

A Model to Evaluate the Regional Competitiveness of the EU Regions¹

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The starting point is the investigation of competitiveness – resource and measure of development within the context of internationalization and globalization of the world economy. At regional level, competitiveness must capture the distinguishing features that influence the overall competitiveness of the economic agents located in a certain region, despite the usual mix of highly and less competitive economic agents. Such features might comprise, among others, social and physical infrastructure, labor skills and public institutions efficiency. Defining the regional competitiveness and correct identification of its determinants may be attempted in different manners – either adaptations for the regional level of the definitions of macroeconomic or microeconomic competitiveness are attempted and the corresponding determinants are identified, or other ways to “deal with” the notion and to identify and, eventually, to aggregate the corresponding determinants are pursued.

In their attempt to assess regional competitiveness, the authors started from an operational model that evaluates national competitiveness on the basis of five integrating criteria (each criterion is an aggregation of several domains): overall operational economic performance, energy use, information and communication technology, gross value added structure, participation on the international markets.

The author’s central idea regarding the elaboration of a model to assess the regional competitiveness is also that of using integrating criteria (complex indicators) able to reveal clearly the final results of the efforts of the national and local governments, the business environment and the civil society aimed at increasing the regional competitiveness of the EU countries. Thus, following the performed analyses certain domain-grouped criteria were selected, regarding the overall economic performances of the regions, labor quality and skills, business environment, research-development and innovation, infrastructure and environment – analyzed through domain-specific indicators. In the authors’ opinion, the proposed model fully satisfies the requirements of an operational model to assess the regional competitiveness, because it employs significantly integrating criteria and it uses comparable data resulted by applying quasi-unitary methodologies, accessible each year for a large number of countries and regions, which will allow for multi-annual comparisons in the future.

Keywords: regional competitiveness, national competitiveness models, integrating criteria, complex indicators.

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1. General aspects regarding competitiveness

Competitiveness is a complex economic phenomenon, with many definitions and quantification methods upon which the specialists have not yet reached full consensus, but the need of competitiveness gaining and maintaining are frequently discussed both in the economic literature and in the everyday practice. At the same time, the increasing importance of competitiveness issues may be explained by the deeper economic integration and increased globalization, which require a constant increase in the competitive power of every economic entity belonging to a certain country, as well as in the competitive power of the country itself.

Many different definitions of competitiveness may be found in the specialized literature. Thus, in the most general sense, competitiveness may be defined as the capability of a country, measured by comparison with other countries, to shape and ensure an economic, social and political environment able to support the accelerated and durable value-added creation. As against the competition (considered as representing the contradictorily interests of the economic entities), competitiveness may be defined „in a more restricted sense (i) as the exploration of the conditions in which the entities' interests are contradictorily (achievement of a goal by a certain entity would make impossible for other entities to achieve their own goals) and in a broader sense (ii), which also includes the indirect and potential competition among the entities, analyzing the areas where the direct interests of the economic entities are not contradictorily”.¹ Considered as such, competitiveness is the ability to coexist with the other entities under the circumstances of conflict of interests, being characterized by several **floors**²:

- Capability of survival – considered as the lowest competitiveness level, refers to the capability of an economic entity to passively adapt to the economic environment in which it evolves, without significantly changing or developing.
- Capability of development – considered as the competitiveness medium level, refers to the capability of an economic entity to respond actively to the changes occurring in the competitive economic environment and, in this way, to improve its own qualities and turn its own activity into a more efficient one.
- Superiority – considered as the competitiveness highest level – refers to the capability of an economic entity to influence the economic environment through more efficient activities, faster development or better qualities than its competitors, which means that the leaders' activity impacts upon the positions of the other agents.

From another point of view, the approach of the competitiveness floors has in view the level at which it is generated and supported. Thus, competitiveness is generated at microeconomic level, and a country becomes competitive when it succeeds to build up that environment able to allow for each value-added producing company to become efficient and be able to survive or develop in any economic environment, not only domestic, but especially international. The level at which competitiveness is supported and

¹ Janno Reiljan, Maria Hinrikus, Anneli Ivanov, *Key Issues in Defining and Analyzing the Competitiveness of a Country*, University of Tartu, Finland, Faculty of Economics and Business Administration, Working Paper Series, No. 1/2000.

² Janno Reiljan, *et al.*, op cit.

consolidated is the macroeconomic one – a country will maintain and even improve its strong points on a global scale when it will decide to implement that set of economic policies that leads to the achievement of the environment necessary for the microeconomic expansion. Moreover, at national level competitiveness also involves a territorial dimension, the spread of its competitive economic agents being rather unequal and usually concentrated in certain areas of the national territory.

As regards the last aspect, the general competitiveness concept also involves the defining of its limits, the usual competitiveness analyses emphasizing three competitiveness levels – country, industry and company¹. The more recent analyses have also expanded to sub-regions and supranational organizations². Under these circumstances, three main competitiveness **levels** may be identified: - the local (regional) level, the domestic (national) level and the international (global) level.

In the following, the authors present a possible model to evaluate the national and regional competitiveness, elaborated on the basis of a Romanian model to evaluate competitiveness and to monitor the performances of the new EU member states or the countries candidate to EU accession³. The model is somehow similar with the systems of indicators for evaluation of global competitiveness on the basis of ranks used by the World Economic Forum and other international organizations in order to define the supporting capability of an economy's development, to monitor the achievement of the Lisbon Strategy goals, to evaluate a nation's or community's degree of readiness for and benefiting from the information and communications technology development, etc.

2. Criteria and methodology to evaluate the national/regional competitiveness

2.1 The model's criteria

The main idea of the elaboration of the model to evaluate the national competitiveness was to use integrating criteria able to reveal in a clear way the finality of the conjugated efforts of the governments, business environments and civil society with the aim of increasing the competitiveness of the analyzed countries⁴, especially the 12 countries that at the time when the model was elaborated represented the „new accession wave”. On

¹ Op cit, after Porter, M., *The Competitive Advantage of Nations*, The Free Press New York, 1990.

² Op cit., after Hatzichronoglou, T., *Globalisation and Competitiveness*, STI Working Papers, 1996/5.

³ Model pentru evaluarea competitivității economiei românești. Monitorizarea performanțelor noilor țări membre sau candidate la aderarea în Uniunea Europeană – Faza III-a, Model elaborated by Partner P3, CERME (author Cezar Mereuță, Carmen Mereuță), in co-operation with Partner P2, IEF (authors: Lucian Liviu Albu, Mihaela Nona Chilian, Marioara Iordan, Corina Sâman, Caraianni Petre), within the research contract “Metodologie și model econometric pentru evaluarea competitivității economiei românești în context internațional. Monitorizarea performanțelor noilor țări membre sau candidate la UE”, Phase IV/2006, Contract CERES 4-106/4, November 2004, Contractor CEIS (Partner P1), Subcontractors IEF (Partner 2) and CERME. (Partner 3), Contracting Authority IFA Măgurele, 2004-2006.

⁴ In the origin model detailed analyses for the 27 EU countries for 2003 were performed.

the basis of thorough analyses of the factors that restrict the competitiveness potential of the analyzed countries, 10 criteria were selected, grouped in 5 domains:

a. Economic operational overall performance (of the reference year), analyzed through 4 criteria:

- annual GDP growth rate, %
- annual average unemployment rate, %
- annual average inflation rate, %
- share of consolidated budget deficit (-) /surplus (+) in GDP, %

The 4 criteria selected corresponded to the major goals of the EU governments, and some of them had and have preset values for all the EU countries as according to the Maastricht Treaty (annual inflation rate and general consolidated budget deficit). The annual values of the 4 criteria mirror the finality of the governmental policies in many areas of the social and economic life and represent significant benchmarks of the macroeconomic stability of the analyzed countries.

Of these four criteria, according to the availability of the statistical data and the relevance for the current analysis two were considered for the regional competitiveness analysis: (IC1) annual GDP growth rate, (%) and (IC2) annual average unemployment rate, (%). To these a third criterion was added – (IC3) evolutions of the households disposable income, aggregated from two sub-criteria:

- (IC31) households disposable income (uses) at standard purchasing power parity per inhabitant (absolute values);
- (IC32) annual change of the households disposable income (uses) at standard purchasing power parity, (%).

b. Energy use, analyzed through one criterion:

- energy intensity, Kg oil equivalent/1 USD of GDP

The criterion was considered as essential in assessing a country's energy intensity, in other words its capability to generate GDP under circumstances of maximum energy efficiency. The energy intensity is directly influenced by the economy's structure, by the extent to which the high value-added and low energy consumption sectors are developed, as well as by the energy production, transport and distribution ratios.

Unfortunately, for the regional level there are no statistical data available as regards such an indicator, and in the case of possible proxies either by the means of energy production or by that of energy consumption currently there are not enough statistical data for computation and analysis.

c. Information technology and communications, analyzed through one criterion, aggregated from 5 sub-criteria:

- computers/1000 inhabitants,
- Internet users/1000 inhabitants,
- mobile phones/100 inhabitants,
- fix phone lines/100 inhabitants,
- TV receivers/1000 inhabitants.

The information technology and communications are unanimously recognized as main vectors of competitiveness development and increase, at the same time constitut-

ing the essential framework of the knowledge society. This criterion is influenced by the population structure (urban-rural), and by the upgrading and updating of the education, research-development and public administration systems.

As mentioned above, currently there are not enough statistical data at regional level as regards such indicators, although there is an Eurostat new data base referring to the informational society indicators, which also includes some regional series – but the number of indicators and countries is limited. To the extent to which in the future such a data base may be completed with compatible and relevant information from other sources, such a criterion will be introduced in the proposed system, a fact that will open new opportunities of analysis and will induce a higher relevance into the „global” competitiveness evaluation indicator.

It is also worth mentioning that the authors’ intention to use a „substitute criterion” referring either to the share of R&D expenditures in the regional GDP or the number of patent applications at regional level was blocked by the absence of the relevant statistical data for many EU countries and regions.

d. Gross value-added structure, analyzed through 2 criteria:

- share of gross value-added in the high technology sectors (TA), transport means (TR) and machinery and equipment (TH) in the manufacturing industry, %
- share of services value-added in GDP, %

The peculiarity of the origin model was the systemic approach through which were identified the domains where the systems of companies bring important contributions to the sustainable GDP growth and, consequently, to that of competitiveness.

Since at regional level more detailed data (referring to the technology level, as according to the model’s requirements) regarding the gross value-added structure are not available and given the importance of industry for the economy of many EU regions, the use of another criterion was preferred, namely (IC4) the share of industry and services gross value-added in GDP, (%). To the extent to which in the future the available data will be completed with information regarding the GVA structure by technology level categories, such a criterion will be expanded as according to the national level model.

e. Participation on the international markets, analyzed through 2 criteria:

- share of exports of high technology sectors (TA), transport means (TR) and machinery and equipment (TH) in the total manufacturing industry exports, %
- coverage of imports by exports, %

These sub-criteria reveal each country’s position as regards the influence of the trade deficit or surplus on the gross domestic product. From the point of view of the European union single market, the criterion reveals in a clear manner the countries with significant surplus or deficit on the international market, with impact upon competitiveness growth.

Also in the case of this criterion, currently there are no published data regarding the exports structure by technological groups at regional level, which means that for the time being such a criterion cannot be included into the structure of the „global” competitiveness indicator.

However, in order not to give up entirely the importance of the technology level for the regions’ competitiveness and also taking into account the recent dynamics of the

economic sectors, the authors propose another criterion (in accordance with the available data as well) – (IC5) the share in total employment of the persons employed in competitiveness-enhancing sectors in industry and services, aggregated from three sub-criteria:

- (IC51) share in total employment of the persons employed in high and medium-high technology manufacturing and knowledge-intensive high-technology services, (%);
- (IC52) share in the total employment of the persons employed in low and medium-low technology manufacturing sector, (%);
- (IC53) share in total employment of the persons employed in the knowledge-intensive services, (%).

An argument against the use of such a criterion might be that that it is more one of resources/causes and less a results one, but currently the statistical data available for the EU countries/regions do not allow for the use of other indicators.

According to the authors' opinion, the proposed model is highly corresponding to the requirements of an operational model of competitiveness evaluation because it uses essentially integrating criteria and comparable data resulted from quasi-unitary methodologies (all the statistical data series were extracted from the Eurostat regional data bases) accessible each year for a large number of regions and countries, which in the future will allow for global multi-annual comparisons.

2.2. The competitiveness evaluation methodology

From methodological point of view, each criterion computes the hierarchy of the countries/regions as according to the relationship:

$$I_{ci} = \frac{V_i - V_{i_{\min}}}{V_{i_{\max}} - V_{i_{\min}}} \text{ where:}$$

V_i – value of a country/region for the „i” criterion;

$V_{i_{\min}}$ – the minimum value of the „i” criterion for the evaluated countries;

$V_{i_{\max}}$ – the maximum value of the „i” criterion for the evaluated countries.

In the case of unemployment rate and share in total employment of the persons employed in low and medium-low technology manufacturing sector, the relationship is as follows:

$$I_{ci} = 1 - \frac{V_i - V_{i_{\min}}}{V_{i_{\max}} - V_{i_{\min}}}$$

In these cases, the criteria's maximum values have a negative economic significance, while the minimum ones have a positive economic significance.

The final value of the „global” competitiveness indicator for each country/region is:

$$IC_{Fin} = (IC1+IC2+IC3+IC4+IC5)/5.$$

As according to the methodology, all the criteria values fall within the interval 0 – 1, and for each criterion there is a country that has 1 as reference value – the maximum

one – and a country that has 0 as reference value – the minimum one.

The evaluation method is similar to that used by UNDP to elaborate the value of the human development index (HDI), with the specification that the maximum and minimum values of each criterion are not preset but are depending on the number of the evaluated countries/regions.

The essential advantage of the method is the comparability of the values and, consequently, of the facilities provided to the determination of the „global” competitiveness indicator.

It was also computed a final „weighted” competitiveness indicators of the countries/regions, in the attempt to better capture both the impact of the economic structure and of the competitiveness-enhancing sectors:

$$ICPond = (IC1+IC2+IC3/3)*0.4 + IC4*0.3 + IC5*0.3$$

In order to identify the country’s weak and strong points as regards competitiveness, in the origin model a hierarchy of the EU countries in 5 competitiveness groups was created by using the „core” method, largely used in statistical analysis. The values of the final hierarchy and also for each criterion were divided as according to Table 1 (where m is the average and s the standard deviation of the series).

Table 1

Group	Value of indicator x_i	Competitiveness significance
A ⁺	$m + s < I_{Ci}$	Very high relative competitiveness
A	$m + 1/3 s < I_{Ci} \leq m + s$	High relative competitiveness
B	$m - 1/3 s < I_{Ci} \leq m + 1/3 s$	Medium relative competitiveness
C	$m - s < I_{Ci} \leq m - 1/3 s$	Low relative competitiveness
C ⁻	$I_{Ci} \leq m - s$	Very low relative competitiveness

The term „relative competitiveness” emphasized the fact that the analysis referred to a restricted group of countries (27) and it did not take into account all the world’s countries.

Using a similar methodology, for the countries/regions analysis the authors propose a hierarchy by 9 competitiveness groups, as according to Table 2:

Table 2

Group	Value of indicator x_i	Competitiveness significance
A ⁺⁺	$m + 1,75s \leq I_{Ci}$	Very high relative competitiveness
A ⁺	$m + s < I_{Ci} \leq m + 1,75s$	High relative competitiveness

A	$m + 0,5 s < I_{Ci} \leq m + s$	High-medium relative competitiveness
B ⁺	$m < I_{Ci} \leq m + 0,5 s$	Medium-high relative competitiveness
B	$m - 0,5 s < I_{Ci} \leq m$	Medium relative competitiveness
B ⁻	$m - s < I_{Ci} \leq m - 0,5 s$	Medium-low relative competitiveness
C	$m - 0,5s < I_{Ci} \leq m - s$	Low-medium relative competitiveness
C ⁻	$m - s < I_{Ci} \leq m - 1,75s$	Low relative competitiveness
C ⁻	$I_{Ci} \leq m - 1,75s$	Very low relative competitiveness

The sense of the term „relative competitiveness” is similar to the origin model, also emphasizing that the analysis refers to a restricted group of EU countries and regions.

3. Application of the model for the most recent reference year for which there are available data for the EU countries and regions

For computations were used only data extracted from Eurostat databases, for 2004, this being the reference year for the application of the model. Also, were taken into account only those countries for which complete or near complete data series for all the five considered criteria were¹.

In the following, it will be presented only the final hierarchy of the EU countries/regions according to the „global” competitiveness indicators (ICFin and ICPond)². The results are shown in Appendix 1.

Thus, in the case of the no-weighting „global” competitiveness indicator (ICFin), the average of the values of the considered EU countries/regions was 0.5186, while the standard deviation was 0.0820 in 2004. As compared to the series average, the EU countries/regions included in the newest two „accession waves” fell within the limits 100.9% for Latvia and 121.5% for the Praha region in the Czech Republic and 77.5% for Poland and 62.3% for the Podlaskie region also in Poland. The average values were lower as compared to the EU-15 countries, in their case the limits varying between 118.8% for United Kingdom and 128.8% for the Berkshire, Bucks and Oxfordshire region also in the United Kingdom and 94.8% for Spain and 69.4% for the Extremadura region, also in Spain.

In the case of the weighted competitiveness indicator (ICPond), the average of the values of the considered EU countries/regions was 0.5911, while the standard devia-

¹ In the case of some countries like Germany, France, Spain, Italy and Finland a very small number of regions for which there were missing data for a certain indicator was excluded.

²For the detailed results, the authors may be contacted.

tion was 0.0886 in 2004. As compared to the series average, the EU countries/regions included in the newest two „accession waves” fell within the limits 95.8% for the Czech Republic and 124.3% for the Praha region also in the Czech Republic and 72.4% for Romania and 54.3% for the Nord-Est region also in Romania. The average values were also lower as compared to the EU-15 countries, in their case the limits varying between 118.8% for United Kingdom and 127.9% for the Berkshire, Bucks and Oxfordshire region also in the United Kingdom and 95.3% for Spain and 67.0% for the Extremadura region, also in Spain.

3.1. Hierarchies by competitiveness groups of the EU countries/regions

Table 3 shows the synthesis of competitiveness groups hierarchies of the analyzed EU countries using the above-mentioned methodology.

Table 3

<i>Country</i>	<i>Competitiveness group</i>			
	<i>No weight- ing IC</i>	<i>Significance</i>	<i>Weighted IC</i>	<i>Significance</i>
<i>United Kingdom</i>	<i>A⁺</i>	<i>High relative competitiveness</i>	<i>A⁺</i>	<i>High relative competitiveness</i>
<i>Sweden</i>	<i>A</i>	High-medium relative competitiveness	<i>A</i>	High-medium relative competitiveness
<i>Austria</i>	<i>A</i>	<i>High-medium relative competitiveness</i>	<i>A</i>	<i>High-medium relative competitiveness</i>
<i>Netherlands</i>	<i>A</i>	<i>High-medium relative competitiveness</i>	<i>A</i>	<i>High-medium relative competitiveness</i>
<i>Ireland</i>	<i>A</i>	<i>High-medium relative competitiveness</i>	<i>A</i>	<i>High-medium relative competitiveness</i>
<i>Belgium</i>	<i>B⁺</i>	<i>Medium-high relative competitiveness</i>	<i>A</i>	<i>Medium-high relative competitiveness</i>
<i>Denmark</i>	<i>B⁺</i>	<i>Medium-high relative competitiveness</i>	<i>B⁺</i>	<i>Medium-high relative competitiveness</i>
<i>Germany</i>	<i>B⁺</i>	<i>Medium-high relative competitiveness</i>	<i>A</i>	<i>High-medium relative competitiveness</i>

<i>Estonia</i>	<i>B⁺</i>	<i>Medium-high relative competitiveness</i>	<i>B</i>	<i>Medium relative competitiveness</i>
<i>France</i>	<i>B⁺</i>	<i>Medium-high relative competitiveness</i>	<i>B⁺</i>	<i>Medium-high relative competitiveness</i>
<i>Latvia</i>	<i>B⁺</i>	<i>Medium-high relative competitiveness</i>	<i>B</i>	<i>Medium relative competitiveness</i>
<i>Finland</i>	<i>B⁺</i>	<i>Medium-high relative competitiveness</i>	<i>B⁺</i>	<i>Medium-high relative competitiveness</i>
<i>Czech Republic</i>	<i>B</i>	<i>Medium relative competitiveness</i>	<i>B</i>	<i>Medium relative competitiveness</i>
<i>Spain</i>	<i>B</i>	<i>Medium relative competitiveness</i>	<i>B</i>	<i>Medium relative competitiveness</i>
<i>Italy</i>	<i>B</i>	<i>Medium relative competitiveness</i>	<i>B</i>	<i>Medium relative competitiveness</i>
<i>Lithuania</i>	<i>B</i>	<i>Medium relative competitiveness</i>	<i>B⁻</i>	<i>Medium-low relative competitiveness</i>
<i>Hungary</i>	<i>B</i>	<i>Medium relative competitiveness</i>	<i>B⁻</i>	<i>Medium-low relative competitiveness</i>
<i>Romania</i>	<i>C</i>	<i>Low-medium relative competitiveness</i>	<i>C⁻</i>	<i>Very low relative competitiveness</i>
<i>Slovakia</i>	<i>C</i>	<i>Low relative competitiveness</i>	<i>C</i>	<i>Low relative competitiveness</i>
<i>Poland</i>	<i>C</i>	<i>Low relative competitiveness</i>	<i>C</i>	<i>Low relative competitiveness</i>

Significant competitiveness differences might be noticed among the EU-15 countries and those that acceded to the EU in 2004 and 2007, the negative differences being even more important when considering the weighted indicator. As regards the situation of the NUTS-1 and NUTS-2 regions (where they are revealed), the positions are even more differentiated:

- **Belgium:** according to ICFin, the highest competitiveness group is *A⁺* - high relative competitiveness (1 region – Brabant Wallon), and the lowest is *B⁻* - medium-low relative competitiveness (1 region - Hainaut). The relative competitiveness gap among the regions (the ratio of maximum to minimum ICFin for a country's regions) is 1.32. According to ICPond, the highest competi-

tiveness group is A^+ - high relative competitiveness (2 regions – Vlaams-Brabant, Brabant Wallon), and the lowest is B - medium relative competitiveness (2 regions – Hainaut, Liege). The relative competitiveness gap among the regions (the ratio of maximum to minimum IC_{Pond} for a country's regions) is 1.25.

- **Czech Republic:** according to IC_{Fin}, the highest competitiveness group is A^+ - high relative competitiveness (1 region – Praha), and the lowest is C - low relative competitiveness (1 region - Severozápad). The relative competitiveness gap among the regions is 1.48. According to IC_{Pond}, the highest competitiveness group is A^+ - high relative competitiveness (1 region – Praha), and the lowest is C – low-medium relative competitiveness (4 regions – Severozápad, Severovýchod, Jihovýchod, Stredni Morava). The relative competitiveness gap among the regions is 1.46.
- **Germany¹** - according to IC_{Fin}, the highest competitiveness group is A^+ - high relative competitiveness (1 region NUTS-1 - Bayern and 5 regions NUTS-2 – Karlsruhe, Oberbayern, Mittelfranken, Darmstadt, Rheinessen-Pfalz), and the lowest is C⁻ - very low relative competitiveness (1 region - Dessau). The relative competitiveness gap among the regions is 1.66. According to IC_{Pond}, the highest competitiveness group is A^{++} - very high relative competitiveness (1 region – Oberbayern), and the lowest is C – low-medium relative competitiveness (1 region NUTS-1 – Sachsen-Anhalt and 4 regions NUTS-2 – Mecklenburg-Vorpommern, Dessau, Halle, Magdeburg). The relative competitiveness gap among the regions is 1.43.
- **Spain²** - according to IC_{Fin}, the highest competitiveness group is A^+ - high relative competitiveness (1 region – Comunidad de Madrid), and the lowest is C⁻ - very low relative competitiveness (1 region - Extremadura). The relative competitiveness gap among the regions is 1.67. According to IC_{Pond}, the highest competitiveness group is A^+ - high relative competitiveness (1 region – Comunidad de Madrid), and the lowest is C – low-medium relative competitiveness (2 regions – Castilla-la-Mancha, Extremadura). The relative competitiveness gap among the regions is 1.77.
- **France³** - according to IC_{Fin}, the highest competitiveness group is A – high-medium relative competitiveness (1 region – Île de France), and the lowest is B⁻ - medium-low relative competitiveness (1 region - Picardie). The relative competitiveness gap among the regions is 1.23. According to IC_{Pond}, the highest competitiveness group is A^+ - high relative competitiveness (1 region – Île de France), and the lowest is C – low-medium relative competitiveness (2 regions – Picardie, Champagne-Ardennes). The relative competitiveness gap among the regions is 1.35.
- **Italy⁴** - according to IC_{Fin}, the highest competitiveness group is A^+ - high relative competitiveness (1 region – Lazio), and the lowest is C⁻ - very low relative competitiveness (1 region NUTS-1 - Isole and a region NUTS-2 - Sicilia). The relative competitiveness gap among the regions is 1.57. According to IC_{Pond}, the highest competitiveness group is A^+ - high relative competitiveness (1 region – Lazio), and the lowest is C - low relative competitiveness (1 region

¹ Excluding NUTS-2 regions Brandenburg Nordost (missing data regarding IC2) and Brandenburg Sudwest (missing data regarding IC2 and IC5).

² Excluding NUTS-2 regions Ciudadada Autonoma de Ceuta and Ciudad Autonoma de Melilla (missing data regarding IC2 and IC5).

³ Excluding NUTS-2 region Corse (missing data regarding IC5) and NUTS-1 region French overseas departments (missing data regarding IC3 and IC5).

⁴ Excluding NUTS-2 regions Valle d'Aosta and Provincia Autonoma Trento (missing data regarding IC5).

- NUTS-1 - Isole and 5 regions NUTS-2 – Puglia, Basilicata, Calabria, Sicilia, Sardegna). The relative competitiveness gap among the regions is 1.44.
- **Hungary** – according to ICFin, the highest competitiveness group is B^+ - medium-high relative competitiveness (1 region – Közép-Magyarország), and the lowest is C^- - Low relative competitiveness (3 regions – Nyugat-Dunántul, Dél-Dunántul, Észak-Alföld). The relative competitiveness gap among the regions is 1.26. According to ICPond, the highest competitiveness group is B^+ - medium-high relative competitiveness (1 region – Közép-Magyarország), and the lowest is C^- - very low relative competitiveness (2 regions – Észak-Alföld, Dél-Alföld). The relative competitiveness gap among the regions is 1.43.
 - **Netherlands** – according to ICFin, the highest competitiveness group is A – high-medium relative competitiveness (3 regions – West Nederland, Utrecht, Noord-Holland), and the lowest is B – medium relative competitiveness (1 region NUTS-1 - Noord-Nederland and 3 regions NUTS-2 – Friesland, Drenthe, Zeeland). The relative competitiveness gap among the regions is 1.20. According to ICPond, the highest competitiveness group is A - high-medium relative competitiveness (3 regions – West Nederland, Utrecht, Noord-Holland), and the lowest is B – medium relative competitiveness (1 region NUTS-1 - Noord-Nederland and 3 regions NUTS-2 – Friesland, Drenthe, Overijssel, Zeeland). The relative competitiveness gap among the regions is 1.23.
 - **Austria** – according to ICFin, the highest competitiveness group is A^+ - high relative competitiveness (1 region – Salzburg), and the lowest is B^+ - medium-high relative competitiveness (1 region – Burgenland). The relative competitiveness gap among the regions is 1.12 (the lowest among the analyzed countries). According to ICPond, the highest competitiveness group is A^+ - high relative competitiveness (1 region – Wien), and the lowest is B – medium relative competitiveness (1 region – Burgenland). The relative competitiveness gap among the regions is 1.19 (the lowest among the analyzed countries).
 - **Poland** – according to ICFin, the highest competitiveness group is B^+ - medium-high relative competitiveness (1 region – Opolskie), and the lowest is C^- - very low relative competitiveness (3 regions NUTS-1 – Wschodni, Polnocno-Zachodni, Polnocny and 7 regions NUTS-2 – Lubelskie, Swietokrzyskie, Podlaskie, Zachodniopomorskie, Dolnoslaskie, Kujawsko-Pomorskie, Warminsko-Mazurskie). The relative competitiveness gap among the regions 1.93 (the highest among the analyzed countries). According to ICPond, the highest competitiveness group is B – medium relative competitiveness (2 regions – Slaskie, Opolskie), and the lowest is C^- - very low relative competitiveness (3 regions NUTS-1 – Wschodni, Polnocno-Zachodni, Polnocny and 8 regions NUTS-2 – Lodskie, Lubelskie, Swietokrzyskie, Podlaskie, Wielkopolskie, Zachodniopomorskie, Kujawsko-Pomorskie, Warminsko-Mazurskie). The relative competitiveness gap among the regions is 1.78.
 - **Romania** - according to ICFin, the highest competitiveness group is A – high-medium relative competitiveness (1 region – București-Ilfov), and the lowest is C^- - very low relative competitiveness (2 regions – Nord_Est, Centru). The relative competitiveness gap among the regions is 1.55. According to ICPond, the highest competitiveness group is B^+ - medium-high relative competitiveness (1 region – București-Ilfov), and the lowest is C^- - very low relative competitiveness (7 regions – Nord-Est, Sud, Sud-Est, Sud-Vest, Vest, Centru, Nord-Vest). The relative competitiveness gap among the regions is 1.95 (the highest among the analyzed countries).
 - **Slovakia** - according to ICFin, the highest competitiveness group is A - high-medium relative

competitiveness (1 region – Bratislavský Kraj), and the lowest is C^- - very low relative competitiveness (2 regions – Stredne Slovensko, Vychodne Slovensko). The relative competitiveness gap among the regions is 1.68. According to ICPond, the highest competitiveness group is A^+ - high relative competitiveness (1 region – Bratislavský Kraj), and the lowest is C^- - very low relative competitiveness (2 regions – Stredne Slovensko, Vychodne Slovensko). The relative competitiveness gap among the regions is 1.62.

- **Finland¹** - according to ICFin, the highest competitiveness group is A - high-medium relative competitiveness (1 region – Etela-Suomi), and the lowest is C - low relative competitiveness (1 region – Ita-Suomi). The relative competitiveness gap among the regions is 1.37. According to ICPond, the highest competitiveness group is A - high-medium relative competitiveness (1 region – Etela-Suomi), and the lowest is C - low relative competitiveness (1 region – Ita-Suomi). The relative competitiveness gap among the regions is 1.42.
- **Sweden** - according to ICFin, the highest competitiveness group is A^+ - high relative competitiveness (1 region – Stockholm), and the lowest is B - medium relative competitiveness (3 regions – Norra Mellansverige, Mellersta Norrland, Smaland). The relative competitiveness gap among the regions is 1.20. According to ICPond, the highest competitiveness group is A^+ - high relative competitiveness (1 region – Stockholm), and the lowest is B^+ - medium-high relative competitiveness (4 regions – Norra Mellansverige, Mellersta Norrland, Ovre Norrland, Smaland). The relative competitiveness gap among the regions is 1.25.
- **United Kingdom** - according to ICFin, the highest competitiveness group is A^{++} - very high relative competitiveness (3 regions – Bedfordshire-Herfordshire; Berkshire, Bucks and Oxford; Devon), and the lowest is C - low-medium relative competitiveness (1 region – Lincolnshire). The relative competitiveness gap among the regions is 1.39. According to ICPond, the highest competitiveness group is A^{++} - very high relative competitiveness (1 region – Berkshire, Bucks and Oxford), and the lowest is C - low-medium relative competitiveness (1 region – Lincolnshire). The relative competitiveness gap among the regions is 1.40.

4. Conclusions

A first conclusion very relevant at strategic level is that all the countries/regions included in the last two „accession waves” must continue their efforts (by their own and joined) to close the gaps against the EU-15 countries/regions, especially that some of them have already succeeded (in 2004) to reach competitiveness levels similar or even higher than those recorded by many EU-15 countries/regions.

It is worth noticing also in the newly acceded countries the presence of certain „engine regions”, much more competitive as compared to the rest of the territory (usually the region where the country’s capital is located), and the very high competitiveness gap among these regions and the regions with lower competitiveness indicators. The most unfortunate situation in this respect may be found in Poland and Romania, especially from the point of view of the indicator that quantifies the influence of the competitiveness-enhancing factors. Thus, these two countries must further concentrate upon accele-

¹ Excluding NUTS-1region Aland (missing data regarding IC2 and IC5).

rating the economy's structure modernization and upon the increasing the importance of the high technology and knowledge intensive sectors.

A somewhat better positioning within the hierarchy as regards the weighted indicator recorded the regions of Belgium, Czech Republic, Germany, Italy, Slovakia and Sweden, a somewhat weaker positioning recorded the regions of France, Spain, Hungary, Poland, Austria, Romania and United Kingdom, while the regions of Finland and Netherlands recorded similar positions.

It is obvious that the hierarchy of the EU countries/regions on the basis of such indicators cannot be deemed as absolute and it does not also capture all the factors that have an impact upon competitiveness – a situation of which the authors are fully aware. They have in mind the further „refining” of the indicators and model in order to include new factors of influence, highly relevant for the competitiveness dynamics at regional, national, European and even world level. Nevertheless, such indicators may have at least a warning signal role as regards the competitiveness deficits of the countries/regions and their possible causes, as well as regarding the economic reforms that must be implemented in order to improve continuously competitiveness as a crucial factor of long-term ensuring of the welfare of a country's/region's citizens.

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Appendix 1

Competitiveness Indicators	ICFin	ICWeigh
be Belgium	0.6118	0.6396
be10 Région de Bruxelles-Capitale/Brussels Hoofdstedelijk Gewest	0.5641	0.6378
be2 Vlaams Gewest	0.6393	0.6522
be21 Prov. Antwerpen	0.6483	0.6676
be22 Prov. Limburg (B)	0.5766	0.6050
be23 Prov. Oost-Vlaanderen	0.6418	0.6487
be24 Prov. Vlaams Brabant	0.7011	0.7211
be25 Prov. West-Vlaanderen	0.6031	0.5968
be3 Région Wallonne	0.5780	0.6144
be31 Prov. Brabant Wallon	0.7225	0.7374
be32 Prov. Hainaut	0.5400	0.5886
be33 Prov. Liège	0.5488	0.5900
be34 Prov. Luxembourg (B)	0.6173	0.6163
be35 Prov. Namur	0.5897	0.6234
cz Czech Republic	0.5611	0.5665
cz01 Praha	0.7066	0.7348
cz02 Střední Čechy	0.5758	0.5753
cz03 Jihozápad	0.5825	0.5619
cz04 Severozápad	0.4765	0.5102
cz05 Severovýchod	0.5310	0.5301
cz06 Jihovýchod	0.5178	0.5163
cz07 Střední Morava	0.5074	0.5033
cz08 Moravskoslezsko	0.5630	0.5564
dk Denmark	0.5925	0.6018
de Germany (including ex-GDR from 1991)	0.6105	0.6558
de1 Baden-Württemberg	0.6565	0.6996
de11 Stuttgart	0.6620	0.7125
de12 Karlsruhe	0.6715	0.7182
de13 Freiburg	0.6337	0.6665
de14 Tübingen	0.6461	0.6803
de2 Bayern	0.6708	0.6977

de21 Oberbayern	0.7135	0.7468
de22 Niederbayern	0.6592	0.6661
de23 Oberpfalz	0.6291	0.6531
de24 Oberfranken	0.5883	0.6075
de25 Mittelfranken	0.6800	0.7125
de26 Unterfranken	0.6385	0.6691
de27 Schwaben	0.6584	0.6794
de30 Berlin	0.5264	0.6287
de4 Brandenburg	0.5054	0.5663
de50 Bremen	0.5836	0.6509
de60 Hamburg	0.6633	0.7089
de7 Hessen	0.6516	0.7009
de71 Darmstadt	0.6727	0.7278
de72 Gießen	0.6080	0.6460
de73 Kassel	0.6209	0.6594
de80 Mecklenburg-Vorpommern	0.4599	0.5240
de9 Niedersachsen	0.5992	0.6389
de91 Braunschweig	0.5716	0.6438
de92 Hannover	0.6135	0.6597
de93 Lüneburg	0.6153	0.6395
de94 Weser-Ems	0.5952	0.6161
dea Nordrhein-Westfalen	0.6091	0.6482
dea1 Düsseldorf	0.6182	0.6616
dea2 Köln	0.6378	0.6877
dea3 Münster	0.6001	0.6336
dea4 Detmold	0.5825	0.6050
dea5 Arnsberg	0.5835	0.6164
deb Rheinland-Pfalz	0.6491	0.6765
deb1 Koblenz	0.6266	0.6500
deb2 Trier	0.6208	0.6310
deb3 Rheinhessen-Pfalz	0.6733	0.7080
dec0 Saarland	0.6589	0.6906
ded Sachsen	0.5252	0.5893
ded1 Chemnitz	0.5181	0.5773
ded2 Dresden	0.5521	0.6094
ded3 Leipzig	0.4939	0.5756
dee Sachsen-Anhalt	0.4671	0.5377
dee1 Dessau	0.4298	0.5140
dee2 Halle	0.4675	0.5448
dee3 Magdeburg	0.4808	0.5417
def0 Schleswig-Holstein	0.6148	0.6524
deg0 Thüringen	0.5274	0.5773
ee Estonia	0.5818	0.5608
ie Ireland	0.6607	0.6591
es Spain	0.5514	0.5632
es1 Noroeste	0.5114	0.5182
es11 Galicia	0.4945	0.4978

es12 Principado de Asturias	0.5380	0.5512
es13 Cantabria	0.5464	0.5525
es2 Noreste	0.5925	0.5919
es21 Pais Vasco	0.6005	0.6151
es22 Comunidad Foral de Navarra	0.6197	0.6055
es23 La Rioja	0.4975	0.4388
es24 Aragón	0.5884	0.5783
es30 Comunidad de Madrid	0.6747	0.7008
es4 Centro (ES)	0.4684	0.4439
es41 Castilla y León	0.5022	0.4854
es42 Castilla-la Mancha	0.4561	0.4091
es43 Extremadura	0.4033	0.3958
es5 Este	0.5677	0.5793
es51 Cataluña	0.5898	0.6049
es52 Comunidad Valenciana	0.5285	0.5324
es53 Illes Balears	0.5862	0.6030
es6 Sur	0.4726	0.4875
es61 Andalucía	0.4670	0.4859
es62 Región de Murcia	0.4917	0.4823
es70 Canarias (ES)	0.5503	0.5842
fr France	0.5976	0.6245
fr10 Île de France	0.6555	0.7082
fr2 Bassin Parisien	0.5803	0.5813
fr21 Champagne-Ardenne	0.5728	0.5231
fr22 Picardie	0.5344	0.5438
fr23 Haute-Normandie	0.6090	0.6330
fr24 Centre	0.5883	0.5989
fr25 Basse-Normandie	0.5953	0.5958
fr26 Bourgogne	0.5876	0.5815
fr30 Nord - Pas-de-Calais	0.5427	0.5816
fr4 Est	0.5929	0.6129
fr41 Lorraine	0.5670	0.5945
fr42 Alsace	0.6245	0.6405
fr43 Franche-Comté	0.5811	0.5967
fr5 Ouest	0.6035	0.6071
fr51 Pays de la Loire	0.5989	0.6059
fr52 Bretagne	0.6273	0.6272
fr53 Poitou-Charentes	0.5723	0.5751
fr6 Sud-Ouest	0.5795	0.5910
fr61 Aquitaine	0.5738	0.5802
fr62 Midi-Pyrénées	0.5928	0.6107
fr63 Limousin	0.5543	0.5632
fr7 Centre-Est	0.6071	0.6258
fr71 Rhône-Alpes	0.6162	0.6400
fr72 Auvergne	0.5624	0.5582
fr8 Méditerranée	0.6002	0.6359
fr81 Languedoc-Roussillon	0.5702	0.6003
fr82 Provence-Alpes-Côte d'Azur	0.6167	0.6546

it Italy	0.5670	0.5898
itc Nord Ovest	0.6151	0.6298
itc1 Piemonte	0.6171	0.6293
itc3 Liguria	0.6146	0.6479
itc4 Lombardia	0.6139	0.6270
itd Nord Est	0.6012	0.6042
itd1 Provincia Autonoma Bolzano-Bozen	0.6256	0.6054
itd2 Provincia Autonoma Trento	0.5785	0.5859
itd3 Veneto	0.6121	0.6103
itd4 Friuli-Venezia Giulia	0.5920	0.6027
itd5 Emilia-Romagna	0.5938	0.6015
ite Centro (IT)	0.6181	0.6331
ite1 Toscana	0.5735	0.5852
ite2 Umbria	0.5849	0.5916
ite3 Marche	0.5623	0.5586
ite4 Lazio	0.6679	0.6929
itf Sud (IT)	0.4656	0.5069
itf1 Abruzzo	0.5014	0.5432
itf2 Molise	0.5098	0.5370
itf3 Campania	0.4642	0.5179
itf4 Puglia	0.4482	0.4810
itf5 Basilicata	0.4754	0.4966
itf6 Calabria	0.4695	0.4994
itg Isole (IT)	0.4320	0.4864
itg1 Sicilia	0.4242	0.4826
itg2 Sardegna	0.4573	0.4998
lv Latvia	0.5869	0.5650
lt Lithuania	0.5557	0.5392
hu Hungary	0.5461	0.5145
hu10 Közép-Magyarország	0.6080	0.6006
hu2 Dunántúl	0.5167	0.4794
hu21 Közép-Dunántúl	0.5786	0.5325
hu22 Nyugat-Dunántúl	0.4815	0.4569
hu23 Dél-Dunántúl	0.4828	0.4377
hu3 Alföld és Észak	0.5213	0.4580
hu31 Észak-Magyarország	0.5820	0.5264
hu32 Észak-Alföld	0.4820	0.4337
hu33 Dél-Alföld	0.5069	0.4214
nl Netherlands	0.6271	0.6431
nl1 Noord-Nederland	0.5741	0.5837
nl11 Groningen	0.6042	0.6254
nl12 Friesland	0.5516	0.5496
nl13 Drenthe	0.5479	0.5589
nl2 Oost-Nederland	0.6009	0.6057
nl21 Overijssel	0.5867	0.5904
nl22 Gelderland	0.6069	0.6129

nl23 Flevoland	0.6191	0.6149
nl3 West-Nederland	0.6338	0.6495
nl31 Utrecht	0.6501	0.6751
nl32 Noord-Holland	0.6598	0.6723
nl33 Zuid-Holland	0.6105	0.6271
nl34 Zeeland	0.5759	0.5784
nl4 Zuid-Nederland	0.6054	0.6179
nl41 Noord-Brabant	0.6113	0.6244
nl42 Limburg (NL)	0.5896	0.6016
at Austria	0.6408	0.6442
at1 Ostösterreich	0.6401	0.6579
at11 Burgenland	0.5981	0.5801
at12 Niederösterreich	0.6395	0.6278
at13 Wien	0.6439	0.6892
at2 Südösterreich	0.6434	0.6338
at21 Kärnten	0.6320	0.6292
at22 Steiermark	0.6476	0.6353
at3 Westösterreich	0.6420	0.6349
at31 Oberösterreich	0.6352	0.6237
at32 Salzburg	0.6670	0.6648
at33 Tirol	0.6350	0.6367
at34 Vorarlberg	0.6439	0.6281
pl Poland	0.4506	0.4666
pl1 Centralny	0.4638	0.4866
pl11 Łódzkie	0.3995	0.4001
pl12 Mazowieckie	0.5001	0.5311
pl2 Poludniowy	0.5299	0.5471
pl21 Malopolskie	0.4791	0.5031
pl22 Slaskie	0.5575	0.5712
pl3 Wschodni	0.3975	0.4080
pl31 Lubelskie	0.3885	0.3996
pl32 Podkarpackie	0.4472	0.4696
pl33 Swietokrzyskie	0.3654	0.3841
pl34 Podlaskie	0.3624	0.3435
pl4 Północno-Zachodni	0.4282	0.4230
pl41 Wielkopolskie	0.4500	0.4264
pl42 Zachodniopomorskie	0.3633	0.3993
pl43 Lubuskie	0.4723	0.4638
pl5 Poludniowo-Zachodni	0.4600	0.4910
pl51 Dolnoslaskie	0.4159	0.4663
pl52 Opolskie	0.6143	0.5784
pl6 Północny	0.3911	0.4098
pl61 Kujawsko-Pomorskie	0.3736	0.3793
pl62 Warmińsko-Mazurskie	0.3178	0.3254
pl63 Pomorskie	0.4523	0.4884
ro Romania	0.5133	0.4280
ro11 Nord-Vest	0.4985	0.3914

ro12 Centru	0.4284	0.3587
ro21 Nord-Est	0.4035	0.3207
ro22 Sud-Est	0.5484	0.3998
ro31 Sud - Muntenia	0.5375	0.4039
ro32 Bucuresti - Ilfov	0.6242	0.6264
ro41 Sud-Vest Oltenia	0.4993	0.4020
ro42 Vest	0.5246	0.4246
sk Slovakia	0.4708	0.4911
sk01 Bratislavský kraj	0.6619	0.6843
sk02 Západné Slovensko	0.4978	0.4956
sk03 Stredné Slovensko	0.3978	0.4232
sk04 Východné Slovensko	0.3934	0.4247
fi Finland	0.5834	0.5917
fi1 Manner-Suomi	0.5819	0.5904
fi13 Itä-Suomi	0.4598	0.4549
fi18 Etelä-Suomi	0.6278	0.6441
fi19 Länsi-Suomi	0.5461	0.5433
fi1a Pohjois-Suomi	0.5627	0.5606
se Sweden	0.6514	0.6678
se01 Stockholm	0.7154	0.7460
se02 Östra Mellansverige	0.6511	0.6653
se04 Sydsverige	0.6326	0.6536
se06 Norra Mellansverige	0.6076	0.6005
se07 Mellersta Norrland	0.5983	0.5952
se08 Övre Norrland	0.6237	0.6267
se09 Småland med öarna	0.6136	0.6091
se0a Västsverige	0.6434	0.6652
uk United Kingdom	0.6912	0.7024
ukc North East	0.6472	0.6560
ukc1 Tees Valley and Durham	0.6773	0.6712
ukc2 Northumberland, Tyne and Wear	0.6274	0.6469
ukd North West (including Merseyside)	0.6624	0.6667
ukd1 Cumbria	0.6315	0.6066
ukd2 Cheshire	0.6816	0.6832
ukd3 Greater Manchester	0.6976	0.6924
ukd4 Lancashire	0.6458	0.6510
ukd5 Merseyside	0.5959	0.6351
uke Yorkshire and The Humber	0.6421	0.6402
uke1 East Riding and North Lincolnshire	0.6295	0.6078
uke2 North Yorkshire	0.6297	0.6265
uke3 South Yorkshire	0.6627	0.6583
uke4 West Yorkshire	0.6440	0.6507
ukf East Midlands	0.6695	0.6606
ukf1 Derbyshire and Nottinghamshire	0.6830	0.6708
ukf2 Leicestershire, Rutland and Northants	0.7003	0.6908
ukf3 Lincolnshire	0.5383	0.5394

ukg West Midlands	0.6451	0.6508
ukg1 Herefordshire, Worcestershire and Warks	0.7077	0.6781
ukg2 Shropshire and Staffordshire	0.6514	0.6444
ukg3 West Midlands	0.6121	0.6418
ukh Eastern	0.6960	0.6912
ukh1 East Anglia	0.6804	0.6642
ukh2 Bedfordshire, Hertfordshire	0.7378	0.7421
ukh3 Essex	0.6689	0.6710
uki London	0.7064	0.7224
uki1 Inner London	0.7062	0.7293
uki2 Outer London	0.7077	0.7191
ukj South East	0.7026	0.7092
ukj1 Berkshire, Bucks and Oxfordshire	0.7493	0.7559
ukj2 Surrey, East and West Sussex	0.6792	0.6923
ukj3 Hampshire and Isle of Wight	0.6869	0.6934
ukj4 Kent	0.6860	0.6813
ukk South West	0.6825	0.6733
ukk1 Gloucestershire, Wiltshire and North Somerset	0.6944	0.6960
ukk2 Dorset and Somerset	0.6594	0.6470
ukk3 Cornwall and Isles of Scilly	0.5868	0.5710
ukk4 Devon	0.7293	0.6969
ukl Wales	0.6512	0.6521
ukl1 West Wales and The Valleys	0.6503	0.6491
ukl2 East Wales	0.6555	0.6577
ukm Scotland	0.6459	0.6491
ukm1 North Eastern Scotland	0.6061	0.6012
ukm2 Eastern Scotland	0.6680	0.6629
ukm3 South Western Scotland	0.6440	0.6617
ukm4 Highlands and Islands	0.6250	0.5904
ukn0 Northern Ireland	0.6212	0.6133

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