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Structural factors of regional income inequalities in Hungary

ABSTRACT OF PHD DISSERTATION

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2007.

I. Introduction, objectives

One of the most important elements of the social changes at the time of the systems change was the widely perceived increase of the social inequalities. A striking manifestation of this process was the differentiation in space. The fast increase of the macroregional partitioning raised particular attention making lost of people feel and fear the division of the country into two (or three or more) parts, and that the development "slope" gets steeper and steeper. The increase of regional differences exceeded the stimulus threshold of most social studies (like economics and sociology) and that of the policy makers, either. This change, followed by putting regional development into the forefront of social thinking, brought a positive effect for social geography, because it raised interest in the science, especially in the research of the territorial process of the transitional period. It is not a coincidence, that this topic has become the most popular for researchers studying social processes in space in the past one and a half decades.

My paper fits into this general trend. I have examined regional differentiation and its factors in the period of time that has elapsed since the change of political system. In my analysis I concentrate on one of the most obvious elements of the multi-dimensional regional inequalities, the economic-material differences. My research focuses on inequalities of two key indicators: the regional GDP, and gross personal income. There are a number of reasons for my choice. On one hand, this the most general field of study internationally, and this is what most "official" EU rankings are based on. On the other hand, "common" interpretations regard this as the most decisive factor of inequalities. Thirdly, there is a general view among scholars that in the 1990s economy became the key factor of regional development. Empirical sociological studies proved that after the systems change the material inequalities grew to the largest extent among the factors that determine people's general status. Lastly, the change of topic can be accounted for measurement reasons: as incomes can be measured unambiguously, they are capable for international comparisons and complicated analytical methods.

To isolate the reasons for income differences, I created a new classification of regional and social factors, as well as structural and non-structural impacts. (The two columns of the chart stand for social and regional factors, the two horizontal lines stand for structural and non-structural factors.)

Factors of regional income inequalities (own compilation)

<table>
<tr><td><u>Non-structural spatial characteristics (locality):</u> geographical factors based on the own characteristics of the places, e. g. natural resources, consumers market, cultural traditions, the ability of the local elites to represent their interest, the innovative ability of local societies, strategies of the local self-governments, etc.</td><td><u>Non-structural social factors:</u> consumption and cultural patterns, prestige, social institutions and regulations, economic and social policy of the government, direst and indirest interferencies (EU and national subsidies etc.)</td></tr>
<tr><td rowspan="2"><u>Spatial strucures (regionality):</u> the parameters of location and accessibility, e. g. east-west, north-south, neighbourhood, core-periphery, accessibility and distance of specific points of space (borders, centres, nodes)</td><td><u>Social structures:</u> demographic composition (e. g. by cohorses, gender, religions, and ethnical groups) types and size of the settlements, people's educational composition, the groups of social division of work (division of payers by property, branches, types of job - manual or intellectual -), etc.</td></tr>
<tr><td>structure of economy by different aspects (size, industries, type of the organization, etc.)</td></tr>
</table>

My most important research hypothesis was that the income differences between the "rich" and the "poor" areas are mostly determined by the structural division of society and territory. Within that, the effect of social structures is greater than that of the regionality. Despite the appearance the social structures not directly related to income determine the regional pattern f income relations. My research aimed at the basic question of regional research—the relationship of space and society—approaching from social structures, making an effort to identify and measure the importance of the factors of income inequalities.

My work is strictly empirical, basic research to open up facts. My opinion is that lots of questions are still not clear about the matters of regional inequalities after the change of systems, e.g. the unidentical territorial picture of the way and level of development, the effect of commuting in the regional GDPs, the long-term stability of regional inequalities, or the role of industry.

II. Methods and sources of data

My work was only a few basic data, the emphasis is mostly on data analysis. In the first main part I analysed to sequences of data: the official county data of the CSO (KSH) from 1994 to 2005 and APEH data about gross personal incomes between 1988 and 2005. Eurostat's "Regio" database and Nemes Nagy József's internet collection about regional GDP data served as basis for international comparisons. In the second main part, as explanation to the microregional differences in incomes to be taxed in 2003, I use 13 aspects of 7 dimension

of social structure, most of which comes from the CSO's 2003 "T-STAR" database. As for the number of the Gypsy population I used Péter Bajmócy's database. To measure territorial effects, I used 8 parameters. A part of these is from the CSO, most data about accessibility is the product of Terra Stúdió Kft. Three basic data (the nearest microregional centre, the time to reach the Austrian border, and the average income of the neighbouring microregions) are the results of my own calculations and programs. I used some table of the 1910th , 1960th and 1980th census, and a special table about commuter flow which can be found only on the web.

To examine the income trends and to explain inequalities I used mainly statistical apparatus. The methodological approach of my work is necessarily of mathematical-statistical nature. It is the most effective tool in the hand of the researcher. I have a methodological objective, too: to introduce and demonstrate various approaches which offer lots of surplus information. To measure income differences, for example, I used four different indicators of regional concentration (Hoover-, Gini-, Éltető Frigyes-index, weighted relative variance). To illustrate the influential impacts on regional inequalities I made about a hundred thematic maps, 60 of them can be found in the present study. A peculiar methodological instrument of my work is two estimates: the county GDP data from 2004 cleared from the effects of commuting, and the identification of the real value of the microregional personal incomes between 1988 and 2005. Such calculations have not been published yet in this country. To separate two aspects of the moves of income focuses (change of population + relative change of incomes), making possible a more accurate analysis, is my "invention", too. Despite of its methodological simplicity, calculation of volume indices of regional GDP data seems to be as an innovation.

The most frequent ways of the interdependence examinations are calculating correlations and regression models. Beside these, I made a large number of dispersion diagrams, too. I include the results of two, not very often used, shift-analysis. I identified the complex structural impacts in three ways. Two of these—multiple parameter regression and principal component analysis—are well-known, the third one is an improved version of Ferenc Jánossy's method. The most important methodological novelty of my work is, I think, the method based on the practical proportioning of the results of the single parameter linear regression model.

III. Antecedents in research and literature

My paper—beside its basic geographical view—is of regional science approach, but builds on theories and terminology of other social sciences, mainly sociology.

Its topic fits into the mainstream of Hungarian regional studies about analysing "transition" and "new spatial structure". In a broader context, therefore, its antecedents are all those studies which examined the changes and transitions focusing on a territorial level—county, region, microregion, towns—in a national context. Let me call the attention to works that aim at cross-sectional and/or temporal survey of regional economic inequalities (Csatári 1996, Cséfalvay 1995, Dobosi 2003, ECOSTAT 2003, Enyedi 1996, 2004, Faluvégi 2000, 2004, 2005, Hahn 2004, Hrubi 2000, Kovács T. 2002, Kovács Z. 2004, Lengyel 2000, Lukovics 2007, Nagy 2002, 2007, Nemes Nagy 2005, Németh 2003, Rechnitzer 1993).

We should pay special attention to those publications that deal with income inequalities, like mine. Out of my two income indicators it is, interestingly, the GDP that was less frequently examined as a distinct topic (GKI 2004, Lőcsei-Németh 2006, Nemes Nagy 2006). For most researchers it appears only as one possible inequality indicator (Lengyel 2000, Nagy 2002, 2007, Lukovics 2007). However, I learnt a lot from the research estimates relating to the time before "official" GDP calculations were made (Bartek 1971, Barta 1977, Rechnitzer 1988, Nemes Nagy 1995, 2005), just as well I did from the articles about the methodology of GDP calculations (Farkasháziné-Hüttl 1996, Gábriel-Hüttl 1996, Bruckerné-Gether 2003).

There are a lot more studies about the territorial distribution of household incomes. Most authors wrote about the inequalities of personal incomes (Bódi-Obádovics-Mokos 1999, Dusek 2004, 2005, Kovács Cs. 1993, Major–Nemes Nagy 1999, Lőcsei 2002), but there were several attempts to estimate or evaluate the inequalities of a broader range of incomes (Adler–Skultéty 2005, GFK 2006, Jakobi 2002, Kenyeres–Keszthelyiné 2006, Kovács Cs. 1996, Szabóné 1996).

There are only a few empirical studies about the possible explanations and factors of income differences, and of territorial inequalities in general. The works of Barta (2003) about industry, Abonyiné (2001) and Barta-Bernek-Nagy (2003) about foreign capital investments, Tóth (2005) about the role of motorways, and Nemes Nagy-Jakobi-Németh (2001) about factors of settlement structures can be considered as such ones. The multiple parameter regressional analysis of József Nemes Nagy and NSándor Németh should be absolutely highlighted (e.g. Németh 2003, Nemes Nagy-Németh 2005), which examine the independent

and common effects of various factors. These are the works most similar in approach to mine. They examine quite a lot of structural factors or they operate with the elements of territorial and social structures as well. There are only a few exceptional works on the role of socio-economical structures (e.g. G. Fekete 1991, Barta 2003, and especially Czirfusz 2007). Therefore, although this is one of the main topics of scholarly works in sociology (Ferge 1969, 2002, Kolosi 1987, 2000, Tóth 2003, 2005), we can find hardly any examples of approaching territorial inequalities basically from the direction of the social structure. From this angle my work is quite original in the field of Hungarian regional studies.

IV. Results and conclusions

First, I briefly present the theories regarding the changes in and explanations of the regional income inequalities, and survey the home literature on regional differentiation.(Chapter 1) Then in three thematically well-distinguished chapters, I sum up the results of my research.

Chapter 2 tells about some problems regarding income data, followed by the presentation and evaluation of the tendency of changes in regional income inequalities between 1988 and 2005, in relation to the convergence—divergence dichotomy. My research has supported previous studies, which claim that between 1984 and 1994 there was a considerable increase in income differentiation, but in the second half of the decade this progress slowed down, especially in the field of personal incomes. As a result of my work it become evident that around the year 2000 a new phase began in the regional income process.

Lots of different methods proved however, that the period of divergence came to an end, and between 2000 and 2005 regional equalization, the convergence of incomes could be observed. On the other hand, only slight beta-convergence can be seen in regional GDPs, whereas there was significant sigma convergence on every level of personal incomes, and inequalities fell to the level of the year 1994. The period of equalization, however, coincided with the structural distortions of Hungarian economic growth, so it is possible that the equalization will be only a coniunctural, temporary phenomenon.

With widespread international comparisons and calculations of Hoover-indexes, it became clear that—whereas the social differences here are not higher than in most European countries, the regional income differences a lot higher than in the rest of Europe, and higher then they should be according to the Williamson-hypothesis. According to calculations, although the Budapest—countryside difference is responsible for about half of the extent of regional income inequalities, this phenomenon, especially in relation with personal incomes,

is diminishing. Up until the end of the 1990s there was a deepening macro-regional partitioning in rural areas, and the equalization that followed was the lowest here.

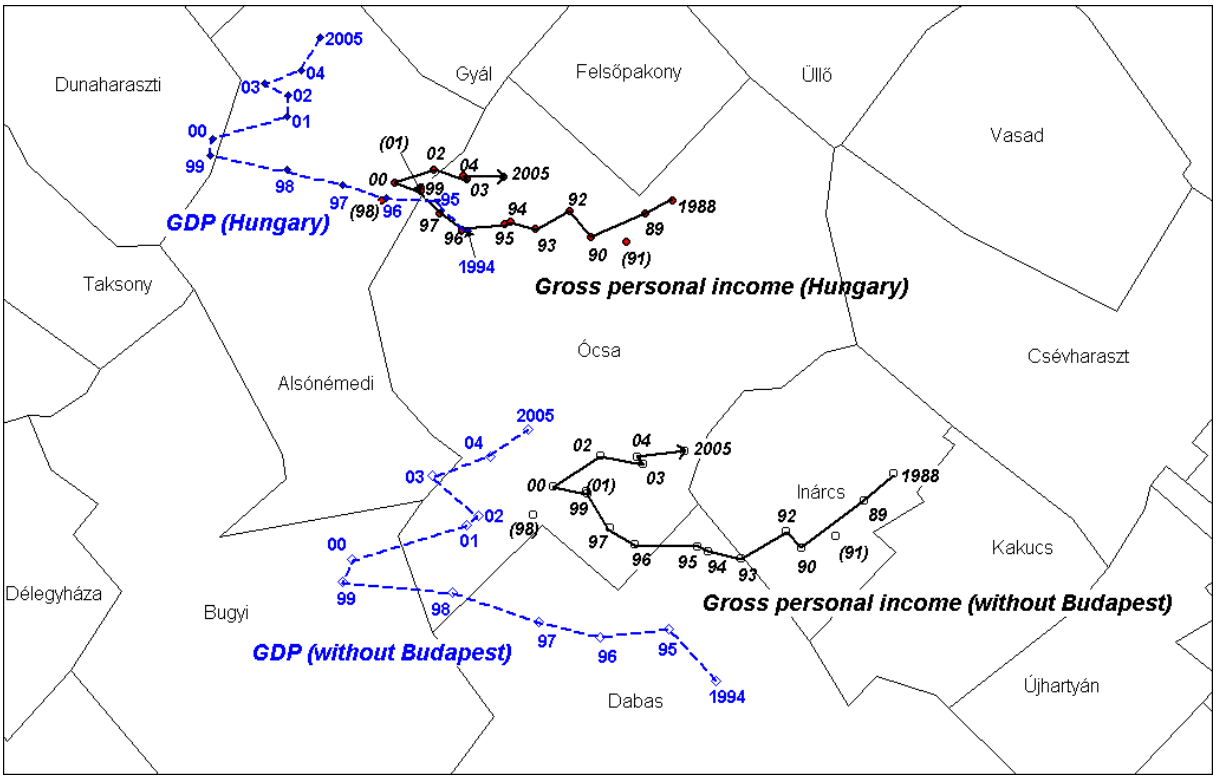
According to county GDP volume indices, however it turned out that despite the great differences in regional economic growth, since the mid-90ies, and with the exception of Békés and Tolna county, every county got closer to the average of the 25 EU member states. The leaders of this trend were the counties of Northern Transdanubia and Central Hungary. After 2000 however, the formerly leading counties became the last ones in this respect, with under 1% per year. Equalization, therefore, is mostly due to their stagnation. The only exception is Komárom-Esztergom, which got to the top by 2005 again. Pest and the underdeveloped counties of Eastern Hungary also produced above-average pace of growth. Thus, since 1994 the slowest developing areas are Jász-Nagykun-Szolnok, Nógrád, and the counties of the Southern Plains and Southern Transdanubia, with an average of only 1,5%-3% per year. As it developed, that there is an evident division in GDP growth by the north-south axis, too.

Measuring the differences between people in different areas, the GDP data are slightly distorted by the commuter flow (people taking employment outside of their own county). According to my own calculations, the GDP of Budapest would be about 30% bigger without taking account of the commuter flow. The position of Komárom and Fejér would also be better.

With a longer (starting in 1988) timespan and the analysis of personal incomes (figures of which are available for smaller area units, too) I justified that despite the increase of regional inequalities, the basic regional structuralization of the country is identical with the regional pattern before the change of the political system. I also found evidence that the Northern Transdanubian counties increased their advantage (right after the change of system alongside the Austrian border, but mostly due to the industrial boom between 1994-2000). There is an especially well distinguishable increase in the development of the small town and rural areas in Northern Transdanubia. The change after 2000 is even bigger: in each county east of the Danube growth was faster—due to the 2001-2003 national pay rises—than anywhere in Transdanubia, except Komárom-Esztergom. However, the overall “winners” of the 1988-2005 period are Western Transdanubia, Budapest and its conurbation, and most microregions near the seats of the underdeveloped countries. Most of the greatest “losers” are areas of formerly “socialist” mining and heavy industrial areas, but we can distinguish four compact groups of microregions that got into a critical position: alongside the border in Northern Hungary, around the common borders of Baranya, Somogy and Tolna, alongside the

Tisza river in the middle of the Great Hungarian Plain, and alongside the Danube from Kalocsa to Bácsalmás. Via simple estimating method to reveal their absolute size of the income increase of the microregions, it turned out that the measure of income increase between 1988-2005 is very diverse in the microregions (from –24% to +55% opposed to the average of +23%). In 24 microregions the levels of income were still below the 1988 in 2005.

Moving of gravity centers of incomes 1988-2005 (standardized population dispersion)



In the analysis about the factors of microregional income differences I used my own classification. As it cleared by calculations I made in this chapter checking of my hypothesis it was cleared that there are mostly structural factors in the background of territorial income differences. And within these factors the role of social structures exceeds the force of regional factors. There is a marked emphasis in the chapter on the study of spatial consistency of the various structural factors. A geographical pattern, very similar to that of the dimensions of social structures could be revealed. The structural advantages or disadvantages are reinforced by the effect of regional factors in most microregions.

In the first part of this chapter I briefly introduce the geographical pattern of seven dimensions of social structure: level of education, size of settlement, age of people, ethnic structure, employment, sectoral structure, nature of work, with help of simple index members and cartographical methods. Some of these seven patterns show regional disperse, others vary

according to the hierarchy of settlements (whether the microregion is of big town or small size character). The interdependence of income levels and the seven dimensions shows medium size correlation. Here I used one parameter regression models. It turned out unequivocally, however, that the most important factor of structural inequalities is the level of education, the territorial differences of which are 78% responsible for the variance of incomes. The identical results of the regressions models and the shift-share analysis suggest that the income positions of most microregions strongly correlate with the levels of education. The non-structural factors, however, show a very similar, characteristic spatial pattern in every dimension. Local impacts change the levels of income positively in most microregions of Northern Transdanubia and Central Hungary—especially in small town areas which were sites of multinational industrial investments in the 1990s, and negatively in Eastern and Southern Hungary. It became evident that these days it is the branch structure of employment, and within that, especially the role of industry is the least dependent of the other dimensions of the social structure, and this is the dimension that can be changed the fastest. The appearance of large industrial companies can improve the level of employment and in such a way, the level of incomes.

The three different researches on the overall impact of social structure (summing up the results of the one parameter regressions models with the method of Ferenc Jánossy, principal component analysis, and multiple parameter regression) basically brought the same results. The influence of social structure (the factors of which are strongly interdependent) is more important than the "non-structural" impacts in about three quarters of the microregions. All in all, the complex indicators of social structure 85% explain the regions' income differences, whereas the regressions model of the territorial parameters (regionality) explains them by only 62%. So, calculations supported my most important hypotheses regarding the impact of structures on defining incomes, and these calculation suggest that the impacts of advantageous and disadvantageous location can be modified more easily than those of the advantageous or disadvantageous social structures.

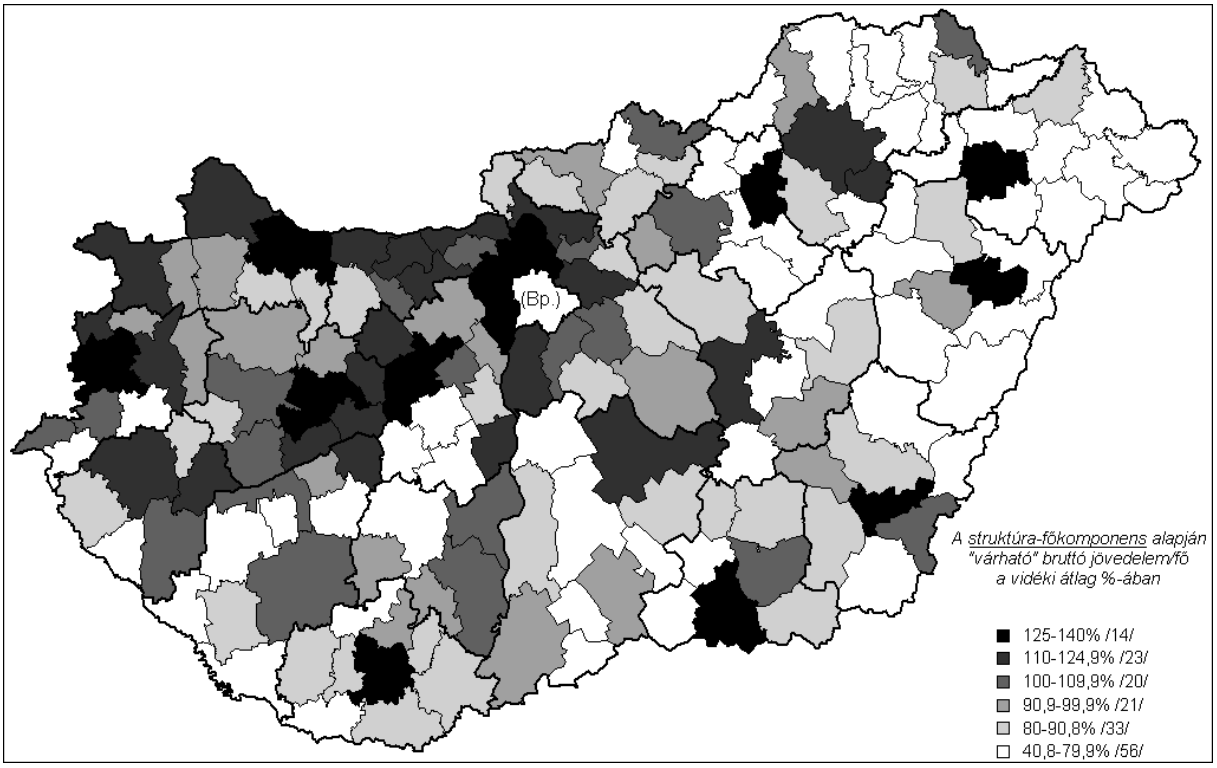
Chapter 4 brings the aspects of time back into the investigations of the correlation of the space(area) and society. Comparing the long-term (100 year) and mid-term (since 1988) positions of the microregions, the generalizeable character of the results for the year 2003 could also be verified. The map of regional inequalities shows a great deal of permanence. If we make a complex index of development from two indicators of the 190 census, and compare it with the microregions' income ranking for 2003, there is a considerable, +0,66 rank correlation coefficient. Industry stands in the background (industrialization or industrial

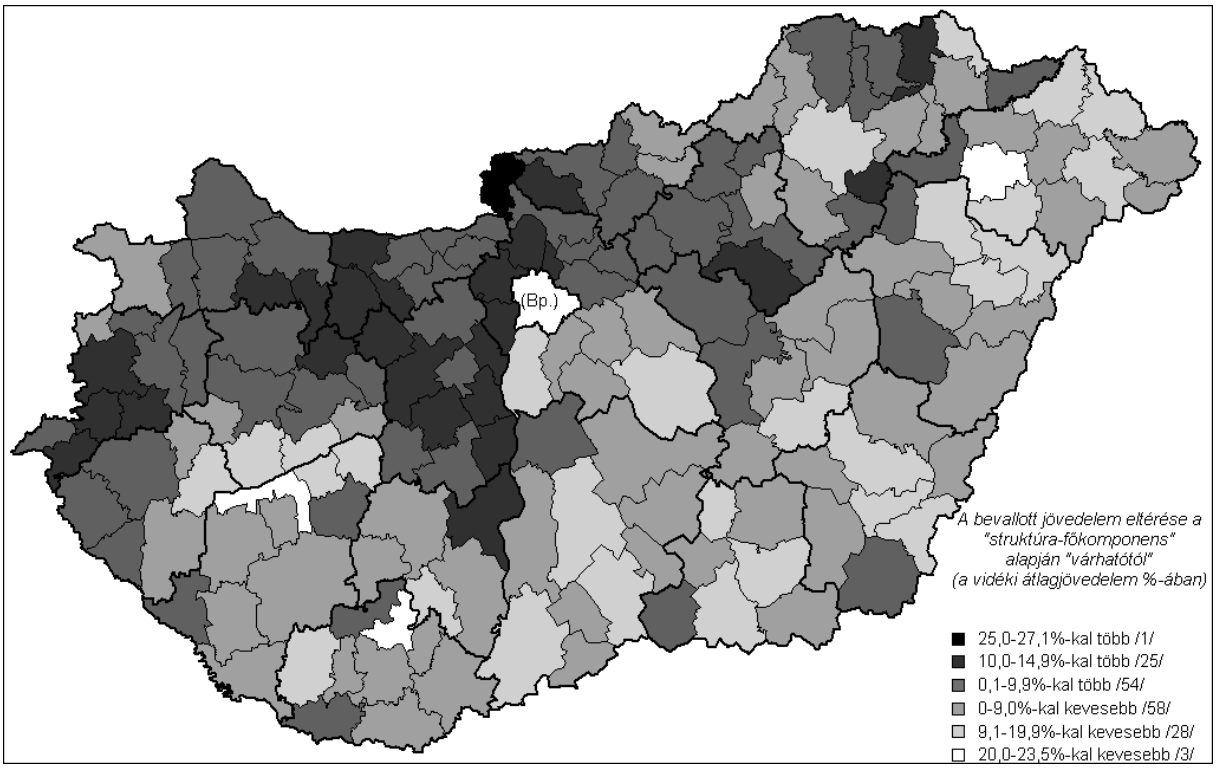
decline) of all the major changes. It is not a coincidence, because, as I proved it with correlation calculations, up until the end of the 1970s it was not the level of education, but the structure of employment as key dimension of the system of structural inequalities. In the change of incomes between 1988 and 2005, however, the roles of education and industrialization are equally important. The greatest miners are the Northern Transdanubian areas involved in the industrialization after 1990, and the biggest losers are the declining mining areas, and the areas of the former socialist heavy industry. (While the microregion of Tét got 77 position higher in 17 years, the microregion of Komló fell 101 position.)

At the same time the role of education increased: especially in the areas characterised by great inconsistency in 1988, the position of the levels of income and education got closer to each other, regardless of their position of rank, or geographical location.

Two conclusions can be drawn from for all these for regional policy. First, there are very limited opportunities for regional development to change the regional inequalities because of decisive force of the structures which reinforce each other's impacts. Secondly, the biggest chance for success opens in two structural dimensions. In the short run—mostly because of its job creating impact—industrialization still seems to be the most efficient way regional development. A more durable and sustainable income levelling, however, only be reached by diminishing the regional differences in education, especially by reducing the inequalities of chances in general education, and with the positive discrimination of handicapped groups and areas.

Income level of microregions in 2003 (average of counties = 100%). At the top: determined only by social structure, at the bottom: only by the non-structural factors, based on principal component analysis. Income is got into shape due to these factors. The two impacts. Intervals of categories are the same in both figure.





V. Publications on topic of dissertation (1998-2007)

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Kiss János Péter (2001): Dinamika az elmaradottságban? Szabolcs-Szatmár-Bereg megye és Nyíregyháza fejlődése az 1990-es években. In.: Maarten Keune–Nemes Nagy József (szerk.): *Helyi fejlődés, intézmények és konfliktusok a magyarországi átmenetben.* (Regionális tudományi tanulmányok 5.) ELTE Regionális Földrajzi Tanszék, Budapest. 125-149. old.

János Péter Kiss (2001): Industrial Mass-Production and Regional Differentiation in Hungary. In: *European Urban and Regional Studies* 4. 321-328. old.

Kiss János Péter (2003): Az alföldi városok fejlődésének adottságai az 1990-es évek új feltételrendszerében. In: Timár Judit – Velkey Gábor (szerk.*): Várossiker alföldi nézőpontból.* MTA Regionális Kutatások Központja Alföldi Tudományos Intézet – MTA Társadalomkutató Központ, Békéscsaba–Budapest 39-54. old.

Kiss János Péter (2003): A kistérségek 2000. évi GDP-jének becslése. In: Nemes Nagy József (szerk.): *Kistérségi mozaik.* (Regionális tudományi tanulmányok 8.) ELTE Regionális Földrajzi Tanszék – MTA-ELTE Regionális Tudományi Kutatócsoport, Bp. 39-54. old.

Jakobi Ákos – Kiss János Péter (2003): A lakossági jövedelmek kistérségi becslése. In: Nemes Nagy József (szerk.): *Kistérségi mozaik.* (Regionális tudományi tanulmányok 8.) ELTE Regionális Földrajzi Tanszék – MTA-ELTE Regionális Tudományi Kutatócsoport, Bp. 55-86. old.

Kiss János Péter (2004): Az Alföld fejlődési esélyeiről – egy évtized kutatásai tükrében. In: Nemes Nagy József (szerk.): *Térségi és települési növekedési pályák Magyarországon.* (Regionális tudományi tanulmányok 9.) ELTE Regionális Földrajzi Tanszék – MTA-ELTE Regionális Tudományi Kutatócsoport, Bp. 91-106. old.

Kiss János Péter – Lőcsei Hajnalka (2005): Kistérségtípusok a Tisza mentén. In: Nemes Nagy József (szerk.): *Régiók távolról és közelről.* (Regionális Tudományi Tanulmányok 12.) ELTE Regionális Földrajzi Tanszék – MTA-ELTE Regionális Tudományi Kutatócsoport, Bp. 83-142. old.

Kiss János Péter – Lőcsei Hajnalka (2006): Kistérség a sor végén. Bodrogközi hátrányok. In: *Falu Város Régió* 2. 36-42. old.

Kiss János Péter – Németh Nándor (2006): Fejlettség és egyenlőtlenségek. Magyarország megyéinek és kistérségeinek esete. *Budapesti Munkagazdaságtani Füzetek (BWP)* 8. MTA Közgazdaságtudományi Intézet – Budapesti Corvinus Egyetem Emberi Erőforrások Tanszék, Budapest.

Németh Nándor – Kiss János Péter (2007): Megyéink és kistérségeink belső jövedelmi tagoltsága. *Területi Statisztika 2007/1.* 20-45. old. A Területi Statisztika 2006. évi Kovács Tibor pályázatán 1. díjat nyert tanulmány.