

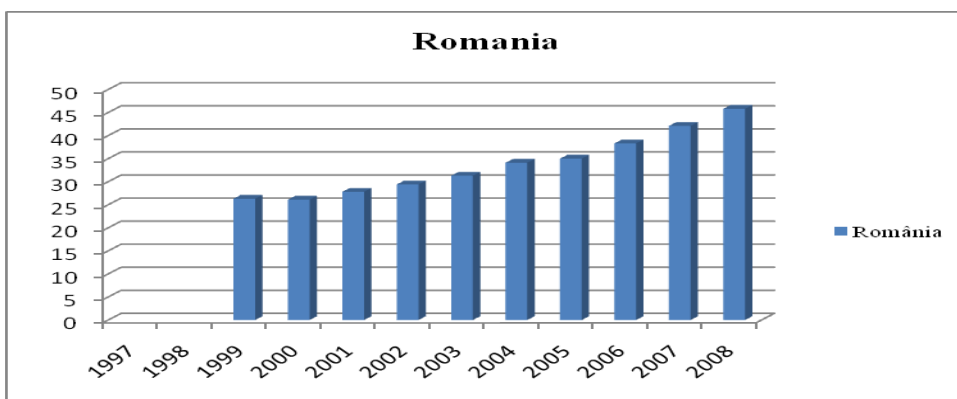
THE PERSPECTIVE OF SPATIO-TEMPORAL VARIABILITY OF ROMANIAN ECONOMY IN EUROPEAN SPACE

Prof. Ioan TALPOȘ, PhD
Assist. Prof. Oana Ramona LOBONȚ, PhD
Assoc. Prof. Nicoleta Moldovan, PhD
West University of Timișoara

Disparities between countries and economic disparities and also the impact of adverse shocks on the economy in recent years is an intense topic of debate for researchers and professionals. Framework for analysis of these phenomena is the economic theories that shape the temporal and spatial dynamics of various economic indicators. Each economic size is characterized by spatial and temporal dimensions and relations of dependency with other economic indicators.

Given the complexity of functional relations that describe the economic indicators, have been developed a number of tools for analysis, and also the statistical and econometric models to study spatial and temporal evolution of different economic size. Romania had made significant progress in the analysis of national accounts by accounting rules, methods for estimating treatment seasonality and consistency between quarterly and annual accounts, in essence, they found "solutions" to provide comprehensive macroeconomic information and detailed in terms of short-term behavior of the economic system, both financially and legally non-financial, of states of the world.

After 1989, it was necessary to ensure comparability of macroeconomic aggregates who reflects the Romanian economy and the economy of other countries and especially with EU countries by introducing the European System of National Accounts (ESA95). In the ranking done by the World Economic Forum 2009-2010, based on Global Competitiveness Index, Romania ranked in 2007, was 72 of 134 countries, in 2008, ranked 68 out of 133 countries (Moldova was excluded from statistics because of lack of official data), respectively, in 2009, ranked 64 out of 133 countries in terms of highlighting key factors for boosting productivity and competitiveness, grouped into nine categories: 1) institutions, 2) infrastructure, 3) the macroeconomic environment, 4) health and primary education, 5) university education and training, 6) market efficiency, 7) technological level; 8) business level, 9) innovation, and ranked 42 in section development, characterized by a GDP amounting to 165,983,000 million \$ at current prices, with a population of 21.5 million people, which gives them a 57 ranked instead of \$ 7,697.2 per capita GDP at current prices per capita.



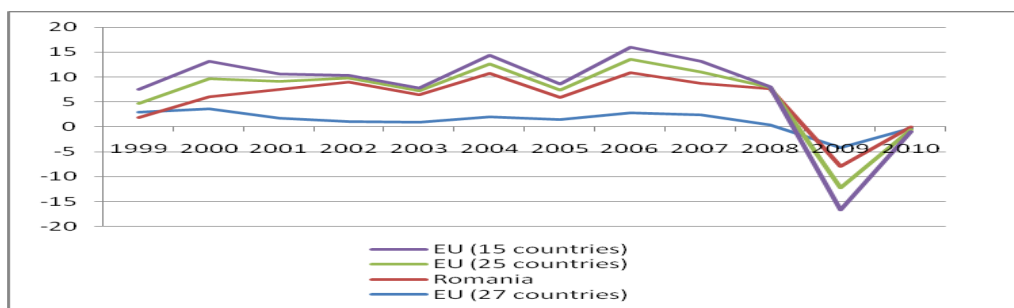
Graph no. 1. Trend in share of GDP per capita in Romania, EU average 27

During the reported period 1997-2008, GDP per capita, although decreased compared to EU-27 average, in a number of countries including Belgium, Denmark, Germany, Italy, Sweden continues to be above that average. In other countries such as Austria, Holland, Finland, the United Kingdom have been small fluctuations, while belonging to the former Communist bloc countries Bulgaria, Latvia, Hungary and Romania have registered significant increases.

Romania, although it has recovered more than 25%, continues to be the second smallest among the EU countries before Bulgaria and Turkey, with a GDP per capita from 2008 PCS, which represent 45.8% of the EU-27, see so that growth of GDP per capita in our country was achieved due to the increase on account of total GDP and population. We believe that our country's integration

into EU structures has increased the chances and opportunities and stressed the need, the advantage of being a full member, to expand the effort to modernize its economy and reduce the gaps that still separate us from other countries.

We base our claim by analyzing the evolution of Romanian economy compared to the EU through economic indicator growth rate of GDP per capita. Motivation for choosing this indicator is that any economic impact, or any crisis, is reflected in the growth rate of GDP, and this presents an analysis of changes in real interest rate of GDP growth over time and space. Analysis period 1999-2008 is the time interval is chosen not by chance, as for Romania, since 1999, the growth rate of GDP is one indicator consistently-stable without disproportionate variations.



Graph no. 2. Dynamics of real output per capita

Real GDP growth in EU-27 countries recorded an average annual rate of 2% versus 6% in our country, but, despite a stronger economic growth (doubling GDP per capita in the last five years) than that recorded by EU-15 over the past decade, new member states Bulgaria and Romania are only about 50% of the EU, the GDP per capita in purchasing power parity. In recent years, Romania has one of the highest growth rates in Europe, however the gap between Romania and the European Union (EU) remains significant. Increase of 7.9% of gross domestic product in 2006, it enrolled in the general process of growth began in 2000 and the latest results recorded Romania was by 4.8 percentage points above the EU-27 average (3, 1%).

But be noted that the process of economic growth was mainly supported by consumption and investment, and although the period 2001-2007 average annual growth rate was about 6% due to construction (8.2%), industry (5 4%) and services (5.8%), investments were recorded (for the third consecutive time) the fastest growing components of demand since 2008, the Romanian economy is affected by the economic crisis. Moreover, historical experience shows that in the world, there are very few economies have managed to grow consistently over 5% per year long term. For example, during 1990-2008, only seven countries have managed this performance, but none of them had a

manpower disadvantage in aging and/or mitigation, phenomena which are found in Romania and which are characteristic of developed countries.

We propose a statistical approach to spatial and temporal variability of the Romanian economy, sought to highlight this trend compared with the EU, the level of development, based on composite index RO/EU

($I_{RO/EU}$), using a methodological elements such as concept of factor and matrix and its properties:

$$I_{RO/EU} = \det M \quad (1.)$$

where:

$I_{RO/EU}$ = composite index RO/EU

$\det M$ = matrix determinant value M ;

$$M = \begin{pmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{pmatrix} = \begin{pmatrix} \bar{v}_1 \\ \bar{v}_2 \end{pmatrix} = \text{Matrix A (a}$$

matrix 2×2 , and a_{ij} matrix coefficients, with $i=1,2$ and $j=1,2$)

\bar{v}_1 and \bar{v}_2 = recorded growth rates for GDP per capita each year for two spatial entities, ie spatial variation.

So if $I_{RO/EU} = 0$ then the growth rate of GDP per capita in Romania is amended, in more or less the same amount, next year as the change in same direction or in opposite, the growth rate of GDP per capita for EU.

Projection of gross domestic product per capita development ¹

Table no. 1.

Indicators	2001	2007	2013	2020
GDP per capita (lei)	5.211	18.790	43.480	76.670
GDP per capita (euro)	2.002	5.630	13.175	23.230
GDP per capita (PPS)	5.400	10.000	20.800	36.700
- % from EU-27 average	27,8	42,1	60	80

¹ Comisia Națională de Prognoză, *Prognoza de toamna pe termen lung*, 28 noiembrie 2008.

Growth rate of GDP per capita and the determinant value

Table no. 2.a

Indicators	1999	2000	2001	2002	2003	2004	2005	2006	2007
Growth rate of GDP per capita in the EU (27 countries)	2,9	3,6	1,7	1	0,9	2	1,5	2,8	2,4
Growth rate of GDP per capita in Romania	-1	2,5	5,8	8	5,5	8,8	4,4	8,1	6,4
$I_{RO/UE}$	-	-10,85	-16,63	-7,8	1,7	3,08	4,4	0,17	1,52

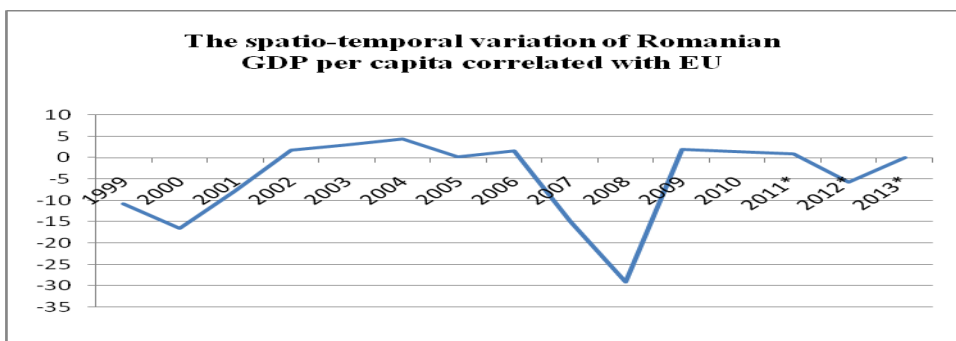
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Table no. 2.b

Indicators	2008	2009*	2010*	2011*	2012*	2013*
Growth rate of GDP per capita in the EU (27 countries)	0,4	-4,2	-0,3	4,9	7,2	5,3
Growth rate of GDP per capita in Romania	7,3	-3,8	0,2	1,7	2,3	2,5
$I_{RO/UE}$	-14,96	-29,14	1,98	1,49	0,97	-5,81

The index $I_{RO/UE}$ takes a value close to zero only in two cases, ie calculated for 2005-2006 and 2011-2012 respectively, accounting for almost the same value, therefore, growth rates of GDP per capita of the two spatial entities either remained constant, or have changed in proportion. For other years can be seen that the value of determinant is different from zero, i.e. the vectors have different directions, therefore, the growth rates of GDP per capita of the two spatial entities considered have evolved differently from one year to another. The largest variation between the two spatial

entities calculated for a given period is given by a high value of the determinant (in absolute value), so, we find that the highest values recorded are in 2001 compared to 2000 in 2005 compared to 2004, in 2008 compared to 2007 and in 2009 over 2008. Considering the index value in 2012, found that only since this year we can talk about crossing economic crisis, namely, the coordination of measures taken by the two space entities, Romania and the European Union.



Graph no. 3. Graphical representation of vectors determinant

Another interpretation of the index $I_{RO/EU}$ shows that the factors behind changes in the evolution of the growth rate of GDP per capita in a spatial entity, have not influenced the growth rate of GDP per capita of the other entity:

- for a regional economic impact, were not affected simultaneously the two entities;

- for a global economic shock, a spatial entity is affected to a greater extent than the other entity.

Taking into account the evolution of Romanian economy in terms of developments in macroeconomic indicators, we consider that the cost-benefit analysis should be generalize to any economic policy decision, because no assessment of its impact is difficult to quantify the welfare losses due to deviations from the desired objectives. Romania's integration into global games is requiring speedy completion of the internal processes of transition and completion of convergence with the European economy and society project. Romania's integration into the European Union do not justify their legitimacy and ensure social grip that does not have the purpose functionalization of the trinomial: growth - development – modernization.

Currently, the economic horizon has become significantly darker, whereas the EU economy is affected by the financial crisis that has intensified during the autumn of 2008, taking a toll on business and consumer confidence.

For implementation of economic policies is needed more consistency, macroeconomic policies should be based more on rules than on discretionism, it must establish clear whether shocks affecting the Romanian economy are temporary or permanent, it must be increased synchronization of macroeconomic policy makers, requires a rigorous institutional arrangement between the National Bank and government to synchronize the effects of monetary and fiscal policies, and it must be awareness that "fine tuning" of fiscal policy is impossible because such policy has a high internal gap. (Dinu M., Socol C, 2006)

Outcomes show that the Romanian economy is not prepared to face competitive pressure from European Union forces, is still facing eternal problem for solving the cyclical temporary shocks due to Monitoring Reports prepared by international organisations and it continues to favor imports of solutions that give shape to form but not substance.

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Jaba Elisabeta, Balan Brigitte, Botezat Alina	<i>A statistical approach of spatial-temporal variability of a phenomenon, using a RO-EU composite index</i> , www.asecib.ase.ro/simpozion/2009, 2009;
Mankiw G.	<i>Principles of Macroeconomics</i> , ediția a 4-a, Thompson South-Western Publisher, 2006;
*****	<i>Comisia Națională de Prognoză, Prognoza de toamna pe termen lung</i> , Comisia Națională de Prognoză, 2008.

Correction

Correction for “The perspective of spatio-temporal variability of Romanian economy in European space” by Ioan TALPOS, Oana Ramona LOBONT and Nicoleta MOLDOVAN, which appeared in *Finante - provocarile viitorului (Finance - Challenges of the Future)*, 2010, vol. 1, issue 11, pages 21-25, <http://feaa.ucv.ro/FPV/011-03.pdf>

The authors note the following:

1. We wish to bring to your attention an issue regarding our publication at page 21, in the introduction, were it is the text: *„Disparities between countries and economic disparities and also the impact of adverse shocks on the economy in recent years is an intense topic of debate for researchers and professionals. Framework for analysis of these phenomena is the economic theories that shape the temporal and spatial dynamics of various economic indicators. Each economic size is characterized by spatial and temporal dimensions and relations of dependency with other economic indicators. Given the complexity of functional relations that describe the economic indicators, have been developed a number of tools for analysis, and also the statistical and econometric models to study spatial and temporal evolution of different economic size.”*

We want to bring in your attention that this introduction, and the subject of the paper, was an inspired starting point by the approach of Jaba Elisabeta, Balan Brigitte, Botezat Alina in *A statistical approach of spatial-temporal variability of a phenomenon, using a RO-EU composite index*, www.asecib.ase.ro/simpozion/2009, 2009

Therefore we believe that it should be reflected in the text quoting this source:

Disparities between countries and economic disparities and also the impact of adverse shocks on the economy in recent years is an intense topic of debate for researchers and professionals. Framework for analysis of these phenomena is the economic theories that shape the temporal and spatial dynamics of various economic indicators. Each economic size is characterized by spatial and temporal dimensions and relations of dependency with other economic indicators.

Given the complexity of functional relations that describe the economic indicators, have been developed a number of tools for analysis, and also the statistical and econometric models to study spatial and temporal evolution of different economic size. (Jaba et al., 2009)

2. We wish to bring to your attention also, the issue regarding our publication at page 23 were it is the text *„We propose a statistical approach to spatial and temporal variability of the Romanian economy, sought to highlight this trend compared with the EU, the level of development, based on composite index RO/EU, using a methodological elements such as concept of factor and matrix and its properties”*

We want to bring in your attention that the *composite index RO/EU* is developed by Jaba Elisabeta, Balan Brigitte, Botezat Alina in *A statistical approach of spatial-temporal variability of a phenomenon, using a RO-EU composite index*, www.asecib.ase.ro/simpozion/2009, 2009

In order to properly highlight in this paper the spatio-temporal variability of the Romanian economy compared the EU economy in terms of a composite index, please consider the following change for the mentioned text:

*„We propose **the** statistical approach of **the** spatial and temporal variability of the Romanian economy, sought to highlight this trend compared with the EU, the level of development, based on composite index RO/EU, **developed by Jaba E. et al, (2009)** using a methodological elements such as concept of factor and matrix and its properties”*

We apologize for not properly citing our related work and for not citing earlier work of others.
Ioan TALPOS, Oana Ramona LOBONT and Nicoleta MOLDOVAN