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Regional differentiation, agglomeration and clusters within the EU¹

Josef Abrhám, Milan Vošta

The European integration process is constantly deepening. In the 90s of the last century the project of the internal market was completed and then Member States started to implement the provisions of a monetary union. Coordination proceeds also in terms of fiscal, structural and to some extent and social policies. Nevertheless, the European Union is quite a heterogeneous as a whole. Individual economies are different both in absolute and relative economic indicators, the economic and social disparities of the member base is even more marked after the recently realized enlargement of the original Fifteen by the twelve new member states.

European Union is characterized by significant concentration of economic activities, both sectoral and spatial. The aim of this paper is to evaluate regional differentiation and agglomeration within the EU₂₇. We will use quantitative analyses of empirical statistical data from Eurostat databases and the European Cluster Observatory.

1. Regional differences of the European Union

To monitor regional differences in economic level, gross domestic product per capita expressed in purchasing power parity is used as an indicator which is also suitable for international comparisons, since it addresses issues of the effects of price levels and exchange rates. A substantial issue in the assessment of regional disparities represents a selection of examined territorial units. In our analysis we will come out, for reasons of comparability, from the unified classification of territorial regions of the European Union, which divides the territory of all member countries into the so-called NUTS regions. Specifically, we will follow namely the units at NUTS 2 level, only in certain evaluation we enter the regions at the level of the NUTS 3.

Regional differentiation of the European Union belongs among intensively studied topics. It is not surprising that the economic level of the European Union varies not only across the countries, but also the regions. In addition, the differences persist in a long term and in some countries they even grow, representing an ongoing challenge for the makers of economic and regional policies.

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The last two rounds of the enlargement of the European Union logically contributed to the widening of regional disparities. According to current statistics there are quite substantial differences among the European regions. The most advanced regions of the European Union at the NUTS 2 level exceed the frontier 200% and more of the average GDP per capita of the European Union, but, by contrast, the least-developed regions of the new member states reach from 20 to 30% of the average GDP per capita of the enlarged European Union (EU 27). Gross domestic product per capita in London is more than twelve times higher than that in the Nord-East region in Romania.

The 15 most advanced and least developed regions of the European Union. The first three places in terms of GDP per capita levels are occupied by Inner London (303% of the average of EU_27), Luxembourg and Brussels (the two regions reach about 250% of the EU_27 average). Further follow the regions Vienna, Paris conurbation (Ile de France) and eight regions of northern and western Europe. The only region of the new member states in the first fifteen is Prague, which reaches 160% average EU_27.²

Still, the central part of the EU remains the pentagon - the area framed by five points: London, Hamburg, Munich, Milan and Paris. However, there is a gradual drop in the dominance of the region. The most advanced regions are more scattered in an area of the European Union (the examples are such regions in Ireland, the Scandinavian countries or Vienna).

Fifteen of the least-developed regions of the European Union come from only three countries - Romania, Bulgaria and Poland. Their gross domestic product per capita is between 23 and 39% of the EU average. Regional underdevelopment is not only a problem for these countries. The overwhelming number of the regions of the new member states is characterized by backwardness compared to the average of the European Union. Only three regions of the twelve new member countries achieve higher GDP per capita compared to the EU_27 average (Prague, Bratislava and Közép-Magyarország in Hungary) and only six regions get above the level of 75% of the EU average, the level crucial for inclusion among the most lagging regions within the economic and social cohesion policy of the EU. In addition to the three regions belongs also Cyprus, Mazowieckie voivodship in Poland (region where the capital Warsaw is situated), and Slovenia.³

When looking for crucial trends of regional differentiation, we find that in all countries EU_15 a large part of differences in regional prosperity results from the concentration of

² Eurostat (2008): Regional GDP per Inhabitant in EU-27. News Release 19/2008. Luxembourg: EUROSTAT, s. 1-2.

³ Eurostat (2008): Regional GDP per Inhabitant in EU-27. News Release 19/2008. Luxembourg: EUROSTAT, s. 1-2.

economic activity and growth in the vicinity of major cities. Even in countries where differences in the period decreased or remained constant, per capita GDP in capitals grew faster than in other regions. An exception in this respect is only Berlin, which as the only capital city in the EU is making a lower economic level than the national average and also its development in the last decade was substandard in the national comparison.

Favourable development of major cities is strongly associated with their attractiveness for business and for the people. In 2004 the regions with the capitals produced on average 32% of the given country's GDP. Polarization of the main cities brings some advantages such as economies of scale and agglomeration of businesses and market size. However, there are also some clear disadvantages, such as traffic congestion, poorer air quality and higher property prices. Only in four countries there are other strong centres of growth, which offset the regions of major cities. These are Barcelona in Spain, the centres in northern Italy - Milan and Turin, the region of Utrecht in the Netherlands and the developed areas of Germany - Munich, Frankfurt and Hamburg. Berlin and Rome are not even the most advanced areas of the country.

In other countries the region with the capital tends to dominate. In France and Great Britain, Paris and London contribute to gross domestic product by almost one third, while the other major centres only by around 3-4% (such as Lille, Marseille, Birmingham, Manchester or Glasgow). Significantly dominant position of the central region can be found in Belgium, Greece and Austria. Brussels achieves almost 250% of the average level of EU_27 and the least developed region of Hainaut in Belgium, by contrast, less than 80%. In Austria, Vienna exceeds 177% of the EU average and Burgenland makes less than 80%. In principle all member countries of the European Union, however, show enormous differences between the most and least developed region⁴.

For the New EU Member States both the continuing regional disparities within individual states and also the global backwardness of those regions compared to the EU average are characterised (EU-25). Just two regions of the researched states achieve higher GDP/per capita than the EU average (Prague in the Czech Republic and Bratislava in Slovakia) and only four regions go beyond the level of 75% of the EU average GDP/per capita (besides the Prague and Bratislava also the region Közép-Magyarország and Slovenia), which is crucial for the classification among the most underdeveloped regions within the framework of the economic and social coherency policy of the EU. The relatively large differences in economic

⁴ Eurostat (2008): Regional GDP per Inhabitant in EU-27. News Release 19/2008. Luxembourg: Eurostat.

level between the central regions and peripheral areas persist in a number of new and the original European Union countries, despite the effects of national policies regional policies as well as the policy of economic and social cohesion of the EU. Moreover, some regions (mainly urban agglomerations or geographical advantage localized regions) are undoubtedly in a better competitive position in the globalized economy.

Regional disparities are certainly a significant problem to solve, but on the other hand, it should be noted that statistical indicators of regional GDP per capita of the central regions are slightly overstated since they include e.g. commuters for work to the central region to work from surrounding areas or companies that have a place of business in the central region and carry out activities in other areas, too. Moreover, some regions (mainly urban agglomerations or geographical advantage localized regions) are undoubtedly in a better competitive position in the current globalized economy, and complete elimination of economic and social inequalities would not be economically efficient. Regional, national and European actions should therefore continue to look for optimal tools to maintain a balanced regional development and strengthen the competitive position of regions in the national but also global environment.

When we consider the regional differentiation within individual states, we can find some common features which are characteristic for the all the countries researched. This is primarily the so called double dichotomy:

- central and peripheral polarization of the central region compared to the rest of the country,
- differentiation between the western and eastern regions of the researched states.

The dichotomy centre – periphery is characterized by the unique dominant position of the capital city and its surroundings, compared to the rest of the country.

Capitals are the centres of modern sectors, they have high levels of the above-average research and development potential as well as the educational potential and they also show an above-average attraction for foreign investors. The economic level of central regions reaches, in extreme cases, more than 200% level of the national level e.g. the Czech Republic or Slovakia.

The most significant dominancy within the states, where we evaluate the regional structure on the level of NUTS II, is shown by the central regions of Slovakia and the Czech Republic. In case of Slovakia the economic level of Bratislava exceeds three-times (measured on the basis of GDP/per capita in PPP – Purchasing Power Parity) the value of the least developed region (Východné Slovensko) and the value of the second most developed region 2.4-times

(Západné Slovensko). Prague goes beyond the level of the least developed region of the Czech Republic more than 2.5-times (Eurostat, 2006, pp. 1 – 7). The lower degree of differentiation of the central regions of Poland and Hungary is given mainly by the greater dimensions of the NUTS II regions, compared to the Czech Republic or Slovakia. Higher region, say, includes further areas besides the capital, what makes its higher heterogeneity from the point of view of economic level. The typical example of such a NUTS II region like that is the Polish region Mazowieckie, which includes a number of areas with a considerable concentration of agriculture.⁵

Estonia, Lithuania, Latvia and Slovenia represent, as a whole, the separated regions of NUTS II, but if we consider the regional level NUTS III, we can claim, that even here the central regions considerably exceed the national average in the evaluation of economic development. Less significant polarization of the central region on NUTS III level is obvious in the case of Slovenia (Central Slovenia achieves about 130% of the national average) and Lithuania (GDP/per capita of Vilnius comes to some 140% of the national average) compared to Estonia and Latvia.

Another phenomenon of the regional differentiation of the New Member States is the higher level of development of the western areas, which are situated near the markets of the developed EU Member and therefore, they can make profit from the higher inflow of FDI (Foreign Direct Investment) as well as from a better availability of the western markets compared to the peripheral eastern regions. The extreme form of this dichotomy is e.g. northwest area of Hungary, where the inflow of FDI was strongly displayed. Both western regions (Nyugat- -Dunántúl and Közép-Dunántúl) represent the areas with above-average potential of growth. The major economic stimulus was represented in the last decade by the FDI, which contributed to the restructuralization of the industrial structure and to the development of innovation and export oriented branches (Kiss, 2001, p. 16). Another example of the west-east dichotomy is Slovakia, where this phenomenon is highlighted by the location of the capital in the western part of the country near one of the most developed centres of the EU – Vienna. The crossing of two dichotomies here causes a multiplication effect. The substantial differences in economic level between the western and eastern parts can be seen also in Poland and on the level of NUTS III also in case of Slovenia, Estonia and Latvia.

⁵ A higher dimension of a Central Region can be seen in the case of Poland as a well chosen, as it ensures to the capital also in the following financial perspective (2007-2013) the opportunity to draw a larger volume of financial means from the structural funds of the EU

The peripheral regions of the New EU Member States are represented by the areas on the eastern boundaries of Russia, Byelorussia, Ukraine, Romania, Serbia, and Croatia, which are significantly less attractive from the view of foreign investors. A typical examples of non-developed eastern regions are the regions of East Slovakia (Východné Slovensko) and Hungary (Észak-Magyarország) and primarily the areas of East Poland (Podkarpatskie, Podlaskie, Lubelskie and Warminsko-Mazurskie), where the proportion of employment in agriculture exceeds 30% and, moreover, there is only a low development of economic activities in industry and services, which supports the over-employment in the agricultural sector as well as its low productivity. The added value expressed by an employee in the mentioned Polish regions reaches some EUR 1.500 (Römisch and Ward, 2004, p. 96).

Complete elimination of economic and social inequalities under the existing external and internal conditions of the European economy is not possible or it would not be economically efficient. Regional, national and European actions should therefore continue to look for optimal tools to maintain a balanced regional development and solving serious structural problems by strengthening the competitive position of regions in the national but also global environment (e.g. through investing in infrastructure, increasing the attractiveness of the region to foreign and domestic firms, promoting the improvement of business environment, making the research and innovative potential more efficient, through the intensification of network and cluster cooperation of companies, etc.).

2. Clusters in the EU

In our analysis, we use data from a database of European Cluster Observatory, which represents the most comprehensive European source. The database contains comparative data for all 27 EU member countries and focuses only on clusters of high quality levels. Clusters are identified based on regional employment. Geographical dimension is observed at the NUTS 2 regions. To determine the quality of industrial specialization and agglomeration is used in so-called Star classification under which the cluster can take one, two or three stars. Three stars are seen as the highest achievable rating.

Qualifying criteria are as follows:

- *„Size: if employment reaches a sufficient share of total European employment, it is more likely that meaningful economic effects of clusters will be present. The 'size' measure shows whether a cluster is in the top 10% of all clusters in Europe within the same cluster category in terms of the number of employees. Those in the top 10% will receive one star.*

- **Specialisation:** *if a region is more specialised in a specific cluster category than the overall economy across all regions, this is likely to be an indication that the economic effects of the regional cluster have been strong enough to attract related economic activity from other regions to this location, and that spill-overs and linkages will be stronger. The 'specialisation' measure compares the proportion of employment in a cluster category in a region over the total employment in the same region, to the proportion of total European employment in that cluster category over total European employment (see equation). If a cluster category in a region has a specialisation quotient of 2 or more it receives a star.*
- **Focus:** *if a cluster accounts for a larger share of a region's overall employment, it is more likely that spill-over effects and linkages will actually occur instead of being drowned in the economic interaction of other parts of the regional economy. The 'focus' measure shows the extent to which the regional economy is focused upon the industries comprising the cluster category. This measure relates employment in the cluster to total employment in the region. The top 10% of clusters which account for the largest proportion of their region's total employment receive a star.*“⁶

Largest clusters in the tertiary sector (as measured by total employment) were found in financial services, business services, education and in hospitality and tourism. The largest clusters of financial services can be found in developed regions of the Old Member States (EU_15), such as London, Paris, Darmstadt, Amsterdam, Athens, Lombard, etc. In the framework of the New Member States shows concentration of financial services only central regions (Mazowieckie, Praha, Bratislava). The largest clusters of business services providers also found mainly in the so-called Pentagon's most advanced regions of the European Union, which includes mainly the regions of northern Italy, western Germany, Benelux, northeastern France, Austria and Great Britain. High employment in the tourism cluster is evident mainly in the areas of the Mediterranean countries (Italy, Spain, Greece, Portugal, Cyprus and Malta) and also in large conurbations (London, Paris, Amsterdam, etc.). Významné znalostně orientované klastry se vyskytují především v regionech Velké Británie, skandinávských zemí a také ve vyspělých oblastech západoevropských zemí. Significant knowledge-based clusters are found mainly in the regions of Great Britain, Scandinavian countries and in developed areas of Western European countries.

Industrial agglomerations with the highest number of employees occurring in the automotive, pharmaceutical, chemical and clothing industries. Agglomeration of automotive industry are mainly in German regions, northern Italy, northern Spain, western Austria, western France,

⁶ European Cluster Observatory on-line (<http://www.clusterobservatory.eu/index.php?id=44&nid=>).

southern England and southern Sweden. Many automotive clusters formed in the 90 he also served in the new EU Member States, in western and central Hungary, on the western Slovak Republic and particularly in the Northeast region and Central Bohemia, Czech Republic. The largest number of clusters in the chemical industry operates in Belgium, the Netherlands and Germany. Apart from those countries are major clusters, which employ more than 10 thousand. workers still in northern Italy, Catalonia and in Lyon, France.

Table 1: Clusters of services in the European union

Regional cluster	Employment	Stars
Financial Services		
Île de France (Paris), FR	426 596	***
Inner London, UK	254 760	***
Lombardia (Milan), IT	174 101	**
West-Nederland (Amsterdam), NL	157 810	**
Darmstadt (Frankfurt am Main), DE	135 793	***
Madrid, ES	117 019	**
Düsseldorf, DE	105 996	**
Oberbayern (München), DE	100 173	**
Cataluña (Barcelona), ES	97 597	**
Stuttgart, DE	94 021	**
Business Services		
Île de France (Paris), FR	215 845	**
Inner London, UK	186 696	***
West-Nederland (Amsterdam), NL	123 420	**
Outer London, UK	105 373	***
Vlaams Gewest, BE	91 853	**
Lisboa, PT	87 506	***
Lombardia (Milan), IT	81 512	*
Berks, Bucks and Oxon (Oxford), UK	73 865	***
Düsseldorf, DE	70 237	**
Oberbayern (München), DE	68 923	**
Hospitality and Tourism		
Andalucía (Sevilla), ES	89 366	**
Île de France (Paris), FR	84 560	*
Canarias (Tenerife), ES	82 099	***
Cataluña (Barcelona), ES	80 649	*
West-Nederland (Amsterdam), NL	64 876	*
Madrid, ES	58 912	*
Ireland, IE	56 346	**
Inner London, UK	53 781	*
Lombardia (Milan), IT	53 282	*
Valencia, ES	50 083	*

Source: European Cluster Observatory on-line http://www.clusterobservatory.eu/index.php?country_ID=).

Table 2: Industrial clusters in the European union

Regional cluster	Employment	Stars
Automotive		
Stuttgart, DE	136 353	***
Piemonte (Turin), IT	85 915	***
Oberbayern (München), DE	82 339	***
Braunschweig, DE	79 997	***
Cataluña (Barcelona), ES	74 086	*
Île de France (Paris), FR	61 351	*
Lombardia (Milan), IT	51 631	*
Vlaams Gewest, BE	46 084	*
Västsvrige (Gothenburg), SE	42 832	***
Karlsruhe, DE	40 694	***
Chemical		
Rheinhessen-Pfalz (Mainz), DE	40 075	***
Lombardia (Milan), IT	33 528	*
Cataluña (Barcelona), ES	30 645	*
Düsseldorf, DE	25 248	**
Vlaams Gewest, BE	21 937	**
Rhône-Alpes (Lyon), FR	20 361	**
Darmstadt (Frankfurt am Main), DE	16 250	**
Köln, DE	15 928	**
Zuid-Nederland (Maastricht), NL	14 946	*
West-Nederland, NL	14 825	*
Biopharma		
Île de France (Paris), FR	47 493	**
Lazio (Rome), IT	21 990	**
Darmstadt, DE	16 459	**
Kozep-Magyarország HU	14 197	**
Centre (Orléans), FR	13 960	**
Karlsruhe, DE	13 207	**
Mazowieckie (Warszawa), PL	11 522	**
Berlin, DE	10 350	**
Stockholm, SE	10 325	**
Tübingen, DE	9 650	**
Textile		
Lombardia (Milan), IT	91 468	**
Cataluña (Barcelona), ES	52 885	*
Norte (Porto), PT	51 205	***
Nord-Est (Iasi), RO	45 786	***
Centru (Brasov), RO	38 378	***
Piemonte (Turin), IT	35 914	**
Veneto (Venice), IT	32 153	*
Vlaams Gewest, BE	31 583	*
Toscana (Florence), IT	29 943	**
Valencia, ES	27 376	*

Source: European Cluster Observatory on-line (http://www.clusterobservatory.eu/index.php?country_ID=).

Concentration of biotechnology and pharmaceutical industries are typical for France, Germany, Denmark, Italy, northern and central regions and major cities in Sweden, Poland and Hungary. Although the sectors of clothing and textile industry is not on the continent of dynamic sectors, show a relatively large concentration of employment in the cluster. The largest of them are located in regions of southern Europe (mainly Portugal, Italy, Bulgaria, Romania and Spain) and in Poland and the Baltic countries.

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