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Research on the quality of life in the spa towns of Hungary*

Within the framework of the Széchenyi Plan, the realised spa investments and the accommodation investment related to them significantly improved the quantitative and qualitative indicators of the health tourism supply in Hungary. The health tourism developments promoted by the tourism politics (Budai 2001, Budai & Székács 2001), and the closely related marketing communication motivated the researchers to devote more attention than previously to the examination of seemingly positive changes of the socio-economic effects (Mundruczó & Szennyessy 2005, Formádi 2007, Ács & Laczkó 2008). In connection with the topic, with the co-ordination of Hungarian Academy of Science Geographical Research Institute, in the summer of 2007, a research began that primarily concentrates on giving an overall picture about the quality of life of the population of the settlements in connection with health tourism.

The tourism that influences the strengthening of the regional competitiveness, becomes the measurable depositary of the living conditions of the given settlement, on one hand by satisfying the needs of visitors (developing a service industry), on the other by improving the local population's living conditions (creating a liveable settlement) (Dobos & Jeffres 1993, Jurowski & Brown 2001).

It is recognised that the Hungarian nation, which is struggling with significant challenges in relation to physical and mental health, can improve some of the aspects defining the quality of life by the active consumption of the supply of health tourism (Kopp & Kovács 2006). However, is the quality of life better for those citizens, who live in a settlement that offers health oriented tourism? To be able to give a cautious answer to this question an overall research is needed. The first step of the research is to analyse the guest turnover rates of spa towns in Hungary (especially focusing on investments relating to the Széchenyi Plan), and the mathematical-statistical analysis of socio-economic affects. With this, we aimed to create a comprehensive picture about the processes that were generated by the spa developments, as they are commonly success stories, especially regarding the demand changes that are directly/indirectly influencing the quality of life and their impression on local society and economy.

The dynamic role of spas in guest turnover

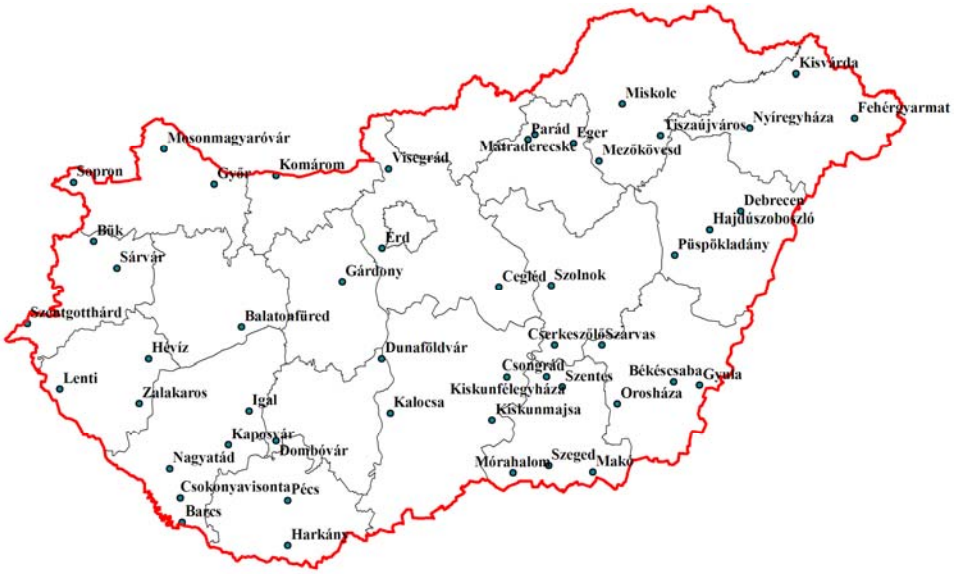
In the first phase of our analysis, we paid particular attention to answer the question that compared to the national average, how much more favourable or unfavourable the tourist

* This study was carried out with the support of the Bolyai János Research Scholarship and the OTKA (K67573).

arrival indicators of the qualified spa towns (later spas) are. In 2006 there were 50 settlements operating a spa.

Figure 1

The analysed spas



Considering that commercial accommodation was only established in Mórahalom in 1998 and in Mátraderecske in 2002, for the longer time series and a comprehensive comparison of dynamics, these two settlements' indicators were not taken into account. The observations focused on the tourist arrivals of the 48 analysed settlements between 1995 and 2006, during which base indexes were calculated and were used to reveal the most important tourist developments over the 12 years. The source of these data was the KSH (Hungarian Central Statistical Office) informative database. Nationally on average the number of tourist arrivals increased by 39.6% from 1995 to 2006, in which the expansion rate for domestic travellers was 70.9% and for foreigners it was 15%. There are 16 settlements among the spa towns, where the number of guests decreased during the examined period. The most significant decline happened in Barcs (nearly 90%). There are another 13 settlements, where between 1995 and 2006 the increase in the number of tourist arrivals is below the national average. In the examined period, the most substantial increase was observed in Kisvárda (473.2%).

Regarding the number of domestic guests, there are only 10 settlements where in 2006 the number of tourist arrivals decreased compared to 1995, although there are another 15 settlements where the expansion rate is below the national average. The most significant decline also occurred in Barcs (68.5%), while the largest increase was in Zalakaros (650.1%). In contrast, the number of foreign visitors fell in 34 settlements, with 2 additional settlements registering slower development than the national average. The most considerable decline occurred in Fehérgyarmat (97.2%), while the largest increase occurred in Szentgotthárd (3 115 %). (This means a 31 times higher increase, but we respect the author's choice of % format – editor).

The number of tourism nights on a national level grew by 20.3% from 1995 to 2006. Within this, we observed a 51.5% growth for domestic tourism nights and a 0.5% growth for foreign tourism nights. In the analysis, we found 22 settlements where the number of tourism nights decreased, and at 3 further settlements the rate of increase did not reach the level of national indicators. Considering the total tourism nights, Barcs is representing the worst situation with a decrease of 92.6% and Szentes is in the most favourable situation with an increase of 433.4%. The number of domestic tourism nights decreased in 11 settlements during the investigated 12 years and in further 10 settlements the rate of expansion was below the national average level. The 2 extremes are Barcs (–75.3%) and Cserkeszőlő (521.9%). Regarding foreign tourism nights, the situation is even worse; there was a decrease in 31 settlements, while in Parád the rate of stagnation was equal to the national average. The rate of decline is the highest in Barcs (97.7%), while in contrast we can experience an expansion of 2 026.7% in Szentgotthárd.

Therefore, we cannot say that the tourist arrival indicators of spa towns in Hungary are better than the national average. There are many towns where the dynamics of tourism demand is considerably above the national average, but there are more settlements that are below the average.

In order to exclude the distorting effects of the significant tourist destinations (Budapest, Balaton) which highly influence the national indicators, we separately examined how the tourist arrivals of spa towns relate to the processes of their counties.

For this analysis, the base index of all settlements was compared to the adequate data of their county. In our opinion, in such cases it is easy to represent how important a role the spa towns play in the tourism life of the county.

Analysing all the tourist arrivals together, we can conclude that in more than half of the settlements (28 settlements) the dynamics was less favourable than the county average. The most significant differences were represented by Lenti (–127.2 percentage points) and Szentes (425.1 percentage points). Regarding the number of domestic tourist arrivals, there are 26 settlements that represent a more unfavourable dynamic than the county average. The two cornerstones are Nagyatád (–163.3 percentage points) and Szentes (526.5 percentage points). Regarding the number of foreign visitors, 28 settlements have less favourable dynamics than the county average, with the extremes represented by Cegléd (–79.6 percentage points) and Szentgotthárd (3 073.7 percentage points).

Regarding all the tourism nights, we could find 28 settlements where the registered growth between 1995 and 2006 was below the county average. In Fehérgyarmat, the dynamics of all tourism nights was 113.7 percentage points lower, while in Szentes (404.8 percentage points) it was higher than the average of the county. In case of domestic tourism nights at half of the settlements (24 settlements), we experienced more favourable dynamics than the county average. Barcs was far behind (with 140.2 percentage points) the county average and Visegrád exceeded it to the greatest extent. The situation is even worse regarding the foreign tourism nights; most of the settlements (26 settlements) were below the county average. The extremes represented by Fehérgyarmat, (–94.5 percentage points) and Szentgotthárd (2 003.1 percentage points).

It is therefore possible to conclude that the majority of spa settlements did not become the driving force of their counties in determining the dynamics of tourism during the reviewed period. It seems that in most cases the attraction of health tourism does not

equal any potential advantage compared to other tourist facilities of settlements in the county.

The effects of the Széchenyi Plan on the guest turnover of spa towns

The Széchenyi Plan affected a significant proportion of the examined settlements. In the following, we are trying to find an answer as to whether there is a connection between the dynamics of tourist arrivals, and the investments that were part of the development plan. For this reason, we divided the test period into two equal parts, the period from 1995 to 2000 and 2001 to2006. The first period was considered as the reference period, while in the second one we expected the plan based investment to have an impact. Although the projects were completed at different times, we chose this solution to best illustrate any differences – if the project was successful – regarding the dynamics between the two periods. In this case, the difference was measured by the annual average increment.

Regarding the national average of the number of visitors between 1995 and 2000, we can see that the increase was 1 percentage point higher than the annual average increase between 2001 and 2006. Of the examined 48 settlements, 34 have implemented some kind of investment within the framework of the Széchenyi Plan. Among the 34 settlements, there are 11 settlements where the increase in tourist arrivals from 2001 was lower than during the previous 6 years. We cannot state that we can expect increases only in those settlements, which are in connection with the Plan. The evidence for this is that 5 out of 14 settlements that were not connected with the Széchenyi Plan, experienced an increase in the annual dynamics compared to the previous years. As can be seen, the Széchenyi Plan did not mean an improvement in the dynamics of tourism nights by itself, but it is noticeable that those settlements, where an investment of HUF 2 billion or more was carried out from 2001 are representing a higher annual average increase than previously.

Among the settlements with positive dynamics, Cserkeszőlő carried out the lowest cost (HUF 147 million) investment. In this case, in the first period a 3% of annual increase was recorded, which was followed by the second period with a 19% increase. The most significant investment of the Széchenyi Plan was carried out in Bük (HUF 8.8 billion). Here in the first year the number of tourist arrivals was stagnant, but this period was followed by an annual 12% increase after 2001.

Analysing the tourism nights, it can be ascertained that according to the national average, compared to 1995–2000, the annual average increase fell by 0.2 percent points in the period from 2001 to 2006. By the second period, the growth rate had slowed in 21 out of the 48 settlements, while in other settlements it stagnated or increased. The most significant decline happened in Csongrád, where the annual average 75% increase in the first period, was followed by an 8% decrease in the second period. On the contrary, in Mezőkövesd there was a 10% annual average decline, which was followed by a 14% increase in the second period. Of the Széchenyi Plan affected settlements, 13 experienced a decline in the annual growth rate by the second period, while in all others the growth stagnated or increased compared to the first period. Regarding the tourism nights, it is not possible to present a connection between the cost of investment and the improvement of

turnover dynamics, since the largest investment happened in Bük, but in this situation the recovery of the turnover was only 4% between the two periods, while there was a more significant improvement – as we have already stated – in Mezőkövesd, where the cost of investment was only HUF 460 million.

It is therefore concluded that in many settlements regarding the spa project investment of the Széchenyi Plan, very good growth trends can be shown. However, it is not possible to generalise since most of the settlements regarding tourist arrivals were not able to benefit from the investment. This can be due to quite a wide range of reasons, and in order to explore theme, a case study could clarify the issues by investigating the settlements separately.

The economic stimulating role of spas

From the aspect of our research topic, we considered it extremely important to explore to what extent that tourist arrivals are able to influence the income situation of each settlement. The analysis of this issue possesses several problems. It is difficult – especially in settlements with a higher population – to separate what proportion of development, or what proportion of income comes from tourism, and to what extent it is the consequence of other investments or developments. We wanted to demonstrate that even if only partially, tourism has an impact on economic processes. Since the role of tourism has a different emphasis in the life of the settlements, thus we examined the change in the relationship between the settlements with 1 000 inhabitants per commercial accommodation and income from 1995 to 2006. In this case the correlation coefficient (r=0.52) indicates a moderately strong relationship, that is, the tourism of the analysed settlements has a minor impact on income growth. We looked also for a similar relationship between the difference of the domestic migration annual average per 1 000 people from 1995 to 2006, and the number of bed-places at public accommodation establishments per 1 000 people. The correlation coefficient (r=0.62) was higher than the previous ones. The most significant relationship was detected between the change in the size of the population from 1995 to 2006 and the number of bed-places at public accommodation establishments per 1 000 people (r=0.65). Therefore, we can conclude that there is a connection between the tourism in the settlements and income, as well as the ability to prevent the population from leaving their hometowns.

On this basis, we examined how competitive the spa settlements are in relation to the country's relation. Indeed, we can see the competitive settlements, or that settlements more involved in tourism can expect positive socio-economic trends. To illustrate this, the relative households' incomes have to be divided into a well and clearly defined multiplication of socio-economic factors (Lengyel 2000, Nemes Nagy 2004). After some mathematical transformations (taking the logarithm of the values), the figures become more manageable and are derived according to the following formula:

$$\log\left(\frac{Income}{Population}\right) = \log\left(\frac{Income}{Employees}\right) + \log\left(\frac{Employees}{Active\_aged\_people}\right) + \log\left(\frac{Active\_aged\_people}{Population}\right).$$

Since we started the measurements from the levels of the different settlements, in the case of income, it was considered as the current year's income, which is subject to

income tax. The number of employees are people who paid tax in the given year; the active aged population are women between the ages of 15 to 60, and men between the age of 15 to 61; while the population refers to permanent residents. The income per taxpayer is essentially representing the economic productivity of the settlements; the proportion of taxpayers within the active population gives an acceptable estimation, while the proportion of active aged people within the population is a kind of calculator number, since it is considering the younger demographic image as a positive regional resource.

The division of these factors is used to standardise the region. We adopted József Nemes Nagy's findings showing that the pay gap is preliminarily shaped by productivity, while the effect of the age factor is very small (Nemes Nagy 2004). The basis of standardisation are the values of certain settlements in relation to the national average, examining household' income and the three factors referred to. Adapting the technical solutions of Nemes Nagy (2004), in the second column of the first chart (categories of competitiveness), 1 represents the above average and 0 represents the below average factors. (The first digit of the code is a symbol of household income, the second digit is productivity, the third is the level of employment, and the fourth is the age structure factor.) Regarding the concept of competitiveness, we consider competitive those settlements where the income of inhabitants is above the average, and we consider uncompetitive those settlements where the income of inhabitants is below the average. Within this we can determine a complex competitive advantage if the given settlement regarding all the three components values of household income is above the average, whereas competitive advantage is more of a single factor, if only one of two factors meet the condition. The competitive disadvantage is identified in the analogy.

Table 1

The competitiveness and the tourist arrival processes of the examined settlements

Settlement	Competitive category	Tourism nights, 2006 (1995=100%)	The annual average increase of tourism nights, %		The difference between the two periods , pp.
			1995–2000	2001–2006	
Balatonfüred*	0011	81.1	98.4	96.4	–2.0
Barcs*	0001	7.6	84.1	77.9	–6.3
Békéscsaba*	1011	91.4	96.5	103.5	7.1
Bük*	0011	160.9	102.3	106.7	4.5
Cegléd*	0000	71.8	91.8	99.8	8.0
Cserkeszőlő*	0000	248.1	104.0	110.7	6.8
Csokonyavisonta	0000	62.2	176.0	93.0	–83.0
Csongrád	0010	33.3	176.0	93.0	–83.0
Debrecen*	1101	103.9	99.5	102.2	2.7
Dombóvár*	0001	56.9	92.2	98.1	5.9
Dunaföldvár	0000	135.5	109.2	94.3	–14.9
Eger*	1111	132.6	104.7	99.6	–5.1
Érd*	1101	130.1	98.8	105.3	6.5
Fehérgyarmat	0001	51.7	91.5	93.6	2.2
Gárdony* (Agárd)	1111	35.4	87.6	97.7	10.1
Győr*	1111	135.4	108.9	95.5	–13.4
Gyula*	0011	78.0	98.1	98.1	0.1

(The table is continued on the next page.)

(Continued)

Settlement	Competitive category	Tourism nights, 2006 (1995=100%)	The annual average increase of tourism nights, %		The difference between the two periods, pp.
			1995–2000	2001–2006	
Hajdúszoboszló*	0011	198.5	107.9	104.3	–3.6
Harkány*	0000	98.7	102.2	97.8	–4.4
Hévíz*	0010	157.1	104.7	102.6	–2.2
Igal*	0000	26.4	91.8	77.8	–14.0
Kalocsa	0001	74.5	94.2	101.2	7.0
Kaposvár	1011	128.2	128.7	81.6	–47.1
Kiskunfélegyháza	0011	163.2	94.4	108.1	13.7
Kiskunmajsa	0000	144.8	107.9	104.3	–3.7
Kisvárda*	0001	371.7	95.2	115.7	20.6
Komárom*	1111	90.7	100.1	99.6	–0.5
Lenti*	0011	65.5	96.5	99.7	3.2
Makó	0000	254.5	102.7	112.3	9.5
Mezőkövesd*	0010	130.4	90.3	114.2	23.8
Miskolc*	1101	93.4	98.7	97.8	–0.9
Mosonmagyaróvár	1011	67.2	102.2	94.5	–7.7
Nagyatád	0011	141.7	95.6	103.2	7.7
Nyíregyháza*	1001	123.0	105.0	97.6	–7.4
Orosháza	0011	320.0	143.5	131.6	–11.9
Parád* (Parádfürdő)	0000	277.9	104.2	106.5	2.3
Pécs	1110	105.3	98.9	99.7	0.7
Püspökladány*	0001	92.7	89.3	106.7	17.4
Sárvár*	1011	92.6	101.7	98.9	–2.8
Sopron*	1011	129.8	106.2	98.6	–7.6
Szarvas*	0010	405.7	110.0	116.0	6.0
Szeged*	1111	121.4	96.1	104.5	8.4
Szentes*	0010	533.4	111.1	112.5	1.3
Szentgotthárd*	1111	95.2	108.6	91.3	–17.3
Szolnok*	1111	107.3	98.0	98.4	0.4
Tiszaújváros	1111	248.1	118.0	103.1	–14.9
Visegrád*	1110	504.7	115.0	120.2	5.2
Zalakaros*	0010	266.9	104.6	111.7	7.1

Note: the first number of the four-digit code represents household income, the second number represents productivity, the third number represents employment, and the fourth represents the factor of age structure. The value of 1 represents the value above the national average, and the value of 0 represents the value under the national average. The mark * identifies those settlements, that had developments within the framework of Széchenyi Plan.

Based on 2006, 8 settlements can be characterized by complex competitiveness with 5 of these settlements experiencing an increase in tourist arrivals. However, in the period of 2001 to 2006, only 8 out of 19 settlements experienced an accelerating pace of progress in relation to the annual average growth, where one or multi factor competitive advantage can be identified. A growing number of tourist arrivals in relation to tourism nights can be identified in 6 settlements. Of 29 settlements that experienced a certain competitive disadvantage, 16 experienced a tourist arrival increase, so in our opinion these are the settlements where in many cases the only opportunity for catch up is medical tourism; it is also true that there are significant barriers to their development.

The regional effects of the operation of spas

In the next step, we wanted to find the answer to the question of how the tourist arrivals of spa settlements correlate to regional tourist demand. We started out from the hypotheses that advantageous and disadvantageous sub-regional processes affect the settlement and vice versa, the process can take away energy from other settlements in the sub-region, but can also provide strength for growth.

We can conclude that the tourism nights from 1995 to 2006 are broadly similar in the examined settlements and in their sub-region. There are only a few positive and negative divergences. Regarding Kiskunfélegyháza and Pécs, despite the declining regional indicators they were able to expand the number of tourism nights. On the contrary, in 4 settlements a negative trend has been registered compared to the micro-region. These places are Harkány, Mosonmagyaróvár, Cegléd and Fehérgyarmat.

From the aspect of our study, it is worth noting how the settlements tourism nights share changed in connection to the micro-region from 1995 to 2006. This way it is possible to show to what extent spa settlements can be considered as the driving force for their micro-region and to what extent their development serves the micro-region in a positive or negative way.

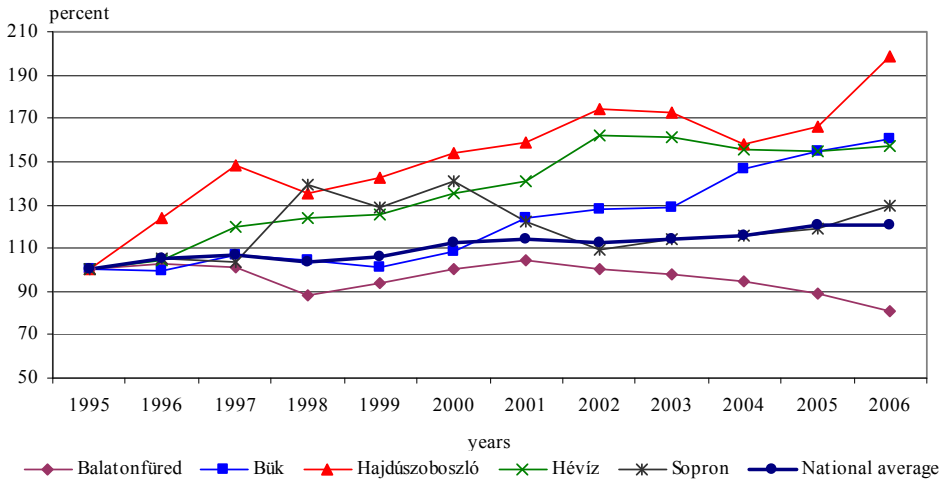
The analysis shows the tourism night shares in the micro-region, regarding 48 settlements, in 26 of them shares fell, 2 remained unchanged, and only 20 settlements increased their shares. The most significant share decrease happened in Cegléd (50.4 points), Fehérgyarmat (44.8 points) and Mezőkövesd (42.4 percentage points). The most significant share increase happened in Visegrád (50.3 points), Kiskunfélegyháza (35.2 points) and Csokonyavisonta (30.3 percentage points). The increase of these settlements is so significant that it was partly harmful for the micro-region.

Among the 46 settlements, based on the data of 2006, Hévíz, Hajdúszoboszló, Bük, Balatonfüred and Sopron are the top five regarding tourism nights. In 2006, these settlements provided 15.1% of the total tourism nights in Hungary. Since they have such a significant share, we found it worthy to compare their tourism nights to the national average. We can see that all of the above mentioned settlements, except Balatonfüred, have more favourable dynamics than the national average of 20.3% (Figure 2). Hajdúszoboszló has the best dynamics, where the pace of increase reached the 100%.

From 48 settlements, 23 are located in Western Transdanubia, 25 are located in Eastern Hungary. A significant difference can be observed depending on whether we examine the share of domestic or foreign tourism nights. The analysis is based on the data of 2006. In Transdanubia, in 10 out of 23 settlements the proportion of foreign tourism nights is more significant. The smallest proportion of foreign tourism nights was experienced in Visegrád (13.7%), while the most significant was in Csokonyavisonta (76.0%). Alternatively, in Eastern Hungary there is only a single spa town where the proportion of foreign tourism nights is higher than the domestic nights, namely Püspökladány (59.2%). In Eastern Hungary, the smallest number of foreign tourism nights was registered in Parád where it did not reach 2%.

Figure 2

The five most important spa towns' tourism nights, 1995–2006 (1995 = 100%)



In analysing the spa towns, we concluded that the regional differences are stronger. Based on the data of 2006, we can see that the proportion of foreign tourism nights in Western Transdanubia spa towns (48.9%) approaches the domestic demand, while in Eastern Hungary the proportion of foreign visitors (27.9%) is well behind this. This fact of course influences the development and future prospects of the given settlements. Compared to the base year of 1995, in Western Transdanubia guest nights increased by 728 000, while in Eastern Hungary it had increased by 700 000 by the 2006. This represents a 22.1% increase in the West and 31.3 % increase in the East. Out of 23 analysed spa towns in Western Transdanubia, 12 experienced a decline in tourism nights during from 1995 to 2006. In most cases, the decline was caused by the loss of foreign demand. By contrast, in Eastern Hungary there were only 7 settlements, where the number of tourism nights fell by 2006 compared to 1995, in these cases the loss of foreign sales is in the background of this negative indicator. The decrease in the number of foreign tourism nights was 4.7% in the West, while 13.6% in the East. This affected 14 settlements in the West, and 16 in the East. The number of domestic tourism nights increase was 67.3% in the West, while in the East it was 64.4%. In Eastern Hungary we found only 4 settlements where compared to the base year the number of domestic tourism nights decreased, while in Transdanubia this number reached 7!

The spa-based developments and improvements

So far, we have been focusing on tourist arrivals to Hungarian settlements with a spa but we should also mention the effects of tourism on the society and economy. In the next part of our study, we are going to deal with these effects in detail, not simply to compare the related index-number of tourism to the index-number of society and tourism, but to

search for deeper connections. Some components of this area that have been examined have a complex relationship, in which the difficult cause-and-effect relationships of the changing components have a particular network. Whilst we do not intend to reveal this complex system entirely, we merely would like to get an answer to the question as to whether the touristic investments in the 34 settlements relating to the Széchenyi Plan have a demonstrable social-economical influence. In this analysis, we used the numbers of the active age group per 1 000 inhabitants, natural increase per 1 000 inhabitants, migration balance per 1 000 inhabitants, the number of legal persons and unincorporated businesses per 1 000 inhabitants, the personal income tax per person paying a tax and the registered number of job-seekers per 1 000 inhabitants. We analysed the changes during a 12-year-period between 1995 and 2006 in order to show the effects of the support. We examined all the settlements of Hungary. We wanted to get an answer to our question as to whether the sponsored investments of spas had or may have had a significant effect that could generate social-economic changes beyond the borders of tourism in the narrow meaning. In our analysis, we do not intentionally mention the specific touristic features. We focus on the specific social and economic area affected by the changes we have chosen, where we have all the settlements as a control group and can compare the temporal movements of the supported settlements to this group.

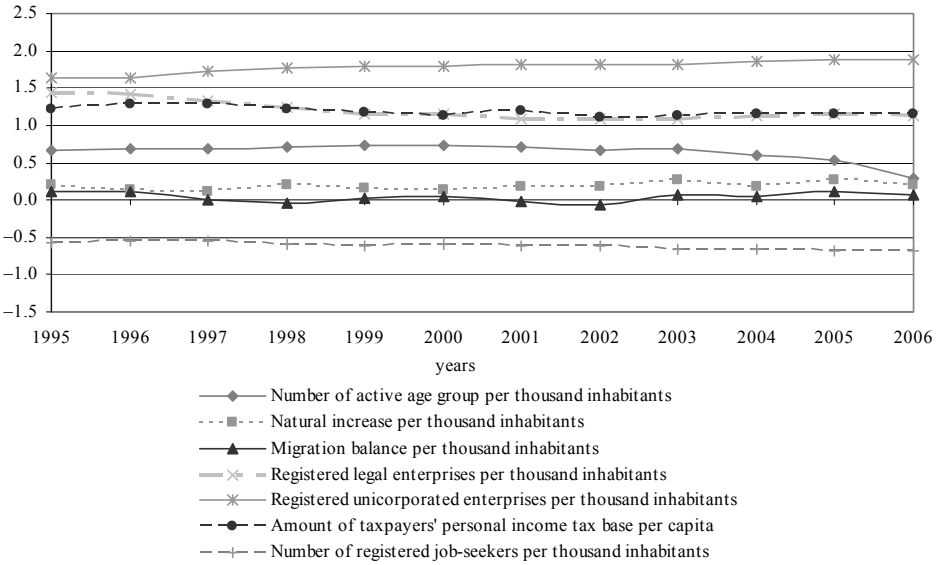
We have to consider the cause and effect statements of our analysis very carefully. It is not possible to decide unambiguously whether a settlement works better because of its additional touristic resources, or assume that it has worked well because of these additional resources. It is not always possible to state this clearly, since out of a multivariate chain we are only aware of two factors. The detection and the excavation of the relationship are the tasks of the researchers, no matter what the length the time series is that we are testing, it is quite difficult and dangerous to conclude that in a settlement, behind the strong or weak economic and social performance the only driving force is a Széchenyi Plan supported touristic investment. Therefore, in this place the only goal is to find contacts and to show that there were some changes in the mentioned variables, or modification between those variables. Can the signal started by the investment, or its modified form be considered somewhere in the analysed space? If so, what is the direction, how large are the differences between the supported settlements and are there successful and less successful projects? Before the tests, we standardised our variables. Thus, the average value for all the seven variables is zero for all villages, the deviation of the variables is a unit. Therefore, positive values are greater than the average; the negative values are smaller than the average. This can be exploited to examine the average values of the supported settlements along the variables:

Between 1999 and 2001, we can observe smaller turning points and inflection points (Figure 3). We can conclude that in the period between 1998 and 2002, a slight increase can be experienced in taxpayers' personal income tax base and that the rate of unemployment decreased slowly in the examined 34 settlements. The number of enterprises per 1 000 inhabitants is growing, not forgetting that the national average in every year, for every variable is zero! We can also see that the settlements – which have already won the tender – were representing better indicators than the average even before the tender, and after a permanent “lurch”, were even able to strengthen them. The

standard deviations are smaller than the national unit, and decrease slowly through to 2006.

Figure 3

The examined socio-economic variables regarding the averages of the supported settlements, 1995–2006



So far, the data of socio-economic space was examined plotted against time. Our task, however, requires analysing the relationship between the variables and the whole space defined by the variables in a more detailed way. It is important to note that these seven criteria are not independent from one another. Factor analysis was used to reduce the number of variables and to create a less complex socio-economic indicator. In this way, a new variable and fewer axes were defined, than the original seven factors. On one hand, these are uncorrelated with each other, and on the other they are covering most of the characteristics of the analysed space. (For a more detailed description of the method, see Hajdu Ottó (2003): Multivariate statistical calculations, pages 362–438.) The factor analysis with all the seven initial variables was performed for each year between 1995 and 2006 for all the villages in Hungary.

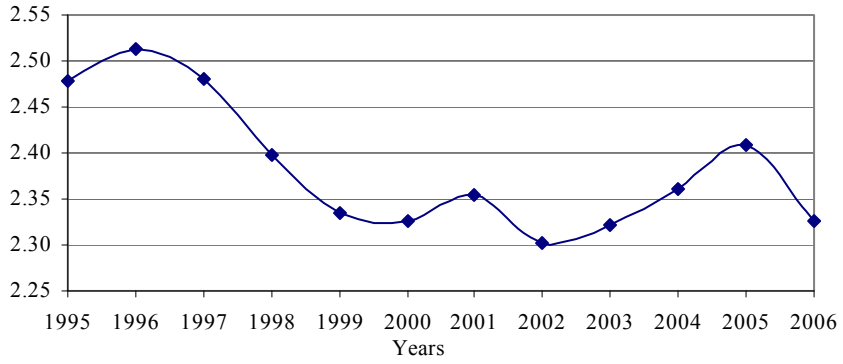
The calculation of the principal components is a base transformation, where the new basic elements are the axis. We have carried out a coordinate transformation, by searching for the ai vectors (These vectors belong to the eigenvalues of the correlation matrix of the basic data matrix), in which the Xst*aitr deviation is the maximum (Xst is a standard basic data matrix, which includes the original seven variables.) The resulted Yi = Xst*aitr vectors are called the main component vectors. These are the highest values along the dispersion, and here we can experience the biggest differences. The retained principal components can be summarised by a variance condense. We only kept the >1 value for each year from the eigenvalues belonging to the basic data. Thus, three eigenvalues remained, which explain 63–65% of the total variance. The three

eigenvectors corresponding to the eigenvalues, i.e. the relations between the main axis and the original variables are very strong in the different years. We can see that the strongest relation with the main component is the number of registered legal enterprises and unincorporated enterprises per 1 000 inhabitants, the amount of taxpayers' personal income tax base per capita and the number of registered jobseekers per 1 000 inhabitants. The main component is in opposite relation with the last one, while in positive relation with the others. Therefore, the economic indicators are strengthened by the increase of the first principal component. Regarding the second principal component a close relation can be seen between the number of active age people per 1 000 inhabitants and the natural increase per 1 000 inhabitants. The demographic progresses and the complex indexes are changing in the same direction. Our third principal component is explained by the internal migration, separated from the other basic data. Thus, from the original seven variables we developed a complex three-dimensional space, where the new variables condense economic, demographic, and internal migration data.

From this we can examine how the settlements, which were subject to the research have changed in this demographic and economic space over time, not forgetting that the data of all settlements are included in the analysis, and the average of the new variables are also zero! This means that values better than the average will be positive and values worse than the average will be negative.

Figure 4

The changes of the first principal component in time according to the average of the subsidised settlements, 1995–2006



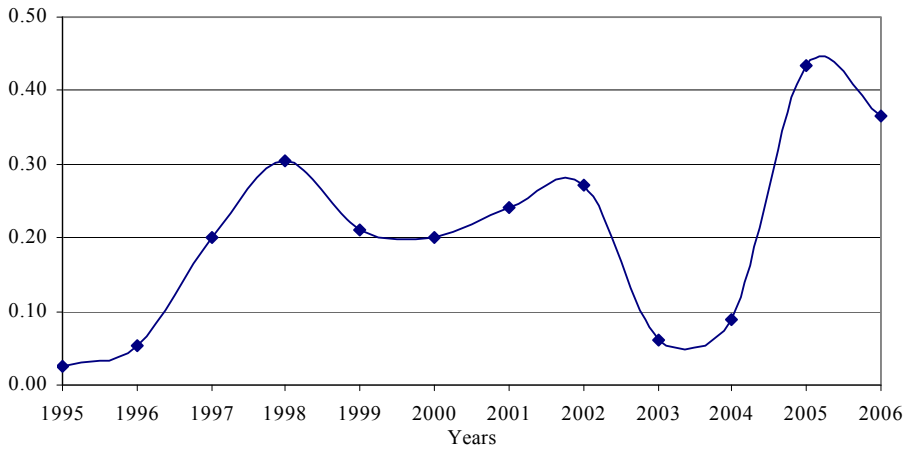
We can see a strong decline regarding the economic variable in the first half of the test period compared to the national average, and then after the transitional period between 1999 and 2002, a three-year increasing period can be seen, which seems to settle in 2006 (Figure 4). We can assume that the effects of spa thermal investments or the transformation of these effects can be observed in this three-year rise. This hypothesis is supported by the fact that nearly all the 34 supported towns present a similar pattern, which shows a relative improvement compared to the other Hungarian settlements. Since these settlements were not influenced by anything else during the same period, neither in financial support nor in development and there are no close economic ties among them, it is likely that the impact of the support has been identified.

We should not forget to state that the effects of one-time investments began to decrease after the start-up period, showing that a single investment is not enough for the economy, for the participants of the economy and for the settlements to launch a long-term economic development. Of course, the next few years will show whether it is only a downturn, or the termination of the affects creating benefits for the settlement compared to the country. Analysing the specific settlements we can say that the above mentioned statements are absolutely true for the largest investments like Bük, Hajdúszoboszló, Hévíz, Balatonfüred, and Sopron, where the city experienced a strong recovery and then a strong decline. For the above average Harkány, Barcs and Igal, these are representing a negative difference, while Visegrád, Cserkeszőlő and Szeged are representing a positive difference. These observations are coherent with the competitiveness represented in the first chart. We can see that in the first three settlements the increases are barely detectable, while in the latter three cases the signs of the decrease or reversal of the increase cannot be detected.

Regarding the second main component, which includes the demographic trends, the average of the supported settlements compared to the other settlements is very hectic in time, thus for this complex variable we cannot clearly present the effect of the support (Figure 5). We realised that in an economic sense, an economic investment has an economic, rather than a demographic impact. Probably for demographic (natural increase, the number of economically active citizens) variables only a longer term, multiple, high investment can exert an appreciable effect.

Figure 5

The changes of the second principal component in time according to the average of the subsidised settlements, 1995–2006

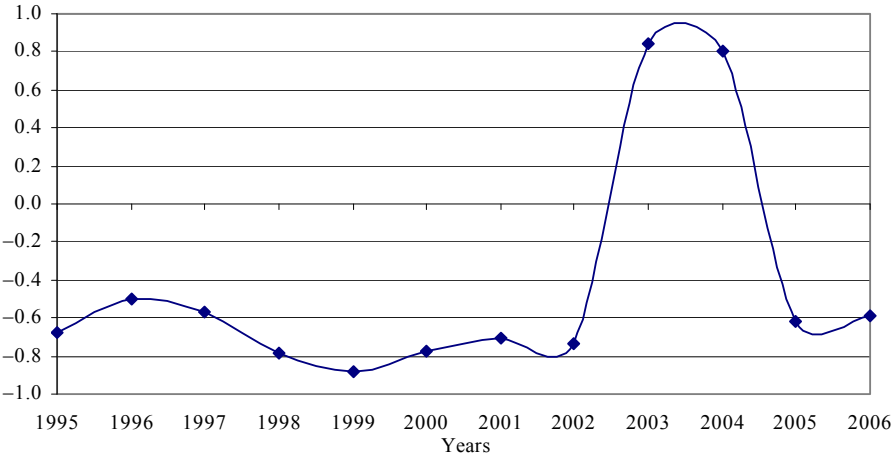


Surprisingly, the third principal component, the effect of tourism investment in the test space can be observed at the domestic (temporary and permanent) migration, with the rapid decay of the effect being the most striking here (Figure 6). Out of the three complex variables, the third variable's value was below Hungary's average and returned to the original level after a 2-3 year migration wave. The investments and their multiplier effects have implicated strong mobility towards these settlements. Here we have to

mention, that regarding the settlements almost collectively, they have improved compared to the national average however, the size of the change is closely linked to the cost of the project. The flow was the most intense in Bük, Hungary, Hévíz, Hajdúszoboszló, Sopron, Debrecen, Szeged and Balatonfüred. Such coherence could not be detected at the economic variables. A sort of threshold value investment launched a multiplicative process with multi-variables that could be seen in the economy. This effect was much longer on the economic variables, however regarding the domestic migration the original relative low value returned at all settlements.

Figure 6

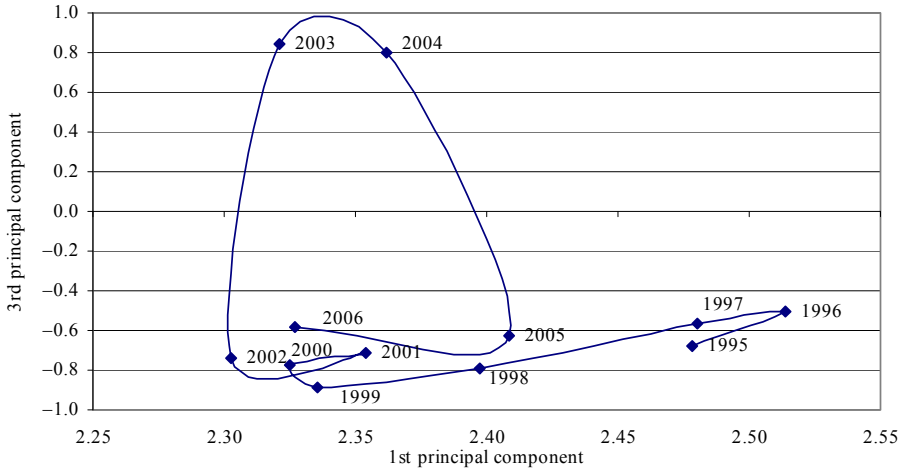
The changes of the third principal component in time according to the average of the subsidised settlements, 1995–2006



The new, three-dimensional construct space allows us to analyse the coherence among the uncorrelational variables. To do this, the principal component values of the averages of the supported settlements are represented on the x and y axes. These values, like previously, are intended relative to the Hungarian average. See Figure 7. We can see the movements of the spa-investment settlements in relation to time, in connection to the principal components, which are responsible for the economic and domestic migration, (there was no detectable change in the demographic components in the case of investments). Between 1996 and 1999, the value of both variables decreased compared to the national average, and then after a transitional period from 2002, the complex economic indicator and the domestic migration difference suddenly started to grow at the same time. We can observe that the volume increase of permanent and temporary migration to the settlements is much more concentrated (the process took place in 1-2 years), while the economic growth took longer on average at the 34 settlements. These results also confirm our hypothesis: compared to the other settlements, such collective and detectable growth can only be caused by a common investment covering all the supported settlements. The only investment, which was exactly at that time and exactly covered the analysed settlements was the Széchenyi Plan spa investment.

Figure 7

The average of supported settlements regarding the 1 and 3 principal components, 1995–2006



Summary

The tourist arrivals of the spa settlements cannot be considered more favourable than the country's average. In more detailed studies, we revealed that from the point of view of tourism, the majority of these settlements cannot be the motive force of their county. The attraction of health tourism in most cases does not mean a comparative advantage compared to other settlements with tourism attractions in the county.

The Széchenyi Plan affected a significant proportion of spa settlements. In the settlements, which implemented the investment projects, positive growth trends can be seen in many cases. However, we cannot generalise because most of the settlements were not able to make a profit regarding tourist turnover in respect of the investments. The reasons may be quite broad in scope, and within the framework of this study we were not able to undertake further exploration.

A relationship can be detected between the involvement of settlements in tourism, income and ability to retain population. Thus, from the issue's perspective it was a relevant issue to see how competitive spa towns are in relation to the country. Regarding most of the settlements with competitive disadvantages, we registered expanding guest turnover, so our opinion is that primarily these are the settlements where in many cases the only catch-up opportunity is health tourism, however their development has significant limitations.

In the second half of the analysis we were looking for answers to the question as to whether the supported spa investments had or have any significant results, which crossing the strictly limited borders of tourism resulted in detectable socio-economic effects. Examining the complex economic variables between 2003 and 2005, we can observe an increase. We assume that the effects of spa thermal investments or the

transformation of these effects can be observed in this three-year-long rising period. This hypothesis is supported by the fact that nearly all the 34 supported towns present a similar pattern, showing a relative improvement compared to the other Hungarian settlements. Since these settlements were not influenced by anything else during the same period, neither in financial support nor in development and there are no close economic ties among them, it is likely that the impact of the support has been identified

It is important to note that the effects of one-time investments began to decrease after the start-up period, showing that a single investment is not enough for the economy, participants of the economy and for settlements to launch a long-term economic development.

The indicator responsible for the domestic migration represents a similar characteristic as the economic variable, but in a much more concentrated form. Regarding the second main component, which includes the demographic trends, the average of the supported settlements compared to the other settlements is very time infirm, thus for this complex variable we cannot clearly present the effect of the support. The socio-space is much rather an investment-variant than the economic space.

The tourist arrivals of the spa settlements and the socio-economic effect in connection to it are not necessarily favourable compared to other tourist settlements of the given region, but from the point of the research programme focusing on the quality of life, it provided basic information. The Széchenyi Plan obviously had a stimulating affect, but to ensure its sustainability was rather problematic, it is also expected that regarding these privileged settlements, we will not show a higher quality of life in any future research.

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Keywords: Tourism, guest turnover, medicinal spas, Széchenyi-Plan, competitiveness.