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Analysis of the Regional Distribution of Rural Unemployment

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CONTENTS

1. PRELIMINARY AND GOALS

1.1. The issue

Unemployment is a natural phenomenon in countries with market economy. In Hungary, unemployment started with the change of regime. The social and economic developments of transition showed considerable differences both in time and space, so the appearance, culmination and fluctuation of unemployment was also different. After 1993, when a record number of people were out of work, the rate of unemployment slowly decreased. The tendency once again turned around at the turn of the millennium, and it also began to fluctuate. Unemployment rate in some micro regions (e.g. Encs) still reaches 30%, but is less than 3% in developed areas (e.g. Sopron). [1]

1.2. Objectives

In this paper I try to explore the social-economic factors that are behind the regional differences in unemployment rate. I identify the most characteristic types of rural unemployment, which will assist decision-makers in finding ways of how to handle it.

My **hypotheses** are the following:

1. Certain characteristics of unemployment are defined by social-economic peculiarities, and can be identified by data already available.
2. The condition of human resources plays a crucial role in the factors that cause regional differences in unemployment rate.
3. Micro regions can be identified and grouped by their patterns of unemployment.

The **main objectives** of this paper are as follows:

1. Overview of Hungarian and international literature;
2. Characterization of regional differences and social-economic peculiarities of rural unemployment, including the condition of human resources;
3. Analysis of the development of unemployment in rural micro regions by, gender, age, education, duration and economic sector;
4. Typifying rural micro regions by unemployment characteristics.

[1] Own calculations based on data by the Employment Office ('Foglalkoztatasi Hivatal', formerly called OMMK, before that: OMK)

2. SUBSTANCE AND METHOD

In the first part of the chapter, I will give an overview of the **databases used** during the research. For the characterization of human resources I used the 1990 and 2001 Census Databases compiled by KSH ('Hungarian Central Statistical Office'). For social-economic indicators, I looked in the Settlement Statistics Database, the database made from the tax return handled by APEH SZTADI, and the General Agricultural Survey for 2000. The main topic of this paper, the analysis of unemployment, is based on the database of the registered unemployed, coordinated by the Employment Office. The unemployment data of this database is gathered and forwarded by local employment offices.

In the second half of the chapter I present the **statistical methods** I applied. After interpreting the resulting indicators, I will show the procedure for index calculation, with the help of the demographic index of a micro region. By adapting the Human Development Index, I will also present another type of index calculation.[2]

The chapter ends with the methodological presentation of multi-variable statistical methods, factor analysis, cluster analysis and discriminant analysis.

3. RESULTS

During the survey of the literature it became evident that in Hungary (as in other countries) regional differences have a decisive effect on unemployment. In my analysis I will present the adaptability of some the methods acclaimed by the literature to the Hungarian unemployment database. Basically, my analysis has two parts. In the first part I will test the adaptability of different indexes to rural regions.[3] In the comparative analyses I concentrated on rural region types. In the second part I will present the application of some of the major multi-variable methods appearing in the literature. For this, I will use the rural unemployment database as an example.

- Firstly, I tried to find what social and economic indicators affect the rate of unemployment.
- I made a possible classification of rural unemployment by principal component analysis, and created 3 factors out of 26 variables.
- This factor group served as input variables of cluster analysis suitable for classifying micro regions. By clustering I identified 10 micro region types, which had markedly different unemployment characteristics.
- I used discriminant analysis to show the different social and economic characteristics of micro regions.

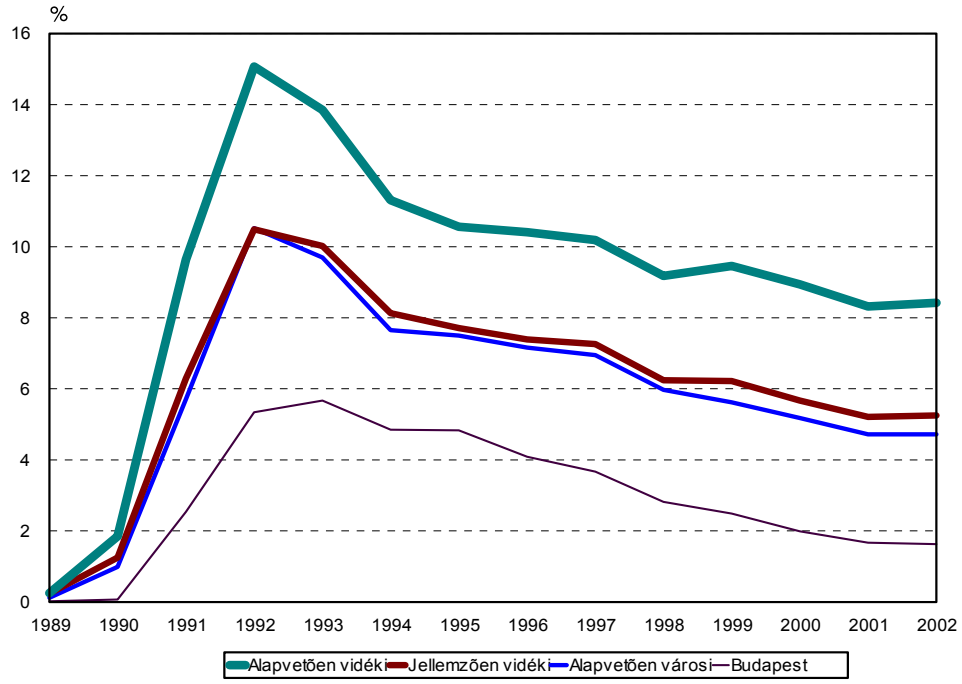
[2] I'll use both index types in the multi-variable statistical analysis of unemployment.

[3] I defined 'rurality' based on the OECD-typology mentioned above. According to this categorization, a region is 'predominantly rural' if more than 50% of the population lives in settlements that have a population density of less than 120 capita per square kilometer. 'Significantly rural' micro regions (49) have 15-50% of the population living in rural settlements. In 'urban micro regions', less than 15% of the population lives in rural settlements. I chose not to include Budapest in the analysis, because of its special status.

3.1. An analysis of unemployment based on social and demographic characteristics

First, by aggregating the unemployment database according to different sections, I created a micro region-level data pool of basic data and micro region averages. To assist comparability and analyzability, I created indicators from the basic data and indices from the averages. In this way, I defined an 'age index' from the average age of the unemployed, 'time index' from the average duration of unemployment, and 'education index' from the educational level.

Thus, **according to the data concerning the period of unemployment**[4], I created three categories for micro regions: (1) those in which the rate of unemployment is usually high; (2) those with an average unemployment rate (3) those where unemployment rate is typically low. I compared these three categories with the categories of rurality. As far as duration is concerned, the rate of unemployment developed as follows:



significantly rural – predominantly rural – significantly urban – Budapest

Categories of rurality are based on OECD methodology.
Source: Employment Office (Foglalkoztatási Hivatal), own analysis

Figure 1: Development of unemployment rate between 1989 - 2002 by categories of rurality

From the data concerning the period of unemployment in micro regions, I created a new variable called 'ratio category', which characterizes the total period, according to the following:

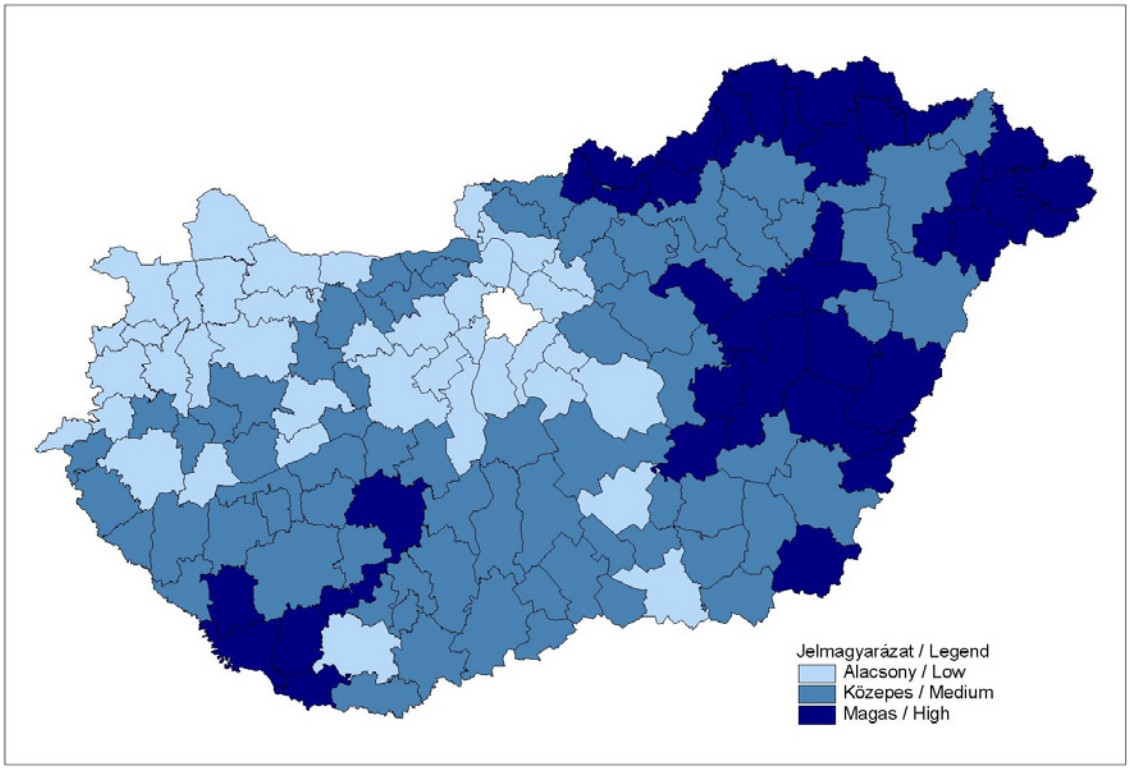
A micro region can be one of the following types (and can have the following ratio category value) based on its position on the 'period' list in every year: (+1) if unemployment rate is high, 0 if unemployment rate is average, and (-1) if unemployment rate is low. Unemployment is 'high' if a micro region is in the upper quartilis[5] of the 'period' list, and 'low' if it is in the lower quartilis. The rest (50%) of micro regions have 'average' unemployment rate.

[4] Rate of unemployment in the population aged 18-59.
[5] Upper quartiles: Upper quarter (25%) of a list.

Micro regions were than further grouped as having high, average or low unemployment rate, provided they belonged to the same category in at least 8 years out of the total of 13 years. As a result, I ended up with 37 micro regions with a permanently high, 72 with average, and 40 with a permanently low rate of unemployment.

Map 1

Distribution of unemployment ratio category



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By analyzing ratio categories according to rurality categories I observed that predominantly rural micro regions typically have a permanently high unemployment rate, while significantly rural and urban micro regions have a low unemployment rate.
In this respect, rurality is not necessarily a disadvantage, as a dozen of predominantly rural regions have a permanently low unemployment rate. The lack of jobs, the distance from towns, and the unfavourable demographic status and tendencies make any short-term change in the situation unlikely. Therefore, I considered predominantly rural micro regions with a permanently high unemployment rate as the most disadvantaged.

By analyzing unemployment rate according to **gender**, one gets the same result every year: the ratio category of men is significantly higher than that of women. The same difference exists between towns and rural settlements, and also between unemployment rate categories.[6]

In predominantly rural regions, there are a lot more unemployed men, while in predominantly urban regions it is the other way around. In the typically rural category, the ratio of the two sexes is roughly the same.

When analyzing the discrepancy between sexes according to unemployment ratio categories, it turns out that in micro regions with a permanently high unemployment rate

[6] I compared the unemployment rate of the two sexes for every year with a T-test. The results were significantly different even at a level of 99% (P=0,00).

men are unemployed in significantly greater numbers (58%-42%). In micro regions with an average or permanently low rate, the ratio is roughly equal.

At the time when large-scale unemployment reared its head, the **average age** of the unemployed was lower than today. Between 1993 and 2003 the increase was continuous (from 34.5 to 37.3 years). The main reason for this is that in the beginning people who were before retirement were rather made to retire prematurely for political reasons. Also, in some regions, masses of people exited the labour market by putting themselves on disability allowance.

Examining micro regions according to unemployment ratio categories, one can note that in micro regions with a permanently low unemployment rate the average age of the unemployed is considerably higher than in those with a permanently high unemployment rate. This is accounted for by the social phenomenon that in regions with a higher unemployment rate, even young people have hard time finding a job, while in regions with a more favourable employment conditions it is mainly true for the older generations.

From the average age data of the unemployed I compiled an **age index**[7] which enables better understanding and analysis of the differences between micro regions. With the index I followed HDI methodology, that is the age index of a micro region is the ratio (given as a percentage) of the distance from the lowest average age value of all micro regions, and the total value spread. The formula is:

$$I_{ij} = \frac{X_{ij} - \text{Minimum } X_i}{\text{Maximum } X_i - \text{Minimum } X_i}$$

Age index is a value between 0 and 100: the higher the age value of a micro region is, the higher the average age of the unemployed is in that micro region.
The age index average is 49.7 for predominantly rural micro regions, 52.6 for significantly rural micro regions, and 60.2 for predominantly urban micro regions. This further underlines the fact that predominantly rural regions are also in a more unfavourable situation as far as employment is concerned, as the average age of the unemployed is lower.

On examining this by unemployment rate categories, we shall see that the age-index average of regions with permanently high unemployment rate is lower (43.5) than that of the regions with average or low unemployment ratio (49.7 and 60.9). That is to say, where the unemployment rate is higher, the average age shall be lower - being in line with the above stated observations.

I also prepared a so called "**education index**" by applying the formula described in the age index section. The index figures are between 0 and 100, and a higher index figure means higher educational level. The index average is 45.7, with 36.3 in predominantly rural micro regions, 58.5 in significantly rural micro regions and 74.1 in predominantly urban micro regions. However, we must note that the divergence of the rurality categories in the full population is similar, implying that rurality "conditions" are closely connected to unemployment and educational level.

As to unemployment ratio categories, the index average of the educational level reveals considerable differences. The educational level of micro regions with permanently high unemployment ratio category is 22.0, while the figure amounts to 46.1 in the average

[7] The age-index based on the database of registrated unemployment.

group and up to 66.8 in regions with low unemployment rate. This shall suggest that the educational level is lower in regions where there are unfavourable unemployment conditions.

The so called "duration index" is based on the average duration of the unemployed status. The higher the duration index figure is, the longer the unemployed status lasts in the region. The average value of the time index is 73.6. The duration index average of predominantly rural micro regions is 79.3, while that of the significantly urban micro regions is 53.1. We found that the duration of unemployment is generally longer in rural regions, i.e. it is more difficult to find a job here, than in non-rural regions.

There are similar differences on examining the data with regard to unemployment ratio categories: the index average of regions with permanently high unemployment rate is 92.3, while the figure is 76.4 in regions with average rate, and 51.1 in the low unemployment ration categories.

There are significant correlations between the indexes presented. Yet, the analysis of these correlations is not at all problem-free. For the sake of better understanding, we shall revise the definition of the index values.

- The higher the age index, the lower the unemployed average age is in the given micro region.
- Higher duration index means longer unemployment status.
- Higher education index figures denote higher educational level.

The correlations between the indexes are indicated by Table No.1.

Table 1.

		Age index	Duration Index	Education index
Age Index	Pearson correlation	1	-0,418**	0,271**
	Significant level	,	0,000	0,001
Duration Index	Pearson correlation	-0,418**	1	-0,756**
	Significant level	0,000	,	0,000
Education Index	Pearson correlation	0,271**	-0,756**	1
	Significant level	0,001	0,000	,

**. Significant at 0,01 level

There is a strong negative correlation between the indexes of educational level and duration. That is to say: higher educational level implies shorter unemployed status on average. The duration index and the age index show a moderate negative linear relationship, while the age index and education index are in weak (yet significant!) positive correlation with each other. Such statements are difficult to accept on their own. However, if we recollect our experience from the analysis of the average age of the unemployed, namely that in disadvantaged regions, the average age of the unemployed is lower, the correlation is explained. On examining the correlation factors, we found that the duration of the unemployed status is generally shorter and the average educational level is higher in regions where the conditions are more favourable, than in underdeveloped regions.

Regarding the unemployment rate, the time index and the education index clearly define the group of disadvantaged and less disadvantaged regions. The first ten regions with the

lowest age value are relatively homogeneous, representing the group of disadvantaged micro regions.

Unemployed people are registered in the unemployment database according to the economic **sector** of the workplace from where they were sent to unemployed status. I combined the sectoral data according to the main categories, thus differentiating between unemployed people coming from agriculture, sylviculture, industry and service provision.

Concerning predominantly rural regions, unemployed people from agriculture represent a considerable quantity, while the service-providing sector produced more significant number of unemployed people in urban micro regions. As to industry, there is no major difference in respect of rurality. Nonetheless, it shall be noted that unemployed people coming from the agricultural sector are generally over-represented in every region in view of the significance of this sector. In predominantly rural micro regions, 12% were employed in agriculture, which is half of the ratio represented in the unemployed population. In significantly rural regions, the figure is 5%, while the sector ratio within the unemployed group is the double. In urban micro regions (excluding Budapest!), the figures are 1.7% and 6%. As to the industrial sector, the sectoral ratio of the employed is higher than that of the unemployed, while in urban regions, the ratio of unemployed people coming from the service providing sector is higher than the sectoral ratio of the employed. All these prove that regarding the unemployed people coming from agriculture have practically no opportunities for sectoral employment. Their only chance is occupational retraining and redirection.

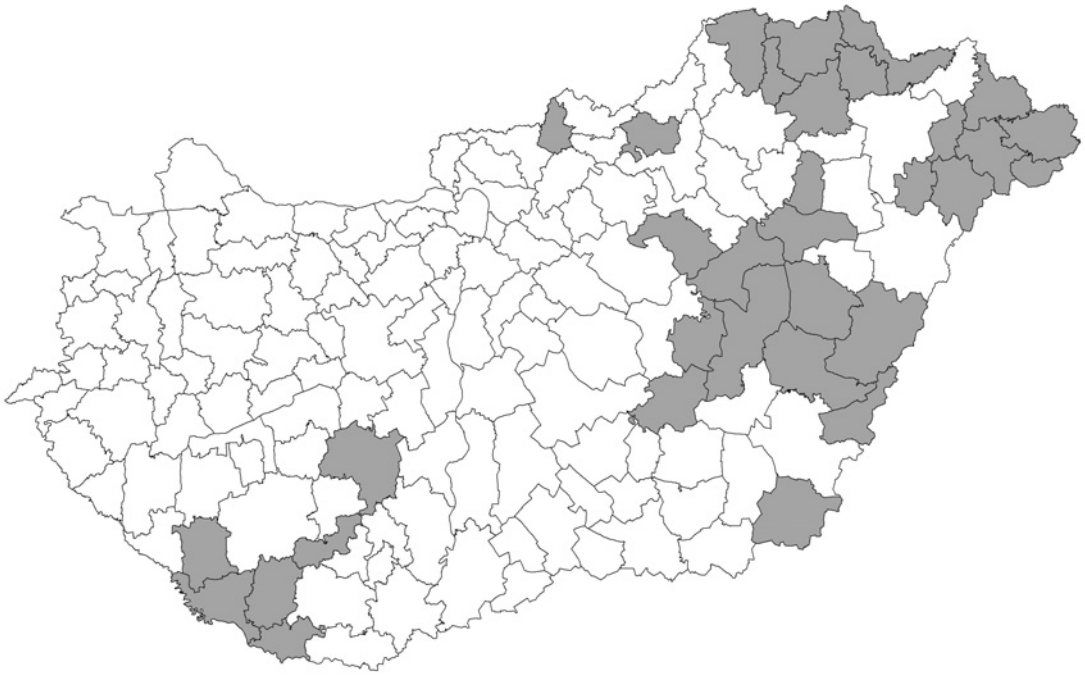
Yet, on examining the ratio categories of unemployment, we find that the agricultural sector is stronger in regions with permanently high unemployment (as compared to rurality: 26.2%), and the unemployment rate of people coming from the service sector is more dominant in regions with permanently low unemployment rate (57.7%). When analysing employment data, we discovered that the sectoral distribution of the three unemployment category is app. even[8], and only in regions with low unemployment rate have lower agricultural ratio.

The number of predominantly rural micro regions with permanently high unemployment rate is 33. These micro regions may be considered as the **most endangered** from the aspect of unemployment. When comparing this group with the rest of the rural micro regions other than this category, it may be seen that the average of the various **social and economic indexes** show significant differences.

[8] The proportion of regions with permanently high, average and low index figure: Agriculture: 10-10-5%; Industry 36-38-38%; Services 54-52-57%. *Source: KSH, census of 2001, own processing of data.*

Map 2.

Predominantly rural micro regions with permanently high unemployment rate



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In a demographic point of view, the population loss of disadvantaged micro regions is higher due to their negative migration balance, yet their natural reproduction balance seems less negative, possibly due to the ethnic groups living there with higher reproduction tendency.

The proportion of young people is higher and the old-age index is lower in the micro region group classified as disadvantaged. The HDI value, thus the average number of school grades completed and the income per person is more favourable in the not disadvantaged micro regions.

The number of cars per a thousand persons, as well as the number of telephone main lines falls behind the average of the rest of the rural micro regions. Enterprising willingness is higher if speaking of regions other than the disadvantaged ones. The rate of those receiving supplementary pay and regular social welfare payments is many times the number of the not disadvantaged micro regions.

The average duration of unemployment is longer in these regions, the average age of the unemployed – just as the age distribution of the population – is lower, the educational level is much lower than that of the not disadvantaged areas. When observing the territorial arrangement of disadvantaged micro regions, the northern- north-eastern part of the country becomes very distinct (e.g. Vásárosnamény, Nyírbátor, Fehérgyarmat, Mátészalka, Berettyóújfalu, Püspökladány, Nagykálló, Szerencs, Tiszafüred, Edelény, Encs, Szécsény etc.), along with the southern Transdanubian part (e.g. Nagyatád, Sellye, Szigetvár etc.), being the two negative poles.

All in all, via applying my unemployment ratio category and rurality category, 33 micro regions could be highlighted, where unemployment poses serious problems and requires special programmes to handle it. Without intervention, unemployment rate shall continuously increase, and while certain ethnic groups migrate from these regions, the

higher reproduction tendency of those staying shall increase the number of the socially indigent.

3.2. Rural unemployment analysis via multivariable statistical methods

The first step of multivariable statistical analysis is applying a variable reduction procedure in order to define the characteristic types of rural unemployment. Analysing the regional connection of the unemployment types – as defined via this procedure - reveals whether there are micro regions that could be characterised by a certain type of unemployment. The answer to this question could be presented by performing cluster analysis, where the regions are to be typified by the factors of the factor analysis. By concluding discriminant analysis, the homogeneity of the clusters could be checked, and the social-economic profile of the micro regions belonging to a certain cluster could also be closely observed, along with detecting profile differences. Thus, exploiting the advantages of these three consecutive multivariable methods, the nature of rural unemployment could be revealed in more precise details.

3.2.1. Factoranalysis

When performing factor analysis (principal component analysis), I examined several characteristics of the unemployment in rural regions. Thus, I analysed data concerning the educational level, age, sex and economic sector of the unemployed[9]. I experienced a surprisingly high level of variable communality in most of the cases during the variable reduction procedure. The total explained variance was 71.1% if considering factors with an own value higher than 1.5. Three factor met this condition. Regarding the rotated factor weights, the variance explained by the first factor was 29.9%, 28.8% by the second factor, and 12.4% by the third one. I only included factors in further analyses if they had an own value higher than 1.5.

The first and the strongest factor includes the variable of educational level and points towards the social groups of higher education. The correlation between the component and the groups with secondary school diploma or higher degree is especially strong. It shall be noted that people with lower educational level are connected to this factor with negative sign. In addition, the unemployed coming from the agricultural sector is to be found here with negative sign, as well. Therefore, this factor could be referred to as the factor of higher educational level.

The second factor is related to age. As to the characteristics of the unemployed age group, the connection of the older age groups seems to be predominant. This is even more supported by the negative correlation of the younger age groups with the component. Therefore, middle aged people are indicated in the high educational level factor with negative sign, while the old aged unemployed take part with positive sign. This factor could be referred to as the factor of old unemployment.

The third component is related to the unemployed coming from industry, where people from the service sector are connected with negative correlation.

[9] The variables included in factor analysis were as follows: ratio of the unemployed coming from agriculture (%); ratio of the unemployed coming from the industrial sector (%); ratio of the unemployed coming from the service sector (%); ratio of the unemployed between the age of 15–29 (%); ratio of the unemployed between the age of 30–39 (%); ratio of the unemployed between the age of 40–49 (%); ratio of the unemployed between the age of 50–59 (%); ratio of the unemployed over the age of 60 (%); average age of the unemployed (2000); ratio of the unemployed with an educational level lower than the 8 classes of primary school (%), ratio of the unemployed with an educational level of 8 primary school classes (%); ratio of the unemployed with secondary school qualifications but without diploma (%); ratio of the unemployed with secondary school diploma (%); ratio of the unemployed with a higher degree (%).

The results of the factor analysis clearly point out that both high educational level and high age characterise define two unemployed layers where there are different characteristics, but methodologically they play a definitive role in variable reduction.

3.2.2. Clusteranalysis

The aim of cluster analysis was classifying the rural micro regions into relatively homogeneous groups according to unemployment. I arranged the 149 micro regions into groups relying upon 3 factors. Measuring their similarities was based on Euclidean distance calculation.

As the first step, I performed cluster analysis by applying hierarchical procedure with agglomeration method. Initially, the 149 micro regions formed 149 separate groups, and the closest micro regions or regional groups were merged step-by-step. This procedure was repeated until all the micro regions were included in one cluster. During the agglomeration procedure we obtained the distance data related to every step, along with the id. of merging clusters and cases. Steps are tracked on a dendogram.

In order to decide how many clusters should result in creating relatively homogeneous groups, we shall rely upon the distance data of the agglomeration table and the dendogram. Based on the dendogram, the limit was between 6 and 14 clusters. I declined the 6-cluster solution because individual clusters included too many micro regions, thus creating rather heterogenic clusters. In contrast, the 14-cluster solution resulted in so many clusters that one cluster only included 1-2 micro regions.

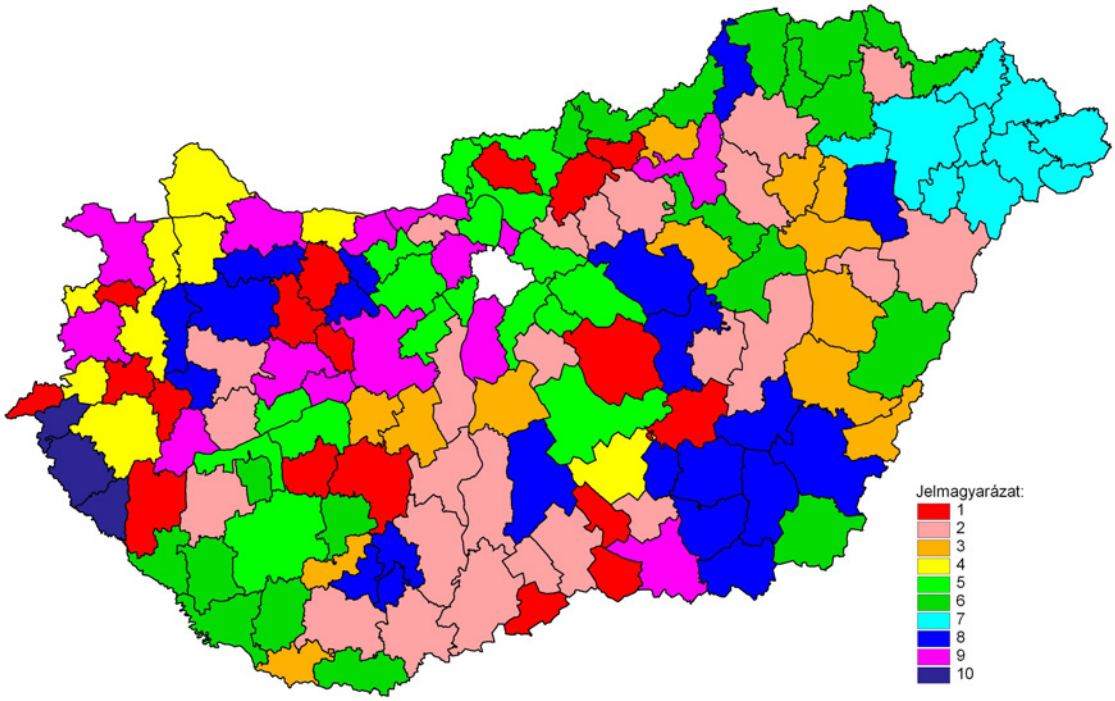
Observing the dendogram, I could point out the two groups having a merger line relatively far from the preceding ones. I defined the dendogram limit according to the 138th step of the agglomeration table, and finished the procedure at a 10-cluster level.

In order to form homogeneous clusters, I also created groups by applying the K-centred cluster procedure, defining the number of clusters with k=10. Comparing the results of these two methods, similarities and differences may be observed.

Hereinafter, my analysis shall be based on the clusters created by applying the K-centred procedure. Map No. 3 illustrates the arrangement of the 10 clusters.

Map 3.

Micro regions per clusters



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The characteristics of the clusters in view of unemployment are indicated by their arrangement in a space defined by the axes of the factors. These clusters are located in different places, and provided the factors are valid, the micro regions of the clusters could by listed into the following types:

Table 2.

Location of clusters in a space defined by factors [10]

Clusters	Unemployed with high educational level	Old age unemployed	Unemployed coming form the industrial sector
1	-0,39885	0,85947	0,38194
2	0,17140	-0,30628	-0,14610
3	-1,55816	0,15055	0,38045
4	0,89660	1,02586	1,53132
5	0,44655	0,56992	-1,67640
6	-1,04229	-0,38913	-0,77366
7	-0,31433	-2,10845	0,30118
8	0,61952	-0,62541	1,04320
9	1,47691	0,30454	-0,47809
10	-1,08348	2,88525	1,00748

Source: Own analysis

[10] The F-test proved to be significant at p=.000 for all the three factors.

Defining the main characteristics of the clusters did not pose serious problems in most of the cases. Only cluster No. 2 bears no significant difference as to the factors, thus we can describe it as being non-extreme in any point of view.

Therefore,

cluster No 1.	is characterised by old age unemployed,
cluster No 3.	by unemployed with low educational level,
cluster No 4.	by old age unemployed with high educational level primarily coming from the industrial sector,
cluster No 5.	by non-industrial unemployment,
cluster No 6.	by non-industrial unemployment with low educational level,
cluster No 7.	by young unemployed,
cluster No 8.	by young unemployed with high educational level primarily coming from the industrial sector,
cluster No 9.	unemployment with high educational level and
cluster No 10.	by old age unemployed with low educational level primarily coming from the industrial sector

As a result, it could be stated that by multi-variable analyses, the unemployment characteristics of the micro regions could be revealed. The educational level and the age of the unemployed people are of major importance. Each of the 10 clusters has pronounced characteristics, according to which micro regions could be distinctly separated.

3.2.3. Discriminantanalysis

Regarding the groups created via the K-centred procedure, cases have a better distribution and homogeneity than those of the clusters formulated by applying the hierarchical procedure. I also supported this observation by discriminant analysis. Results indicate that creating the clusters was properly executed in 98.7% of the cases.

I investigated the socio-economic profile of the 10 clusters created by cluster-analysis via performing discriminant analysis. I decided to apply the step-by-step method, thus being able to track the real effect of the independent variables and point out fake correlations. Canonical functions – similarly to the factors – could be regarded as variables not observed, and they have given characteristics expressed by constant variables.

The first canonical function is described by the high ratio of young population and high outward migration, along with a high ratio of people receiving supplementary income subsidies. This highlights the problems of the socially disadvantaged groups living in areas of decreasing population, i.e. facing regional and social disadvantages.

The second function indicates high enterprising spirit with a dynamic population increase, which could be regarded as economic development. The following table presents the cluster characteristics along these two canonical variables.

In short, we may state that the first variable is typical of disadvantaged regional and social conditions, while the second one indicates prosperity and development.

Table 3.

Values of canonical functions per clusters

Clusters	Regional and social disadvantages	Economic development
1	-0,445	-1,120
2	-0,370	-0,305
3	2,033	-0,218
4	-1,515	-1,100
5	-1,647	1,521
6	2,400	0,163
7	3,305	1,378
8	-0,591	-0,975
9	-2,135	1,681
10	-1,284	-1,757

Source: own analysis

The micro regions of cluster 3, 6 and 7 primarily bear regional and social disadvantages. In contrast, economic development is typical of the micro regions in cluster 9 and 5 according to the results of the discriminant analysis. However, economic development could also be seen in cluster No. 7 along with the characteristics of disadvantageous conditions, indicating that these micro regions are rather special. Cluster No. 7 includes micro regions with their town centre in Szabolcs-Szatmár-Bereg county, and could be described by economic activity and socio-demographic underdevelopment.

The clusters are represented in Figure No. 2 in space as defined by the two functions.

Factor analysis, cluster analysis and discriminant analysis create four distinctive groups of micro regions with regard to unemployment characteristics, considering their socio-economic conditions.

The first group includes cluster No. 5 and 9 with their relatively high values, containing 17 and 14 micro regions. These regions belong to large or medium towns, out of which 65% is located in Transdanubia, and none of the remaining 35% is to be found on the Eastern side of river Tisza.

The second group includes cluster No. 3 and 6 with their 33 micro regions in total. These micro regions are primarily described by regional and social disadvantages, even underdevelopment. The typical areas are namely North-Hungary and South-Transdanubia. 81% of the micro regions concerned are located here.

The third group is unfavourable as to economic development, yet regarding migration and social disadvantages, average micro region are to be found here. (clusters No. 1,2,4,8,10). These regions predominantly have a small town centre, and they are primarily located in Transdanubia and on the Great Plain ("Alföld").

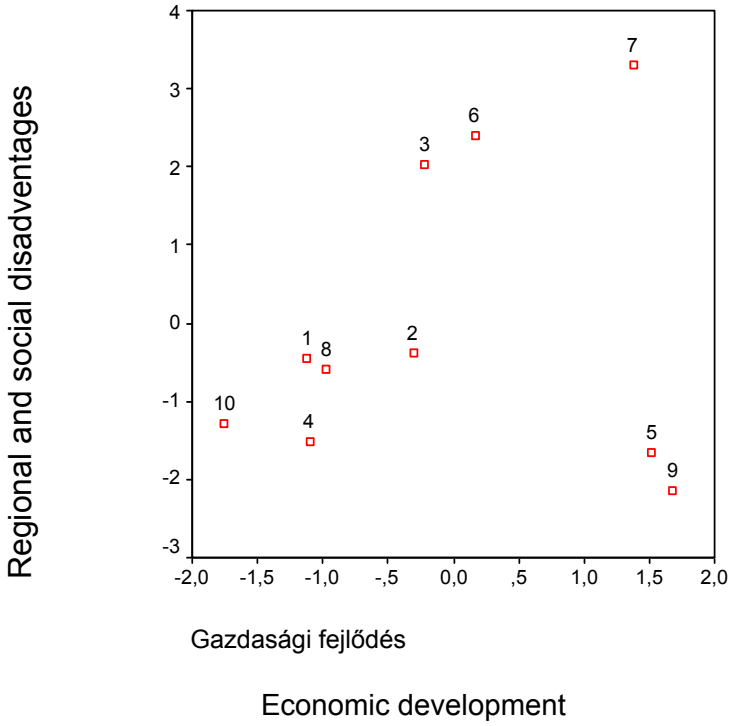

Figure No. 2: Clusters in a space defined by canonical discriminant functions

The fourth group contains the previously mentioned cluster (No. 7). In fact, it covers Szabolcs – Szatmár – Bereg County, and economic activity is primarily seen more in the centre towns than in the villages. However, concerning HR conditions, the situation is rather negative.

Generally speaking, the rural regions of Hungary show a rather varied picture, yet it could be properly typified. It is important that the socio-economic policy is adjusted to this picture, and one of its main priorities is developing the human resources.

3.3. New Academic Results

As a summary, my new research results are the following:

1. I prepared new indexes in order to map the characteristics of unemployment. For instance, I created a "time index" to measure the duration of unemployment, an "age index" to measure the age of the unemployed, or an "education index" to trace down their educational level.
2. I prepared a category index for the rate of unemployment. I relied on socio-economic figures when I described the predominantly rural micro regions with permanent unemployment – as defined by the ratio category I created for unemployment. The special and extremely disadvantageous conditions of these regions (33 micro regions) are supported by my results.
3. Applying factor analysis, I defined the types of unemployment that characterize the rural regions. I demonstrated that the major factors are the following: educational level and age. In comparison, the economic sector plays a less important role.
4. With the help of the factors I merged the 149 micro regions into 10 clusters, representing special micro region types as to unemployment conditions. I checked the results of the cluster analysis by performing discriminant analysis.
5. I used the results of the main component analysis and the canonical functions of the discriminant analysis to define the cluster types.
6. I find it a new research result to have unified the various databases, and in addition, I also applied multi-variable procedures to complement each other on unified basis (factor analysis – cluster analysis – discriminant analysis).

4. CONSEQUENCES AND SUGGESTIONS

1. Having surveyed the literature, the conclusion shall be drawn that a unified methodology should be established for defining and measuring unemployment. It is of major importance for the society to set up an unemployment rate expressing passive or hidden unemployment, as well.

2. Indexes should be prepared to measure (similarly to HDI) certain social and demographic characteristics of the unemployed population.

3. The scope of applying multi-variable methods to describe socio-economic processes and to indicate the regional conditions should be more widely introduced. In many cases, analyses are finished after having performed a factor analysis. Yet, applying various methods consecutively shall open the way to a more complex analysis.

4. Although cluster analysis does not generate straightforward classification, applying several methods and comparing their results may have a positive result. Re-checking the created clusters could be performed by discriminant analysis.

5. For characterizing groups and identifying types, both main component analysis and discriminant analysis proved effective.

6. Analyses with new indicators and multi-variable methods should be made regular, through the cooperation of scientific institutions.

7. I do not think my analysis to be complete. Further study may be possible by combining the methods presented here.

5. PERTINENT PUBLICATIONS

a) Book

- Bódi F., **Obádovics Cs.**: Rural Unemployment . Edited by F. Bódi. In: *Vidéki szociális ellátórendszer Magyarországon.* Agroinform Kiadóház, Budapest, 2001 p.149-169.

b) Journals

Hungarian

- **Obádovics Cs.**, Kulcsár L., Mokos B.: HDI in rural Hungary. A falu 2001. tél, XVI. Évf. 4. szám
- **Obádovics Cs**., Kulcsár L.: HDI of rural population in Hungary. Területi Statisztika 2003.július (6. évf. 4. sz.) p. 303-322

International

- **Obádovics Cs**., Kulcsár L.: The Human Development Index in rural Hungary: territorial inequalities. A Gazdálkodás 8. számú különkiadása 2004.XLVIII. évf. p. 26-37
- **Brown, D**. L., Kulcsar, J. L., Kulcsar, L., Obadovics, Cs.: Post-Socialist Restructuring and Population Redistribution in Hungary. Rural Sociology, Vol 69. 2004 forthcoming.

c) Published congress papers

Hungarian

- **Obádovics Cs**.: The effect of population density and the proximity to cities on rural unemployment. 4th 'Village Conference. edited by Kovács Teréz MTA RKK. Pécs 1997. p 445-452
- **Obádovics Cs**.: The effect of proximity to towns on regional and settlement distribution of unemployment . 1997. GATE GTK, 1998. p. 113-117

International

- **Obádovics Cs.:** Diversity of Unemployment Rates in the Rural Regions. 1997. Gödöllő, ICA Summer University, Proceeding of the Conference p. 113-121
- Kulcsár L., Madarász I., **Obádovics Cs.:** The Spatial Dimensions of Rural Diversity and its Impact on Rural Development, „VISIO-2000" 1998. Gödöllő GATE GTK p. 99-110

f) Other published publications

Hungarian

Obádovics Csilla: Hungarian and EU databases used for micro region analyses
Training material for micro regions on the preparation for the SAPARD pre-accession programme. Edited by Dr. László Kulcsár, Scolar Kiadó 1999. (6. topic)

Research

1997-2000 Defining Rural in Hungary. Based on OECD methodology.

1998-2001 Analysis of the Regional Distribution of Rural Unemployment (OTKA 25100 sz.)

1999-2000 Unemployment in Hungary (OFA)

2000-2002 – HDI of rural population in Hungary (**Leader of the researc**, FVM)

2003-2004 Indicators of the Development of Human Resource and application for life qualitiy leveli in rural territories. **Leader of the research** OKTK A/0008/2003