# Social Disparities in Relation to Sector Specialization

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**Abstract:** *One of the main objectives of the European Union is decreasing of the differences (disparities) between European Union's regions. The unemployment, employment, GDP, etc. belong to constantly monitored disparities. This paper is devoted to sometimes a little neglected disparities namely those in the social sphere. The aim of the paper is to measure regional disparities in the social sphere by two integrated indicators (health condition and social facilities) and point methods. The results of measuring of the regional disparities will be related to sector specialization. The measuring will be done in four regions of the Czech Republic – the Hradec Králové Region, the Pardubice Region, Ústí Region and the Moravian-Silesian Region in 2011.*

**Keywords:** *regional disparities, health condition, social facilities, point method, localization quotient.*

## 1. INTRODUCTION

The European Union (EU) under the objective Cohesion emphasizes balanced development that reduces differences (disparities) between the regions. Despite of the EU efforts to continuously reduce disparities between regions, there are still significant differences between them. Regional disparities are manifested in different conditions of life as well as in unequal economic and development potential. Regional disparities help to improve the state of knowledge about regions and their competitive position relative to other regions. Evaluate what the overall level of regions and what conditions offer for life and the social, economic and environmental perspective (Hučka, Kutscheraurer, 2011).

This paper is devoted to the issue of above mentioned regional disparities in the social sphere. For the measuring there will be used integrated indicators "health condition" and "social facilities". The measuring will be done in four regions of the Czech Republic (CR) – the Hradec Králové Region (HKR), the Pardubice Region (PR), the Ústí Region (UR) and the Moravian-Silesian Region (MSR). These regions were chosen due to the Hradec Králové and the Pardubice Regions are known as the regions "good for life" and the Moravian-Silesian Region and the Ústí Region are contrast to them. The first two regions often win in some competition as the best places for life. The Moravian-Silesian Region and Ústí Region belong to the "worst" regions of the CR. There is high unemployment, low level of education, high migration, high criminality etc. In this paper there are determined disparities in the social sphere in relation to sector's specialization. The sector's specialization could be determined by a localization quotient. The localization quotient for employing in the sector of social and health care will be calculated. We assume that in region where the social facilities and health condition are good, the specialization in this sector is higher than in worse regions.

## 2. THEORETIC BACKGROUND AND METHODOLOGY

This chapter is devoted to the theoretic background of the regional disparities, the point method and the location quotient.

### 2.1. Regional Disparities

There exist a lot of definitions of terms of disparity and regional disparity in theoretical literature. Regional disparities by Karin Vorauer (1997) Under „*Regional disparities we understand deviations from any conception reference division of characters taken as relevant, in association with different spatial benchmark levels (region borders).* " The Molle (2007) approach significantly contributes to objective concept of regional disparities. He says that the key question the policies of European Union come from is the question of cohesion (coherence) and a lack of cohesion is measured by disparities

size. Regional disparities primarily help the citizens to raise awareness of the region and their position relative to other regions. Due to them it is possible to determine the differences between entities of the regions, their performance, structure, activities, etc. The focus here is primarily on what the total level of regions is and what the region offers for living conditions of its inhabitants namely from the social, economic and environmental point of view (Hučka et al, 2011). Viturka (2008, 2010) and Skokan (2011) devoted their researches of the regional disparities too.

Kutschenaurer et al. (2010) in his monograph divided regional disparities into three areas and to the economic, social and territorial. They defined the second level of classification of social sphere as: inhabitants, social facilities and social pathology. For the measuring of the regional disparities we used two integrated indicator from social sphere – the health condition and the social facilities. These indicators consist of these descriptors:

- Health condition: life expectancy at birth (male), life expectancy at birth (female), the average percentage of incapacity, the incidence of neoplasm per 100 thousand inhabitants.

- Social facilities: number of doctors per 10 thousands inhabitants, number of hospital beds per 10 thousand inhabitants, number of places in social care organizations per 10 thousand inhabitants, number of leisure centres for children and youth per 10 thousand inhabitants (Fachinelli and Tománek, 2011).

For the measuring of the regional disparities authors do not use the descriptor number of leisure centers for children and youth per 10 thousand inhabitants because the data of these descriptors did not available.

### 2.2. Point Method

In this paper there will be used the point method, whose method of calculation for integrated indicators Tuleja (2009) elaborated in his paper. Melecký and Staníčková (2011) used this method in their research too, where they used it for measuring of the competitiveness of the NUTS 2 regions.

The point method is one way of measuring of regional disparities. Tuleja (2009) in his paper states that the author of the point method is Bennet. One advantage of the point method is its ability to summarize characteristics captured in different units of measurement in one synthetic characteristic. The result is a dimensionless number that does not possess a real sense, but it can be used either to determine the rank of the regions or to determine the regional differences that are associated with different categories of indicators. Specific form for using the point method is to determine the economic value of the index of regional disparities using weighted average of points (1) that each region will receive for the relevant indicators.

$$EI_{RD} = \frac{1}{p} \sum_{i=1}^{p} \frac{x_{ij}}{x_{i\max}}, \frac{x_{i\min}}{x_{ij}}$$

(1)

Where,

$x_{ij}$ - represents the ith variable for the jth region,

$x_{max}$ - represents the maximum value of the ith indicator,

$x_{min}$ –represents the minimum value of the ith indicator (Tuleja, 2011).

### 2.3. Location Quotient

First introduced by Florence (1939), the location quotient is often employed to quantify industrial concentration in regions. The location quotient (LQ) is a technique that allows for the comparison of local area characteristics such as employment rates to the national characteristics (Robinson, 1998). This technique has been widely used by economic geographers and regional economist since 1940 (Miller et al., 1991). The location quotient, the commonly employed measure of regional industrial agglomerations, was as an estimator derived from Ellison and Glaeser (1997). The location quotient has long been applied to estimate the strength of regional economic impacts and export (economic-base) activities (Isserman, 1977b; Isserman, 1980).

Location quotient purports to reveal distinct specializations in regional activities based on natural assets like coastal locations, along with other comparative and competitive advantages, including the

positive agglomeration economies of existing local industry clusters. Obviously, they must reflect firm location decisions. Yet, as stressed by Duranton and Overman (2005), industry location is in part a random phenomenon.

A location quotient is a way of measuring the relative contribution of one specific area to the whole for a given outcome. Let $x_i$ and $n_i$ denote the outcome and population size of the $i^{th}$ are. The location quotient for the $i^{th}$ area is defined in this equation (2).

$$lq_i = \frac{\dfrac{x_i}{n_j}}{\dfrac{x}{n}} = \frac{r_i}{r} \qquad (2)$$

Here $r_i$ and $r$ are dependent rates therefore $lq_i$ is the ratio of two dependent random variables (see Moineddin et. al., 2003).

The problems associated with this method have been discussed in the literature for decade. Norcliffe (1982) develops an excellent synopsis of both theoretical considerations and empirical evaluations. He finds the theoretical basis to be sound and explains that the differences in empirical evaluations between the LQ methodology and other methods system from problems in the LQ methodologies used. Empirical evaluations of accuracy by Tiebout (1962), Greytak (1969), Leigh (1970), Gibson and Worden (1981), and Mathur and Rosen (1974) indicate varying degrees of underestimation of economic base with a resultant overestimation of multipliers. Techniques to correct the sources of this underestimation of export base are developed by Isserman (1977a, 1977b) who demonstrates that disaggregation of industries to the three and four digit SIC level and inclusion of service and government exports will lessen these biases. He also recommends a bracketing approached by Norclifffe (1982) who incorporates national consumption data to correct the tendency of the LQ technique to underestimate the level of basicness of those regional industries in which the nation is an exporter.

Richard and Jacobson (1996) focused their research on adjustment of localization quotient. They pared the core areas from the denominator and recalculate the location quotients for the industries in peripheral places, where they obtained location quotients whose size and standard deviations indicate trading more fully. This is very interesting approach, which unfortunately is not usable for this paper because authors do not have all regions of the Czech Republic but only a few which authors cannot divided into peripheral and core areas. Another interesting modification of localization quotient is by Zheng et al., (2011). Authors approached the LQ as FLQ which involves not only the relative size of supplying and purchasing sector but also the regional size. As the meaning as LQ, FLQ also reflect the degree of industrial geographic concentration, it differs importantly in that FLQ considers the effect of regional size.

In this paper authors used simple location quotient for specialization in the sector – social and health care. According Stejskal and Kovárník (2009) is used the edited equation (3).

$$lq_i = \frac{\dfrac{z_i}{z}}{\dfrac{z_j}{z}} \qquad (3)$$

Where:

$z_i$ – the number of employees in the sector $i^{th}$ in the region,

$z$ – the number of employees in the region,

$Z_i$ – the total number of employees in the sector $i^{th}$ in the higher level,

$Z_j$ – the total number of employees in the higher level.

The value of lq higher than 1 is pointing out the specialization in the sector i in the region, i.e. in this sector there are employed more workforce than on the higher level (in our case in the Czech Republic).

### 3. MEASURING OF REGIONAL DISPARITIES AND LOCATION QUOTIENT

For the next analysis will be used data by the Czech Statistical Office (CSO) in 2011 and the data by the Health Information and Statistics of the Czech Republic (HISCZ). More recent data was not available for the descriptors.

#### 3.1. Data of Regional Disparities

Table 1 shows the values of descriptors of social facilities. The Hradec Králové Regions is the best in two of the descriptors. The worst situation is in the Pardubice Region. Authors expected that the worst situation in social facilities would be in the Moravian-Silesian Region or the Ústí Region, but it was not.

**Tab1.** *Social facilities in 2011*

| Social facilities | HKR | PR | MSR | UR |
|---|---|---|---|---|
| Number of doctors per 10 thousands inhabitants | 44.93 | 38.91 | 39.94 | 34.68 |
| Number of hospital beds per 10 thousand inhabitants | 62.56 | 50.04 | 51.05 | 61.69 |
| Number of places in social care organizations per 10 thousand inhabitants | 75.25 | 78.60 | 82.22 | 100.53 |

**Source:** *Own proceeding according data by CSO*

Table 2 represents values of indicator the health condition. The best situation was in this case in the Pardubice Region in two descriptors – the average percentage of incapacity and in the incidence of neoplasm. In this indicator the worst social situation was in the Moravian-Silesian Region, which had the worst values for two descriptors – life expectancy at birth (male) and the average percentage of incapacity. These descriptors have relation with heavy industry in the Moravian-Silesian region. Especially the mining industry has negative impact on life expectancy of miners and work incapacity related to this profession.

**Tab2.** *Health condition in 2011*

| Health condition | HKR | PR | MSR | UR |
|---|---|---|---|---|
| Life expectancy at birth (male) | 75.47 | 74.84 | 72.71 | 76.46 |
| Life expectancy at birth (women) | 81.33 | 80.34 | 79.86 | 78.70 |
| The average percentage of incapacity | 3.63 | 3.14 | 4.26 | 3.60 |
| The incidence of neoplasm per 100 thousand inhabitants | 633.50 | 568.70 | 575.8 | 605.70 |

**Source:** *Own proceeding according data by CSO and HISCZ*

#### 3.2. Rank According Calculation

For measuring regional disparities there was used the point method. In the first step it was necessary to divide those indicators for which the optimal value is called value of the maximum and for which the optimal value is called the minimum value. Furthermore, there was calculated the maximum (for number of doctors, number of hospital beds, number of places in social care organization, life expectancy) and minimum (the average of percentage of incapacity, the incidence of neoplasm) value in all regions. Finally there was formed converted table, where in the case of the minimum values there was divided the criterial value by the actual value, and this proportion was multiplied by the 1000. In the case of the maximum values there was divided the actual value by the criterial value and the percentage multiplied by the 1000 (see Tab. 3 for social facilities and Tab. 4 for health condition).

**Tab3.** *Max values – Social facilities*

| | HKR | PR | MSR | UR |
|---|---|---|---|---|
| Number of doctors per 10 thousands inhabitants | 1000 | 866 | 889 | 772 |
| Number of hospital beds per 10 thousand inhabitants | 1000 | 800 | 816 | 986 |
| Number of places in social care organizations per 10 thousand inhabitants | 749 | 782 | 818 | 1000 |

**Source:** *Author's calculations*

**Tab4.** *Max values - Health condition*

| | HKR | PR | MSR | UR |
|---|---|---|---|---|
| Life expectancy at birth (male) | 987 | 979 | 951 | 1000 |
| Life expectancy at birth (women) | 1000 | 988 | 982 | 968 |
| The average percentage of incapacity | 867 | 1000 | 737 | 872 |
| The incidence of neoplasm per 100 thousand inhabitants | 898 | 1000 | 988 | 939 |

**Source:** *Author's calculations*

Tab. 5 and Tab. 6 show the average values which could be described as an economic index of regional disparities. These values were calculated by averaging the values mentioned in the tables 3 and 4. On the basis of the average values there were established ranks of the regions. According to the Tab. 5 we can see that the Usti Region is the best region in the social facilities. In contrast, the Pardubice Region is the worst region in the social facilities in average according to point method.

**Tab5.** *Rankings of regions - Social facilities*

|  | HKR | PR | MSR | UR |
|---|---|---|---|---|
| The average values of social facilities | 927 | 904 | 878 | 932 |
| Rankings of regions | 2 | 4 | 3 | 1 |

**Source:** *Author's calculations*

Tab. 6 shows the rankings of regions in health condition. The Pardubice Region is now the best region and the Moravian-Silesian Region is the worst. In the average of both of these indicators the best region is the Usti Region and the worst the Moravian-Silesian Region. Authors expected that the best region will be the Pardubice or the Hradec Králové Region because the Moravian-Silesian and the Usti Region are regions with the high economics problems (unemployment, GDP, migration) which are connected with social problems.

**Tab6.** *Rankings of regions – Health condition*

| Health condition | HKR | PR | MSR | UR |
|---|---|---|---|---|
| The average values of health condition | 927 | 992 | 902 | 935 |
| Rankings of regions | 3 | 1 | 4 | 2 |

**Source:** *Author's calculations*

### 3.3. Location Quotient

Authors calculated the localization quotient for employment in the sector of social and health care. For calculation they used the data from Tab. 7.

**Tab7.** *Employment in the regions*

|  | HKR | PR | MSR | UR |
|---|---|---|---|---|
| Number of employees in social and health care in the region | 18.67 | 15.82 | 39.50 | 24.20 |
| Total number of employees in the region | 252.19 | 238.31 | 540.70 | 362.96 |
| Total number of employees in social and health care in the CR | 324.80 | 324.80 | 324.80 | 324.80 |
| Total number of employees in the CR | 4872.41 | 4872.41 | 4872.41 | 4872.41 |

**Source:** *Author's calculations*

Table 8 shows the results of the localization quotient. If the value of the localization quotient is higher than 1, the specialization in the sector of social and health care is in the region higher than in the CR. Authors expected that if the social facilities and health conditions are good, the specialization in this sector is higher. The best situation was in the Usti Region and the LQ – UR was 1.000 (more than 1 – higher specialization). In contrast to that, the worst situation in social facilities and health care (average of both of them) was in the Moravian-Silesian Region. The LQ – MSR was 1.096. It was higher specialization than in the Usti Region and higher than in the CR. The lowest specialization was in the Pardubice Region (LQ–PR - 0.996) and the highest specialization was in the Hradec Králové Region (LQ-HKR – 1.111) and both of these regions were in the middle of our rating. Based on these results authors could not confirm their expectation that if the social facilities and health condition are good in the region, the specialization in the sector will be high.

**Tab8.** *Results of LQ*

| LQ - HKR | 1.111 |
|---|---|
| LQ - PR | 0.996 |
| LQ - MSR | 1.096 |
| LQ - UR | 1.000 |

**Source:** *Author's calculations*

## 4. CONCLUSION

The EU under the objective Cohesion emphasizes the balanced development that reduces differences between the regions. This paper dealt with the differences in social sphere by using integrated indicators namely health condition and social facilities.

The aim of this paper was measuring the regional disparities in social sphere in the four regions of the Czech Republic namely the Hradec Kralové Region, the Pardubice Region, the Ústí Region and the Moravian-Silesian Region and comparing them in relation to sector specialization. The measuring was performed using the point method and the integrated indicators social facilities and health condition. On the base of the point method there was determined the rank of the region. Unexpectedly the Ústí Region had the best ranking in the integrated indicators all together. The second place belonged to the Hradec Králové Region. The Moravian-Silesian Region belongs to the very problematic regions and this analysis confirmed it. Its average values were the worst.

The conclusion of this paper was devoted to the localization quotient. The location quotient is a technique that allows for the comparison of local area characteristics such as employment rates to the national characteristics. Authors used this quotient for measuring sector specialization in employment in the social and health care. Authors expected that if the social facilities and health conditions are good (respectively their integrated indicators), the specialization in this sector will be high. The best situation was in the Ústí Region and the LQ–UR was 1.000. In contrast to that, the worst situation in all indicators was in the Moravian-Silesian Region. The LQ-MSR was 1.096. It was higher specialization than in the Ústí Region. The higher specialization than in the Moravian-Silesian Region was only in the Hradec Králové Region (LQ-HKR – 1.111). Author's expectation was that the values of LQ – MRS would be under the 1 or under the region with better social situation as the Ústí, the Hradec Králové and the Pardubice Regions but it was not confirm.

## REFERENCES

CSO. *Regional time series*. [online]. [10.10.2014]   Available from: http://www.czso.cz/csu/redakce. nsf/i/regionalni_casove_rady.

Duranton, G., H. Overman, 2005. Testing for localisation using micro-geographic data. *Review of Economic Studies* 72(4), 1077-1106.

Ellison, G., E. Glaeser, 1997. Geographic concentration in U.S. manufacturing industries: A dartboard approach. *Journal of Political Economy* 105 (5), pp. 889-927.

Fachinelli, H., P. Tománek, 2011. Hodnocení regionálních disparit prostřednictvím integrovaných indikátorů. Regionální disparity. *Electronic journal*, pp. 31-44.

Florence, P.S., 1939. *Report on the Location of Industry*. Political and Economic Planning. London, U.K.

Gibson, L., J., M.A. Worden, 1981. Estimating the Economic Base Multiplier: A Test of Alternative Procedures. Economic Geography, 57, pp. 146-159.

Greytak, D., 1969. A Statistical Analysis of Regional Export Estimating Techniques. *Journal of Regional Science*, 9, pp. 387-395.

HISCZ. *Data Presentation System – aktualizace dat*. [online]. [18.2.2015]   Available from: http:// www.uzis.cz/zpravy/data-presentation-system-aktualizace-dat.

Hučka, M., A. Kutscheraurer, 2011. Teoreticko-metodické otázky regionálních disparit. Regionální disparity. *Electronic newspa*per, pp. 20-30.

Isserman, A. M., 1977a. A Bracketing Approach for Estimating Regional Economic Impact Multipliers and a Procedure for Assessing *Their Accuracy. Environmental Planning* A, 9, pp. 1003-1011.

Isserman, A. M., 1977b. The location quotient approach to estimating regional economic impacts. *Journal of the American Planning Association* 43 (1), pp. 33-44.

Isserman, A. M., 1980. Estimating export activity in a regional economy: a theoretical and empirical analysis of alternative methods. *International Regional Science Review* (2), 155-184.

Kutscheraurer, A. et al., 2010. Regionální disparity. Disparity v regionálním rozvoji země – pojetí, teroie, identifikace a hodnocení. Ostrava: EkF VŠB-TU. *Research project* No. WD-55-07-1, 2010, pp. 175-177.

Leigh, R., 1970. The Use of Location Quotients in Urban Economic Base Studies. *Land Economics*, 48, pp. 202-206.

Mathur, V.K. and H.S. ROSEN, 1974. Regional Employment Multipliers: *A New Approach. Land Economics*, 50, pp. 93-96.

Melecký, L., M. Staníčková, M, 2011. Hodnocení konkurenceschopnosti regionů České republiky v kontextu Lisabonské strategie, *Ekonomická revue - Central European Review of Economics Issues*, VŠB - TU Ostrava, Ekonomická fakulta, pp. 183-200.

Miller, M.M., L.J. Gibson, and N.G. wright, 1991. Location Quotient: A Basic Tool for Economic Development Analysis. *Economic Development Review* 9(2), pp. 65-68.

Moineddin, R., J.beyene, and E. Boyle, 2003. *On the Location Quotient Confidence Interval*. Vol. 35, No. 3, the Ohio State University.

Molle, W. European Cohesion Policy. London: Routledge, 2007.

Norcliffe, G.B., 1982. Using Location Quotients to Estimate the Economic Base and Trade Flows. *Regional studies*, 17 no. 3, pp. 161-168.

Richard S.M. and D.S. JACOBSON, 1996. Core periphery analysis of the European Union: a location quotient approach. *The Journal of Regional Analysis & Policy*, 26 (1), pp. 3-21.

Robinson, G.M., 1998. *Methods α Techniques in Human Geography*. Toronto: John Wiley & Sons.

Skokan, K., 2011. Regional disparities and the ways of their measurement; the case of the Visegrad Four countries. *Technological and Economic Development of Economy* (Jimp, IF=3,235). Vilnius: Gediminas Technical University.

Stejskal J., J. Kovárník., 2009. *Regionální politika a její nástroje*. Prague, Portál, pp. 170-171.

Tiebout, C., 1962. *The Community Economic Base*. New York Commitee for Economic Development.

Tuleja, P., 2009. Možnosti měření regionálních disparit – nový pohled. *Regionální disparity: Working Papers* No. 5. Ostrava: EkF VŠB-TU. pp. 62-70.

Tuleja, P., 2011. Měření regionálních disparit – pohled zpět. *Regionální disparity. Working Paper*s No. 8. Ostrava: EkF VŠB-TU, 2011. pp. 55-67.

Viturka, M., 2008. Disparity v regionálním rozvoji. In *Analýza regionálních a mikroekonomických aspektů konkurenceschopnosti*. Brno: CVKS ESF MU, pp. 4-15.

Viturka, M., 2010. *Regionální disparity a jejich hodnocení v kontextu regionální politiky*. Geografie, Praha: ČGS, 15, no. 2, pp. 131-143.

Vorauer, K., 1997. *Europäische Regionalpolitik Regionale Disparitäten. Theoretische Fundierung, empirische Befunde und politische Entwürfe*. Passau: Münchener Geographische Hefte.

Zheng, L., T.A. flegg, and X. Deng, 2011. Regional specialization: a measure method and the trends in China. *MPRA Paper No*. 33867, posted 2.

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