

**Zoltán Bujdosó, Lóránt Dávid,
Gulmira Uakhitova**

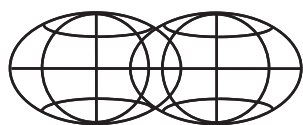
**The effect of county border on the
catchment area of towns on the
example of Hajdú-Bihar County -
methodology and practice**

Bulletin of Geography. Socio-Economic Series nr 22, 21-33

2013

Artykuł został opracowany do udostępnienia w internecie przez Muzeum Historii Polski w ramach prac podejmowanych na rzecz zapewnienia otwartego, powszechnego i trwałego dostępu do polskiego dorobku naukowego i kulturalnego. Artykuł jest umieszczony w kolekcji cyfrowej bazhum.muzhp.pl, gromadzącej zawartość polskich czasopism humanistycznych i społecznych.

Tekst jest udostępniony do wykorzystania w ramach
dozwolonego użytku.



ISSN 1732-4254 quarterly

The effect of county border on the catchment area of towns on the example of Hajdú-Bihar County – methodology and practice

Zoltán Bujdosó^{1, CDFMR}, Lóránt Dávid^{2, CDFMR}, Gulmira Uakhitova^{3, CDFMR}

^{1, 2} Károly Róbert University College, Department of Tourism and Regional Development, Mátrai u 36, 3200 Gyöngyös, Hungary;
¹ phone: +36 37 518 187, e-mail: zbujdosoz@karolyrobert.hu (*corresponding author*), ² davidlo@karolyrobert.hu; ³ Lev Nikolai Gumi-lyov Eurasian National University, Astana, Kazakhstan, phone: +7 7 015 110 940, e-mail: uakhitova_g@mail.ru

Bujdosó, Z., Dávid, L. and G. Uakhitova, 2013: The effect of county border on the catchment area of towns on the example of Hajdú-Bihar County – methodology and practice. In: Szymańska, D. and Biegańska, J. editors, *Bulletin of Geography. Socio-economic Series*, No. 22, Toruń: Nicolaus Copernicus University Press, pp. 21–33. DOI: <http://dx.doi.org/10.2478/bog-2013-0028>

Abstract. Towns constitute 9% of the settlements of Hungary and represent 68% of the population. This value roughly corresponds to the European Union average. Their number, however, considerably grew in the past decade. While in 1980 there were 96 settlements with town status in 1990 there were already 177 and at present there are 324, which is more over three times more than in 1980. Nevertheless, there are significant differences in their size and scope of activities. Several researches have been conducted concerning the urban fields of many settlements and larger territorial units in Hungary but there no comprehensive map of the urban fields has been prepared yet. Inter-settlement relations started to play a more and more important role in the economic life of the country. The paper focuses on the study of the urban fields of the towns situated along the borders of Hajdú-Bihar county pointing out those functions whose attractions remain within the administrative border and those which cross it. The studied area are the towns along the county border. A special methodology was used which could be used for other regions and towns in other countries.

Article details:

Received: 3 April 2013

Revised: 6 June 2013

Accepted: 27 August 2013

Key words:

Hungary, Hajdú-Bihar,
catchment area,
functions of towns,
county border.

© 2013 Nicolaus Copernicus University Press. All rights reserved.

Contents:

1. Introduction	22
2. Material and research	23
3. Results	23
3.1. The geographical bordering of the studied area	23
3.2. Transportation	24
3.3. Public and specialised administrative institutions	25
3.4. Function of public health and its attraction zone	25
3.5. Labour force migration and its attraction in the studied area	26

3.6. Secondary education and its catchment area	26
3.7. The function of retail trade and its attraction.....	27
3.8. Services and their attraction zones	28
3.9. The complex attraction area of the towns situated along the border of Hajdú-Bihar County	28
4. Conclusions	30
Acknowledgements	31
References.....	32

1. Introduction

The size of towns can be determined on the basis of the relative extent on the basis of their participation in the regional division of labour. The problem is that the number of the towns recognised administratively (*de iure*) has exceeded the number of settlements having real town scope of function in the country (Christaller, 1962; Boustedt, 1962; Vadász, 1986). The main reason for this is that after abandoning the division into districts, the former district centres and several settlements – not necessarily with central function – were declared towns.

In the socio-economic life of the country, regional processes, and inter-settlement and catchment connections play a significant role (Chabot, 1962; Huff, 1973). The towns and connections developed between their narrower and wider environments have formed a catchment area system covering the whole area of Hungary (Beluszky, 1981).

An investigation of the catchment area of the settlements is important and timely because of the following: (a) this is the most interesting field of Geography as joint effects of several factors are reflected in the attraction system (Physical Geography, Transport Geography, Settlement Geography, Historical Geography, Economic and Social Geography, etc.); (b) it can be used when establishing economic, cultural and health institutions; (c) a thorough examination of the catchment area provides the most accurate picture of the urban development of a settlement; (d) it shows the pattern of the space structure (Cloke, 1979); (e) emotional contacts can be reflected in the attraction conditions, which are the basic elements of the locality; (f) the administrative system of our country has to be adjusted to EU requirements, in which the mi-

cro regions based on attraction conditions should be given an important role; (g) the towns amount to 9% of Hungary's settlement range and 68% of its inhabitants. This value is similar to the average of the European Union. However, their number has increased considerably in the last decades. Whereas in 1980 there were 96 settlements with the legal status of towns in 1990 there were already 177, and recently, the value is more than three times higher than in 1980; Hungary has 346 towns. However, there are significant differences in their size and scope of their function.

A double aim guided us when writing this paper. On the one hand; we aimed at examining the complex attraction zone of the individual towns situated on the county border on the basis of the appointed functions, and on the other hand we looked for the answer to the question whether the county border effects the attraction zone of the towns. We set ourselves the task to delineate the goals of regional development and planning on the basis of the results.

The primary task was to collect data related to the studied functions (public and specialised administrative institutions, public health, transport, education, labour force attraction, spread of daily papers, tourism) and to construct a usable database on the basis of these data. Using these databases we had to construct the catchment areas, relating to the individual sectors, and the complex ones adopting the method of Beluszky (1970). Within this topic we set ourselves the task to examine how the resulted complex attraction zone corresponds to the county border, and where differences can be found. Using these results our task was to determine the regional development and planning possibilities, and the possibilities to continue this research.

2. Material and research

The research area mentioned above are the towns within the county border of Hajdú-Bihar County. The timeframe of the research is the year of 2010. The database required to the examination was constructed using two methods. The existing databases were applied, and we also collected up-to-date data.

One of the most problematic fields of catchment research is the lack of databases. The reason for this is that the database is hardly available in statistical offices and institutional statistics. The collected data may be incomplete or there may be functions that have not been measured

First of all, we adopted the method of questionnaire survey (closed and open questionnaire survey constructed in advance) in the course of the commercial examinations (shopping habits, origin of customers doing shopping in the markets, etc.) We also counted customers in shops and used information provided by receipts (for the turnover of shops and division of customers according to their residences).

The bulk of the available data comes from the publications of the Central Statistical Office, name-

ly we used the County Statistical Year Books and statistics of national census. We collected data from statistical databases of institutions (surgeries, hospitals, schools, local councils, etc.). Additionally, we utilised the timetables of Hungarian train and coach companies and web sites of the individual settlements as well.

After constructing the database we put the data into tables using Excel 97, whereas some parts of the resulted data were worked out mathematically by means of the SPSS for Windows. Certain parts of these were adopted from my former work and we prepared most of them using the ArcView software.

3. Results

3.1. The geographical bordering of the studied area

In delimiting the studied area we had a relatively simple thing to do because the county border determined the region to be researched. However, during the investigation several questions appeared.



Fig. 1. The studied area in Hungary

Source: Own edition

Finally, towns situated administratively on the county border or near to it were included in the examination, and one town fulfilling these criteria on the other side of the county border. The final

list is as follows: Nyíradony – Nyírbátor, Hajdúhadház (– Téglás –) Újfehértó, Hajdúnánás – Tiszavasvári, Polgár – Tiszaújváros, Tiszacsege – Tiszafüred, Püspökladány – Karcag, Berettyóújfalú (– Komádi).



Fig. 2. The studied towns

Source: Own edition

3.2. Transportation

The state of economic development of an area is considerably influenced by the structure of the road system its quality and the possibility for creating transport connections (Cliff et al., 1974; Ewing, 1974; Simon et al., 1978). That is why it is essential for a town to be properly connected to its attraction zone and to have proper links and roads.

First, in the studied area we looked at access to the towns included in the research. We examined the number and quality of the roads that lead to individual towns. It was needed because it does determine the spatial connection of towns since roads

connect surrounding and farther settlements. Inappropriate transport systems may cause development.

The studied towns have different transport-geographical position in terms of the number of roads providing access, and their quality. Besides this, the structure of the settlement-system shows considerable differences. As a consequence, the size of the area and the number of the settlements which can be reached between 15 and 30 minutes vary. In terms of the studied indexes Püspökladány, Berettyóújfalú, Nyírbátor, Karcag and Tiszafüred are in the best position, whereas the position of Tiszacsege, Füzesgyarmat, Téglás and Komádi cannot be said to be weak (Table 1).

Table 1. The accessible area in 30 minutes of the studied towns according to the fastest mode of transport

Town	A	B
Berettyóújfalu	17	28
Füzesgyarmat	4	22
Hajdúhadház	5	29
Hajdúnánás	6	27
Karcag	11	31
Komádi	5	19
Nyíradony	6	23
Nyírbátor	13	23
Polgár	6	21
Püspökladány	7	32
Szeghalom	7	20
Téglás	4	19
Tiszacsege	3	21
Tiszafüred	10	31
Tiszaújváros	18	23
Tiszavasvári	5	21
Újfehértó	5	23

Explanation: A – number of the settlements accessible in 30 minutes; B – distance of the outermost settlement accessible in 30 minutes (km)

Source: Own edition

3.3. Public and specialised administrative institutions

The administrative function is one of the most ancient central function scopes of settlements, mainly of towns, which influence considerably their development and their position in the settlement-system. At the same time, public administration is the most extensive activity which influences the regional and settlement framework of the life of population: 'with branching-out operation it considerably influences its development' (Erdősi et al., 1985).

In the course of the research we aimed at examining how the individual towns are supplied with public institutions and at analysing the attraction area of the individual institutions. Administrative, state-security and other specialised administrative functions were differentiated.

The studied towns are variously supplied with public and specialised administrative institutions. Only those settlements that have considerable town history play a significant role with respect to administrative institutions, and the existence of

these institutions represented a fundamental condition to declare them towns. The settlements which have recently received town status cannot attract offices and branch agencies except for a some institutions (registration office).

3.4. Function of public health and its attraction zone

The function of public health has a significant role in the investigation of catchment areas. Its advantage is that the data of operational zones and individual institutions are easily available.

In the course of the research we examined how the individual towns are supplied with institutions of public health, and their attraction area. Besides the specialist clinics, we looked through the regional distribution of ambulance stations and hospitals. It can be said that the attraction of public health as a second-grade function is still determined mainly administratively. In terms of specialist clinics and ambulance stations we can encounter rigid

boundaries and structures, and cross-county border attraction cannot be found anywhere.

3.5. Labour force migration and its attraction in the studied area

It is rather difficult to effectively examine the labour force attraction in the case of towns, since commuters are not registered by the Statistical Offices (only during the census in 2001). Thus it can provide a proper picture for a given time but the change is not measurable. The Central Statistical Office surveyed the residences and work places of the commuters in the country during the census in 2011; in this way, the labour force movement was demonstrated.

We studied the labour force attraction in the towns from two points of view: we calculated the number of people commuting to the towns from the individual settlements for 1,000 inhabitants, and we studied the ratio of commuters from the given settlement to the towns and all the commuters of the settlement. For the examination we separated the people commuting for employment from the pupils going to school (this last group is analysed in the chapter on secondary education).

In the database of the statistical office we studied all the settlements from which workers can be found in the given towns, but we only took into consideration the final results where 0.1 workers were for 1,000 inhabitants. The settlements with big industrial factories, which were ranked as the most extensive attraction area. Of these we would emphasise the attraction of Nyírbátor which spreads over farther settlements mainly due to its bigger specialised factories (Unilever, Clerol, etc.). Both the ICN Pharmaceutical Factory in Tiszavasvári and the Chemical Complex in Tiszaújváros play a significant role in the labour force attraction of the region as well, the evidence of which is that they have considerable attraction not only from the adjoining counties (the latter employs people from Hajdú-Bihar County but also from Szabolcs-Szatmár-Bereg County). The greatest employer in Karcag and Tiszafüred has a considerable effect not only on their active workers but also on the adjoining counties. For example, the attraction zone of Karcag includes

areas over Püspökladány and Békés County and the influence of Tiszafüred extends over the county border. The same can be said in the south county border where mainly Szeghalom has attraction on some settlements in Hajdú-Bihar County.

The number of people commuting from the individual settlements to the town was compared to the number of the active wage earners. This is important because it gives a ratio that shows to which town the inhabitants of settlements are more attracted. The data from the national census by the Hungarian Statistical Office 2001 provided the database for this examination. We did not take into consideration the settlements having values lower than 20%, as below this value only accidental attraction can occur. As a result 21–39% weak, 40–69% middle and over 70% strong attraction was estimated. In the course of estimating the results the relative labour force attraction we only encountered differences in a couple of cases compared to the values for 1,000 inhabitants.

3.6 Secondary education and its catchment area

The general education and qualification of labour force have an impact on the possibilities of the economic development of a town. The education appearing and rising in the course of the social development of a town stimulates the consolidation of the functions of urban character (Berényi, 1988; Bodor, Péntzes, 2012). Therefore education plays a significant role in the range of central functions, which can have a double role. On the one hand it can be preventive, as the lack of educational institutions can influence the economic development of a settlement negatively (e.g. the lack of qualified labour force in a settlement) but it has another role since the resignation of the economic development of a settlement may involve the foundation of many secondary schools and secondary courses. When establishing the catchment area of secondary education we studied the number and ratio of pupils from the countryside for 1,000 inhabitants in the towns. The database was constructed by our own data collected from the secondary schools of the towns, then we calculated the number of pupils for 1,000 inhabitants in every settlement.

During the examination of the educational attraction conditions we considered another factor as an important aspect to examine, namely, the ratio of pupils from the countryside studying in secondary schools and all secondary school pupils in a given settlement. This shows that the ratio of pupils from a given settlement studying in a given town i.e. to which town they are more attracted from the point of view of education.

Education is one of the most important factors when establishing the attraction zone of a town since it removes obstacles for pupils. The traditions developed in the course of history, the formal institutional structure and the informal county borders in many cases have stabilised the developed structure. The towns and town pairs on two sides of the county border represent other types and therefore they could form their attraction areas, which, unfortunately, only in few cases show a well-balanced form only in few cases.

3.7. The function of retail trade and its attraction

Trade has a distinguished role from the point of view of the operation of the settlement-system and the supply of inhabitants; it makes a connection between the product and consumption. Why does trade have an outstanding role in the investigation of attraction zones: (a) trade plays a considerable role measuring the importance of attraction (the number of developed connections); (b) retail trade makes the strongest connection between towns and villages; (c) its directions are determined by the subjective decisions of customers, that is why it is independent from administrative restrictions; (d) of all the institutions of central function the specialist shop network is the densest one; thus, the inequality of the institution system does not influence the development of the attraction zone; (e) all towns have a commercial attraction; (f) its attraction zone system is the most complete one; (g) its results can be generalised; (h) the connections developed by retail trade attraction are permanent, they change very slowly; (i) its formation is influenced by the connection developed by its other central functions, that is why the attraction of the different central functions is summarised in the retail trade attraction; (j) the

attraction considerably influences the turnover of the commercial network of the centre, it contributes to develop the shop system quantitatively and qualitatively (Beluszky, 1966); (k) there is a strong connection between the inhabitants of the settlements and their position in the hierarchy of commercial centres; (l) of the central functions, the commercial function scope is the nearest to the general level (Beluszky, 1966; Szabó, 2009); (m) there is no parallel between the central function of centres and the hierarchical grade developed by the total functions; (n) it can be divided into different grades which makes it possible to draw multiple subordinated attraction areas and ones which overlap; (o) it is not limited in its dimension; therefore, the role of accident is limited in the survey.

The examination widely covered the commercial functions. The lack of data caused the biggest problem, that is why we relied exclusively in the information obtained by primary data collection. In each settlement we did counted customers in shops and also in markets. The results were projected to 1,000 inhabitants of each settlement and we were able to create intensity zones of the commercial attraction.

Clearly, at the north-east border part of the county the shop attraction of Nyírbátor is the most noticeable one. A ring of strong attraction has developed surrounding the town in Szabolcs, which is surrounded by an increasingly split zone of medium attraction. The weak attraction of the town spreads over Hajdú-Bihar County as well. Of the adjoining towns neither Nyíradony, Újfehértó, Hajdúhadház nor Téglás could develop zones of strong attraction, which is due to the attraction of big shopping centres in Debrecen and Nyíregyháza. As a consequence, their weak attraction covers only some settlements (in the case of Újfehértó it covers cross-county border areas).

From the point of view of shopping, the attraction of Hajdúnánás and Tiszavasvári is well balanced; however, the former can influence Hajdúdorog weakly because of the strong urbanisation of the surrounding area while the latter attracts several settlements.

The attraction condition in the north-west corner of the county shows an interesting picture in the case of Polgár and Tiszaújváros. As this town in Borsod has units belonging to several bigger chains of department stores, its shop attraction spreads not

only over the adjoining settlements but also over a lot of farther areas, over the county border (moreover, it has a weak effect on Polgár itself as well).

The attraction of Tiszafüred is the most noticeable along the county border towards the south. Tiszacsege, except for itself, has no shop attraction effect at all, people from the adjoining settlements go shopping either to Tiszafüred or to Polgár, thus the attraction of the former town extends over the county border considerably.

The attraction in the case of Karcag and Püspökladány can be said to be well-balanced as well. The Cumanian town has a strong shop attraction in the eastern part of Jász-Nagykun-Szolnok County, at the same time it has a weak effect on Püspökladány and on the north-east villages in Békés. The attraction of Püspökladány on the adjoining settlements is strong but moving away from the town it becomes weaker, nevertheless the reverse case occurs as well (e.g. Nádudvar).

The shop attraction conditions are complicated in the Bihar region as well. A zone of strong attraction surrounding such as Berettyóújfalu and Szeghalom, has been formed, however, the same can be noticed around the small towns of Komádi and Füzesgyarmat. Moving away from the towns, the zone becomes torn.

With the development of the shop trade the role of the markets decreased. As there are generally smaller or bigger market fairs in most settlements the market attraction of the towns has decreased considerably. Despite this fact the markets of almost every town have a kind of attraction. In order to measure this, we carried out a survey when surveying the shopping on market day. The attraction of markets does not show a considerable difference from shop attractions, a stronger or weaker attraction can be experienced in a couple of cases.

Taking into consideration the shop commercial units and the attraction zone of markets we formed the commercial attraction zone of the individual studied towns. It can be stated that the hierarchy of the commercial attraction centres is fairly complicated, there is a lot of overlap in the attraction area, and there are many smaller attraction centres. However, it can be clearly seen that the older towns can influence their environment a lot more considerably because of their higher grade shop system (stores, bigger chain stores having more specialist departments).

3.8. Services and their attraction zones

In the narrow sense, service is the production and repairing of products for inhabitants, whereas in a wider sense it means a complex of repairing-maintaining commercial and transport activity which serves the direct consumption of inhabitants (Fodor, Hajdú, 1985).

Numerous institutions of very different character can be ranked among the service institutions on urban level (Beluszky, 1970). Beside the institutions which have been studied so far several dozen institutions can play a central role in the life of a town. The competence area of most of them corresponds to the administrative borders. First, we wondered how the studied towns are supplied with service institutions playing a significant role also in the life of inhabitants of the surrounding village. We divided the services into four large groups; financial, insurance, public utility and economic services were differentiated.

The studied towns are supplied with service institutions very differently. Similarly to the public administration institutions, only those institutions which already have a considerable urban past can play a real role in this field. The settlements which were recently awarded urban status – except for a couple of institutions which can be regarded as a ‘basic supply’ – cannot attract offices, branch agencies.

It can be mentioned as an interesting fact that similarly to the administrative function – apart from some cases – the towns supplied better with institutions cannot be found not on the Hajdú-Bihar side.

3.9. The complex attraction area of the towns situated along the border of Hajdú-Bihar County

The most important scientific and practical result of attraction zone investigation can be the formation of its complex attraction zone if we explore its complex attraction zone (Berry, Garrison, 1958; Fodor, Hajdú, 1985; Bujdosó, 2009). However, a simple summary of the sectoral attraction zones cannot give the complex attraction zone, since the are-

al connection zones developed by the sectoral attraction zones are heterogeneous, they reflect the role of the given sector within the area, they depend on the degree of supply of the centre (Preston, 1971; Kostrubiec et al., 1975). In consequence it is an issue debated by among the researchers whether it is possible to summarize the individual factors and functions and to form a complex attraction area. According to several researchers, the summary does not lead to results, it is not possible to develop the summarised attraction zone (Erdei et al., 1959, Bernát, Enyedi, 1961). At the same time, other researchers profess that the attraction of the institutions which are on the same hierarchical level can be merged with weighting (Beluszky, 1981, Kovács 1987). In Hungarian specialist literature the most accepted and the most frequently used method was worked out by Pál Beluszky when determining the attraction zone of Nyíregyháza (Beluszky, 1970).

$$L_v = \sum_{i=1}^n x_i, \text{ where}$$

L_v – population of the complex catchment area
 n – population attracted by a function of a town
 x_i – population of the ‘i’ attracted settlement

While marking out the complex attraction zone it is an essential principle that only the boundaries of attraction zones of institutions that are on the same level can be merged.

In the case of the functions which are administratively controlled the settlements linked to the institutions got, of course, maximum value, whereas the ones which do not belong to them got minimum value.

In the course of calculating the complex attraction zone as a first step we calculated the average attraction intensity, we compared the indexes of each settlement to this result. According to the method, we raised the resulted quotients to second power, added them together and then extracted the roof.

Using the results we marked out the strong, medium and weak attraction zones of the towns. On the basis of this the following can be stated: according to Pál Beluszky, to maintain the differentiated institution system a town of 16 thousand

inhabitants and the attraction zone of 33 thousand people belonging to it, a total of approximately 50 thousands people are needed (Beluszky, 1999). The data in the table reveals that six towns, namely Berettyóújfalu, Karcag, Nyírbátor, Püspökladány, Tiszafüred and Tiszaújváros practically totally, while Szeghalom and Tiszavasvári partly are suitable for this criterion. Hajdúnánás is *de facto* a town because of its historical traditions and degree of institutional supply. On the basis of the mentioned criteria the other settlements of urban status cannot be regarded functionally as towns with total scope.

Table 2 shows the data of the catchment area of towns (Table 2).

Table 2. The main data of the complex catchment of the studied towns

Town	A	B	
		a	b
Berettyóújfalu	16,116	33	51,775
Komádi	6,015		
Hajdúhadház	12,709	2	9,152
Téglás	6,213		
Hajdúnánás	18,055	2	12,104
Karcag	22,574	13	58,734
Nyíradony	7,701	4	16,884
Nyírbátor	13,433	20	38,746
Polgár	8,373	5	6,432
Püspökladány	15,946	12	36,684
Szeghalom	10,198	11	34,878
Füzesgyarmat	6,428		
Tiszacsege	4,975	1	5,535
Tiszafüred	13,747	17	32,736
Tiszaújváros	17,207	26	39,525
Tiszavasvári	14,373	6	16,902
Újfehértó	13,526	5	16,510

Explanation: A – population (inh.); B – complex catchment area; a – number of attracted settlements; b – population of the attracted settlements

Source: Own edition

There are two great important roles of attraction zone examinations: on one hand to show the settlement system, on the other hand to describe the degree of supply of institutions in individual settlements. The results can suggest the insufficiencies, and possible changes.

4. Conclusions

To summarise the results we can say that the examination suggested that the boundary of Hajdú-Bihar County does not follow the attraction conditions, there are several cases when towns from the county attract a settlement from another county, and *vice versa*. After the examination of the complex attraction zone results and the sectoral attractions of the individual functions it is revealed that three settlements in Hajdú-Bihar are attracted to the towns of another county. The relations of Csökmő and Újiráz

near the south border of the county can be said to be closer to Szeghalom than to Berettyóújfalu or Komádi. The same phenomenon can be noticed in the case of Egyek whose inhabitants use the services of Tiszafüred than Tiszacsege.

Naturally, we can find the same examples for the attractions towards the other direction along the border of the county. Due to the chaotic attraction conditions of the southern Bihar area, Zsadány and Körösnagyharsány 'benefit from' the attraction of Berettyóújfalu not Szeghalom, whereas on the north the inhabitants of Szakoly, Balkány and Bököny are attracted towards Hajdúhadház or Nyíradony instead of Újfehértó.

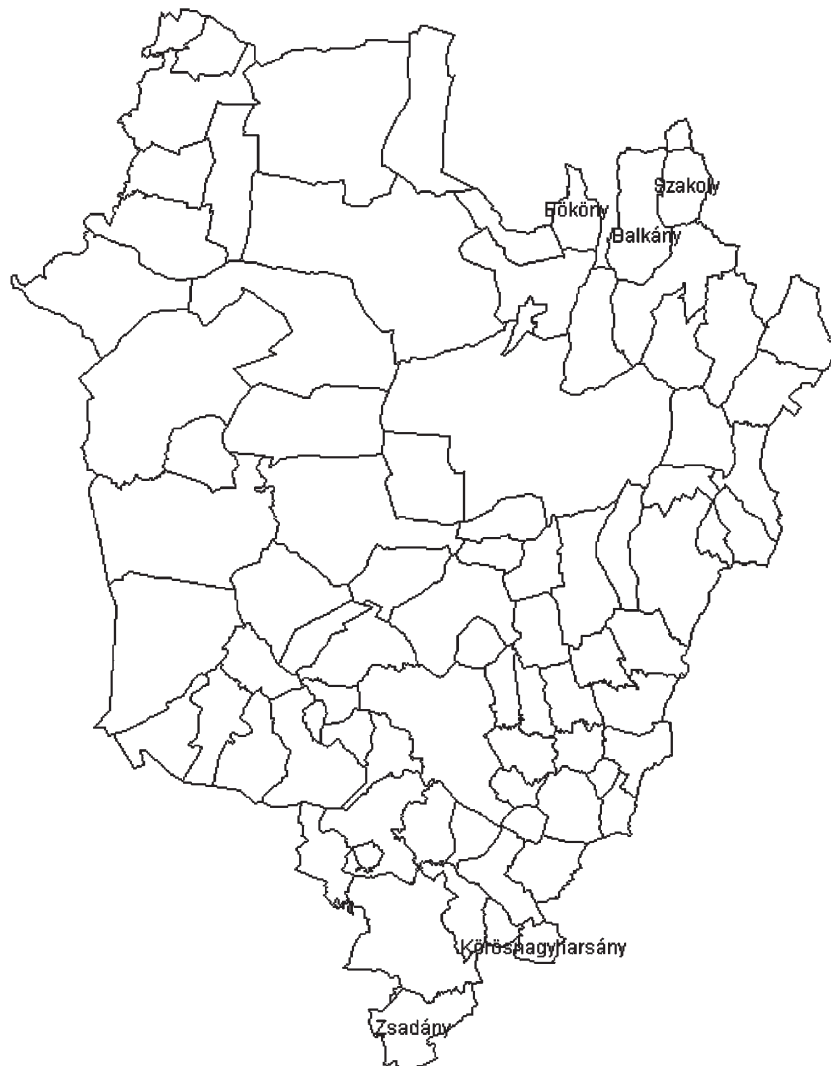


Fig. 3. Hajdú-Bihar County according to the results of the research
 Source: Own edition

If the administrative boundaries followed the connection developed by the attraction, the number of settlements in Hajdú-Bihar County would increase by two. The area of the administrative units (by 63.49 km²) and its population (by 7,050 persons) would increase as well.

Table 3. Some data of Hajdú-Bihar County according to the results of the research

Indicator	A	B
Area (km ²)	6,210.88	6,274.37
Population (inh.)	552,998	560,048
Number of settlements	82	84

Explanation: A – resent situation; B – according to the results of the research

Source: Own edition

The research of the towns formed after the regime change shows that the central functions are missing from the settlements with urban status they have incomplete function scope. During our investigations we tried to point out which towns are included in this category and which functions should be decentralised and transferred to other towns.

Practically, there is a lack of functions of settlements in the case of the studied towns which obtained urban status in the 1990s and later. In most of them, institutions with secondary grade attraction are missing, except for a couple of except for a couple of institutions with little attraction (secondary school department, specialist clinic, etc.).

There are kinds of secondary-grade function institutions which can be found only in some towns (civil protection, customs, land registries, gas, telephone and electricity suppliers, etc.). With regard to administrative and public institutions, opening a land registry and home guard would be needed in the north part of the county, since there are not any institutions of that kind in the towns of Hajdú-Bihar. The northern towns in the county are not supplied with the institutions of the court and general public health service either.

The towns are relatively well supplied with institutions of public health, the institutions of specialist clinics and pharmacies are adequately built. However, because of the long distance it would be needed to establish an ambulance station in Polgár and Komádi. As hospitals do not belong to the

functions of medium grade, we did not deal with them in details; however, it is worth noting that the northern areas in Hajdú-Bihar County belong to the attraction of the hospitals in Debrecen (e.g. Hajdúböszörmény or Hajdúnánás).

Secondary schools are the most essential institutions in towns, despite this fact only a couple of classes are working as a specialised schools, generally as a correspondence one. Therefore, opening a continuously working full secondary school in Komádi, Nyíradony and Tiszacsege would be needed as well. Of the service functions the branch agencies of the Hungarian telecommunication company show great concentration therefore it would be worth restoring the former areal master system (Püspökladány, Polgár, Hajdúnánás and Hajdúhadház) and to establish a branch in Tiszacsege. Opening an enterprise-development foundation branch in Komádi, Polgár and Tiszacsege would also be needed (Süli-Zakar, 1998).

The lack of the mentioned functions causes problems in the towns since they cannot supply the inhabitants of the surrounding settlements. In this case it is justified to ask whether a settlement rises above the others and whether it has the kinds of services that a town must have.

We consider the use of the above mentioned results in the public administration as a possibility to continue our research. At the same time, using similar methods the towns and town pairs situated along the boundary of the North Great Plain Region can be involved in the investigation. In this way we may get an answer to the question of which settlement can be classified into another region and whether it would be practical to reform regions which follow the EU norms and have a proper position in the Hungarian public administration at the same time.

Acknowledgements

The authors would like to acknowledge the Bólyai Scholarship of the Hungarian Academy of Science which has made the completion of this paper possible. This paper was supported by the János Bólyai Research Scholarship of the Hungarian Academy of Sciences.

References

- Beluszky, P.**, 1966: Magyarország kiskereskedelmi központjai (Trade centres of Hungary – in Hungarian). In: *Földrajzi Értesítő*, Vol. 5, Issue 9, pp. 237–261.
- Beluszky, P.**, 1970: A falu-város közötti kapcsolatok vizsgálati módszerei (Research methods of centre-periphery connections – in Hungarian) In: *Területi Statisztika*, Vol. 3, Issue 4–5, pp. 38–49.
- Beluszky, P.**, 1981: A városi vonzáskörzetek (városkörnyékiség) vizsgálatának elvi-módszertani kérdései (Methodological questions of the catchment area of towns – in Hungarian). In: *Államigazgatási Szervezési Intézet*, Budapest: Közigazgatási és Jogi Kiadó, p. 97.
- Beluszky, P.**, 1999: Magyarország településföldrajza (Settlement geography of Hungary – in Hungarian), Budapest-Pécs: Dialóg-Campus Kiadó, p. 584.
- Berényi, I.**, 1988: A határmenti térségek kutatásának szociálgeográfiai aspektusai (Sociogeographical aspects of the research of border regions – in Hungarian) In: Erdősi, F. and Tóth, J. editors, *A terület és településfejlődés társadalmi-gazdasági folyamatai Magyarországon*, c. program MTA RKK Pécs- Ts-2/2 Program Iroda, pp. 58–61.
- Bernát, T. and Enyedi, G.**, 1961: A magyar mezőgazdaság termelési körzetei (Agricultural regions of Hungary – in Hungarian), Budapest: Magvető Kiadó, p. 168.
- Berry, B.J.L. and Garrison, W.L.**, 1958: The functional bases of the central place hierarchy. In: *Economic Geography*, Vol. 3, Issue 4, pp. 37–51.
- Bodor, N. and Péntzes, J.**, 2012: Eger komplex vonzáskörzetének dinamikai vizsgálata (Dynamical analysis of the complex hinterland of Eger – in Hungarian). In: *Tér és Társadalom*, Vol. 26, No. 3, pp. 30–38.
- Boustedt, O.**, 1962: Die Zentralen Orte und ihre Einflussberichte (The central places and their attraction areas – in German). In: *Lund Studies in Geography*, Ser. B, No. 24, pp. 25–42.
- Bujdosó, Z.**, 2009: Gyöngyös város vonzáskörzetének változása az elmúlt negyed évszázadban (Changing of the attraction zone of Gyöngyös in the last decade – in Hungarian) In: *Földrajzi Közlemények*, Vol. 133, Issue 1, pp. 59–74.
- Chabot, G.**, 1962: Presentation D'une carte des zones d'influence des Grandes villes françaises (Map of the attraction zones of the french cities – in French). In: *Lund Studies in Geography*, Ser. B, No. 24, pp. 43–59.
- Christaller, W.**, 1962: Die Hierarchie der Städte (Hierarchy of towns – in German). In: *Lund Studies in Geography*, Ser. B, No. 24, pp. 60–82.
- Cliff, A.D., Martin, R.L. and Ord, J.K.**, 1974: Evaluating the Friction of Distance Parameter in Gravity Models. In: *Regional Studies*, Vol. 8, Issues 3/4, pp. 41–67.
- Cloke, P.**, 1979: Key Settlements in Rural Areas, Mthuen: University Press Cambridge, p. 259.
- Erdői, F., Csete, L. and Márton, J.**, 1959: A termelési körzetek és a specializáció a mezőgazdaságban (Agricultural regions and specialities in the agriculture – in Hungarian), Budapest: Közigazgatási és Jogi Könyvkiadó, p. 416.
- Erdősi, F., Hajdú, Z. and Hrubí, L.**, 1985: A vonzáskörzeti viszonyok alakulása Baranya megyében a felszabadulás óta (Forming of attraction zones in Baranya county after the II World War – in Hungarian). In: Ádám, A. and Farkas, K. editors, *Államigazgatás, terület-és településpolitika*, Pécs: Egyetemi Kiadó, pp. 65–81.
- Ewing, G.O.**, 1974: Gravity and Linear Regression Models of Spatial Interaction: A Cautionary Note. In: *Economic Geography*, Vol. 5, Issue 1, pp. 23–37.
- Fodor, I. and Hajdú, Z.** editors, 1985: Szekszárd vonzáskörzetének vizsgálata (Attraction zone of Szekszárd – in Hungarian), Pécs: MTA RKK DTI, p. 293.
- Huff, D.L.**, 1973: The Delineation of a National System of Planning Regions on the Basis of Urban Spheres of Influence. In: *Regional Studies*, Vol. 7, Issue 1, pp. 49–63.
- Kostrubiec, B., Łoboda, J., Zagożdżon, A. and Zipser, T.**, 1975: Application of Mathematical Models in Analyzing and Forecasting Development of a Settlement System, presented at the RSA Seminar in Zakopane, p. 125.
- Kovács, Z.**, 1987: Kiskereskedelmi centrumok és vonzáskörzetek Heves megyében (Retail centres and attraction zones in Heves county – in Hungarian). In: *Földrajzi Értesítő*, Vol. 36, Issue 3, pp. 253–272.
- Preston, R.E.**, 1971: The Structure of Central Place System. In: *Economic Geography*, Vol. 1, Issue 2, pp. 136–155
- Simon, I. and Tánczos-Szabó, L.**, 1978: Az alföldi megyék közúthálózatának topológiai vizsgálata (Topological research of the road network in the Great Plain

- in Hungarian). In: *Alföldi Tanulmányok*, II, Békéscsaba: MTA FKI ACS, pp. 183–201.
- Süli-Zakar, I.**, 1988: Megyehatár menti elmaradott térségek település – és népességföldrajzi helyzete a Sárréten (Settlement geography and demography along the county border – in Hungarian), Debrecen: Kézirat, p. 39.
- Szabó, G.**, 2009: A térinformatika alkalmazási lehetősége vonzáskörzetvizsgálatokban, kiskereskedelmi vonzáskörzet felmérésének (Application possibilities of GIS in the attraction zone research – in Hungarian). In: *Területfejlesztés és Innováció*, Vol. 3, Issue 1, pp. 20–30.
- Tóth, J., Dövényi, Z. and Mosolygó, L.**, 1975: A vonzáskörzet – kutatások és a gazdasági körzetesítés kapcsolata (Connection between the research of attraction zones and ecologic regions – in Hungarian). In: *Földrajzi Közlemények*, Vol. 23, Issue 3–4, pp. 347–354.
- Vadász, I.**, 1986: Kunhegyes vonzáskörzete (Attraction zone of Kunhegyes – in Hungarian). In: *Alföldi Tanulmányok*, XI, Békéscsaba: MTA RKK ATI, pp. 279–306.