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Conference Paper

The regions development characterisation by diversity/ variety of the firms - study case for Romania

50th Congress of the European Regional Science Association: "Sustainable Regional Growth and Development in the Creative Knowledge Economy", 19-23 August 2010, Jönköping, Sweden

Provided in Cooperation with:

European Regional Science Association (ERSA)

Suggested Citation: Lincaru, Cristina et al. (2010) : The regions development characterisation by diversity/variety of the firms - study case for Romania, 50th Congress of the European Regional Science Association: "Sustainable Regional Growth and Development in the Creative Knowledge Economy", 19-23 August 2010, Jönköping, Sweden, European Regional Science Association (ERSA), Louvain-la-Neuve

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The regions development characterisation by diversity/variety of the firms – study case for Romania

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Abstract

In this paper we try to find empirical evidence regarding the region diversity by firm characteristics, using spatial data from Tempo (INS Romania database) at NUTS 1, 2 and 3 region level for the period 1997-2008. Using instruments of statistical analysis of spatial data (Anselin, Varga) we try to sketch the *spatial pattern* of firm agglomerations and values of main firm's characteristics (size class according to employee's number and economic activity by NACE Rev.1 sections). Starting point is represented by the discussion made by Saviotti² regarding the efficiency vs diversity/variety in economic development respectively development versus growth. The pattern variation of the regions "profile" by diversity/variety of the firms could offer an image for the structural transformation of economic development tendencies of it in the last decade.

1. Introduction

The regional development could be characterised also under the evolutionary theories of economic development perspective. In this frame the development is a process of qualitative changes and not simply one of quantitative growth. As is emphasized by Saviotti³ there is a trade of between efficiency and diversity/variety in economic development respectively development versus growth and the role of variety is both a determinant and a result of growth. Among the two hypotheses that link variety to economic development (Saviotti, 1996): we make reference to the first one "Hypothesis 1: **The growth in variety is a necessary requirement for long-term economic development.**"⁴

If we consider, the variety as a changing development mechanism, then every component (actors, resources, activities, results) of the economic system is transformed and

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² Pier Paolo Saviotti, INRA GAEL, Grenoble, and CNRS GREDEG I2C, Sophia Antipolis, France.

Is there a direction in economic development?, Pech, 2009

³ Pier Paolo Saviotti, INRA GAEL, Grenoble, and CNRS GREDEG I2C, Sophia Antipolis, France.

Is there a direction in economic development?, Pech, 2009

⁴ Pier Paolo Saviotti and Andreas Pyka, **ECONOMIC DEVELOPMENT, VARIETY AND EMPLOYMENT**, Working Paper No. 35, Working Papers Series: Growth and Employment in Europe: Sustainability and Competitiveness, September 2003

dynamic differentiated from others. In the literature there are some development regarding the concept of variety applications in the ‘theories of consumption and welfare (Lancaster, 1975, Dixit Stiglitz, 1977) and, increasingly, of economic growth (see for example Romer, 1987,1990; Bils et al 2001; Funke, Ruhwedel, 2001a, 2001b).’⁵

2. Diversity/variety definitions

“In the economic literature, variety is used to describe differentiation within a given product group...but “Structural change can occur for *activities* and *actors* as well as for outputs, thus also for knowledge, and institutions. In biology, the concept of diversity is defined as the number of species existing in a given habitat.”⁶

Based on these references the formalisation of variety is represented as a number of distinguishable entities. Making the analogies with the biodiversity approach then Diversity/ variety represents the distinguishable number of economic species in system or the „variety is the number of actors, activities and objects required to describe the economic system.”⁷

2.1. Our definition of variety and methodological issues

In view to characterize the regions development by the diversity / variety of the firms we consider:

-Among the actors that develop economic activities we select only the active local units by activity of national economy at level of CANE Rev.1 classes, size classes of number of employees, macroregions, development regions and counties as is measured by the INS (National Institute for Statistics from Romania as the indicator **INT101J** provided by the **TEMPO** online database (see Annex 1).

-The exclusion of the institutional actors and the common methodological framework of the measurement permit to consider related the units but distinctive from each others by the following criteria:

⁵ Phuong NGUYEN ; Pier-Paolo SAVIOTTI ; Michel TROMMETTER ; Bernard BOURGEOIS, VARIETY AND THE EVOLUTION OF REFINERY PROCESSING, Laboratoire d’Economie Appliquée de Grenoble, Working Paper ; 2004-28, October 2004, Institut National de la Recherche Agronomique - Université Pierre Mendès France Unité Mixte de Recherche 1215;

⁶ Phuong NGUYEN ; Pier-Paolo SAVIOTTI ; Michel TROMMETTER ; Bernard BOURGEOIS, VARIETY AND THE EVOLUTION OF REFINERY PROCESSING, Laboratoire d’Economie Appliquée de Grenoble, Working Paper ; 2004-28, October 2004, Institut National de la Recherche Agronomique - Université Pierre Mendès France Unité Mixte de Recherche 1215;

⁷ Pier Paolo Saviotti and Andreas Pyka, **ECONOMIC DEVELOPMENT, VARIETY AND EMPLOYMENT**, Working Paper No. 35, Working Papers Series: Growth and Employment in Europe: Sustainability and Competitiveness, September 2003

One “Species” could be described as a vector with (region NUTS 3, class size according to employees number, class CANE Rev.1) dimensions descriptions.

a. CANE Rev.1 – classes. Grace to the official statistics developments we can access the number of items at the most detailed level of the current classification 514 classes

b. Size class according to employees number

b1. 0-9 employees: microenterprises;

b2. 10-49 employees: small enterprises;

b3. 50-249 employees: medium enterprises;

b4. 250 employees and more: large enterprises;

For the time period 2002-2008, yearly frequency at NUTS 1, NUTS 2 and NUTS 3 regional aggregation level where the regional level represent the “habitat of he analysed species” or the environment where we make the analogy with the natural environment described as the “**ecosystem** is a community of living and non-living things that work together.”⁸

2.2. The species richness S

If “the species richness S is simply the number of species present in an ecosystem”⁹ then in our case the maximum imposed by the methodology is:

S maximum = 514 classes x 4 firm type by size classes o number of employees = 2056
„species of active local units (see Annex 1)

Indexes to measure diversity /variability: Simpson's diversity (see Box 1 ¹⁰ a) and Hirschman-Herfindahl Index (HHI) (see Box 1b)¹¹.

⁸ ecosystem definition, <http://www.nhptv.org/natureworks/nwepecosystems.htm>

⁹ <http://www.newworldencyclopedia.org/entry/Biodiversity>

¹⁰ <http://www.newworldencyclopedia.org/entry/Biodiversity>

¹¹ http://en.wikipedia.org/wiki/Diversity_index

Simpson's diversity index

If p_i is the fraction of all organisms which belong to the i -th species, then **Simpson's diversity index** is most commonly defined as the statistic:

$$D = \sum_{i=1}^S p_i^2$$

This quantity was introduced by Edward Hugh Simpson.

Note that $0 \leq D \leq 1$, where values near zero correspond to highly diverse or heterogeneous [ecosystems](#) and values near one correspond to more homogeneous [ecosystems](#). Biologists who find this confusing sometimes use $1/D$ instead; confusingly, this reciprocal quantity is also called Simpson's index. A more sensible response is to redefine Simpson's index as

$$\tilde{D} = 1 - D = 1 - \sum_{i=1}^S p_i^2,$$

(called by statisticians the index of diversity), since

- this quantity has a simple intuitive interpretation: it represents the probability that if we randomly choose two individuals, that they will belong to distinct [species](#)

In the same idea another source mention that "Simpson's diversity index: An index of species diversity devised in 1949 by E. H. Simpson, given by $D = 1 - \sum p_i^2$, where D is the diversity index, p_i is the proportion of individuals in the i th species, and Σ means 'sum of'."¹²

2.3. The model

The equivalent of the Simpson's diversity index is HHI:

Hirschman-Herfindahl index (HHI)

In economics essentially the same quantity is called the Hirschman-Herfindahl index (HHI), defined as the sum of the squares of the shares in the population across groups (with E as the group size, that is, the number of employees or the number of specimina):

$$D = \sum_{i=1}^E \left(\frac{E_i}{E}\right)^2.$$

Note that a HHI is also used within sectors, to measure competition.

In view to "decode" the calculated results then the significance of HHI is:

"a HHI index below 0.01 (or 100) indicates a **highly competitive** index.

¹² MICHAEL ALLABY. "Simpson's diversity index." *A Dictionary of Ecology*. 2004. Retrieved April 13, 2010 from Encyclopedia.com: <http://www.encyclopedia.com/doc/1O14-Simpsonsdiversityindex.html>

a HHI index below 0.1 (or 1,000) indicates an **unconcentrated index**.

a HHI index between 0.1 to 0.18 (or 1,000 to 1,800) indicates **moderate concentration**.

a HHI index above 0.18 (above 1,800) indicates **high concentration** [1].¹³

The limits (assuming infinite categories with equal representation in each category) of the scores for this index are:

-“0” the case of perfectly **homogeneous population**.

-“1” the case of perfectly **heterogeneous population**

In our model then, for every year during 2002-2008:

$$HHI_{NUTSm} = \sum_j^{Sk} \left(\frac{n_k}{N_{NUTSm}} \right)^2 = \sum_j^{Sk} \left(\frac{n_{(a_i b_l) j}}{N_{NUTSm}} \right)^2 \quad (1)$$

Where:

For every $m=1$ to 3 , $m=1$ then NUTS 1 – 4 cases;

$m=2$ then NUTS 1 – 8 cases;

$m=3$ then NUTS 1 – 42 cases54 cases /year

with

$i=1$ to 514 cases;

$l=1$ to 4 cases;

$j=1$ to 2056 cases.

3. Results

The results for the 54 scores for the HHI index for each year are presented in the Table 1 and Figure 1.

The scores of the HHI index calculated at regional level indicate as general characteristics an **unconcentrated index** situation (with values of HHI below 0.1). In the figure 1 these areas are presented with red with higher diversity of units and also a high competition level. Is indicated an **homogeneous population with some exceptions** where HHI index is 0.1 to 0.18 indicates situation considered with moderate **concentration** (the case of Teleorman at NUTS 3 level for he years 2002-2005 and Tulcea for 2002)

¹³ <http://www.justice.gov/atr/public/testimony/hhi.htm>, THE HERFINDAHL-HIRSCHMAN INDEX, Horizontal Merger Guidelines issued by the U.S. Department of Justice and the Federal Trade Commission. See *Merger Guidelines* § 1.51.

Table 1

a. The Hirschman-Herfindahl Index (HHI) and the grade of " S - species richness" at NUTS 1 level by CANE Rev.1class and firm dimension

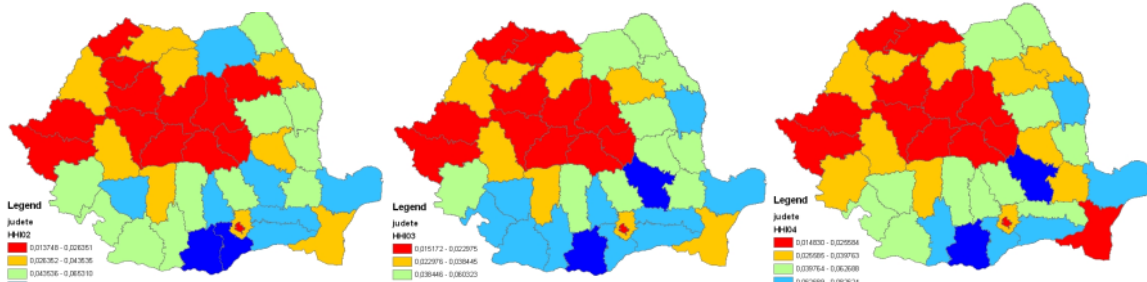
MACRO	HHI02	HHI03	HHI04	HHI05	HHI06	HHI07	HHI08	GRS02	GRS03	GRS04	GRS05	GRS06	GRS07	GRS08
Macroreg1	0,020	0,020	0,018	0,018	0,017	0,017	0,016	62,6	63,9	63,9	64,5	64,6	65,3	66,1
Macroreg2	0,046	0,049	0,045	0,040	0,037	0,033	0,030	58,8	61,0	60,9	59,4	59,4	59,8	60,7
Macroreg3	0,035	0,029	0,026	0,024	0,023	0,021	0,020	68,6	68,8	68,7	70,2	70,6	71,0	71,1
Macroreg4	0,035	0,036	0,032	0,029	0,027	0,024	0,022	56,0	58,5	58,6	59,1	59,1	60,1	60,5

b. The Hirschman-Herfindahl Index (HHI) the grade of " S - species richness" at NUTS 2 level by CANE Rev.1class and firm dimension

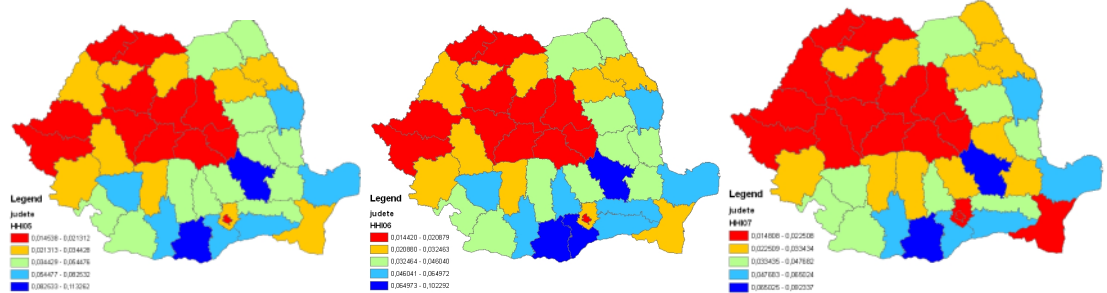
REGIUNE	HHI02	HHI03	HHI04	HHI05	HHI06	HHI07	HHI08	GRS02	GRS03	GRS04	GRS05	GRS06	GRS07	GRS08
RegBucuresti Ilfov	0,020	0,017	0,017	0,018	0,018	0,017	0,016	62,2	62,4	62,8	64,2	64,7	65,1	65,0
RegCentru	0,019	0,019	0,018	0,017	0,017	0,016	0,016	53,9	55,4	56,1	56,5	56,3	56,6	58,1
RegNE	0,044	0,047	0,043	0,039	0,036	0,032	0,030	49,8	51,5	51,9	51,4	51,5	52,0	53,9
RegNV	0,022	0,021	0,019	0,018	0,018	0,018	0,017	52,8	55,4	55,2	55,9	55,7	55,6	57,1
RegSE	0,049	0,051	0,049	0,041	0,038	0,035	0,031	49,2	51,2	50,8	50,0	50,5	50,0	50,8
RegSud	0,072	0,066	0,058	0,052	0,047	0,041	0,037	50,5	52,7	52,7	52,1	53,0	53,4	54,8
RegSV	0,053	0,061	0,054	0,049	0,044	0,039	0,034	42,5	44,9	46,0	45,7	45,9	46,6	48,2
RegV	0,023	0,022	0,020	0,019	0,018	0,017	0,016	49,5	51,5	51,7	52,5	52,8	53,7	54,1

c. The Hirschman-Herfindahl Index (HHI) the grade of "S - species richness" at NUTS 3 level by CANE Rev.1class and firm dimension

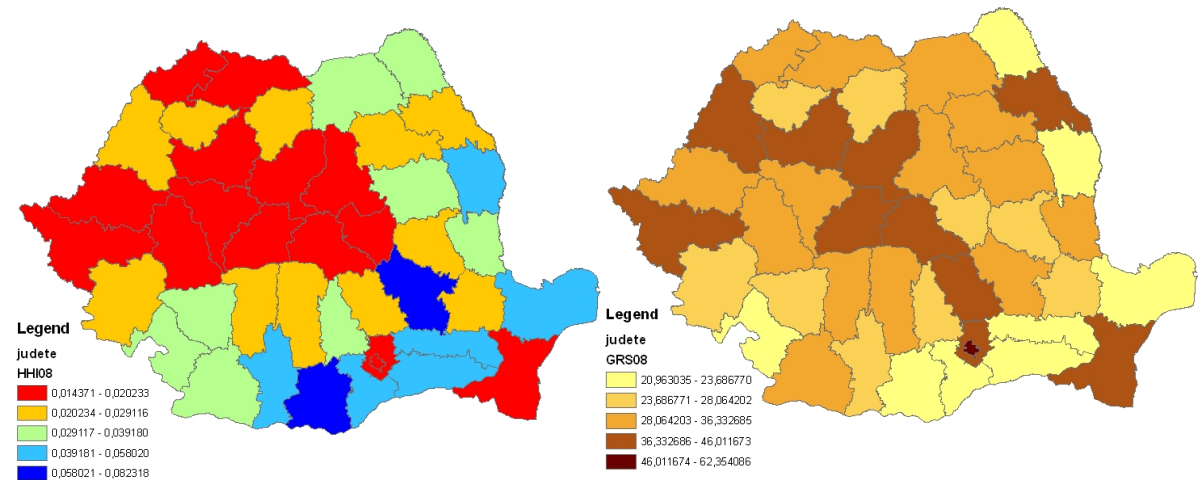
JUDET	HHI02	HHI03	HHI04	HHI05	HHI06	HHI07	HHI08	GRS02	GRS03	GRS04	GRS05	GRS06	GRS07	GRS08
ALBA	0,016	0,020	0,020	0,019	0,019	0,019	0,019	27,0	29,4	29,8	29,9	29,6	30,0	31,2
ARAD	0,014	0,015	0,015	0,015	0,016	0,016	0,016	31,8	33,7	34,0	34,7	34,9	34,6	35,6
ARGES	0,060	0,056	0,048	0,042	0,037	0,033	0,029	30,4	32,1	32,7	33,0	34,2	34,4	36,3
BACAU	0,048	0,052	0,046	0,042	0,040	0,037	0,033	31,3	32,9	32,7	33,0	32,2	32,8	33,8
BIHOR	0,044	0,032	0,028	0,026	0,024	0,023	0,022	34,6	36,5	36,3	37,2	37,6	38,0	38,7
BISTRITA-NASAUD	0,035	0,035	0,033	0,033	0,030	0,028	0,026	22,9	25,1	25,1	25,6	26,0	26,8	27,4
BOTOSANI	0,062	0,050	0,044	0,041	0,038	0,033	0,032	21,0	22,5	23,3	22,8	22,8	23,1	23,7
BRAILA	0,046	0,041	0,040	0,038	0,035	0,032	0,029	24,4	26,4	26,7	27,1	27,0	27,0	27,7
BRASOV	0,024	0,020	0,018	0,017	0,017	0,016	0,015	38,2	40,1	40,9	41,9	41,7	42,3	42,9
BUCURESTI	0,019	0,016	0,017	0,018	0,018	0,017	0,016	59,9	60,2	60,5	62,0	62,5	62,4	62,4
BUZAU	0,083	0,154	0,157	0,113	0,102	0,092	0,082	26,0	27,2	28,3	28,5	28,3	29,0	30,8
CALARASI	0,076	0,081	0,079	0,072	0,065	0,057	0,051	18,5	20,0	20,6	21,0	21,7	22,0	22,8
CARAS-SEVERIN	0,047	0,041	0,036	0,034	0,032	0,029	0,027	21,4	22,6	23,0	23,6	23,5	24,0	24,9
CLUJ	0,015	0,018	0,017	0,016	0,015	0,016	0,016	40,3	42,9	42,7	43,6	44,0	44,4	46,0
CONSTANTA	0,030	0,027	0,026	0,024	0,023	0,022	0,020	36,0	37,5	37,5	37,6	38,2	37,1	38,7
COVASNA	0,022	0,023	0,022	0,021	0,021	0,020	0,019	22,8	23,9	24,9	24,1	24,5	24,9	26,6
DAMBOVITA	0,088	0,067	0,059	0,054	0,049	0,044	0,039	24,0	26,1	27,7	26,6	26,9	27,9	28,1
DOLJ	0,058	0,063	0,055	0,050	0,045	0,040	0,034	30,7	32,3	33,3	33,9	34,4	34,2	36,1
GALATI	0,065	0,056	0,049	0,045	0,041	0,036	0,032	28,4	31,5	31,5	31,9	32,2	32,5	33,2
GIURGIU	0,133	0,095	0,083	0,083	0,078	0,065	0,058	17,5	19,8	19,8	20,0	20,2	20,3	21,3
GORJ	0,081	0,071	0,063	0,058	0,051	0,044	0,039	21,9	23,2	23,6	23,3	23,2	23,2	24,7
HARGHITA	0,018	0,019	0,020	0,019	0,019	0,018	0,018	27,0	27,5	27,9	28,7	28,9	29,1	30,8
HUNEDOARA	0,036	0,029	0,028	0,026	0,023	0,021	0,019	29,5	31,1	31,4	31,5	32,2	32,3	32,8
IALOMITA	0,079	0,064	0,059	0,054	0,051	0,048	0,043	17,8	19,8	20,0	20,6	20,5	20,6	21,0
IASI	0,037	0,041	0,037	0,032	0,029	0,026	0,023	33,2	35,0	35,6	36,1	37,0	37,9	39,0
ILFOV	0,037	0,036	0,030	0,026	0,023	0,021	0,020	28,6	31,5	33,2	35,1	36,0	38,4	40,2
MARAMURES	0,027	0,022	0,020	0,020	0,020	0,021	0,020	29,9	32,2	31,5	31,3	31,6	31,5	32,5
MEHEDINTI	0,050	0,063	0,056	0,051	0,046	0,040	0,035	18,2	18,9	19,7	20,3	20,1	21,6	21,4
MURES	0,021	0,021	0,020	0,019	0,019	0,018	0,017	33,6	34,9	34,6	35,1	35,7	36,3	37,3
NEAMT	0,021	0,030	0,031	0,031	0,030	0,029	0,027	27,8	29,4	30,5	30,0	29,8	30,3	31,4
OLT	0,063	0,083	0,075	0,068	0,060	0,055	0,048	21,1	21,9	22,5	21,9	22,7	23,5	24,8
PRAHOVA	0,056	0,052	0,044	0,039	0,036	0,033	0,029	38,1	40,1	40,9	40,4	41,4	41,7	42,3
SALAJ	0,026	0,030	0,028	0,027	0,026	0,026	0,024	20,1	21,8	22,7	23,3	24,0	24,3	24,6
SATU-MARE	0,021	0,018	0,018	0,018	0,019	0,020	0,019	27,0	27,9	28,5	29,0	29,9	29,8	30,3
SIBIU	0,014	0,015	0,015	0,015	0,014	0,015	0,014	33,1	34,4	34,4	35,8	36,4	37,5	37,9
SUCEAVA	0,077	0,060	0,053	0,046	0,041	0,037	0,034	26,6	28,4	28,6	28,7	28,4	29,1	30,8
TELEORMAN	0,120	0,129	0,120	0,105	0,096	0,085	0,073	18,5	19,4	19,6	20,5	20,8	21,4	22,9
TIMIS	0,021	0,020	0,018	0,017	0,017	0,017	0,016	39,3	41,3	41,6	42,7	42,9	44,0	44,8
TULCEA	0,100	0,071	0,066	0,058	0,053	0,050	0,043	19,2	21,3	21,2	21,2	21,9	21,8	23,0
VALCEA	0,033	0,038	0,035	0,032	0,030	0,027	0,025	24,5	26,6	27,1	26,8	28,0	28,3	30,2
VASLUI	0,048	0,069	0,071	0,067	0,062	0,054	0,052	19,8	21,1	20,6	21,8	21,9	21,9	22,8
VRANCEA	0,033	0,042	0,039	0,037	0,034	0,031	0,028	21,1	22,8	23,8	23,5	23,2	23,4	24,6



a) HHI /NACE Rev.1 2002 b) HHI /NACE Rev.1 2003 c) HHI /NACE Rev.1 2004



d) HHI /NACE Rev.1 2002 e) HHI /NACE Rev.1 2003 f) HHI /NACE Rev.1 2004



g) HHI /NACE Rev.1 2008 h) GRS08 the grade of "S - species richness" at NUTS 3 level by CANE Rev.1 class and firm dimension as proportion from the maximum number of class - 2056

Figure 1. Hirschman-Herfindahl index (HHI) variation at NUTS 3 level during the period 2002-2008 (using Arc Gis 9.0) with data from TEMPO data base INS Romania

3.1. Local Spatial Autocorrelations characteristics for the HHI in 2008 comparing to 2002, at NUTS 3 level.

In Figure 2 is presented the situation of Local Spatial Autocorrelations characteristics for the HHI in 2008 comparing to 2002, at NUTS 3 level . Arc GIS 9.3. (Arc GIS Catalog and Arc MAP). With the Arc GIS software was aggregated the NUTS 2 region' s map for Romania (the map for development regions) into NUTS 1 region's map for Romania (the map for macroregions). Spatial econometrics (Varga)¹⁴ through the GeoDa software¹⁵ has some applications like the spatial Lag Construction LISA using rook contiguity weight file.

The cluster map, the significance map the Moran scatter plot and the box plot (p= 0.05 are not reliable then the location with significant local Moran statistics are the location with at least p=0.01) (Anselin). There are visible two core for the spatial clusters:

Table 2

	2002	2008
Low-Low	Bihor, Alba, Salaj, Cluj, , Mures	Bihor, Alba, Mures, Salaj, Cluj, Sibiu, Arad
High – High	Teleoman, Giurgiu, Dimbovita	Teleoman, Giurgiu

In our cluster map is a positive situation the blue counties /judete described in the Low-Low case. Bihor, Alba and lately Mures represent core clusters for the locations where diversity idex (calculated as 1-HHI) is higer.

4. Conclusion

Admitting that “the growth in variety is a necessary requirement for long-term economic development” then also the region as a host or environment for activities, actors outputs, knowledge or institutions is extremely important in view to support the variety creation and the richness of “species” from both perspective natural and artificial.

Region as environment is a complex and dynamic structure. The HHI annual variation (at NUTS 1, 2, and 3 level) could indicate the development tendencies of the regions. Another useful characteristic for the region is represented by the possible quality of the region to be a coe cluster as a result of Local spatial Autocorrelation Analysis.

One important limit of our model is represented by the only one dimension perspective – only the only the active local units by activity of national economy at level of CANE Rev.1 classes, size classes of number of employees.

Next to this dimension at the region level there are “other” many species waiting to be integrated in view to better understand how to build the sustainable development for every region.

¹⁴ Attila Varga, Introduction to Applied Spatial Econometrics, course presentation, DIMETIC Pécs, July 3, 2009;

¹⁵ The GeoDa Center for Geospatial Analysis and Computation succeeds the Spatial Analysis Laboratory (SAL) which was founded by the new School of Geographical Sciences Director Luc Anselin while at the University of Illinois. <http://geodacenter.asu.edu/about>

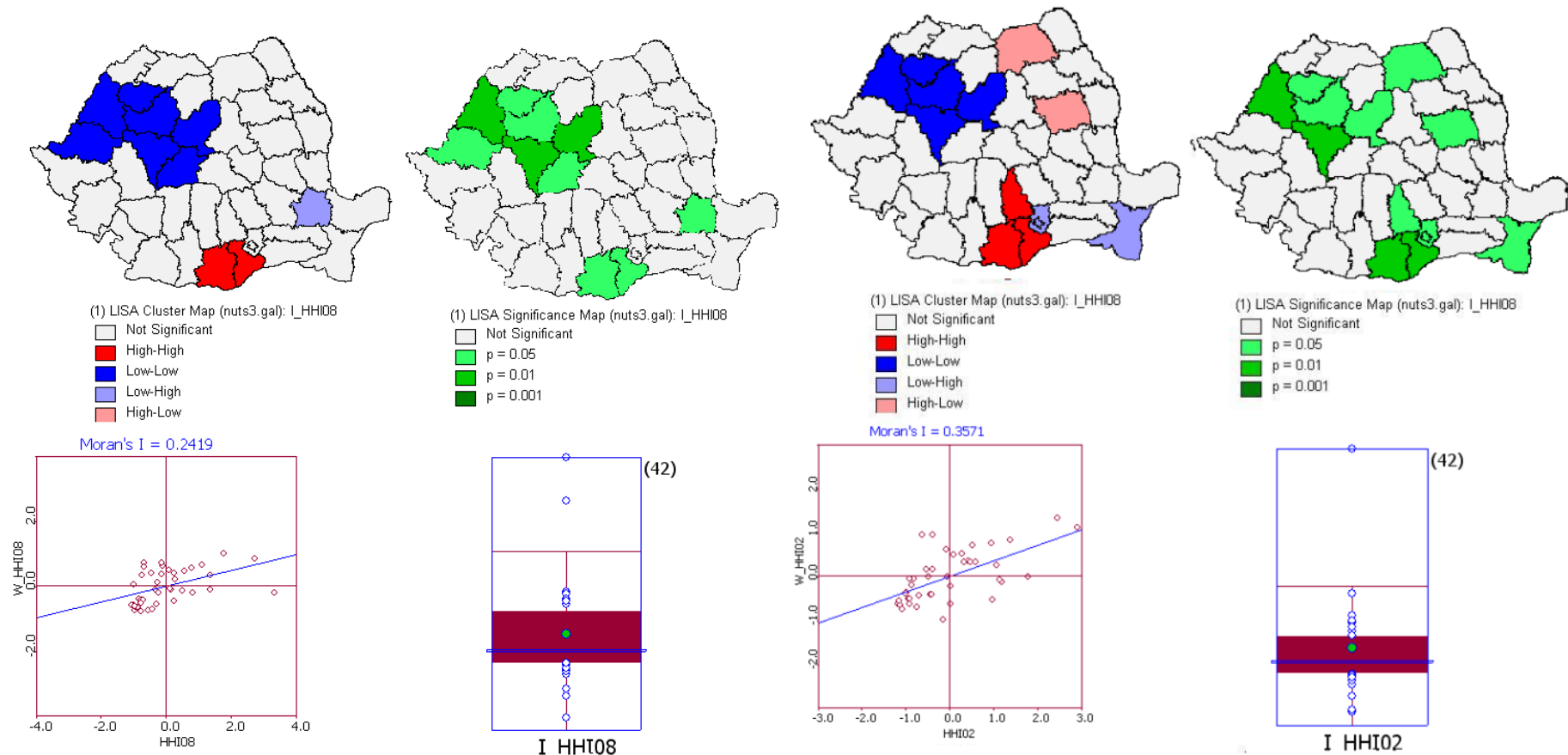


Figure 2. Local Spatial Autocorrelations characteristics for the HHI in 2008 comparing to 2002 , at NUTS 3 level. The cluster

map, the significance map the Moran scatter plot and the box plot ($p=0.05$ are not reliable then the location with significant local Moran statistics are the location with at least $p=0.01$) (Anselin). {using rook contiguity weight file) There are visible two core for the spatial clusters:

	2002	2008
Low-Low	Bihor, Alba, Salaj, Cluj, , Mures	Bihor, Alba, Mures, Salaj, Cluj, Sibiu, Arad
High – High	Teleoman, Giurgiu, Dimbovita	Teleoman, Giurgiu

The values of the HHI for neighbors of this core clusters are similar with the HHI value for the core clusters (as summarized by the weighted average of the neighboring values, the spatial lag).

“The global Moran’s I statistic is the mean of the local Moran statistics.”(Anselin)

Methodological issues¹⁶

TEMPO-Online, NATIONAL INSTITUTE OF STATISTICS Romania, database selection of the indicator:

INT101J - Distribution of active local units by activity of national economy at level of CANE Rev.1 classes, size classes of number of employees, macroregions, development regions and counties	
Definition	<p>Economic unit represents an organisation (consisting of one or several persons) with legal entity, created in order to carry out certain activities according to the Law no. 15 and on Law no. 31 / 1990 with subsequent modifications of Law no. 507/2002 and Decree no. 44/2008.</p> <p>Social unit represents an organisation (consisting of one or several persons) with legal entity, created in order to carry out an activity devoted to social interest.</p> <p>Legal unit represents any economic or social unit having its own patrimony, which could conclude, on own account, contracts with third parties and defend their interests in justice (has legal entity). Legal units are either natural persons or family associations (as entrepreneurs) or legal persons.</p> <p>Enterprise is the group of legal units set up as an organisational entity producing goods, trading services or social interest services, enjoying decisional autonomy, particularly for ensuring its current resources.</p> <p>Active enterprise is the entity which, from economic viewpoint is active (during the observation period), namely it produces goods or provides services, outlay and draws up the balance sheet.</p>
Periodicity	Annual
Data sources	Statistical business register managed
Methodology	Local unit is an enterprise or part thereof (workshop, factory, warehouse, office, mine or station a.s.o) situated in a geographically identified place.
Last update	DEC 08, 2009
Observations	<p>The data are available since 2002.</p> <p>Because administrative sources are developed in time, for 1990 - 2001 period the completed sources of data are not available.</p> <p>The activities - Education or Health and social assistance - include only the local units with activities related to education or health and social assistance, organised as companies.</p> <p>Due to structural changes between CANE Rev.1 and CANE Rev.2 (such as aggregation and/or detail of the classification entities of CANE Rev.1) may occur changes of the number of companies related to one or more sectors of activities. So, it is possible that the number of enterprises calculated for a particular sector of CANE Rev.2 to be higher than the number of enterprises calculated for the same segment of CANE Rev.1.</p>
Interruption	Last period of this series: Year 2008. After this period, the series continue with the INT101U matrix
Responsible person	Iacob Gh Georgeta Octavia, Tel. 1488, geta.iacob@insse.ro

¹⁶ <https://statistici.insse.ro/shop/>, downloaded on 12.04.2010

Selection from the UN Questionnaire regarding the National Classifications, CAEN Rev.1¹⁷, Country / Area: Romania; Classification category: Activity Classifications

	Question	Answer
1	Name of the current national classification (Original)	Clasificarea Activităților din Economia Națională rev.1(CAEN rev.1)
2	Name of the current national classification (English)	Classification of Activities of National Economy rev.1 (CANE rev.1)
3	Link to international classifications (Give the name of the international standard classification the current classification is linked to or derived)	CANE rev.1 comply with NACE Rev.1.1
4	Levels in the structure: Is the structure identical to international standard or, if not, how does it differ? Have additional levels been added or have changes been made, e.g. aggregations or additional breakdowns?	5 levels. All levels are identical to NACE Rev.1.1 .
5	Number of items at the most detailed level of the current classification	514 classes.
6	Name of institution / office responsible for the elaboration and maintenance of the classification	National Institute of Statistics (NIS)
7	Contact address, phone number, e-mail or website for public information and inquiry	Http://www.insse.ro/NOMENCLATOARE
8	Implementation date: Please state the date of the first official adoption and the programme for the implementation of the various statistical applications.	CANE rev.1 is approved by Order No 601/Nov.2002 of NIS President, on base of Government Decision No. 656/Oct. 1997, published in the Official journal 908/13.12.2002. It came into force on January 1st, 2003.
9	Plans for revision or update of the current classification. Please state if plans are made to revise the classification (e.g. due to national needs not reflected in the international classification).	CANE rev.1 will be updated in 2007 according with the revisions of international classifications
10	Users of the classification for statistical purposes Please state in which statistics (surveys etc.) this classification is used and if there are users outside of the Statistical Office.	It is used for grouping the statistical indicators from all branches. Institutions and bodies with statistical activities grouping indicators by activity criterion.
11	Statistical data collected according to	- Structural Survey in Industry, Construction, Transport

¹⁷ <http://unstats.un.org/unsd/cr/ctryreg/ctrydetail.asp?id=334>

	the current classification Please describe for which statistical surveys or indicators the classification is used and, if not used at the most detailed level, indicate the level or aggregates used.	and Services. - Business Survey in Manufacturing and Trade. - Survey on Goods Retail and Vehicle Sales. - Statistical Reports (goods and passengers transport; research and development; labour force-employees and incomes; investments, construction and geological works; wholesale; market services rendered to economic units and population; energy and fuels use). All data are collected at class level.
12	Statistical data published according to the current classification Please describe for which statistical surveys or indicators the classification is used and, if not used at the most detailed level, indicate the level or aggregates used.	The results are published at the level of divisions, sub-sections and sections.
13	In which languages is the classification available?	CANE rev.1 is available in Romanian language.
14	Is the classification available in electronic form?	It exists as handbook and in electronic form
15	Do the conversion key(s) exist in electronic form?	Yes, between CANE and CANE rev.1
16	Have national explanatory notes and recommendations been elaborated?	Yes
17	Problems occurred during the period of use of the current classification Please describe the kind of problems that have occurred (interpretation, methodology, etc.)	- Description of activities for each CANE rev.1 classes (the same of NACE rev.1.1) does not exhaustively define the respective classes, entailing sometimes difficulties when framing the units in the nomenclature; - The methodology of main activities is the same NACE rev.1.1 The diversity of activities carried out by the units affect the algorithms to define the main activity
18	Users of the classification for non-statistical purposes Please give the names of institutions that use the classification for non-statistical purposes (as opposed to statistical purposes in question 13). Also indicate the kind of use (e.g. tax offices, social security, customs, enterprise register etc.)	CANE is used for non-statistical purposes by the Trade Register, the Ministry of Finances, various institutions of public administration, economic agents registering, balance sheets drawing out, some fiscal or social regulations, trade agreements, and prices setting up - aggregate and detail levels
19	Alternative classifications used by other institutions of the economy Please indicate if these classifications are available and useful for the Statistical Office.	No
20	Link of former classification to international classifications	No

Source: UN questionnaire, 7/30/2004

References

- Attila Varga, Introduction to Applied Spatial Econometrics, course presentation, DIMETIC Pécs, July 3, 2009;
- Luc Anselin Exploring Spatial Data with GeoDaTM : A Workbook Spatial Analysis Laboratory Department of Geography University of Illinois, Urbana-Champaign Urbana, IL 61801, <http://sal.uiuc.edu/Pg.6>, Center for Spatially Integrated Social Science <http://www.csiss.org/Revised> Version, March 6, 2005, pg.106
- MICHAEL ALLABY. "Simpson's diversity index." A Dictionary of Ecology. 2004. Retrieved April 13, 2010 from Encyclopedia.com: <http://www.encyclopedia.com/doc/1O14-Simpsonsdiversityindex.html>
- Phuong NGUYEN ; Pier-Paolo SAVIOTTI ; Michel TROMMETTER ; Bernard BOURGEOIS, VARIETY AND THE EVOLUTION OF REFINERY PROCESSING, Laboratoire d'Economie Appliquée de Grenoble, Working Paper ; 2004-28, October 2004, Institut National de la Recherche Agronomique - Université Pierre Mendès France Unité Mixte de Recherche 1215;
- Pier Paolo Saviotti and Andreas Pyka, ECONOMIC DEVELOPMENT, VARIETY AND EMPLOYMENT, Working Paper No. 35, Working Papers Series: Growth and Employment in Europe: Sustainability and Competitiveness, September 2003
- Pier Paolo Saviotti, Is there a direction in economic development?, Pech, 2009, INRA GAEL, Grenoble, and CNRS GREDEG I2C, Sophia Antipolis, France.
- The GeoDa Center for Geospatial Analysis and Computation succeeds the Spatial Analysis Laboratory (SAL) which was founded by the new School of Geographical Sciences Director Luc Anselin while at the University of Illinois. <http://geodacenter.asu.edu/about>
- ***, ArcGIS Desktop Help 9.3, including 9.3.1, [http://webhelp.esri.com/arcgisdesktop/9.3/index.cfm?TopicName=How%20Spatial%20Autocorrelation:%20Moran's%20I%20\(Spatial%20Statistics\)%20works](http://webhelp.esri.com/arcgisdesktop/9.3/index.cfm?TopicName=How%20Spatial%20Autocorrelation:%20Moran's%20I%20(Spatial%20Statistics)%20works)
- ***, The GeoDa Center for Geospatial Analysis and Computation succeeds the Spatial Analysis Laboratory (SAL) which was founded by the new School of Geographical Sciences Director Luc Anselin while at the University of Illinois. <http://geodacenter.asu.edu/about>
- ecosystem definition, <http://www.nhptv.org/natureworks/nwepecosystems.htm>
- http://en.wikipedia.org/wiki/Diversity_index
- <http://unstats.un.org/unsd/cr/ctryreg/ctrydetail.asp?id=334>
- <http://www.justice.gov/atr/public/testimony/hhi.htm>, THE HERFINDAHL-HIRSCHMAN INDEX, Horizontal Merger Guidelines issued by the U.S. Department of Justice and the Federal Trade Commission. See Merger Guidelines § 1.51.
- <http://www.newworldencyclopedia.org/entry/Biodiversity>
- <https://statistici.insse.ro/shop/>, downloaded on 12.04.2010