

A TERRITORIAL PROFILE OF PUBLIC EXPENDITURES AT LAU 2 LEVEL, FOR 2007-2013 PERIOD IN ROMANIA

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Abstract:

In view to improve the use of Cohesion policy resources more effectively and efficiently, we propose to explore the achievements of Structural and Cohesion Funds in 2007-13 in Romania at NUTS 5 /LAU 2 level in rural and urban areas. The common reformed cohesion policy represented by the EU Regulation 1303/2013 proposes the integrated approach of territorial development. On this background the territorial unit of analysis is the local administrative unit as the smallest regional hub for integrated public policies, including cohesion policy as well. This analysis involves administrative data provided by MDRP – Regional Development and Public Administration Ministry, connected with socio-economic indicators provided by INS TEMPO.

The budgetary capacity of the LAU2 is evaluated using the spatial analysis applications according Anselin (2005, 2006 - using ARC GIS and GEODA software) for period 2007-2013.

The main result of this article is the territorial heterogenic profile of public expenditures at LAU 2 level with focus on expenditures on projects funded by external grants (irredeemable), useful input for regional policy efficient targeting, especially on the background of the Jobs – Growth - Investment Plan's New EU Initiative. Looking at the big picture it is visible the higher the spatial heterogeneity tendency in terms of socio economic indicators than the terms of local budget indicators, when is applied the LISA clusters analysis.

Key words: public expenditures at local level LAU2; expenditures on projects funded by external grants (irredeemable) at LAU 2 level, total incomes at LAU2 level, endogenous incomes total incomes at LAU2 level.

JEL classification: H53, H72, O20

INTRODUCTION

This territorial profile of public expenditures associated to cohesion policy, using spatial analysis tools, has its start point from The Sixth report on economic, social and territorial cohesion (2014) under the perspective "Investment for jobs and growth, Promoting development and good governance in EU regions and cities". This report describes the new role of the public expenditures in general and at regional and local level in special, following 2008's crises impact with a consequence in increasing the contribution of Cohesion Policy to public investment as share in total public investment in the Member States. The increasing importance share of public expenditures and public investment at regional and local level increases the responsibility of regional and local level of government administrative units in an integrated development strategic perspective (Regulation 1303/2013 of the EU Parliament and Council).

One approach is focused on Cohesion policy impact evaluation is provided by Martin Ferry in the report "The Achievements of Cohesion Policy: Evidence and Methodological Challenges from a EU10 Perspective". Author "include a range of perspectives and methodologies: assessing Cohesion policy's input in terms of: the reduction of regional disparities; contribution to growth and competitiveness (including at an EU level); impact in specific policy-fields. (Ferry, 2013, 1). Coccossis and Psycharis, Ed. (2008) presents The Greek Experience in cohesion policy implementation after 20 years, using some spatial analysis tools. As an example of regional pattern analysis Monastiriotis explores the spatial patterns and spatial heterogeneity across the regions at prefectures level: using "exploratory spatial data analysis (ESDA), the author explores the persistence of spatial clustering across socio-economic indicators through the application of simple statistical tests." (Monastiriotis, Coccossis and Psycharis, Ed. 2008, 16) The Greece spatial pattern identified indicates "that policy spill overs for interventions targeting spatial cohesion may be also limited" (Monastiriotis; Coccossis and Psycharis, Ed. 2008, 16). Another regional pattern analysis is made by Psycharis (2008) regarding the Public Spending Patterns - The Regional Distribution of Public Investment in Greece. This profile highlight the spatial spending pattern governments of period 1976-2005, to compare the changes (between) different periods and to try to explain whether redistribution of national wealth or other factors such as political ones could be held as sufficient evidence for explaining the pattern and its temporal changes." (Psycharis; Coccossis and Psycharis, Ed. 2008, 41)

Public expenditure programmes on regional level represents a debate topic exploited in Central and Eastern Europe. Problems of public expenditures programmes on regional level in Czech Republic is signalled by Šumpíková, Krbová et.al in 2004.- these findings fully support heavy criticism of the quality of public financial control and audit in Central and Eastern Europe". (Šumpíková, M., Krbová J., et.al., 2004, 323),

In Romania in 2014 Huşman analyses the local budget place in the general consolidate budget, exploring theoretical aspects regarding the new role of local budgets "in the context of constantly increasing the importance and impact of local budgets both on the economy at European and national level through the decentralization processes that are more intensely debated and implemented (Huşman, 2014, 105).

2. RESEARCH QUESTION

Our research is centred to realise an territorial heterogenic profile of public expenditures at LAU 2 level with focus on expenditures on projects funded by external grants (irredeemable), useful input for regional policy efficient targeting, especially on the background of the Jobs – Growth - Investment Plan's New EU Initiative, for 2007-2013 period in Romania.

The local public budget [1] is a management instrument for multilevel governance, regulated according to Law No. 273 of 29 June 2006 updated in 24 April 2014. Among the budget typology from the source point of view, the external non-refundable budget funds (introduced by the Emergency Ordinance 63/2010, becoming active since 1 January 2011 as indicated by the Art.1 (2) L237/2006) plays an important role from the policy cohesion perspective. We consider this category the best proxy for monitoring at LAU2 level the input of cohesion funds.

3. MODELS, VARIABLES AND DATA

3.1. SPATIAL DATA

The specific of spatial / geographic data is to link place (location), time and attribute. (Fisher, Wang, 201, 2)

Administrative and geographical data – area data:

a. Area data are provided by Romania ESRI shape polygons that reflects territorial description of LAU2 are regulated according Law 351/6th July 2001 regarding the National

Territory Arrangement Plan - spatially vectorised using the polygons areas for LAU2 described by ESRI Romania using Arc GIS Software. The territorial administrative units LAU2 level are represented in SIRUTA [2] code by municipality,

- b. town, commune and County residence and are equivalent with NUTS5 level [3].

3.2. ATTRIBUTE DATA

Local budget data are provided by MDRAP / Finance Ministry:

The execution of revenue and expenditures budgets of administrative-territorial units [4] is reported at national level by the General Direction of Public Finance from the Finance Ministry at county level by the County Administration of the Public Finance annually at the 31st of December. Our *data source is provided by the MDRAP [5] site.*

Variable on which is made the LISA spatial analysis, on which we calculated “high-high” (H-H), “low-low” (L-L), “low-high” (L-H), and “high-low” (H-L) clusters for 2013 in GeoDA (Anselin), are:

Expenditures (RON) in 2013 on projects funded by external grants at LAU2 level in Romania

Variables used to characterize the territorial profile of public expenditures at LAU 2 level, for 2007-2013 period in Romania:

- A1) Total incomes (RON) in years: 2007, 2009 and 2013 at LAU2 level;
- A2) Total endogenous incomes (RON) in the years: 2007, 2009 and 2013 at LAU2 level;
- A3) Total expenditures (RON) in the years: 2007, 2009 and 2013 at LAU2 level;
- A4) Expenditures (RON) in the years 2009 and 2013 on projects funded by external grants at LAU2 level

Socio-economic indicators (Romania, provided by INS) as attribute information

- B1) Number of LAU2 in the specific cluster type
- B2) Average number of employees in the years 2007, 2009 and 2013 at LAU2 level, FOM104D INS TEMPO
- B3) Registered unemployed persons at the end of the month in the years: 2010 and 2013 at LAU2 level, SOM101E INS TEMPO
- B4) Demography data 2011 Census Data INS –ESRI for the indicators: Total population, Total masculine population; Total feminine population; Total population aged 15-64 years old; Total masculine population aged 15-64 years old; Total feminine population aged 15-64 years old;
- B5) Number of persons that entered in a locality 2009 (*)-Total population which who arrived and proved to have ensured a dwelling in a locality in 2009: Settling of domicile (including external migration) by counties POP307A - TEMPO INS - *Origin–destination flow.*

3.3. MODELS

Our territorial profile of public expenditures is focused in direct relation with its specific subcomponent of ***expenditures on projects funded by external grants at LAU2 level*** in Romania through the instruments of spatial analysis. The spatial perspective is built in 5 steps of spatial analyse with the objective of spatial variation analyse and agglomeration tendency identification for the mentioned indicator:

1. Exploratory spatial data analysis (ESDA) procedures applying the tool Choropleth maps using the classification [6] scheme by natural breaks (Jenks) [7] in 5 classes, from the software ARC GIS 10.2.3 [8]. Using the Choropleth maps classification by natural breaks (Jenks) then the error distributions of the “error blanket” is homogenous on the mapped surfaces. This classification scheme allows the using of less than 7 classes of data. Each class of data “minimize the average deviation from the class mean, while maximizing the deviation from the means of the other groups. The method reduces the variance within classes and maximizes the variance between

classes. See (map no. 1) with expenditures (RON) in 2013 on projects funded by external grants at LAU2 level in Romania and by area of residence (urban/rural) are presented. The share of expenditures on projects funded by unrefundable external grants in total expenditures at LAU2 level (%) in 2013 in Romania and by area of residence (urban/rural) are presented in (map no.2);

2. Neighbourhood analysis / contiguity and spatial weighting technique used. Spatial relation conceptualization spatial LAG modelling is based on rook contiguity, first order type. Among the 3189 LAU2 with data there are 805 locations with 5 neighbours, 799 locations with 6 neighbours, 577 locations with 7 neighbours, 408 with 4 neighbours and 282 with 8 neighbours, summing a cumulative percent of 90.1%. The maximum number of neighbours is 16 and minimum 1 in 4 locations.

3. Analysis of global and local spatial autocorrelation is realised through the Moran's I [9] and LISA *Local Indicators of Spatial Association* Maps [10], local clusters highlighting in 2013 the spatial pattern for **expenditures on projects funded by external unrefundable grants at LAU2 level**. (Anselin, 2003,p.99)

It is evident a slight clustering tendency in 2013 while Global Moran I Index (Anselin 1995, 1996) $=0.0220969 > 0$. In this case, Global Moran's I values are higher than its theoretical value $E[I] = -0.0003$ indicates a significant correlation, corresponding to a total of 999 permutations, with a pseudo-significance level of $p=0.027 \in [0.27; 0.316] < 0.32$ (low confidence level of 68%. Based on the scheme of interpretation, Z score of Moran's I $\in [0.1467; 0.3081]$ $Sd=0.097 < 1.65 Sd$, we accept the null hypothesis and we conclude that the identified pattern is a result of chance.

We present in (map no. 3) the 4 clusters types that reflect 4 types of spatial autocorrelation: The high-high [HH] and low-low [LL] locations (positive local spatial autocorrelation) are typically referred to as spatial clusters, while the high-low [HL] and low-high [LH] locations (negative local spatial autocorrelation) are termed spatial outliers. While outliers are single locations by definition, this is not the case for clusters. It should be kept in mind that the so-called spatial clusters shown on the LISA cluster map only refer to the core of the cluster." (Anselin, 2005, p.145) This agglomeration profile is obtained at LAU2 level in Romania at general Significance 0.05, for 999 permutation in (map no. 4.) LISA Cluster Map for expenditures (RON) in 2013 on projects funded by external grants and in (map no. 5). LISA Significance Map for expenditures (RON) in 2009 on projects funded by external grants.

4. Selection of LAU2 units included in HH and LL clusters types (Anselin 1995, 1996) [11] refers to the spatial clusters on the map refer to the core of the cluster. The cluster is classified as such when the value at a location (either high or low) is more similar to its neighbours (as summarized by the weighted average of the neighbouring values, the spatial lag) than would be the case under spatial randomness. The cluster itself extends to its neighbours. [12] The (maps no. 3 and no. 4) shows at least $p < 0.05$ and 999 permutation HH and LL spatial clusters and HL and LH spatial outliers

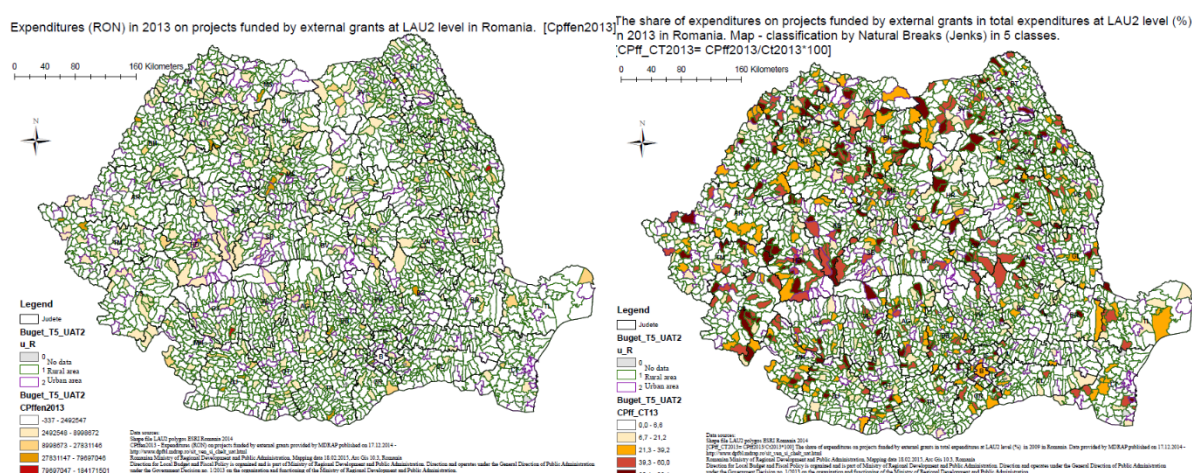
5. Comparing the means of some relevant socio-economic indicators at LAU2 level in the period 2007 - 2013, differentiated by spatial variation and agglomeration tendency of the cluster level with national means and emphasis some tendencies. See for the LISA clusters express the spatial association tendency for "expenditures on projects funded by external grants (un-refundable) in 2013 in locations at LAU2 level the (table no. 1). A measure of spatial heterogeneity is expressed through ratio of local budget indicators means at national level to means by clusters type during 2007-2013 and (table no. 2). Measure of spatial heterogeneity expressed through the share calculated for means of some socio-economic means by clusters type in the means at national level during 2007-2012.

4. RESULTS AND DISCUSSIONS

Our first set of results is represented by the geo-visualisation for the Expenditures (RON) in 2013 on projects funded by external grants at LAU 2 both in absolute terms in (map no. 1) and in relative terms in (map no. 2.) The natural groupings of the data values emphasis some break points

with relevance to policy budget projecting. In (map no. 1), is visible that the large majority of LAU2 locations execute expenditures on projects are funded by external grants (un-refundable) in 2013 are below 2.4 million RON / LAU2 and in (map no. 2) below 6.7% as a share in total expenditures/LAU2. The outliers look to appear in locations with expenditures on projects that are funded by external grants (un-refundable) over the 27.8 million RON / LAU2 visible in (map no. 1) and over 21.3% as a share in total expenditures /LAU2 as it is visible in (map no. 2).

The second set of results is represents by the description of spatial dependence / spatial association characteristic for execute expenditures on projects are funded by external grants (un-refundable) at LAU2 level in 2013. In purpose to keep the full spectrum of diversity we identified with a low significance level ($p < 0.05$) the locations included in clusters and outliers according (Fisher, Wang, 2011 p.15). In (map no. 3) are presented the LISA cluster map with 40 HH locations as nucleus for clusters with positive externalities and 42 LL locations as nucleus for clusters with negative externalities. There are identified 123 LH outlier type locations and 51 HL outlier's locations. In (map no. 4) are presented the LISA significance levels for the locations included in LISA

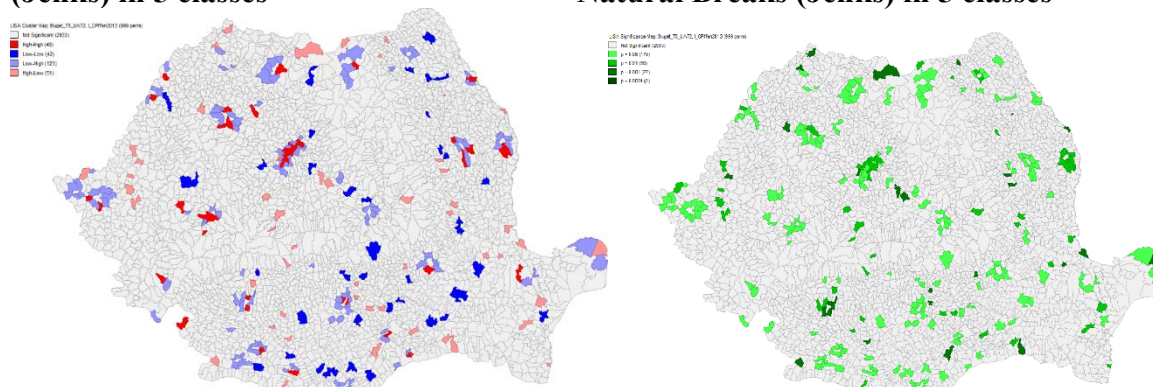


Map no. 1.

Expenditures (RON) in 2013 on projects funded by external grants at LAU2 level in Romania and by area of residence (urban/rural). Map classification by Natural Breaks (Jenks) in 5 classes

Map no. 2.

The share of expenditures on projects funded by external grants in total expenditures at LAU2 level (%) in 2013 in Romania and by area of residence (urban/rural). Map classification by Natural Breaks (Jenks) in 5 classes



Map no. 3.

LISA Cluster Map for expenditures (RON) in 2013 on projects funded by external grants at LAU2 level in Romania. [Cpffn2013] Significance 0.05, Number of permutation 999

Map no. 4.

LISA Significance Map for expenditures (RON) in 2013 on projects funded by external grants at LAU2 level in Romania

Legend

NotSig.	High-High	Low-Low	Low-High	High-Low	Not Sig.	p=0,05	p=0,01	p=0,001	p=0,0001
2933	40	42	123	51	2933	179	50	27	0

Source: Own elaboration using data from MDRAP, INS-TEMPO and ESRI-RO

Cluster Map. From the 179 locations with a significance level of $p < 0.05$ there are 50 locations with a significance level of $p = 0.01$ and respectively there are 27 locations with a significance level of $p < 0.001$.

The locations with HH cluster type for expenditures are mostly in rural area, with high level of $p < 0.01$ level of significance are entirely communes. We mention for 2013 this type of cluster in county Gorj Comuna Hurezani and comuna Stoina, in county Vaslui/ Comuna Dimitrie Cantemir and Comuna Hoceni, in county Mures there are included in the list the following communes: Papiu Ilarian, Ceusasu de campie and Band, and not least in Salaj counthy the Comuna Sanmihaiu Almasului. With the same level of significance we point out the the only one center of LL cluster for comuna Ruginoasa from county Neamț.

The 3rd set of results reflects the spatial heterogeneity of the attributes of location included in the identified cluster by the LISA for Expenditures (RON) in 2013 on projects funded by external grants at LAU 2 level. For each type of location (HH, LL cluster, HL or LH outlier or not significant) at national level and at rural area are calculated the following aggregate characteristics for local budget and for some socio economic indicators: mean, the share of each category in total sum, the Standard Deviation and the Standard Error of Mean.

In synthesis our territorial heterogenic profile of public expenditures at LAU 2 level with focus on expenditures on projects funded by external grants (irredeemable) is presented in (table no. 1 and no. 2). According with the structure of clusters identified the national mean for any indicator (from the mentioned list) is very close to the means of location included in NS (Not Significant) clusters. A measure of spatial heterogeneity is presented in (table no. 1) as the ratio of local budget indicators means at national level to means by clusters type during 2007-2013 and in (table no. 2) as the share calculated for means of some socio-economic means by clusters type in the means at national level during 2007-2012 (according with the best existing data).

Table no. 1. Measure of spatial heterogeneity calculated as a ratio of local budget indicators means by clusters type (NS, HH, LL, LH and HL for the means corresponding to the numbers by location type) to national level means (T for the total number of LAU2) during 2007-2013
[Ratio]

Indicator	year	Rural area location type					average location				
		NS/ T	HH/ T	LL/ T	LH/ T	HL/ T	NS/ T	HH/ T	LL/ T	LH/ T	HL/ T
Total income	2007	1	0,9	1,1	1	0,9	1	0,7	2,1	0,8	1,1
	2009	1	1	1,2	1	1	1	0,7	2,1	0,8	1
	2013	1	3,7	0,4	0,3	2,8	1	4,1	0,4	0,4	2,7
Total endogenous incomes	2007	1	1	1,1	1	0,9	1	0,6	1,9	0,7	1,2
	2009	1	1	1,2	1	1	1	0,6	1,9	0,7	1,1
	2013	1	3,3	0,3	0,3	2,3	1	3,6	0,3	0,3	2,2
Total expenditures	2007	1	0,9	1,1	1	1	1	0,7	2,2	0,8	1,2
	2009	1	1	1,2	1	1	1	0,7	2,1	0,8	1,1
	2013	1	3,7	0,4	0,3	2,7	1	4,1	0,4	0,4	2,7
Expenditures on projects funded by external grants	2009	1,1	0,3	0	0	0	1,1	0,1	0,1	0	0,2
	2013	0,9	7,4	0,1	0,1	3,3	0,9	8,2	0,1	0,1	3,4

Source: data calculated by authors, LISA clusters express the spatial association tendency for “expenditures on projects funded by external grants (un-refundable) in 2013 in locations at LAU2 level

Note: all communes are included in rural area / average commune location type

Table no. 2. Measure of spatial heterogeneity expressed through the share calculated for means of some socio-economic means by clusters type (NS, HH, LL, LH and HL for the means corresponding to the numbers by location type) in the means at national level (T for means corresponding to the total number of LAU2) during 2007-2012 [share %]

Indicator		year	Rural area location type					average location				
			NS/ T	HH/ T	LL/ T	LH/ T	HL/T	NS/ T	HH/ T	LL/ T	LH/ T	HL/ T
Average number of employees		2007	99,7	90,0	101,4	114,7	88,0	99,2	56,2	253,1	77,0	111,2
		2009	99,7	96,5	107,5	108,1	95,9	99,3	55,7	239,9	76,4	119,4
		2012	99,7	95,7	99,8	114,2	87,4	99,1	53,8	236,2	78,0	126,9
Registered unemployed		2010	100,9	95,6	110,4	84,4	84,1	99,9	91,7	193,2	80,9	82,6
		2013	101,0	88,9	113,2	81,7	83,2	100,4	91,3	176,6	77,0	78,4
Total Population	T	2011	100,2	93,5	122,0	93,9	95,3	99,7	81,1	191,7	80,6	102,4
	M	2011	100,2	93,8	121,6	93,8	94,5	99,7	82,0	191,0	80,8	101,5
	F	2011	100,1	93,1	122,5	94,0	96,0	99,7	80,3	192,4	80,3	103,3
Population 15-64 years	T	2011	100,2	92,9	118,5	94,5	96,7	99,7	78,3	196,5	79,5	103,5
	M	2011	100,2	93,2	118,9	94,6	95,8	99,7	79,6	194,2	80,1	102,5
	F	2011	100,2	92,5	118,0	94,4	97,6	99,7	77,1	198,8	79,0	104,5
Persons entering in location		2009	100,0	88,2	110,2	99,4	102,9	100,1	67,2	200,5	74,5	99,1

Source: data calculated by authors, LISA clusters express the spatial association tendency for "expenditures on projects funded by external grants (un-refundable) in 2013 in locations at LAU2 level

In HH commune location type the expenditures on projects funded by external grants, un-refundable are 7.4 times higher than national mean in 2013 (while the same ratio was only 0.3 in 2009), the total expenditures are 3.7 times higher than national mean in 2013 (while this ratio was 0.9 in 2007 and 1 in 2009), total endogenous incomes are 3.3 times higher than national mean in 2013 (in 2007 and 2009 the national and HH commune mean were equal) and the total income is 3.7 times higher than national mean (in 2007 and 2009 the national and HH commune mean were equal).

In HH commune location or **rural location** type the mean values for the demographic indicators is much below the mean of the same indicators in the “average national rural location”, respectively this share is 93.5% for total population, 93.8% for masculine population, 93.1% for feminine population in 2011. For persons entering in a location in 2009 the share of mean in HH rural location type in the national mean location 95.7% is registered the lowest level compared with the other share of means by cluster type (LL, HL, LH, NS). In HH rural location type the mean values for the labour market indicators is also below the mean of the same indicators in the “average national rural location”, respectively this share is for population in working age 15-64 years in 2011 is 92.9% for total population, 93.2% for masculine population and 92.5% for feminine population, for the average number of employees in 2012 (decreasing from 96.5% in 2009 but increasing with 3.5pp comparing to 90% in 2007), is 88.9% for registered unemployed persons in 2013 (decreasing from 95.6% in 2010).

5. CONCLUSION

Looking at the big picture it is visible the tendency that the spatial heterogeneity for attributes in terms of socio economic indicators is higher than the terms of local budget indicators for the LISA clusters identified (HH, LL, HL, LH, NS) by the public expenditures on projects funded by external grants (non-refundable) criteria. The highest differences are registered between the HH and LL clusters locations, conserving the general tendency that the levels for budgetary indicators are inverse proportional variation to socio-economic indicators. The degree of spatial heterogeneity has a higher variation among the labour market indicators and especially by the dimension of LAU2 by population. Because of the high level of heterogeneity of urban areas (municipality, town and county residence) we presented only the results from rural areas – results more reliable and more homogenous.

Our research considers that the public expenditures on projects funded by external grants (non-refundable) outside the process of local budget balance procedure according to L273/2006 and working under the cohesion policy demands, subordinated to strategic objectives (cohesion policy, employment strategy, etc.).

This article is an attempt to fill the gap in Romania's spatial processes identification in literature. The spatial processes understanding offers a useful instrument to the cohesion policy in identifying the barriers and opportunities in development.

The presence in the local budget of the external grants (irredeemable / non-refundable) as instrument to implement cohesion policy highlight the need to improve the public local expenditures management, on the background of integrated approach of territorial development requested by the 1303/2013 Regulation of the EU Parliament and Council.

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ENDNOTES

[1] According to Article 5/L273/2006 is presented the public local budget structure includes: “a) own revenue [endogenous revenues/ incomes] consisting of: taxes, contributions and other payments, other income and allowances deducted from income tax; b) amounts deducted from certain income of the state budget; c) subventions received from the state budget and other budgets; d) donations and sponsorships; e) amounts received from the European Union and / or other donors made payments and pre-financing.”

[2] ***, Romania's National Institute of Statistic (INS) – The National Interest Nomenclature Server – SENIN, Methodology SIRUTA –General Presentation, http://colectaredate.insse.ro/senin/classifications.htm?selectedClassification=SIRUTA_AN_2014&action=download

[3] NUTS - Nomenclature of Territorial Units for Statistics (Nomenclatorul unităților teritoriale pentru statistici la nivelul Uniunii Europene - Autoritatea de origină : Oficiul de Statistică al Uniunii Europene EUROSTAT)

[4] MDRAP's data published on 17.12.2014 -http://www.dpfbldrap.ro/sit_ven_si_chelt_uat.html, Romanian Ministry of Regional Development and Public Administration, Direction for Local Budget and Fiscal Policy is organized and is part of Ministry of Regional Development and Public Administration. Direction and operates under the General Direction of Public Administration under the Government Decision no. 1/2013 on the organization and functioning of the Ministry of Regional Development and Public Administration.

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