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**Territorial process study of social and economic development
in Hungary**

Written by
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INTRODUCTION

Based on my review of the post-1989 regional policies of Hungary and the European Union, it is clear that the main target of regional development is to help the catch-up of socially and economically backward regions and thus to raise the standard of living for the local population. Therefore I have come to the conclusion that it is time to conduct a study in order to assess the efficiency of the measures taken with the aim of helping the catch-up of socially and economically backward regions of Hungary during a certain period after the change of the political system.

A comparison of today's two main concepts of territorial development reveals various overlappings and marked differences between them. The advocates of the competitiveness approach (Lengyel, Lukovics, Malecki, Porter and others) say that, although determined by several factors, the state and pace of development are evidently manifested in the amount and growth of the generated income¹, which is fully in line with the approach applied by the economic policy to the state and pace of development in its everyday practice. However, according to the representatives of the human or ecology approach (Dabóczi, Heltai, Myrdal, Pataki, Sen, Streeten, Szlávik and others), income is only a tool and not the purpose of development; in other words, instead of being the manifest of the state and pace of development, income is only one of many factors that determine the state and pace of development. As a matter of fact, the state of social and economic development is a complex phenomenon shaped by the joint forces of several factors and can therefore be measured only with several indicators. In view of the foregoing, the state and pace of social and economic development of a territorial unit means, for the purposes of this study, the position or progress that can be measured against the dimensions determined by the study indicators.

The review of domestic studies conducted with regard to the state of social and economic development in the post-1989 period shows a significant majority of status studies performed for a time span of one year or maximum two years (Fazekas 1993, Csatári 1996, Faluvégi 2000, Molnár et al. 2002, Dobosi 2003, Hahn 2004, Obádovics 2004, Beluszky and Sikos 2007 and others). Having a much smaller number than that of status studies, the process studies² (Nemes Nagy and Németh 2005, Csité and Németh 2007, Németh and Kiss 2007) either measure – by focusing on income and unemployment i.e. the two major

¹ While questioning the competition between the territorial units, Krugman also thinks that development is manifested in income growth.

² An analysis is deemed a process study where data capture and analysis are performed for each indicator during a five-year interval and in at least three dates (that must be preferably distributed evenly and be the same for all indicators), and where the changes in the results of the different dates are also evaluated.

indicators of social and economic development – the change of development differences on the basis of deviation-type indicators (sigma convergence), or try to capture the complex nature of development but in this case the studies deal with complexity only through a small number of indicators, the study period is short and, even during such short period, data are acquired only on a few occasions. In view of the foregoing, I have conducted such a complex development study on the basis of multiple indicators which covers – within the framework of the available database – the longest possible period, makes measurements on every possible date of the study period, focuses on the regional processes of social and economic development, measures the development differences also on the basis of the relationship between the initial state of development and the pace of development (beta convergence) and focuses on microregions, although the new model integrates all area levels and makes their comparison possible.

As it is clear from the defined purpose, unlike the former status studies, my study – coupled with a complex analysis of social and economic development – focuses on processes and wishes to answer the following questions:

What kind of correlation can be seen between:

- 1) the initial state of development and the progress made since that initial stage in Hungarian microregions?
- 2) the pace of development of the studied territorial units and the internal differentiation of their state of development?
- 3) Based on the initial state of development and the study period's pace of development, are there such groups that include microregions that show similarities in terms of the two grouping factors as well as other aspects?
- 4) Is it possible to separate a group from the studied territorial units that is considered below the average as to both the initial state of development and the pace of development?
- 5) If the Hungarian microregions have a below-the-average set in terms of both of the above factors, what are the properties of such set and what possibilities are available for the catch-up of the affected area units?
- 6) Is there any change in the direction and strength of the relationship between the social and economic development and the per capita GDP-based development during the study period?

Based on the statements of the reviewed literature, the following hypotheses have been worked out for the above questions:

H1: As, with one exception, the reviewed literature shows an increase in the territorial differences of the state of social and economic development, therefore the initially more developed microregions tend to show a higher pace of development during the study period.

- H2: According to the reviewed literature, the backward regions permanently belong to the least developed category in the post-1989 period. If it is compared with the study dealing with the internal income differentiation of microregions (Németh and Kiss 2007) and if it is assumed that the income processes are in line with the complex development processes³ then a hypothesis can be formed by saying that *during the study period the microregions with a higher pace of development show a smaller internal differentiation, while in the last study year the internal differentiation of the more developed microregions is smaller than that of the less developed microregions.**
- H3: The microregions with a promising state and pace of development mostly have county-seat centers or are located in Pest county. At the same time, the microregions with an adverse state and pace of development are mostly located in the eastern and southern part of the country, mainly close to the border.*
- H4: If the initially more developed microregions tend to show a higher pace of development during the study period then there must be a group of microregions where both the initial state of development and the pace of development are below the average.*
- H5: The microregions with a poor state and pace of development are mostly agriculturally oriented and their inhabitants are poorly qualified.*
- H6: Based on the findings available in the reviewed literature, it is assumed that there is a positive and gradually strengthening relationship between the level of social and economic development and the level of economic development based on per capita GDP.*

³ It is supported by the findings of Dobosi (2003), Nemes Nagy and Jakobi (2003), and Rechnitzer and Smahó (2005).

MATERIAL AND METHOD

The space and time limits of my research as well as the describable dimensions of social and economic development were determined by the content and scope (in space and time) of the available data. For this study I have used the interactive analytical method of TeIR (National System for Regional Development and Physical Planning) – this system is able to supply data in all spatial divisions currently known in Hungary. As the relevant data were available for 3125 municipalities, 174 microregions, 19 counties, 7 regions and the entire territory of Hungary for the study period i.e. from 1996 until 2007⁴, I have used these time and space limits to collect 140 basic data in order to generate 220 ratios that represented the basic indexes of the combined indicator that is able to capture the state of social and economic development. After testing the position of Budapest in terms of the 220 basic indicators, the study period of 12 years and the five territorial level, I have come to the conclusion that the capital "excels" to such an extent from the other territorial units that would significantly distort the future results and therefore I have excluded Budapest from the study⁵.

The overall analysis of the 220 basic indicators generated for the measurement of the studied phenomenon would, on one hand, produce great technical difficulties for the study and would be, on the other hand, unnecessary – in view of the overlappings between the characteristics described by the indicators – and, in certain cases, harmful as far as professional aspects are concerned. In view of the foregoing, the final set of indicators that best matches the study targets can be generated through a filtering of the 220 basic indicators, for which I have used the method of main component analysis. In this case the purpose of the procedure was not to capture the dimensions (main components) of the studied phenomenon but to identify an indicator structure that is a source of time and space information, suitable for statistical weighting and, at the same time, that represents a continuous system. When using this method, I have considered the parameters published in the literature (KMO value, communality, information share of main components having an eigenvalue above one).

When generating the combined index that is able to measure the state of social and economic development, I have considered the percentage form of indicators (e.g. unemployment and social aids indicators, etc.) where higher values mean worse positions, with their values deducted from one hundred. In order to avoid differences in the units of measurement, I have used the process of normalization (applied also for HDI generation) and expanded it in space and time so that the studied territorial units can be compared. As to normalized scales, they represent

⁴ Budapest was excluded from county, regional and national data; at these territorial levels Budapest formed a separate unit.

⁵ There are several examples of this in the studies listed in the references.

interval levels of measurement and can therefore be used for wide-ranging statistical assessments (unlike rankings), the individual scales can be compared based on mean and deviation (unlike in the case of standardization), and – with fixed extreme values – they provide a framework (unlike in the case of comparison with a typical value) for my model where the studied territorial units can be described in a coherent closed system.

The combined index describing the state of social and economic development of the individual territorial units was determined as the weighted mathematical average of the normalized indicator values that belong to the relevant territorial units.

As it is clear from the study questions, my research program is based on the development analysis of Hungarian microregions. Given that development is a process occurring in time and having a direction and pace, it can be measured through trend calculations. As during my examinations I also wanted to identify interrelations, I performed correlation and regression calculations.

Three of the study questions required a categorization of the territorial units on the basis of their initial state of development and their pace of development during the study period. As categorization is done in two dimensions, it is possible to use the traditional method where, once the categories of the two dimensions have been identified on the basis of professional considerations, the relevant elements are mechanically grouped into the various categories. With this method the territorial units under study can be clearly categorized on the basis of both grouping factors and thus the various categories can be named in a consequent manner. However, this method will not necessarily produce the most homogeneous and most distinctively separated categories. Modern (complex) grouping procedures (hierarchical and non hierarchical clustering) are able – based on various grouping criteria – to produce the most homogeneous and most distinctively separated categories. Nevertheless, these methods may produce overlappings along the grouping criteria between the sets and therefore the straightforward and consequent naming of the categories may be difficult in many cases. For the grouping of the territorial units under study, I have used both methodological approaches with a view to utilizing their benefits and avoiding their disadvantages as far as possible.

Discriminant analysis, i.e. a special method of the classifying techniques, is also used during my research work. This method is special in that for its use the territorial units under study must already be classified on the basis of the relevant criteria but then this method is able to test the correctness of the classification along the relevant criteria and to make proposals on how to create more homogeneous and more distinctive categories. If the results of the original grouping and the classification proposed by the discriminant analysis do not substantially differ from each other then the original grouping can be considered

successful with regard to the homogeneity and separation of the categories. The method is suitable also for identifying such indicators – among those introduced in the procedure on a step-by-step basis – that make the most clear distinction between the categories. In other words, the method enables the researcher to describe the categories on the basis of such discriminating indicators.

RESULTS

As my research work focuses on the study of the differences (in space and time) of the state and pace of social and economic development in Hungary, as a first step I have identified the scope of the studied phenomenon.

Scope of the state and pace of social and economic development

The large number of initial indicators enabled me to pick the indicators from several similar ones for the final study that were most suitable, in terms of technical and mathematical aspects, for the creation of a complex relative development index.

As to technical aspects, the following considerations were thought important:

- the indicators must provide the widest possible, yet detailed and transparent coverage for the dimensions of social and economic development;
- in cases where a dimension is characterized in a detailed manner, not a single part of the entire picture must be left out as it would entail loss of information;
- each dimension must be characterized with about the same number of indicators in order to avoid any extreme under- or overrepresentation of certain dimensions;
- the indicators must measure the same impact only once in the model.

As to mathematical aspects, the following parameters were held applicable:

- the communality value of the indicators must be the highest possible but at least above 0.25;
- the main components having an eigenvalue above one must retain the highest possible share but minimum 60% of the total variance of the standardized indicators;
- the KMO value of the study indicator structure must be the highest possible but at least above 0.5;
- the number of territorial units involved in the main component analysis must be at least five times higher than the number of indicators in the final indicator structure.

At the level of municipalities and microregions the indicators were selected by performing repeated main component analyses for each year of the study period in such a manner that during the repetitions the technically unsuitable indicators showing the lowest communality and MSA values were excluded from the study.

As a result, I have identified the following 34 indicators⁶ for each year of the study period and for all territorial units under study:

1. Population density (persons/km²)
2. Resident population aged below 15 years/resident population aged above 60 years
3. Balance of migration/1,000 inhabitants
4. Natural reproduction/1,000 inhabitants
5. Number of enterprises in the building industry/1,000 inhabitants
6. Number of enterprises in mining, processing industry, electricity, gas, heat and water supply/1,000 inhabitants
7. Number of enterprises in agriculture, forestry, game management and fishing/1,000 inhabitants
8. Number of enterprises in the services sector/1,000 inhabitants
9. Corporate income tax payable/inhabitant
10. Net export sales/inhabitant
11. Total domestic income/inhabitant
12. Number of persons receiving regular social aid from municipality/population, %
13. Number of registered unemployed without primary school education/working-age population, %
14. Number of registered unemployed with primary school education/working-age population, %
15. Number of registered unemployed with secondary school education/working-age population, %
16. Number of registered unemployed with higher education/working-age population, %
17. Number of long-term (over 180 days) registered unemployed/registered unemployed, %
18. Number of restaurants, patisseries, bars and wineries/1,000 inhabitants
19. Number of retail shops (excluding pharmacies)/1,000 inhabitants
20. Foreign guest nights spent at places of accommodation/1,000 inhabitants
21. Domestic guest nights spent at places of accommodation/1,000 inhabitants
22. Number of residential units built during the year (excluding resort places)/housing stock, %
23. Housing stock/1,000 inhabitants
24. Sewer length/water conduit km
25. Number of gas consuming households/housing stock, %
26. Number of cars at year end/1,000 inhabitants
27. Number of main telephone lines/1,000 inhabitants

⁶ Demographics 1–4; Business potential 5–8; Income and aids 9–12; Unemployment and human capital 13–17; Tourism and commerce 18–21; Infrastructure 22–27; Human infrastructure and human capital 28–34. Although due to mathematical reasons certain initial dimensions were excluded from the study, their impacts are substantial in the 34 indicators listed above.

28. Number of qualified nursery attendants/1,000 nursery-age inhabitants
29. Number of kindergarten teachers/1,000 kindergarten-age inhabitants
30. Number of full-time primary school teachers/1,000 primary school-age inhabitants
31. Number of full-time secondary school teachers/1,000 secondary school-age inhabitants
32. Number of family physicians/1,000 inhabitants
33. Number of mother and infant care nurses/1,000 nursery-age inhabitants
34. Number of cinema visits/1,000 inhabitants

In view of the established technical criteria, the above indicator structure is considered suitable for the description of the phenomenon under study. The human field may seem a bit overemphasized but it is evident that business potential, income, tourism and trade are all economic fields. Also, unemployment is again, at least partly, an economic field in this breakdown. In addition, infrastructure is also not independent of the economy, so the overemphasis is not relevant at all.

At the level of microregions the indicators fully satisfy the required mathematical criteria⁷. Compliance at the level of municipalities⁸ is 100% for KMO, 98% for communality and 33% for retained variance. The promising KMO values obtained for the indicator structure prove, at both territorial level, that the identified set of indicators forms a closely integrated system with a strong latent structure being in the background; therefore it is suitable for describing social and economic development in the form of an aggregate index. At the level of municipalities the indicator structure fails to reach the established statistical threshold in certain cases but given that the sewers indicator having a lower than expected communality is the sole factor to represent environmental load, it was allowed to remain in the study for technical reasons. As far as retained variance is concerned, it should be noted that, according to Székelyi and Barna (2005), 33% is already acceptable; furthermore, Molnár et al. (2002) produce their aggregate indicator – to measure the complex development of domestic municipalities – from the linear combination of such main components which have a total retained information content of 48.7%. In view of the foregoing, the identified set of indicators is considered suitable, also in terms of mathematical considerations, for the implementation of the study at the level of municipalities and microregions⁹.

⁷ Minimum values: communality 0.30; retained variance 71.9%; KMO 0.869

⁸ Minimum values: communality 0.188; retained variance 55.1%; KMO 0.829

⁹ Due to the small number of elements, the main component analysis cannot be applied to territorial levels above microregions, although it is assumed from the obtained results that the indicator structure is suitable for the creation of a complex index and the performance of analyses also at such higher territorial levels.

For consolidation purposes the identified 34 indicators were normalized according to *formula (1)*. During the normalization process – in order for the territorial units to be comparable along the various indicators, including the complex index, in space and time – the highest and lowest values, measured in space and time, were assigned as the extreme values of a given indicator. Thus for each indicator all territorial units under study were displayed on a scale from 0 to 1, where 0 and 1 were assigned to the territorial unit showing, respectively, the worst and best position in space and time with regard to a given indicator.

$$N_{ijk} = \frac{X_{ijk} - X_{j_{\min}}}{X_{j_{\max}} - X_{j_{\min}}} \quad (1)$$

$$FI_{ik} = \frac{\sum_{j=1}^{34} c_{jkm} * N_{ijk}}{\sum_{j=1}^{34} c_{jkm}} \quad (2)$$

Where:

- X_{ijk} means the value of indicator 'j' of microregion 'i' in year 'k'
- $X_{j_{\min}}$ and $X_{j_{\max}}$ mean the minimum and maximum of indicator 'j' in space and time
- c_{jkm} means the communality of indicator 'j' in year 'k' at territorial level 'm'
- N_{ijk} means the normalized value of indicator 'j' of microregion 'i' in year 'k'
- FI_{ik} means the complex relative development index of microregion 'i' in year 'k'
- $1 \leq i \leq 3324^{10}$ $1 \leq j \leq 34$ $1 \leq k \leq 12$ m: territorial level

The complex relative development index generated from normalized indicators was produced with the help of *formula (2)*. As during the index generation the various indicators were weighted with their own communality, the indicator representing a more integral part of the indicator structure and thus supplying a greater share of its own information content to the indicator system had a bigger weight in the aggregate index used for the description of social and economic development. In other words, an indicator with bigger weight can better describe (explain) the variability of the territorial units in the field of development. Therefore, for each year of the period between 1996 and 2007, the state of social and economic development of the territorial units under study was described with the complex relative development index generated with the help of *formula (2)*, while the pace of development was described with the slope of the linear trend function placed over the time series produced by the index.

¹⁰ 3,324 territorial units: 3,124 municipalities, plus 173 microregions, plus 19 counties, plus 7 regions, plus the country (Hungary).

Study of the development differences of microregions

As one of the study objectives is to identify the correlation between the initial state of development of Hungarian microregions and the progress made during the study period, a regression model was used to examine the correlation between the complex relative development indexes of year 1996 and the slope of the trend functions placed over the time series produced by the complex indexes (Figure 1).

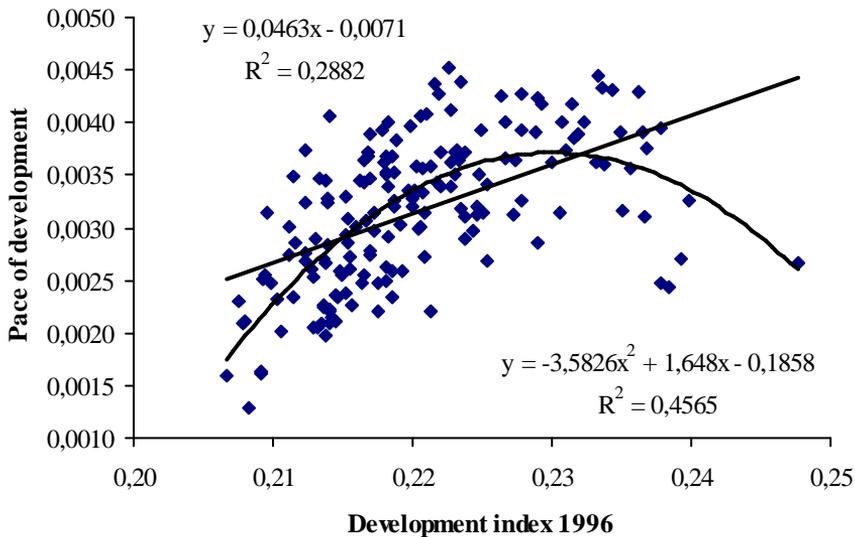


Figure 1: Correlation between the initial state of development of microregions and their average pace of development until 2007

Source: Own calculation and editing, 2011

The positive slope of the linear regression function evidences that the microregions of higher initial development level tend to show a higher pace of development. This is a clear indication that during the study period the microregions of higher initial development level kept leaving behind their less developed counterparts i.e. the development differences between the territorial units under study did actually increase. This was also confirmed by my examination based on the relative deviation of the complex relative development index highlighting the fact that with the passing of time the development differences between the microregions increased at a reduced pace, although it should be noted that the extent of such reduction is very little. This trend indicates that Williamson's hypothesis is valid in the time dimension also for the complex development of the microregions.

It is clear from the regression function given in the form of a second-degree polynomial that, although the average difference between the microregions increased, the changes in their relationships were not even. As the initial state of development increased, the domestic microregions tended to become, although to an always decreasing extent, more distant from each but above a development level of 0.23 they started getting nearer again. It led to the strongest breakaway for microregions with the lowest initial state of development; however, this breakaway process gradually decreased as the initial state of development improved and, actually, turned into a catch-up phase in the case of microregions with the highest initial state of development. The examination of the development differences between the microregions following each other in the development ranking highlighted the fact that although there was a decrease in the development differences between the most developed microregions during the study period, yet it was not the most developed microregions that showed the smallest development differences in the last year of the study period. In terms of development, the averagely developed microregions showed the smallest differences in each year of the study period.

Study of the inner development differences of microregions

In order to clarify the process of inner differentiation of microregions, I have determined, for each year of the study period, the relative deviation of the municipality-level complex relative development index within the microregions.

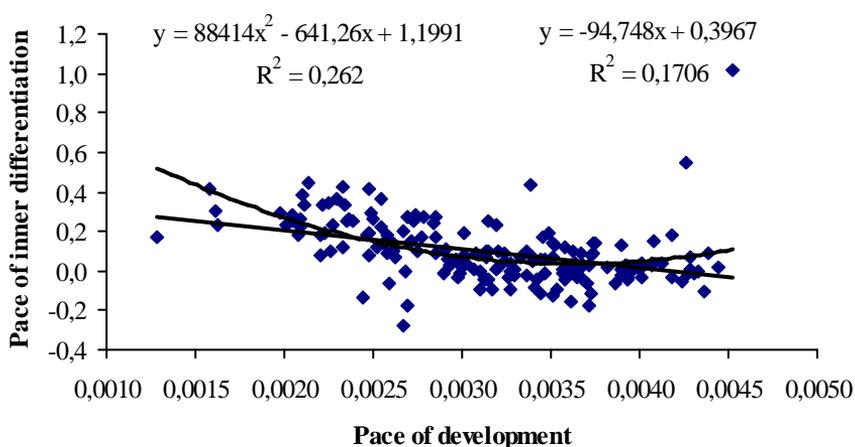


Figure 2: Correlation between microregion-level development and inner differentiation

Source: Own calculation and editing, 2011

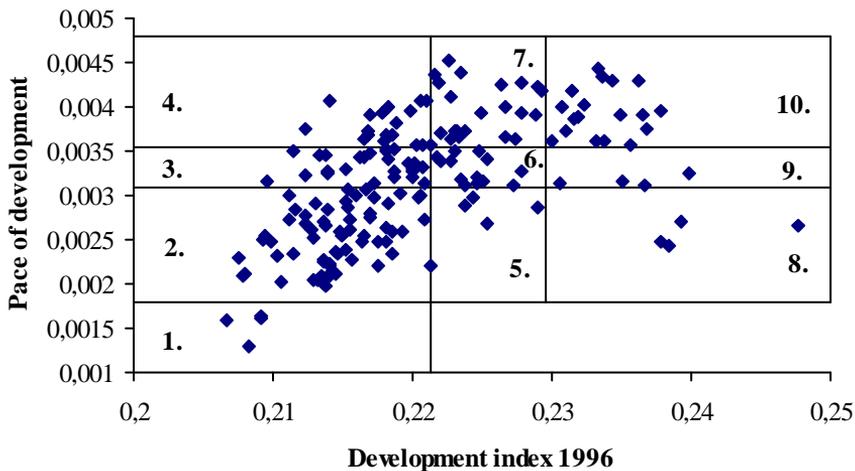
I have placed a linear trend function over the time series of relative deviations in the case of each microregion and described the pace of inner differentiation with the slope of such trend functions. As, according to its second question, my study wants to identify the correlation between the pace of development of the studied territorial units and the inner differentiation of their state of development, I have used a regression model to examine the relationship between these two factors (*Figure 2*). As it is clear from the Figure, during the study period the increased pace of development was coupled with a decreased pace of inner differentiation, which means that the more developed microregions tended to show a smaller differentiation. It is also evident from the second-degree regression function that the increased pace of development was coupled with a decreased pace of inner differentiation and that a slight increase started above a development level of 0.0036 in the studied territorial units. This tendency of smaller differentiation in the case of microregions producing a higher pace of development is supported also by the finding that the more developed microregions tended to show higher inner differentiation from 1996 to 2001 but the differences in the inner differentiation of such territorial units tended to level out. From 2002 the correlation reversed and resulted in a higher differentiation of the less developed microregions. This process went on until the end of the study period i.e. the differentiation of the less developed microregions tended to increase in comparison with the more developed ones. The evaluation of the relationship between microregion development and inner differentiation also shows that Williamson's hypothesis is not valid in cross section, given that instead of the expected inverse U-shape curve, the relationship of the two factors gives a normal U-shape curve where during the first part of the study period the uphill section is stronger but in the second part – after a gradual transition – the downhill section dominates.

Description of the groups of microregions formed on the basis of their state and pace of development

As the answer to the third study question required a categorization of Hungarian microregions on the basis of their initial state of development and their pace of development during the study period, I have classified the studied territorial units as shown in *Figure 3*. The classification was performed through a combined application of the traditional and complex methods. Hierarchic clustering was used to determine the optimal number of clusters¹¹ and then – in view of the large number of elements in the studied assembly and of the fact that K-means clustering produces more homogeneous groups – a K-means procedure was performed. The microregions were then consequently classified in the studied two dimensions making sure to cause the least possible injury to the generated clusters. As a result of the procedure, the most homogeneous and most

¹¹ The optimal number of clusters means a number that can still be handled and that will not allow exaggerated cluster sizes resulting in excessive heterogeneity.

distinct groups were formed by clearly and consequently classifying each of the territorial units in the dimensions of their state and pace of development; the groups obtained in this manner could be properly named. The newly formed groups were checked with a discriminant analysis performed along the two dimensions and, according to the results, 88.4% of the territorial units were correctly classified. In view of the literature data and the complex nature of the procedure, these results can be considered fairly good.



- | | |
|---|--|
| 1. Poorly developed – Very poorly developing; | 2. Poorly developed – Poorly developing |
| 3. Poorly developed – Strongly developing; | 4. Poorly developed – Dynamically developing |
| 5. Developed – Poorly developing; | 6. Developed – Strongly developing; |
| 7. Developed – Dynamically developing; | 8. Very developed – Poorly developing |
| 9. Very developed – Strongly developing; | 10. Very developed – Dynamically developing |

Figure 3: Classification of microregions in view of their state and pace of development

Source: Own calculation and editing, 2011

According to the analysis of the obtained groups of microregions¹²: (1) During the study period the microregions in Pest county improved their development status in comparison with the others and there are four microregions in Pest county that were even able to reinforce their position in the best group. (2) Although the distance of the said microregions from Budapest did not influence their pace of development, it played a major role in terms of their initial state of development. (3) Except for the microregions of Salgótarján and Kaposvár, the dominance of microregions with county-seat centers strengthened or increased. (4) The backward areas are concentrated in the eastern and southern part of

¹² See their exact location in *Figure 4*.

Hungary; the situation of Borsod-Abaúj-Zemplén county and Szabolcs-Szatmár-Bereg county is particularly alarming. (5) As to the microregions around Lake Balaton, their competitive edge deteriorated in the study period. (6) Except for the north-western border of Hungary, almost all microregions along the borders belong to the group of disadvantaged¹³ territorial units.

The cartogram of domestic microregions, displayed according to their development categories, shows that they produce distinct development zones in the territory of Hungary (*Figure 4*).

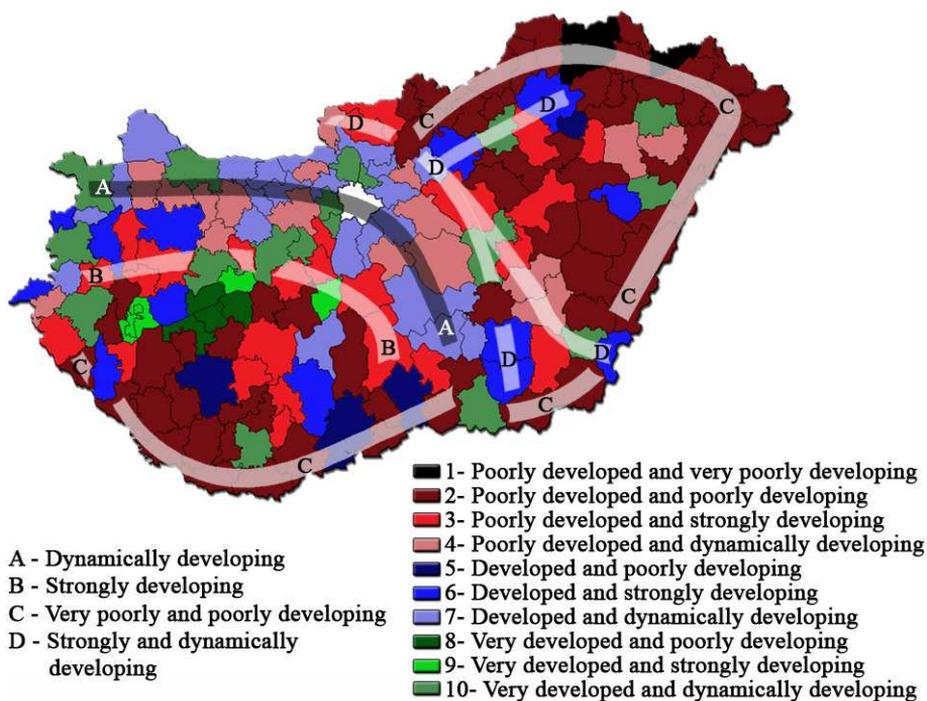


Figure 4: Microregion groups formed on the basis of their state and pace of development and the corresponding development contour lines

Source: Own editing, 2011

The contour line made up of dynamically developing microregions includes the best developing microregions along motorways M5 and M1. The dynamically and strongly developing territorial units are located on the two peripheries of the dynamic zone, clearly showing the adverse impact of the increasing distance from the best zone on the pace of development. There is a contour line including dynamically and strongly developing microregions also along the Heves county

¹³ As to the ten groups, the microregions of group 1 and 2 were considered disadvantaged because they were in the worst position with regard to both of the studied dimensions, and because the initial pace of development and state of development were under the average for 95% of them.

section of motorway M3, although in terms of its pace of development the Füzesabony microregion stands out from the other microregions. As it was stated above, the most disadvantaged microregions make up a contour line consisting of poorly and extremely poorly developing territorial units in an almost continuous belt along the entire country border, except for the north-western border region. This zone becomes wider in the Southern Transdanubia and in Baranya and Somogy counties as well as in the central section of the eastern country border, plus it runs in the form of a wide belt along the eastern side of the northern country border.

The correlation of the development contour lines with the motorway network highlighted the need to examine the link between the easy access to Budapest with the pace of development of certain microregions. In this regard a negative correlation of medium strength was determined between these two factors for 2007. It is clear from the result that in 2007 the time to reach Budapest was shorter from the center of the microregions with a higher pace of development than from the center of those with a lower pace of development. Naturally, the result shows not only the quality of road traffic infrastructure but also the overemphasized role of Budapest, Hungary's capital.

Table 1: Assessment of disadvantaged microregions

Studied characteristic		Microregion group		Difference
		Disadvantaged	Non disadvantaged	
Share of registered unemployed by education (2007)	No primary school education	9.9	4.9	5
	Primary school education	42.1	31.4	10.7
	Secondary school education	45.9	57.8	-11.9
	Higher education	2.1	5.9	-3.8
Group average of the number of enterprises / 1,000 inhabitants by sector (2007)	Industry	3.84	6.29	-2.45
	Building industry	5.18	8.39	-3.21
	Agriculture	5.84	4.59	1.25
	Services	25.20	42.47	-17.27
Group average of education indicators (share within the relevant age groups) (2001)	No primary school education	2.39	1.69	0.70
	Primary school education	34.66	30.99	3.67
	Secondary school education	37.13	43.39	-6.26
	Higher education	6.42	11.27	-4.85

Source: Own calculation and editing, 2011

The examination of disadvantaged microregions¹⁴ shows (*Table 1*)¹⁵ that these territorial units are characterized by a low level of education and, in line with that, a high share of undereducated people on long-term unemployment. The assessment of the structure of economic sectors indicates that, in comparison with the microregions that are better positioned in terms of their state and pace of development, the disadvantaged area units can offer free capacities only in the field of agriculture. It is also clear that the sector structure of the disadvantaged areas markedly and painfully lacks an industrial sector.

Surveys of per capita GDP

The strength of the relationship between the social and economic development measurable with my complex index and the per capita GDP-based economic development shows (*Figure 5*) the decreasing efficiency of the domestic system of redistribution, which is in line with the growing differences between developed and underdeveloped territorial units.

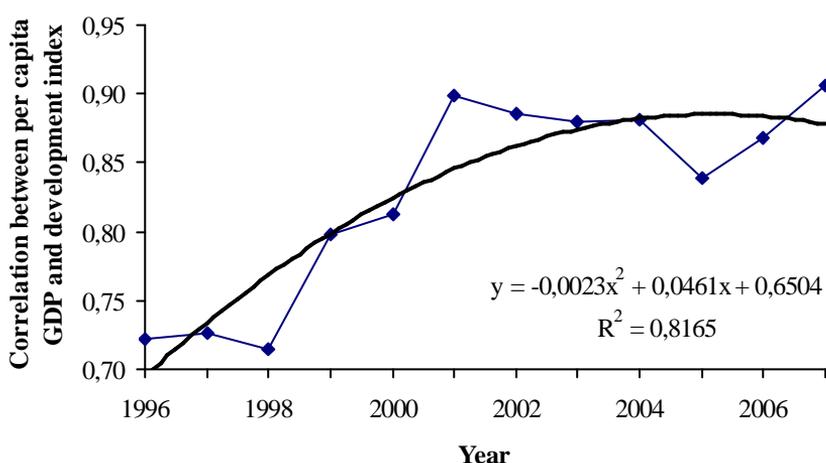


Figure 5: Change in time of the correlation between per capita GDP and complex relative development index at county level

Source: Own calculation and editing, 2011

The surveys of per capita GDP have also revealed that during the study period people kept moving towards more developed areas offering better employment conditions and having a higher per capita GDP; this process was clearly evident during the study period and will, most probably, continue in the future.

¹⁴ As it was stated above, the microregions of group 1 and 2 of the ten groups were considered disadvantaged.

¹⁵ The results were supported also by the discriminant analysis.

New scientific results

1. Based on mathematical and technical considerations, I have created a complex relative development index – through the weighted consolidation of thirty-four indicators obtained from a very large base of indicators – which makes domestic municipalities, microregions, counties and regions comparable in space and time, and thus ensures the performance of both status and process studies for the comparison of the states of social and economic development. As the complex relative development index has been determined also at country level, the said phenomenon can be analyzed in the function of time at national level, too.
2. By comparing the initial state of development and the pace of development of Hungarian microregions in a regression model, I have concluded that, on average, the development differences between the territorial units increased, although not evenly. The development differences increased in the microregions of lower initial development and, with a gradual transition, decreased in the microregions of higher initial development. It has also been confirmed that, in terms of development, the averagely developed microregions showed the smallest differences in each year of the study period. My analyses performed with deviation-type indicators have also highlighted that the increase of development differences in time did not occur evenly but showed a slightly decreasing pattern. The revealed differentiation processes mean that Williamson's hypothesis can be confirmed in time dimension also with regard to complex development, although it shows some time lag (delay) in comparison with the income processes.
3. According to a comparison between the pace of development and the inner differentiation of microregions, the territorial units with a greater pace of development tended to show a lower level of differentiation. It is supported also by the finding that the microregions of higher initial development tended to show higher inner differentiation in the beginning but then this trend changed and became just the opposite by the end of the study period. These findings suggest that Williamson's hypothesis should be valid in cross section but then the more detailed analyses has confirmed that it is not the case given that instead of the inverse U-shape curve, the relationship of the two factors gives a normal U-shape curve where during the first part of the study period the uphill section is stronger but in the second part the downhill section dominates. A comparison between my study results and the results of the income processes reveals the same "time lag" as mentioned above for the analysis made in the time dimension.

4. By combining two classification procedures, I have created such microregion groups in the dimension of initial development and pace of development that represent, for both grouping factors, the most homogeneous and most distinct categories that can be named in a consequent and straightforward manner. By combining the two classification procedures – and making the inevitable compromises – I was able to utilize their benefits and avoid their disadvantages.
5. I have determined the development zones and contour lines all over Hungary. According to my findings, the contour line made up of dynamically developing microregions includes the best developing microregions along motorways M5 and M1; the territorial units on the peripheries of both sides represent dynamically and strongly developing contour lines. There are dynamically and strongly developing microregions also along the Heves county section of motorway M3. The most disadvantaged microregions make up a contour line consisting of poorly and extremely poorly developing territorial units in an almost continuous belt along the entire country border, except for the north-western border region. This zone becomes wider in the Southern Transdanubia and in Baranya and Somogy counties as well as in the central section of the eastern country border, plus it runs in the form of a wide belt along the eastern side of the northern country border.
6. The trend analysis of the relationship between the complex relative development index and the per capita GDP has shown that Hungary's social and economic development in the study period was determined by GDP-based economic development, leading to an increased correlation between social and economic development. My analyses have also confirmed that the positive correlation between migration and the state of social and economic development tended to increase during the study period, giving a marked pattern of migration towards more developed territorial units.

My study results have also confirmed my study hypotheses.

CONCLUSIONS AND SUGGESTIONS

1. The indicator, created in the form of a complex relative development index, makes it possible for the local governments and other bodies in charge of managing and developing the economic and social activities of the various territorial units to evaluate the success of their own work or to elaborate the direction and content of future development strategies.
2. The indicator structure created under mathematical and statistical criteria can be successfully used for future area-based development studies based on statistical methods with two or multiple variables. For example, it will be possible to perform a detailed analysis of certain dimensions of social and economic development, to identify the correlations between the individual dimensions and to assess their impacts on the state of development. The complex relative development index provides a basis for the simple comparison of the findings of other research projects with the results of this study and may be used as a variable in future studies in order to simplify their implementation.
3. According to the trends evidenced by the initial state of development and the pace of development of Hungarian microregions, the attempts made to help the catch-up of the most backward microregions have failed and, during the study period, these microregions not only slightly lagged behind but showed a strong breakaway from the rest. It is also clear from the assessment of the inner differentiation of microregions that, during the study period, the most backward microregions not only broke away from the more developed regions of the country but the development differences between the affected municipalities also intensified.
4. In view of the foregoing, I suggest that a cooperation between the microregions and the municipalities should be established and developed at the level of individuals and organizations. Good relations at the level of organizations may increase the chances of winning development funds and their cost-efficient use and may also help in the spreading of local initiatives that positively affect development. Good relations at the level of individuals may, in addition to economic benefits, positively influence the human development of local people, leading to an improved quality of life. Besides good cooperation between backward regions, the representatives of the bodies responsible for local development must carry out pro-active lobbying in order to direct the attention of government decision-makers, journalists and the entire society to permanently backward regions and to facilitate this way their access to development funds. In my opinion, the above suggestions may help reduce the inner differentiation of microregions and

mitigate their breakaway position shown through my analysis of the differentiation process.

5. It can be concluded from the time lag between the differentiation processes measured with complex relative development and income that the changes of income conditions emerge earlier in the differentiation processes, while the same effects can be felt only later in terms of complex development. In other words, the changes revealed in terms of income processes forecast the events expected in the field of social and economic development.
6. Given that the backward microregions are dominated mostly by agricultural enterprises, a short-term catch-up scheme should be based on the utilization of the available agricultural potential. By producing high-quality agricultural products – increasingly demanded by consumers and forming the basis of healthy foods – and by reviving the related processing industry, it would be possible to establish a viable sector that would provide, under the guidance of well-trained professionals, work and livelihood even for less educated employees. Keeping agricultural land well-cultivated would generate economic results not only through the actually grown crops but would also facilitate – through nice landscape and attractive natural environment – a better use of the economic benefits inherent in tourism. In addition, the agricultural potential may also be utilized through bioenergy generation, which becomes ever more important today as fossil fuel sources are being depleted, energy demand is rising and environmental awareness is a burning issue in the world.
7. It would be beneficial both for economic and cultural reasons to keep alive and to spread among young people the traditional artisan trades still practiced by those living in backward microregions, as well as to ensure markets for the related products and services. The traditional building forms, everyday objects, foods and drinks are becoming popular nowadays; this creates a market demand that will probably increase in the future and establish a basis for the livelihood of families involved in such activities. The implementation of the suggestions of the last two paragraphs would not only give a financial safety for those living in backward microregions but, through the productive activities, would also help parents teach their children how to work.
8. In my opinion, the development of education should be the basis for the long-term development of backward microregions. A better educated employee is able to produce greater added value and to live a fuller life of better quality, representing a smaller burden on the society. Although the development of human capital requires time and money, it can be clearly seen that the problems of backward microregions should be eliminated

through the development of human capital. For such purpose efforts should be made to integrate young people into the school system, to create the conditions for obtaining qualifications as high as possible, and to ensure training courses so that older people may learn new trades.

9. The trend analysis of the correlation between complex relative development index and per capita GDP indicates the weakening efficiency of central redistribution in Hungary during the study period. In case of a well-functioning central redistribution the relationship between the social and economic development measurable with my complex index and the per capita GDP-based economic development must be weaker or, at least, show a weakening trend to reflect the improved efficiency of the role played by the state. The insufficient redistribution, affecting social and economic development, is probably caused – among others – by corruption, which is a phenomenon that represents a great obstacle to development. Actually, corruption may increase the costs of public investments by more than fifty percent (Papanek 2005).
10. The analysis of the correlation between migration, per capita GDP and complex relative development index shows that during the study period the migration of the population was driven by better employment opportunities and the resulting higher level of social and economic development. In my opinion, a development of the transport infrastructure of the backward microregions would be able to stop the abandonment of such areas. It would not only lead to an increase of job-creating investment projects in the backward microregions but the quick, affordable, comfortable and environment-friendly railway traffic would enable local people to reach their distant places of work in a short time. Undoubtedly, the development and maintenance of transport infrastructure would represent a financial burden on the state budget but it is one of the responsibilities of the state and would result in savings in other areas. The effective demand – retained by keeping local people in place as a result of the above development efforts – could serve, on one hand, the basis of further improvements and, on the other hand, the crowded nature of developed areas could be reduced, which would improve the quality of life of those living there.

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