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Model of Comparative Analysis of the Main Indices of Economic and Social Performance of the European Union Countries¹

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Abstract

In the context of current economic and financial crisis a comparative analysis of the main indices of economic and social performance of the EU member states is necessary. In such line of argument, the authors propose, as novelty, an *economic power-economic performance matrix* as a methodological instrument for monitoring significant discontinuities in the development of the EU member states, able to provide consistent information about some of the threats against the EU economic sustainability. The core idea is to use *integrating criteria* able to reveal in a clear manner the results of the common efforts of governments, businesses and civil society aiming to improve the economic and social performance of the 27 EU countries.

Developing their previous research, the authors propose a model based on 16 criteria grouped into 6 domains, selected on the basis of thorough analyses of the main medium-term determinants of a country's economic and social performance (referring to overall economic performance, structure of economy, foreign trade efficiency, human development policies, informational society and tourism incomes, as proxy for infrastructure development). The economic power-economic performance matrix built on the basis of such a model for all the EU countries revealed a single net leader, both in terms of economic power and economic performance (Germany), but also high significant negative discrepancies between economic power and economic performance, both among the countries with higher economic power (United Kingdom, Italy, Spain) and among the countries with lower economic power (Greece and Romania).

Keywords: economic power, economic performance, integrating criteria, comparative analysis

JEL Classification: C18, C43, O47, O52

Introduction

In the current context of economic and financial crisis we consider as useful the comparative analysis of the main indices of economic and social performance of the European Union countries from at least the following reasons:

¹ The paper presents results of the IEF research project "Model de analiza comparativa a principalilor indici de performanta economica si sociala ai tarilor Uniunii Europene-varianta 2012" (Comparative Analysis Model of the Main Indices of Economic and Social Performance of the EU Countries – Version 2012), authors: Prof. Cezar Mereuta, Prof. Lucian Liviu Albu, mca, Dr. Marioara Iordan, Prof. Ion Ghizdeanu, Dr. Mihaela Nona Chilian, Ph.D. Student Diaconescu Tiberiu.

² Research partially supported by the Sectoral Operational Programme Human Resources Development (SOP HRD), financed from the European Social Fund and by the Romanian Government under the contract number SOP HRD/89/1.5/S/62988.

- a. Romania is member of the European Union;
- b. From medium-term development perspective it is necessary to find out in which class of economic performance is Romania positioned as compared to the EU countries;
- c. A SWOT approach to identify the weak and strong points of each analyzed index is important;
- d. It is also important that the model allows for assessment of the performance levels of the selected indices over time.

1. Defining the criteria and methodology to evaluate the economic and social performance of the European Union countries

The main idea in elaborating the model is to use integrating criteria that allow for a clear revelation of the common efforts of governments, businesses and civil society towards improving the economic and social performance of the analyzed 27 countries.

After a thorough analysis of the main factors that influence the economic and social performance of a country in the medium run, **16 criteria grouped into 6 domains were selected.**

1.1. The model's criteria

a. Macroeconomic performance indices

Ip1 – annual GDP growth rate, %

Ip2 – annual average unemployment rate, %

Ip3 – annual average inflation rate, %

Ip4 – share of gross capital formation in the GDP, %

Ip5 – share of consolidated budget deficit/surplus in the GDP, %

Ip6 – share of public debt in the GDP, %

The six selected criteria correspond to the major goals of the EU governments, some goals having targets set as according to the Maastricht Treaty (inflation rate, consolidated budget deficit, public debt). The selected criteria may be deemed as the most important benchmarks of macroeconomic stability.

b. Index of economy structure

Ip7 – energy intensity, Kg oil equivalent/1 USD of GDP.

The criteria is paramount in assessing the capability of a country to generate gross domestic product with maximum energy efficiency. **The level of energy intensity is directly influenced by the structure of the economy**, by the extent to which the sectors with high value added and low energy consumption are developed, as well as by the yield of energy generation, transport and distribution.

c. Indices of efficient participation in the international markets

Ip8 – share of export of high technology sectors (TA), transport means (TR) and machinery and

equipment (TH) in the total export of manufacturing industry, %

Ip9 – covering of high-tech import by high-tech export, %

Ip10 – covering of imports of goods and services by export, %

The criteria reveal the position of each analyzed country as regards the contribution of deficit or surplus to the gross domestic product. At the same time, the criteria reveal the degree of modernization of the manufacturing industry.

d. Indices of human development policies

Ip11 – share of expenditure on research-development in the GDP, %

Ip12 – share of expenditure on education in the GDP, %

Ip13 – share of expenditure on health in the GDP, %

The three indices define the government policies regarding human development and creativity.

e. Indices of information society

Ip14 – number of Internet users/100 inhabitants

Ip15 – number of computers/100 inhabitants

The two criteria simultaneously reveal the development of and the extent of population involvement in the information society.

f. Index of tourism incomes

Ip16 – spending of foreign visitors in the analyzed country, bill. USD.

The index synthesizes, among others, the ensemble of infrastructure facilities that highly impact on the tourism incomes.

1.2. Methodology to evaluate the performance level

Methodologically, each criterion orders the countries by using the relationship:

$$I_{pi} = \frac{V_i - V_{i \min}}{V_{i \max} - V_{i \min}}, \text{ where:}$$

V_i – the value of the „i” criterion for each country,

$V_{i \min}$ – the minimum value of the „i” criterion for the analyzed countries,

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

For unemployment, inflation, public debt and energy intensity we used the formula:

$$I_{pi} = 1 - \frac{V_i - V_{i \min}}{V_{i \max} - V_{i \min}}.$$

In the above-mentioned cases, the maximum criterion values have negative economic significance, while the minimum values have positive economic significance.

For the criteria where very high differences between the maximum and minimum values were found, the values in logarithm were used. This happened in the cases of „energy intensity” and „tourism incomes” criteria.

According to the methodology, all the values range between 0 and 1. For each criterion we may find at least two countries with reference values 1 – the maximum value – and 0 – the minimum value.

The evaluation method we used is similar to that employed by UNDP to assess the human development indices (HDI).

The final value of the performance index for each analyzed country is

$$I_{pg_i} = \frac{\sum_{i=1}^{16} I_{pi}}{16}$$

1.3. The use of model results as strategic benchmarks for the analyzed countries

The model allows for applying a SWOT analysis, framing the results of each criterion into five classes, as according to the „core” method – frequently used in statistical analysis of distributions that do not vary significantly from the normal one. The criterion’s value are assessed as according to Table 1.

Table 1

Class	The Ipi index values	Significance of performance	Significance of SWOT
A ⁺	$m + s < I_{pi}$	Relatively very high performance	Significantly strong point
A	$m + 1/3 s < I_{pi} \leq m + s$	Relatively high performance	Strong point
B	$m - 1/3 s < I_{pi} \leq m + 1/3 s$	Relatively average performance	Neutral point
C	$m - s < I_{pi} \leq m - 1/3 s$	Relatively low performance	Weak point
C ⁻	$I_{pi} \leq m - s$	Relatively very low performance	Significantly weak point

2. Applying the model on 2009 data for the 27 EU countries

Applying the model on 2009 data is very interesting, because the EU27 went through a year of crisis, when a single country – Poland – experienced a positive growth rate.

Table 2 shows the hierarchy of the 27 EU countries as according to the global performance index, I_{pgi}.

Table 2

Country	Average of 16 indices	Class
Sweden	0.732	A ⁺
Germany	0.687	
Denmark	0.683	
Austria	0.646	
Luxembourg	0.644	
France	0.643	
Netherlands	0.634	A
Finland	0.617	
Belgium	0.598	
Ireland	0.563	

United Kingdom	0.541	B
Slovenia	0.531	
Czech Republic	0.525	
Malta	0.503	
Spain	0.501	
Italy	0.500	
Cyprus	0.464	
Slovakia	0.454	C
Portugal	0.444	
Hungary	0.438	
Poland	0.421	
Estonia	0.413	
Bulgaria	0.379	
Greece	0.321	
Romania	0.294	
Latvia	0.264	
Lithuania	0.262	
m+s	0.640	
m+1/3s	0.552	
m-1/3s	0.463	
m-s	0.375	

M – average 0.507

S – standard deviation 0.133

V – variation coefficient 0.261

The distribution was normal at $P = 0.05$ (Masey test).

Table 3 shows the positioning of the analyzed countries in performance classes as according to the „core” method.

Table 3

No.	Class	Countries
1	A ⁺	Sweden, Germany , Denmark, Austria, Luxembourg, France
2	A	Netherlands, Finland, Belgium, Ireland
3	B	United Kingdom, Slovenia, Czech Republic, Malta, Spain, Italy, Cyprus
4	C	Slovakia, Portugal, Hungary, Poland, Estonia, Bulgaria
5	C ⁻	Greece, Romania, Latvia, Lithuania

3. Strategic options for Romania

3.1. The SWOT analysis of the performance model of Romania

Class	Points	Indices
A ⁺	Significantly strong points	Public debt/GDP
A	Strong points	Unemployment rate
B	Neutral points	Consolidated budget deficit/GDP Share of high technology export in total export

		Covering of high technology import by export
C	Weak points	GDP growth rate Expenditure on education Gross fixed capital formation Tourism incomes
C ⁻	Significantly weak points	Inflation rate Energy intensity Expenditure on R&D Expenditure on health Covering of import of goods and services by export Number of computers per 100 inhabitants Number of Internet users per 100 inhabitants

As compared to the other EU countries, in 2009 Romania had predominantly weak and significantly weak points (Figure 1).

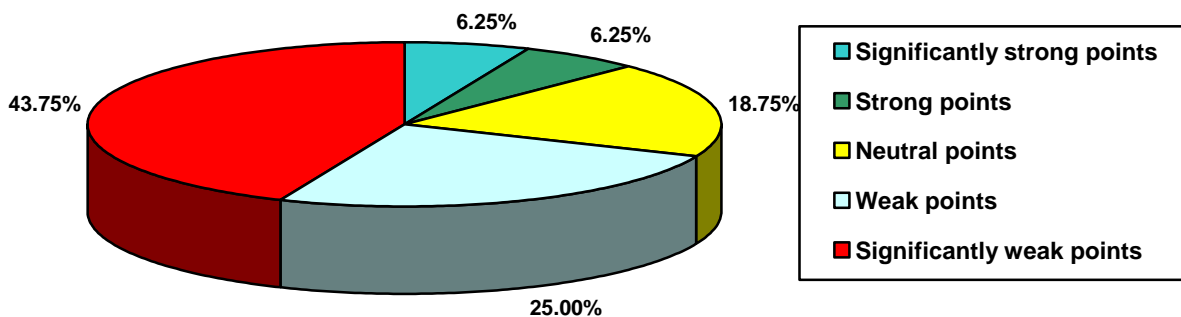


Figure 1

3.2. From strategic point of view, the main options are:

- Health,
- Research-development,
- Development of information society,
- Updating of economy structure,
- Increasing the covering of import of goods and services by export,
- Diminishing the inflation rate,
- Increasing investment,
- Economic growth,
- Education,
- Tourism incomes.

Analysis of the economic and social performance of the 27 EU countries will be done on annual basis, and after three years the model will perform a static and a dynamic evaluation.

4. The economic power – economic performance matrix

4.1. Methodology

The economic power of a country is mainly determined by the size of its gross domestic product. Ideally, to a high gross domestic product, also a high performance level should correspond. However, in reality the facts do not confirm such a rule, so that the presentation of the economic power – economic performance matrix is necessary. Positioning of countries into the matrix zones is highly significant from the perspective of EU27 economic stability.

To elaborate the matrix, we used the same method to classify the GDP as in the case of economic performance and the same economic power hierarchy with five classes, with the following significance:

Class	Significance
A ⁺	Very high economic power
A	High economic power
B	Average economic power
C	Low economic power
C ⁻	Very low economic power

The GDP values in logarithm for 2009 led to the following hierarchy of the 27 EU countries (Table 4):

Table 4

Country	Value	Class
Austria	2.581	A
Belgium	2.672	A
Bulgaria	1.673	C
Cyprus	1.364	C ⁻
Czech Republic	2.292	B
Denmark	2.492	B
Estonia	1.274	C ⁻
Finland	2.380	B
France	3.428	A ⁺
Germany	3.524	A ⁺
Greece	2.525	B
Hungary	2.111	B
Ireland	2.366	B
Italy	3.326	A ⁺
Latvia	1.417	C ⁻
Lithuania	1.573	C ⁻
Luxembourg	1.686	C
Malta	0.898	C ⁻
Netherlands	2.898	A
Poland	2.634	A
Portugal	2.356	B
Romania	2.205	B
Slovakia	1.947	C
Slovenia	1.688	C
Spain	3.167	A ⁺
Sweden	2.606	A
United Kingdom	3.338	A ⁺
M	2.312	m+s
S	0.708	m+1-3 s
V	0.306	m-1/3 s
		m-s
		1.603

The distribution was normal (Masey test).

Figure 2 shows the economic power – economic performance matrix.

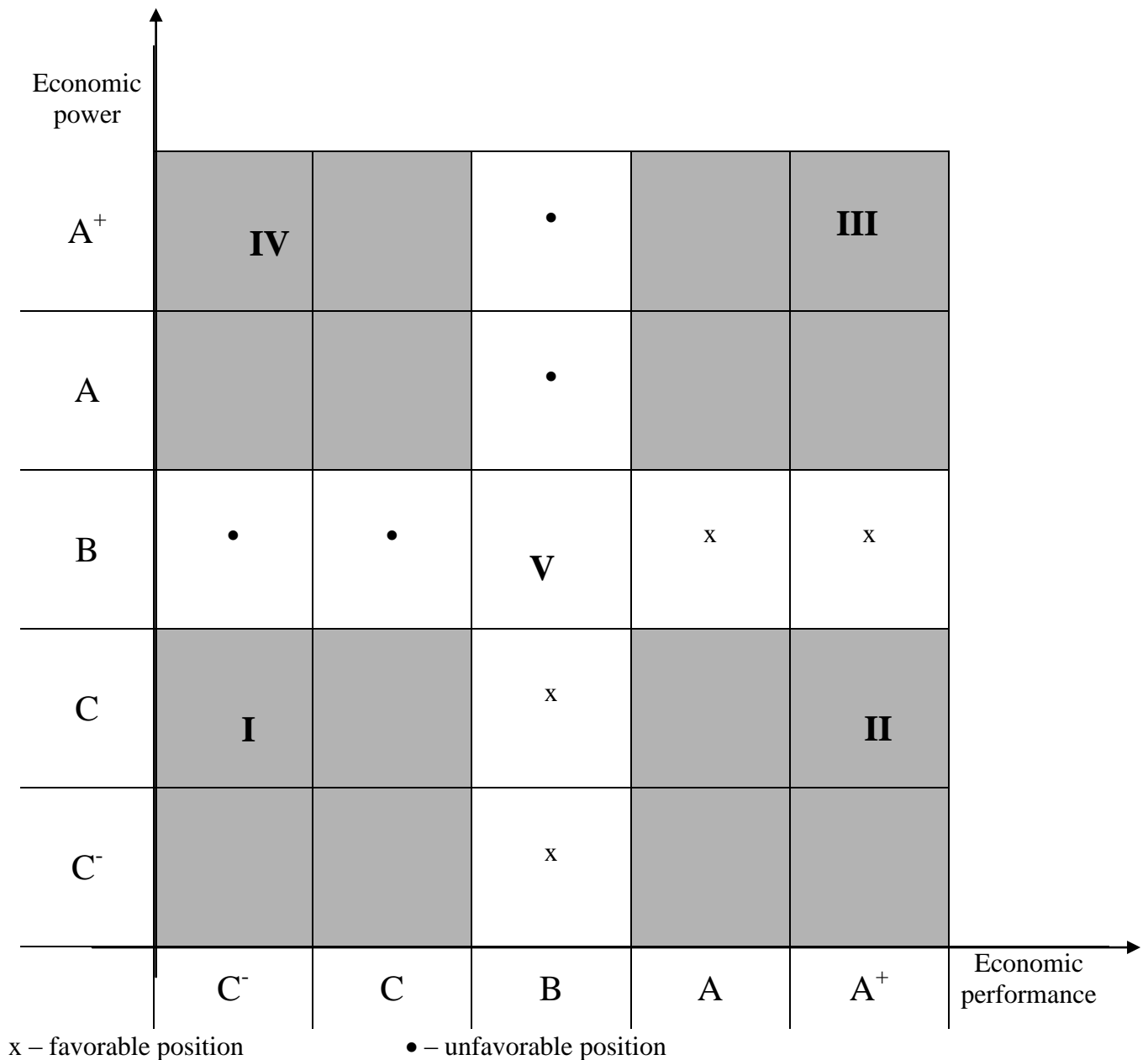


Figure 2

The matrix has five areas, with the following significance:

- Quadrant I – countries with low or very low economic power and poor and very poor economic performance,
- Quadrant II - countries with low or very low economic power and good and very good economic performance
- Quadrant III - countries with high or very high economic power and good and very good economic performance
- Quadrant IV - countries with high or very high economic power and poor and very poor economic performance

- Quadrant V – countries with average economic power or average economic performance and with economic performance or economic power corresponding to other quadrants.

The most important areas of the matrix are:

- Quadrant III – that reveals consolidated positions in countries with high and very high economic power also with good and very good economic performance
- Quadrant I – which signifies the poor economic performance of countries with low economic power. Such countries should aim at surpassing their condition, namely at increasing their economic performance levels.
- Quadrant IV and sub-areas of quadrant V that identify countries with economic power exceeding the economic performance – which include problem-countries as regards monitoring. A special case is that of countries where the difference between the economic power and the economic performance exceeds one class. Such countries may pose significant threats to the global performance of the EU27.

4.2. Positioning of European Union countries into the economic power – economic performance matrix in 2009

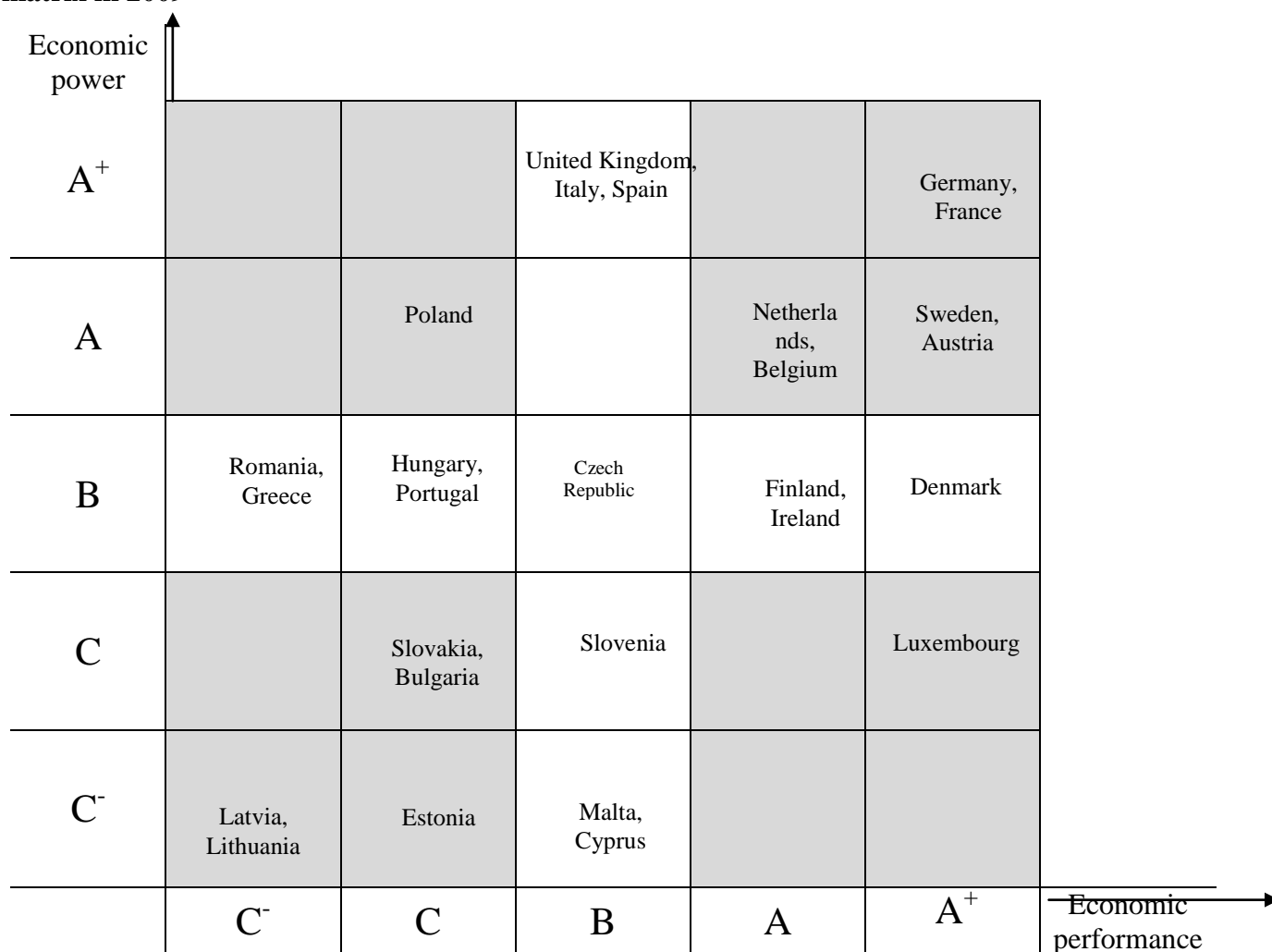


Figure 3

4.3. Conclusions

- a. Two European Union countries - **Germany and France** - were positioned in class A+ on both coordinates: economic power and economic performance.
- b. Quadrant III also included: Sweden (the performance leader), Austria, Netherlands and Belgium.
- c. Luxembourg was the single country with low economic power and A+ class of economic performance. It exhibits the highest class difference in the European Union, thus explaining why it has the highest GDP per capita in the EU.
- d. Three countries with very high economic power had economic performance at a difference exceeding one class ($A^+ - B$): Italy, Spain and the United Kingdom.
- e. Two countries showed significant problems regarding the difference between the economic power and economic performance ($B - C$): Romania and Greece. The situation was serious, because the economic performance was poor.

We consider the economic power – economic performance matrix as a consistent methodological instrument to monitor certain significant discontinuities in the development of the European Union countries.