A Note on Regional Differences in the Context of Selected Indicators

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Abstract

The paper was divided to several parts. Starting point was the analysis and assessments of the development of the Slovak regions based on several regional indexes in the time span 2004-2012. The emphasis was given especially to the development of disparities of among the regions before and after the economic crisis of 2008. A part of the paper was focused on the development of the regions from the perspective of the modern development of the Slovak Republic. Another part was devoted to the comparison of the analysed regions position in line with the selected variables. For evaluation of regions` positions the complex indicator and the partial indicators were used such as FDI, employment etc.

Key words: regional development, indicators, crises, FDI, employment

JEL Classification: O11, R58, Q43

1 Introduction

Regional disparities are not an unknown notion. As stated by Matlovič, Matlovičová (2011), the issue of disparities is being solved by professionals in field of geography (e.g. Hurbánek 2008), economists (e.g. Buček-Rehák, 2011, Rehák 2011, Želinský 2009, Samson-Koľveková 2009) and sociologists (e.g. Falťan 2008). The regional development comparison was suggested by plenty of authors in various methodologies such as within-country differences presented by K. Galuscak, et al. (2012). Following this, the disparities are often explained differently. In this paper this disparity will be approached as the inequality or difference, dissimilarity within the social-economic development of the selected regions. It was not an ambition of the the paper to provide neither an complex evaluation of the disparities in Slovak Republic, nor the evaluation of the Košice and Prešov region in all its aspects. The paper was focused on selected indicators, which could be the base for the evaluation of the disparities`development in the regions in the quation. The paper was considering some indicators for traditional and others modern ones. In our previous work the traditional indicators were used, such as unemployment rate (for instance Samson, Koľveková, 2009 or Ďurčová, Raisová, 2013). The purpose of this paper was to find new perspectives in comparing the development of regions by use of non-traditional or modern indicators, modern in respect to use of Information and Communication Technologies -ICT. (for instance Ďurčová, Raisová, 2013) The analysis was performed for the NUT3 level. The region that was evaluated was Eastern Slovakia, i.e. Prešov and Košice regions. This approach supports similar study by H. Bleakley and J. Lin (2012) using the individual and aggregate (city level)

data. Similarly, the "cities are functional areas based on the self-containment of commuting flows." (M. Andini, et al., 2013) The commuting and labour market pooling based on skills is presumed also for Prešov and Košice. Those were a local labour market areas studied.

Data content and their availability have been relevant parameters for the selection of the evaluation indicators. The contribution of the paper was aimed at broadening the perspective of evaluation of regions and pointing out how various indicators are linked together. For instance the linkage between: (1) employment as a traditional indicator of labour market and (2) employment as high or low skilled employee or at green jobs as a newer and modern indicator. For this reason, we used partial and comprehensive indicators for the evaluation of regional disparities. Partial indicators were created from several sub-indicators by using methods such as: normed variable and indices. In order to calculate the composite indicators it was needed to norm all variables by using average values and standard deviations. The resulting partial indicator value was calculated as the sum of the values obtained by multiplying the weight and the value of sub-indicators (number assigned to each region according to its ranking among the other regions within the indicator) of all sub-indicators in the partial indicator.

During the evaluation it was found that Bratislava region is having too much influence over the results, thus it was decided that we exclude it from the evaluation, thus comparing the comparable regions. Similar methods were using for instance authors Rajčáková, Švecová (2011). Composite indicators were rescaled using min and maximum values as upper and lower boundaries of the series of the observed values. The result is number from the interval <0 - 100>.

2 Literature

A brief theoretical outline for the core part of this paper was anchored in the labour skills, which could be placed in the literature overview starting with Marshall (1920, book IV, chapter 10, §3) quote:

> *"Employers are apt to resort to any place where they are likely to find a good choice of workers with the special skill which they require; while men seeking employment naturally go to places where there are many employers who need such skill as theirs and where therefore it is likely to find a good market."*

Marshall`s views motivated many researchers as well M. Andini, et al. (2013), who pointed out that most literature has established a robust relationship between various sorts of agglomeration and productivity, which was partly included in this paper. Furthermore the authors Andini at al. warn policymakers in respect of deriving lessons from the agglomeration successes of some industries based on their analysis, which included skills as variable. Dominant skill group was used also by Galuscak, et al. (2012). Their understanding of dominant skill is very much similar to understanding and use of the skill division in this paper. The other literature support was uttered along the areas analyzed such as Sauvy`s index or Demographic window.

3 Evaluation of Košice and Prešov Region in the Context of the Classical Indicators

Economic performance is most often assessed through indicator of GDP, respectively GDP per capita. So, this indicator can be uniquely categorized as classic indicators. We choose a few other indicators that also can be categorized as classic indicators: Value added, Construction production, Turnover, Average nominal monthly earning, PZI, Population, Density of population, Ageing index, etc.

3.1 GDP and Production Efficiency

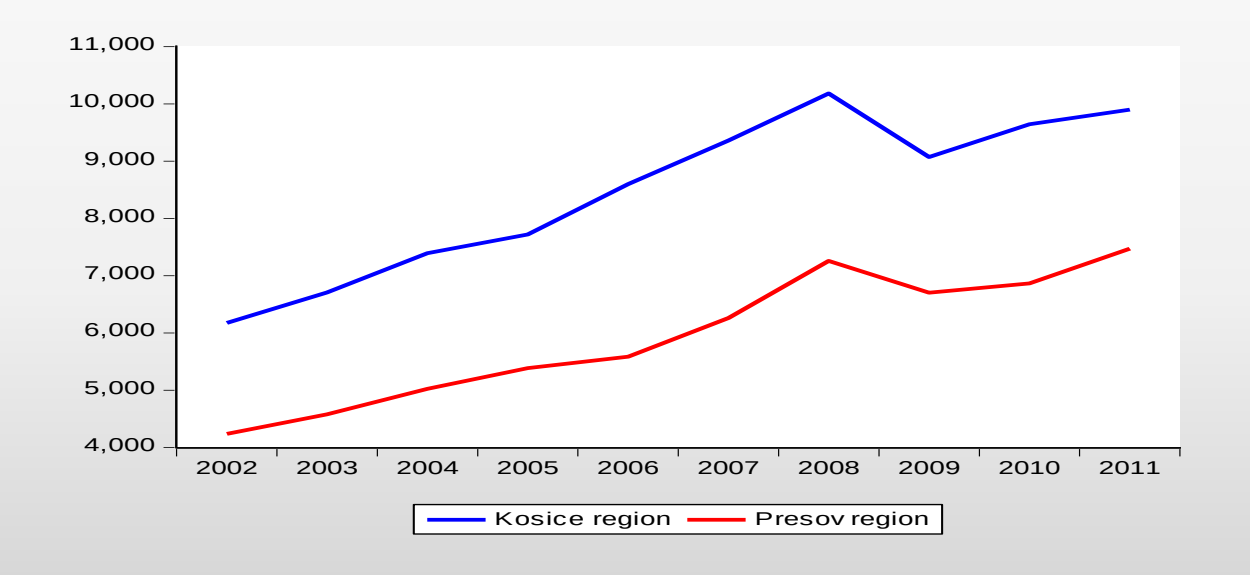
The first category of the traditional indicators, evaluated in this paper, was GDP and Production efficiency. From the perspective of economic performance measured by GDP represent regions of Košice and Prešov different variables. While the Kosice region is ranked second, respectively third place in the period, the performance of the Prešov region has always been in last place.

Tab. 1 GDP indicators

Indicators	GDP in PPS (c.p., mil. EUR, NUTS3)				GDP per capita in PPS (c.p., NUTS3)			
Year	**2002**	**2004**	**2009**	**2011**	**2002**	**2004**	**2009**	**2011**
Prešov region	5 425	5 868	7 934	9 003	6 800	7 400	9 900	11 100
Košice region	7 655	8 359	10 358	11 596	10 000	10 900	13 300	14 600
Slovakia	59 471	66 313	92 326	102 038	11 100	12 300	17 000	18 900

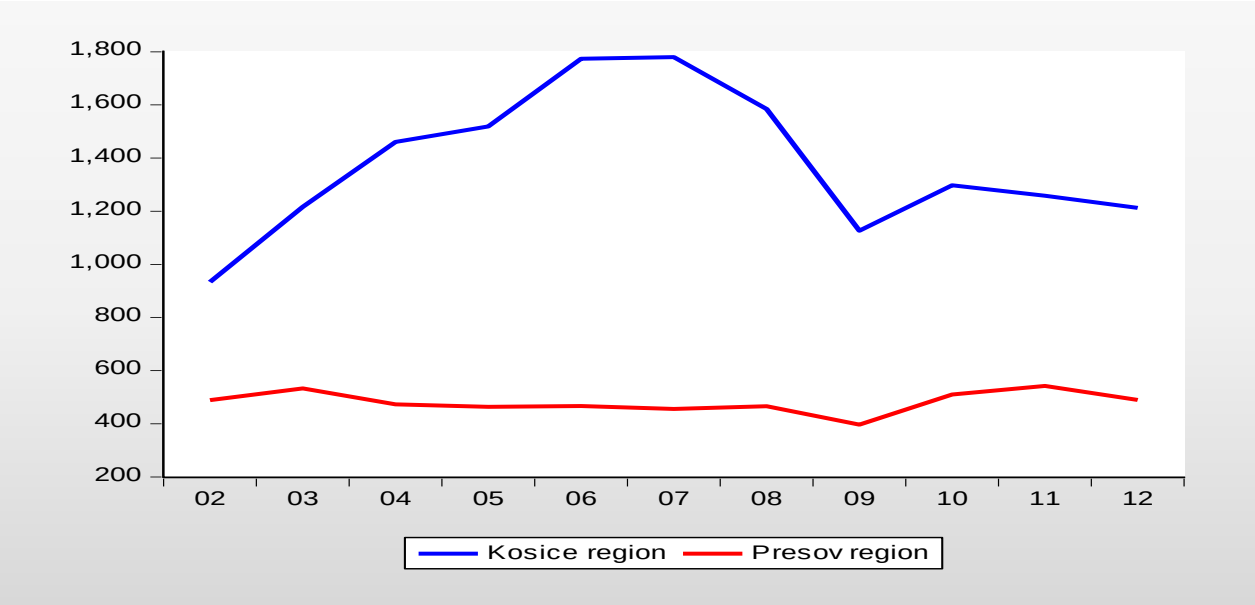
Source: EUROSTAT, 2014

The output of individual regions is different, but trends are developing in the similar way. In the periods of the decrease, it was noticeable that Prešov region took more time to recover. On the other hand the GDP in Košice region began to grow quickly, despite the fact that it did not achieved the value before the crises (Graph 1) at last the growth of GDP slowed down. During the whole term the GDP of Košice region was growing in average 5,6% and the GDP of Prešov region 6,7%.



Graph 1 GDP per capita in Presov and Kosice region (in c.p. mil.EUR), period 2002 - 2011
Source: EUROSTAT, 2014

A sudden changes and differences could be derived from the development of the value added in the regions in question (see Graph 2). There is unique predominance of Košice region. The Value added in Košice region was growing till 2007, Prešov region was only growing in first year of the analysed time span and later on it was decreasing slowly. In times of crisis to decrease in value occurred in both regions and in spite of repeated short-term increase in recent years again comes to a slow decline. Prešov Region maintains the volume of value added at about the same level. Košice region is true that after the crisis period level would have added value given only to the level of 2003-2004.



Graph 2 Regional Value added (mil. EUR), period 2002 - 2011
Source: EUROSTAT, 2014

It may be given by the composition of the enterprises that are active within that region e.g. U.S. Steel, etc. In times of crisis the value of this indicator declined in both regions. In 2011, similarly in Europe also in Slovakia, there was a revival of the economy and both regions were gradually returned to values prior to 2009.

Tab. 2 GDP indicators - continued

Indicators	GDP per capita in PPS as a share of EÚ 28 average (%)				Value added (mil. EUR, NUTS3)			
Year	**2002**	**2004**	**2009**	**2011**	**2002**	**2004**	**2009**	**2011**
Prešov region	34	34	42	44	488,65	472,91	396,67	542,22
Košice region	49	50	57	58	933,54	1 460,74	1 126,56	1 258,02
Slovakia	54	57	73	75	7 098,89	9 497,93	10 658,70	12 357,82

Source: EUROSTAT, 2014

Another indicator is an indicator of production efficiency. We used four sub-indices: Construction production per 1000 inhabitants - thereinafter - inhab., Turnover per 1000 inhab., FDI per 1000 inhab. and Average nominal monthly earning for its compilation. The development of four sub-indicators suggests that particularly in turnover and average monthly earnings are significant differences between regions. Again, this is related to the actual industrial structure of each region. Prešov region is in both parameters at the very end of the ranking and achieves values that are well below the national average. In contrast, the average monthly earnings in the region of Košice is the second highest in Slovakia, folowing the Bratislava region. Košice region maintained this position even during the crisis. However, Kosice region during the crisis cannot sustain the level of turnovers achieved at pre-crisis level. They declined slightly in 2009. Despite subsequent sales growth this has not been sufficient change and the region in this area began to lose significantly in comparison with other regions, reaching the third position from the end.

Tab. 3 Production efficiency indicators

Indicators	Construction production per 1000 inhab. (Mil. EUR)				Turnover per 1000 inhab. (Mil.EUR)				Average nominal monthly earning (EUR)			
Year	**2002**	**2004**	**2009**	**2011**	**2002**	**2004**	**2009**	**2011**	**2002**	**2004**	**2009**	**2011**
Prešov region	0,4	0,5	0,7	0,7	2,7	2,9	2,8	4,1	379,4	455,8	581,7	636,0
Košice region	0,5	0,5	0,9	0,9	6,0	7,6	7,4	9,5	520,1	636,3	796,2	878,0

Source: RegDat, 2014;RegDat1, 2014;

However, a long-term problem in this area is the volume of FDI. The problem is mainly for the Prešov region, which in this area lags behind other regions. In order to compare we present data, where in 2011 Košice region had only 5.5 times more FDI than had Prešov region in the same year. The lack of new resources that could flow through FDI into the Prešov region leads to its stagnation and falling behind not only in the individual sub-areas, but also in the overall productivity of the region. As shown in Table 4 both regions achieved during the period decrease in the overall indicator, but it is also very significant difference in value, which indicates a strong disparity between these regions.

Tab. 4 Production efficiency indicators - continued

Indicators	FDI per 1000 inhab. (Mil. EUR)				Indicator of production efficiency			
Year	**2002**	**2004**	**2009**	**2011**	**2002**	**2004**	**2009**	**2011**
Prešov region	0,2	0,3	0,5	0,6	25,7	28,6	25,5	22,1
Košice region	1,0	2,0	2,9	3,3	83,7	74,8	62,7	65,4

Source: NBS, 2014; own calculations;

3.2 Demography

The second category of the traditional indicators was demography. Demography is the necessary starting point for it gives a basic characteristic of the region, shown in Table 5 and 6. The changes taking place in Prešov and Košice region were not surprising. Let aside the basic indicators and point out the two interesting or the most influential indicators from this category (mainly Table 6).

Ageing index (Sauvys index) is calculated as the number of persons 60 years old or over, while understanding that there are young-old and old-old, per hundred persons under age 15. According to statistics, it is calculated that for 100 children there is 58 pensioners (elderly people) in Prešov region or 65 in Košice region. The two regions in question are rather young, but the trend is towards ageing population as in Slovakia the index is 83 elderly people for 100 children as for the data in the year 2012 (also afore mentioned data referring to the regions).

The lowest the value of Demographic window (or sometimes referred to as Index of economic burden) the better. Through this window authors (Kasprowicz, Rhyne, 2013) of publication called "Looking Through the Demographic Window: Implications for Financial Inclusion", were identifying the demand and supply of invisible market in 2020. They claim that in Slovakia the window is closed. Further they support the argument that young generation must be flexible at the labour market by obtaining a good education and skills. Not forgetting the old generation that should be supported, this is explained by other traditional indicators. Prešov region and Košice region are similar in this index achieving 41, while Slovakia 39. This indicator is decreasing in the time span from 2002-2011. Thus this seems to give a positive sign about the development. It is rather a sign, because the unemployment rate is high and it is not sure that one person living in one of the regions needs to work for his - hers needs and plus the fraction of 0.41 more to supply unproductive portion of population.

Tab. 5 Demography indicators

Indicators	Population (thous. persons)				Density of Population (per square km)				Crude Rate (change per 1000 persons)			
Year	**2002**	**2004**	**2009**	**2011**	**2002**	**2004**	**2009**	**2011**	**2002**	**2004**	**2009**	**2011**
Košice region	767,9	773	786,6	789,6	113,7	114,5	116,4	116,9	1,8	2,2	3,5	3
Prešov region	792,4	794,5	796,7	799,1	88,1	88,7	90,2	90,5	3,8	4	5,1	4,5

Source: Eurostat1,2,3,4,,

The overall demography situation was evaluated by the indicator of demography profile throughout the years 2002, 2004, 2009 and 2012, in Table 6. Before crisis the changes were rather incremental and so it was after the crisis. Demography does not seem to be influenced by

crisis so far. Prešov region is stagnating and Košice region is better off in 2011. The causes for this could be hidden and looked for in various hypotheses.

Tab. 6 Demography indicators - continued

Indicators	Ageing Index (%)				Demography Window (%)				The indicator of the demography profile			
Year	**2002**	**2004**	**2009**	**2011**	**2002**	**2004**	**2009**	**2011**	**2002**	**2004**	**2009**	**2011**
Košice region	52,8	56	63,7	65,3	44,7	42,9	40,8	41	33,1	33,9	32,1	39,7
Prešov region	44,8	48	56,5	58,7	48,7	46,5	42,2	41,9	31,6	32,4	29,7	29,7

Source: Eurostat1,2,3,4,

3.3 Labour Market

The third category of the traditional indicators was labour market. The category includes employed and unemployed measurements recalculated per hundred of inhabitants as well as for the following measurements of the entrepreneurship activities. Those activities are done either within the scope of so-called legal persons or free lacers (natural persons).

Employment in Košice region was growing and reached its peak in 2009, as seen in Table 7. Prešov region was also improving gradually till 2009 and after the crisis a drop in employment was noticeable. All of this was reflected in the complementary indicator of unemployment, which was rising after the crisis. Similar economic evaluation was provided by Rusnák, Bystrická (2010) linked with the structure of economy. The authors are agreeing that for evaluation of smaller regions an economic aggregate different from Gross Domestic Product (GDP) is useful. In this paper the index of economic structure progressivity was used based on employment. The optimum in this index is maximum, which is to be found before crisis in year 2002 for both regions in Table 8. After the crisis the employment in tertiary sector was decreasing rapidly, in Košice region from 75% to 50% and in Prešov region from 73% to 47%, both changes from 2008 and 2009. This situation people at labor market tried to solve by taking chances in secondary sector, where the employment had risen moderately 24% to 49% in Prešov and 22% to 48% in Košice region, both changes from 2008 and 2009. It might be useful to see also other calculations for instance based on Lilien index (Lilien,1982), which is an inspiration for further work as was done earlier by Čutková, Donoval (2004).

Tab. 7 Labour market indicators

Indicators	Employees per 100 inhab. (thousands)				Unemployed per 100 inhab. (thous. persons)				Legal persons per 100 inhab. (number)			
Year	**2002**	**2004**	**2009**	**2011**	**2002**	**2004**	**2009**	**2011**	**2002**	**2004**	**2009**	**2011**
Košice region	44,8	45	51,1	49,9	14,3	15,2	9,4	12,2	2	2,4	3,4	3,9
Prešov region	41,6	41,4	46,6	45,4	10,6	12,4	9,1	9,9	1,6	1,9	2,9	3,2

Source: RegDat 2,7,8,9,10, Note: own calculations

In overall evaluation Prešov region was hit by crisis more than Košice region, which even seemed to have gained on crises (Table 8). Again the causes for this could be hidden and looked for in various hypotheses, such as better development of ICT sector in Košice region.

Tab. 8 Labour market indicators – continued

Indicators	Natural persons per 100 inhab.				Index of economic structure progressivity				The indicator of the labor market			
Year	**2002**	**2004**	**2009**	**2011**	**2002**	**2004**	**2009**	**2011**	**2002**	**2004**	**2009**	**2011**
Košice region	5,5	6,5	7,2	6,9	345,2	347,9	298	306	36	42,17	50,2	65,4
Prešov region	5,4	6,9	8,7	8,5	337,8	342	291,4	298,7	43,3	49,77	36,1	46,6

Source: RegDat 2,7,8,9,10 Note: own calculations

4 Evaluation of Košice and Prešov Region in the Context of the Modern Indicators

4.1 Modern indicators at labour market

To continue with labour market analysis, it was decided to construct new indicators. They should reflect modernity in respect to use of employees' skills already described in Koľveková, Svrčeková (2012). High skilled employees (ISCO-08: groups 1, 2, 6, 7) and Low skilled employees (ISCO-08: groups 3, 4, 5, 8, 9, 10) were examined in regions as shown in Table 9.

Evaluation of shift in skills was carried out with help of indices, which provided better information in Table 10. Information and message was that in Košice region the Low skilled jobs openings were increasing within the time period of 2002 and 2011 and High skilled jobs decreased, but the overall index is even after the crisis rather favorable. Prešov does not differ in the structure of skills very much during the examined time span.

Tab. 9 Labour market indicator for skills

Indicators	Green Jobs (persons)				High skilled employees (persons)				Low skilled employees (persons)			
Year	**2002**	**2004**	**2009**	**2011**	**2002**	**2004**	**2009**	**2011**	**2002**	**2004**	**2009**	**2011**
Košice region	8050	6573	7086	5836	51151	47511	56318	62183	85784	82794	112352	136944
Prešov region	7586	5769	4802	4618	47420	44998	44398	53776	75776	73526	94180	105920

Source RegDat 3,4,5,6,11,12 Note: own calculations, Note: Green Jobs – 2009 there was a change in statistical categories of differentiation of these sectors

It only differs in the overall indicator of skills at labour market, which is less favorable. We may assume this could have been possibly caused by Green Jobs (classified by NACE) closings or more trustworthy explanation was the change in the statistical differentiation of the green jobs.

Tab. 10 Labour market indicator for skills – continued

Indicators	Index of Low Skilled Employees (%)				Index of High Skilled Employees (%)				Indicator of skills at labour market			
Year	**2002**	**2004**	**2009**	**2011**	**2002**	**2004**	**2009**	**2011**	**2002**	**2004**	**2009**	**2011**
Košice region	62,6	63,5	66,6	68,8	37,4	36,5	33,4	31,2	16,4	17,59	77,9	56,7
Prešov region	61,5	62	68	66,3	38,5	38	32	33,7	14,8	16,45	10,1	41,2

Source: RegDat 3,4,5,6,11,12 Note: own calculations

4.2 Comprehensive indicator of infrastructure (CII)

A relatively new indicator assessment can include the indicators of use or availability of information and communication technologies. When we are evaluating the intellectual capital facilities we note that the Prešov region is better than Košice region. But even here it is necessary to doubt and reconsider whether it is so. It is true, according to statistics, that in the Prešov region has access to a computer at home a larger percentage of households as in the Kosice region. The same conclusion applies to the availability to access the internet from home. From this perspective, we can say that the Prešov region has enough capital, but which has not yet been reflected in other indicators.

On the other hand, the region has a large number of public payphones that in today's era of mobile phones are not used and there is a strong presumption that their numbers will be shortly reduced significantly. The same is true about the number of fixed telephone lines. Positive for the Prešov region is rapid growth of road length mentioned in the report Prešov region, which may have a positive impact on its further development. It also can have a positive influence on the economic development in the Košice region. In the long-run it is also expected a positive impact of the growing network of water and sewer pipes, which is thus allowing a larger part of the population to increase their standard of living.

Tab. 11 CII indicators

Indicators	Indicator of ICT				Indicator of network connection				Indicator of transport			
Year	**2002**	**2004**	**2009**	**2011**	**2002**	**2004**	**2009**	**2011**	**2002**	**2004**	**2009**	**2011**
Prešov region	66,8	72,3	67,7	67,2	67,8	67,4	76,7	77,3	66,7	65,1	65,0	65,6
Košice region	79,5	69,4	66,7	61,2	69,7	66,3	69,2	68,2	70,3	68,1	60,3	59,3

Source: Statistical Office of SR, own calculations

When creating a comprehensive indicator of the infrastructure, we worked with the three partial indicators. Partial indicators were made up of the following sub-indicators:

- Indicator of ICT – Number of Main Telephone Lines, Number of ISDN Telephone Lines, Number of Public Payphones, Household with computer (% of all households) and Households with access to the Internet at home (% of all households)
- Indicator of network connection - Length of water-supply systems (km), Length of sewage systems (km), Number of people supplied by water from public water-supply system, Number of the people connected up to public sewage system
- Indicator of transport - Passenger cars (thousands), Length of the roads (km)

The resulting value of the comprehensive indicator is the arithmetic mean of the values of partial indicators. In conclusion, we can state that among the monitored indicators is the complex indicator of the infrastructure one of those, in which Prešov region ranked better than Košice region during the entire period. Both regions have reached high values of the indicator (more than 60 points), which is a positive characteristics.

Tab. 12 CII indicators - continued

Indicators	Complex indicator of infrastructure							
Year	**2002**	**Order**	**2004**	**Order**	**2009**	**Order**	**2011**	**Order**
Prešov region	67,1	2	68,3	2	69,8	2	70,0	1
Košice region	73,2	1	67,9	3	65,4	3	62,9	3

Source: own calculations

5 Conclusions

The evidence gathered in the indicators provides reader with situation in NUT3 regions in Slovak republic. New perspective was given by use of composite indicators for different categories. During the evaluation we have used several indicators in an effort to point out the disparities between two neighbouring regions.

First, GDP as an overall evaluation of economic activity did not provided any unexpected results. Better close up was achieved by the production efficiency indicators, which showed that FDI possibly could be the cause of the falling behind in the regional development in Prešov region and can subsequently lead to commuting of workers further to Košice region.

Second, Ageing index is still favourable for both regions, while the index of economic burden is almost the same for both regions. However two points negative difference compared to overall evaluation in Slovakia. Labour market index of economic structure progressively pointed out the effect of transferability of the skills between sectors as already mentioned the employment in tertiary sector decreased, while secondary sector increase (although in moderate proportion in respect to the former one. We would like to emphasise that Košice region seemed to have gained on crises according ot the indicator of the labour market (substantially). Skills shift was noticed also in separate evaluation the shifts itself should be studied more carefully for the results were somewhat less consistent. Specific category was labour market and skills shift. Skills were shedding more light on changes after the crisis as well as the Index of the economic structure progressivity. Combining those two, the crisis was having substantial influence on economics. These influences, though, might had also positive effects, i.e. people were able to cope with the changes the crisis had brought about. Most probably they were learning (how to establish their own business either as legal or natural person - also within the KEGA project acknowledged below) and adapting new behaviours, which might be researched further.

Third, we note that in the case of Comprehensive Indicator of Infrastructure (CII) the difference between regions is small and now comes out in favour of Prešov region. On the other hand, in the case of Indicator of Production Efficiency and Indicator of Value Added the differences are very big and are to the disadvantage of the Prešov region significantly. This situation creates conditions for a strong stagnation and backwardness of the Prešov region which may negatively be influencing the development of the overall economy in the long term.

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