# SPATIAL AND TEMPORAL PATTERNS OF POLARIZATION AND POPULATION DECLINE IN ROMANIA'S DEMOGRAPHY: 1992-2018

**Giorgian GUȚOIU**
Assist. Ph.D.
"Lucian Blaga" University of Sibiu
giorgian.gutoiu@ulbsibiu.ro

**Abstract***: After 1990, Romania experienced an important demographic decline. This transformation developed within the economic context of global capitalism. The present paper argues that this economic context causes significant spatial demographic disparities as the demographic decline does not occur uniformly across the country because of the economic polarization through which some areas concentrate more wealth than others. The spatial demographic differences are explored from a longitudinal perspective for the 1992-2018 period at the geographic level of 41 counties and the capital of Bucharest. Three important demographic phenomena are discussed: depopulation, internal migration and aging. The spatio-temporal evolution of these three is analyzed in correlation with the spatial economic polarization. Results indicate that the spatial economic polarization influences across time the spatial inequalities developed in the evolution of depopulation, internal migration and aging in Romania. Bucharest and other richer counties such as Cluj, Iași and Timiș show lower rates of depopulation or even display some growth, higher numbers of internal migrants and lower rates of aging.*

**Key words**: *Romania; spatial demography polarization; population decline; global capitalism.*

## Introduction

After the fall of the communist regime, Romania embarked on a trajectory of economic development under the neoliberal and global capitalism political project. This development has been stronger since the 2000s, as Romania has followed a more moderate economic transition during the 1990s. Within this current economic context, the circulation of global capital has a creative destruction impact by generating important social inequalities and differences at many geographic scales (global, national, regional, local) (Brenner & Theodore, 2002; Harvey, 2006; Stiglitz, 2012).

The present paper analyses the spatio-temporal demographic inequalities inflicted by this economic context on Romania's counties (județe) – the main administrative territorial units within the country. We expect important spatio-temporal demographic inequalities, as more developed counties should attract more workforce and younger populations at the expense of the poorer areas, which, in turn, would experience demographic shrinkage (Gregory & Patuelli, 2015). Our hypothesis states a clear influence of the economic context on the spatio-temporal

demographic phenomena. The few studies dealing with the spatial demography of Romania and its relation with the economic context explore the changes only for the first two decades, up to the last national census in 2011 (Benedek & Torok, 2014; Nancu, Guran-Nica & Persu, 2010; Istrate, Muntele & Bănică, 2015). The present paper uses more recent data (2017 and 2018).

The spatial economic polarization at regional or county level was researched in previous studies and constitutes an important matter of interest within Romania's economic geography (Goschin, 2017; Oțil, Miculescu & Cismaș, 2015; Török, 2019). In the present paper we also include a section regarding the economic context. In this regard, we provide data on the inequality between each county's share from national GDP. The aim here is to provide the reader with a detailed account on the economic context and the spatial economic inequalities between counties.

Romania's post-socialist demography is marked mostly by a deep drop in population number, influenced by declining birth rates and outward economic migration (Rotariu, Dumănescu & Hărăguş, 2017: 125-152). The total number of population has dropped about two million between 1992 and 2011, from 22.810.035 to 20.121.641. By 2017, about one fifth of Romania's citizens of 20-64 age were living in other EU countries. Within this context, Romania's population became increasingly older (Rotariu, 2015). In 1992, in Romania, 23% were below or aged 14 years old and 11% were above or aged 65 years old. By 2018, the ratio was inversed. The younger group was 16% while the older group was 18%.

In order to account for the spatio-temporal changes within Romania's demography, we analyze the total number of population, the number of domicile acquirings and the aging structure of population in each of Romania's 41 counties and the capital city of Bucharest. We analyze these changes for the 1992-2018 period. We expect the spatio-temporal changes in this three demographic dimensions to be influenced by the development of an economic context that enhances spatial polarization between places.

## 1. Spatial economic polarization in Romania

The former totalitarian regime had an official policy for uniformization. However, in real practice, state-lead planning favored particular urban centers thus leading to significant spatial inequalities. There were also the existing pre-World War II regional inequalities, which the socialist regime only partially resolved. The country entered its post-socialist transition towards a market economy with profound spatial inequality patterns. After 1989, this uneven development was increased. Table 1 reveals how the economic disparities between counties increased in the last two decades. The standard deviation computed from the GDP share of each county within the national GDP almost doubled from 1995 to 2016. Regional inequalities have grown under the development of a neoliberal and globalized economy.

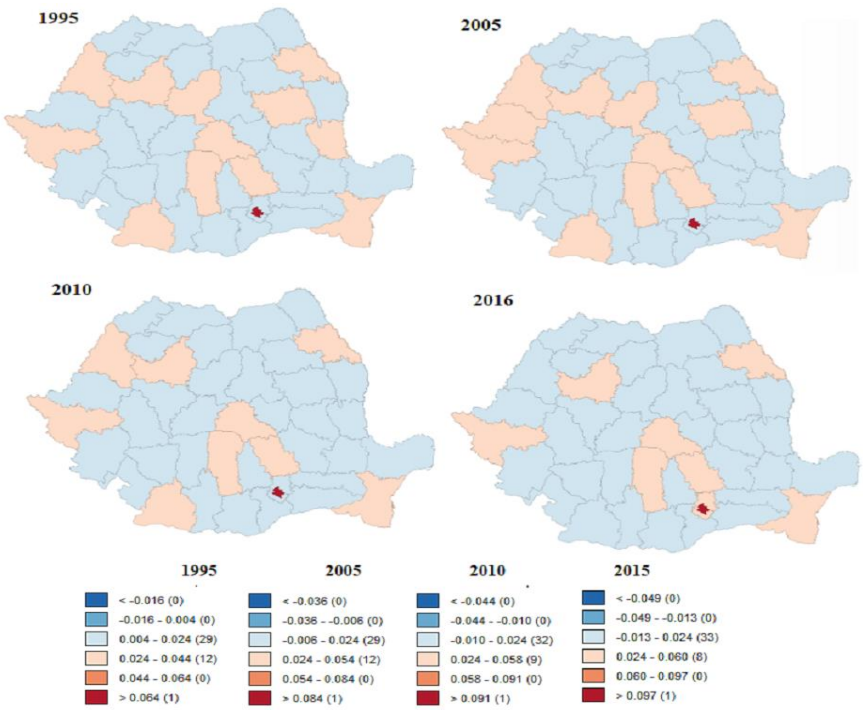
**Table 1**. National standard deviation for GDP - computed from counties and Bucharest

| | 1995 | 2005 | 2010 | 2016 |
|---|---|---|---|---|
| Regional economic inequalities | 1,96% | 2,97% | 3,34% | 3,62% |

*Source*: http://statistici.insse.ro

However, above explanation only account for a national perspective on the disparities between counties. Further, a local analysis is needed in order to grasp the actual spatial patterns of economic inequality. In this regard, Figure 1 shows standard deviation maps for the GDP reported by each county and Bucharest in 1995, 2005, 2010 and 2016. The shares for each county and Bucharest are displayed in Table 2, which also shows the differences between the values from 2016 and those from 1995. Figure 1 and Table 2 can be used as tools for a spatio-temporal understanding of Romanian local economic disparities.

**Figure 1**. Standard deviation maps for GDP - counties and Bucharest




*Source*: http://statistici.insse.ro

**Table 2.** Share's from the national GDP for counties and Bucharest

| *County* | *1995* | *2005* | *2010* | *2016* | *Differences 2016-1995* | *Ratio 2016:1995* |
|---|---|---|---|---|---|---|
| Alba | 1,7% | 1,6% | 1,8% | 1,7% | -0,1% | 0,96 |
| Arad | 2,2% | 2,4% | 2,2% | 2,2% | 0,0% | 0,99 |
| Argeș | 3,2% | 3,3% | 3,1% | 2,7% | -0,5% | 0,84 |
| Bacău | 3,0% | 2,6% | 2,3% | 1,9% | -1,1% | 0,63 |
| Bihor | 2,8% | 2,8% | 2,5% | 2,3% | -0,5% | 0,82 |
| Bistrița-Năsăud | 1,2% | 1,2% | 1,1% | 1,1% | -0,1% | 0,89 |
| Botoșani | 1,4% | 1,1% | 1,1% | 1,0% | -0,4% | 0,71 |
| Brașov | 3,4% | 3,2% | 3,3% | 3,4% | 0,0% | 1,01 |
| Brăila | 1,5% | 1,3% | 1,2% | 1,1% | -0,4% | 0,73 |
| Bucharest | 13,6% | 20,4% | 22,8% | 24,5% | 10,8% | 1,80 |
| Buzău | 1,8% | 1,6% | 1,5% | 1,4% | -0,4% | 0,76 |
| Caraș-Severin | 1,3% | 1,3% | 1,2% | 1,1% | -0,1% | 0,90 |
| Călărași | 1,3% | 0,8% | 1,1% | 0,9% | -0,4% | 0,70 |
| Cluj | 3,5% | 4,0% | 4,0% | 4,7% | 1,2% | 1,35 |
| Constanța | 4,1% | 4,3% | 4,0% | 4,5% | 0,4% | 1,09 |
| Covasna | 1,1% | 0,9% | 0,8% | 0,7% | -0,4% | 0,67 |
| Dâmbovița | 2,2% | 1,9% | 2,0% | 1,7% | -0,4% | 0,80 |
| Dolj | 2,6% | 2,5% | 2,7% | 2,4% | -0,3% | 0,90 |
| Galați | 3,1% | 2,2% | 2,1% | 1,7% | -1,4% | 0,55 |
| Giurgiu | 0,9% | 0,7% | 1,0% | 0,9% | 0,0% | 1,01 |
| Gorj | 1,8% | 1,8% | 1,8% | 1,6% | -0,2% | 0,90 |
| Harghita | 1,5% | 1,2% | 1,1% | 1,1% | -0,4% | 0,72 |
| Hunedoara | 2,3% | 2,0% | 1,8% | 1,6% | -0,7% | 0,69 |
| Ialomița | 1,6% | 1,0% | 0,9% | 0,9% | -0,7% | 0,56 |
| Iași | 3,3% | 3,0% | 3,1% | 3,1% | -0,2% | 0,94 |
| Ilfov | 1,5% | 2,3% | 2,4% | 2,7% | 1,2% | 1,77 |
| Maramureș | 1,9% | 1,7% | 1,7% | 1,6% | -0,2% | 0,88 |
| Mehedinți | 1,1% | 0,9% | 0,8% | 0,7% | -0,4% | 0,66 |
| Mureș | 2,7% | 2,4% | 2,1% | 2,1% | -0,5% | 0,80 |
| Neamț | 2,2% | 1,7% | 1,4% | 1,4% | -0,9% | 0,62 |
| Olt | 1,8% | 1,4% | 1,3% | 1,2% | -0,5% | 0,69 |
| Prahova | 4,3% | 3,9% | 3,4% | 4,1% | -0,1% | 0,97 |
| Satu Mare | 1,5% | 1,4% | 1,2% | 1,2% | -0,3% | 0,79 |
| Sălaj | 1,0% | 0,9% | 0,8% | 0,8% | -0,2% | 0,83 |
| Sibiu | 2,0% | 2,1% | 2,3% | 2,3% | 0,3% | 1,18 |
| Suceava | 2,4% | 2,2% | 1,9% | 1,8% | -0,5% | 0,77 |
| Teleorman | 1,7% | 1,2% | 1,1% | 0,9% | -0,8% | 0,54 |
| Timiș | 3,5% | 4,3% | 4,9% | 4,8% | 1,3% | 1,35 |
| Tulcea | 1,0% | 0,9% | 0,8% | 0,8% | -0,2% | 0,82 |
| Vaslui | 1,3% | 1,0% | 0,9% | 0,9% | -0,4% | 0,70 |
| Vâlcea | 1,9% | 1,7% | 1,4% | 1,3% | -0,6% | 0,70 |
| Vrancea | 1,8% | 1,1% | 1,1% | 1,0% | -0,8% | 0,56 |

*Source*: http://statistici.insse.ro

Over time, the GDP tends to clusterize within less and less number of counties. The economic poles in 2016 are Cluj (4,7%), Constanța (4,5%), Prahova (4,1%), Brașov (3,4%), Iași (3,1%), Argeș (2,7%) and Ilfov (2,7%) and Bucharest with by far the heighest share (24,5%). The 2016 map shows visible less economic poles than in 1995. Many counties had lost their former economic status. In time, some significant poles from 1995 witnessed a shrinkage in their economic powers: Galați (-1,4%), Bacău (-1,1%), Bihor (-0,5%), Mureș (-0,5%), Dolj (-0,3%). From all 41 counties, Galați, which was former major industrial center, has the largest decrease. During the 90s and up until the mid 2000s, most of these counties experienced major deindustrialisation, unemployment and social insecurity. Nevertheless, the decreasing share is a fixture for most of the counties. The share from the national GDP increases only in a few counties, namely in Timiș (1,3%), Cluj (1,2%), Ilfov (1,2%), Constanța (0,4%), Sibiu (0,3%) and Bucharest (10,8%). The most spectacular developments are by far in Bucharest and Ilfov. Here the share from the national GDP almost doubled itself during the time of analysis. Most of these counties that act as regional growth poles, namely Timiș, Cluj, Iași, Constanța, Prahova, Brașov and Sibiu have county capitals that are important urban aglomerations and have adapted well to the service based economy, overcoming the urban shrinkage caused by the closing down of socialist large industrial sites (Benedek & Cristea, 2014). Bucharest is the largest Romanian city and a global urban aglomeration with a high diversified economy. The striking rise of Ilfov is due entirely to the spillover effect coming from its enclave - Bucharest.

Throughout the entire period of study, Bucharest-Ilfov represents a major national growth and economic pole. Other counties act as regional and local poles. Also there is a strong tendency of deepening spatial polarization, as Bucharest-Ilfov toghether with the local growth poles gradually increase their share from the national GDP at the expense of other underprivileged counties.

## 2. Spatio-temporal analysis of Romania's demographic patterns

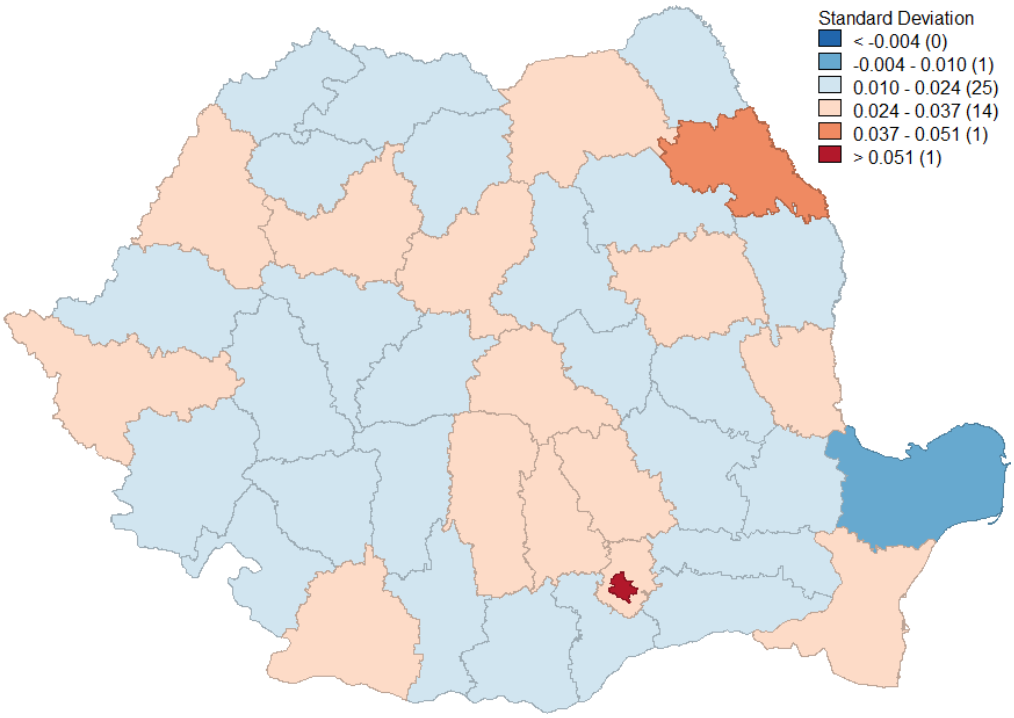
### a. Population decline

We start by exploring the spatio-temporal demographic differences between counties. Firstly, we analyze the total number of inhabitants for each territorial unit. In this regard, we employ data on the population of Romanian nationality, foreign or stateless who have their usual residence in the respective county or in Bucharest. The usual residency is considered the place where the person spends its resting time. People who emmigrated from Romania are excluded from these statistics.

Figure 2 shows a standard deviation map computed from the share of each county and Bucharest from the total resident population in Romania at 2018. The shares are displayed in Table 3. Bucharest has by far the highest share (9,4%). Its population is well above those of the 41 counties and is by far the most inhabited city. There is an important group of counties with shares above the average, namely

Iași (4,1%), Prahova (3,7%), Cluj (3,6%), Timiș (3,6%) and Constanța (3,5%). These units have cities as county capital that act as growth poles. The population of Iași (capital of Iași), Ploiești (Prahova), Cluj-Napoca (Cluj) or Timișoara (Timiș) exceeds those of the least populated counties. Lower shares we find in the following counties: Călărași (1,5%), Bistrița-Năsăud (1,4%), Caraș-Severin (1,4%), Giurgiu (1,4%), Ialomița (1,3%), Mehedinți (1,3%), Sălaj (1,1%), Covasna (1%), Tulcea (1%).

**Figure 2.** Standard deviation map for shares from the national population - counties and Bucharest, 2018




*Source*: http://statistici.insse.ro

*Table 3*. Population and shares of population from the national population

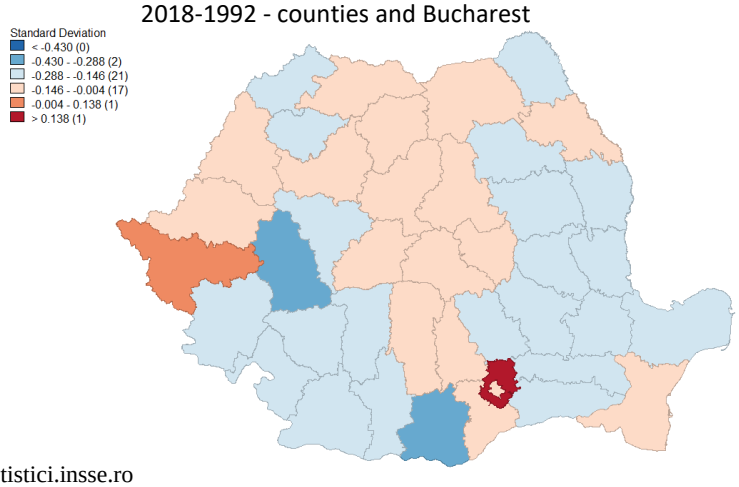
| County | 2018 | | Difference 2002-1992 | Difference 2011-2002 | Difference 2018-2011 | Difference 2018-1992 |
|---|---|---|---|---|---|---|
| | Pop. Number | Pop. share from the national | | | | |
| Alba | 328311 | 1,7% | -7,5% | -10,5% | -4,1% | -20,7% |
| Arad | 419360 | 2,1% | -5,3% | -6,7% | -2,6% | -14,0% |
| Argeș | 585730 | 3,0% | -4,2% | -6,2% | -4,4% | -14,0% |
| Bacău | 591035 | 3,0% | -4,2% | -12,8% | -4,1% | -19,9% |
| Bihor | 564109 | 2,9% | -6,0% | -4,1% | -2,0% | -11,7% |
| Bistrița-Năsăud | 280106 | 1,4% | -4,6% | -8,2% | -2,1% | -14,3% |
| Botoșani | 385046 | 2,0% | -1,8% | -8,9% | -6,7% | -16,5% |
| Brașov | 551183 | 2,8% | -8,4% | -6,8% | 0,4% | -14,3% |
| Brăila | 294143 | 1,5% | -4,8% | -13,9% | -8,4% | -25,0% |
| Bucharest | 1827810 | 9,4% | -6,8% | -2,2% | -3,0% | -11,6% |
| Buzău | 419829 | 2,1% | -4,0% | -9,1% | -6,9% | -18,8% |
| Caraș-Severin | 275063 | 1,4% | -11,5% | -11,3% | -6,9% | -26,9% |
| Călărași | 288043 | 1,5% | -4,2% | -5,5% | -6,1% | -15,0% |
| Cluj | 704759 | 3,6% | -4,6% | -1,7% | 2,0% | -4,3% |
| Constanța | 676215 | 3,5% | -4,5% | -4,3% | -1,2% | -9,7% |
| Covasna | 203534 | 1,0% | -4,6% | -5,5% | -3,2% | -12,7% |
| Dâmbovița | 496173 | 2,5% | -3,6% | -4,2% | -4,4% | -11,7% |
| Dolj | 630911 | 3,2% | -3,7% | -10,0% | -4,5% | -17,2% |
| Galați | 509471 | 2,6% | -3,3% | -13,5% | -5,0% | -20,5% |
| Giurgiu | 269279 | 1,4% | -4,9% | -5,5% | -4,3% | -14,1% |
| Gorj | 319919 | 1,6% | -3,4% | -11,8% | -6,3% | -20,2% |
| Harghita | 304280 | 1,6% | -6,3% | -4,7% | -2,1% | -12,6% |
| Hunedoara | 388600 | 2,0% | -11,4% | -13,8% | -7,2% | -29,1% |
| Ialomița | 258931 | 1,3% | -3,1% | -7,6% | -5,6% | -15,4% |
| Iași | 791210 | 4,1% | 0,7% | -5,5% | 2,4% | -2,5% |
| Ilfov | 473445 | 2,4% | 4,6% | 29,5% | 21,8% | 65,0% |
| Maramureș | 463354 | 2,4% | -5,6% | -6,2% | -3,2% | -14,2% |
| Mehedinți | 245120 | 1,3% | -7,8% | -13,5% | -7,6% | -26,3% |
| Mureș | 538329 | 2,8% | -4,8% | -5,2% | -2,3% | -11,8% |
| Neamț | 447102 | 2,3% | -4,1% | -15,1% | -5,0% | -22,7% |
| Olt | 400802 | 2,1% | -6,5% | -10,8% | -8,2% | -23,4% |
| Prahova | 725609 | 3,7% | -5,1% | -8,1% | -4,9% | -17,0% |
| Satu Mare | 334678 | 1,7% | -8,4% | -6,2% | -2,8% | -16,5% |
| Sălaj | 213816 | 1,1% | -7,0% | -9,5% | -4,7% | -19,9% |
| Sibiu | 400110 | 2,0% | -6,9% | -5,8% | 0,7% | -11,7% |
| Suceava | 626789 | 3,2% | -1,9% | -7,8% | -1,3% | -10,7% |
| Teleorman | 341440 | 1,7% | -9,9% | -12,8% | -10,2% | -29,4% |
| Timiș | 701499 | 3,6% | -3,2% | 0,8% | 2,6% | 0,2% |
| Tulcea | 197754 | 1,0% | -5,4% | -16,9% | -7,2% | -27,0% |
| Vaslui | 380001 | 1,9% | -1,4% | -13,1% | -3,9% | -17,6% |
| Vâlcea | 353188 | 1,8% | -5,7% | -10,1% | -5,0% | -19,4% |
| Vrancea | 324545 | 1,7% | -1,5% | -12,2% | -4,6% | -17,5% |

*Source*: http://statistici.insse.ro

As seen from the above analyses, the most inhabited counties are largely also the richest. Sparsely populated counties have lower GDP mainly because economic activities are clustered within the larger urban agglomerations mentioned above. Meanwhile, as we have observed in terms of economic performance, the spatio-temporal patterns have revealed an increase in polarization, since the main clusters have grown in economic strength while the poorer counties have continued to decrease their share from the national GDP. In this regard, further, we employ a deeper spatio-temporal perspective to understand how regional patterns and differences in county population have developed during the 1992-2018 period.

The map in Figure 3 shows the geographic distribution for the differences between the number of residents in 2018 and those of 1992. These information are also displayed in Table 3, together with the differences between 2002 versus 1992, 2011 versus 2002 and 2002 versus 1992. These data help us understand the spatio-temporal patterns of growth, depopulation and stagnation. We shall frame these spatio-temporal changes in relation with the economic polarization of the era. Throughout the 1992-2018 period we see an increase in the resident population only in Timiș (0,2%) and Ilfov (65%). For all the other 39 counties and Bucharest, the resident population decreses between 1992 and 2018. This can be explained by the general pattern of depopulation within post-socialist and present day Romania. However, among these 40 units there are major disparities. There are smaller decreases for Iași (-2,5%) and Cluj (-4,3%). Most of decreases are placed within the range of -10% and -20% (Bucharest included). 11 counties decreased with values ranging from -20% to -29,4% (the lowest – Teleorman). Further, we shall explore these patterns.

**Figure 3**. Differences across time for shares of population from the national population, 2018-1992 - counties and Bucharest




*Source*: http://statistici.insse.ro

Trends of clusterization with growth or weak decline in economic poles are stronger after the first decade of transition. The percentage of population decrease during the 2002-2011 is larger than during the 1992-2002 period, mostly due to emigration. Regarding our spatio-temporal analysis, the 2002-2011 shows a much higher degree of variation within the changes each county has experienced, than the first decade. The standard deviation of changes for 2002-2011 is 0.071. The value increased heavily from 0.029 during the 1992-2002. This pattern reveals an increase in polarization as the growth poles during 2002-2011 show a smaller decrease or even increasing population (Timiș, Ilfov), while for the economic disadvantages counties the population decline is sharpened. The standard deviation for 2011-2018 is 0.049. This shows that polarization continues to be powerful into the 2010s.

We firstly discuss the changes in the growth poles. Ilfov has grown in population throughout the entire period of study, but the rise is highly prominent during the 2000s. For the 2011-2018 the increase is smaller than the previous decade. Bucharest decreases throughout the entire period. For the capital city, the evolution is similar to that of Ilfov. This is due to the spillover effect that determines the growth in Ilfov. Therefore, the 2000s mark for Bucharest the lowest decrease, namely 2.2%. Afterwards, the negative value increases slightly, yet without reaching the level of the 90s. For the regional poles, the increase and polarization is also stronger starting with the 2000s (Timiș, Cluj). In some counties, this pattern is delayed for the 2010s (Iași, Sibiu, Brașov).

However, the vast majority of Romanian counties have undergone some massive depopulation after 1989. For these counties, in most cases, the largest decrease in the total number of population happened during the 2000s. Within this larger group of counties, a spatial difference can be observed in terms of the period with the second major decrease. For most of the counties in the Western part of Romania, the depopulation is slightly stronger during the 1992-2002 than 2011-2018. This trend is reversed for most of the counties located in the Eastern and Southern areas. A major argument for this difference are the migration patterns. Starting with the mid-2000s (most notable in 2007, the date of Romania's accesion into EU), when the economic migrancy towards Western Europe increased dramatically, patterns of emigration were stronger in the Eastern and Southern Romania. During the 90s, significant numbers of German and Hungarian minorities located in the Western counties migrated from Romania. Also, overall, during the 90s, the general emigration was much stronger in the Western parts of the country.

After 1989, Romania's phenomenon of depopulation developed following clear spatio-temporal patterns that were heavily influenced by the existing and growing economic polarization. Some key spatial disparities developed over the years. Overall, the main economic and growth poles had lower rates of shrinkage. At some times, these poles even increased their population - mostly in the recent decade. In the same time, the rather poorer counties that failed short in their transition to the new economic conditions experience continuously depopulation.

## b. Internal migration (Domicile acquiring)

Further, in our spatio-temporal analysis of demographic polarization, we examine internal migration patterns between counties. In this regard, we analyze the number of persons who acquired a new domicile by settling in the respective county, migrating thus from their county of origin. The percentages of acquired domiciles in each county and Bucharest by internal migration (computed from the total number of population with domiciles in that territorial unit) in 1992, 2002, 2011 and 2017 are displayed in Table 4.

**Table 4**. Shares of domicile acquirings from the national total

| County | 1992 | 2002 | 2011 | 2017 | Difference 2017-1992 | Difference 2017-2002 |
|---|---|---|---|---|---|---|
| Alba | 1,5% | 1,6% | 1,5% | 1,4% | -0,1% | -0,2% |
| Arad | 2,7% | 2,2% | 2,0% | 2,1% | -0,6% | -0,1% |
| Argeş | 3,0% | 3,2% | 3,1% | 2,6% | -0,4% | -0,5% |
| Bacău | 3,0% | 3,1% | 3,0% | 2,9% | -0,1% | -0,3% |
| Bihor | 2,2% | 2,5% | 2,5% | 2,6% | 0,4% | 0,1% |
| Bistriţa-Năsăud | 1,4% | 1,3% | 1,2% | 1,1% | -0,3% | -0,2% |
| Botoşani | 1,8% | 2,3% | 1,6% | 1,5% | -0,3% | -0,8% |
| Braşov | 3,1% | 2,8% | 2,6% | 2,8% | -0,3% | 0,1% |
| Brăila | 1,3% | 1,4% | 1,1% | 1,0% | -0,3% | -0,3% |
| Bucharest | 14,1% | 13,8% | 14,2% | 13,6% | -0,4% | -0,1% |
| Buzău | 1,9% | 2,7% | 2,0% | 1,8% | -0,1% | -0,9% |
| Caraş-Severin | 1,8% | 1,9% | 1,2% | 1,2% | -0,6% | -0,7% |
| Călăraşi | 1,5% | 1,5% | 1,2% | 1,2% | -0,3% | -0,4% |
| Cluj | 3,0% | 2,4% | 3,5% | 4,2% | 1,2% | 1,8% |
| Constanţa | 4,7% | 4,0% | 3,6% | 3,5% | -1,2% | -0,5% |
| Covasna | 0,9% | 1,0% | 0,6% | 0,6% | -0,3% | -0,3% |
| Dâmboviţa | 1,8% | 2,1% | 2,6% | 2,1% | 0,3% | 0,0% |
| Dolj | 2,4% | 3,3% | 2,9% | 2,6% | 0,2% | -0,7% |
| Galaţi | 2,0% | 2,1% | 2,2% | 2,1% | 0,1% | -0,1% |
| Giurgiu | 0,6% | 1,2% | 1,2% | 1,1% | 0,5% | -0,1% |
| Gorj | 1,7% | 2,3% | 1,9% | 1,6% | -0,1% | -0,7% |
| Harghita | 1,0% | 1,3% | 1,0% | 0,9% | -0,2% | -0,4% |
| Hunedoara | 3,1% | 2,0% | 1,7% | 1,7% | -1,4% | -0,3% |
| Ialomiţa | 1,3% | 1,5% | 1,2% | 1,1% | -0,2% | -0,4% |
| Iaşi | 3,0% | 3,6% | 4,2% | 5,1% | 2,2% | 1,6% |
| Ilfov | 1,8% | 0,8% | 4,1% | 5,8% | 4,0% | 5,0% |
| Maramureş | 1,5% | 1,6% | 1,7% | 1,6% | 0,1% | 0,1% |
| Mehedinţi | 1,4% | 1,6% | 1,4% | 1,2% | -0,2% | -0,4% |
| Mureş | 2,6% | 2,9% | 2,3% | 2,4% | -0,2% | -0,5% |
| Neamţ | 2,6% | 2,6% | 2,4% | 2,1% | -0,5% | -0,6% |
| Olt | 2,4% | 1,9% | 2,0% | 1,7% | -0,7% | -0,2% |
| Prahova | 2,7% | 3,2% | 3,0% | 2,9% | 0,2% | -0,2% |
| Satu Mare | 1,2% | 1,7% | 1,5% | 1,3% | 0,1% | -0,3% |
| Sălaj | 1,1% | 1,0% | 0,8% | 0,9% | -0,2% | -0,2% |
| Sibiu | 2,5% | 1,7% | 1,9% | 2,3% | -0,2% | 0,6% |
| Suceava | 2,3% | 2,6% | 2,7% | 2,6% | 0,3% | 0,0% |
| Teleorman | 1,8% | 1,8% | 1,6% | 1,4% | -0,4% | -0,4% |
| Timiş | 5,6% | 2,9% | 4,5% | 5,3% | -0,4% | 2,4% |
| Tulcea | 0,9% | 1,2% | 0,9% | 1,0% | 0,1% | -0,1% |
| Vaslui | 2,0% | 1,7% | 1,8% | 1,9% | -0,1% | 0,2% |
| Vâlcea | 1,6% | 2,3% | 1,9% | 1,7% | 0,1% | -0,6% |
| Vrancea | 1,3% | 2,0% | 1,7% | 1,6% | 0,4% | -0,3% |
| *Standard Deviation* | *0,0209* | *0,0195* | *0,0210* | *0,0214* | | |

*Source*: http://statistici.insse.ro

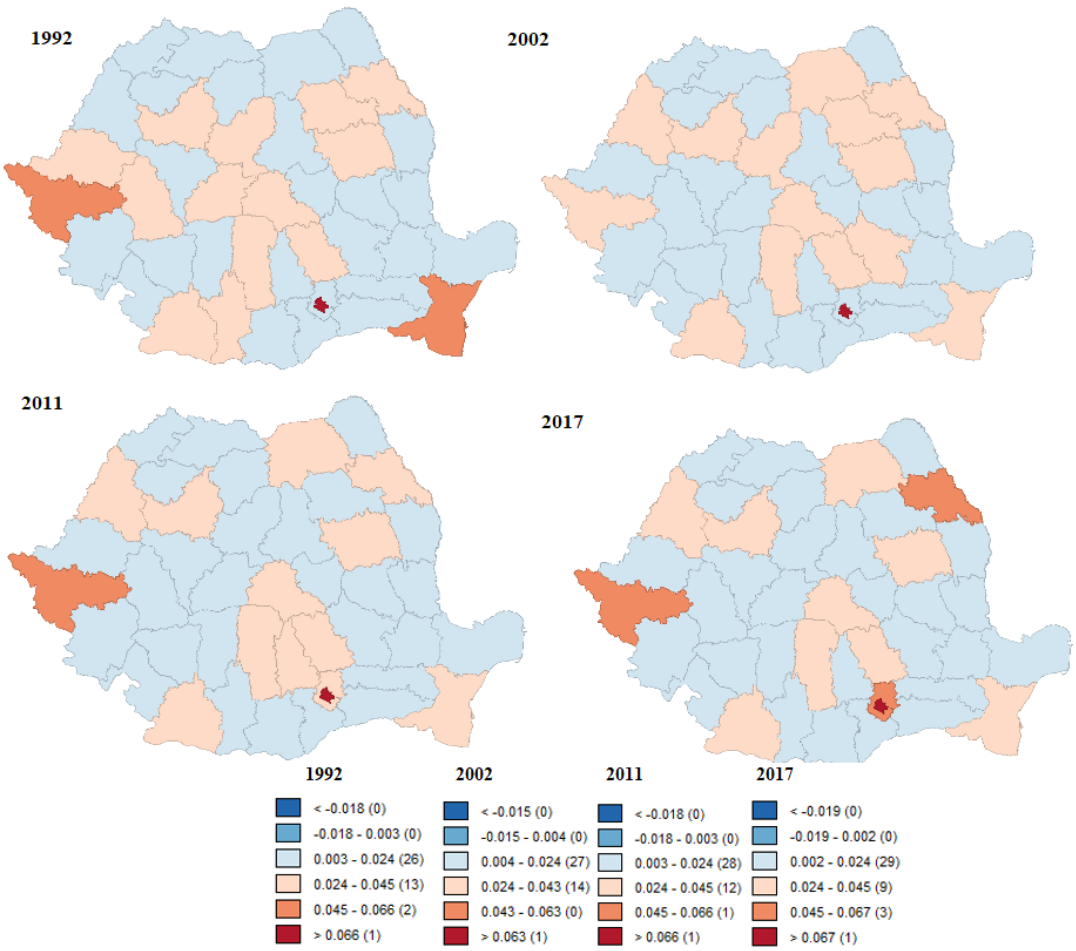
The data displayed in Table 4 show important patterns pointing to an increasing polarization starting with the 2000s. This is observable from the longitudinal analysis of standard deviation. The value in 1992 was 0,0209. It decreases in 2002 to 0,0195, yet afterwards the polarization increases in 2011 to 0,021 and in 2017 to 0,0214. The spatial polarization of internal migration patterns is strong at the beginning of the 90s due to removal after 1989 of former restrictions on free movement of population and labour force (Suditu, Prelipcean, Vîrdol & Stângaciu, 2013).

The internal migration in 1992 was directed towards the economic poles existing at that time. However, as we have seen above in the discussion regarding the economic context, some of the important urban centers and counties of the former communist regime had problems adapting to the transition. These counties have a high share of domicile acquirings in 1992 and 2002 but they display a decrease mostly in the last decade. The most striking case is that of Hunedoara (1,4% decrease between 1992 and 2017), a densely industrialized and urbanized county under the communist regime. Other counties that fit into this pattern are Neamț, Olt, Argeș or Caraș-Severin.

The shares of domicile acquirings are by far the largest in Bucharest. However, the capital city display some temporal variations. These trends confirm the hypothesis of spatio-temporal demographic polarization caused by the economic context of neoliberal development. The peak values are in the early 90s (14,1%), in the midst of the democratic free movement of population and labour force, and in 2011 (14,2%) at a time when the capital city polarized much stronger than in previous two decades. For Ilfov, the difference between the share in 2002 and the one in 2017 is 5%. In counties like Timiș (2,4%), Cluj (1,8%), Iași (1,6%) or Sibiu (0,6%) the increase is also strong. Starting with the mid2000s, Bucharest-Ilfov and the other regional growth poles display a consistent pattern of clusterization in terms of attracting internal migration.

The continuos polarization of internal migration around the most important pole, namely Bucharest-Ilfov, and the other regional poles can be observed also by quantifying the total number of counties that decrease in their share of domicile acquiring. For the 1992-2017 period, 64% of counties (N includes also Bucharest) decrease their share. During the 2002-2017, the percentage of counties displaying a reduction is even greater, namely 74%. This is the result of clusterization within fewer and fewer counties. A graphic representation of this polarization is also depicted in Figure 4.

**Figure 4.** Standard deviation maps for shares of domicile acquirings from the national number of domicile acquirings - counties and Bucharest




*Source*: http://statistici.insse.ro

The figure contains standard deviation maps for the share of domicile acquirings for the four years of interest. The maps show how during the 2002-2017 period the number of outliers is reducing. This increase in polarization is consistent with the hypothesis of spatial polarization caused by the growing economic disparities starting with the mid2000s.

**c. Age structure**

Declining birth rates and outward economic migration have greatly contributed to the aging process of the Romanian population. The country has one of the most elderly population in Europe. However, this process is not evenly distributed across the country. We explore the spatio-temporal patterns of aging in Romania's counties in order to identify the link between the demographic process of aging and the economic context. We expect these spatio-temporal patterns to be influenced by economic migration. The aging process should be stronger in poorer counties and should display low intensity in more developed counties.

We measure the demographic aging using an indicator from Ernst Billeter's work (1954). The formula for Billeter's indicator is:

$$I = \frac{P_{0-14} - P_{65+}}{P_{15-64}};$$

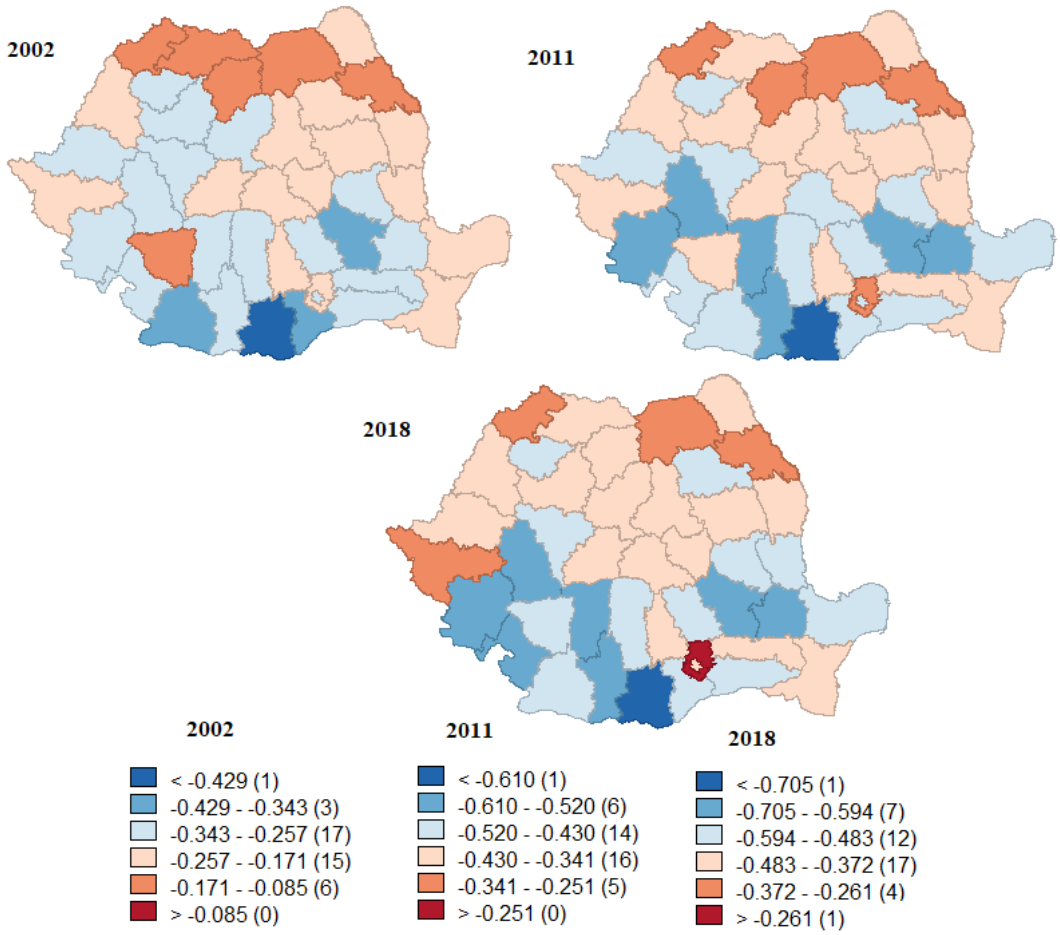
where $P_{0-14}$ is the pre-productive group comprised of population aged between 0 and 14 years old, $P_{65+}$ is the post-productive group comprised of population aged 65 years old or above, and $P_{15-64}$ is the productive group comprised of population aged between 15 and 64 years old. A high negative value characterizes a very aging population. The nominator is negative when the older generation (65+ y.o.) exceeds the youngest generation (0-14 .y.o.). The Billeter's indicator for each county and Bucharest at 2002, 2011 and 2018 is displayed in Table 5. Standard deviation maps for the above mentioned years are depicted in Figure 5.

**Table 5**. Billeter's indicator - counties and Bucharest

| County | 2002 | 2011 | 2018 | County | 2002 | 2011 | 2018 |
|---|---|---|---|---|---|---|---|
| Alba | -27% | -50% | -57% | Harghita | -22% | -35% | -40% |
| Arad | -31% | -45% | -47% | Hunedoara | -26% | -52% | -63% |
| Argeș | -26% | -44% | -53% | Ialomița | -28% | -42% | -46% |
| Bacău | -17% | -41% | -45% | Iași | -12% | -26% | -26% |
| Bihor | -25% | -38% | -41% | Ilfov | -23% | -26% | -23% |
| Bistrița-Năsăud | -15% | -33% | -40% | Maramureș | -16% | -34% | -42% |
| Botoșani | -23% | -36% | -42% | Mehedinți | -33% | -51% | -60% |
| Brașov | -20% | -44% | -45% | Mureș | -27% | -40% | -43% |
| Brăila | -32% | -57% | -64% | Neamț | -23% | -50% | -54% |
| Bucharest | -31% | -43% | -42% | Olt | -34% | -52% | -62% |
| Buzău | -37% | -55% | -61% | Prahova | -30% | -48% | -55% |
| Caraș-Severin | -29% | -52% | -61% | Satu Mare | -17% | -31% | -37% |
| Călărași | -32% | -43% | -49% | Sălaj | -29% | -43% | -50% |
| Cluj | -30% | -43% | -42% | Sibiu | -18% | -36% | -38% |
| Constanța | -18% | -38% | -42% | Suceava | -15% | -32% | -35% |
| Covasna | -20% | -34% | -39% | Teleorman | -58% | -72% | -79% |
| Dâmbovița | -23% | -38% | -46% | Timiș | -23% | -37% | -37% |
| Dolj | -35% | -50% | -52% | Tulcea | -21% | -48% | -56% |
| Galați | -18% | -43% | -49% | Vaslui | -18% | -36% | -39% |
| Giurgiu | -42% | -48% | -52% | Vâlcea | -32% | -53% | -68% |
| Gorj | -16% | -37% | -50% | Vrâncea | -27% | -48% | -52% |
| | | | | *National* | *-25%* | *-42%* | *-46%* |

*Source*: http://statistici.insse.ro

**Figure 5.** Standard deviation maps for Billeter indicator - counties and Bucharest




*Source*: http://statistici.insse.ro

The maps in Figure 5 illustrate some clear spatio-temporal patterns within the aging process. The number of counties with a higher aging population has increased throughout the years. The spatio-temporal patterns are coherent over time, as some counties have a constant high aging process while others display lower aging for the entire period.

The age structure of a population is influenced also by other demographic process, not only by economic factors. This explains the lower aging for counties in the north, where although there are no major growth poles (with the exception of Iași), the population has a lower degree of aging because of demographic

conservative behaviors and higher shares of rural population. In this regard, the correlation between spatial economic polarization and demographic aging is best observed in a spatio-temporal perspective. Nevertheless, spatio-temporal patterns of aging are present also in the north (Maramureș, Bistrița-Năsăud, Bacău).

Table 5 helps us understand the spatio-temporal changes within the overall pattern of national aging. The Billeter indicator computed for the national level decreases dramatically beetween 2002-2011 from -25% to -42%. The evolution is slower afterwards, but is nevertheless continous, as Romania's population follows its steady aging process. All counties have more or less decreasing values throughout the 2002-2018 period. There are also some exception to this situation. Some of the growth poles have slightly higher or similar values in 2018 in comparison with 2011. The difference for Bucharest is 1%, Cluj 1%, Ilfov 2%, Iași 0%, Timiș 0%. Although, it is true that the 2018-2011 period is shorter than the previos one and the aging process also has a shorter time span to develop, the spatio-temporal changes that developed during the 2010s also reveal strong disparities between the growth poles and the other counties. The more developed counties attract productive and pre-productive groups and thus display lower longitudinal values of aging than the other poorer counties. In 2018, Ilfov has the higher value (23%) among all counties. In 2002, Ilfov had a rather average value (the 20th largest – 23%). Bucharest, Timiș or Cluj are other relevant similar cases (B: 32th in 2002 and 14th in 2018, T: 16th in 2002 and 5th in 2018, C: 31th in 2002 and 16th in 2018).

Stronger aging patterns we identify at two main groups of counties. Firstly, there are the counties that had a high share of older population already in 2002. In the following years, they maintained an elderly population more numerous than other counties. We can mention here Brăila, Vâlcea, Mehedinți, Olt, Buzău, Teleorman. These counties did not attract significant productive or pre-productive groups and were also affected by outward economic migration. In the second group, we place the counties highly affected by economic transformations. These were mostly the former industrialised counties that were relatively well under the socialist regime but had major troubles in adapting to the new economy. These counties had some of the strongest patterns of aging during the 2000s and 2010s, although as seen from the Table 5 they were not among the oldest counties in 2002. Here we include Hunedoara, Galați, Gorj, Bacău, Argeș, Neamț or Caraș-Severin.

Through the spatio-temporal analysis we have seen how spatial economic polarization enhances aging patterns more strongly in poorer counties, as productive and pre-productive groups tend to be concentrated within counties that adapted better to the new economy.

## Conclusions

Our analysis focused on the relation between the economic development and the demographics of Romania's territorial units. In this regard, we have analyzed the spatio-temporal changes for three important demographic dimensions: total population, internal migration (domicile acquirings) and population aging. The hypothesis stated that under the current neoliberal and global capitalism development, Romania would experience significant patterns of spatial polarization in its demography. These patterns were researched longitudinally for the 1992-2018 period. The results have revealed important spatial polarization patterns for all three demographic dimensions. These patterns were more salient starting with the 2000s, when the economic development under the neoliberal and global capitalism political project enabled deep spatial economic polarization.

We have seen how the spatial economic polarization interacts with the demographic process mostly through patterns of economic migration. The Bucharest-Ilfov area, a major national growth pole, and other regional growth poles like Cluj, Iași, Timiș or Sibiu attract productive groups of population. Simultaneously, the poorer counties experienced a significant demographic contraction in population loss and comparatively higher rates of aging. These findings contribute to an understanding of Romania's social and geographic transformation under current political economic development.

## References:

1. Benedek, Jozsef & Toeroek, Ibolya. (2014). *County-Level Demographic Disparities in Romania* in "Transylvanian Review", 23 (2): 138-147.
2. Benedek, Jozsef & Cristea, Marius. (2014). *Growth Pole Development and Metropolization in Post-Socialist Romania* in "Studia UBB Geographia", 59 (2): 125-138.
3. Billeter, Ernst. (1954). *Eine Masszahl zur Beurteilung der Altersverteilung einer Bevölkerung* in "Swiss Journal of Economics and Statistic", 90: 496-505.
4. Brenner, Neil & Theodore, Nick. (2002). *Cities and the Geographies of Actually Existing Neoliberalism* in Brenner, Neil & Theodore, Nick (eds.. (2002). *Spaces of Neoliberalism*: *Urban Restructuring in North America and Western Europe*. Oxford: Blackwell: 2-32.
5. Goschin, Zizi. (2017). *Exploring regional economic convergence in Romania. A spatial modeling approach* in Eastern Journal of European Studies", 8: 127-146.
6. Gregory, Terry; Patuelli, Roberto. (2015). *Demographic ageing and the polarization of regions: an exploratory space-time analysis* in "Environment and Planning", A 47 (5): 1192-1210.
7. Harvey, David. (2006). *Spaces of global capitalism: A theory of uneven geographical development*. New York: Verso.

8. Istrate, Marinela; Muntele, Ionel & Bănică, Alexandru. (2015). *Spatial Resilience of the Ageing Population in the Romanian Functional Urban Areas* in "International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering", 9 (5): 1565-1575.
9. Nancu, Daniela; Guran-Nica, Liliana & Persu, Mihaela. (2010). *Demographic Ageing in Romania's Rural Areas* in "Human Geographies – Journal of Studies and Research in Human Geography", 4 (1): 33-42.
10. Oțil, Maria; Miculescu, Andra & Cismaș, Laura. (2015). *Disparities in Regional Economic Development in Romania* in "Scientific Annals of Economics and Business", Sciendo, 62 (1) 37-51.
11. Rotariu, Traian. (2015). *Un sfert de secol de declin demografic* in Stănescu, Iulian & Zamfir, Cătălin (eds.). (2015). *România la Răscruce: Opțiuni pentru viitor.* Bucharest: Pro Universitaria: 162-195.
12. Rotariu, Traian; Dumănescu, Luminiţa & Hărăguş, Mihaela. (2017). *Demografia României în perioada postbelică (1948-2015)*. Iași: Polirom.
13. Suditu, Bogdan (ed.). (2013). *Perspectivele politicii de migrație în contextul demografic actual din România*. Bucharest: Institutul European.
14. Stiglitz, Joseph. (2012). *The Price of Inequality: How Today's Divided Society Endangers Our Future*. New York: W.W. Norton.
15. Toeroek, Ibolya. (2019). *Regional Inequalities in Romania before and After the EU Accession*. IOP Conference Series: Earth and Environmental Science 221 (1).