Changing and continuous patterns of regional development disparities in Hungary, 1910–2022

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Our research aims to shed light on the long-term transformation of territorial development disparities in Hungary between 1910 and 2022. Based on statistical data, cross-sectional development indices were built for the years 1910, 1970, 2001, 2011 and 2022. In order to compare the changing spatial patterns of development in different eras, the analysis was carried out based on today's local administrative units (174 LAU 1 districts). Besides mapping the regional differences, the role of north–south, east–west and core–periphery divide was also measured. Our study revealed that a large proportion of well-off regions (the districts surrounding Budapest, county seats and their hinterlands, and some Transdanubian districts) had been the most prosperous territories throughout the whole period analysed. Continuity is also apparent in the position of the north–east zone of Hungary and the middle part of the Tisza region; the districts located in these regions have always been the least developed. A small number of emerging and declining districts can also be detected, however, the changes that were brought about by different state policies and broader economic transformations over the last 110 years seem to be rather limited and often temporary.

Keywords:
Hungary,
regional development disparities,
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Introduction

In geography the study and modelling of regional disparities has a history of some six to seven decades. In the first half of the 20th century it was the landscapes and regions built on the unique (varying from place to place) natural and social constituent elements that stood at the forefront of interest in European and Hungarian geography. Placing the focus on uniqueness in general made geography an ideographic discipline, with the conceiving of general truths and the creation of models remaining secondary. The decades of World War II and the Cold War

transformed the natural sciences and, subsequently, the social sciences profoundly, and "scientific" methods quickly gained ground in American social geography (Barnes 2004, Barnes–Farish 2006). The quantitative revolution building on the antecedents between the two world wars did not only provide geographers with new tools, but also brought about a new form of approach to space (Gyuris 2014). In social geography, instead of studying the development and life of the unique landscapes, it was the research into the spatial configuration of social phenomena and its modelling that came to the forefront, the basic concepts of the new approach were disparity and orderliness. It was from this period that we can see the start of the investigation into regional disparities.

In addition to research into the spatial arrangement of unique phenomena, there was also an early demand for geography to use synthesising concepts, to compress the ever-broadening content of regional disparities into a single, complex metric. The quantitative tool options available for establishing this complex indicator (for combining data measured in differing dimensions) ranged widely from simple scoring methods to factor analysis. Numerous such complex indicators were used in social geography in practice, the most well-known of these are *development* and *economic development*, which have differing content depending on the study and author concerned, and were generated from a diverse set of indicators. In all cases the most important variables of development studies are income and GDP data, these are supplemented with the various standard of living indices: infrastructure, qualifications variables, and the variables relating to the state of health of the population. For example, the *human development index* (HDI), elaborated by the UN and used widely in international comparison studies, is based on the combination of four indicators (life expectancy at birth, literacy, schooling rate and purchasing power parity-based GDP) (Nemes Nagy 2005). In itself the use of the concept of development raises numerous questions, and the critical literature on development theories has grown substantially in the past decades (Farkas 2015). The problem for the users of the concept today is that the concept of development is not value-free, it cannot deny its evolutionist roots, therefore, on our part, we would prefer to use more value-free terms, such as economic disparity, quality of life, standard of living. However, we do see that due to the widespread use of the term of development and its level of understanding by the public, it is unavoidable, so in this study we will be using the term regional development as a synonym for standard of living.

The historical research into disparities in regional development in Hungary has become an important subject in recent years. Pál Beluszky (2000) was the first to deal with the issue in his study examining the regional disparities of the modernisation in the Carpathian Basin at the beginning of the 20th century. The authors of this study expanded upon Pál Beluszky's basic ideas and mapped out Hungary's regional development disparities for the years 1910, 1970, 2001, 2011, and then identified both the stable and transitioning elements of the spatial structure (Győri–Mikle 2017). This

work went on to inspire historians and geographers to perform longer-term development studies. Multiple papers have been published in the past few years in which the authors revealed the disparities in the development within Hungary's former territory existing before 1920 based on statistical analysis and historical GIS system data (Bán 2020, Demeter 2020, Demeter et al. 2023a, 2023b, Szilágyi 2019). Works have also been written that researched the effect of the border changes following World War I. These pointed out that these formerly cohesive, homogeneous regions intersected by the new borders found themselves on new economic courses within the frameworks of the new states, and so the disparities in development between the severed regions grew (Jankó et al. 2022, Mikle 2022, Pénzes 2020, Szilágyi 2022). Zoltán Egri's article published in 2024 examined Hungary's spatial development changes over the course of a sixty-year period, between 1960 and 2020, which took the stance that the spatial pattern of underdevelopment in the periods of both socialism and post-socialism had remained a permanent feature.

In this present work, in the knowledge of new research results, adding the data of the census of 2022 to our work published in Hungarian in 2017, we are now attempting to map out Hungarian regional development disparities at five points in time, identify the characteristic shifts, and collect the possible explanations for the considerably strong stability of the spatial structure. To summarise the basic idea of this work: in order to understand the regional disparities in standard of living, economic performance, etc. in Hungary today it is essential to take into account the effect today of factors rooted in the past, i.e. path dependency.

Methodology

We performed the study concentrating on the changes taking place in the 20th and early 21st centuries at five points in time. It seemed practical to rely on the 1910 census when selecting the starting point, on the one hand because of the large amount of data available from the source and, on the other hand, because it was possible to extract a territorial account from the more-or-less undisturbed growth during the heyday of the Austro-Hungarian Monarchy. We wanted to set the second temporal cross-section, as it were, at the middle of the socialist period, therefore we selected the time of the 1970 census. The third timepoint sheds light onto the status in existence at the turn of the millennium with the use of the census data of 2001 and, in the case of a number of metrics, the data of the T-STAR database. The fourth and fifth cross-sections draw the pictures at the times of the 2011 and 2022 censuses, in the course which we use both the census data and the data of the T-STAR database.

We had to face numerous difficulties to overcome when setting up the database. The reason for this is that a researcher focussing on the historical dimensions of regional development disparities is not in such a favourable position as a geographer researching the status at the present moment. Today, when the territorial statistics

databases, the settlement-level census data are available in digital format, on the internet, the analyst can search among them as he or she wishes, struggling merely with the abundance of the data. At the beginning of the 20th century, for example, however good Hungarian statistics documentation was at the time, much less data was collected that reflected standard of living and economic performance, and among the data that was collected it was not all available at settlement level. (For example, the Hungarian Central Statistical Office [HCSO] did not publish the per capita income data we find essential in the studies performed today.) This is why we were forced to work with a limited number of variables and use metrics that indicate development only "indirectly".

One of our most important goals was to obtain comparable results, due to this we adjusted the territorial units of the analysis to correspond to the present boundaries of the districts and combined the variables at district level. The innumerable administrative border changes, the combining and separation of settlements make it impossible to compare the 1910 and 1970 county and district data with the county and district data of today: this, however, also meant that at all five points in time we were only able to work with settlement-level data, and then these data were aggregated to the district level. This, sometimes, also led to special problems: e.g. we were unable to produce 1910 data for the district of Mórahalom, as the settlements in this district today did not yet have administrative independence, their territories fell within the boundaries of nearby towns.

Of course, when drawing up the long timescale analysis we were not able to use the same variables for each temporal cross-section. (This, as a matter of course, was made impossible by the fact that the scope of data collected by the HCSO had changed significantly over a century.) Additionally, even if certain data are "still alive today", their meaning, their usefulness in the study had changed anyway. For example, at the beginning of the last century the content of the literacy metric, which was used to measure level of education, is today more equivalent to secondary school qualification, as in the meantime the ability to read and write has become common in Hungary. So, what we focussed on more was to collect metrics with similar content for all the five points in time: the cross-sectional examinations should all include data on standard of living, education and the level of residential infrastructure. Taking all this into consideration in the research (and the experience and lessons learned from the similar studies in the referenced literature) we used the following indices:

- **1910** [1], [2], [3]:
  - the literacy rate in the population over the age of 6 years (1910),
  - the proportion of the deceased who received medical care before their death (1901–1910),
  - the proportion of stone or brick-wall homes, or homes with brick or stone foundations (1910),
  - the proportion of the employed not working in agriculture (1910).

- **1970** [4]**:**
  - the average number of school grades completed in the population aged 7 years and older (1970),
  - the migration rate (1960–1970),
  - the proportion of actively employed in the total population (1970),
  - the proportion of homes built after 1945 out of all housing (1970),
  - the number of television subscribers per 1000 persons (1970),
  - the proportion of the employed not working in agriculture (1970).
- **2001** [5]**:**
  - the employment rate (2001),
  - the migration rate (2001),
  - the number of incorporated enterprises per 1000 persons (2001),
  - per capita taxable income (2001),
  - the number of motorcars per 100 persons (2001),
  - the proportion of those with at least secondary qualifications from the population over the age of 18 years (2001),
  - the number of bathrooms per 100 homes (2001).
- **2011** [6]**:**
  - the employment rate (2011),
  - the migration rate (2001–2011),
  - the number of incorporated enterprises per 1000 persons (2011),
  - per capita taxable income (2011),
  - the number of motorcars per 100 persons (2011),
  - the proportion of those with at least secondary qualifications from the population over the age of 18 years (2011),
  - the number of homes with a bathroom per 100 homes (2011).
- **2022** [7]**:**
  - the employment rate (2022),
  - the migration rate (2011–2022),
  - the number of incorporated enterprises per 1000 persons (2022),
  - per capita taxable income (2022),
  - the number of motorcars per 100 persons (2022),
  - the proportion of those with at least secondary qualifications from the population over the age of 18 years (2022),
  - the number of homes with a bathroom per 100 homes (2022).

We employed simpler statistics methods when processing the data. Firstly, we aggregated the settlement data to district level, then using standardisation[1] we performed unweighted consolidation on the individual variables to transform them into a development index. After this we placed the results onto the map, and examined the changes in the districts' ranking using Spearman's rank correlation and

[1] Standardised for average and distribution, using the formula $z = (x - \mu)/\sigma$.

cross tabulation. Finally, we performed spatial autocorrelation calculations to show the regularities in the spatial patterns, and then we examined the relationships between the development picture and the spatial parameters selected (east–west, north–south, centre–periphery) using Pearson correlation.

The position of Hungary in Europe at the beginning of the 20th century and Hungary's internal structure

In the spatial development structure of Europe today, economic performance, the income of the population and quality of life deteriorates progressively the further we are from the core area of Europe. This phenomenon cannot be explained merely by the fact that the countries of East Central Europe and Eastern Europe followed the socialist model for decades (and were at a continuously accumulating disadvantage up to the beginning of the 1990s); a much better explanation originates from the stable nature of the European spatial structure, which has been in place for centuries and which can be best described using the centre–periphery model. A number of economic historians have made estimates of the GDPs of European countries and certain regions at specific points in time, with an examination of the shifts taking place in the second half of the 19th century.[2] In spite of the differences apparent in the estimation methodologies, the results of the calculations paint a more or less similar picture: the value of per capita GDP dropped progressively as one moves to the east and south of Great Britain, the west–east duality was supplemented by a distinct north–south duality. The Austro-Hungarian Monarchy, and Hungary within it, fitted well into this scheme. Hungary witnessed a period of convergence between the 1870s and the outbreak of World War I; at this time the rate of economic growth exceeded that of most western European states, but also that of the western half of the monarchy. The rate of growth of GDP/capita was put at 1.34%, and at 1.5% by different estimates for the territory of the country today. The regional disparities within the Austro-Hungarian Monarchy fell: the per capita GDP for the Hungarian Kingdom reached 77–81% of that of the western half of the empire, and recalculating these figures for the territories within the state borders of today, Hungary's GDP was 65–73% of the value in Austria. Although we cannot speak of significant progress in the European ranking, Hungary did improve its position and converged towards the European middle (Good–Ma 1999, Schulze 2007).

Although it is true that the inequalities measured at the regional level in Hungary were nowhere near as pronounced as in the other half of the monarchy (Bukovina and Dalmatia vs. Lower Austria), there were considerable visible differences in the structure of the economy and in productivity between certain regions. In the sector of agriculture, the most important territorial differentiating factor, in addition to

[2] *Good* 1993, *Good–Ma* 1999, *Schulze* 2007. David F. Good compares and assesses his own calculations and those of, Anton Kausel, N. F. R. Crafts, Paul Bairoch, Angus Maddison, and László Katus.

market access conditions (the proximity of the markets, transport conditions, etc.) and the farm ownership conditions, was the different quality level of the farming performed. The role of agriculture in shaping regional disparities was determinant throughout the large part of the country: this sector employed 60% of earners in 1910, and constituted 44% of the domestic product (Katus 1988). The most favourable natural features for agricultural production were offered by the regions of the plains. Western Transdanubia, with the northern part of the Little Hungarian Plain (or Little Alföld), was at the forefront of the country in terms of the level of development of agriculture. Fallow land had disappeared on the Little Plain as soon as the end of the 19th century, and crop rotation farming had become the norm: with feed crop production serving the demands of intensive indoor livestock farming. Large areas were taken up with the cultivation of labour-intensive industrial plant crops, primarily sugar beet; this form of cultivation used the largest proportion of artificial fertiliser and mechanisation. A high standard of production technology was true for both small and large-scale farms. In contrast to this, the regions of the Great Hungarian Plain (or Alföld) were characterised by a less differentiated production structure: the application of crop rotation was unvarying, the large majority of the Great Plain was used for grain production (usually in a wheat–maize system). This uniformity was only broken in places by continually expanding, intensive vineyards, orchards and horticulture (Kecskemét, Nagykőrös, Cegléd, Makó, etc.). This uniformity also meant vulnerability to changing market conditions. The quality of the cultivation, the degree of mechanisation, the use of fertilisers and the standard of livestock farming was below that of the Little Plain. The conditions for agricultural cultivation in the country's hill regions were more adverse than in the plain regions, and agricultural technology here was also struggling to catch up with the rest of the country. The three-field system continued to be the norm on the poorer soil in the eastern part of Upper Hungary, and in Transylvania two-field crop rotation remained over large areas. (At the beginning of the 20th century more than one fifth of the arable land in Transylvania lay fallow [Nagy 2003, Vörös 1988]). After this it is not surprising that Moson county led the national ranking in net production value per agricultural earner; Győr county was in 5th position and Sopron county in 7th.

At the beginning of the 20th century, the Hungarian manufacturing industry was characterised by a large degree of territorial concentration. First, because at that time Budapest was indisputably the country's largest manufacturing centre: 20% of manufacturing industry workers worked in the plants in Greater Budapest (while just 5.1% of the country's population lived in the capital city and its environs). Second, because the large-scale factories of heavy industry were preferably located near to where the raw materials could be found. The most significant industrial concentration after the capital city was established in the central part of Upper Hungary: partly in the valley of Hernád, Garam, Sajó and Ipoly rivers (ore mining and iron smelting locations), and partly in the coal basins lying more to the south (Ózd, Salgótarján,

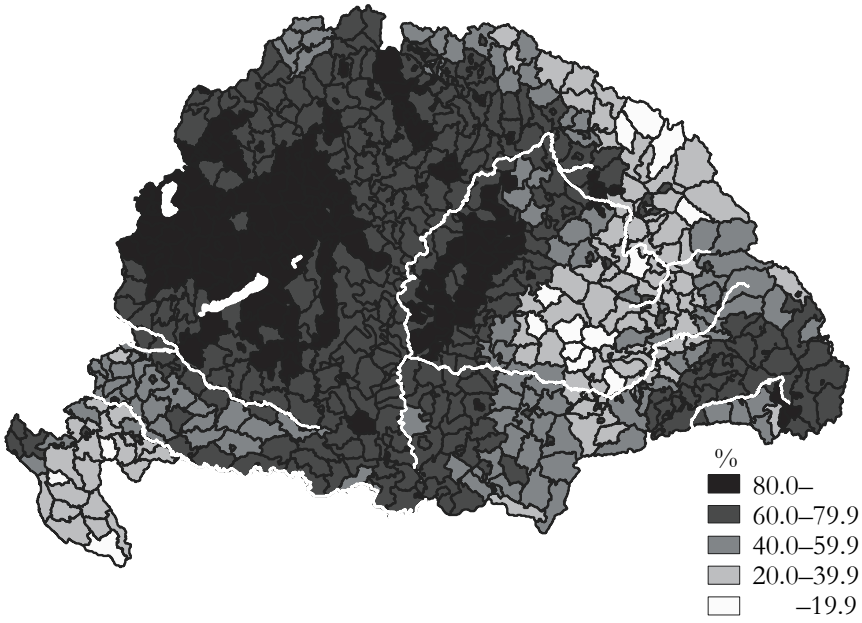
Diósgyőr). An industrial area similar in character was formed in the southern part of the then Hunyad county (Jiu Valley, now in Romania), and in the then Krassó–Szörény county (now Caraş–Severin county) (Reşiţa, Anina). Western Transdanubia was also one of the more industrialised regions: the proportion of those working in industry exceeded 20% in the region, and 23% in Győr and Sopron counties (including the towns), in contrast with the average of 16.5% outside Budapest. Western Transdanubia had national importance in a number of industrial sectors, one such was the food industry, primarily sugar production (5 sugar factories were in operation in Sopron county at the beginning of the century). The same could also be said of the quickly developing textile industry (Sárvár, Pápa, Győr, Szentgotthárd), with its plants being built around the turn of the century. Then, in a number of towns it was heavy industry, machine production and chemicals industry factories, that broadened the range of industries (Győr, Sopron, Moson-Magyaróvár, Szentgotthárd). The industrialisation of the country's other large regions fell well behind these regions. On the Great Plain the manufacturing industry was almost only present in the largest cities (Szeged, Debrecen, Arad, Temesvár (now Timişoara, Romania), Nagyvárad (now Oradea, Romania), although several thousand industrial workers were employed in these factories. At the turn of the century in Szabolcs county though there were just two factories that had a workforce of 20, and even in 1910 in the county seat, Nyíregyháza there were no factories employing more than 100 persons. The only industrial district to be established in Southern Transdanubia was around Pécs, and in Transylvania only Brasov, Cluj-Napoca and Sibiu stood out (Beluszky 2005, Katus 1988). Taking all this into consideration it may be stated that the territorial scheme of the level of development of the Hungarian economy largely repeated the general European pattern: in terms of economic performance a west–east slope and a moderate north–south duality can be seen. In addition to the capital city and its environs, the country's western regions stood out in terms of both agriculture and the manufacturing industry.

This observation is also supported by regional GDP estimates concerning the Austro-Hungarian Monarchy (Good 1993, Good–Ma 1999, Schulze 2007). The economic historians did not only perform their investigations at the national level, but extended their calculations to the regional level as well. In Hungary, the basis of the territorial division of the country was formed by the statistical region system set up by the Statistics Office in the 1880s. These units, primarily serving as the framework for reporting statistical data, however, did not fit in with any natural geography boundaries or social geography dividing lines either (e.g. the section of the country called the "Left Bank of the Tisza" also included the northern counties of Partium and the eastern counties of Upper Hungary and extended from Békés county to Máramaros county); this means that the usability of the estimated GDP values is limited. Nevertheless, the per capita GDP data also indicate a marked west–east division. The outstanding values of the Danube–Tisza Basin, which includes

Budapest, were followed by the close-to-average values of the three western and northern regions (Transdanubia, Western Upper Hungary and Middle Upper Hungary [right bank of the Tisza]). The eastern parts of the country performed poorly compared to this group: at the bottom of the economic performance ranking list was Transylvania (Schulze 2007). Mapping out the special development level metric of literacy to the district level makes it possible to perform a more refined estimate of regional disparities. The superiority of the western and central parts of the country can be detected quite well on the map.

Figure 1

Literacy in Hungary, 1910

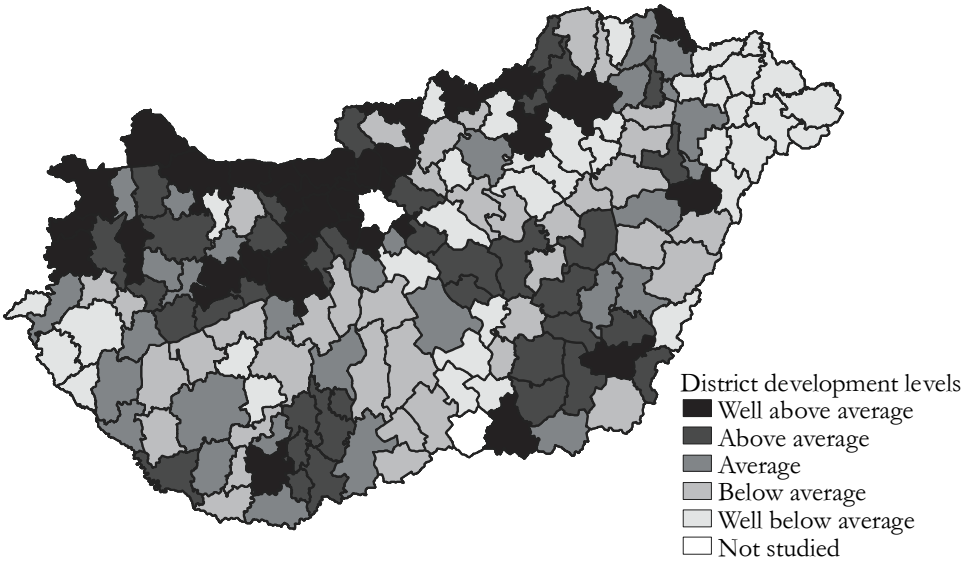


Transformation of regional development disparities in Hungary

Using the database discussed and based on the presented methodology we mapped out the regional disparities in development level at five points in time. In each case we created the map with a five-level scale to enable comparability: we identified above-average and below-average development districts compared to the average development level in the given period. The data from Budapest were not used to calculate the averages in any case. The results of the investigation are presented in Figures 2 to 6.

Figure 2

Regional development disparities in Hungary in the early 20th century



The favourable position of the Western Transdanubia districts is quite striking on the 1910 development map. The internal periphery in Western Transdanubia, which is still in existence today, can be easily detected even at the turn of the previous century: here, surprisingly, it is the districts to the south of Győr that appear the weakest. In the region it is Zala county and the southern part of Vas county that are clearly in the worst position: these areas, with their tiny villages, poor transport access, and poor agriculture, did not profit much from the proximity of the west at the time. In Southern Transdanubia, as the study shows, the southern shore of Lake Balaton was not among the best of areas (in contrast with the Balaton Uplands): at the time tourism was only just starting to spread its wings. The image of the area (and a large part of Somogy county) was marked by large estate farming on not-too-good-quality soil. Standing out though are the German-populated districts in Southern Transdanubia in Baranya county (the Swabian settlements in Hungary were always richer than their immediate environment), and the districts in Tolna county running along the Danube were also in a good position. The large part of Middle Transdanubia was among the best regions in the country, especially the districts along River Danube and those located between Budapest and Veszprém.

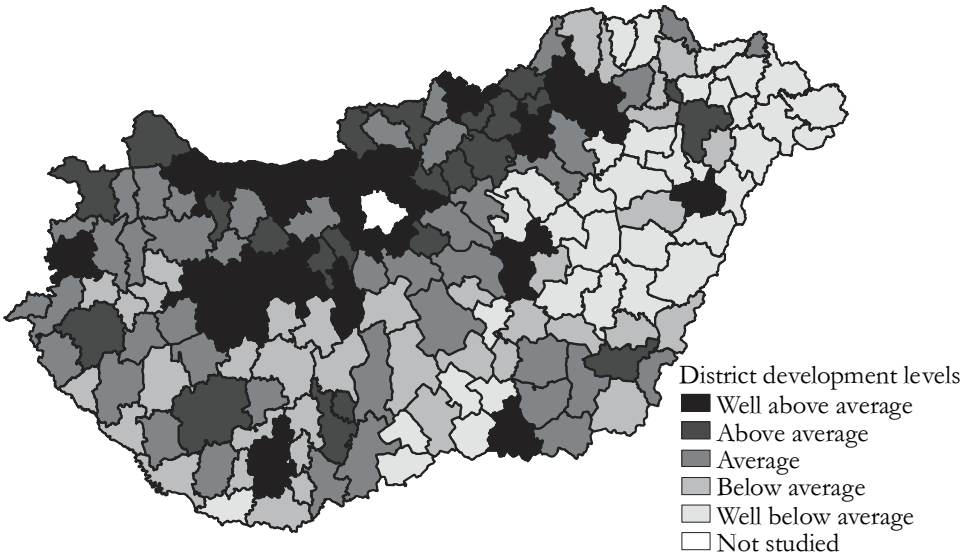
In Central Hungary, the region of today's Budapest metropolitan area was strongly one-sided, well-situated districts are more common in the immediate vicinity of the city, but on the side of the Great Plain, in areas more distant from the transport axes, the districts (Dabas, Nagykáta) were among the least prosperous even at the national level. The development picture of North Hungary was strongly mosaic: outstanding

in the region were the areas industrialised at the end of the 19th century and Hegyalja, which was only just recovering from the phylloxera plague. The villages farming on the poor soil of the hills and mountains and confined by the large farm estates (in Palócföld and the districts of Cserehát) lived at a level of poverty that was well known in folk sociography writings.

The Great Plain benefitted greatly from the economic upswing of the age of dualism and the grain boom based on the markets in Europe and the monarchy. This is especially true of the market towns with good quality arable land, the districts of Békés, Nagykunság and Hajdúság. In contrast with the areas to the east of River Tisza as a whole, the southern part of the Homokhátság region and the neighbouring areas along River Tisza saw little of this prosperity, and the districts of the Central Tisza Region belonging to Heves and Borsod counties were all in a poor situation. Similarly to the situation today, the districts of Szabolcs, Szatmár and Bereg constituted the least prosperous region in the country at the previous turn of the century. (We may assume that this has always been the case ever since we have been able to see a picture of the area based on statistics data on standard of living and economic performance.) This region located far from the central regions, with its poor agriculture and the maintenance of traditional social formulas (such as demographic behaviour), hardly had any signs modernisation at all. In terms of the territory of the Hungary of today, it was here where the literacy rate was the lowest, there were essentially no industrial plants, and in the majority of the districts in Szabolcs a half to two thirds of those working in agriculture were servants or day-labourers (this figure was three quarters in the district of Baktalórántháza).

Figure 3

Regional development disparities in Hungary in 1970



By the middle of the socialist era significant transformations had been taking place in the territorial picture of development-standard of living. A pronounced element of the spatial structure was the so-called "hill region axis", the industrial-energy production zone stretching from Borsod to Veszprém county: the districts with a below average level of development were in the majority to the east and south of this area. Western Transdanubia cannot be said to have benefitted much in the 1950s and 1960s, but nor can it be stated that it became the most disadvantaged region in the country in one blow: the relative loss of position of these districts was more of a shift towards the middle ground. In contrast, the improvement of the position of the districts in Zala county was spectacular, which can be presumably explained by the development of oil drilling. In 1970, in Southern Transdanubia, the impact of tourism on the shores of Lake Balaton could be clearly observed, the districts of the south shore increasingly constituted a dynamic zone in the region. Apart from these areas, it was only the areas around the larger towns and the Pécs–Komló industrial area that were in a good position. A striking phenomenon is the loss in position of the regions where the ethnic German population had previously lived: to this day this region has still not recovered from the relocation of the large majority of the German population.

In the region of Central Hungary, growth in the area impacted by the Budapest metropolitan area can be observed, which is demonstrated by the improved position of the districts of the Great Plain to the east of the capital city. However, the clear winner of the processes taking place in the socialist era was Northern Hungary, the districts of Nógrád, Heves and Borsod counties draw out a continuous developed zone on the map of Hungary. However, it is also important to emphasise that this zone did not extend beyond the Sajó valley: the position of the Cserehát districts, which had been in a bad position even at the previous turn of the century, did not improve, what is more, the entire Hegyalja region displayed a picture of decline.

This decline appeared exponentially on the Great Plain, especially in the central part of the region to the east of the Tisza. The bad position of the Great Plain is most definitely the result of a longer process: the grain production and export crisis in the region had started at the turn of the century, with the entry of cheap Russian and overseas grain onto the European markets. This market loss was exacerbated by the dissolution of the monarchy (and the protected, joint customs area with it). In addition, the first decades of socialism were not at all beneficial for rural regions: the Great Plain suffered both the negative consequences of the socialist transformation of agriculture and the strict policy measures against scattered farmsteads. The positive effects of the agricultural boom of the 1970s and of the rural installation of industrial facilities had not yet appeared. Overall it may be stated that almost only the level of development of the large towns on the Great Plain exceeded that of the country average. Additionally, there was no sign of any progress at all in Szabolcs county, which had been the least developed region in 1910.

The effect of a much earlier spatial structure transformation can also be read from the development map of the socialist era: the effect of the Trianon border changes. The economic geography and social geography consequences of the new country border established in 1920 are extremely complex, and of these we would like to mention just one here. In the case of most of its sections, the new country border cut through previously established village-town connections, and so on the one side of the border one could see the stagnation of towns with their dismembered catchment areas, and on the other side the decline of villages cut off from their centres. (For details see, e.g. Pénzes 2020, in the case of the Great Plain Szilágyi 2022, in the case of Western Transdanubia Győri 2006, Jankó et al. 2022, in the case of Northern Transdanubia Mikle 2022.) This exacerbated the inherently negative effect of the new border: an extended periphery zone was formed in the regions that now ran along the border. The negative consequences of this can be shown already in the period between the world wars, and the situation became even worse after 1945, when virtually all connections between the two sides of the country border were broken. (In the 1950s the Hungarian–Austrian and the Hungarian–Yugoslavian borders were almost hermetically sealed.) The decline of the areas along the border, the loss of population, the economic difficulties can be largely explained by this peripheralization.

Figure 4

Regional development disparities in Hungary in 2001

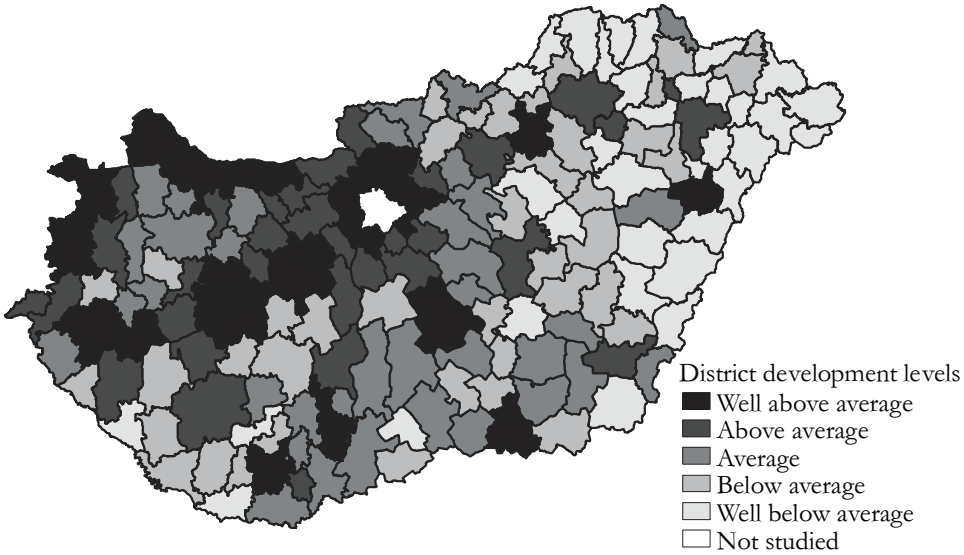
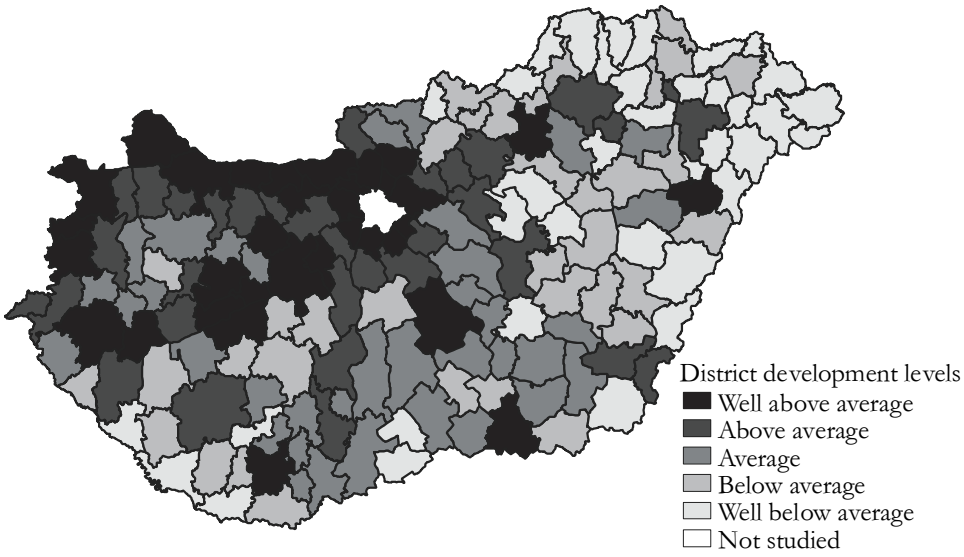


Figure 5

Regional development disparities in Hungary in 2011



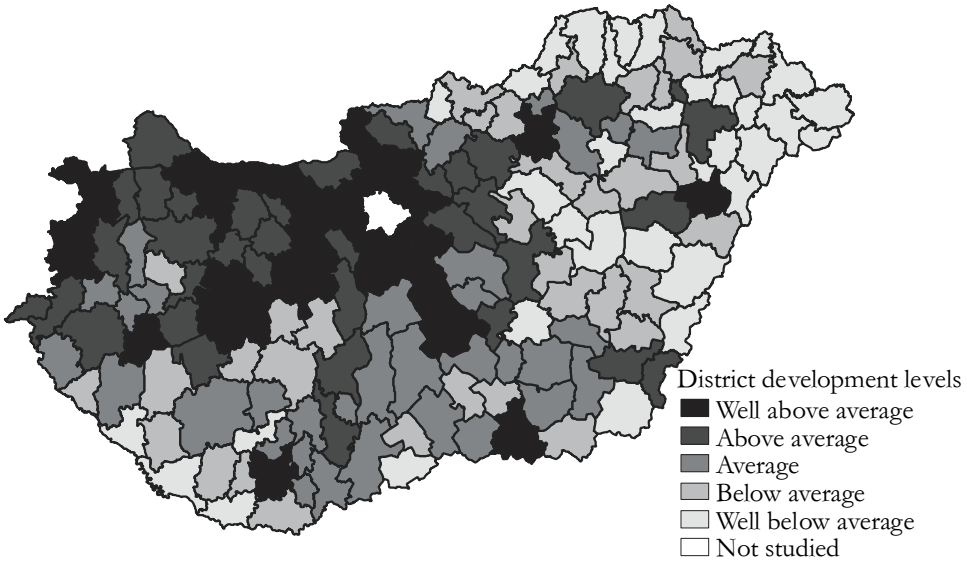
The investigation using the 2001 data reveals a well-known picture: the west–east division of the country. The spatial structure scheme of Western and Central Transdanubia can be described the simplest: the dynamic regions located on the Budapest–Vienna and the Budapest–Balaton axes, and those located next to the Austrian–Hungarian border surround an internal periphery with an average or a little above-average position. Along with the capital city and its metropolitan area, these two regions have been firmly the most prosperous regions in the country since the transition to democracy. At the turn of the millennium Southern Transdanubia now displayed fewer "western" characteristics. With the exception of the south shore of Lake Balaton, the districts of Duna-mellék and Baranya achieved an average or higher development level, however Külső-Somogy and Mezőföld stand out with their very bad positions. In addition, the development level of southern Somogy county districts and southern Zala county districts has remained permanently under the national average.

The most spectacular rearrangement of the spatial pattern of development can be seen in the region of North Hungary. The eastern half of the former "hill region axis" was unable to recover from the industrial depression for a decade and a half after the change of political regime: today essentially, discounting the large towns located in the south of the region and those towns that were able to implement a change in the structure of their economy (Tiszaújváros, Kazincbarcika), it is difficult to find a district that is not in a bad or the worst category.

If in the case of Transdanubia we sense that there has been little change in the essential structural features of the development picture compared to the status during the age of state socialism, then this is even more true of the Great Plain. Today (just as in 1970) the districts of the Danube–Tisza interfluve are viewed as being in a better position, while to the east of the Tisza only the large towns and one or two special spa tourism regions (the Gyula and Hajdúszoboszló districts) have risen above disadvantaged zone level. In addition to medium-term immobility, the century or so of stability in the spatial development structure is also palpable on the Northern Great Plain: Szabolcs and the so-called Central Tisza Region proved to be the worst positioned region in the entire country at all five examined points in time. It is a well-known fact that has been widely dealt with in the literature that, following the fast transformation after the change of political regime, the country's spatial development structure became rigid in the past decades, and the most striking fault line is seen as the Balassagyarmat–Békéscsaba line (Beluszky 2003, Nemes Nagy–Németh 2005, Németh 2009). Our research only adds to this finding in that the part of this fault line on the Great Plain had already existed in 1970 in more or less the same form as today.

Figure 6

Regional development disparities in Hungary in 2022



Compared to the situation ten years previously, the territorial picture of development had essentially not changed by 2011. Discounting the change in the relative position of a number of districts, the country's spatial development structure displayed no substantial change even after the crisis of 2008. The changes in the situation of districts shifting in terms of their development ranking are, without

exception, of a negligible degree (the greatest positive shift can be seen in the case of the district of Szécsény, which moved up by 22 places, and, at the other end of the scale, the district of Szeghalom worsened its relative position by 26 places over the course of 10 years). The stability of the territorial disparities was determinant in the 2010s as well. By the time of the 2022 census the position changes of the Pannonhalma and Tiszaújváros districts were the most prominent (the former went forwards by 37 places, and the latter dropped back by 29 places in the development ranking), but the territorial location of the development quintiles displayed just minimal change.

In order to be able to draw a generalised picture, a model-like scheme of the transformation of development disparities in Hungary, we also performed a comparison of the individual points in time with the highlighting of a number of basic factors. We performed rank correlation calculations to quantify the stability of the spatial development structure, during which we compared the district rankings at the five points in time. The results of this are presented in Table 1.

Table 1

Rank correlations between the districts' rankings

Period	Rank correlation	Period	Rank correlation	Period	Rank correlation
1910–1970	+0.62	1970–2001	+0.84	2001–2011	+0.98
1910–2001	+0.61	1970–2011	+0.81	2001–2022	+0.96
1910–2011	+0.62	1970–2022	+0.79	2011–2022	+0.99
1910–2022	+0.59				

On the basis of the calculations it may be said that in the past one hundred years the changes to the basic spatial structure of development over the whole of Hungary are not large scale: in spite of the political turning points that had a fundamental impact on the course the country took, no development "inversion" took place (i.e. the majority of previously disadvantaged districts did not switch places with other districts further up the development ranking). In spite of a small number of characteristic shifts, the development picture of 1970 and of today still strongly resembles the picture of development at the previous turn of the century, in addition the present status displays a closer relationship with the regional picture in the socialist era. The difference between the district ranking at the turn of the millennium, in 2011 and the ranking from the latest census is clearly negligible.

We separately examined the question of what regularities does the spatial development pattern of the five periods show, how has the spatial concentration of development changed in the past century, has the zonal spatial system of development

intensified or diminished. To measure this, we performed regional autocorrelation[3] calculations at all five points in time, the results of which can be found in Table 2.

Table 2

Spatial autocorrelation of regional development disparities

Period	Spatial autocorrelation
1910	+0.61
1970	+0.58
2001	+0.68
2011	+0.72
2022	+0.75

From the results of the autocorrelation study it may be determined that at all five points in time the clearly separated developed and undeveloped districts are located in a spatially concentrated way (i.e. it is very probable that we find a developed district next to a developed district, and an undeveloped district next to an undeveloped district), in addition, since the 1970s, this spatial separation has continuously intensified. In other words, Hungary's spatial development structure was not mosaic in nature at any of the times, the regions in good and bad situations were located in well-separated zones, and the extent of this zonal nature (although the weakest in the socialist era) bears witness to a basic feature of the spatial structure.

Finally, we also attempted to find an answer to the question of what was the directional dependence of Hungary's spatial development structure at the five points in time: can a west–east or north–south slope be seen, or possibly a centre–periphery-type arrangement. During the investigation we correlated the district development data sets available for the five points in time with the east–west and north–south geographical coordinates of the district centres, and the centres with the distance from Budapest and from Vienna. (Budapest was taken into account as country centre and Vienna as the closest western economic centre to Hungary.) The results of the calculations are to be found in Table 3.

[3] The essence of spatial autocorrelation is that the numerical average of the development of the neighbouring districts is placed next to the development values of every district, and correlation is calculated between the two metrics (Nemes Nagy 1998). If the given district and its neighbours are similar to each other – there is strong determination between the original data and the data of the neighbours – then the correlation gives a value close to +1, if, however, they are all different to each other, then the coefficient will approach –1. A correlation value close to 0 refers to randomness, in this case there is no displayable spatial order. In order to carry out the process a so-called adjacency matrix has to be constructed: the neighbours of each district have to be identified. In the case of the present study we did not insist on actual spatial contact when determining adjacency; we calculated the bee line distance between the districts (i.e. the district centres) and viewed the five closest districts as neighbours.

Table 3

The East–West and the centre–periphery effect in regional development disparities

Direction dependence	1910	1970	2001	2011	2022
West–east	–0.31	–0.36	–0.49	–0.47	–0.48
North–south	0.00	0.06	–0.1	–0.08	–0.1
Budapest	–0.40	–0.53	–0.55	–0.58	–0.63
Vienna	–0.41	–0.48	–0.58	–0.58	–0.59

From the data of the table it is clear that the west–east slope in the Hungarian spatial development structure was always prominently present over the course of the past century (even in the era of socialism), and the phenomenon grew constantly. (The negative correlation figures indicate that the more east one goes in the territory of the country the more likely it is that the development level of the districts is below the country average.) In contrast with this, the north–south difference was not a significant factor in the Hungarian spatial development pattern. (Naturally, this finding only remains correct if we disregard the economic weight of the capital city, which we did during the analysis.) Similarly to the west–east dimension, the centre–periphery disparities were fundamental characteristics of Hungary's spatial development pattern, irrespective of whether Budapest, the western economic centre or Vienna is placed among the variables. The capital city's centre effect was strong already at the turn of the previous century, which intensified during the socialist era, and has become a permanent feature right up to today. Today the scale of the effect of the western central region is comparable with that of the Budapest centre.

Within the scope of our analysis it would be important to tackle the question of whether the regional development disparities in Hungary have gone down or grown in absolute terms over this hundred-year period. However, we must forget to clarify this. The reason for this is that the development metric generated by us consists of different basic data at each time cross-section, the increase or the decrease of the deviation of these may also originate from the varying nature of the data.

In addition to fundamental stability, the changes occurring in the district ranking were also remarkable; we are able to display characteristic tendencies with the study. Table 4 shows those 10 districts where moving up in the development ranking compared to 1910 was the greatest and those 10 districts where moving down in the ranking was the greatest.

Table 4

The most significant district position changes over the past century

District	Ranking					Ranking change 1910–2022
	1910	1970	2001	2011	2022	
	Moving up					
Dabas	154	68	51	34	8	146
Pannonhalma	149	45	60	56	19	130
Zalaegerszeg	153	53	28	30	36	117
Siófok	123	34	17	19	22	101
Hatvan	139	39	73	62	50	89
Tiszaújváros	166	23	37	49	78	88
Tiszakécske	146	172	100	88	67	79
Nagykáta	147	85	87	82	70	77
Szentgotthárd	142	70	42	59	65	77
Lenti	162	97	68	73	86	76
	Moving down					
Sümeg	37	116	93	95	101	–64
Csurgó	71	137	142	141	142	–71
Gönc	89	171	172	171	170	–81
Karcag	58	144	138	131	140	–82
Kazincbarcika	36	26	117	110	119	–83
Salgótarján	25	32	82	102	112	–87
Barcs	62	125	131	152	149	–87
Sátoraljaújhely	11	71	85	103	107	–96
Putnok	55	86	161	166	166	–111
Ózd	28	40	153	163	169	–141

The districts displaying the greatest move upwards may be classified into four groups:

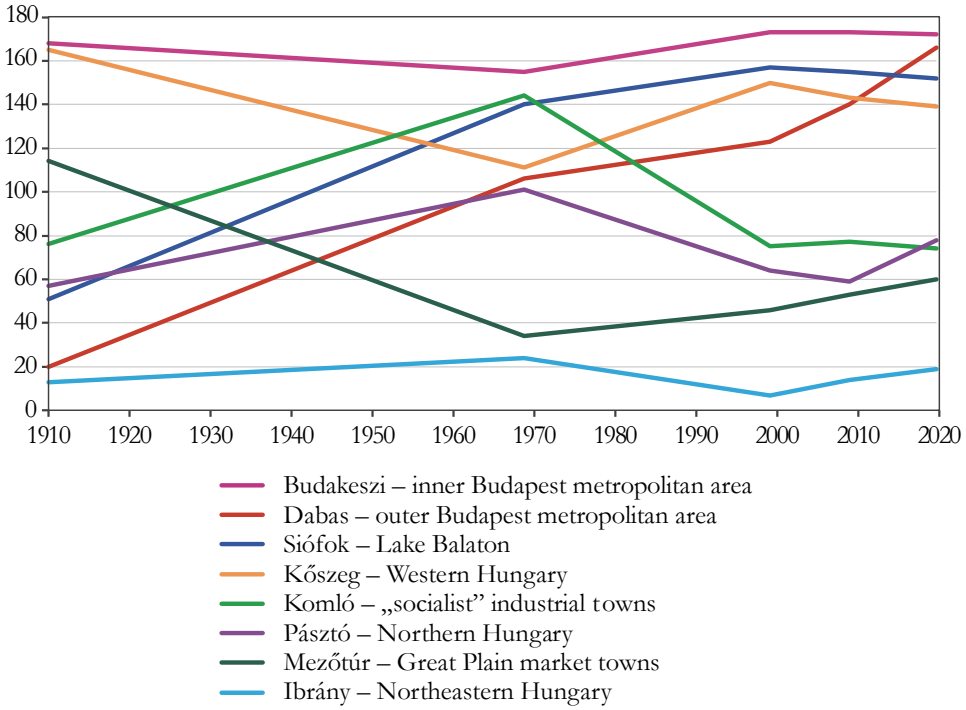
- resort town, resort zone districts (mainly on the shores of Lake Balaton),
- the districts of the "outer" zone of Budapest metropolitan area,
- districts in Zala county and in Western Transdanubia,
- the districts of socialist industrial towns that remain "successful" to this day.

However, the majority of districts moving significantly downwards in ranking may be found in Northern Hungary, with the majority of them having an industrial past. Apart from these, one or two districts on the Great Plain, market town districts (mainly from Nagykunság and the middle part of the area to the east of the Tisza), and districts in Southern Transdanubia are also among those districts that are moving down in ranking.

We have summarised the characteristic district shifts on a graph (see in Figure 7), which also presents the shifts of the most important district groups.

Figure 7

The path of the characteristic district types over the course of a century



It is the easiest to interpret the shifts of those groups that have hardly changed their positions over the past one hundred years. On the one part, these include the districts located in the core area of the Budapest metropolitan area, numerous Central and Western Transdanubia districts and most of the large town districts. (In Figure 7 the course of the Budakeszi district displays the relative "immobility" of these districts.) A common characteristic of them is that at all five points in time they were in the most prosperous regions in the country. On the other part, these also include those districts that were always in the least prosperous regions of the country: the entirety of Szabolcs-Szatmár-Bereg county (discounting the district of Nyíregyháza), the Central Tisza Region, the Cserehát region and some Bihar and Somogy districts. (The district of Ibrány symbolises this group in Figure 7.) On the third part, these also include those districts that were always positioned between the two extreme poles, in the "quiet midfield", such as the districts of the internal periphery in Northern Transdanubia.

Two district groups with a small number of members have a characteristic, continuously upwards course, these are the resort regions and the districts in the "outer metropolitan area" (in Figure 7 these are represented by the Siófok and Dabas

districts.) It is true of both groups that they significantly improved their positions by the era of the socialism compared to the previous turn of the century, and maintained this good position and even improved it by the turn of the millennium. There is also just a very small number of districts that have experienced a continuous downwards course. It can be said of just a few market towns and Great Plain districts (such as the Enying, Tamási, Törökszentmiklós and Kunszentmárton districts) that over the course of the 20th century they saw only continuous decline or stagnation. In addition, the Sátoraljaújhely and Ózd districts moved from the first third to the middle field and to the top third.

A number of district groups display a special U-shaped and inverted U-shaped course. A good number of Western Transdanubia districts shifted downwards during the socialist era and then achieved an upwards path in the period following the change of political regime (the district of Kőszeg represents these in Figure 7). A number of districts on the Great Plain (such as Mezőtúr) also have similar characteristics with the difference being that in these cases the upwards section is not very steep: this reflects less progress and more stagnation. The course of the curve of two district types (partially overlapping each other) is the opposite to these: the "Northern Hungary" and the "socialist industrial town" types (these are embodied by the Komló and Pásztó districts in Figure 7). The upswing of these districts was not constant in the second half of the 20th century, after the end of socialism they were unable to maintain their good position, and slipped back to more or less their previous positions.

Summary

In this study we were looking for the answer to the question of what historical determination the spatial development structure in today's Hungary has: can the roots of the current status be found over a timeframe of one hundred years. In the course of our investigations we were able to determine that stable advantages-disadvantages established (accumulated) over a long period of time lie behind today's spatial distribution of "development": the spatial development maps drawn up for the five time cross-sections are very "similar" to each other. The west–east division of the country, the centre–periphery characteristics, the striking separation of developed and undeveloped regions are all permanent features of the Hungarian spatial development pattern of today. All this may also mean that even the best implemented regional development interventions enacted with the utmost of good intent have to struggle against long-term disadvantages that are difficult (or impossible) to remedy. (Such a disadvantage that is difficult to overcome is, for example, the limitation of geographical location.)

The stability fundamentally characteristic of the spatial development structure is only broken by a limited group of districts that move up and down (in the case of some of these the shift in position was only temporary). It is essential to highlight the

fact that regions involved in tourism and spa tourism, the districts located in the outer zone of the Budapest metropolitan area, the districts of Southwestern Transdanubia and the districts of one or two successful socialist industrial towns have significantly improved their positions over the course of one hundred years. At the same time certain districts in the central part of the area to the east of River Tisza and Northern Hungary display signs of decline compared to the beginning of the last century. It makes us wonder how much planning and the efforts of regional development lie behind long-term success, and to what extent processes with greater force outside of this impact this success.

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