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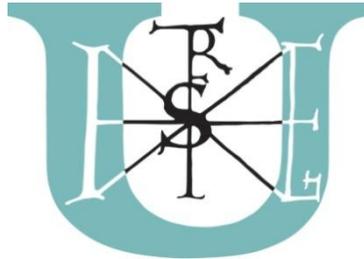
PhD DISSERTATION THESIS

THE EXAMINATION OF MAJOR REGIONAL ECONOMIC COHERENCES OF GROWTH-POLES IN HUNGARY

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1. INTRODUCTION

The Hungarian social-economic space structure of the period after the **change of regime** was characterized by significant differences; the **territorial inequalities have gradually increased.** Even spatial policy was not able to halt them or moderate them. As a result of the differentiation processes of the past two decades, – in comparison with the Union member states – Hungary has the largest gap regarding the GDP per capita of the regions. A little more than 50% of the Hungarian micro regions have disadvantaged conditions with 30% of the population.

Territorial policy before the change of regime was centralized, the settlements did not have or had only minimum freedom in decision-making and the real market and social conditions were sometimes hidden. Despite of this, **the changes due to the change of regime,** which were drastic in many cases, as well as the adaptation to the real market conditions **have modified the economic-social space structure of Hungary significantly**. Not all the settlements could adapt to the sudden changes appropriately and this was even worsened by the problems due to the collapse of the socialist centralized system (collapse of heavy industry, closing of factories, extremely high unemployment etc.). **The basic features of the space structure were created at that time and the gaps have further widened since then**. The different areas reacted in different ways to the sudden changes in the economy, therefore various development paths have been created due to the various economic development measures. Such development paths determine the future of the local economies and the achievable targets. If we carry out analysis independent from the geographical location, **significant come off can be observed in the relation between urban and rural areas,** especially in the villages with population under 1000 (tiny-, micro- and small villages). Such villages are characterized by peripheral features (e.g. depopulation, ageing, the lack of economic activity, unemployment etc.).

Dealing with and moderating territorial imbalances are the determinant elements of regional policy not only in Hungary but in the EU as well. Several theoretical wings have been born to handle the territorial discrepancies which will be detailed later in my dissertation. While I was studying those wings, I found out that **perfect territorial equality cannot be reached by any means in our globalized world.** With artificial measures it can be achieved for short terms, but it cannot be sustainable. The other wing of theories analyzes the polarized development, i.e. it does not intend to reach perfect equality in space – since it is impossible –, however, it says that the key to economic development is „expanding" development. It says that not the peripheral areas must be developed but the strengthening of the **economic centers needs to be encouraged**. In that way the prosperal centers **will pull the semi-peripheral and peripheral areas**

with themselves, therefore they can generate economic development in the areas lagging behind.

The abovementioned motivated the selection of the topic, i.e. whether the **theory can be applied in practice** and **how successfully it can be realized in Hungary**.

As it is known by many of us**, there are huge differences** between the territorial units in the EU at both NUTS 1 and NUTS 2 levels. Although the international **economic crisis** slowed down the **economies of the core areas** as well – therefore the gap in the development levels narrowed a bit –, but it is these areas that can deal with the effects of the crisis in the shortest time. Innovation ability is concentrated here that can find the way out from the handicapped status towards dynamic development.

Even higher territorial discrepancies can be observed at lower territorial levels. There are high inequalities at NUTS 3 level, but it is even higher at LAU 1 (micro-region) and **LAU 2 (settlement) levels**. The lower territorial level we take into the examination, the higher differences can be discovered, thus I carried out **settlement-level** (LAU 2) research in my dissertation.

The method applied in my research is comparison. As a result of great efforts in collecting the database, I selected the base year of **2003 as the start of the period examined** – the year before our EU accession – and – the latest data available, i.e. the year **2010**.

The speciality of my dissertation is that I have carried out not only my original research targets but I did additional **examinations due to the unexpected results of my investigation**. The dissertation includes not only a dynamic analysis but it also discovered the **impacts of the economic crisis**.

Based on the abovementioned, I set the following **major targets in my research**:

1. According to the aspects applied in my research, what territorial definitions can be observed and how the space structure of the country changes based on settlement-level examinations on the economy and society?

2. While evaluating the results of the comparative examination what impacts influenced the territorial processes the most? Which effects are responsible for the decline and which are the "fundaments of success"?

3. How did the economic crisis influence the economic status of the settlements? Did it have the same negative impacts on the whole country? If yes, where and how much? Is there a territorial cohesion among these territories? If not, which areas were less dependent on the crisis– due to their economic weight?

4. Whether the pole-cities – defined in a centralized way – are able to operate as "dynamising cores"? If yes, how long do they have positive impact on the other areas and how are they linked to each other?

1.1. Starting hypotheses of the dissertation

1. **hypothesis:** I wanted to prove with a settlement-level analysis that settlements near highways constitute a uniform and coherent cluster and they generally belong to the developed areas of the country. Favourable employment, income and infrastructural conditions feature them. They reacted better to the impacts of the economic crisis than the rest of the country.

2. **hypothesis:** Central-Hungary is the most developed region where the developed settlements are located around the capital like a ring. According to my hypothesis, this position is not due to static but continuous economic development. In addition, these settlements – that cover almost the whole agglomeration of the capital – do not depend on the social problems which exist throughout the country. The capital has expanding agglomeration and it gradually steps over the borders of Central-Hungary region, therefore the number of settlements with favourable economic conditions also increases.

3. **hypothesis:** The most important poles in the countryside are Debrecen, Miskolc, Szeged, Pécs and Győr. Similarly to the capital, they operate as "engines" in their surroundings Of course this effect is stronger right next to the center and gradually decreases as we are getting farther from it. However, they provide determinant economic performance to their whole region.

4. **hypothesis:** I think that favourable (young) age-structure is characteristics not only to the economically developed areas, but also to the external peripheral territories. While the high number of children is due to the economic welfare in the developed areas, it is the only one way to survive supported by the social net in the peripheral areas.

5. **hypothesis:** According to my hypothesis, the number of peripheral areas seems to increase, there is a gradual decline especially near the national borders. These external peripheral areas are characterized by further lasting social-economic come off which contributes to the widening gap between the Hungarian territories.

2. MATERIAL AND METHOD

2.1. Material

While I was preparing my dissertation, I considered it the most important task to review the national and international literature systematically as well as making comments to them. After the literature review I collected the necessary database. I tried to select the data based on five aspects as follows:

- Data on infrastructure,
- Data on unemployment,
- Demographic data,
- Data on school attainment and human resource and
- Economic data.

The definition of the abovementioned data is included in this chapter. **My research contains only secondary data**.

2.1.1. Spatial- and timeframe of the analysis

The dissertation primarily focuses on the research on inequalities. As I mentioned in the introduction and the literature review, territorial differences are significant and gradually increase.

Nowadays, such researches are carried out at micro-regional level, therefore most of the latest data is available at that level. Since the differences between the settlements even in the same micro-region are also high, it might distort the status of the settlements very much.

Thus, **in my dissertation,** I carried out **settlement (LAU 2) level** analysis, getting more accurate picture about their situation. In my opinion, it is also a merit that the results can be aggregated to carry out further examinations at any territorial levels. This is extremely important, since the existing 175 micro-regions [MAGYAR KÖZLÖNY, based on Act 149 of 2010] are not the same as the 175 public administration units that came to effect on 1 January 2013.

After the long lasting data collection, I selected the **base year of 2003**. I made this decision because 2003 was the year just before our EU accession. Other years e.g. 2000-2002 could not provide full database. There were some missing data from each year.

The most important aspect in selecting the other year was to find the latest data available **i.e. 2010**. I started to collect the data in May of 2012.

The number of Hungarian settlements has been continuously changing – regarding the past decades, the number of cities and settlements also **increased**.

The number of Hungarian settlements in 2003 was 3145 – including the capital –, while it increased to 3152 by 2010.

2.1.1.1.Data collection

I collected **87 indicators** for all the Hungarian settlements for both years. Since there are big differences between the sizes of settlements, and therefore between their data, I used only inherited indicators in my examination. From the 87 raw, basic data I created **54 inherited indicators**.

While applying various statistical processes (factor-analysis, cluster analysis, discriminancy analysis), I involved only **33 variables** due to some missing data and after taking into consideration several conditions. I intended to select the abovementioned indicators based on **five major aspects**:

- **Infrastructural indicators,**
- **Unemployment data,**
- **Demographic data,**
- **School attainment and human resource,**
- **Economic status.**

2.2.Method

From various statistical methods I selected three which are the most suitable to achieve the targeted results – in my opinion. In the principle component analysis I tried to reduce the number of the variables to be able to create groups. It is called cluster analysis. In order to prove the results of cluster analysis, I carried out discriminancy analysis.

For the calculations, I used SPSS 19.0 and Microsoft Office Excel 2007 programs and for the maps I used Quantum GIS 1.8.0-Lisboa program.

3. RESULTS

3.1. Cluster-analysis for the settlement data of year 2010

In a **non-hierarchical clustering, the researcher is responsible for how many clusters are created.** Therefore I defined 4 clusters. **I created groups so that the results of both years could become comparable**.

In the matrix below (Table 1) I summarized the tendencies which clearly show the changes in the positions of the settlements.

Table 1: Matrix of the changes in clusters of the settlements, 2003-2010

Clusters (settlements)	Pole-zone, 2003	Close to pole-zone, 2003	Approaching to periphery, 2003	Absolute periphery, 2003
Pole-zone, 2010	**690**	125	24	2
Close to pole-zone, 2010	77	**970**	52	22
Approaching to periphery, 2010	28	103	**696**	55
Absolute periphery, 2010	0	48	39	**214**

Source: own editing, 2012.

The **matrix shows** that out of the four clusters the „pole-zones", the „approaching to periphery" and the „absolute periphery" clusters increased more or less. The cluster of "**close to periphery"** has the most members, however gradually decreasing, while the „absolute periphery" has the fewest members.

Figure 1 shows the **results of the cluster analysis**. Since there are thousands of cases, the maps shows that it is very similar to that of 2003. In order to interpret the data easier, I will examine the new clusters one by one.
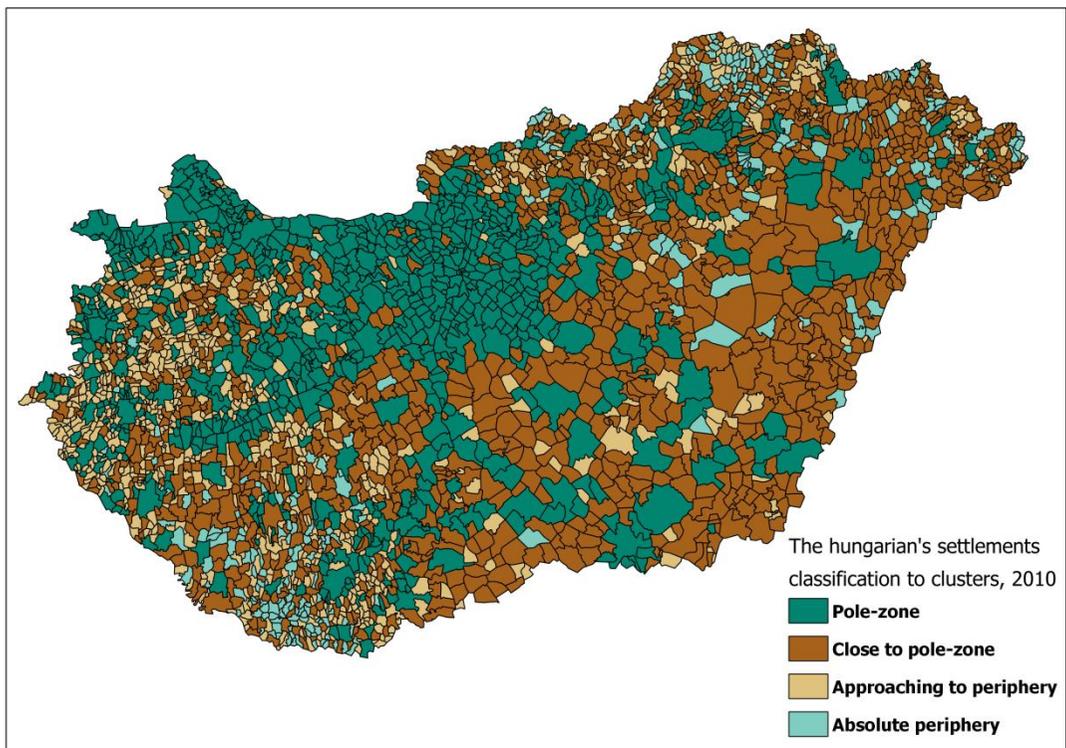
Figure 1: Clusters of Hungarian settlements based on the data of year 2010

Source: own editing, 2012.

By the end of the seven-year period, 575 settlements changed their positions, which is 18.24 % of the total settlements.

The introduction of the 4 clusters of year 2010 and their comparison to those of 2003:

The **„pole-zone" cluster** (Figure 2) was extended by the settlements around the core areas. It is basically characterized by positive economic performance. We can draw consequences regarding the incomes if we consider the personal income tax per capita. The results of my research are very similar to those of PÉNZES [2012], who created a rank for the settlements based on their income levels. The graphic representation of his and my results are more or less the same.

It seems to be an **interesting research** to examine the „**migration**" of the settlements from one cluster to another. As analizing the cluster changes it is not a surprising fact that the members of the „close to the pole-zone" „developed", namely 125 settlements (blue color) were able to improve their positions.

The ring around the **capital expanded by 34 members,** primarily to the east, however, it is eye-catching that in the western part of the agglomeration in 2003 there was a huge „white spot" in the „pole-zone" cluster. This group could catch up with the most-developed cluster by 2010. **10 settlements in the Gyúró-**

Tabajd-Alcsútdoboz triangle were able to achieve such development, consequently, almost all the settlements of the Central-Hungary region belong to the most advanced group.
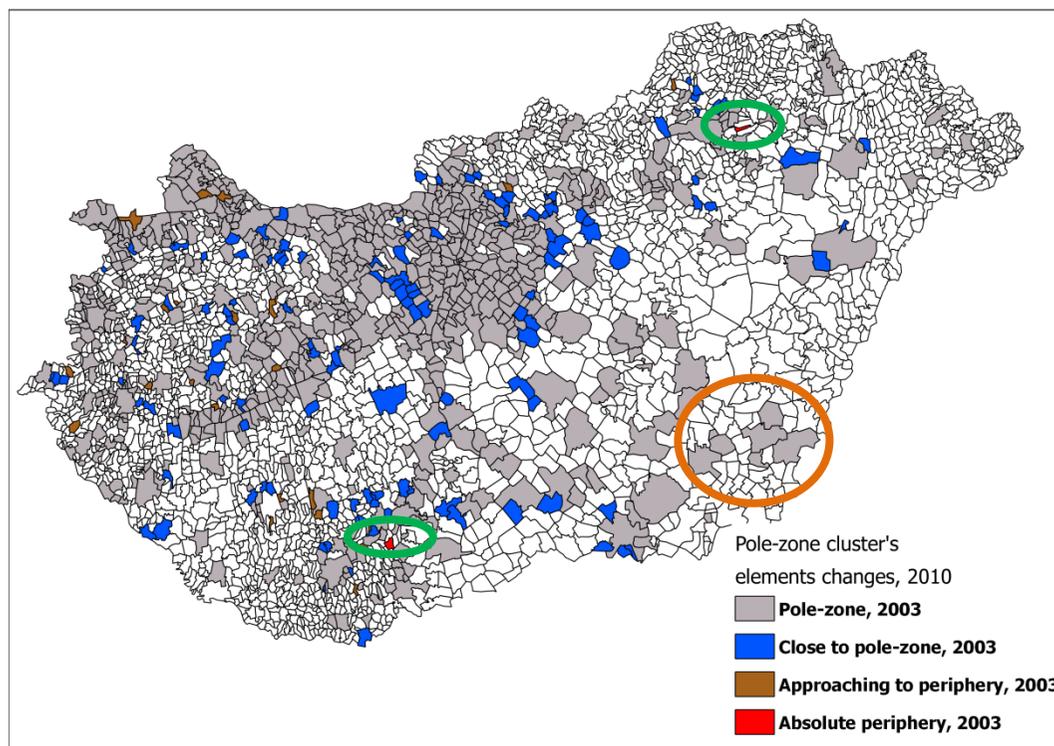

Figure 2: The settlements belonging to the „pole-zone" cluster according to their „origin", 2010

Source: own editing, 2012.

Based on my research it can be stated that there is **strong correlation between the highways and the members of the „pole-zone" cluster.** There is only one exception **in the case of a widespread „pole-zone"** (brown color), however, **the nearest highway conjuction can be reached in over 100 minutes. This is the area of Békéscsaba-Gyula-Békés**, which could keep its good position under unfavourable approachability conditions. I did not aim at the examination of cross-border cooperations, however, it needs to be mentioned that this area is closely linked to the **development zone of Temesvár-Arad**, which obviously has significant influence on the area, despite of the fact that the Schengen border [Schengen agreement, 1985] isolates them from each other at the moment.

Although it is much more surprising that 24 settlements of the "approaching to periphery" cluster (brown color) have become the member of this category (skipping one step i.e. „close to pole-zone" cluster. Figure 2 shows that these **settlements are located in the area surrounding the „pole-zone" cluster**, having good accessibility (highway, main road).

If the abovementioned fact was a surprise, this case is a miracle – certainly if it is not due to data-collecting or supplying failure. Namely that **two settlements from the „absolute periphery" cluster** (red-coloured circle) moved **directly to the centrum zone, i.e. to the** „**pole-zone" cluster**. These two settlements are Hernádkak and Bátaapáti.

The **„close to pole-zone cluster"** (Figure 3) had the highest number of members even in **2010**, with middle- and large villages and small- and middle-sized town, mainly located on the Great Plain. Settlements near the highways, highway conjunctions are close to the center settlements.
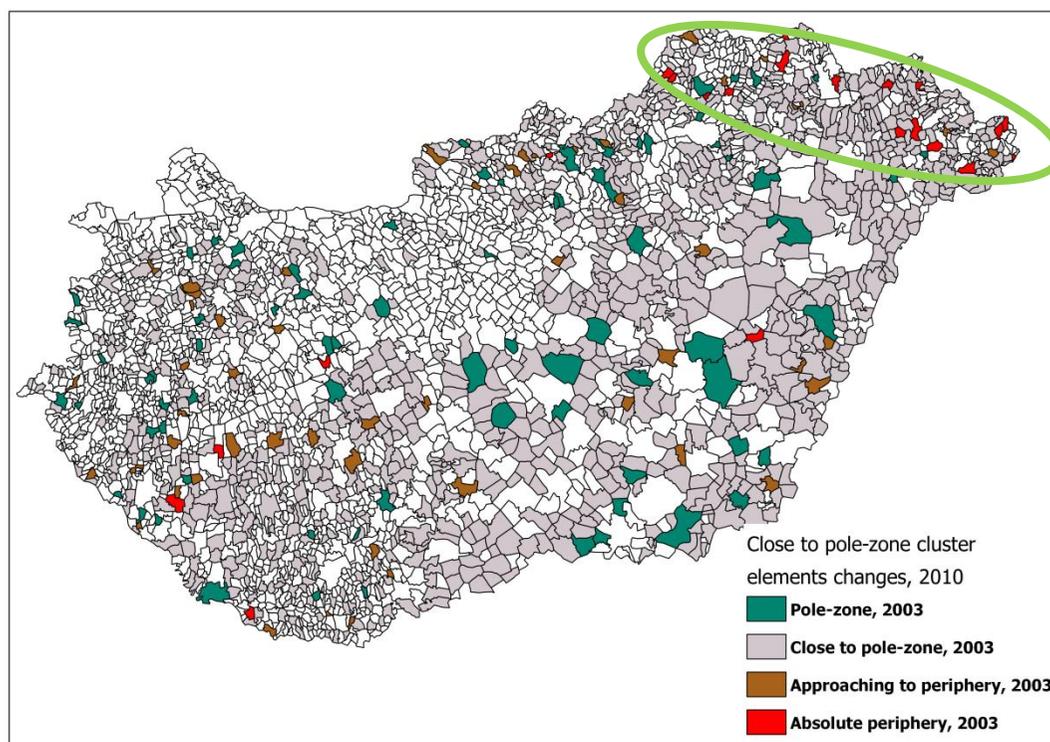
Figure 3: Settlements of the „close to pole-zone" cluster, according to their „origin", 2010

Source: own editing, 2012.

Settlements whose category has not changed are colored in grey on Figure 3, meaning that they belonged to the **„pole-zone" cluster even in the base year**. These settlements are characterized by **favourable share of young population and high quality healthcare service**.

For the **77 settlements (green color) which used to belong to the** „**pole-zone" cluster, this is a result of unfavorable tendencies**.

Out of the settlements of the "approaching to periphery" in the base year, 52 (brown color) shifted to the „close to pole-zone" cluster. It includes middle-sized

and small villages and they are located throughout the country. Their situation is improving with positive tendencies in infrastructure, unemployment, healthcare and the age-structure, resulting in stronger indicators within the whole cluster.

In the examination mentioned above, the „**absolute periphery" cluster** (red colour) **could achieve the highest improvement.** It can be observed in the case of 22 settlements and the members are only small- and tiny villages. They are located mostly in Borsod-Abaúj-Zemplén and Szabolcs-Szatmár-Bereg counties.

If the **„approaching to periphery" cluster** is examined (Figure 4), it can be seen that except for 1-2 settlements on the Great Plain, it kept its character with consisting of mainly middle-sized and small villages as well as tiny ones. Their exitence is dominant in **Transdanubia and North-Hungary,** with increasing density as we are getting farther from Budapest.

28 settlements have been hit the most by unfavourable impacts – within the cluster –, which used to belong to the „pole-zone" cluster, i.e. **the most favourable category**. They are located mainly the area bordered by **M7 and M1 highways,** near the national border. **All of them have population under 1000**, however this kind of settlements are represented in Nógrád and Baranya by two settlements. They feature economic recession, combined with unfavourable social conditions.

Settlements which **originally belonged to this cluster** (grey colour) feature **ageing population, high migration rate and high social benefits**. The infrastructural conditions are poor. Due to the ageing population, the quality of primary education is also low.

The last group of the original investigation („**absolute periphery**", red colour) experienced **minimal improvement**, since they could move to the semi-peripheral cluster.
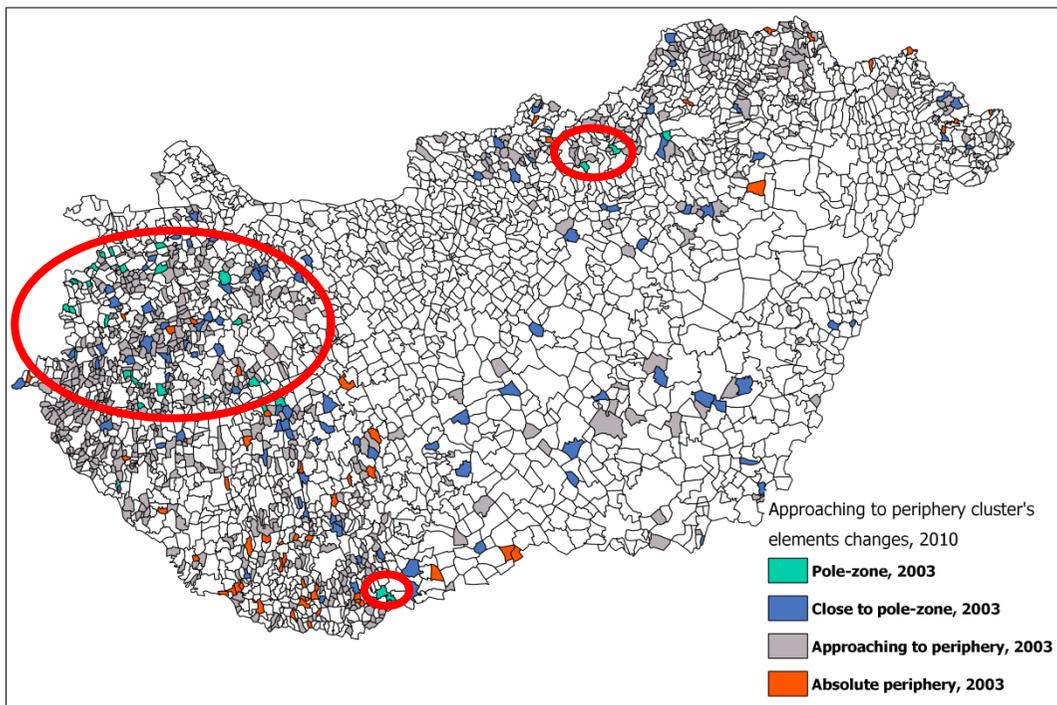
**Figure 4: Settlements belonging to "approaching to periphery" cluster,
according to their „origin", 2010**

Source: own editing, 2012.

The last cluster (covering the fewest settlements), i.e. **„absolute
periphery"** received new members only from two clusters – „close to pole-zone"
and „approaching to periphery" (Figure 5). Similarly to the analysis of the year
2003, **the least developed settlements constitute this group**. **They have been hit
the most by the economic recession** (in circles: Baranya, Borsod-Abaúj-Zemplén,
Szabolcs-Szatmár-Bereg and Nógrád). They represent extremely peripheral picture
even based on the indicators, **especially regarding the unemployment rate**. They
are located far from the center areas, **they are characterized by total lack of
prospects for the future**.

48 settlements that belonged to the „close to pole-zone" cluster in 2003
(blue colour) are the losers of the cluster, since they fell down from a prosperous
zone to the perfect periphery. It is an interesting fact that we can find some
settlements of this kind near the pole-cities, like **Pécs, Debrecen and Miskolc**.
39 settlements which have become „approaching to periphery" (brown colour)
declined, which was reflected in the unemployment rate and the higher share of
young population.
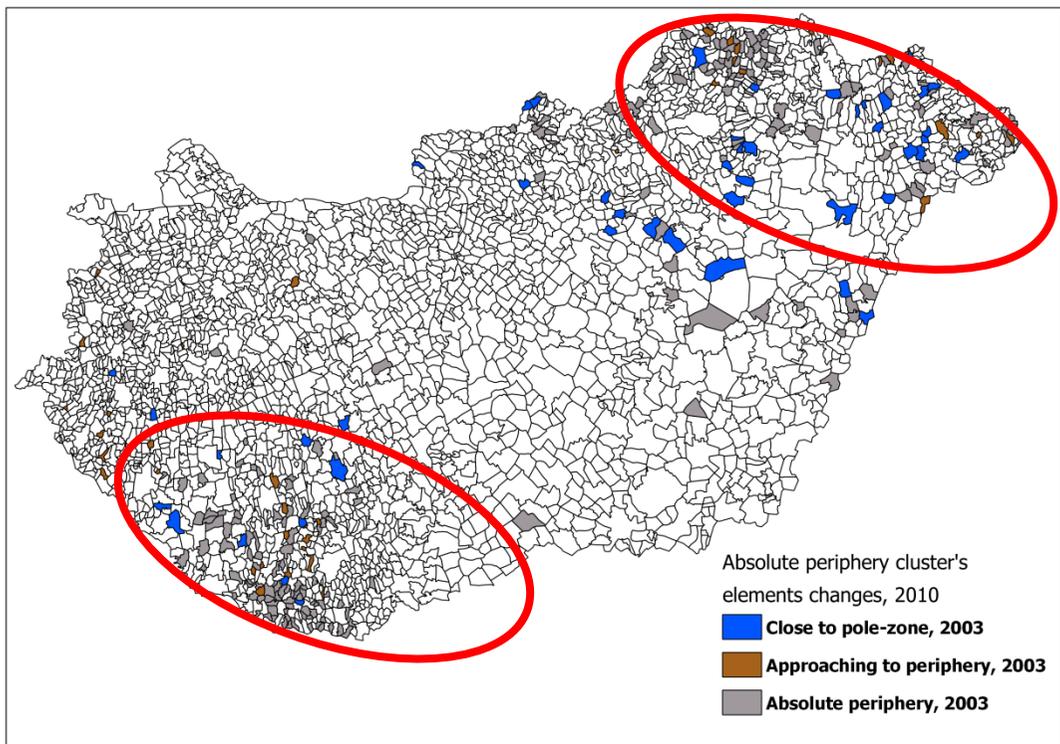
Figure 5: Settlements belonging to the "absolute periphery" cluster, according to their „origin", 2010

Source: own editing, 2012.

It is also **interesting to examine the population of the settlements that changed their status over the period** (see Table 2). In the diagonal of the matrix (brown colour) the size of the population of the unchanging status can be found. The **most significant „migration" is characteristic to the two, developed clusters**, as for the population. In order to avoid the distortion, **I included in the table the indicator so called „average population size of settlements"**. It can be clearly seen that though the total size of population in the moving settlements is lower, it is due to the small size of settlements. The **population of the periphery cluster members is mainly under 500**.

Table 2: Cluster-changing matrix of the settlements regarding their population, 2003-2010

Clusters		Pole-zone, 2003	Close to pole-zone, 2003	Approaching to periphery, 2003	Absolute periphery, 2003
Pole-zone	**2010**	**6,857,436**	**246,473**	**7,023**	**548**
Settlements average population		9,938	1,972	293	274
Close to pole-zone	**2010**	**326,068**	**1,928,984**	**15,197**	**12,762**
Settlements average population		4,235	1,989	292	580
Approaching to periphery	**2010**	**179,729**	**383,325**	**216,099**	**28,209**
Settlements average population		6,419	3,722	310	513
Absolute periphery	**2010**	**0**	**77,469**	**10,455**	**152,293**
Settlements average population		**0**	1,614	268	712

Source: own editing, 2012.

Table 3 shows the main features of the groups in the year 2010. The **personal income tax per capita** at national level increased from HUF 139,135 (2003) to HUF 178,914 (2010). Despite, the difference between the clusters with the highest and lowest figures changed from **2.42 % (2003) to 2.91 % (2010)**, which reflects the exisitng territorial differences. We are in the third year after the global economic crisis and **the differences in incomes increased dramatically**.

I also need to highlight to examine the **unemployment rate**, because a difference of 3.95 % can be observed between the groups. The global economic crisis influenced first the human resource management. While comparing to the data of 2003, it can be clearly seen that this influenced all the clusters. The increase compared to the base year was 2.2-3.9 %.

The difference is even higher if the **number of people in employment for public purposes is also taken into account**. While the increase in the case of "pole-zone" cluster is only 1 %, it is 3.5-4% in the case of two semi-peripheral clusters. Really extreme data can be seen in the case of „absolute periphery", where the increase was 9%, which can be considered high even compared to the already high value of 6%. If **those who work for public purposes are added to the unemployment rate, we get a figure over 40%(!!!)**. The picture is even more interesting if we remember the fact that „Program for public employment" started at the beginning of my research period, meaning that the examination of years 2011 or 2012 would be even more "colourful".

Table 3: Clusters of year 2010 in figure

Variables (2010)	Pole-zone	Close to pole-zone	Approaching to periphery	Absolute periphery
Number of settlements in the cluster, (piece, %)	843 (26.74%)	1,123 (35.63%)	883 (28.01%)	303 (9.61%)
Permanent population, (person, %)	7,241,698 (71.57%)	2,360,067 (23.33%)	280,782 (2.78%)	235,571 (2.33%)
Area, (km^2, %)	32,716 (35.16%)	43,417 (46.67%)	11,648 (12.52%)	5,245 (5.63%)
Personal income tax per capita (HUF)	269,083 Ft	155,517 Ft	152,191 Ft	92,637 Ft
Natural increase/decrease of the population in %	-0.4	-0.67	-1.24	0.29
Migration rate in %	0.23	-0.25	-0.3	-0.26
Vitality index	0.99	1	0.66	2.42
Unemployment rate	6.56	12.53	13.79	25.95
Unemployment rate (2003)	4.31	9.56	9.84	22.66
Share of active population in public purpose employment	1.41	5.35	5.47	15.46
Figures from 2003	0.44	1.74	2.38	6.23
Registered businesses per 1000 capita	152.8	155.4	168.2	103.8
The accommodation facilities of all the commercial quarters	272,463	23,674	5,906	434
Number of cars per 1000 capita	317.9	239.5	262.8	168.8

Source: own editing, 2012.

3.2. Discriminancy-analysis for the cluster examinations carried out for years 2003 and 2010

This analysis is the check of the results derived from the cluster analysis. It can be stated that the settlements examined are really the members of the clusters. If not, they can be categorized into another cluster. **With the help of the discriminancy-analysis I intended to justify the results of the cluster-analysis.**

The **final results of the discriminancy-analysis** can be seen in Tables 4 and 5, showing the **size of the groups which were put into the right category**. In the first part of the tables the number of settlements are represented in absolute value. It shows which group-mid the settlements are closer. After having interpreted the results, **it is clear that regarding the extreme values, there were no cluster changes at all (or only 1 in 2003)**.

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Table 4: Classification results, 2003

			Classification results[b]				
		Clusters	**Predicted group membership**				**Total**
			1	**2**	**3**	**4**	
Original	Settlement	Close to pole-zone	1,186	11	5	44	1,246
		Approaching to periphery	44	744	15	8	811
		Absolute periphery	30	8	254	1	293
		Pole-zone	68	16	1	710	795
	%	Close to pole-zone	95.2	0.9	0.4	3.5	100
		Approaching to periphery	5.4	91.7	1.8	1	100
		Absolute periphery	10.2	2.7	86.7	0.3	100
		Pole-zone	8.6	2	0.1	89.3	100
b. 92.0% of original grouped cases correctly classified.							

Source: own editing, 2012.

The tables include the same figures in percentage. **The share of settlements which were categorized into the right cluster was over 85% in all the clusters in 2003, while it exceeded 90 % in 2010.** It means that **the results of the cluster analysis are suitable** to carry out further analyses.

Figure 5: Classification results, 2010

			Classification results[b]				
		Clusters	**Predicted group membership**				**Total**
			1	**2**	**3**	**4**	
Original	Settlement	Absolute periphery	276	22	0	5	303
		Close to pole-zone	10	1,053	55	5	1,123
		Pole-zone	0	23	808	12	843
		Approaching to periphery	21	49	10	803	883
	%	Absolute periphery	91.1	7,3	0.0	1.7	100.0
		Close to pole-zone	0.9	93.8	4.9	0.4	100.0
		Pole-zone	0.0	2.7	95.8	1.4	100.0
		Approaching to periphery	2.4	5.5	1.1	90.9	100.0
b. 93.3% of original grouped cases correctly classified.							

Source: own editing, 2012.

The strongest justification was for the „pole-zone" cluster in both years, 95.2% and 95.8 % respectively.

The results of the cluster analysis are justified in both examinations, even after the check by the discriminancy-analysis. Meanwhile, based on the information below the table it becomes clear that the matching points of the four functions covered 92% of the elements in 2003, while it was 93.3% in 2010

3.3. The examination on the changes between the clusters

After my cluster-analysis proved to be justified and valid, I carried out the following examination. In the chapters above I detailed how the elements of the clusters changed over the seven-year period. **However, I intend to represent the positive and negative tendencies independetly from the clusters**. On Figure 6, the **settlements in white** (2577) **have not shifted from one cluster to another** compared to the base year, belonging to the same groups in both year. **Developing tendency** was reflected by 280 settlements (**green colour**), while **decline was** realized by 295 (**red colour**). Based on the abovementioned figures, it can be stated that significant changes could not be observed, only some restructuring.

It can be easily admitted that in the country only **Budapest and its agglomeration i.e. Central-Hungary** realized improvement. There is **only one settlement with declining figures** (Kerepes). A group of settlements in south-west of Central-Hungary reflects a unique coherence. **Ten settlements** (area bordered by Gyúró, Tabajd, Alcsútdoboz) show similar development (**light blue colour**), moving from the second cluster to the first one („pole-zone").

The other **six regions show more various picture**. Settlements which proved improvement based on the cluster analysis, are towns of larger size and are located near highways, mainly in Transdanubia, but there are a few along the M3 and M5 as well.

The situation is more shaded in settlements reflecting the signs of recession. In order to understand their location better, I **divided them into four sectors** which are circled in red on Figure 6.

The **first zone** − circled in **purple** − covers the area of **Balaton-Győr-Sopron triangle**. Out of the four zones that I defined, this is the one **with the highest number of settlements.** Based on the previous examination it can be seen that **these settlements were mainly the members of the most advanced zone, namely the „pole-zone" cluster.** Their basic feature is that it covers mostly tiny- and small settlements. **The main reason for the recession was the increasing unemployment**, since the high-tech industries (mainly car manufacturing) has had outstanding role in this area. The economies of several **middle-sized towns** (Szentgotthárd, Győr, Zalaegerszeg, Szombathely, Sopron, etc.) **depended on the performance of mainly one industry/factory** (not diversified structure) and they **became too defenceless when the crisis came**. The recession hit these sectors the most, therefore in cities which could not provide alternatives, **the unemployment**

rate jumped. Considering economical aspects, in the beginning the dismissals hit the **farthest settlements** (requiring the highest transportation costs), then they gradually reached the centers.
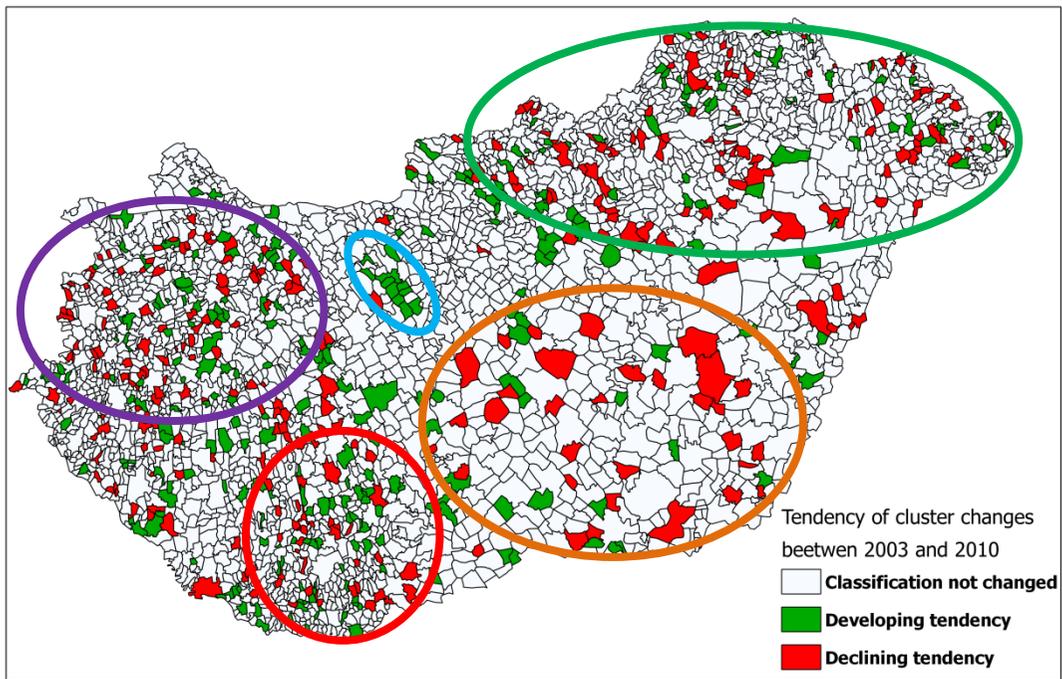

Figure 6: categories of settlements examined

Source: own editing, 2012.

The **second zone** (**red circle**) covers almost the whole **Baranya county**. It cleary shows that **this area is dominated by developing settlements**. It needs to be added that 2010 was the year when the **M6 highway was opened and the pole-city of the area, Pécs was the Cultural Capital of Europe**, thus the **increased state support and the projects for job creation were only temporary and distort the results**. Most of such projects were stopped after the series of programs related to the Cultural Capital. It is the maintenance of cultural institutions which still exist and it does not require such high contentration of supports.

However, there are **several settlements showing the signs of decline**, which are all **tiny or small sizes and are located mainly near the borders and** half way between the M6 and M7 highways.

The third group is coloured in brown, which is the largest in size on the map, still has the fewest members. It is characteristic to the **Great Plain,** with members of **small- and middle-sized towns and large villages**, unlike the abovementioned. This group declined in positions, falling from the **„pole-zone" to the „close to the pole-zone" cluster**.

Finally, **the fourth (green colour) area covers most of Nógrád, Borsod-Abaúj-Zemplén and Szabolcs-Szatmár-Bereg counties**. In the cluster analysis, **most of the settlements constituted the „approaching to periphery"**, which was almost the weakest **cluster regarding the economic performance** and far from any large towns that could be dynamic engines. However, they slipped to the **"absolute periphery"** (the settlements with the poorest conditions) over the seven years. This area is **not only the largest in size, and the second regarding the number of members, but it includes the most disadvantaged settlements with the poorest quality**. Based on the indicators created by me, most of the settlements with the weakest performance are located here and it needs to be mentioned that **this tendency is not constant, this group has been gradually expanding**. The pole-city of the area, **Miskolc, can have dynamic effects on only its own situation and its close surroundings.** Settlements, which are located farther, gradually create links to the „absolute periphery" cluster. In this cluster, the **segregation of minorities**, namely the **Roma population can be observed.** They are concentrated in the abovementioned settlements, isolated from the areas with more favourable social conditions. In the areas with serious difficulties, there is **no chance to create jobs**, and the poor quality healthcare and education basically determine the local population.

3.4. New scientific findings

Based on my research, I consider the followings as new scientific findings:

1. Based on my research results, I can state that **the development of the centers has to be of first priority** by the government, since only these "core areas" **are able to generate dynamic growth in their agglomerations**, gradually covering more and more areas towards the external peripheries. If the support directed to the peripheries does not serve self-sufficient economic growth, they should not be encouraged. I could state that **supporting artificial generators and poles** – based on the comparative cluster analysis – can be a right way, therefore it should be a priority task of the government, of course in relation with and in cooperation with a polycentric system of towns.

2. Based on the research results I stated that only **Budapest and its expanding agglomeration, i.e. Central-Hungary** was the only one which could improve over the seven years. Since I examined the years of 2003 and 2010, I did not detail the starting year of the crisis, however, the abovementioned region was the only one that could step up from the original position (except for Kerepes). **Territorial imbalances do not really affect Central-Hungary**, but of course they exist in that region as well, but the settlements are in the upper quarter. The capital and its

agglomeration consitute almost a whole cluster, while significant differences characterize the other six regions. **The crisis had little effect on Budapest**, it was able to recover fast, since its **economic growth is self-induced.** Ther tertiary sector is very strong which dynamically develop the whole **economy.** Due to this self-induced development, it was able to break out from the crisis much faster than the others and was able to renew. Its economy is complex, polarized, therefore the stronger and prosperous sectors **pull the weaker ones.**

With my research results I proved that **the gravity zone of the capital has expanded.** Compared to the situation of 2003, we can see that **34 settlements (directly bordering the agglomeration) moved to the most-developed ("pole-zone") cluster.** In addition, **several settlements along the highways** developed much and shifted to the abovementioned cluster. With a complex analysis I proved that it is the only center in Hungary which has influence on other regions' economies.

3. With my researches I justified that **Budapest was the only pole-zone which was able to generate dynamic development even in its surrounding region**. **The pole-zones that were defined by the government could maintain their leading position, but** none of them is determinant on their regions.

   As for Szeged, stagtnation or decline could be observed even in the nearest settlements around. In the case of Debrecen and Miskolc, as well as along the axis of Székesfehérvár-Veszprém, we can see stagnating and developing settlements as well, while as for Győr and Pécs, there are only stagnating settlements nearby. The positive tendency is true only for their close environment, **none of them have really strong pole functions. All of them are the centers of regions as well**, like Budapest, **however, it was the capital which could have impact on the whole region.** None of the other centers had positive effect even in their 20-30 km circle.

4. I also found out that **there is no clear coherence between the size of the population and the pole function**, however it is a fact that several factors are necessary to fulfil such functions (e.g. higher education; R&D; industrial-, economic center; innovation center; logistics center; accessibility in major transportation networks; high quality of services; healthcare center, etc.). The settlements with the abovementioned functions allow the gradual growth due to the renewal of their innovation ability. However, these do not guarantee the recession of their wide surroundings, they require a strong center-effect. It is obvious that the abovementioned functions concentrate only if the size of the population is large. In my opinion, it is around 80,000 and 100,000 in Hungary, but there are not concrete figures for such.

Based on my research it can be stated that **the pole-effect easily spread along favourable transportation infrastructure.** It can be observed not only in the center but **along the major transportation lines as a "pole-axis"**.

5. I stated that **there are no similar poles in the country like the ones mentioned above**, though several county centers could be suitable to fulfill such „core functions". There is an **extremely strong link** in **Békéscsaba-Gyula-Békés triangle**, which could contribute to the economic growth of its area as a "pole-triangle" if appropriate spatial policy is applied and the cooperation willingness is encouraged. My researches reflect that each of the cities are important in the area already, but none of them are strong enough to become the center in the Southern Great Plain region. The question arises: whether **these cities that have been competing with each other for centuries** are able to cooperate to achieve a common goal, whether the **two-centered county**, having a strong network of small towns wishes **to function as one pole-zone**.

6. In my research I justified that **the come off in the peripheral areas lasting and gradual**. Due to the economic crisis, sign of levelling can be observed and, consequently, **there is no catching up in the peripheries**. **The settlements belonging to the periphery and approaching to periphery** are mainly tiny and small settlements (**population under 1000**), therefore they are not able to catch up on their own due to their sizes. Moreover, they are segregated based on the age-and race distribution which shade their prospects further.

4. CONCLUSIONS AND RECOMMENDATIONS

The core of my research was the empirical examination of the major Hungarian growth poles and their agglomerations, semi-peripheries and peripheries. When I selected my research topic (2006), I did not know that the basis of my research will not be a simple „linear" analysis, but a dynamic examination due to the **economic crisis of 2008**. Basically, globalization has role in restructuring the space therefore it has significant impact on the settlements. The crisis hit Hungary more in 2008 than other countries and we were not able to moderate its negative impacts – due to the vulnerable economic situation. In this special situation, the conditions were worse due to the high state deficit and high debts as well as the economic-, social and political tension in the background.
They resulted in increasing unemployment rate, the reduction of investments, dramatic decline in the output, in the export, in the real wages and the domestic demand.

In fact, the **global economic crisis moderated the territorial differences**, since there were no significant changes in the most disadvantaged areas because these settlements were the homes only for a few businesses (negative levelling). On the contrary, the global crisis hit very seriously the economically prosperous regions (partly Budapest) whose priority was the export production. **The widening of the development gap stopped**, even only for a short period, since the poorest ones did not change while the upper part declined a bit.

It is essential to mention that – based on several negative, ad-hoc experience regarding spatial policy of the past two decades – conscious settlement development is possible in Hungary if there is a picture about the future. The creation of such a targeted picture about the future is possible if we learn from the mistakes made in the past and if we build on the positive experience.

The moderation of territorial differences cannot be imagined without government and EU policy. **A fundamental question arises regarding the development of settlements: to what extent, how and where does it contribute to the economy?** Which model helps us to achieve the goals: to support the areas lagging behind thus reducing the differences or to support the centers making them artificial generators/poles in economic development?

My dissertation is based on **polycentric way of thinking**, whose basic elements are **to strengthen the national poles in the countryside**, to develop their economies, thus reducing the dominance of Budapest. It is obvious that it should not be achieved by weakening Budapest because a weakening center will have negative influence on the whole country. The agglomeration of the capital has been gradually expanding, therefore it is inevitable to provide support and develop it further. As it can be seen from the investigations, more and more settlements join the agglomeration of Budapest.

The aim should be to urge favourable processes in the poles, to expand their influence on larger areas, thus to strenthen the agglomeration processes as well as to **spread them to farther peripheries**. The state has to invest more money into the secondary poles, since the differences between the **capital and the rural poles are high and gradually increase.** In order to help these large towns to fulfil such functions, the **innovation processes have to be encouraged and the decentralization needs to be supported**.

Based on my research results, it can be stated that the **infrastructure in most of the settlements needs to be developed**, especially regarding the accessibility. Highways and main roads have determinant roles, which fundamentally influence the performance of the economy. From the polycentric and accessibility point of views it is important that the center could be easily accessed by even from the periphery areas. **It is not enough to create multifunctional and polycentric network of towns, if their accessibility is not provided**.

As it was stated in my research transportation infrastructure, especially highway accessibility has extremely important role in economic development. **In**

my opinion, it is important to examine what „accessibility" means, not from geographic point of view but from economic aspect as well. I think that the **restricting factor** is not only the price of the highways but the **market policy**. It means that the shortest period for which ticket can be bought is 10 days. In those areas where the highway is located close, it might not be efficiently used economically. In addition, several studies found out that the „overuse" of highways is often due to the high traffic of trucks and not cars (**one truck causes 30,000 times larger damage to the highways than one car** [GKM, 2007]). My recommendations include the review and repricing of the **highway-use along with its growth-generating role**. It is obvious that I do not recommend 30,000 times higher differences, but I think that the review of the positions and prices is necessary and inevitable. In my opinion, **the issue of highway-use should not depend on the profitability of the company which runs it, but on the fact how much growth it can generate in the economy – even with some state support**.

In addition to the abovementioned, I also recommended to **develop the conditions and facilities of commuting**; to expand the scope of potentials and to reduce the time spent on commuting due to the development of the transportation infrastructure.

While getting out of the global crisis, the roles of the capital and the rural poles are more and more significant. If the most competitive pole would be developed only, it would increase the territorial difference further, but supporting only the peripheries is not a sustainable solution either. Some levelling might appear temporarily, but long-lasting success requires competitive economic environment. **The regional governments should help the rural poles to create such attractive zones for investments**. It is why the support of the rural poles is important whose agglomerations are able to cover the least-developed areas as well.

It is important to mention that any kind of **central support (either national or EU) must not couple with central management and direction,** since the areas have various conditions, thus various needs. Centralized policy dose not know the local conditions and specialities.

The review of the hypotheses listed up at the beginning of the research:

1. **hypothesis:** Based on my research it was justified that the existence of highways and a developed infrastructure are determinant elements in the economic growth. In my dynamic investigation I proved that – despite of a relatively short period – the existence of highways greatly contribute to economic growth. After seeing the results of the cluster analysis, this change can be clearly seen in the case of M7 and M6, since they were opened during my examination period (2008 and 2010, respectively). Positive tendencies can already be observed in the settlements, but in 5-10 years the development is expected to be more significant. Highways help the settlements to join the economic networks more easily, therefore their accessibility greatly influences the economy of a given settlement. The

development pole can also be created along an axis (e.g. highway, main road). The research results reflect that such processes can be observed along most of the main transportation roads in Hungary. I can state that the hypothesis defined at the beginning of my dissertation is right.

2. **hypothesis:** I can state that my second hypothesis is also right, namely that Central-Hungary belongs to the most advanced regions of the country where the developed settlements are closely linked to each other, like a ring. This statement is justified not only by the static analysis but by Figure 6, representing that this agglomeration has been gradually expanding due to the increasing center-power of the capital. Its development, being the only one metropolis area of the country, has not halted. The gravity zone of Budapest has spread a lot. Compared to the situation of 2003, 34 settlements from the surrounding of the agglomeration moved up to the most-developed cluster, i.e. the „pole-zone" cluster. In addition, several settlements along the highways achieved development and got into the abovementioned category. With the cluster analysis I proved that it is the only center which has influence on other rgions' economy, its scope covers larger area than its own region.

3. **hypothesis:** My third hypothesis was wrong, since while comparing the data of the base year (2003) and those of 2010 (Figure 6) it was found out that the surrounding settlements of Pécs, Szeged, Debrecen and Miskolc declined to weaker clusters over the years. It should be examined in another research how much influence the global crisis was on these areas. Based on the abovementioned facts, I need to reject my third hypothesis.

4. **hypothesis:** My fourth hypothesis was right, since the young age-structure does not have anything to do with the economic welfare. Obviously, in the prosperous settlements the willingness for bringing up children is higher, but extreme figures characterize the absolute peripheral areas which have no prospects for the future as well. In my research, the settlements belonging to the „absolute periphery" cluster feature high unemployment rate, higher use of social benefits and the most favourable age-structure in the country. To tell the truth, the reason for the highest vitality index is that the life-expectancy is the lowest in these areas. The reason for the population increase is that those who are segregated and cannot survive in the prosperous towns, leave them.

5. **hypothesis:** I accept my fifth hypothesis, namely that after comparing the clusters, the further come off of the peripheral areas is expected in the future. The decline can be clearly seen from the extreme figures of the settlements, proving that the gap between two extreme clusters („pole-zone"

and „absolute periphery") gradually widens. Increase in quantity could be observed only minimally. It is true that the number of settlements on the periphery increased but further decline can be seen in the existing peripheries.

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