Multicriteria analyses in Czech Statistical Office (CzSO) - - the way to objectification of regional analyses

Jiří Kamenický, Eduard Durník

Introduction

Central and regional governments, international and local authorities involved in regional development and regional disparities do not get along relevant and objective statistical information. The statistical offices play a key role, unreplaceable position belongs to regional and especially local statistics. There are many challenges for regional analysts in the Czech Republic; disclosure of reasons for different life quality between regions, reasons for economic backwardness or evaluation of the effectiveness of programs aimed at sustainable development.

Standard way of dissemination of regional statistics represents releasing the descriptive publication, statistical tables or graphical outputs. Outputs of groups of indicators have still great significance due to use in external information systems or as a source for external analysts. But it is universally known that the subjective selection of statistical indicators could lead to misrepresentation the objective reality. Therefore the Czech regional statisticians deal with possibilities of objectification regional comparisons and methods of multicriteria analysis have been used lately very often.

Each of the methods has its pros and cons, its admirers and disputants. We are aware of advantages in shrinkage calamitous influence of extreme values and in risk of faulty conclusions based on inaccurate selection of indicators. But disadvantage grounds in elimination significant positive and negative impact of component indicators in the synthetic criterion. So significant disproportion could be nullified.

In spite of this, we are persuaded that the multicriteria analyses based on conscionable selection of the component indicators have great significance for objective assessment of regional disparities.

Our paper refers to application of selected method of multicriteria evaluation (method of pair-wise comparison) for detection of current position and trends in regions of the Czech Republic. We point our look both to NUTS-3 territorial units (14 regions) and to lower territorial units (205 administrative districts of the municipalities with extended powers). Data base was contained from series of statistical indicators. We grouped them with the aim of comparing territories in 4 pillars (demographic, social, economic and environmental).

In the preliminary part of this analysis, both motivation of CzSO to make such studies and key principles of selected statistical method are explained. More attention is paid to selection proper indicators; from the point of view of its availability, accuracy, relevance, proportionality and correlation. Assignment of weights to component indicators was also very important task to deal with, we collaborated with many external experts.

Multikriteria analysis in CzSO regional publications

The accession of the Czech Republic into EU was strong stimulus for new flood of requirements for assessment of regional disparities in our country. The opportunity to obtain structural funds (appointed to support of programs aimed at severe problems in some regions) have stimulated regional authorities to ask statisticians to cooperate. The cooperation is concerned at preparation of common analyses of regional disparities or dissemination of regional indicators as a wide data spectrum for the evaluation of effectiveness of implemented regional projects.

Regional analysts have issued several publications every year, some of them contained multicriteria assessment methods. There are two types of these publications:

- Mono-thematic – unemployment, housing construction, demography etc
- Comprehensive or composite – poly-thematic, aimed at sustainable development, comparison of rural and urban territories etc.

For example, “Research and Development in Regional point of view” come under first type, a set of “Disparities in Demographic, Social and Economic Development Within the Region in 2000 – 2005” issued by Regional statistical offices come under second.

Working teams put together from both central and regional analysts have chosen proper and available indicators as components for synthetic indicators. Step by step eligibility, significance and weights of these indicators are discussed among internal and external experts.

Application of pair-wise comparison method for assessment of disparities - both in regional and local level

Requirements from significant number of regional statistics users lead not only to dissemination of standard data sets, but more frequently to sophisticated outputs and to collaboration of statisticians from both central and regional offices in external expert teams preparing e.g. Sustainable development programs for individual regions.

Aware of this need, CzSO statisticians have focused more intensively on producing regional analysis recently. In addition, monothematic (often ad-hoc) analyses dealing with current topics of interest (e.g. science&research, labor market, demography, housing), have CzSO started to produce recently as well as regularly oriented comprehensive regional analyses (e.g. analysis of Census results).

To facilitate the processing of some comprehensive analyses, CzSO creates *horizontal working teams* consisting of regional statisticians from some selected regions and from the central office. Working group defines the target of analysis (according to user demand), provides uniform data collection, technical assistance (e.g. creation of graphic documents, layout of publications, etc.). In addition, it focuses on selection of appropriate analytical methods and organization of training for regional analysts.

In recent years, on a platform of working groups of analysts, *two important studies with the focus on multicriteria assessment of regions* have emerged: first, on higher territorial units (region NUTS 3) and second on smaller - local territories (administrative districts of municipalities with extended powers SO ORP). Besides detection of current situation, we also wanted to examine short-term development trends at least for larger territorial units.

When collecting a large number of available indicators, the question arose, how these indicators meaningfully and objectively categorize. We were inspired by experience gained from teams for processing strategic development plans (including strategies for sustainable development – both at national and regional level) and applied in our analysis of the so-called *"pillar approach"*. Indicators for assessing the status of the regions were grouped into 4 areas (domains), which we think are crucial for regional development and for which we currently have available relevant statistical data (example of important topic, we omitted in the analysis because the lack of data, is institutional pillar of regional development, which includes e.g. quality of authorities and regional/local governments, citizens' satisfaction with public institutions, their availability, etc.). Demographic, social, economic and environmental pillars were applied to the evaluation of regions (NUTS 3) and the evaluation of the administrative districts SO ORP. Evaluation of environmental pillar at the level of small areas (SO ORP) is limited by the lack of data, so small amount of environmental data in this pillar were extended by indicators reflecting transport accessibility, location and technical infrastructure.

After collecting data and sorting them to pillars, basic linear correlations between indicators were tested. Those indicators that showed high correlation coefficients (Pearson> 0.7) were excluded from further processing. For the evaluation of regions (NUTS 3) indicators were still categorized into two groups:

a) describing current status
b) suitable for detecting short-term development trends (2000-2004)

This set of indicators supplemented by additional metadata (describing quality of indicator, the method of its calculation, the justification for inclusion in the analysis - the relationship to regional disparities) created the basis for expert evaluation. Its aim was to assign weights to individual indicators. For the purposes of assigning weights, we used simple and illustrative method – pair-wise comparisons. Each evaluator completed for each domain (topic) table of preferences (2 = important indicator, 1 = equally important or can not be determined, 0 = less important indicator). After summing up preferences for all evaluators, *weights* were calculated by dividing the sum preferences for given indicator by the sum of all preferences for all indicators in given domain (topic). Weights were calculated separately for assessment of the overall status of region and especially for change of the status of region over time (Table 1.2 and 4 and 5 in Annex).

Table 1,2 Infrastructure, location, accessibility, environment – evaluation of indicators

example of evaluation (1 expert)

	Indicator (see in appendix)										Σbi
	env 1	env 2	env 3	env 4	env 5	env 6	env 7	env 8	env 9	env 10	
env1	x	0	1	1	1	1	2	2	2	1	11
env2	2	x	1	1	1	1	2	2	2	1	13
env3	1	1	x	0	0	0	1	1	1	1	6
env4	1	1	2	x	2	1	2	2	2	2	15
env5	1	1	2	0	x	1	2	1	2	1	10
env6	1	1	2	1	1	x	2	1	1	1	12
env7	0	0	1	0	0	0	x	0	2	2	5
env8	0	0	1	0	1	1	2	x	1	1	7
env9	0	0	1	0	0	1	0	1	x	0	3
env10	1	1	1	0	1	1	0	1	2	x	8

Definite preferences (importance) – environ. domain

	Indicator (see in appendix)										Σbi	weight (abs.)	weight (rank)
	env 1	env 2	env 3	env 4	env 5	env 6	env 7	env 8	env 9	env 10			
env1	0,0	0,6	1,4	0,9	1,3	0,8	1,2	1,2	1,1	1,1	9,7	0,107	4
env2	1,4	0,0	1,5	1,2	1,5	1,0	1,3	1,4	1,4	1,3	11,9	0,132	1
env3	0,6	0,5	0,0	0,7	1,1	0,7	0,9	0,9	0,9	0,9	7,2	0,080	9
env4	1,1	0,8	1,3	0,0	1,4	1,1	1,2	1,3	1,2	1,2	10,7	0,119	3
env5	0,7	0,5	0,9	0,6	0,0	0,6	0,8	0,9	0,9	0,9	6,8	0,075	10
env6	1,2	1,0	1,3	0,9	1,4	0,0	1,3	1,3	1,3	1,3	10,9	0,121	2
env7	0,8	0,7	1,1	0,8	1,2	0,7	0,0	1,1	1,3	1,2	8,8	0,098	5
env8	0,8	0,6	1,1	0,7	1,1	0,7	0,9	0,0	1,1	1,0	8,0	0,089	7
env9	0,9	0,6	1,1	0,8	1,1	0,7	0,7	0,9	0,0	0,7	7,7	0,085	8
env10	0,9	0,7	1,1	0,8	1,1	0,7	0,8	1,0	1,3	0,0	8,4	0,094	6
Infrastructure, location, accessibility, environment - total											90,0	1,000	x

Table 3 Order of indicators by score (statisticians vs. external experts)

expert method, example from publication on intra-regional disparities

Demography, settlement structure		Statisticians		External experts	
		score	rank	score	rank
D6	Dependency ratio (person aged 65+ per 100 persons aged 0-14)	17,7	1	15,4	4
D4	Youth-migration attractiveness (balance of internal migration of persons aged 20 – 34 divided by total population aged 20-34)	15,9	2	16,7	2
D7	Educatedness ratio of persons aged 25-64 (sum of % shares of population with different level of education attainment - weighed by standard duration of education required for given educational level)	15,1	4	16,9	1
D9	Social-demographic index of instability (share of natives, net migration, share of non-complete families, share of births and share of induced abortion of females younger than 20 years, abortions per 100 births, divorce rate, share of population with only basic- and without education)	14,6	5	15,7	3
D1	Total fertility rate	15,6	3	13,3	6
D8	Turnout in secondary and tertiary education (share of studying person from total population aged 15-29)	12,9	6	14,2	5
D11	Population density (persons/km^2)	10,7	9	12,6	7
D5	Old-age migration attractiveness (balance of internal migration of persons aged 55 - 74 divided by total population aged 55-74)	10,0	10	10,2	9
D2	Standardized mortality index on diseases of the circulatory system (national level=100)	11,9	7	7,9	11
D12	Index of desintegration of settlement system (share of sparsely-populated municipalities)	7,9	12	11,9	8
D3	Standardized mortality index on neoplasms (national level=100)	11,1	8	7,4	12
D10	Share of foreigners in total population (%)	8,4	11	8,2	10
D13	Number of municipal parts (usually very small settlements) per 1 municipality	4,2	13	5,8	13

Expert group consisted from 50 internal statistician experts (mainly from CzSOs regional offices) enlarged by approximately same number of external experts (employees of regional authorities,

universities etc.). by comparing weights given by external experts and statisticians, we found some interesting deviations. External experts valued highly the our effort to include some partial synthetic indicators (e.g. educational index), contrary to it, statisticians gave higher priority to traditional (but relatively mathematically complicated) demographic indicators (standardized mortality index).

Similar partial discrepancies between the assessment of statisticians and external experts appeared also in other domains. It may be interesting for us as inspiration for future. But it must be stressed that in key indicators deviations were minimal.

In next stage of processing, it was necessary to calculate *normalized values* for all indicators and their distance from anti-optimum. The *anti-optimum* was determined as the most negative value from values obtained in inter-regional comparison. For indicators with positive influence in selected domain (marked as plus (+) in tables 4 and 5), the anti-optimum was equaled to minimum value. For indicators with negative influence (e.g. unemployment rate), the anti-optimum was equaled to maximal value (for these indicators counts: higher value means worse position).

The same direction of evaluation for all indicators was ensured by calculating the distances (in absolute figures) of normalized data from anti-optimum. *Final synthetic score* represents sum of distances from anti-optimum multiplied by weights for indicators for each region in four domains. Based on this calculation, we determined final order of region in each of domain.

A very similar method with a slight simplification was used in analysis of lower spatial unit (administrative district with extended powers – SO ORP) and intra-regional disparities.

In following part, we present briefly some examples of interesting results from mentioned analyses. Detailed interpretation of their results can be found in studies quote in references.

Assessment of demographic, social and economic development in regions (NUTS 3)

Synthetic scores describing current state as well as short-term trends (2001-2005) for individual NUTS 3 regions (for each of four evaluated domains) have created data-base for assessment of regional disparities.

If we try to interpret position of regions in demographical domain (see chart 1), we must be aware of some constraints: e.g. very limited number of selected indicators (many indicators had to be dropped due to high mutual correlations), each of (5) selected indicators scored in each region differently. There was no region that is significantly better or significantly worse in all indicators, while several regions for various indicators gained both positive and negative extremes. Final synthetic scores were also influenced by expert weights and profound regional disparities (extreme position of optimum) in migration balance.

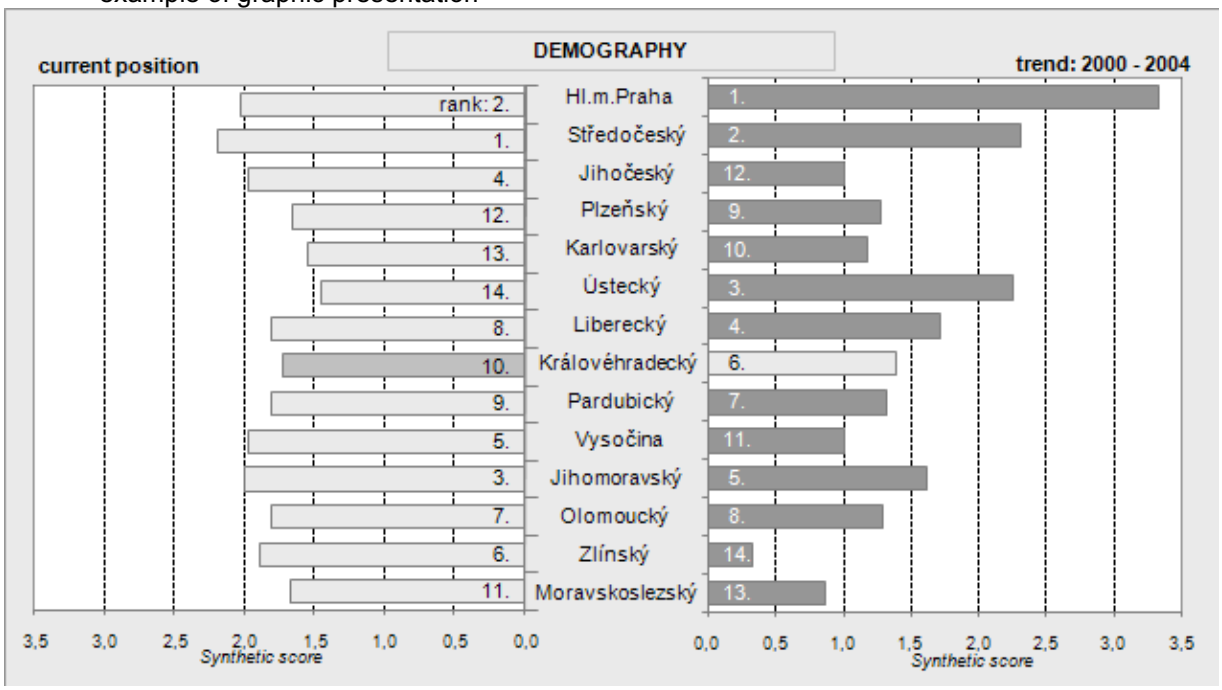
Středočeský region (surrounding Prague) have obtained best overall scores in. demography (due to extremely high positive migration balance, which reflects developing suburbanization process). Also the *capital city of Prague* achieved positive migration balance (contrary to its hinterland – *Středočeský region* – only due to international migration).

Regions in north-western part of the CR placed them in the opposite scale. Their negative scores resulted from high mortality, above average share of children born out of the wedlock as well as lower educational attainment of population..

Praha,. Středočeský- and Jihočeský region obtained best scores also in social and economic domain. On the opposite scale, we can find regions in north-western part of the CR (*Karlovarský and Ústecký*) and region in northern Moravia (eastern part of the CR); these regions have inherited strong industrial base (mainly heavy industry) and after the fall of commuist regime they face severe restrcuturalization problems. Extensive industrial expansion after 2nd world war accompanied by strong population shitfs have created specific and in some aspects of problematic demographic base (higher incidence of social pathological phenomena).

Chart 1 Position and trend in regions by demographic domain

example of graphic presentation

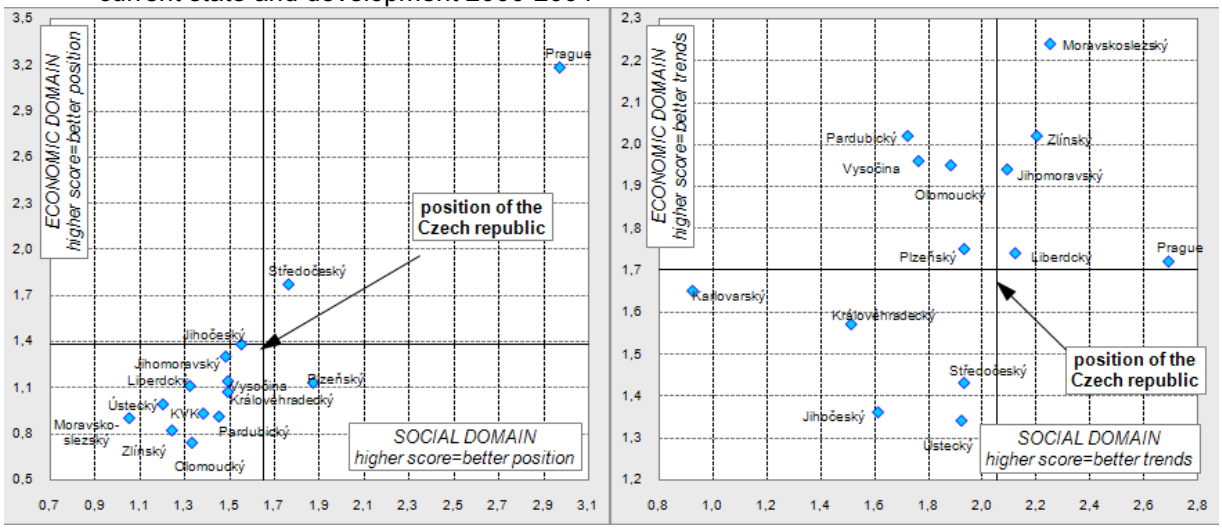


Environmental domain is the only one where Prague did not score positively. However, this result is not very surprising, because similar regional mosaic can be observed in many many developed countries: big cities (mainly those specialized in tertiary and quarternary activities) are natural poles of economic growth (often accompanied also by positive social and demographic profile) and contrary to it, show less favourable score in environmental pillar (e.g. well known problems of traffic congestion, air pollution, accessibility to green area, urban sprawl).

We can also correlate regional scores across different domains. From our study it arose that the most intensive linkages can be found between social and economic profile of NUTS 3 regions (see chart 2).

Chart 2 Score for social and economic domain for regions (NUTS 3)

current state and development 2000-2004



When searching for correlation between current status and short-term development in regions, we find only small examples of significant linkages (e.g. demographic and social trends – mainly because very positive development in Prague and its hinterland). In some cases, trend can even be seen as surprising, e.g. positive economic development in affected *Moravskoslezský region* (containing 2nd

biggest agglomeration in the CR) – mainly due to intensive inflow of FDI (supported by national policies), which have created many jobs in "new" industries (e.g. automotive industry).

Regional disparities among administrative districts of municipalities with extended power (SO ORP)

Assessment of the situation of the administrative districts SO ORP (which could be used for intra-regional disparities, too), as opposed to regions, is pioneering work. No statisticians or other experts have systematically statistically evaluated these territorial units yet. It is also because these territorial units emerged relatively recently (2003) and so far as they are not usually processed for statistical data. These units represent relatively small areas (in the CR there are 205 of these areas, with an average population per 1 unit around 50 thousand.). SO ORP are relatively comparable with local labor markets and are appropriate units for evaluation of intra-regional disparities (between 8 and 26 units exists in each of NUTS-3 region).

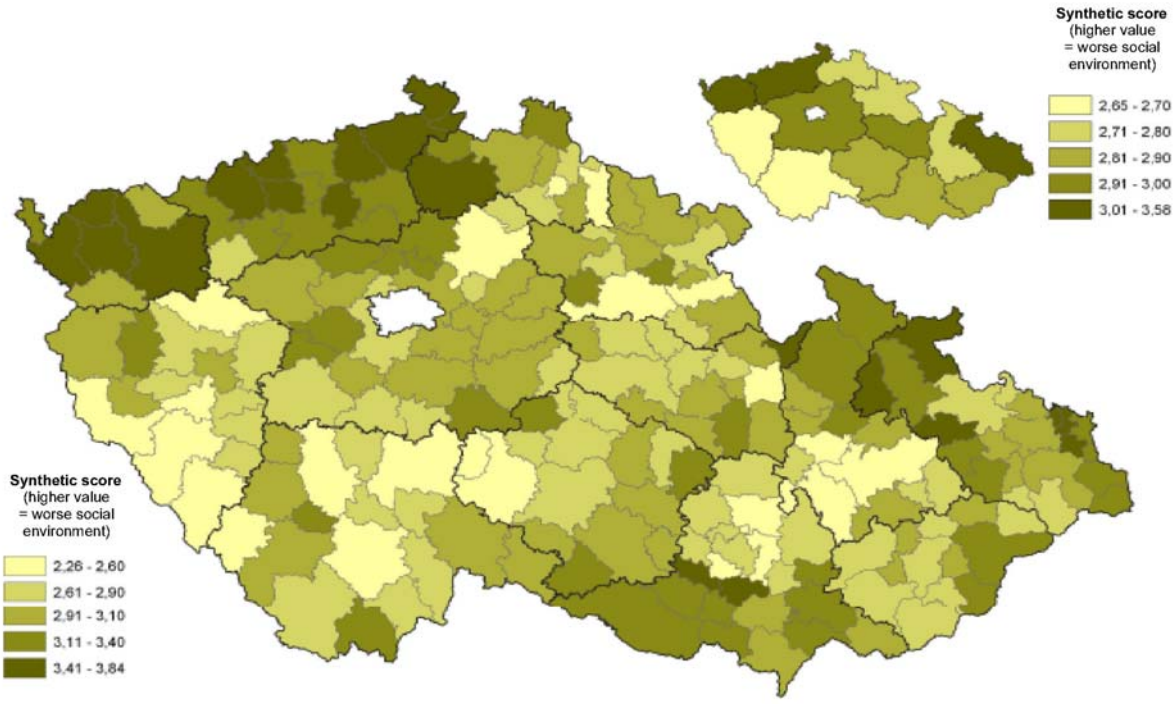
Due to limited data base for assessing SO ORP, we used to a greater extent indicators from the Population and Housing Census (2001). We also had to gave up attempts for development comparisons.

We do not include in the evaluation *the capital city of Prague*, this territory cannot be compared with other small local labor markets (Prague concentrates almost 1/7 of all job in the CR). Prague also posses the statute of region (NUTS 3) and analysis of intraregional (intraurban) disparities means qualitatively very different task than assessment of disparities within other regions of the CR.

Quite a rich mosaic with significant differences within each region can be seen in the social domain. (see Picture 1).

Picture 1 Position of regions and SO ORP by social domain

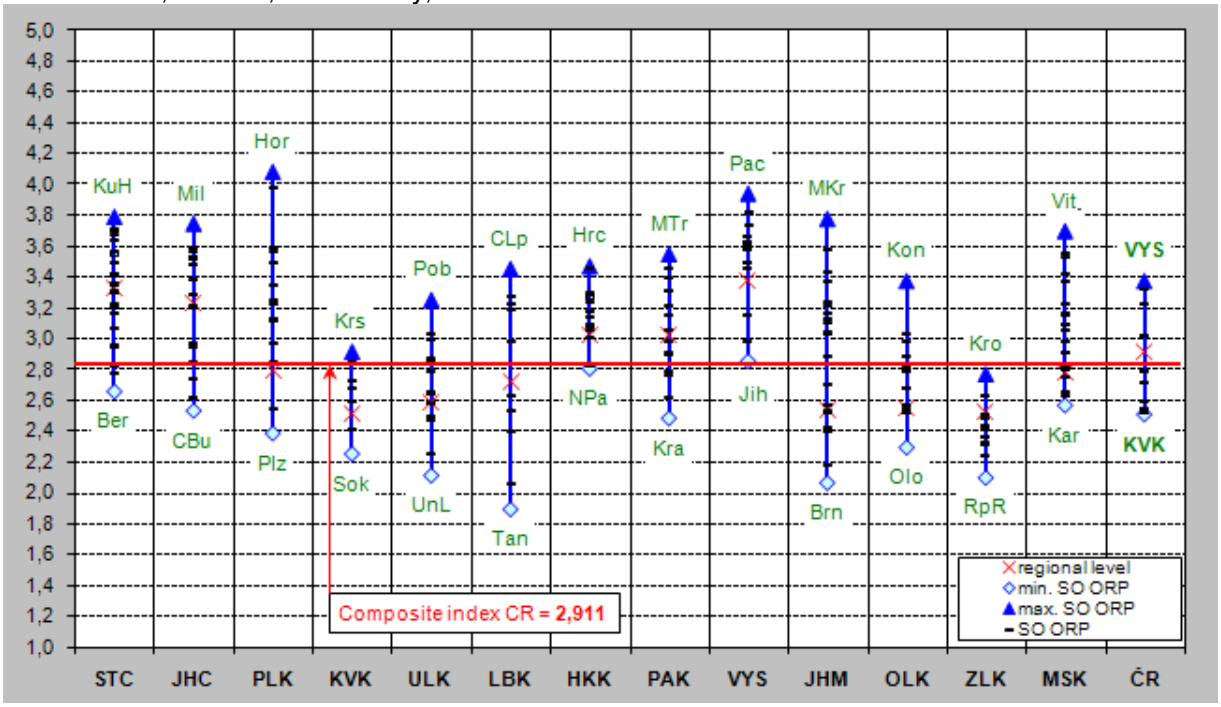
example of graphic presentation,score in 2001-2005, higher value (darker shade) means more adverse assessment



The most negative average scores between regions in social domain are typical of *Ústecký, Moravskoslezský a Karlovarský region*. The major problem there (not just social but also economic, of course), is unemployment (which, according to experts, represents one of the most important indicator of social climate - see table. 5 in annex), that is reflected in many other spheres of human activity. In the long-term perspective, these regions are characterized also by low-intensity of housing construction or relatively high level of crime rate. Social instability reflects also in long-term low voter turnout (in all types of elections).

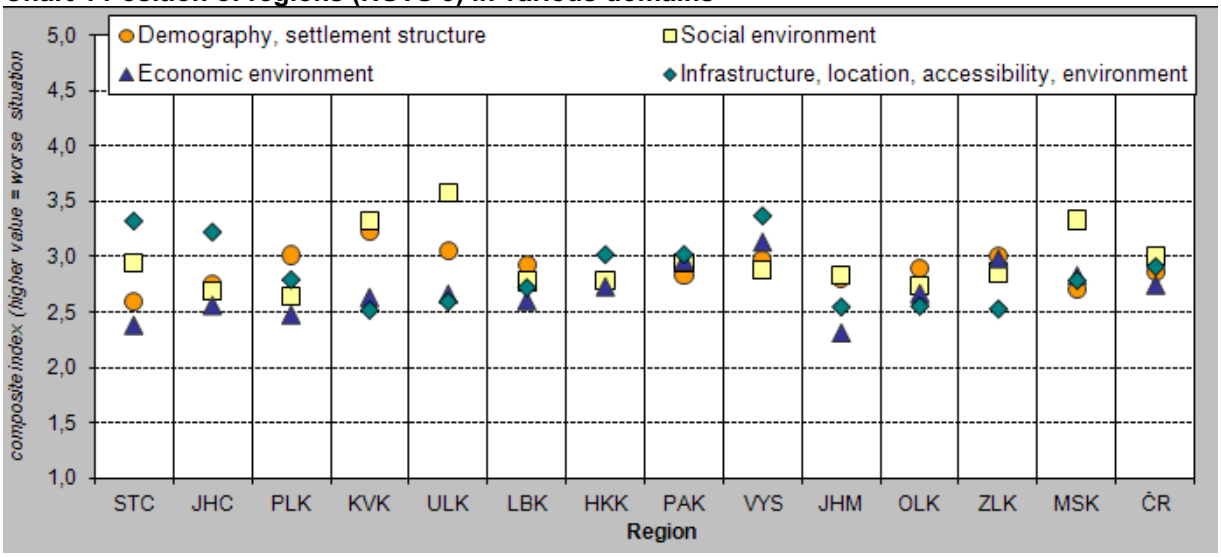
From the Picture 1 is also clear that the districts with negative social characteristics have a relatively strong tendency (in comparison to demographic and economic domain) to clustering.

Chart 3 Disparities within regions (SO ORP)
Infrastructure, location, accessibility, environment



Another way of expressing of intra-regional disparities is illustrated in chart 3. For domain of "infrastructure, location, accessibility, environment" extreme scores for SO ORP within each region are shown. Variation range between the most homogenous vs. heterogenous region in this pillar was 1:2.5 Intensity of intra-regional disparities is also influenced by size of region (larger regions tend to larger disparities) and the significance (power) of the regional centers.

Chart 4 Position of regions (NUTS 3) in various domains

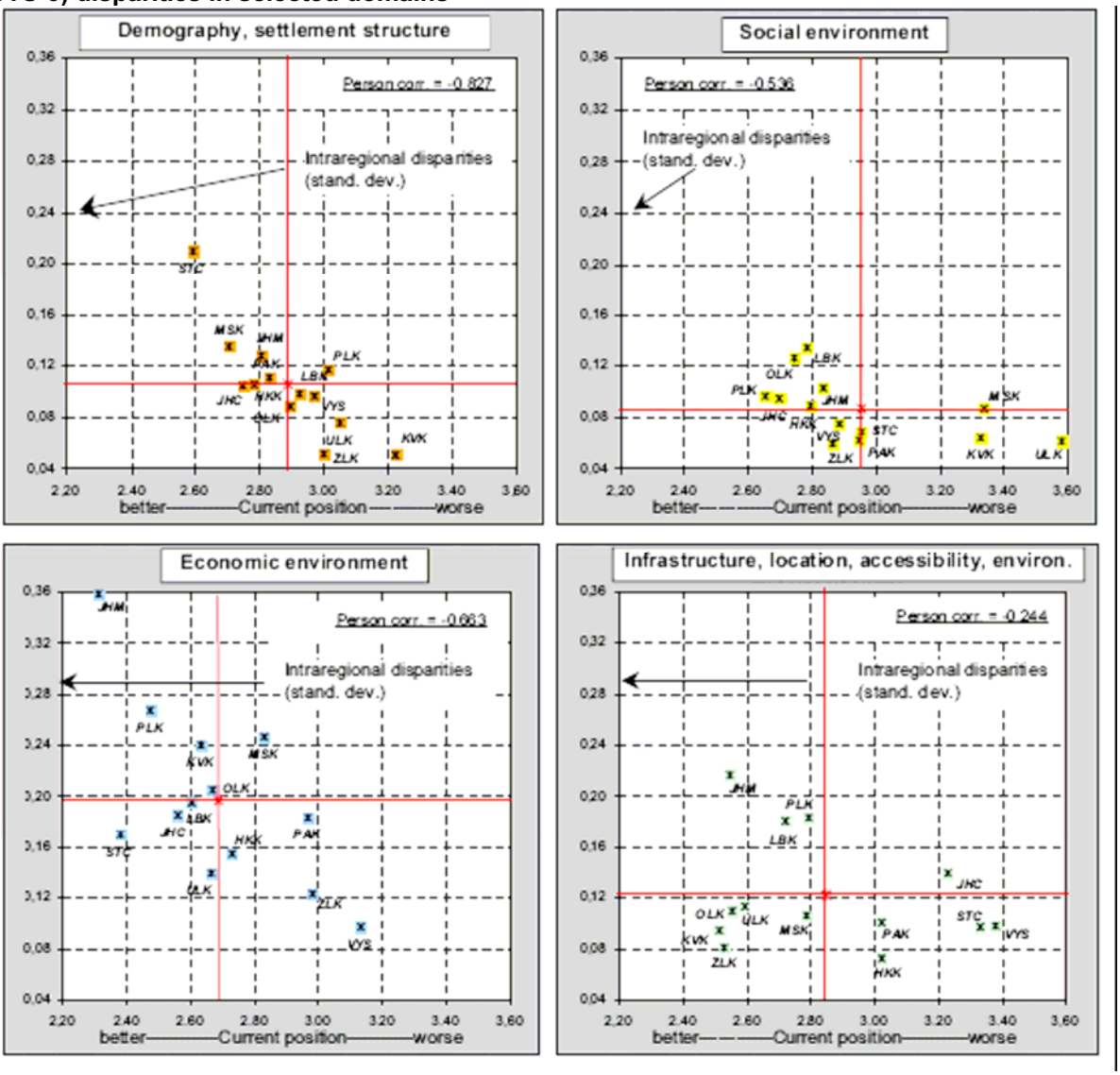


Synthetic score for each SO ORP can also be aggregated into regions (NUTS 3), which brings information on the balance of position of each region in various areas of development (see Chart 4). First of all, regions in the western half of the CR are characterized by a greater mismatch scores across different domains. For example, Central Bohemia (natural hinterland for Prague) has a

favorable evaluation of demographic and economic domain, but lagging behind especially in infrastructure. Another example are migratory less-stable regions in Northern-West (with greater concentrations of social and demographic problems).

An interesting comparison provides analytical view of the current status of regions and extent of intra-regional disparities in combination for different thematic areas (Chart 5).

Chart 5 Correlation between interregional (NUTS 3) vs. intraregional (small districts within NUTS-3) disparities in selected domains



We see a high intensity of intra-regional disparities in the economic field and relatively minor in demography. Another interesting finding is that of inter-regional disparities in social domain considerably exceed intra-regional one. Finally, charts suggest another important finding: regions which obtained overall favorable rating achieved it at the expense of higher intra-regional disparities, mainly due to significant influence regional centers.

These partial findings have the character of hypotheses that need to be tested in followed deeper oriented analyses of intra-regional disparities. It would also be useful to focus our perspective on detection of trends that will help us to give an answer to the question about changes in the position of lower territorial units in respective thematic domains. To this aim, very important role will play results of currently intensively prepared Population and Housing Census (2011), which significantly expand current data base for small territorial units, not only in demography but also in otherwise difficult data-reach domains (social and economic).

Conclusion

The paper contains the overview of multicriteria methods used in analytical activities of regional statisticians in Czech Statistical Office. The results of these analyses were presented in press conferences (in Prague and other regions) and wet met positive acceptance. It persuaded us about appropriateness of this approach of assessing of regional development.

It is clear that multicriteria analysis is a proper way to objective appraisal of disparities among regions and within them. But we are also persuaded they must be followed up by assessment of component indicators.

The decision to set weights to indicators (by expert method) was very successful and it proved well. External experts point of view lead to objectification, it allowed other opinion concerning indicators different from daily statisticians routine. Their reaction for selection of component indicators (e.g. social-demographic index of instability) was stimulating. Their experience with practical use and comprehensibleness of component indicators was valuable, too.

We have run into some problems during preparation of the analysis. We had to solve lacking availability of relevant indicators, especially for economic and environmental pillars on lower than NUTS3 spatial units. This restriction could to be taken into consideration when the results and regional disparities are interpreted.

It is recommended to approach to signal information about regional trends with more caution. To obtain more realistic trends (allowing to make some generalization) it is important to add on results of longer time series period to conclusions from our analysis.

New tools for clear interpretation of sophisticated analyses have appeared recently. Internet visualization enable us to present gorgeous motion charts and other animated charts and maps. Our first experience is very interesting and we want to intensify these activities.

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Eduard Durník
Head of Public database department, Czech Statistical Office. Na Padesátém 81, 100 82 Prague 10, email: eduard.durnik@czso.cz
Jiří Kamenický
Regional Outputs Section, Czech Statistical Office. Na Padesátém 81, 100 82 Prague 10, email: jiri.kamenicky@czso.cz

Annex 1

Table 4 Component indicators used for inter-regional (NUTS 3) comparison

Domain, indicator		weight (for evaluation of)		influence (+ positive, - negative)	evaluated period
		current position	trends		
Demographical domain		**1,000**	**1,000**		
D1	Standardized mortality rate (standard: national (CR) age structure)	0,168	0,211	-	2000-2004
D2	Migration de/increase (per 1 000 inhab.)	0,232	0,293	+	2000-2004
D3	Old-age dependency (person aged 65+ per 100 persons aged 0-14)	0,295	0,380	-	2000-2004
D4	Share of live-born outside marriage (%)	0,096	0,116	-	2000-2004
D5	Share of persons aged 15+ with completed tertiary education (%)	0,209	x	+	2001
Social domain		**1,000**	**1,000**		
S1	Dwellings completed (per 1 000 inhab.)	0,054	0,075	+	2000-2004
S2	Economic activity rate (%; LFS)	0,070	0,096	+	2000-2004
S3	Employment in primary sector (%; LFS)	0,048	0,067	-	2000-2004
S4	Registered unemployment rate (based on Labour Offices, %)	0,086	0,120	-	2000-2004
S5	Pupils in secondary technical (or general) schools and higher professional schools (per 1 000 inhab.)	0,048	0,066	+	2000-2004
S6	Average percentage of incapacity for work	0,053	0,074	-	2000-2004
S7	Physicians (per 1 000 inhab.)	0,057	0,078	+	2000-2004
S8	Beds in health establishments (per 1 000 inhab.)	0,050	0,070	+	2000-2004
S9	Beds in social service establishments (per 1 000 inhab.)	0,047	0,066	+	2000-2003
S10	Applicants on waiting list for stay in homes for seniors (per 1 000 inhab.)	0,040	0,055	-	2000-2004
S11	Average monthly amount of full old-age pension (CZK)	0,066	0,091	+	2000-2004
S12	Criminality: detected offences (per 1 000 inhab.)	0,047	0,065	-	2000-2004

Domain, indicator		weight (for evaluation of)		influence (+ positive, - negative)	evaluated period
		current position	trends		
S13	Suicides (per 100 000 inhab.)	0,030	0,042	-	2000-2004
S14	Net money income per household member (CZK; based on SILC)	0,083		+	2002
S15	Share of households with net money income below subsistence minimum (%; based on SILC)	0,075		-	2002
S16	Average number of persons in permanently occupied flat (Pop. Census)	0,042		-	2001
S17	Share of flats completed in period of 1981 - 2001 (%, Pop. Census)	0,033		+	2001
S18	Share of commuters (from total number of employed) from municipality of permanent residence (%, Pop. Census)	0,048		-	2001
S19	Total turnout in elections to Regional Councils (%)	0,023	0,031	+	2000,2004
Economical domain		**1,000**	**1,000**		
E1	Average monthly gross wage of employees (CZK)	0,120	0,173	+	2000-2004
E2	Difference between branches (CZ NACE) with the highest and the lowest average wage (%)	0,066	0,089	-	2000-2004
E3	Entrepreneurial activity rate (share of own-account workers in total employment, %, LFS)	0,100	0,135	+	2000-2004
E4	Share of agricultural land in total area	x	0,060	+	2000-2004
E5	Sales in industry per employee	0,101	0,140	+	2000-2004
E6	Construction work of contractors and subcontractors (based on region of construction) per capita	0,092	0,125	+	2000-2004
E7	Guests in collective accommodation establishments (per 1 000 inhab.)	0,067	0,090	+	2000-2004
E8	Registered cars (per 1 000 inhab.)	0,044	0,056	+	2000-2004
E9	Total R&D expenditures per capita (CZK)	0,095	0,131	+	2001-2003
E10	Total subsidies received per 1 000 inhab. (CZK, municipal budgets)	0,074	x	+	2004
E11	Capital expenditures per 1 000 inhab. (CZK, municipal and regional budgets)	0,080	x	+	2004

Domain, indicator		weight (for evaluation of)		influence (+ positive, - negative)	evaluated period
		current position	trends		
E12	Share of persons aged 15+ with PC at home (%)	0,050	x	+	2003,2004
E13	Cultivated agricultural land in total area (%, Agrocensus)	0,054	x	+	2003
E14	Share of inhabitants in living municipalities without any bus or railway connection (%)	0,057	x	-	2000
Environmental domain		**1,000**	**1,000**		
ENV1	Population density (persons/km^2)	0,088	0,094	-	2000-2004
ENV2	Share of inhabitants living in small municipalities (up to 300 inhab., %)	0,053	0,055	+	2000-2004
ENV3	Share of forest land in total area (%)	0,102	0,109	+	2000-2004
ENV4	Specific emissions of sulfur dioxide (tones/km^2; REZZO 1-3=big and medium pollutants)	0,141	0,154	-	2000-2003
ENV5	Specific emissions of carbon monoxide (tones/km^2; REZZO 1-3=big and medium pollutants)	0,137	0,150	-	2000-2003
ENV6	Value of fixed assets acquired for environmental protection per capita	0,147	0,160	+	2000-2003
ENV7	Wastewater treated (excl. precipitation water) in total volume of wastewater discharged into public sewerage systems (%)	0,140	0,153	+	2000-2004
ENV8	Share of population permanently living in houses connected to public sewerage systems (%)	0,115	0,124	+	2000-2004
ENV9	Daily water usage per capita (litre/day; Water-supply and sewerage Census 2001)	0,076	x	-	2001

Annex 2

Table 5 Component indicators used in analysis of disparities within regions

Domain, indicator		evaluated period	influence (+ positive, - negative)	weight
Demography, settlement structure				**1,000**
D1	Total fertility rate	2001-2005	+	0,093
D2	Standardized mortality index (national level=100) on diseases of the circulatory system	2001-2005	-	0,063
D3	Standardized mortality index (national level=100) on neoplasm	2001-2005	-	0,059
D4	Youth-migration attractiveness (age 20 - 34)	2001-2005	+	0,104
D5	Old-age migration attractiveness (age 55 - 74)	2001-2005	+	0,065
D6	Old-age dependency (person aged 65+ per 100 persons aged 0-14)	2005	-	0,106
D7	Synthetic indicator of education level (for population aged 25 - 64)	2001	+	0,102
D8	Participation rate in secondary and tertiary education	2001	+	0,087
D9	Synthetic indicator of social-pathology (includes: native persons, migration balance, lone-parent households, extremely young mothers, abortions, divorces, population with low level of education)	2001-2005	+	0,097
D10	Share of foreigners in total population (%)	2005	+	0,053
D11	Population density (persons/km^2)	2005	+	0,074
D12	Index of disintegration of settlement system (share of sparsely-populated municipalities)	2005	-	0,063
D13	Number of municipal parts (usually very small settlements) per 1 municipality	2005	-	0,032
Social environment				**1,000**
S1	Registered unemployment rate (based on Labor Offices, %)	31.12.2005	-	0,116
S2	Share of unemployed women (%)	31.12.2005	-	0,081
S3	Share of unemployed persons aged up to 25 (%)	31.12.2005	-	0,094
S4	Share of unemployed persons aged 50+ (%)	31.12.2005	-	0,085

Domain, indicator		evaluated period	influence (+ positive, - negative)	weight
S5	Relation of permanently occupied flat to number of private households	2001	+	0,077
S6	Private (commercial) dwellings completed per capita	2001-2005	+	0,069
S7	Sate or municipal dwellings completed per capita	2001-2005	+	0,065
S8	Share of low-quality flats, % (in terms of equipment: water, sewerage etc.)	2001	-	0,049
S9	Habitable floor area per living person (m^2)	2001	+	0,054
S10	Total turnout in elections to National Chamber of Deputies (%)	2006	+	0,036
S11	Registered patients per 1 GP (physician) for adults	2005	-	0,061
S12	Registered patients per dentist (independent surgery)	2005	-	0,051
S13	Number of pupils per 1 class (on basic schools)	2005	-	0,049
S14	Criminality: detected offences (per capita)	2000-2005	-	0,066
S15	Share of offences caused by habitual offenders (%)	2000-2005	-	0,047
Economic environment				**1,000**
E1	Specific employment rate (population aged 55-64), based on Pop. Census	2001	+	0,067
E2	Synthetic indicator of "residential- and labor function" of region (based on Pop. Census)	2001	+	0,082
E3	Entrepreneurial activity rate = share of employers or own-account workers in total EA persons (%, Pop. Census)	2001	+	0,093
E4	Share of foreign-controlled enterprises in industry in total number of industrial enterprises (%)	2005	+	0,047
E5	Tax revenues per capita (CZK, municipal budgets)	2003-2005	+	0,089
E6	Share of capital expenditures in total municipal budgets expenditures (%)	2003-2005	+	0,075
E7	Index of branch-progressivity of local economic structure (esp. % of tertiary activities), based on Pop. Census	2001	+	0,083
E8	Branch-diversification of local economy (e.g. dominance of one key-branch in total employment), Pop. Census	2001	-	0,075
E9	Labor productivity in industry	2005	+	0,085

Domain, indicator		evaluated period	influence (+ positive, - negative)	weight
E10	Average monthly gross wages of employees in industry (CZK)	2005	+	0,083
E11	Localization index of construction (branch), Pop. Census	2001	+	0,046
E12	Quality of agricultural land (e.g. fertility)	2002	+	0,051
E13	Synthetic indicator of location potential of tourism (natural or cultural heritage)	2002	+	0,073
E14	Beds in collective accommodation establishments per capita	2005	+	0,052
Infrastructure, location, accessibility, environment				**1,000**
I1	Share of population permanently living in flats equipped by gas form network (%), Pop. Census	2001	+	0,107
I2	Share of municipalities connected to public sewerage systems (%)	2004	+	0,132
I3	Share of municipalities with Physical Plan (%)	2005	+	0,08
I4	Share of land with ecologically-friendly use (e.g. forests, perm-pastures, gardens, orchards, water surface areas) to negative ones (e.g. built-up areas), %	2005	+	0,119
I5	Share of protected areas (e.g. National parks) in total area, %	2005	+	0,075
I6	Share of work commuters using public transport in total number of commuters-to-work (based on Pop. Census)	2001	+	0,121
I7	Average time spent on commuting-to-work (Pop. Census)	2001	-	0,098
I8	Position of region to development areas (cities) and development axes (transport corridors)	2005	+	0,089
I9	Time-accessibility to regional capital by individual road transport (minutes)	2005	-	0,085
I10	Time-accessibility to local centre (seat of administrative municipality with extended powers) by individual road transport (minutes)	2005	-	0,094

Annex 3

Picture 2 Territorial structure of the Czech Republic