing Census 2011 (PHC) (INS, 2013b) and do not cover Romanian citizens which are abroad for at least 12 months. The following paragraphs describe some characteristics of the resident population's dynamics in Romania during 2002-2012, and also throughout the transition period from 1990 to 2012.

The population of Romania at 1<sup>st</sup> of January 2013 is the result of the evolution of birth rate, mortality and international migration over the last 23 years. Table 1 shows the resident population of Romania at January 1<sup>st</sup> by gender and by year.

**Table 1:** The resident population of Romania on January 1<sup>st</sup> 2013

Year	Total	Male	Female
2002	21,723,710	10,566,277	11,157,433
2003	21,627,509	10,515,783	11,111,726
2004	21,521,142	10,468,871	11,052,271
2005	21,382,354	10,401,382	10,980,972
2006	21,257,016	10,343,704	10,913,312
2007	21,130,503	10,284,720	10,845,783
2008	20,635,460	10,007,552	10,627,908
2009	20,440,290	9,910,000	10,530,290
2010	20,294,683	9,836,634	10,458,049
2011	20,199,059	9,791,269	10,407,790
2012	20,095,996	9,746,592	10,349,404
2013	20,020,074	9,761,480	10,258,594

**Source:** National Institute of Statistics

During 2002-2012, the resident population of Romania has decreased with over 1.7 million inhabitants. Expressed in percentage, the decrease has been of 7.8%. The negative natural increase average annual rate of -0.74% highlights a decrease of the resident population of Romania compared to -0.52% for the timeframe 1990-2002.

The decreasing trend of the resident population of Romania during the transition period from 1990 to 2012 has three main causes.

Firstly, it relates to the unprecedented dimension of external migration considering the modern history of Romania. Hence, in this timeframe more than 77% of

the resident population negative natural increase of 3,110,724 inhabitants has been due to external migration. International migration has generated an average annual decrease by about 104.2 thousand inhabitants of the resident population of Romania.

The second important factor which had a contribution in reducing the resident population has been the decrease of live births from 314,746 in 1990 to 180,714 in 2012 (INS, 2014a). During this time period the birth rate has dropped from 13.6 live births per 1,000 inhabitants to 9.0 in 2012 (INS, 2014a). In 1990 the number of births has dropped with almost 15% compared to 1989 as a result of legalizing abortion and of promoting contraceptive methods, hence choosing a different type of familial planning.

The third factor refers to the high level of deaths recorded in this time frame. In 2012, 6,630 more deaths have been registered than in 1990 (INS, 2014a). Over this time period an increase of death rate per 1,000 inhabitants from 10.6 in 1990 to 12.6 in 2012 has been recorded.

During 2002-2012, the decrease of the resident population of Romania has been reduced by 23% due to the negative natural increase of the population and due to external migration by 77%.

If for the following time period the current negative trend of the resident population continues as for 2002-2012, than the resident population will drop to 18.3 million inhabitants in 2025, and to 15 million inhabitants in 2050.

### **3. The population pyramid**

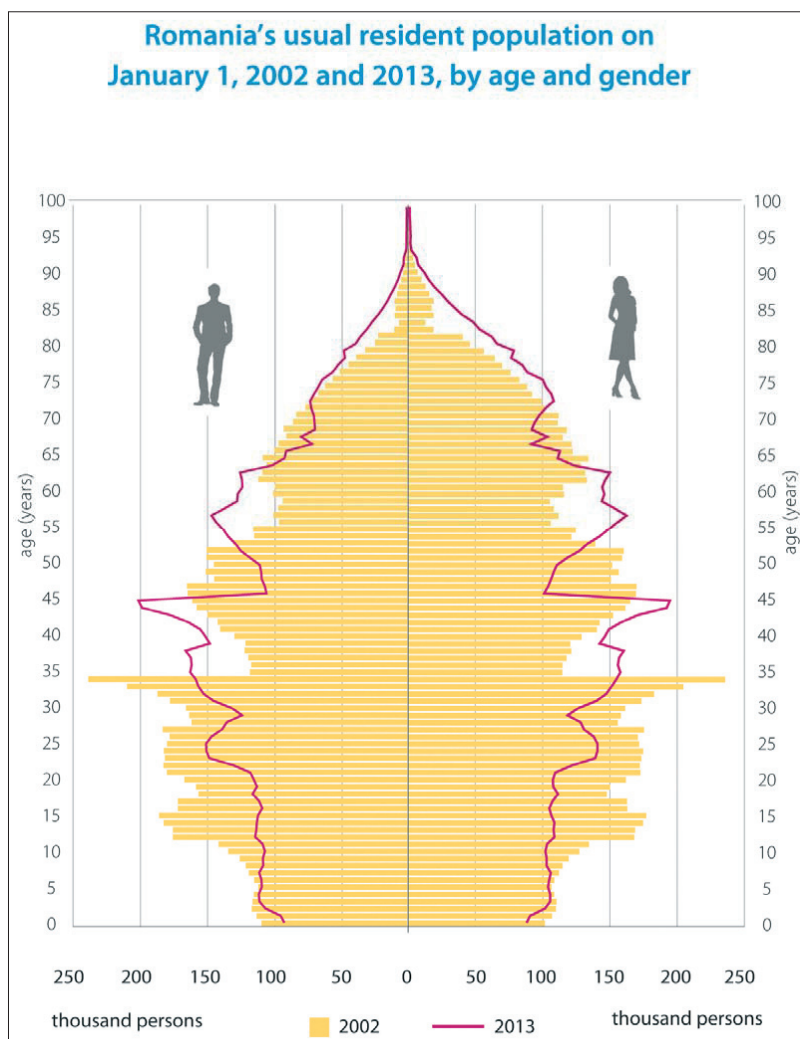
The population pyramid or age pyramid is a useful tool in studying the population of a country. Through this instrument we highlight the influence of economic and political factors on demographic characteristic regarding the population of a country. The population pyramid shows, both for men and women, the population structure by age 0 to 100 years.

The history of a country engraves wars, social movements, political changes, economic growth and decline. All these are reflected in the demography of a nation, hence in the evolution of fertility, births, deaths, marriages and divorces and of the internal and external migration.

In time, the evolution of these phenomena leads to more or less pronounced changes of the resident population pyramid.

Figure 1 describes the population pyramid of the resident population of Romania at January 1<sup>st</sup> 2002 and 2013. The population pyramid at January 1<sup>st</sup> 2013 highlights four important phases of the evolution of the population in Romania.

1. First of all, the births deficit as a result of the Second World War is highlighted.
2. The second important period is the one between 1957 and 1966 during which the birth rate has been diminished due to the liberalization of abortion and the reduced contingent of women born during the Second World War. Throughout this period, the birth rate decreased continuously reaching a minimum of 14.3 live births per 1,000 inhabitants in 1966 (INS, 2014a). During this period there



**Figure 1:** The resident population of Romania on January 1<sup>st</sup> 2002 and 2013

**Source:** Authors' computations based on the National Institute of Statistics' data

has been a natural decrease. Infant mortality, measured as the number of deaths under one year per 1,000 inhabitants has been higher than 44.1 during the entire period.

3. Starting with 1966 a peculiar period in population demographics can be noticed along with the prohibiting of abortion and the pro-natality policies promoted by the communist regime. The first effect of the measures taken in 1966 has been the increase of live births from 273,678 in 1966 to 527,764 in 1967 (INS, 2014a). During the time periods 1967-1970 and 1974-1979 the annual percentage increase of live births compared to 1966 has been more than 50%. Throughout the period 1967-1989 the annual number of live births has been at least 25% higher than in 1966. For this period, the average annual number of live births has been over

400 thousand. The annual live birth rate dropped from 27.4 live births per 1,000 inhabitants in 1967 to 16.0 in 1989. Throughout the entire period the infant mortality rate decreased from 59.5 in 1968 to 26.9 in 1989.

4. The political changes from 1989 caused a radical change in family planning and an increase in the intensity of international migration. The live births of 275,275 persons in 1991 represent only 75.6% of all live births recorded in 1989. The birth rate has constantly decreased since 1989 reaching only 10.0 live births per 1,000 inhabitants in 2012 (INS, 2014a). The 180,714 live births in 2012 represent only 66.0% of the level recorded in 1966. Infant mortality has dropped significantly during this time period, from 26.9 in 1990 to 10.0 in 2012. Nevertheless, the value is much higher compared to the European Union average of 3.9% (EUROSTAT). Given the decrease of birth rates and the increase of death rates, 1992 marks the first year for which a negative natural increase has been recorded after the Second World War. If in 1992 the indicator has been -0.2 it reached -3.6 by 2012. That is to say that a population of 20 million is to be diminished by 72 thousand people due to only natural causes.

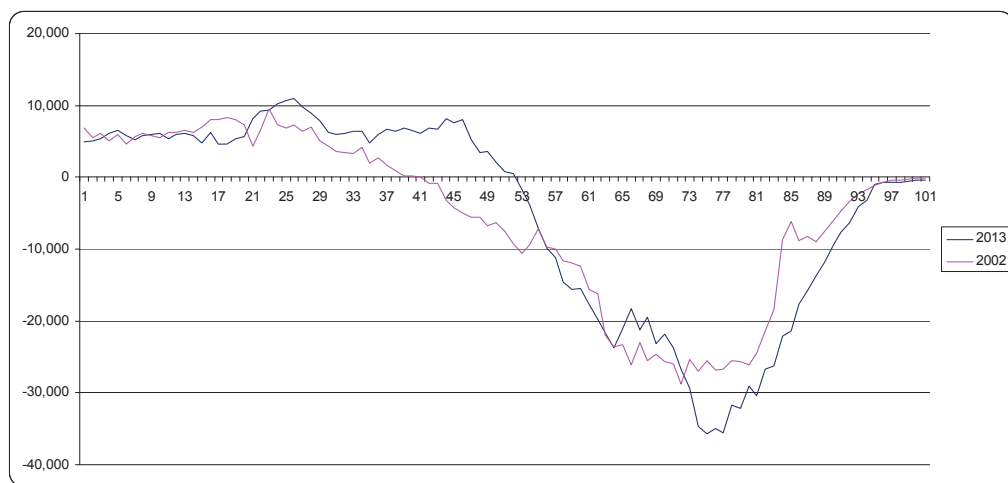
Over the past 24 years, the result of demographic changes has emphasized the aging process of the population (Rotariu, 2006a). The average age of the resident population of Romania increased from 37.8 years in 2002 to 40.9 years in 2013. Moreover, during this period the age structure of the resident population has changed. For example, the share of the resident population aged 15-24 years decreased in 2013 to 12% compared to 16% in 2002. The share of population aged over 65 has increased from 14% in 2002 to 16% in 2013, while the share of the population in the age group of 25-64 years increased from 52% in 2002 to 58 % in 2013, but the latter one as a result of the decrease by 7.8% of the resident population.

#### **4. Population by gender**

One important characteristic for analyzing the population of Romania after 1990 refers to the distribution of the population by gender and age. If at the beginning of the 1990s the male population represented 49.3% of the total population, the share dropped to 48.7% by the end of the period. The differences between the number of males and females by age for the resident population of Romania at January 1<sup>st</sup> 2002 and 2013 (INS, 2013a), shown in Figure 2 emphasize the following:

- Up to age of 40 years in 2002 and to 50 years in 2013, the number of men exceeds the number of females. This is mainly due to the higher number of births among boys. For every 100 girls around 105 boys are born;
- Over the time period analyzed an increase in age of population can be noticed, in particular 40 to 50 years, for which the number of men equals the number of women. A possible explanation would be the increase of external migration among females in recent years;
- Over the age of 50, for each age level of the population pyramid, a greater number of women than men on January 1<sup>st</sup> 2013 can be noticed. This is explained by

the higher mortality rate among men than women after the age of 50. An immediate consequence of this situation is the large difference in life expectancy in 2012 between men and women. For women the life expectancy is 77.9 years while for men 70.7 years.



**Figure 2:** Difference between number of men and women by age of the resident population at January 1<sup>st</sup> 2002 and 2013

**Source:** Authors' computations based on the National Institute of Statistics' data

## 5. International migration

The data on international migration in Romania have been computed by INS according to the European Union Regulation no. 862/2007. Thus, the number of emigrants and immigrants of a country is determined considering the habitual residence and the 12 months limit. Accordingly, a person is considered a Romanian emigrant if 'he had his previously habitual residence in a EU member state and ceases to be a resident in the respective member state for a period that is, or is expected to be at least 12 months'.

During the transition period, Romania had major problems in estimating migration. It is not random that the three censuses held in Romania during the transition period (1992, 2002 and 2011) revealed significant differences between the population assessed statistically before the census and the exhaustive population recorded at the census. To support the above statement, the next paragraphs present the results for the last five PHC in Romania, for the population last estimated before the census, the population after the census and the difference between these two values. This difference may be attributed to the natural change of the population as shown by administrative sources (births, deaths, international emigration and immigration) between the publication of the last results before the census and the recorded values through the exhaustive research or it may be due international migration which is not recorded.

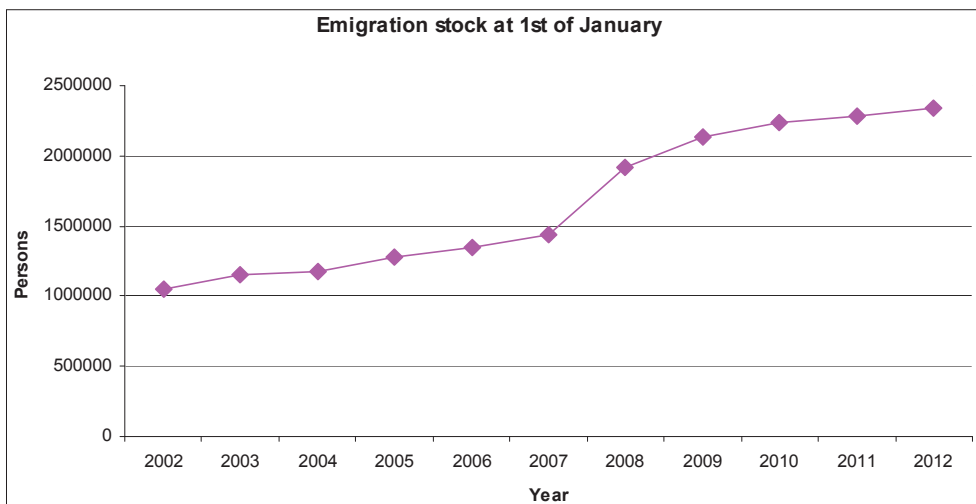
For the five PHC the following results were recorded ([www.recensamantromania.ro](http://www.recensamantromania.ro)):

- At the Population and Housing Census on 15<sup>th</sup> of March 1966 19,103,163 inhabitants have been registered, while the resident population on July 1<sup>st</sup> 1965 has been 19,027,367 inhabitants. The difference of 75,796 people between the two time periods is explained by the positive natural increase of 6.0% of the population recorded in 1965.
- At the PHC on January 5<sup>th</sup> 1977 the population has been of 21,559,910 inhabitants, while six months before, on the 1<sup>st</sup> of July 1976, the population has been 21,445,698 inhabitants. If during the six months that have elapsed between the 1<sup>st</sup> of July 1976 and the time to which the results of the census refer to, the population would have increased at the level of the annual absolute natural increase recorded in 1975, of 10.4, then the absolute growth of the population would have been approximately 115,176 inhabitants. This value does not differ significantly from the difference between the population registered on July 1<sup>st</sup> 1976 and the population registered at the census, namely 114,212.
- Analyzing the data from the PHC in 1992 compared to the period before the census, a decrease of the population by 375,049 inhabitants has been registered as the population on July 1<sup>st</sup> 1991 has been 23,185,084 inhabitants and the population registered at the census on January 7<sup>th</sup> 1992 has been 22,810,035 inhabitants. According to official statistics, the magnitude of migration in 1991 has been of 44,160 people. If migration, births and deaths would have been evenly distributed throughout the year 1991, then a difference between the data before the census and the data from the census should have been of 72 thousand persons. Considering these results we can estimate for Romania a 470 thousand stock of external migration for the first two years after the political changes, hence an underestimation of the migrant population by approximately 330 thousand persons.
- The resident population registered at the 2002 PHC census on March 18<sup>th</sup> has been 21,680,974 people while the statistics from July 1<sup>st</sup> 2001 estimated a population of 22,408,393. The difference of -727,419 between the two values highlights an overestimation of the resident population of Romania. The following assumptions have been considered to assess the existing overestimation: the same negative natural increase of the population of -1.8 persons per 1,000 inhabitants, as for the year 2001 is considered throughout the eight months between the two reporting time periods; during the years 2001 and 2002 external emigration is evenly distributed. Due to the negative natural growth the resident population decreased by nearly 27 thousand people, while due to the external emigration the resident population of Romania decreased by 6,400 people. In these circumstances, the resident population recorded in the census was supposed to be approximately 22,402 thousand inhabitants. The difference of almost 408,000 people is explained by external migration, which could not be recorded, in the timeframe between the two censuses.

- The PHC from October 20<sup>th</sup> 2011 registered a resident population of 20,121,641 people, smaller than the resident population from July 1<sup>st</sup> 2011 of 21,354,396 inhabitants. Between the two values, there is a difference of 1,232,755 people which highlights an overestimation of the resident population of Romania due to undervaluation of international migration.

Based on a methodology developed in accordance with the European Union Regulation no. 862/2007, the external migration of Romania for the time period 2002-2012 was estimated in 2013. Figure 3 highlights the important features of the emigration in Romania:

- During the timeframe considered the external migration of Romania has known a continuous increase. Compared to 2002, in 2012 2.2 times more Romanians have been abroad for at least one year;
- An increase of external migration has been registered since Romania joined the European Union. If in 2007 the number of Romanians working abroad for a period of at least one year was 6.3% higher than the previous year, in 2008 the annual growth was over 33%.
- Since 2009 the annual growth rate of Romanians living abroad for at least one year has decreased. If during 2002-2008 the average annual increase of Romanians living abroad for at least one year was 10.5%, for the timeframe 2009-2012 the average annual increase dropped to 3.1%. Under these conditions at the end of 2012, the number of Romanian emigrants was 2.34 million people, while on the January 1<sup>st</sup> 2002 it was 1.055.423 people.



**Figure 3:** Number of Romanians living abroad for at least one year registered at 1<sup>st</sup> of January for the time period 2002-2012

**Source:** Authors' computations based on the National Institute of Statistics' data

Assessing migration should be seen not only in terms of the number of people who are abroad for a period of at least 12 months, but also in terms of its structure by age, sex, country of destination etc.

As for the analysis of the resident population, the population pyramid can be a useful tool in the evaluation of the migrants stock of Romania at a given time. Figure 4 shows the population pyramid for migrants from Romania registered on 1<sup>st</sup> of January 2002 and 2012. The two charts highlight some important features of emigration from Romania in the time period considered.

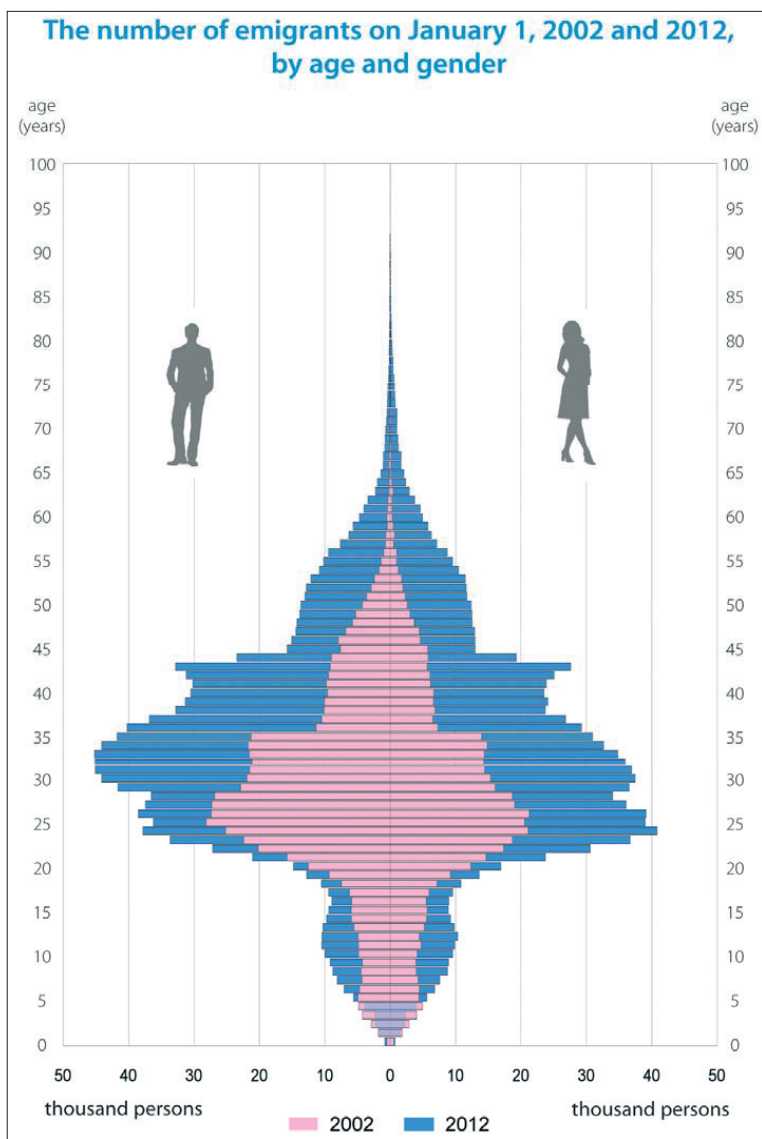


Figure 4: Stock of emigrants at 1<sup>st</sup> of January 2002 and 2012

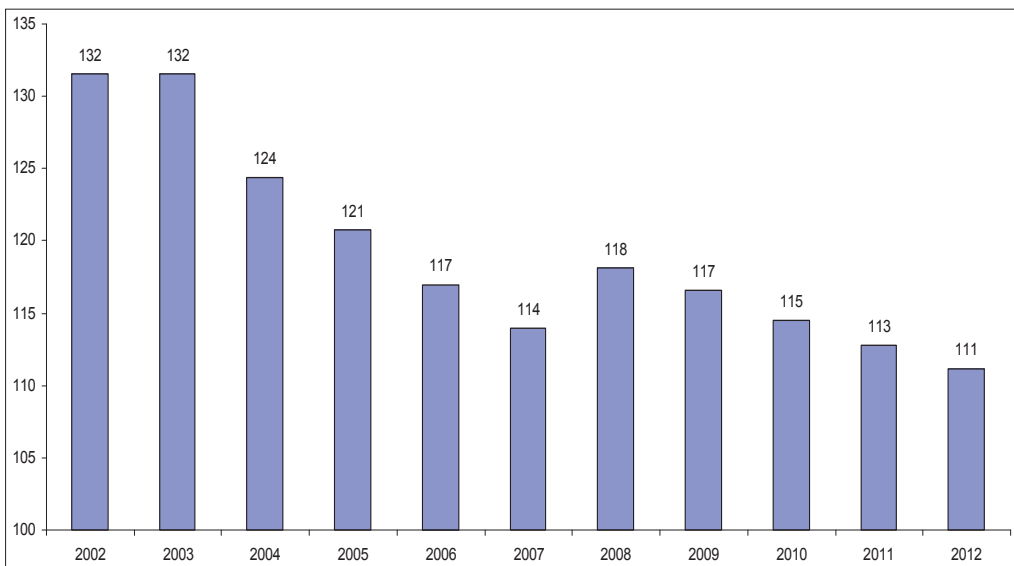
Source: Authors' computations based on the National Institute of Statistics' data

The first feature is related to the magnitude of the phenomena. Thus, during the time period considered a significant increase in the stock of emigrants was recorded. Migration has increased in intensity and the number of emigrants rose to 2,341,263 people in 2012 compared to 1,055,423 emigrants in 2002 (INS, 2014b).

A second feature relates to the changing of the ratio between men and women gone abroad for more than one year during 2002 and 2012. At the beginning of the period, for 100 women 132 men migrate, however this ratio has changed continuously reaching at the end of the reporting period 111 men (INS, 2014b).

A third important feature concerns the distribution by age and age groups of the stock of emigrants at the two moments in time. Both at 1<sup>st</sup> of January 2002 and 2012 the working age population has the largest share in the total stock of emigrants. The ratio increased in time as in 2002 the share of people aged 25-64 years in the total stock of emigrants was 68% and increased to 76% in 2012 (INS, 2014b).

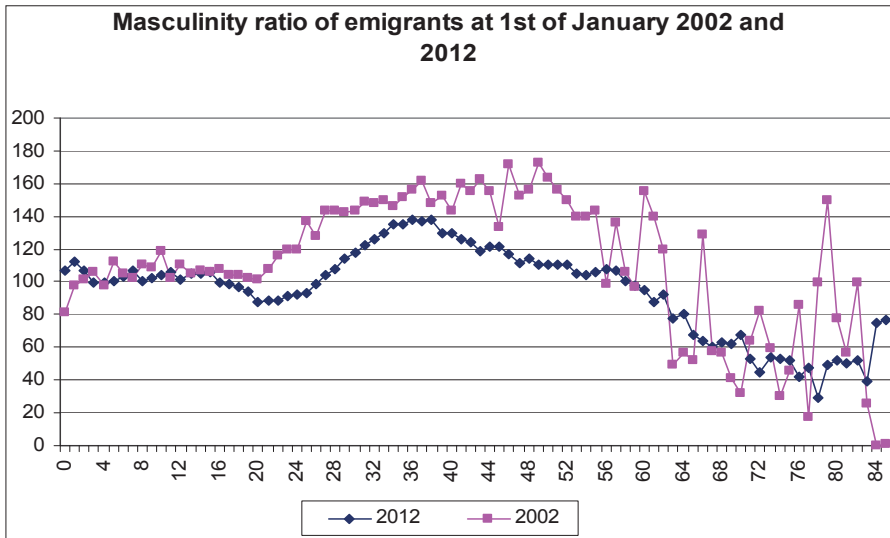
The masculinity ratio per age, computed as the ratio between the number of males and females for each age multiplied by a one hundred, and illustrated in Figure 5, highlights for 2012 a greater weight for the age group 27-57 for men in relation to women. For 2002 this feature can be noticed for the age group 21-58 years.



**Figure 5:** The number of men abroad per 100 women for more than 12 months in the period 2002 – 2012

**Source:** Authors' computations based on the National Institute of Statistics' data

Figure 6 emphasizes the decrease of the masculinity ratio for working age population, showing at the same time an increase of the migration among women. For 2012 we notice that after 60 years the number of women which are abroad is greater than compared to the number of men.



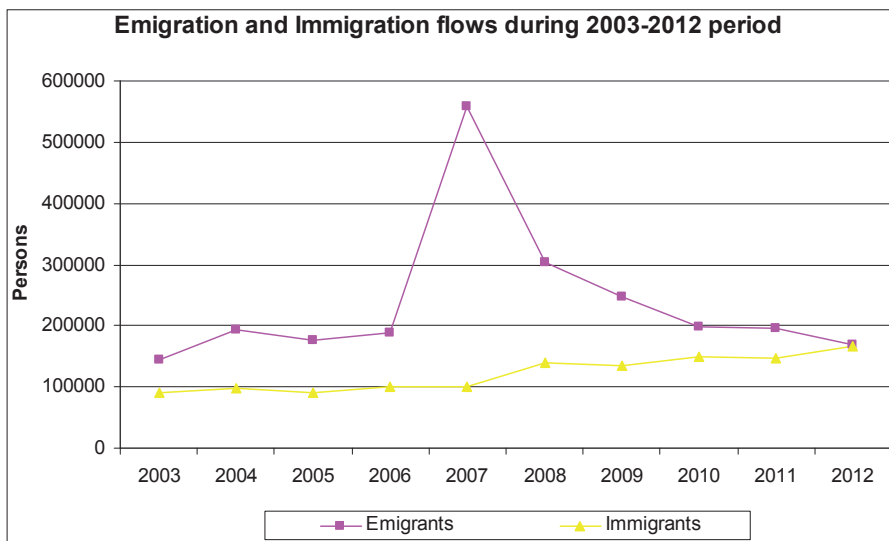
**Figure 6:** The masculinity ratio of emigrants at 1<sup>st</sup> of January 2002 and 2012 by age

**Source:** Authors' computations based on the National Institute of Statistics' data

For the time period 2002-2012 the emigrants and immigrants flows, namely the number of people who left and arrived in Romania during a year, as shown in Figure 7, but who stayed or intended to stay more than one year differ. Joining the European Union has led to an increase in the number of Romanians working abroad for a period exceeding one year. The phenomenon is highly intense in the first two years after joining the European Union, but decreased in intensity in the coming years. Throughout the period 2007-2012 there is a sharp decrease in the number of emigrants and a not very pronounced growth in the number of immigrants (INS, 2014b). In 2012, the number of departures represented only 30% of the value recorded in 2007, while immigration in this period increased by 66.8%. The year 2012 marked a balance between the number of emigrants and immigrants in Romania.

Analyzing the distribution of Romanian emigrants by countries during 2002-2012 highlights the following:

- The largest share of emigrants chose to go to Italy or Spain. In 2002 around 38% of Romanian migrants were living in Spain and 33% in Italy. In 2012 the share of Romanian migrants in the two countries rose at 80%, as the percent of migrants living in Italy increased to 46% and dropped to 34% in Spain;
- The number of Romanian emigrants increased both as an absolute value and as a percentage in Germany (from 5% in 2002 to 7% in 2012), UK (from 1% to 4%) and Belgium (from 1% to 2%).



**Figure 7:** Emigration and immigration flows in 2003-2012

**Source:** Authors' computations based on the National Institute of Statistics' data

## 6. Conclusions

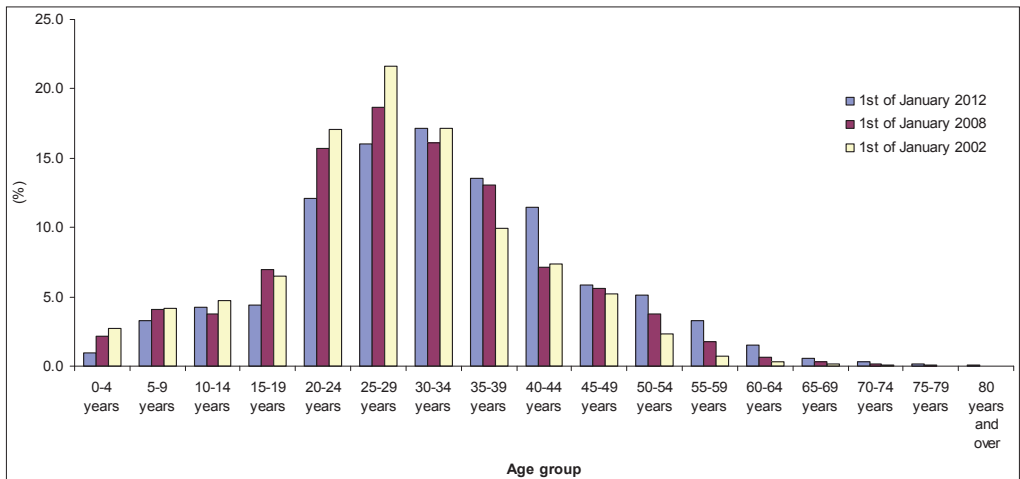
When analyzing the statistical data on the population from Romania for the time series of 1990 – 2012, a series of observations are identified with regard to the demographic evolution in this timeframe.

*The first observation relates to the continuous decrease of the stable population of Romania in the analyzed timeframe.* While on 1 July 1990, statistics recorded a resident population of 23,206,720 people, this was reduced to 20,095,996 people by January 1, 2012. The absolute decline in the time span considered was of 3,110,724 people, which is equivalent to an average annual decrease of 0.57%. In absolute values, we can say that Romania's population was reduced on average each year by about 125,000 people. This decrease was mostly due to concomitant action of two factors. The first and most important is the international migration, and the second is the reduction of the birth rate caused by liberalization of abortion and the population transition to a new family planning.

*A second important observation relates to the substantial change in the population structure by age and age groups.* In this case migration and birth rates again had predominant role. It should be noted that migration had the most important role in changing the shape of the population pyramid throughout the transition period.

*Another important observation regarding the dynamics of the Romanian population is the increasing migration throughout the transition period and a significant change in its distribution by age groups.* While by the end of the analyzed timeframe there was a balance of emigration and immigration, during the period 2002-2012 there was an increasing number of departures abroad of people aged 25-64 years compared with

other age groups. The largest share of emigration is represented by people in the working age group between 25-64 years. In the year 2012 this age group represented 74% of total emigration, while in 2002 the value of this indicator was of 65% and in 2008 this age group accounted for 65%. The graph from Figure 8 shows the distribution of emigration from January 1, 2002, 2008 and 2012 by age groups. The data from this chart highlight even more the important share that the young population from working age groups holds in the emigration process. On January 1, 2012 the age group between 20 and 39 years represented 58.8% of the total emigration from Romania.

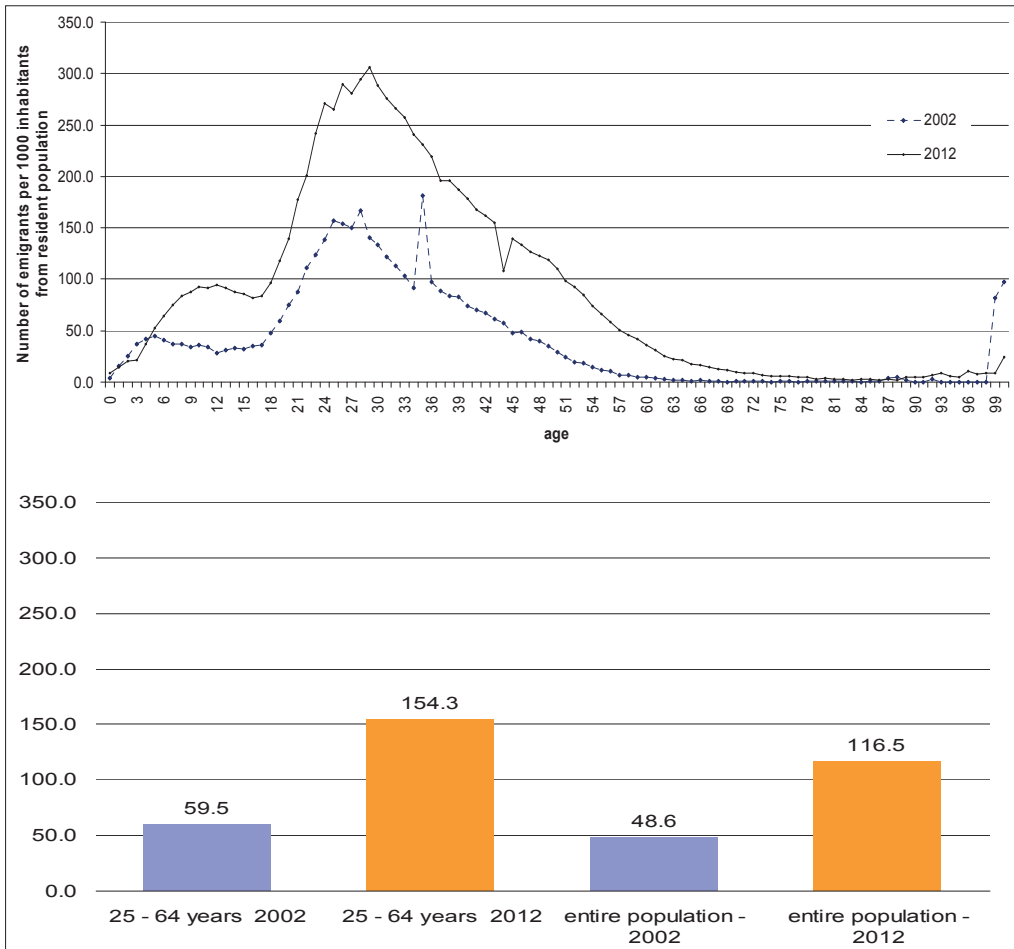


**Figure 8:** Distribution of emigrants on January 1, 2002, 2008 and 2012 by age groups

**Source:** Authors' computations based on the National Institute of Statistics' data

As a result of increasing emigration for certain age groups, the ratio of the number of migrants per 1,000 persons in the resident population by age and age groups has changed considerably during the period 2002-2012. The graphical representation from Figure 9 highlights the following key aspects:

- While in 2002 the number of emigrants per 1,000 inhabitants of the resident population of Romania was 48.6, the value of indicator increased to 116.5 by 2012;
- Calculating this ratio for the age group 25 to 64 years reveals an increasing trend of emigration amid the reduction of the stable population of this age group. Thus, if the indicator was equal to 59.5 in 2002 this increased to 154.3 by 2012. It should be noted that in the year 2012 for 1,000 people aged 30, more than 300 people of the same age were abroad for at least one year. For ages between 22 and 36 years the value of this indicator is higher than 200, and for the ages between 37-43 years is more than 150.



**Figure 9:** Number of emigrants per 1,000 persons of the resident population by age and age groups in 2002 and 2012

**Source:** Authors' computations based on the National Institute of Statistics' data

Towards the end of this period, a balance between the number of emigrants and immigrants is reached, given that a major imbalance continuously manifested between the two categories of population throughout the period. The year 2007 represented for Romanians the peak of departures abroad for durations longer than one year, the number reaching 558,074 people. However, the year 2012 marked a balance, as the difference between the number of emigrants and immigrants was of only 3,000, given that in 2007 it was of 458,000 people.

The increase in the dimension of external migration mainly for the population of working age will generate major problems in a medium and long run on the labor market, in funding the retirement system and in funding the social services in general.

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