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IMPACT OF EUROPEAN INTEGRATION ON COMPETITIVENESS OF CZECH REGIONS

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Abstract. Economic integration supports removal of all obstacles (in economy, trade, tax, administration or industrial area) and establishment of common rules for market competition. Basic benefit of economic integration is thus occurrence of real or potential competitiveness effects. European integration can influence competitiveness of firm, regions or countries. There are existing agglomeration forces causing space and economic concentration and disperse forces working just opposite way. Both effects are influenced by access to a single market and removal of trade barriers. As a consequence, agglomeration effects are expected to dominate. European Commission established RCI (Regional Competitiveness Index) to enable comparison of competitiveness of European regions. Aim of this study is exploration of changes in competitiveness of Czech regions after accession to the European Union as there are no studies analysing regional competitiveness in Czech Republic as a consequence of European integration process via index based approach. Analysis of z statistics of primarily data published by European Commission is used to evaluate theoretical concept of disperse and agglomeration forces. Based on RCI analysis are obvious growing discrepancies with dominant position of Prague and Central Bohemia in comparison with other Czech Regions. Significant differences can be seen in areas of innovations, business sophistication and education. On the opposite, positively can be evaluated lower variability of competitiveness between Czech regions in indicators of infrastructure, institutions and technological readiness. Those indicators could be influenced by European cohesive and regional politics. Decisions on governmental level should follow Europe 2020 strategy and transformation to knowledge based economy.

Keywords: European, economic, integration, regional, competitiveness, index.

JEL Classification: O18, O19.

1. Introduction

Many studies and research papers emphasize increasing difference between capital cities and other regions in countryside. Hence this research is conducted to study via Regional Competitiveness Index changes in competitiveness of Czech regions (mostly Prague and

Central Bohemia and rest of Czech Republic) where are obvious significant difference in many areas and aspects. Contribution of the study can be found in comparison of Czech regions based on RCI and identification of key areas of difference as those are not clearly described in currently available literature.

There are existing a lot of indexes such as AB (Agency Bloomberg), WB DB (World Bank Doing Business), WEF GCI (World Economic Forum Global Competitiveness Index), ČS index or RCI (Regional Competitiveness Index) which describe quality of business environment or competitiveness based on defined factors. Research on those indexes can be considered as quantitative analysis as they are constructed by using hard data or by questioning thousands of relevant respondents at top management level.

Last study of EU showing competitiveness of individual regions using RCI (Regional Competitiveness Index) is for year 2016 (it is being published in 3 years period), European Commission (2017). RCI is constructed based on same principals as GCI (Institutions, Infrastructure, Macroeconomic environment, Health and primary education, Higher education and training, Goods market efficiency, Labor market efficiency, Financial market development, Technological readiness, Market size, Business sophistication, Innovation in total 76 regional indicators) however measuring competitiveness at regional level in European Union. Regional dimension is important because the most competitive factors are not equally distributed in space and many of them are influenced or defined by regional or local authorities (Meyer-Stamer 2008). Index is calculated according to qualitative analysis by Executive Opinion Survey and quantitative analysis (based on available macroeconomic data). Regional competitiveness can be defined as region ability to offer attractive and sustainable environment for companies and working residents (Klvačová 2002). Regional indexes provide specific view at economic region and situated companies without political or functional borders (Combes *et al.* 2008). This study emphasizes long-term growth and strengthening of capital and metropoles regions. In northern and western Europe generates these competitive regions significant spillover effects improving competitiveness or surroundings regions as well (Lagas *et al.* 2015). However, this was not confirmed in southern and eastern regions of EU. Important question for the future is whether excellent performance or metropoles will increase performance of surrounded regions or just opposite, differences between regions will increase. More effective and innovative regions have higher variability of total competitiveness while less competitive regions have lower variability of competitiveness (Martin *et al.* 2006). High variability of innovative countries shows significant differences of innovation capacity of regional economies not only in countries but also in regions. According to available statistics more competitive regions have higher value of GDP per head and also attract more migrants (Annoni, Dijkstra 2017). Analysis at regional level provides for example appropriate politics and investment choice, where is obvious, that less competitive regions will gain more benefits from improvement of institutional and basic education as for example expenditures at R&D (Weterings *et al.* 2011).

2. Theoretical part

Global competition is for last decades getting more and more heavy, touching all countries, sectors and regions. Liberalisation of international economic relationship after World War II contributed positively to significant growth of wealthfare and development of Western Europe. However, until now there is no scientific consensus about the concept of national or regional competitiveness. Despite the ambiguity of its definition, it has become a goal of numerous political documents. Economic policies in many countries and regions are devoted to raise their overall competitiveness. But an unclear definition of relations between different components of competitiveness represents an obstacle to formulate effective political measures. Important question in terms of European geographic integration is its impact on regional level of each country as capital, skilled and unskilled labor can be at different way involved between internal country sectors. Logic of Key concept of European geographic economic integration is based on disperse and agglomeration effects (Zeman 2000). Agglomeration effects support space concentration while disperse effects works in opposite way. Equilibrium concentration is outcome of those 2 contra effects and hence deeper view is needed to justify conclusive prevailing effect. This paper is supposed to cover lack of evidence in available literature based on theoretical concept of disperse and agglomeration effects.

Disperse forces support dispersion of economic activity. Example of disperse forces can be for example land prices in central area of big cities which move civil and construction works outside of the center and support in this way less developed regions. Important disperse force in real life is force of saturation (Wagle 2008). However, it can be integrated because of its limited suitability with European integration.

Important disperse effect caused by European integration is so called force of local competition. For specific transaction costs and imperfect competition are companies naturally more attracted at the markets with smaller amount of competitors. Companies want to avoid competition and hence they are equally distributed across all market and as a result local competition support dispersion of economic activity.

Agglomeration effects works on the opposite in the situation where economic concentration creates motivation to its additional concentration (Ruiz 2011). Hence it can be considered as a cyclic process. Labour force is hence concentrated at the places where jobs concentrated are. Jobs are on the opposite concentrated where labour force is concentrated (Poprter 1998). Two the most important agglomeration forces which can be linked with European integration are demand and supply bond. For description of demand and supply forces can be used simple example of existence of 2 locations where firms decide to place its production- south and north. Demand is linked to market and company size and hence companies will settle preferentially in the place where they can easily access bigger market (Bruggemann, Carlsen 2012). Company based in the north would need in case of higher demand (as a consequence of bigger market) move to the south which will enable to save the costs linked with

transportation. This is basic principle of causality behaviour between market size and demand. Movement of production from north to south cause further growing of southern region and decrease of the market in the north. Further moving of companies to the south will create even more jobs and further movements of the workers to the south. More workers in the south will support further consumption and hence increase demand. Space concentration hence generates further space concentration. It is important to distinguish market size and companies localization which can be seen from figure 1. If there are no disperse forces all companies would move from north to south. From costs point of view, it is common that companies tend to buy inputs from another companies and also reducing transactions costs (Benáček 1997). Goods tend to be cheaper in regions where is wider offer of the goods available which is shown also at the picture.

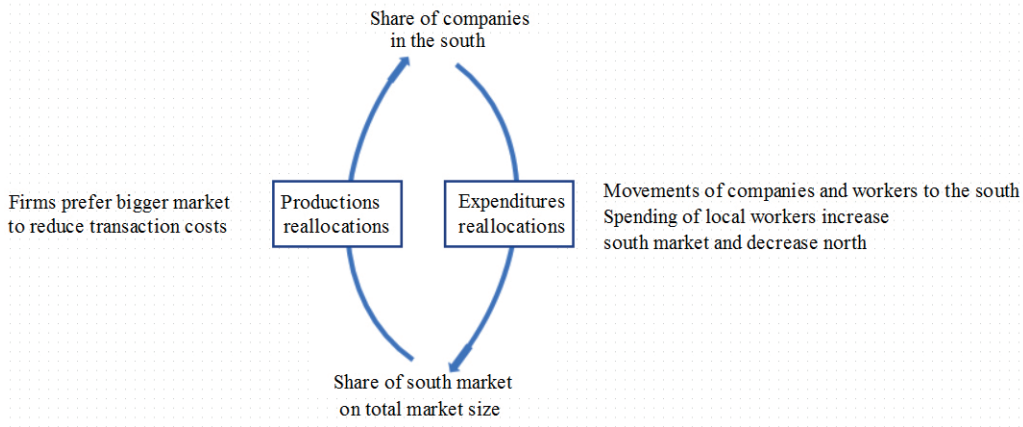

Fig. 1. Cyclic causality of demand bond
(source: Baldwin & Wyplosz (2013), own elaboration)

Costs are linked with settlement of the companies in close distance to its suppliers. In this case similar cyclic bond is created which cause agglomeration effects in case of supply. It is again important to distinguish between space concentration of the companies and costs benefits of being at bigger market. If there are enough companies in the south resources at the south would be much cheaper. Production localization influence production costs (Charron *et al.* 2012). If there are no disperse forces this cyclic causality would lead to total movements of the companies from the north to the south. Causality of cost bond (Fig. 2) explains why more companies are attracted at bigger market with higher amount of suppliers which extend amount of suppliers even further and hence market will become even more attractive.

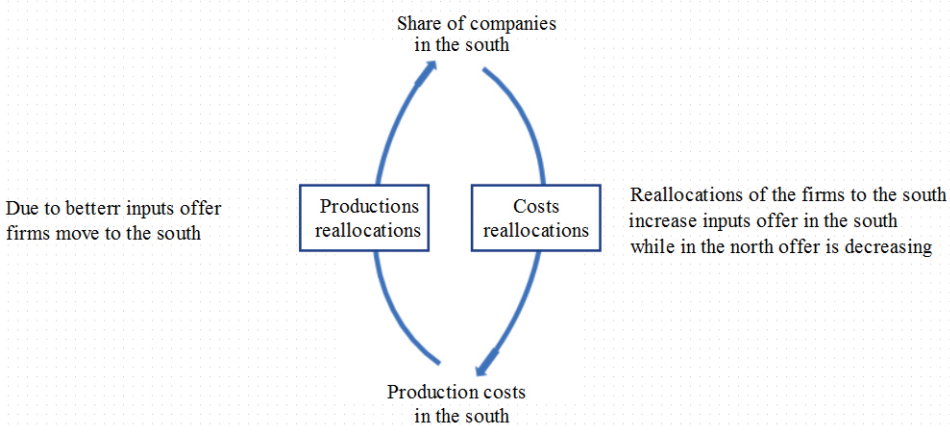

Fig. 2. Cyclic causality of cost bond
(source: Baldwin & Wyplosz (2013), own elaboration)

Important aspect is return from scale where in case of capital requiring automotive production is more beneficial to concentrate production to once place in contrast to for example cheese production (Cronon 1991). Savings from scale are in case of large automotive production much higher than in case of cheese where can be feasible to establish more small cheese factories across Europe.

European integration influence localization effects and equilibrium between agglomeration and disperse forces significantly and in a very complex way (Holmes, Feulner 2008). I will assume for simplification only one disperse force (local competition and no existence of cost bonds- firms do not buy intermediate products). Graphical visualization will be shown at Figure 3. Companies will thus prefer market with less competitors and hence smaller market. Agglomeration demand bond leads to opposite effect- firms will prefer bigger market to reduce transaction costs and were situated closer to consumers. Another assumption is no existence of cycle causality a hence workers will spend all revenues in their home town (regardless place they live). South region is hence further but companies does not make it bigger.

At Figure 4 shows vertical axis disperse and agglomeration forces and horizontal axis share of companies at bigger market. Curve of agglomeration forces is horizontal as there is no existing cyclic bond and hence with increasing number of companies intensity of agglomeration forces is not changed. Disperse curve is growing because the bigger it the share of companies in the south the higher are returns of the company which remains at the smaller market (local competition is decreasing with movement of the companies from north to south). Increased disperse forces intensity (attraction of smaller market) will affect increasing slope of disperse curve. Equilibrium point for disperse and agglomeration forces is marked as E while to this point number of companies in the south is

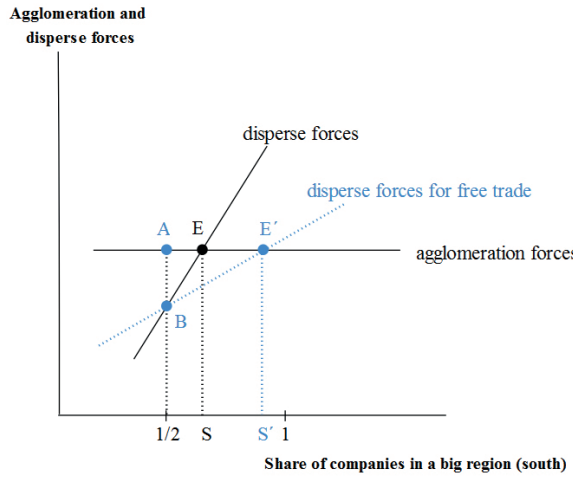

Fig. 3. Agglomeration and disperse effects
(source: Baldwin & Wyplosz (2013), own elaboration)

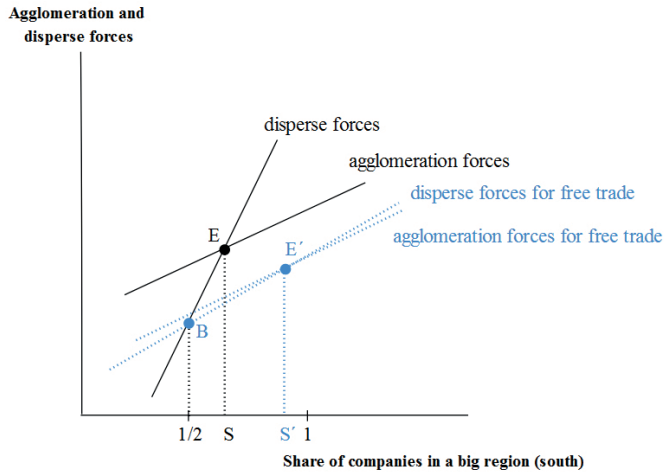

Fig. 4. Involvement of effects of cyclic causality
(source: Baldwin & Wyplosz (2013), own elaboration)

increasing. If there is only half of the companies agglomeration forces would be A while intensity of disperse forces B. Prevailing intensity of agglomeration forces would hence lead to move of companies to the south. After movement of the companies to the south equilibrium would hold at point E for share of south companies S). Point to the right from E would mean situations where are disperse forces higher than agglomeration and number of companies in bigger region would decrease (Krugman 1996).

Tighter economic integration cause removal of barriers and trading transaction costs between regions and inside of the country mostly in the way of using new technologies, increasing of competition and improvement of infrastructure (European Commission 2010). All of these aspects are directly or indirectly touched by European integration via structural and cohesive funds and related EU dedicated budgets. Removal of transaction costs would most probably occur also without European integration but in with a much lower intensity.

With reduction of transaction costs, curve of agglomeration forces will not move further because removal of trade barriers will not influence size of the market. Free trade will however significantly influence curve of disperse forces while transaction costs are source of limitation of competition at local markets. I will further assume a point at disperse curve where will be share of companies at bigger market 1/2. Transaction costs will not in this case have any impact on relative attractiveness any of the markets as competition intensity will be the same at both markets. Disperse curve will be always passing through point B while difference is only in rotation around this point. For points on the right from B would curve need to be shift down because in case of bigger amount of the companies in the south would cause higher competition but decrease of transaction costs would this competition decrease. Lower transaction costs cause also lower protection against competition for the companies in the north. As this is valid for all points since 1/2 on the right curve is rotating exactly around this point. While assuming constant position of agglomeration curve and rotation of disperse curve, new equilibrium point is E` with higher share of companies in a bigger region. Trade liberalization hence supported economic agglomeration in a bigger region. European integration hence could support allocation of economic activity to European core. If there are assumed disperse forces which do not influence companies in the north curve would be shifted vertically up. Factors such as quality of life would move disperse curve regardless on shares for each market. Increase of the wages could some firms in the south negatively influenced and stop them moving to the south- disperse curve would move counter clockwise. Including of cyclic causality for agglomeration forces would change agglomeration curve to curve with growing slope which presents the fact that agglomeration forces with movement to bigger regions growth. Free trade hence rotate disperse curve but also decrease agglomeration effects for whatever amount of the companies in the north. As lower transaction costs decrease differences between markets, agglomeration curve is moved down. New equilibrium point E` would hence left more to the left. Empirical studies show that this theoretical possibility does not occurred and free trade is decreasing agglomeration forces less than disperse forces- equilibrium reflects higher space concentration (Polachová 2009).

3. Methodology

In study were used primarily data published by European Commission in 3 years period including z score for Czech regions as a base for calculation of RCI and its subindexes. These data have been analyzed using Excel as a SW tool, compared and

evaluated considering literature discussed in theoretical part of these papers. It is important to mention that RCI is being published only since 2010 (in total 3 publications – in 2010, 2013 and 2016) hence valid time series cannot be constructed and only comparison for three available datasets can be used.

RCI overall index is based on aggregated score of individual indicators of higher level and calculation based on arithmetic average. Lower level of indexes is on the opposite calculated as weighted average while weights are assigned based on economic development of the country (according to 3 classifications grades). Higher values of individual indicators present increasing competitiveness. RCI is evaluating and comparing level of the European regions while GCI (*Global Competitiveness Index*) whole countries. Based on overall index value are countries or regions ordered into competitiveness ranking. In case of hard data indicators are values transformed to scale 1–7 (Annoni, Dijkstra 2017). Disadvantage of RCI is a risk of subjective respondent's judgement while 1/3 of the indicators is based on questionnaire investigation (Lustig 2011).

Indicators included to RCI calculation are (European Commission 2017):

- *Population and GDP* (population, GDP per capita);
- *Institutions regional level* (Corruption, Quality and accountability of government services, Impartiality of government services);
- *Institutions country level* (Country level corruption perception, Regional level corruption perception, Voice and accountability, Political stability, Government effectiveness, Regulatory quality, Rule of law, Control of corruption, Ease of doing business index, Property rights, Intellectual property protection, Efficiency of legal framework in setting disputes, Efficiency of legal framework in changing regulation, Transparency of government policymaking, Business costs of crimes and violence, Organized crime, Reliability of policy services);
- *Macroeconomic stability* (Government surplus/deficit, Gross national savings, Government bond yields, Government debts);
- *Infrastructure* (Accessibility of motorways, Accessibility of railways, Accessibility to passenger flights, Intensity high- speed railways);
- *Health* (Road fatalities, Healthy life expectancy, Infant mortality, Cancer disease death rate, Heart disease death rate, Suicide);
- *Basic education* (Low achievers in reading, Low achievers in math, Low achievers in science);
- *Higher education* (Population 25–64 with higher education, Lifelong learning, Early school leavers);
- *Labor market efficiency* (Employment rate, Long- term unemployment, Unemployment, Labor productivity, Gender balance unemployment, Female unemployment, Share of population aged 15–24 not in education, employment or training);
- *Market size* (Disposable income per capita, Potential GDP in PPS, Potential POP);
- *Household technical readiness* (Households access to broadband, Individuals buyer over internet, Households access to internet);

– *Technical readiness enterprise* (Availability of latest technologies, Firm-level technology absorption, Technological adoption, FDI and technology transfer, Enterprises having purchased online (at least 1%), Enterprises having received orders online (at least 1%), Enterprises with fixed broadband access);
– *Business sophistication* (Employment, K-N sector, GVA, K-N sector, Innovative SMEs collaborating with others);
– *Innovation* (Total patent applications, Core creative class employment, Knowledge workers, Scientific publications, Total intramural R&D expenditure, Human Resources in Science and Technology, Employment in technology and knowledge-intensive sectors, High-tech-inventors, ICT inventors, Exports in medium-high/high tech manufacturing).

4. Experimental part

According to RCI 2016 rating is obvious dominant position of regions around biggest metropoles like London, Berlin, Paris, Stockholm and other (Fig. 5). In Czech Republic can be positively evaluated competitiveness of Prague and Central Bohemia. As a consequence of European integration and trade liberalization in areas of individual regions it is possible to observe disperse and agglomeration effects where dominant seems to be effect of agglomeration effects (Kubišta 2000).

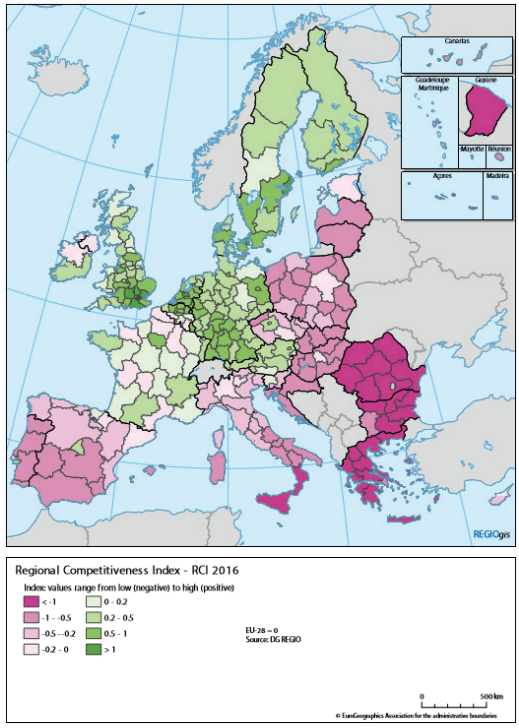

Fig. 5. Comparison of regional competitiveness of European regions according to RCI 2016 (sources: Annoni, Dijkstra (2017), own elaboration)

Figure 6 is showing RCI at regional level and capital cities. There is obvious inconsistency between capital cities and other regions which is valid also for Czech Republic. Single European market, removal of barriers and trade liberalization could make differences between regions even bigger (Turner, Van't Dack 1993).

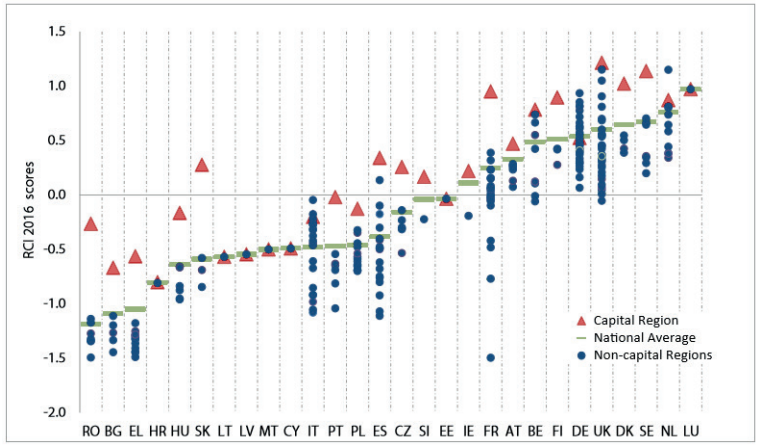

Fig. 6. RCI score differences between capital city regions and other non- capital national regions (sources: Annoni, Dijkstra (2017), own elaboration)

RCI index is constructed since 2010 in a 3 years period and hence it is possible to analyze and compare status of the regions in years 2010, 2013 and 2016.

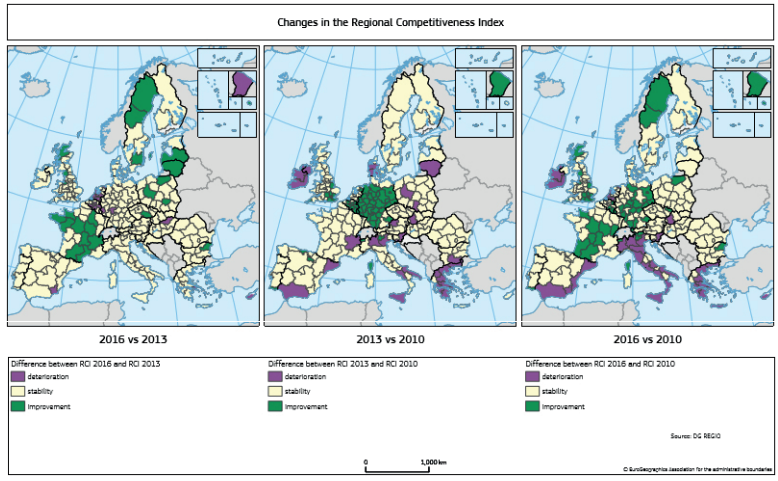

Fig. 7. Changes in RCI scores of European regions (source: Annoni, Dijkstra (2013, 2017); Annoni, Kozovska (2010))

From changes in RCI index in period 2010 to 2016 is at figure 7 possible to see relatively stable trends for Czech Regions, improvement if competitiveness of German and France regions and worsening of the regions of southern Europe. Agglomeration effects could contribute positively to further development of already well developed regions (Martin *et al*. 2006).

Z- score presents standardized statistics of transformed indicators which is weighted by number of citizens in specific regions. The higher is the value, the higher is competitiveness of the region.

From RCI 2016 analysis is obvious dominant position of Prague and Central Bohemia region (which are in rating equalized) in all observed areas (Fig. 8). On the other hand, the worst seems to be Northwest region. Obvious differences are visible in areas of innovations, business sophistication and education and it is clear that all mentioned areas are interconnected (Ravallion 2011). Lower variability of competitiveness based on z-score can be seen in indicators of infrastructure, institutions and technological readiness. In those areas could be positively reflected effects of common European cohesive and regional politics (Chovanec 2005).

Spider graphs at Figure 9 shows graphical position for values of indicators for Czech regions when calculation RCI 2016 index. Specific numerical values of z- score, min-max values as well as rating for all NUTS2 regions for all indicators are visible in table 1. The most significant difference between sub- indexes for all regions is in innovation sub index. Government and also EU subsidies should hence support more innovations mostly in regions outside of Prague (Plchová 2005).

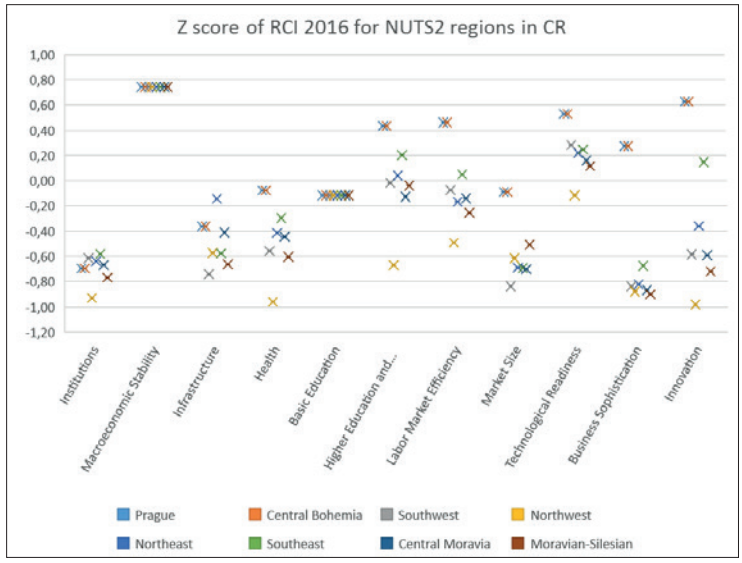

Fig. 8. Comparison of Czech Regions according to RCI 2016 regions (source: European Commission (2017), own elaboration)

Table 1. Summarized values of indicators of Czech regions according to RCI 2016

NUTS NAME	Basic sub-index (Institutions, Macroeconomic stability, Infrastructure, Health)			Effectiveness sub-index (Elementary education, Higher education, Effectiveness of labor market, Market size, Technological readiness)			Innovation sub-index (Business sophistication, Innovations)		
	z-score	min-max score	ranking	z-score	min-max score	ranking	z-score	min-max score	ranking
Prague	–0.10	59.62	146	0.27	69.83	93	0.48	64.26	62
Central Bohemia	–0.10	59.62	146	0.27	69.83	93	0.48	64.26	62
Southwest	–0.26	53.64	170	–0.31	54.92	170	–0.38	40.01	165
Northwest	–0.37	49.44	194	–0.59	47.65	197	–0.66	32.10	190
Northeast	–0.11	59.16	147	–0.27	55.86	162	–0.32	41.68	161
Southeast	–0.17	57.18	156	–0.15	59.12	153	–0.09	48.13	144
Central Moravia	–0.18	56.65	159	–0.32	54.59	171	–0.43	38.52	170
Moravian-Silesian	–0.28	52.72	177	–0.27	56.04	160	–0.50	36.55	176

(source: European Commission (2017), own elaboration)

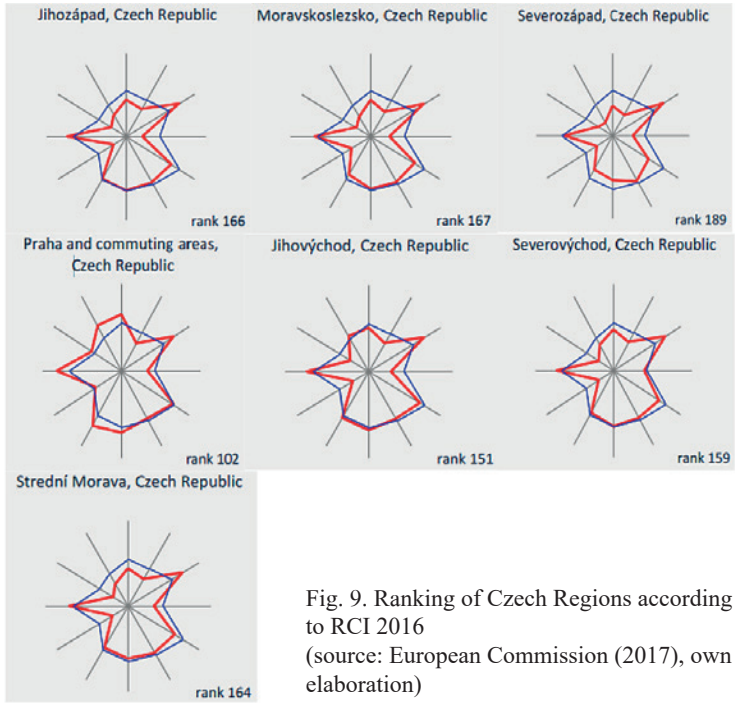

Fig. 9. Ranking of Czech Regions according to RCI 2016
(source: European Commission (2017), own elaboration)

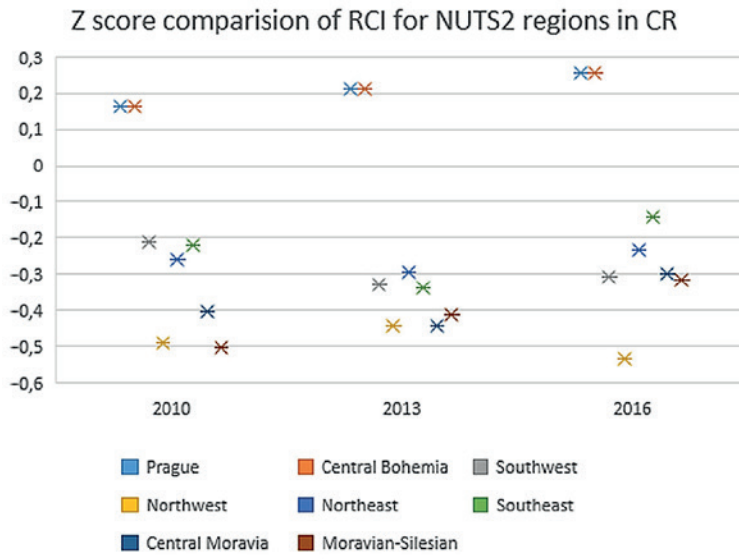

Fig. 10. Comparison of trends of z- score for Czech regions
(source: European Commission (2017), own elaboration)

At Figure 10 can be seen z- score in absolute values for period 2010, 2013 and 2016. From these values are obvious increasing differences in z- score between Czech regions which presents deepening of differences in competitiveness (Stiglitz *et al.* 2009).

When comparing historical RCI z- score it is possible to see improvement of competitiveness Prague region, Southwest and Southeast in period 2010–2013. For period 2013–2016 can be seen 20% improvement for Prague region and Northwest while other regions were decreasing. In average was higher competitiveness growth reached in period 2010–2013 than 2013–2016. There are several factors which could influence these trends such as regional EU politics, effects of industrial restructuralization, foreign investments or increased funding of EU funds at the end of first funding period in 2013 and resulting firstly shorter and secondly long-term positive effects (Jiránková 2007).

5. Conclusions

Based on conducted analysis is obvious growing dominancy of regions around metropoles and capitals. It is possible to observe disperse and agglomeration effects with dominant agglomeration forces. According to RCI 2016 rating of Czech regions is obvious dominant position of Prague and Central Bohemia in all observed areas. On the other hand, lowest is rating for competitiveness of Northwest region. Significant differences can be seen in areas of innovations, business sophistication and education. On the opposite positively can be evaluated, due to lower variability of z-score between regions, indicators of infrastructure, institutions and technological readiness where can

be seen effects of European cohesive and regional politics. Czech government should focus to follow Europe 2020 strategy and transformation to knowledge based economy. Contribution of the study have been seen in structured analysis of z score for RCI index of available datasets (2010, 2013, and 2016) of Czech regions highlighting key differentiated areas. Further research is recommended in 2019 when new datasets of EC should be published. Results can be filled with GCI and DB indexes in order to understand bigger picture and competitiveness on country level.

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