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# MONOCENTRIC ADMINISTRATIVE UNITS, POLYCENTRIC BORDER AREAS? A LOOK AT THE BIHOR – HAJDÚ-BIHAR EURO-REGION

Cosmin Chiriac<sup>1</sup>, Florentina Chirodea<sup>2</sup>, Constantin-Vasile Țoca<sup>3</sup>

**Abstract.** *The Bihor and Hajdú-Bihar counties, from both sides of the Romanian – Hungarian border, are, in different degrees, monocentric administrative units, as it is shown in this paper. Each one has an administrative centre that is demographically and economically dominant. They were important urban centres in most of their history and have remained important during the communist era that has dominated Eastern Europe for almost half a century. In that period, polycentrism was a debated concept revolving around political autonomy and control (citation). In this century, Polycentricity is another debated concept, promoted by the European Union as a means of achieving territorial cohesion throughout the EU. In this paper, the main question revolves around how much the permeable borders of the EU, though sometimes confronted with the national interest, can pave the way to polycentric areas. After a look at the speciality literature to explain the concept and to identify ways to measure it, empirical research will provide an answer to the question of whether the Bihor - Hajdú-Bihar Euro-region is or can be a polycentric urban area.*

**Keywords:** *polycentricity, Euro-regions, cross-border cooperation, Bihor - Hajdú-Bihar*

## Introduction

The Bihor – Hajdú-Bihar Euroregion, composed of the two counties that neighbour each other on both sides of the Romanian-Hungarian border, was founded in 2002 and accumulates almost 20 years of existence<sup>4</sup>. In the initial years both countries were EU membership candidates, both gaining their full membership a few years apart (Hungary - 2004, Romania - 2007). This means that the border that separates the two countries was not a hard dividing line for most of the existence of the Euro-region, facilitating interaction instead of impeding it. As a consequence, increased levels of cooperation were possible. The question that we pose in this research is whether this has led to such cooperation levels that did or might generate a polycentric structure.

The research that was put together in this paper starts with a brief overview of the speciality literature that covers the terms of monocentricity and polycentricity. Specifically in the case of polycentricity, we're looking at Polycentric urban regions (PUR). Following this, in the second part, we'll take a look at the administrative set up of the two counties, their history and characteristics. We'll take a special look at their monocentric structure, heavily dominated by the capital cities of each administrative unit, which, though it is quite evident, is also particularly important in the context of this research. Further on, within the third part of the paper, the focus falls on the metrics that highlight polycentric patterns and we'll apply selected metrics to the Euroregion in the fourth part of the study. Our findings do not indicate the existence of a polycentric pattern in the region and the emergence of such a pattern is not to be expected any time soon.

## Theoretical frame: monocentricity, polycentricity, PUR

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<sup>4</sup> Constantin Țoca, "Ethnical Analysis within Bihor-Hajdú Bihar Euroregion", in *EuroTimes*, supplement 01/2013, p. 128.

As it is already obvious from the title and introduction, in the theoretical part of the study we need to analyse and discuss two opposing key terms: monocentricity and polycentricity.

We will not dive too deep into the speciality literature, as the purpose of the study is not an exhaustive analysis of the two terms. Instead, we're focusing on a small, but relevant, part of it. An in-depth, comprehensive analysis of the speciality literature, that goes back almost a century<sup>5</sup>, would defeat the purpose of this study, so we'll base these concepts on relatively recent studies, published after the European Union started discussing and, eventually, promoting polycentricity as a means of achieving a more economically, socially and territorially balanced Union.

One of the first extensive studies that has put polycentricity in a practical perspective is the report of the *ESPON 111: Potentials for Polycentric Development in Europe* project, which places the two terms in opposition, and describes monocentricity as a territorial structure in which "service provision and territorial management competence is increasingly concentrated to a single centre"<sup>6</sup>, also to be found in a follow-up report published two years later<sup>7</sup>. Another, yet very similar description, states that monocentricity is "the obvious mirror image or contrast case of the polycentric model", which also finds the monocentric model to be inadequate to describe the spatial distribution of cities today<sup>8</sup>.

Thus, monocentric patterns are highly associated with areas that are heavily dominated by an urban centre, no further clarifications being needed in this regard.

Davoudi identifies polycentricity as a term initially used to describe the internal patterns of cities, to "mark a departure from the monocentric model"<sup>9</sup>, putting the two terms in opposition at this level as well.

The use of the two terms at "outer-urban" scales is linked mainly to European spatial planning. The macro level is linked to the European level by the ESPON 111 project report while the meso level is linked to the national and transnational levels, the latter one being of relevance for our study<sup>10</sup>.

Polycentricity is categorized into *morphological*, when addressing the distribution and size of urban areas, and *functional* (or relational), when addressing interactions between urban nodes potentially forming a polycentric pattern<sup>11</sup>. Discussions whether the morphological elements are enough to describe a region as polycentric can be found in the speciality literature, however Vandermotten provides examples of morphologically polycentric areas, that still behave in quite a monocentric manner<sup>12</sup>. Meijers, for example, highlights that the basic definition of polycentricity, which refers to the existence of multiple centres in a given area, refers strictly to the morphological characteristics and the functional aspects are characteristic of networked and not polycentric urban systems<sup>13</sup>.

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<sup>5</sup> For some details regarding the evolution of territorial structures related to the two concepts see Christian Vandermotten et al., "European Planning and the Polycentric Consensus: Wishful Thinking?", in *Regional Studies*, vol. 42, no. 8, 2008, p. 1205–1217.

<sup>6</sup> European Spatial Planning Observation Network (ESPON), *ESPON 1.1.1.: Potentials for Polycentric Development in Europe*, Nordic Centre for Spatial Development, Stockholm, 2005, p. 3.

<sup>7</sup> ESPON, *ESPON project 1.4.3 Study on Urban Functions. Final Report*, The ESPON Monitoring Committee, March 2007, available at [https://www.espon.eu/sites/default/files/attachments/fr-1.4.3\\_April2007-final.pdf](https://www.espon.eu/sites/default/files/attachments/fr-1.4.3_April2007-final.pdf), [accessed in April 2021].

<sup>8</sup> Robert C. Kloosterman, Sako Musterd, "The Polycentric Urban Region: Towards a Research Agenda", in *Urban Studies*, vol. 38, no. 4, 2001, p. 624.

<sup>9</sup> Simin Davoudi, "European Briefing: Polycentricity in European Spatial Planning: from an Analytical Tool to a Normative Agenda", in *European Planning Studies*, vol. 11, no. 8, 2003, p. 993, 994.

<sup>10</sup> ESPON, *op. cit.*, 2005, p. 20–23.

<sup>11</sup> Martijn Burger, Evert Meijers, "Form Follows Function? Linking Morphological and Functional Polycentricity", in *Urban Studies*, vol. 49, no. 5, April 2012, p. 1132, 1133.

<sup>12</sup> Christian Vandermotten et al., *op. cit.*, p. 1210.

<sup>13</sup> Evert Meijers, "Measuring Polycentricity and Its Promises", in *European Planning Studies*, vol. 16, no. 9, October 2008, p. 1319.

Burger and Meijers compared the two forms of polycentricity, morphological and functional, based on local importance, to highlight the former and centrality, to highlight the latter<sup>14</sup>. Their conclusions leave room for improvement; however, they do find heavy correlation between morphological and functional polycentricity<sup>15</sup>.

This brings us to Polycentric Urban Regions (PUR), which is not a new concept according to Kloosterman's brief historical analysis of the related speciality literature<sup>16</sup>. The most common aspects that are presented as defining elements of a PUR are (1) the presence of two or more (multiple) cities and towns, which are (2) historically, administratively and politically independent, (3) located in close proximity and (4) well connected<sup>17</sup>.

Discussions revolve around some of the more unclear and broadly defined aspects mentioned above. The first and the second one is quite clear. They just state that the region has to include several urban areas that are clearly separated urban entities and can be differentiated from other structures such as Metropolitan areas.

The aspects that leave room for interpretation are the ones referring to the proximity of the centres and their level of connectivity.

Reasonable proximity is heavily linked to commuting, in the eyes of many scholars, as Davoudi points out, also highlighting the fact that, as technology advances, faster means of transport are introduced which, eventually, would include larger areas into PUR<sup>18</sup>. Commuting times are also affected, in densely populated areas by traffic congestion<sup>19</sup> which would disqualify some areas that would otherwise be considered PUR, because of the *close proximity* attribute.

It is also questionable whether it is enough to investigate commuting patterns to determine if two urban areas are in reasonable proximity, as there are many other ways in which two cities or towns may interact, on a daily basis, thus checking both the proximity and connectivity attributes of the definition of a polycentric urban region. For example, Burger and Meijers analysed morphological and functional polycentricity based on commuting and shopping flows as well employment numbers<sup>20</sup>.

When it comes to connectivity, or interdependency, the journey to work is considered a defining factor in many studies, however it is not generally accepted as such<sup>21</sup>. Once again, flows and interactions between urban nodes may be generated by many human activities besides travel to work and back.

No matter which is the stance we take here, connectivity and proximity are the more difficult attributes to evaluate and are dependent on the availability of flow related data. They also link PUR more to functional polycentricity rather than morphological polycentricity.

Further on in this study we'll consider size-distribution related data to analyse morphologically polycentric patterns in the area, leaving open the opportunity for functional polycentricity at a later stage, within a different study.

### **The territorial configuration of the study area**

Documentary attestation puts the origins of the two main urban centres of the study area before the 12th (Oradea) and 13th (Debrecen) centuries with archaeological evidence showing that the area has been inhabited for much longer. Their evolution through most of their history is not of importance to this

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<sup>14</sup> Martijn Burger, Evert Meijers, *op. cit.*, p. 1134.

<sup>15</sup> *Ibidem*, p. 1144.

<sup>16</sup> Robert C. Kloosterman, Sako Musterd, *op. cit.*,

<sup>17</sup> Evert Meijers, "Polycentric Urban Regions and the Quest for Synergy: Is a Network of Cities more than the Sum of the Parts?", in *Urban Studies*, vol. 42, no. 4, 2005, p. 765; Simin Davoudi, *op. cit.*, p. 986; ESPON, *op. cit.*, 2005, p. 179, 180.

<sup>18</sup> Simin Davoudi, *op. cit.*, p. 986.

<sup>19</sup> Julien Grunfelder, Thomas Sick Nielsen, "Commuting Behaviour and Urban Form: A Longitudinal Study of a Polycentric Urban Region in Denmark", in *Geografisk Tidsskrift-Danish Journal of Geography*, vol. 112, no. 1, 2012, p. 11.

<sup>20</sup> Martijn Burger, Evert Meijers, *op. cit.*

<sup>21</sup> Simin Davoudi, *op. cit.*, p. 986.

study, however, both cities have been important urban settlements in the area for quite some time, being the capitals of the Bihor and Hajdúság (Hajdú) counties. After the second world war the Hajdú-Bihar County was established, extending the area of the former Hajdú county and affecting the area covered by the Bihor County as well.

The maps below (see **Fig. 1**) highlight the demographic evolution of the main urban localities of today, from the study area, by classifying them based on the number of inhabitants, at different moments in time. They clearly show that the two capital cities have always dominated the area, being important centres and thus, creating a monocentric pattern within their respective counties. This dominance has grown stronger through time. Since this is not of relevance for the current study, we will not go into details regarding the reasons for which they have outgrown to such extent the other localities from the area, though, considering the fact that for a significant amount of time they were under a communist regime, it is pretty clear that the evolution was dictated.

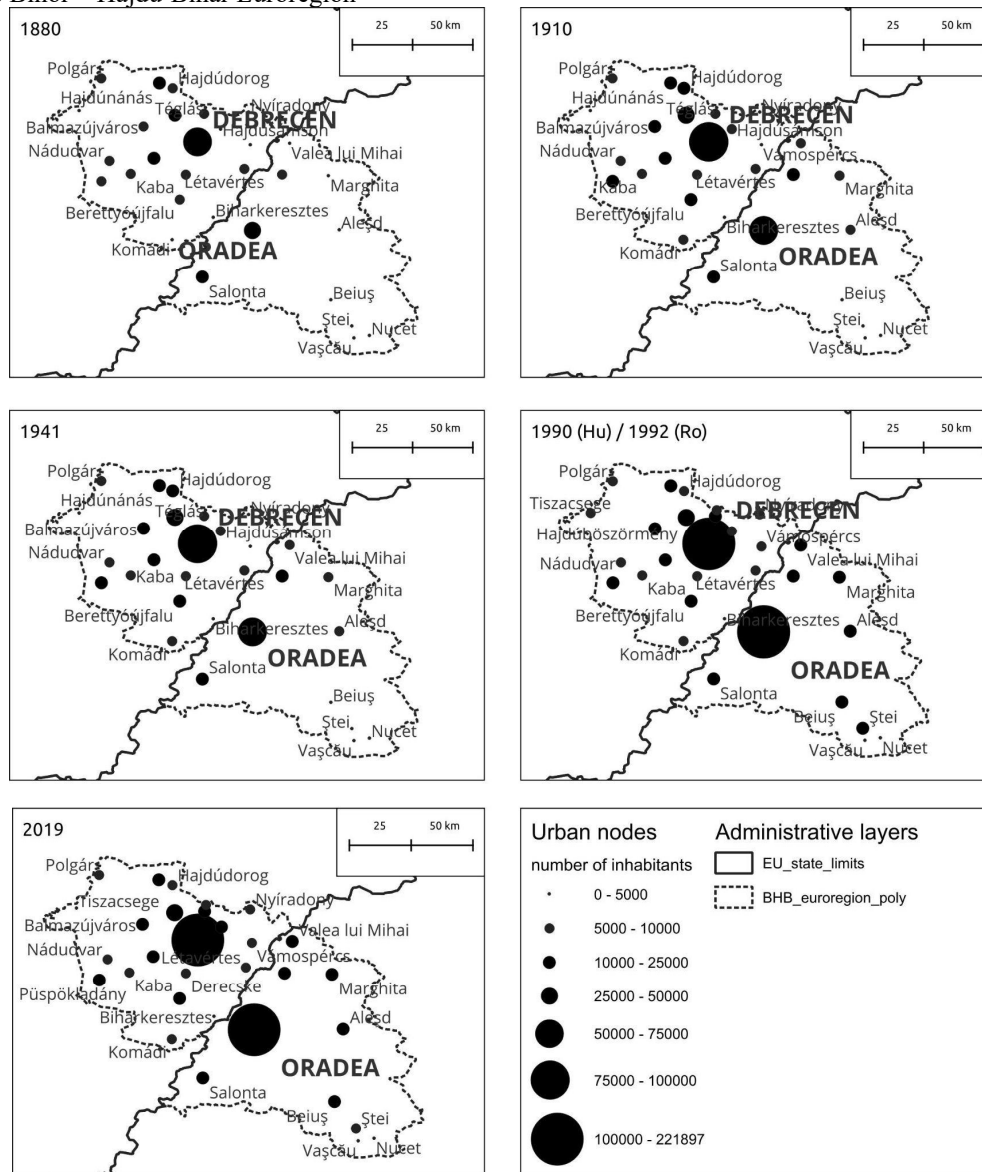
Currently, both counties have a relatively high number of urban localities with a clear advantage for the Hungarian side (Bihor: 10, Hajdú-Bihar: 21). Despite this, besides the two capital cities, and compared to them, the other urban centres are quite small. There is also a difference in the division of the territory into local administrative units. The ones in the western side of the Hajdú-Bihar County cover significantly larger territories than the rest of the Euroregion.

Most urban localities have 30,000 inhabitants or less. Though the map doesn't show it, as it displays only localities having an urban status, there are quite a few communes comparable in size with other smaller sized towns, the largest one being Sânmartin (in Bihor) with more than 10,000 inhabitants. One other remark that can be made is that many of the towns in the Hungarian side are actually quite small in terms of the number of inhabitants (12 of them have less than 10,000 inhabitants), which actually shows that many localities offer better living conditions, that match the requirements for urban status, on the Hungarian side than on the Romanian side, within the study area.

In terms of the territorial distribution of the urban centres, there also seems to be better coverage on the Hungarian side which means that, theoretically, more inhabitants should have access to better important public services in Hajdú-Bihar than in Bihor.

This brief overview of the territorial context stands simply as a starting point that highlights the clear dominance of the two capital cities within the study area.

**Figure 1.** Maps showing the evolution of the number of inhabitants of the urban localities of today, between 1880 and 2020, in the Bihar – Hajdú-Bihar Euroregion



**Source:** Hungarian Central Statistical Office official site, available at <https://www.ksh.hu/?lang=en>, [accessed in August 2021]; Varga E. Árpád, *Erdély etnikai és felekezeti statisztikája. Népszámlálási adatok 1850-2002 között* [Ethnic and denominational statistics of Transylvania. Census data between 1850 and 2002], available at <http://www.kia.hu/konyvtar/erdely/erd2002.htm>, [accessed in August 2021]; Eurostat, *GISCO. Geographical Informations and Maps*, available at <https://ec.europa.eu/eurostat/web/gisco/geodata/reference-data/administrative-units-statistical-units>, [accessed in August 2021].

### Measuring monocentricity and polycentricity

Well, actually, considering the previous research on the topic mentioned within the section concerned with the theoretical frame of this paper, we're not really measuring them separately, but, based on selected indices, we're measuring where they are positioned on a scale that has the monocentricity on one end and polycentricity on the other.

In our case, one of the most challenging tasks regarding the selection of appropriate indices to measure the level of polycentricity (or monocentricity) of the study area is finding the right data to do so.

For the study area that was selected here, even though it is, we think, an interesting case study, being a cross-border area, within a context that facilitates cooperation, at least for the last 20 years or so, both parts of EU member countries, it still challenging to find, not just appropriate data for our purpose, but matching data. To be more specific, the fact that the level we're analysing the local level, within two different countries makes data availability for similar indices almost impossible even if we're only looking to address morphologic polycentricity as mentioned earlier in this paper.

As mentioned in the section dedicated to the theoretical frame, we'll consider only morphologic polycentricity within this study. As an indicator through which we'll analyse it we've selected the number of dwellings within the area. The selection of relevant indices should be based on whether they reflect a pattern that suggests a more balanced distribution of the socio-economic factors within the territory. Considering this, the evolution of the number of dwellings within the territory should highlight a more balanced distribution of such factors as they show, to some extent, when a certain location becomes attractive for incoming population or if it manages to keep the young population in.

However, there is one caveat to these assumptions and that's that the increase of dwellings in local administrative units surrounding larger localities are, many times, caused by that fact that they are attractive just as dormitory villages or towns so, the numbers don't tell the whole story.

Some of the studies researching the level of polycentricity use statistical methods while others also consider spatial factors, which we think are important as they reflect how well distributed the localities are within the territory and, in their absence, certain areas might be considered polycentric even if the more developed localities are all concentrated in one area. However, all these researches are static and they don't analyse the evolution of areas towards either of the two ends of the monocentric-polycentric scale, which is what we intend to look into.

Based on this line of thought, the following methods with corresponding representations will be used to analyse the evolution and level of polycentricity within the study area:

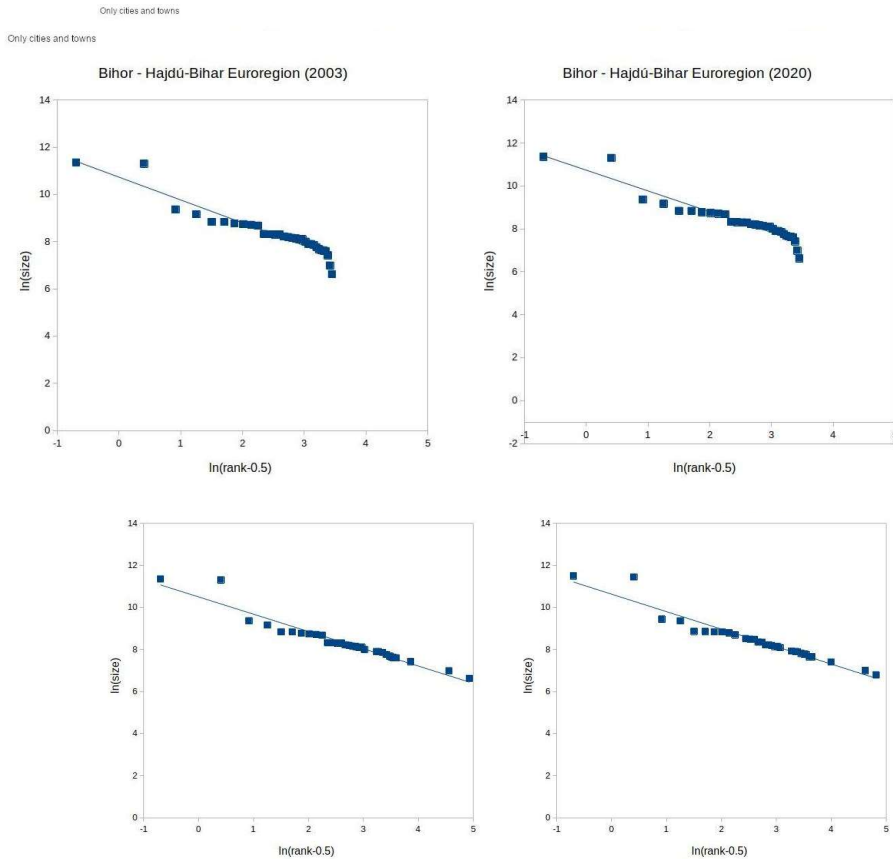
- The difference in the number of dwellings between 2003 and 2020, to highlight the evolution and distribution of growth (or decrease) within the territory, represented as a map,
- The distribution of the number of dwellings within the territory in 2003 and 2020, to understand the evolution, represented as maps,
- Rank-size distribution of the number of dwellings in 2003 and 2020, to highlight the polycentricity levels, without accounting for spatial distribution, represented as charts.

### **Monocentric parts, polycentric whole?**

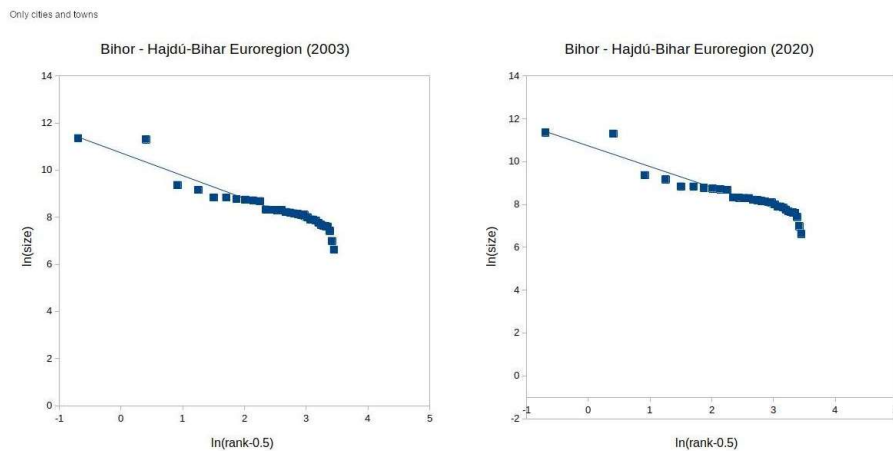
The visual outcome of our research are several maps and charts that explain the evolution of the settlements within the territory from the perspective of the monocentric-polycentric scale. The resulting representations show that the study area didn't evolve in any way towards a polycentric pattern as far as the dwellings related data shows. On the contrary, the increase in the number of dwellings is much stronger in the two county seats, showing that their dominance within the area is actually growing.

First of all, we've applied the rank-size distribution method of analysis to the Euroregion as a whole (Fig. 2), but also to the two counties individually (Fig. 3 and 4). The selection of the nodes that are included in the rank-size distribution analysis is also quite significant and may alter the results. For each of the areas mentioned above we've considered first, all of the localities from the area, but we also looked at the urban nodes separately, as the images below show.

**Figure 2.** Rank-size distribution of the number of dwellings within the Bihor - Hajdú-Bihar Euroregion in 2003 and



2020



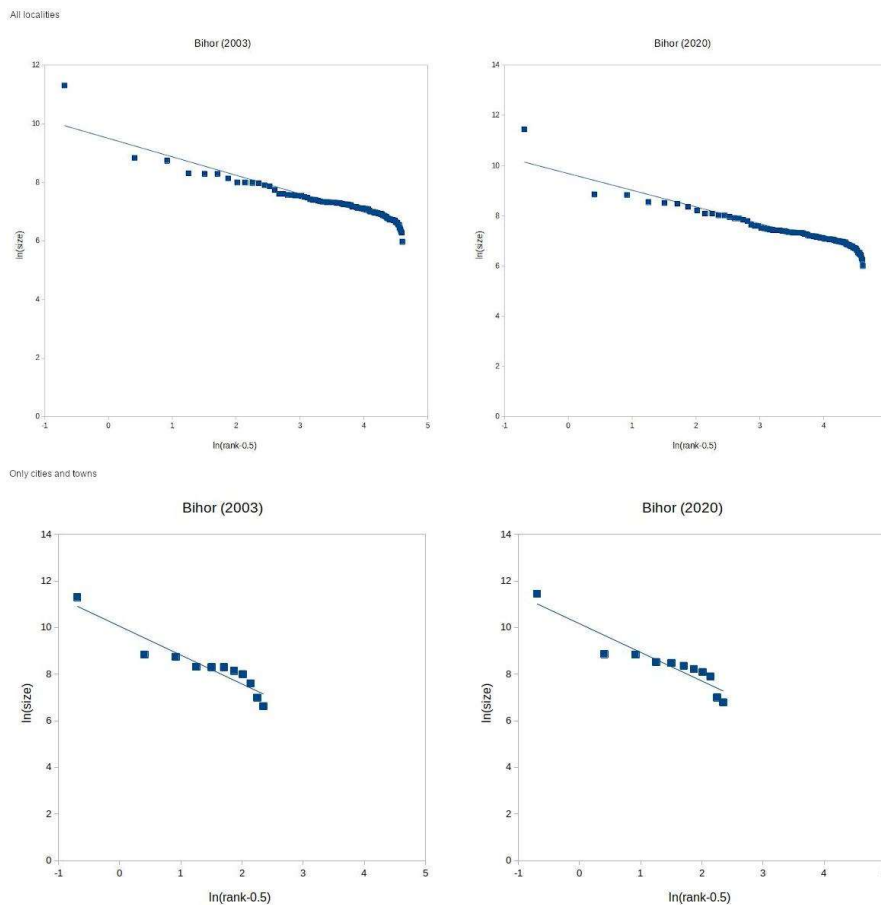


**Source:** Hungarian Central Statistical Office official site, available at <https://www.ksh.hu/?lang=en>, [accessed in August 2021]; National Institute of Statistics, *Statistical data bases*, available at <http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table>, [accessed in August 2021]).

The charts show that there is no significant change within the Euroregion between the two vertical snapshots of 2003 and 2020. Secondly, comparing horizontally the previous image, there is no significant difference between the top two charts and the bottom two ones, which just highlight how dominant the two urban centres are. When thinking of the definition of morphologic polycentricity, which states that there should be two or more well distributed and of balanced size urban centres, perhaps we could say that there is a hint of morphologic polycentricity in the study area as the two capital cities are more or less balanced in term of the number of dwellings. Nonetheless, we consider that this is not enough to state that this area is polycentric and that the flows between the two centres and other urban nodes within the area are necessary to give any significance to this term.

Taken separately, the two areas are, as expected, quite monocentric morphologically. The Bihor County shows a stronger monocentric pattern than Hajdú-Bihar however, the difference is not significant. Again, no significant differences can be spotted based on these charts between 2003 and 2020, in either of the two counties, whether all of the localities are considered or only the urban ones.

**Fig. 3.** Rank-size distribution of the number of dwellings within Bihor County in 2003 and 2020

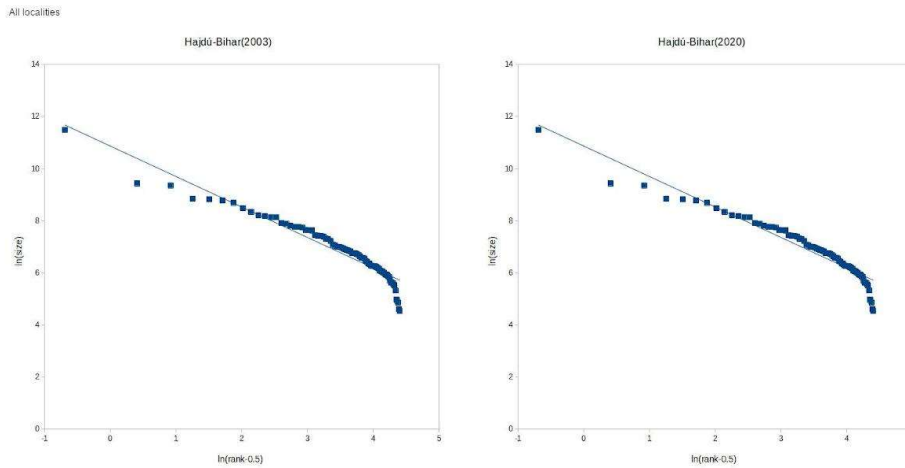


**Source:** National Institute of Statistics, *Statistical data bases*, available at <http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table>, [accessed in August 2021].

Three of the towns from the Bihar County show some increase in the number of dwellings however, not enough to counterbalance the growth in Oradea. Also, there is clear evidence of the dormitory village trend around Oradea, as highlighted in **Fig. 5**.

In Hajdú-Bihar County, Hajdúszoboszló is the one town that has seen a greater increase in the number of dwellings during the analysed time-frame.

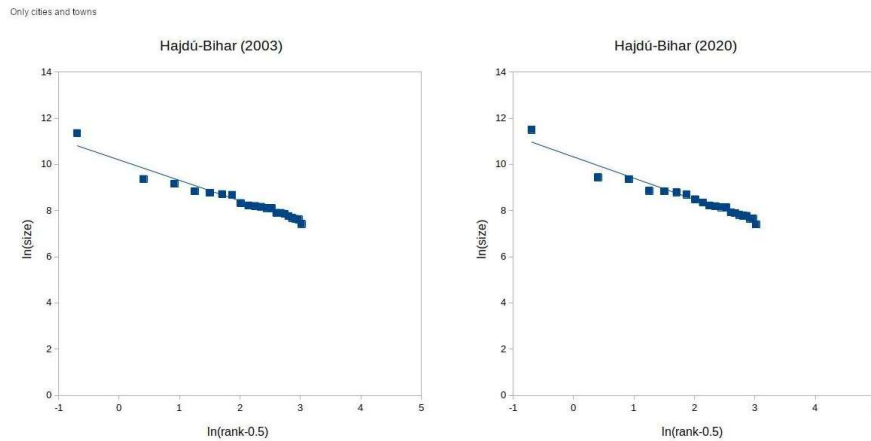
**Fig. 4.** Rank-size distribution of the number of dwellings within Hajdú-Bihar County in 2003 and 2020  
**Source:** Hungarian Central Statistical Office official site, available at <https://www.ksh.hu/?lang=en>, [accessed in



August 2021].

However, just like in the case of Bihar County, the increase in Debrecen is much stronger. There also seems to be some increase in the vicinity of Debrecen, just like in the case of Oradea, but it is not so evident most probably due to the larger area covered by the administrative territory of Debrecen which is most probably where most of the new residential dwellings have concentrated.

**Fig. 5.** Evolution of the number of dwellings within the Bihar - Hajdú-Bihar Euroregion, between 2003 and 2020



**Source:** Eurostat, *GISCO. Geographical Informations and Maps*, available at <https://ec.europa.eu/eurostat/web/gisco/geodata/reference-data/administrative-units-statistical-units>, [accessed in August 2021]; Hungarian Central Statistical Office official site, available at <https://www.ksh.hu/?lang=en>, [accessed in August 2021]; National Institute of Statistics, *Statistical data bases*, available at <http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table>, [accessed in August 2021].

### Conclusions

The study shows that, considering the chosen data, there is no evidence in the case of the Bihar - Hajdú-Bihar Euroregion of a clear evolution towards a clear polycentric pattern, which would include the functional aspects as well, though the characteristics of morphologic polycentricity are there. Even though we think the number of dwellings could provide good indications in this regard, we wouldn't draw any final conclusions regarding the appropriateness of this indicator for this purpose. To confirm these outcomes, we think the study deserves to be continued by looking into other indicators and data that would address both morphologic and functional polycentricity, as proposed by the speciality literature.