

## **Current Socio-demographic situation in smallest administrative districts of municipalities with extended authority**

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### **Abstract:**

The paper picks up on author's previous research activities within the main research project of the university. It is based on the results of the Population and Housing Census 2011 and maps the current socio-demographic situation of the smallest 48 administrative districts of municipalities with extended competence. Out of 10 initial indicators, four were selected for the typological classification of administrative districts of municipalities with extended powers by means of cluster analysis. Five indicators were used for the construction of a composite indicator and according to its values the administrative districts of municipalities with extended powers were sorted by its socio-demographic level. From this perspective, the most favorable values of administrative districts of municipalities with extended powers were shown by Český Brod, Holice a Kaplice. The least favorable socio-demographic situation was shown by administrative districts of municipalities with extended power Pacov, Rýmařov, Králíky and Nepomuk. The results of an analysis are presented in two cartograms, where the first one contains a typological classification of administrative districts of municipalities with extended power by its similarity into 13 clusters and the other one presents groups of municipalities by its socio-demographic level.

### **Key words:**

socio-demographic level, municipalities with extended competence, cluster analysis, composite indicator

### **Introduction**

The last census of houses and flats (population census) was held in the Czech Republic to the decisive moment of the midnight from Friday 25. 3. to Saturday 26. 3. 2011. In these days the results of this census are posted by the Czech statistical office, who is responsive for the preparation, realization, treatment and publication of these results. These results are gradually posted according to the given timetable.

Municipalities with extended (MEP) powers (unofficially called „The municipalities of the third stage“) practice in its administrative districts (abbreviation AD MEP) the authorities according to the Law No 128/2000 Col. (Municipalities Act) and related laws. AD MEPs are also unofficial units NUTS 5 and sometimes also called “small municipalities”.

The Ministry of Defence notice No 338/2002 Col. presents the exhaustive enumeration of the 205 AD MEP<sup>1</sup>. The largest AD MEP is, according of the latest census, the city of Brno with 384,277 inhabitants. The smallest AD MEP, with the number of inhabitants lower than 10.000, are Králíky and Pacov. Other 46 AD MEP has got less than 20,000 inhabitants.

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<sup>1</sup> The capital city of Prague has got specific position given by the special Law of the capital city of Prague, No 131/2000 Col.)

## Literature Review

By the wide range of the problems solved in this article have already dealt DUFEK a MINAŘÍK (2007, 2008, 2009, 2010). In their works they have paid attention to the regions of the Czech Republic, who were defined by different ways.

The cited monographs were (except of other publications) realized like the outcomes of Research of FBA and FRDIS Mendelu in Brno - MSM 6215648904: Czech Economy in the processes of integration and globalization and the development of the agrarian sector and service sector in the new conditions of the integrated agrarian sector (responsible researcher: prof. Ing. Bohumil Minařík, CSc.), of the thematic section No 5: „*Social-economic circumstances of the sustainable multifunction agriculture and the provisions of the agrarian and regional policy*“ and its marginal aim „*The analysis of the demographic development of the Czech Republic, the consequences of the delay compared to the developed western countries, the expressions in the countryside by the base demographic characteristics in general and according to the specific conditions of the Czech Republic regions.*”

Presented article is the marginal outcome of the research (2005 – 2011).

## Materials and Methods

In the last census there were 48 municipalities with extended powers (MEP) with less than 20,000 inhabitants. The number of inhabitants has increased since 2001 from the total number of 749,253 (7.32 % of the Czech Republic inhabitants) to 759,587 (decrease to 7.19 % of the Czech Republic inhabitants). The average number of inhabitants for one AD MEP has decreased from 15,609 to 15,825 inhabitants. The increase of inhabitants from 2001 was 1.38 % (3.25 % in the Czech Republic as a whole). From the total number of 48 there was an increase of inhabitants in the 35 MEPs and a decrease in 13. This indicator has to be interpreted carefully because there was a change in the administrative districts borders in some cases (the shift of municipalities between districts).

The determinacy of AD of the researched MEP to the NUTS 2 regions is stated in the table below.

NUTS 2	The Number of Municipalities	The Percentage out of the Total Number in NUTS 2
Middle Bohemia	3	11,5
Southwest	13	40,6
Northwest	3	13,0
Northeast	11	27,5
Southeast	8	22,2
Middle Moravia	6	23,1
MoravianSilesia	4	18,2
<b>Total</b>	<b>48</b>	<b>23,4</b>

Based on the census of the Czech statistical office<sup>2</sup> the values of 10 socio-economic indicators were set for each of the AD MEP. These values were set for the 48 smallest AD MEPs as a whole as well. The indicators were as follow:

- relative change in the number of inhabitants compared to the last census in 2001 in %<sup>3</sup>,

<sup>2</sup> [http://www.czso.cz/csu/2012edicniplan.nsf/t/920047D35E/\\$File/pvcr13-.xls](http://www.czso.cz/csu/2012edicniplan.nsf/t/920047D35E/$File/pvcr13-.xls)

<sup>3</sup> Only the demography changes were taken into account, not the administrative ones (the shifts of municipalities between AD). Because of this there are few missing values in this indicator.

- mean age (in completed years),
- the load of the productive populations by the young in %,
- the load of the productive population of aged (in %),
- total load in % (the sum of the two previous indicators),
- index age (in %),
- the ratio of primary educated people in % (in adult population),
- the ratio of university educated people in % (in adult population)<sup>4</sup>,
- the ratio of economic active people in %<sup>5</sup>,
- the ratio of educated out of the economic active in %<sup>6</sup>.

The comparison of the detected values of the whole set of the smallest MEPs and of the Czech Republic as a whole was done.

The two groups of five AD MEPs were identified, one with the most convenient and other one with the least convenient values of the stated indicators.

The subset of indicators was identified, that were used for other analyses. For these indicators the weights were set.

The similarity of AD MEPs was set based on the four *cluster analysis* indicators.

Out of the five chosen indicators the composite indicator was set by the *rescaling method* (SIEGEL, SHRYOCK, STOCKWELL, SWANSON, 2003), and the sequence of AD MEPs was set based on theirs values.

All the methods used are identified in detail in the monographs stated above (DUFEK a MINAŘÍK, 2007, 2008, 2009, 2010).

## Results

*The mean age* in the Czech Republic as a whole has increased between censuses in 2001 and 2011 by 2 years, from 38.8 to 40.8 years. The initial value of researched AD MEPs was half a year lower, compared to the Czech Republic as a whole (38.3), and increased to the CR average of 2011 (4.8), i.e. by 2.5 years. Eight ADs showed the mean age lower than 40. The higher mean age than 42 years was reached in four ADs (Horažďovice, Nepomuk, Milevsko and Pacov). This average corresponds to the age average of the capital city of Prague (42.7 years), what is the highest mean age in the Czech Republic.

*Age index* based on the 2011 census was 109.6 % for the Czech Republic as a whole. Extreme value was achieved in the Prague – 130.6 %. In the smallest researched AD MEP was the value of this indicator 107.7 %. The value of the age index lower than 90 was reached by five ADs - Kaplice, Aš, Český Brod, Vizovice a Horšovský Týn. The Prague's value (above 130) was, on the contrast, attained AD Nepomuk, Horažďovice, Náměšť nad Oslavou, Milevsko and Pacov.

*The load of the productive populations by the young* was at the level of 20.75. There was the extremely low value of 18.06 in the Prague. This load was 21.12 in the researched AD MEPs. 11 AD MEPs has reached the value under 20 or above 22. These values are clearly seen in the Table No 1.

*The load of the productive populations by the aged* corresponded, in the 2011 census, in all the researched ADs to the CR average (22.76 compared to the 22.75 for the CR). The load under 20 was reached in the municipalities of Kaplice, Mikulov, Stříbro, Vizovice, Aš and

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<sup>4</sup> The rest of the sum of previous two indicators to 100 % is the number of persons with high school educations both graduated and without graduation (trained).

<sup>5</sup> The rest to 100 % are the economically non-active persons.

<sup>6</sup> The rest to 100 % are the unemployed persons out of the number of the economically inactive persons.

Horšovský Týn. 7 ADs have got the load above 26 (Nové Město na Moravě, Náměšť nad Oslavou, Nová Paka, Horažďovice, Humpolec, Milevsko and Pacov), while Prague has got the value of 23.59.

*The ratio of base educated people*<sup>7</sup> (in adult population) is continuously decreasing in the CR. The values of the 2011 census show the ratio of these persons in population of 18.0 %. Again, there is an extreme value of Prague at the level of 10.5 %. The value in the researched ADs was higher – 21.1. %. Seven ADs stayed behind the CR average (18 %), 24 ADs beaten the average value. For more detail see Table 1.

In contrast, *the ratio of university educated people* (in adult population) is continuously and rapidly increased. Not taken the extreme Prague's values (22.5 %) into account, the 2011 census shows the ratio of 12.4 % of the university educated persons in the Czech Republic. However, in the researched ADs was this ratio substantially lower – 8.2 %. Lower ratio than 6 % was reached in AD Kraslice, Aš, Broumov, Podbořany and Horšovský Týn. Contrary, the higher than 10 % of university educated persons was reached in ADs Vizovice, Lipník nad Bečvou, Nové Město na Moravě, Frenštát, Nové Město nad Metují and Luhačovice.

**Table 1** *The marginal values of the researched indicators for AD MEP*

Indicator	The most convenient value <sup>8</sup>	The least convenient value
Change in population (in %) <sup>9</sup>	Trhové Sviny Vodňany Mnichovo Hradiště Blovice Pohořelice	Rýmařov Frenštát pod Radhoštěm Králíky Konice Broumov
Mean age (in years)	Kaplice Aš Týn nad Vltavou Český Brod Vizovice	Pacov Milevsko Nepomuk Horažďovice Humpolec
Age index(in %)	Kaplice Aš Český Brod Vizovice Horšovský Týn	Pacov Milevsko Náměšť nad Oslavou Horažďovice Nepomuk
Young burden (in %)	Český Brod Holice Jaroměř Aš Vítkov	Bystřice pod Hostýnem Nepomuk Milevsko Luhačovice Rýmařov
Old burden (in %)	Kaplice Mikulov Stříbro Vizovice Aš	Pacov Milevsko Humpolec Horažďovice Nová Paka
Primary educated	Nová Paka	Králíky

<sup>7</sup> To this group is the sum of the persons with completed primary education, uncompleted primary education and uneducated.

<sup>8</sup> descending folder

<sup>9</sup> except of AD MEPs with the change of administrative determination

Indicator	The most convenient value <sup>8</sup>	The least convenient value
(in %)	Nové Město na Moravě Železný Brod Holice Hořice	Kraslice Vítkov Aš Podbořany
University education (in %)	Luhačovice Nové Město nad Metují Frenštát pod Radhoštěm Nové Město na Moravě Lipník nad Bečvou	Kraslice Aš Broumov Podbořany Horšovský Týn
Economic activity (in %)	Vizovice Pohořelice Týn nad Vltavou Mikulov Luhačovice	Nepomuk Broumov Králíky Železný Brod Pacov
Employment (in %)	Mnichovo Hradiště Pacov Nové Město na Moravě Votice Blatná	Rýmařov Kraslice Vítkov Odry Lipník nad Bečvou

The ratio of economic active people<sup>10</sup> was 48.7 % and drawn near the CR's value and simultaneously Prague's value 49.0 %. Lower ration of economic active people than 47 % was reached by ADs Nepomuk, Broumov, Králíky a Železný Brod. 10 ADs gained higher economic activity than the CR's average (and the same Prague's average). The value of 50 % was skipped by 10 municipalities. The extremely low was in the AD Vizovice.

The ratio of employed (out of the economic active) exceeded 90 % and was a little bit lower than the value for CR (90.2 %). The extraordinary position of Prague is demonstrated by the value of 93.1 %. Among the researched ADs were ones with the extremely low values of employment (lower than 86 %) as well as the ADs who exceeded the Prague's value: Votice, Nové Město na Moravě, Pacov and Mnichovo Hradiště.

From the Table No 1 is clear, that some of the names of the AD MEP are repeated quite often in the groups of five the most and the least convenient values. In some of the cases are these names on the both sides. E.g. the mostly appeared AD MEP "Aš" is repeated four times on the side of the most convenient values, and two times on the side of the least convenient values.

Each of the AD is therefore characterized by nine indicators<sup>11</sup>. Now, following aims are to solve:

- to identify the similarity of the ADs of the researched MEPs,
- to set the objective order of the researched AD MEPs, based on the composite indicator, that will characterized their higher or lower level.

<sup>10</sup> Unlike the previous indicators, the economic activity and employment are the indicators, which partially depended on the phase of the economic cycle in the time point of the measurement. These indicators show certain oscillation, which is in no relation to the time point of census.

<sup>11</sup> The indicator of the total load was let out. This indicator is just the simple sum of the young and aged load

To be able to do this the choosing of the set of the marginal indicators is necessary. The guideline for this choice will be the logic as well as the overview about the intensity of their mutual relationships. Both in the case of cluster analysis as well as the composite indicator setting it is necessary to ensure the given position of the marginal indicators, its' specific angle of view of the reality. This could be reached by choosing such set of indicators, those, when summed, maximize the "viewpoint" of the researched problems and therefore are mutually the least related the possible.

Out of the logic of indicators construction the specific relations are clear, that do not allow to put into the couple e.g. employment-unemployment, age index-the load by aged etc. Beside these significant couples there could be also some other groups of indicators, whose mutual relationship will be detected by the correlation coefficients.

Another related problem is, if there are the same or different wages of the marginal indicators while measuring the similarity or the composite indicator construction. By the attempt to set the wages by the expert method the wages of the indicators were very similar. This is the justification of setting the same wages of all the marginal indicators.

The chosen subset of the indicators includes the indicators, which were mutually related maximally weak:

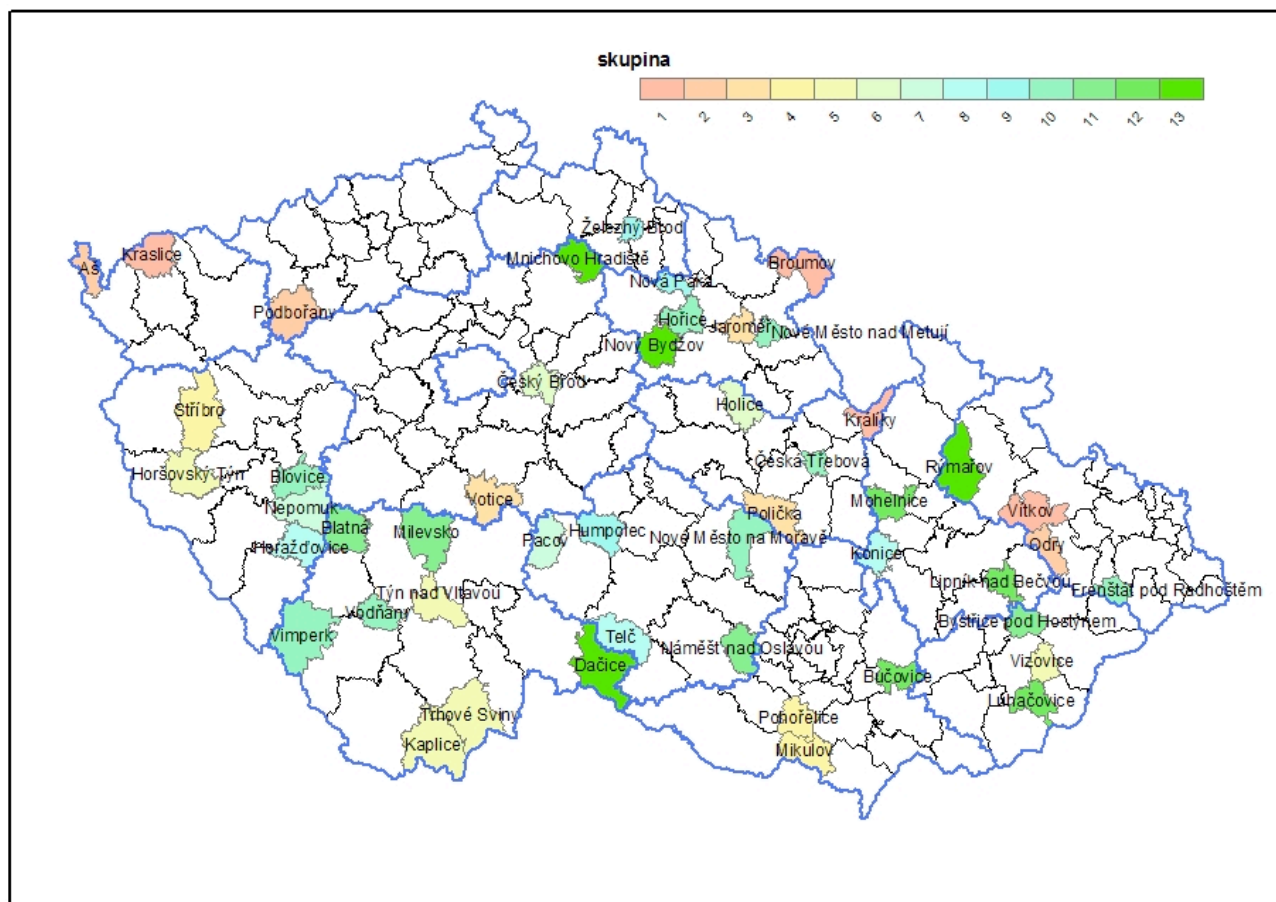
- the relative change of the inhabitants number between 2001 and 2011 census (in %),
- the load of the population by the young (in %),
- age index (in %),
- the ratio of primary educated people (in %),
- the ratio of economic active people (in %).

The first, second and last indicators are *the max* type (the most convenient is the highest value) and the other two are the min type (the desirable value is the lowest).

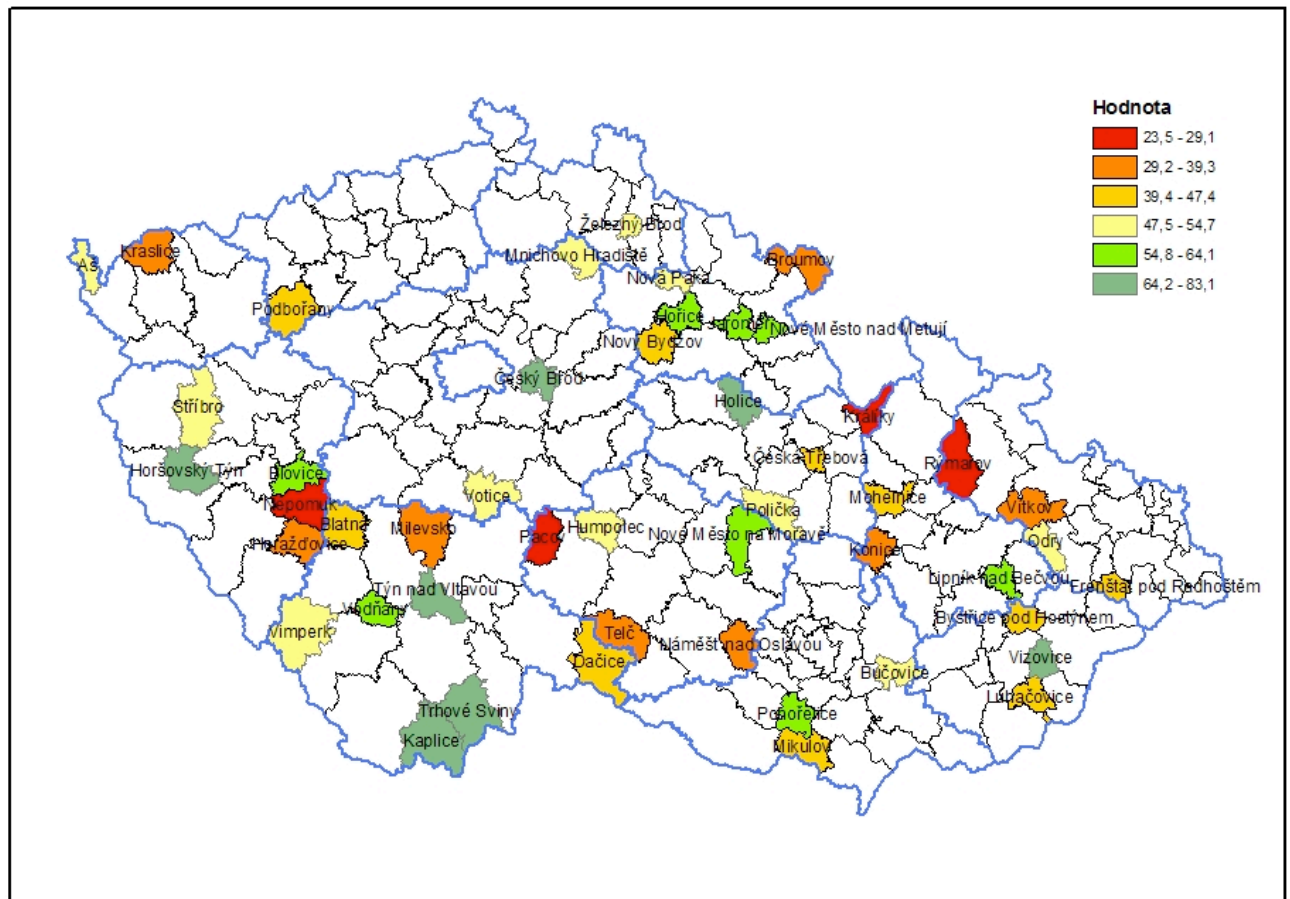
The cluster analysis could be done only for the last four indicators, because there is no possibility of missing values. The square of Euclidean distance was used and the agglomerative clustering proceeding *complete linkage*. The results of the cluster analysis (SMITH, TAYMAN, SWANSON, 2001), which separate the researched AD MEP to the 13 clusters are stated in the cartogram on the Fig. 1.

For all the five indicators the order from the best (Český Brod) to the worst (Pacov) AD MEP was set by the *re-scaling* method.

Beside this order (not stated in this article because of the high number of units), the cartogram of natural breaks has been constructed (see Fig. 2). On this cartogram are the AD MEP classified to the six indifferent groups.



**Fig. 1 Results of the cluster analysis of the smallest administrative districts of the municipalities with extended power (skupina = group)**  
**Source: calculated by author**



**Fig. 2** The cartogram of the smallest administrative districts of municipalities with extended power constructed by the method of natural breaks

*Source: calculated by author*

## Discussion

In the previous parts of the work the socio-demographical characteristics of the smallest AD MEPs were compared with the average of the CR. In some cases also the capital city of Prague was mentioned, who, in the most indicators, is in the disparity position. While evaluation of the socio-demographic situation of the smallest AD MEPs the comparison to the statutory towns of the CR. The statutory towns are (with exceptions) also the largest administrative districts (Brno 384,277 inhabitants, Karviná 70,793 inhabitants). In the Table below there is a comparison of the smallest AD MEPs and the statutory towns.



Table 2 The comparison of indicators for the smallest administrative districts of municipalities with extended powers and statutory towns

Indicator	The smallest administrative districts of municip. with extended power	Statutory towns
The rate of population (in %)	7,2	41,2
The relative population increase from 2001 (in %)	1,38	1,32
The rate of economically active population (in %)	48,7	48,9
The rate of employed on the economic active population (in %)	90,1	89,6
The rate of people with primary education (in %)	21,1	17,5
The rate of people with university education (in %)	8,2	13,7
The rate of children on the population (in %)	14,7	14,2
The rate of post-productive population (in %)	15,8	16,0
Mean age (years)	40,8	40,8
Age index (in %)	109,6	113,3

With exception of the indicators related to the education, the values for the smallest AD MEPs and the statutory towns are the same or almost the same. The similarity in the actual values is highlighted with the same course of the trends since the last census in 2001.

## Conclusion

While the socio-demographic situation in the smallest AD MEPs is the same as the situation in the statutory towns (with the exception of the Prague and the situation of t CR as a whole), there are quite crucial differences among the ADs in the set. The value of the composite indicator of the socio-demographic situation smaller than 30 (in the scale 0 – 100) out of the point of view of the chosen indicators was researched by AD MEPs with the low level Pacov, Rýmařov, Králíky and Nepomuk (ascending from 23.47 to 29.06). The AD MEPs with the high value of composite indicator (above 70) were on the other side of the scale. These are (ascending) Horšovský Týn (70.03), Týn nad Vltavou, Vizovice, Kaplice, Holice and Český Brod (83.11). For the appropriate understanding of the results it is necessary to point out, that these values are not absolute, but relative counted in the respect to the maximal and minimal values, which were really reached in the set of AD MEPs. The results are partially involved by ignoring of the relative change in the number of inhabitants given by the administrative changes of some of the AD's borders (shifts of the municipalities between administrative districts) from the last census in 2001, and not by the demographic changes.

AD MEPs with the smallest values of the composite indicators are mainly the mountain villages or the municipalities in the borderland with worse accessibility, far from the larger

towns and main traffic moves. Contrary, the ADs with high values of indicator are situated near the large towns with universities and job opportunities. This involves the education level, economic activity and, could be said, also the load of the population by the young, because they prefer living in the periphery of the large towns.

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