

APPLICATION PROSPECTS OF THE PARETO MODEL IN THE EXECUTION OF THE LOCAL BUDGETS AND THE CORRELATION WITH THE REGIONAL GDP¹

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Abstract:

Regional economic development data are not the same in various geographic regions of Romania, the issue representing a cause for discrepancies in the living standards, quality of life, on one hand, and propensity for the economic sector, on the other hand. Without a proper involvement of the state (involving targeted support measures), this phenomenon could generate extremely large gaps between various geographical areas.

The regional economic development is reflected - directly or indirectly - in the amount of the local budget because of the algorithm for generating revenues, which is supposed to assemble a share of the profit and income taxes, as well as other sources, and - of course - the allocations of the central state budget. Only local revenues will be considered in this exercise because expenses are mostly correlated by these ones. The surplus or the deficit situations range in a domain between 3-5%, totally irrelevant for a comparative analysis.

Dangerous gaps can be highlighted, in our opinion, due to the scrutiny of the Pareto model 20-80, on the basis of the fact that almost 80% of world's wealth is owned by 20% of the population, while 80% of the value-added is generated by 20% of the economic agents etc. Against this background, a proper objective would be testing the Pareto model for the local budget execution and finding relevant correlations with the GDP.

This paper aims at testing - at the levels of macro-regions, regions and counties - if such a proportion can be observed. Romania's territorial organisation includes four macro-regions, 8 regions for development and 42 counties. The assumption is that such ratio might occur at the level of a county, but it will lose consistency at the levels of the regions and macro-regions.

At the same time, a link between the regional GDP and the size of the local budget revenues will be considered in order to highlight the elasticity indicators. The strength of this link could then be determined with the help of correlation indicators.

Structural analyses of the kind will allow the Government to design measures for stimulating the growth in less developed areas and/or to support measures aiming at closing the gaps.

Keywords: economic macro modelling, regional development, structural analysis

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I. INTRODUCTION

Vilfredo Pareto (an Italian economist) described - in 1906 - the unequal distribution of wealth in his country. He observed that 20% of the people owned 80% of the wealth. In the 1940s, Josef Juran (specialist in management with Romanian origins) attributed the “80/20 rule” to Pareto, naming it Pareto's Principle.

The rule known as the 80/20 rule, Pareto's Principle or Pareto's Law is a very effective tool to support effective management. It is a decision-making technique that statistically separates a limited number of input factors as having the greatest impact on an outcome, either desirable or undesirable. The Pareto analysis is based on the idea that 80% of a project's benefit can be achieved by doing 20% of the work or – on the other hand - 80% of the problems are linked to 20% of the causes².

The same reference³ points out that „the Pareto analysis will typically show that a disproportionate improvement can be achieved by ranking various causes of a problem and by concentrating on those solutions or items with the largest impact. The basic assumption is that not all inputs have the same or even proportional impact on a given output. This type of decision-making can be used in many fields, from government policy to individual business decisions.

Moreover, the **Equilibrium** is described in the economic/business environment as: „The status in which market supply and demand balance each other and, as a result, prices become stable. Generally, when there is too much supply of goods or services, the price goes down, which leads to a higher demand. The balancing effect of supply and demand results from a status of equilibrium. The equilibrium price is where the supply of goods matches the demand. When a major indicator experiences a period of consolidation or sideways drives, it can be said that the forces of supply and demand are relatively equal and that the market is in a status of equilibrium.”⁴

In its turn, the **Disequilibrium** is depicted as: ”A situation where internal and/or external forces prevent market equilibrium from being reached or they cause the market to head off balance. This can be a short-term by-product of a change in variable factors or a result of long-term structural imbalances.”⁵

The economist John Maynard Keynes introduced the term „general disequilibrium” to describe the status of the markets as we frequently find them. Keynes noted that markets will mostly be in some form of disequilibrium - there are so many variable factors that affect financial markets today that “true” equilibrium is more like an idea; it is helpful for creating working models, but it lacks real-world validation.⁶

² <http://www.gassner.co.il/pareto/>(02/14/2011)

³ Idem 1

⁴ <http://www.investopedia.com/terms/p/pareto-analysis.asp> (02/17/2011)

⁵ Idem 3

⁶ Idem 3

II. METHODOLOGY

If the origin of the Pareto Principle showed misbalances in wealth owners, later on it could proper explain the relationship between causes and effects and non-uniform distributions. Also if the economic phenomena are governed by the “general disequilibrium” we consider that a study of the public budget, regional GDP and regional Gross Added Value according with the Pareto Principle will highlight a balanced or unbalanced economic development within Romanian regions. At the same time, the public revenue could be related with the GDP and GAddV.

The research used data for the years 2002-2008 published by the National Institute of Statistics from Romania⁷ and EUROSTAT, statistic databases⁸ for the public budget, regional GDP and regional Gross Added Value.

For the Pareto principle analyses the following stages have to be taken:

- a) Establishing the parameters relevant for the objectives of the study – according to our perspective, regional GDP and GAddV distribution between the regions follow the 80/20 rule if there are significant gaps in economic development.
- b) Identifying of regions and local units – the units as they are legally established are 4 macro-regions (not relevant for this study), 8 regions – Nord-Vest, Centru, Nord-Est, Sud-Est, Bucuresti-Ilfov, Sud-Muntenia, Sud-Vest Oltenia, Vest (as they are designated in the EUROSTAT database), and 42 counties (as presented in Table no.1).

1	Alba	11	Buzău	21	Gorj	31	Olt	41	Vaslui
2	Arad	12	Călărași	22	Harghita	32	Prahova	42	Vrancea
3	Argeș	13	Caras-Severin	23	Hunedoara	33	Sălaj		
4	Bacău	14	Cluj	24	Ialomița	34	Satu Mare		
5	Bihor	15	Constanța	25	Iași	35	Sibiu		
6	Bistrița-Năsăud	16	Covasna	26	Ilfov	36	Suceava		
7	Botoșani	17	Dâmbovița	27	Maramureș	37	Teleorman		
8	Brăila	18	Dolj	28	Mehedinți	38	Timiș		
9	Brașov	19	Galați	29	Mureș	39	Tulcea		
10	București	20	Giurgiu	30	Neamț	40	Vâlcea		

- c) Defining the main criteria for classification – the classification of the counties will be performed in value groups: for example, the distribution of GDP between the 8 regions highlights 3 major groups according to the level of the share;
- d) Arranging the counties in decreasing order subsequent to the value of the main index of the analysis;
- e) Calculating the step by step cumulating percentage of the index;
- f) Building the curve with groupings or with relative cumulated frequencies expressed in percentages;

⁷ <http://www.insse.ro/cms/rw/pages/index.ro.do>

⁸ http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database

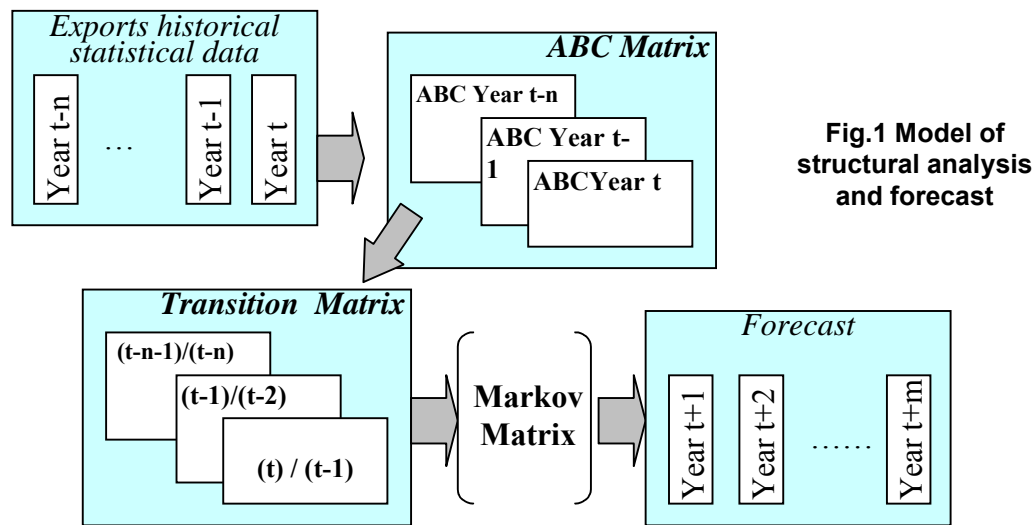


Fig.1 Model of structural analysis and forecast

g) Results presentation and interpretation.

The second stage of the present research is to identify “the movement” of the counties between the identified groups. Later on, this issue could be used in a proposed ABC-Markov model of a structural analysis and forecast⁹. The model was designed and used, with good results, for the Romanian exports and for the 21 products considered as “stars” of portfolio of national products. So, it could be adapted for the 42 counties as well.

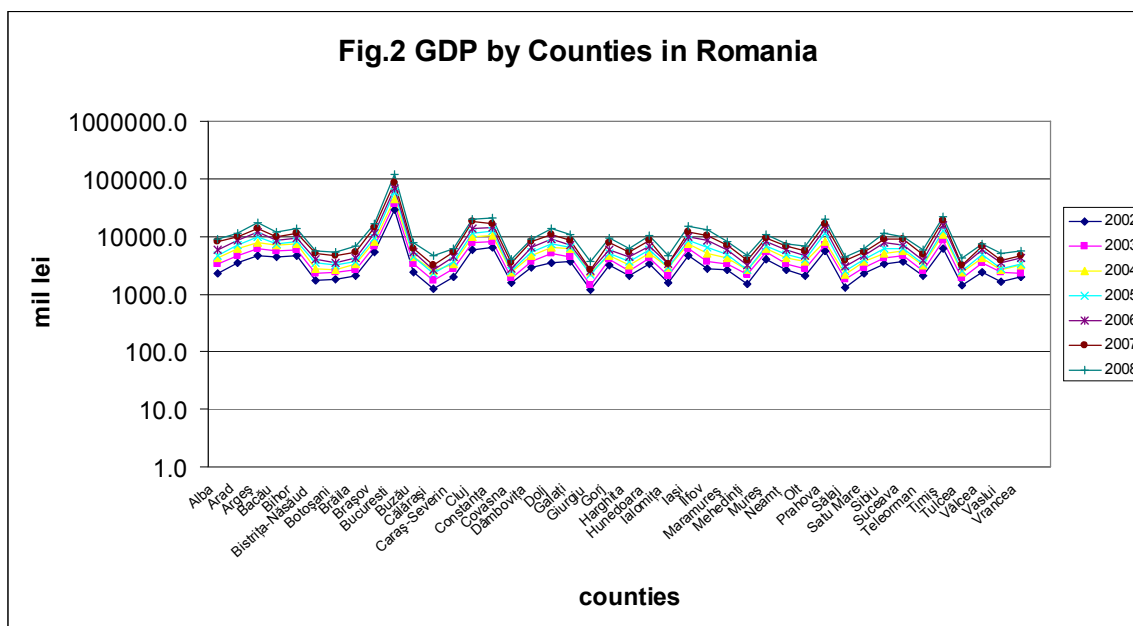
The main principle of the model consists of the ABC method outcomes from the application of the Pareto Principle to the contributions of the counties to GDP and GAddV. Similar models are used in various other areas, for example: the stock products and the inventory amount, the customer distribution and the turnover, the exports structure and amounts etc.

III. RESULTS

In accordance with the research aims an analysis of the DGP distribution among the counties was done. Before it it was our understanding to see the evolution of GDP for the studied time period 2002-2008. This shows the average of the GDP during the studies years and furthers more the modification it suffers for each county.

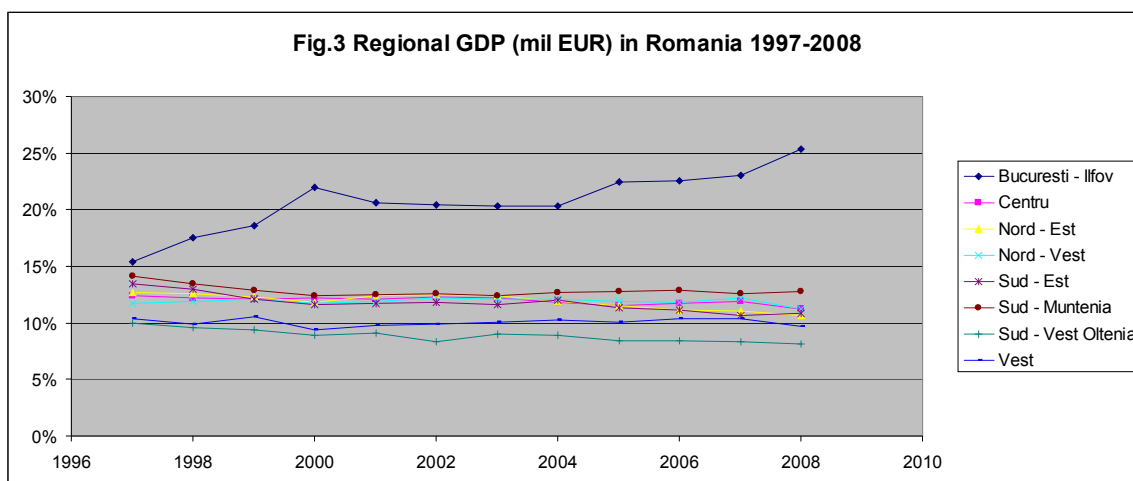
The first results of the analysis show the evolution of the GDP at the regional level and its distribution by counties.

⁹ A. Grigorescu, C.A. Bob, *Structural analysis and forecast of the Romanian exports, Policy Modeling (EcoMod 2003), Global Economic Modeling Network and Bilgi University Istanbul, Istanbul, Turkey, July 3-5, electronic volume CD, 2003*



One could see that the value in this timescale (2002-2008) have increased from the range of 1200-6600 mil LEI (Romanian currency) to the range of 3700-23315 mil LEI with the exception of Bucharest (out-of-range for all indexes) and the distribution seems to be generally the same.

An in-depth picture, starting with data analysis of GDP by regions, in the timescale 1997-2008¹⁰, and the calculation of the share of each region in the total amount demonstrate the appearance of value groups, registered modifications, stability of a region within a group and on the same position.



The contribution of the regions in the GDP for 1997 covers values between 10 to 15% for all 8 regions, as it is presented in Picture 3. This will lead to the perception that the economic activity and - as a consequence - the local development registered similar levels. Starting with

¹⁰ Source of information EUROSTAT, http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database

1998, the București-Ilfov region registered significant grows while other regions registered declines or small oscillations around the same values.

At the end of the studied timeframe (2008), the situation is totally different, namely the Bucuresti-Ilfov region detached itself by reaching about 25%; the Sud-Muntenia, Centru, Nord-Est, Nord-Vest, Sud-Est and Vest regions accounted values between 13% to 10%, while the Sud-Vest Oltenia region turned down to 8%. This ranking highlights the manifestation of economic differences between regions, the wealthier one being at double value than the average and the poorest at 64% from the average.

There was no distribution to confirm the Pareto Principle, meaning 20% of the regions to contribute with 80% to the GDP. The data analyses showed a three level grade: 25-38, 50-44, 25-18 respectively. This could be considered as following: 25% of the regions (2 regions – placed in Group I) generates about 40% from the GDP, 50% of the regions (4 regions – placed in Group II) contributes with about 40%, and the last 25% (2 regions – placed in group III) bring the final 20% of GDP.

TABLE 2

1997			2008		
București - Ilfov	15%	GRUPA A	București - Ilfov	25%	GRUPA I-a
Sud - Muntenia	14%		Sud - Muntenia	13%	
Sud - Est	13%		Nord - Vest	11%	GRUPA a II-a
Nord - Est	13%		Centru	11%	
Centru	12%	Sud - Est	11%		
Nord - Vest	12%	GRUPA B	Nord - Est	11%	GRUPA a III-a
Vest	10%		Vest	10%	
Sud - Vest Oltenia	10%		Sud - Vest Oltenia	8%	

From Table 2 one could see that the 4 regions placed in Group II come from Group A, as well as from Group B. A better perspective is offered by the evolution of the region's contribution to the GDP for all studied timescales presented in Appendix 1.

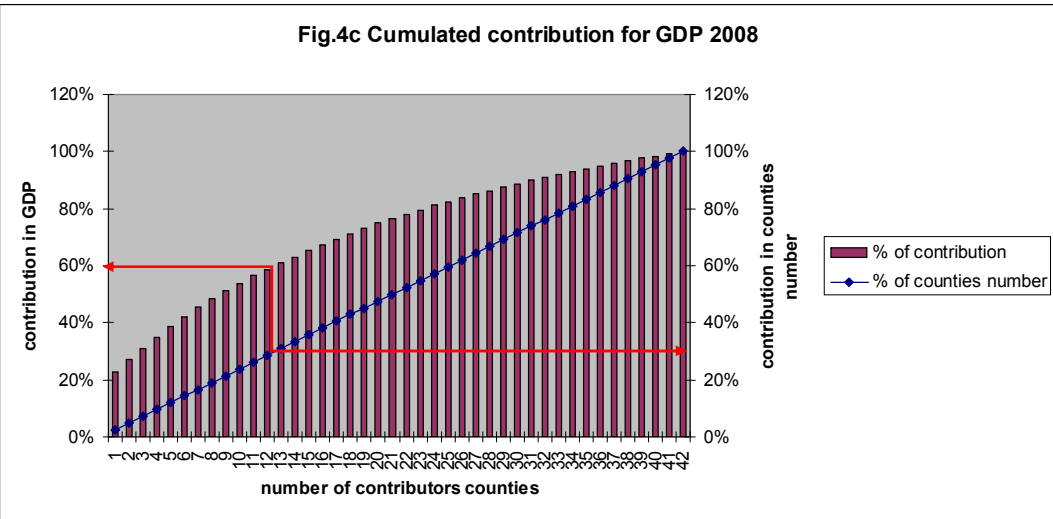
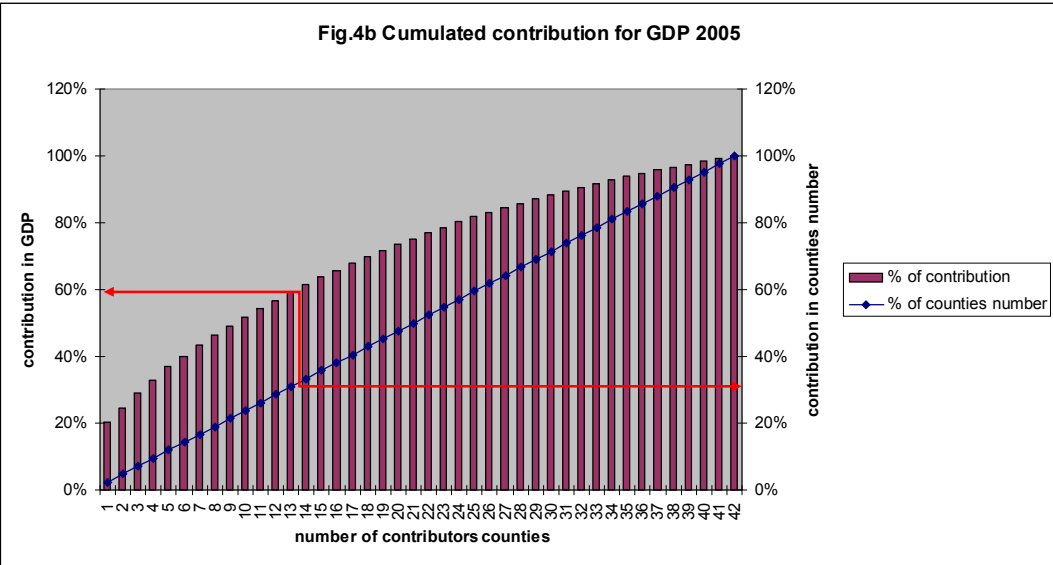
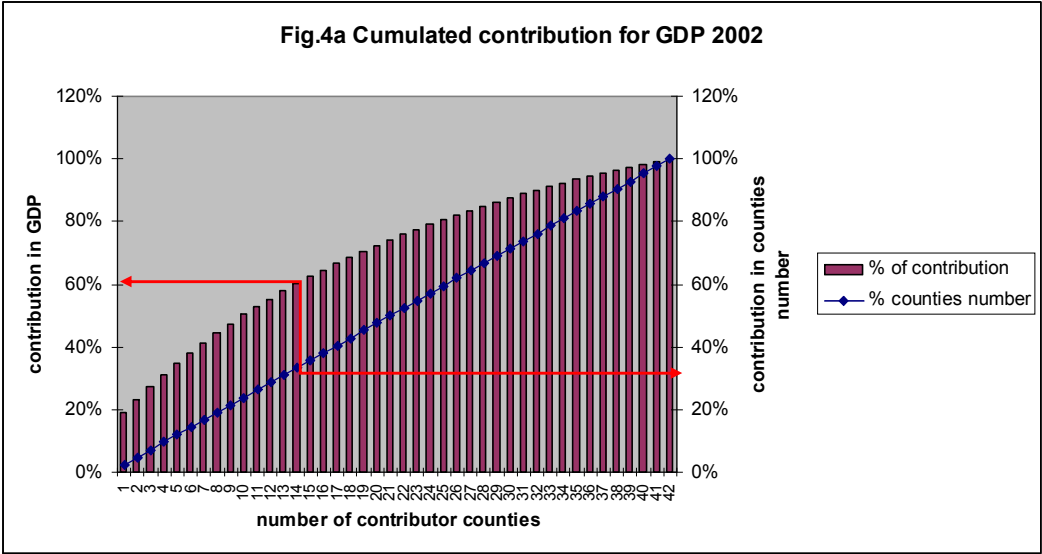
In accordance with the evolutions mentioned above, three value groups show up:

- GROUP I – the regions Bucuresti-Ilfov and Sud-Muntenia are placed on the places 1 and 2 of the entire scale, even if the first one went up from 15% to 25% and the latter had a slight decrease from 14% to 13%;
- GROUP II which includes the regions Sud-Est, Nord-Est, Centru and Nord-Vest, and which records a steady decrease from 13% or 12% down to 11%. Over time, the position registered systematic changes;
- GROUP III - composed of the Vest and Sud-Vest Oltenia regions, which is set at 10% or decreases from 10% to 8%.

This projection in three value groups opens up the opportunity to think about the possibility of testing the ABC-Markov model of structural analysis and forecast (see Picture 1).

The analysis of the contribution to GDP by counties seems to be more relevant in terms of the Pareto Principle. A data analysis for the 42 counties (41 counties and Bucharest) for GDP and for GAddV was performed. The basic information of the analysis is summarised in Appendix 2.

For each year in the timescale 2002-2008, serial cumulated frequencies were illustrated. .

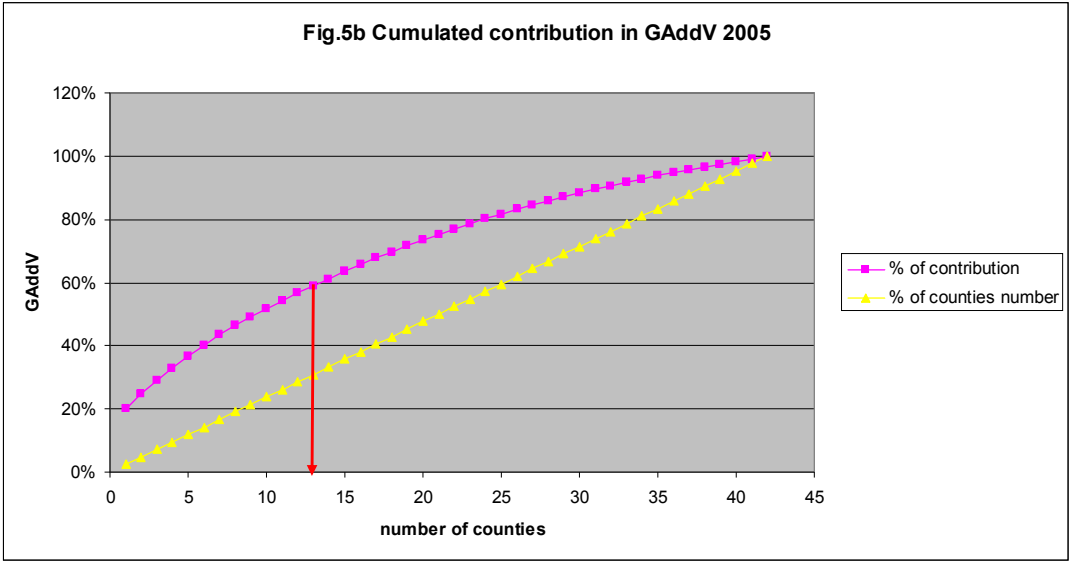
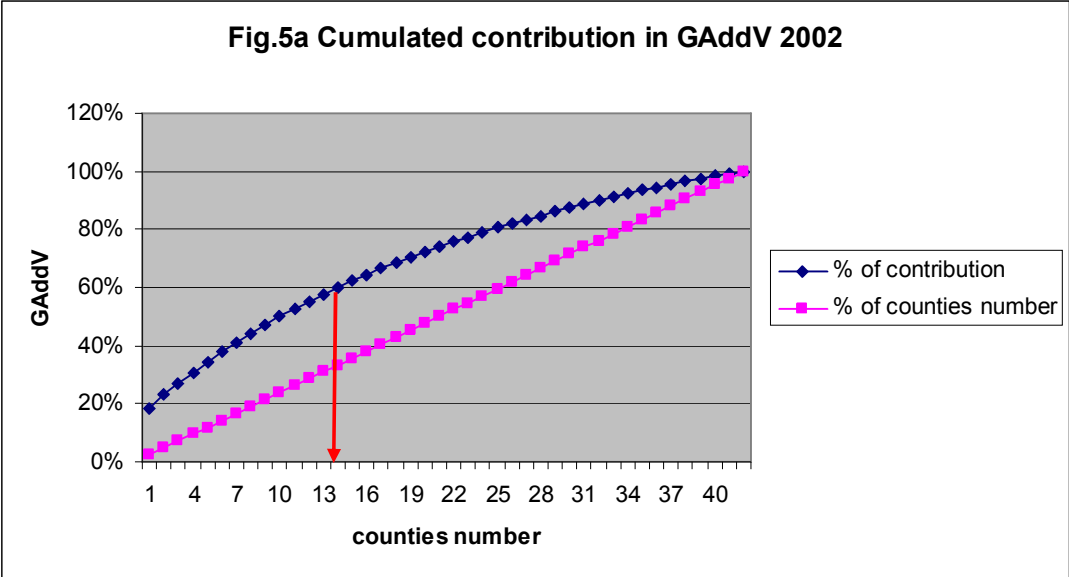


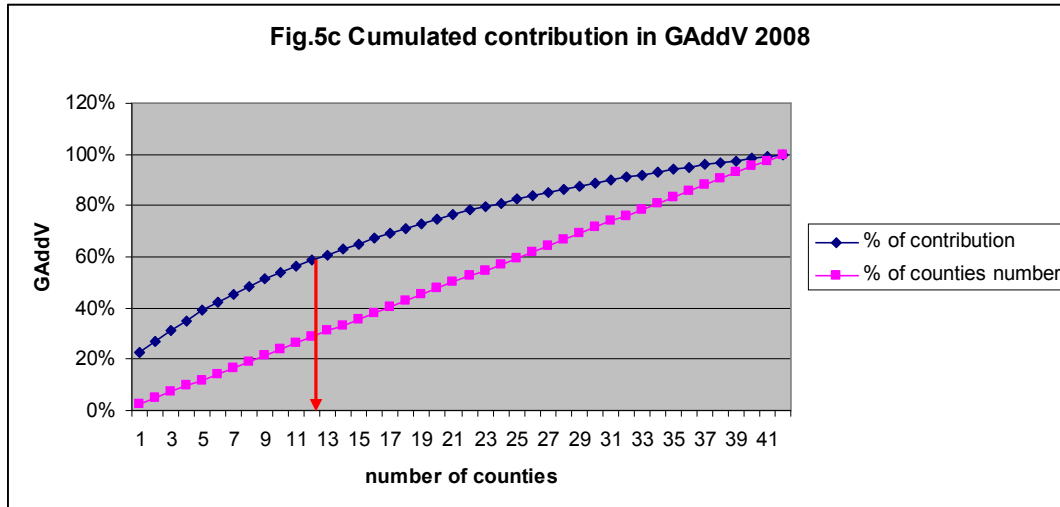
In the Pictures 4a, 4b, 4c are presented the findings for the years 2002, 2005, 2008, in order to highlight the correlation for entire period. The determined rate is **60/30** for all studied years. This means that the Pareto 80/20 Principles cannot be applied to describe the misbalances in economic developments between regions.

The outputs of the data analysis also demonstrate that the identified rate of 60/30 remains stable during the studied timeframe. This leads to the remark that in Romania there are wealthy and poor regions but the discrepancies are not very high.

A similar rate was found for the GAddV of 60/30 which means that 60% of the added value is created in 30% of the counties, which is about 12-14 counties.

Pictures 5a, 5b, 5c for 2002, 2005 and 2008 are illustrating the Pareto graphs using cumulated frequencies.





In Appendix 3 (for GDP) and Appendix 4 (for GAddV) one could see that - during the studied timeframe (2002-2008) - Bucuresti is permanently on the first place with about 20%. Afterward, there are three groups of counties: Group A with contribution from 20% to 60%, Group B from 60% to 80%, and Group C from 80% to 100%.

The Groups are formed by same counties for GDP and GAddV. Group A started with 13 counties in 2002, decreased to 12 in 2005 and - in 2008 – registered 11 counties. Group B started with 10 and increased to 11 by taking 1 from group A. The group C started with 18 counties and went to 19 also by upgrading.

The Ilfov county constitutes a example of success: it started on rank 6 in Group B in 2002 and came up to rank 11 in Group A for at least three years. Mures started on rank 10 in Group A and turned down to rank 4 in Group B. Suceava, Arad, Galati fluctuated between group A and B.

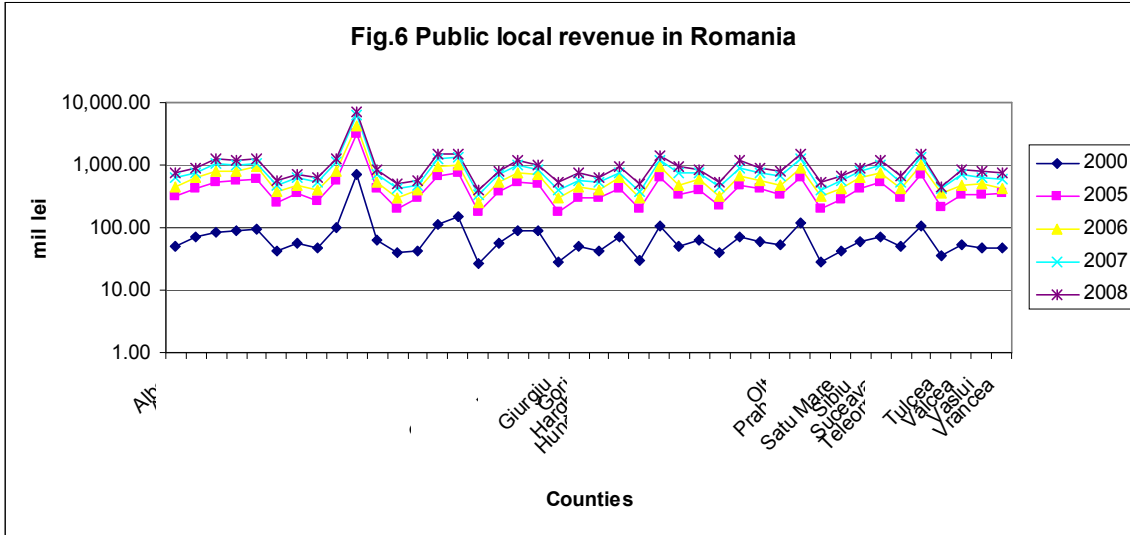
Alba is another success-story county, it started on the first place in Group C and ended on place 9 in Group B.

Within the groups most counties are keeping their places (+/- 1), but there are also counties that experienced significant increases or decreases of position (+/- 4-5). A good exercise will be an in-depth analysis to find out the reasons, the factors of influence etc.

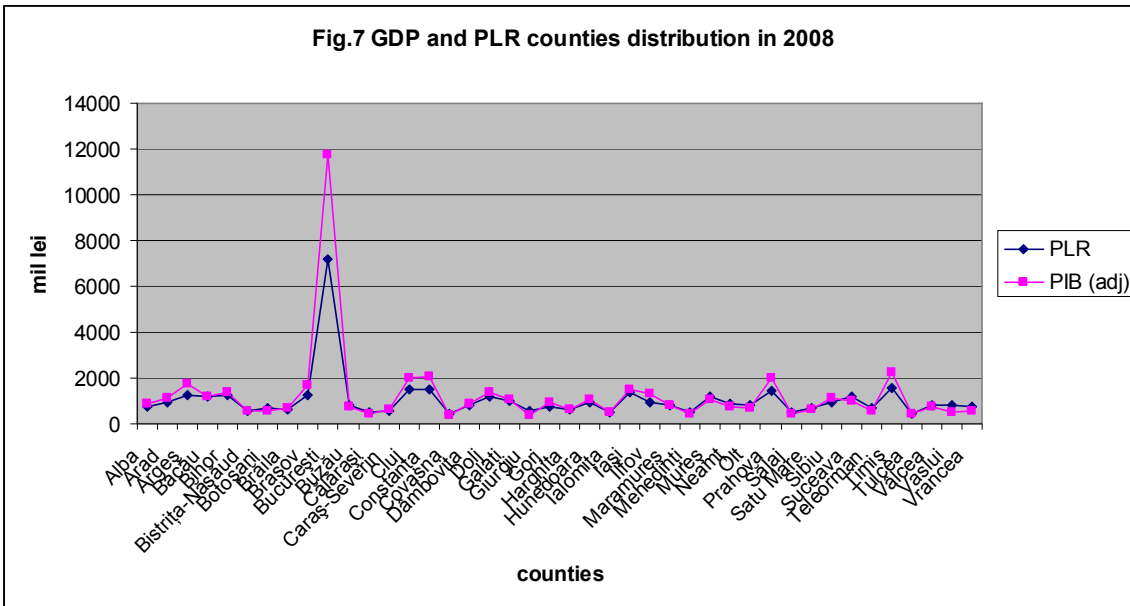
For the GAddV the situation is generally the same: one could conclude that less economic developed counties are Giurgiu and Calarasi, systematically placed on last positions.

At the beginning of the research, the expectation was to finding out a relation between the public budget and GDP at the regional level, capable of explaining differences in economic development. Because the differences between revenues and expenses are quite small, they could be considered as irrelevant and, for this stage of the research, only the public local revenue should be analyzed. .

As one could see in Picture 6, the distribution between counties is similar with GDP



To be more positive with this appreciation for the years 2005, 2006, 2007 and 2008, the graph method was used to see the similarities. As Picture 7 presents for 2008 (similar for the rest of studied years) it is a great similarity between the PLR (public local revenue) and the GDP. The GDP values were adjusted by dividing with 10 to keep the order of magnitude.



It was also calculated the percentage of the difference at the outcome: only for 11 counties the differences were +/- 30%, while for 15 +/-20%.

From the 11 counties with bigger than 30% differences, 8 are placed in Group A, 1 in Group B and 2 in Group C, if we are taking into consideration a value group ranking as before (for GDP and GAddV).

In Appendix 6 we are presenting the ranking of the counties for 2005-2008 by the level of PLR. In the last column are marked with yellow the counties that have differences bigger than 30% and with blue than 20%.

The repartition in the value groups is made by cumulated values of the PLR: Group

A up to 60%; Group B from 60% to 80%; Group C from 80% to 100%. The Group A is bigger because for GDP and GAddV it encompasses 16 counties, the group B has 11 counties and the Group C has fewer counties (15).

It is interesting to see that the position of the counties in the mentioned rankings experiences modifications for the ones that were highlighted with differences between GDP and PLR bigger than 20%. That drives us to the conclusion that we could find a correlation between GDP (GAddV) and PLR and the local expenditures could be a factor of economic development.

IV. CONCLUSIONS

The aim of the present research was to find out if the Pareto Principle could be applied to regional development and if - according to it - the Romanian counties have different levels of development.

The findings show that “a clear” Pareto Principle was not found, which means that Romania does not experience “huge” development gaps between the counties. There are differences and it seems that they have some trend of growing if measures for stopping them are not taken. In 2008, the gap in GDP between the first two counties, Timis and Constanta (Bucharest is not taken into consideration in this conclusion), and the last two, Covasna and Giurgiu, was about 5.5 times.

Also we discovered that counties could be clustered into value groups and an option could be applying the ABC-Markov model to forecast further development evolutions. To determine the actions that could influence economic development at the local level a very useful tool for the authorities would be to design and implement targeted strategies.

A deeper analysis of the GDP and PLR correlation needs to argue the role of public spending as an economic development tool.

BIBLIOGRAFY

1. ADLER Matthew D., POSNER Eric A., Implementing Cost-Benefit Analysis when Preferences are Distorted, University of Chicago Law & Economics, Olin Working Paper No. 88; University of Pennsylvania, Institut for Law & Econ Research Paper 277, 1999
2. BERGS Rolf, EU Regional and Cohesion Policy and Economic Integration of the Accession Countries, Policy Research & Consultancy Discussion Paper, 2002, Working Paper Series
3. CHANG Howard F., A Liberal Theory of Social Welfare: Fairness, Utility, and the Pareto Principle, University of Pennsylvania Law School, Institute for Law and Economics, Working Paper No. 272, December 1999

4. CHEN Shaohua and RAVALLION Martin, The Developing World is Poorer than We Thought, But No Less Successful in the Fight Against Poverty, World Bank Policy Research Working Paper No. 4703, World Bank - Development Research Group (DECRG), 2008
5. CHEN Shaohua and WANG Yan, China's Growth and Poverty Reduction: Recent Trends Between 1990 and 1999, World Bank Policy Research Working Paper No. 2651, World Bank and The World Bank, 2001
6. DÉMURGER Sylvie, SACHS Jeffrey D., WOO Wing Thye , BAO Shu Ming, CHANG Gene Hsin and MELLINGER Andrew D., Geography, Economic Policy and Regional Development in China, Harvard Institute of Economic Research Paper No. 1950, 2002
7. GRIGORESCU Adriana, BOB C.A., Structural analysis and forecast of the Romanian exports, Policy Modeling (EcoMod 2003), Global Economic Modeling Network and Bilgi University Istanbul, Istanbul, Turkey, July 3-5, electronic volume CD, 2003
8. GUIO Luigi, SAPIENZA Paola and ZINGALES Luigi, Does Local Financial Development Matter?, CRSP Working Paper No. 538, Einaudi Institute for Economics and Finance (EIEF) , Kellogg School of Management - Department of Finance and University of Chicago Booth School of Business , University of Chicago Booth School of Business, 2003
9. JULA Nicoleta, JULA Dorin, Modelare economica, Modele econometrice si de optimizae, Editura Mustang, Bucuresti, 2009
10. KAPLOW Louis, SHAVELL Steven, The Conflict Between Notions of Fairness and the Pareto Principle, American Law and Economics Review, 2000, Harvard Law School National Bureau of Economic Research (NBER)
11. KAPLOW Louis, Pareto Principle and Competing Principles, in the volume The New Palgrave Dictionary Of Economics, Steven Durlauf & Lawrence Blume, eds., McMillan, 2006, Harvard Law and Economics Discussion Paper No. 519, Harvard Law School; National Bureau of Economic Research (NBER)
12. SOLUM Lawrence B., Public Legal Reason, Virginia Law Review, Vol. 92, p. 1449, 2006, Illinois Public Law Research Paper No. 09-08, University of Illinois College of Law
13. STRAUB Stéphane, Infrastructure and Growth in Developing Countries: Recent Advances and Research Challenges, World Bank Policy Research Working Paper No. 4460, University of Edinburgh - School of Economics, 2008
14. TABELLINI Guido, Culture and Institutions: Economic Development in the Regions of Europe, CESifo Working Paper Series No. 1492, IGIER Working Paper No. 292, University of Bocconi - Innocenzo Gasparini Institute for Economic Research (IGIER), 2005
15. YU Peter K., Intellectual Property, Economic Development, and the China Puzzle INTELLECTUAL PROPERTY, TRADE AND DEVELOPMENT: STRATEGIES TO OPTIMIZE ECONOMIC DEVELOPMENT IN A TRIPS PLUS ERA, Daniel J. Gervais, ed., pp. 173-220, Oxford University Press, 2007, Michigan State University Legal Studies Research Paper No. 04-23

Appendix 1

Regional gross domestic product (million EUR), by NUTS 2 regions

	1997	1998	1999	2000	2001	2002
București - Ilfov	15%	18%	19%	22%	21%	20%
Sud - Muntenia	14%	13%	13%	12%	12%	13%
Sud - Est	13%	13%	12%	12%	12%	12%
Nord - Est	13%	13%	12%	12%	12%	12%
Centru	12%	12%	12%	12%	12%	12%
Nord - Vest	12%	12%	12%	12%	12%	12%
Vest	10%	10%	11%	9%	10%	10%
Sud - Vest Oltenia	10%	10%	9%	9%	9%	8%

	2003	2004	2005	2006	2007	2008
București - Ilfov	20%	20%	22%	23%	23%	25%
Sud - Muntenia	12%	13%	13%	13%	13%	13%
Nord - Est	12%	12%	12%	12%	12%	11%
Centru	12%	12%	12%	12%	12%	11%
Nord - Vest	12%	12%	11%	11%	11%	11%
Sud - Est	12%	12%	11%	11%	11%	11%
Vest	10%	10%	10%	10%	10%	10%
Sud - Vest Oltenia	9%	9%	8%	8%	8%	8%

Appendix 2

GDP by Romanian counties 2002-2008

milion lei - current prices

	2002	2003	2004	2005	2006	2007	2008
TOTAL	152017.0	197427.6	247368.0	288954.6	344650.6	416006.8	514700
Alba	2308.3	3265.3	4184.5	4658.2	5974.1	8000.7	8777.8
Arad	3452.5	4591.1	6106.3	7028.1	8406.7	10064.4	11221.5
Argeş	4570.6	6096.4	7828.9	9616.2	11770.9	13536.9	17553.7
Bacău	4486.6	5690.1	7139.4	7510.4	8506	9846.2	12071.1
Bihor	4685.8	5864.1	7352.5	8007.4	9475.4	11488.9	13751.5
Bistriţa-Năsăud	1695.9	2241.9	2716.4	3423.6	4086.3	4976.4	5712.7
Botoşani	1821.7	2350.9	2642.5	3109.8	3561.3	4737.6	5435.0
Brăila	2093.3	2598.0	3373.0	3618.5	4156	5238.0	6902.9
Braşov	5405.3	6767.1	7983.3	9372.6	11261.3	14160.4	16822.9
Bucureşti	28559.9	36613.0	45447.8	58791.6	69013.9	85707.2	117289.9
Buzău	2385.1	3374.5	4358.9	4482.3	5334.2	6252.9	7693.4
Călăraşi	1247.0	1693.7	2541.3	2261.6	2686.8	3174.2	4590.0
Caraş-Severin	2000.1	2715.4	3354.8	3736.2	4445.2	5353.2	6097.7
Cluj	5900.7	7638.7	9711.7	11505.1	13558.6	18020.9	19984.7
Constanţa	6577.6	8247.0	10497.3	12480.8	14653.3	16296.6	20637.0
Covasna	1563.1	1866.1	2420.9	2541.8	2779.7	3540.4	3993.2
Dâmboviţa	2835.2	3730.1	4545.9	5343.1	6402.5	8257.4	9032.3
Dolj	3554.8	5098.8	6554.1	7266.9	8839.4	10675.0	13574.1
Galaţi	3609.8	4495.2	6101.2	6459.0	7159.3	8602.0	10884.2
Giurgiu	1192.8	1418.9	2382.1	2132.9	2477.6	2647.1	3666.1
Gorj	3178.4	4014.7	4652.9	5120.1	5984.1	7613.9	9593.1
Harghita	2062.9	2531.9	3123.9	3579.5	4464.5	5248.1	6000.7
Hunedoara	3303.5	4134.3	5205.1	5791.2	6867.1	8740.1	10386.3
Ialomiţa	1548.1	2075.0	2900.3	2931.9	3341.3	3345.7	4693.8
Iaşi	4681.4	6164.4	7301.5	8669.3	10040.6	12071.9	15071.1
Ilfov	2714.5	3713.8	5125.3	6515.5	8696.6	10091.0	13231.8
Maramureş	2578.6	3278.2	4290.4	4833.8	5932.2	7012.7	7998.5
Mehedinţi	1483.9	2207.1	2620.2	2688.6	3246.6	3755.6	4655.9
Mures	3975.3	5438.6	6213.5	6888.0	8174.1	9440.8	10850.8
Neamţ	2656.2	3284.2	4233.0	4952.4	5852.7	6659.7	7536.8
Olt	2072.1	2785.4	3695.2	3937.6	4560.4	5566.3	6764.8
Prahova	5470.3	7035.0	8028.5	11167.6	13775.3	16255.8	19982.4
Sălaj	1312.7	1833.0	2150.8	2547.2	3054	3883.6	4414.1
Satu Mare	2265.4	2859.4	3630.7	4006.0	4699.7	5341.6	6075.6
Sibiu	3357.0	4121.4	5169.7	6103.1	7637.5	9026.3	11141.4
Suceava	3647.4	4579.9	5470.0	6244.7	7054.5	8864.8	9818.2
Teleorman	2080.5	2450.2	3212.1	3402.1	3847	4796.4	5933.5
Timiş	6157.3	8381.5	10587.9	12526.2	16069.9	18838.0	22315.0
Tulcea	1408.9	1891.3	2387.7	2516.4	3027.3	3250.1	4193.1
Vâlcea	2388.4	3474.1	4187.3	4907.3	5958.7	6808.8	7334.0
Vaslui	1637.6	2346.0	2643.8	2779.2	3414.8	3809.9	5008.7
Vrancea	1961.1	2316.8	3125.2	3295.1	4178.6	4633.4	5555.3

Appendix 3

GDP by Romanian counties 2002-2008

2002	2003	2004	2005	2006	2007	2008
București	București	București	București	București	București	București
Constanța	Timiș	Timiș	Timiș	Timiș	Timiș	Timiș
Timiș	Constanța	Constanța	Constanța	Constanța	Cluj	Constanța
Cluj	Cluj	Cluj	Cluj	Prahova	Constanța	Cluj
Prahova	Prahova	Prahova	Prahova	Cluj	Prahova	Prahova
Brașov	Brașov	Brașov	Argeș	Argeș	Brașov	Argeș
Bihor	Iași	Argeș	Brașov	Brașov	Argeș	Brașov
Iași	Argeș	Bihor	Iași	Iași	Iași	Iași
Argeș	Bihor	Iași	Bihor	Bihor	Bihor	Bihor
Bacău	Bacău	Bacău	Bacău	Dolj	Dolj	Dolj
Mureș	Mureș	Dolj	Dolj	Ifov	Ifov	Ifov
Suceava	Dolj	Mureș	Arad	Bacău	Arad	Bacău
Galați	Arad	Arad	Mureș	Arad	Bacău	Arad
Dolj	Suceava	Galați	Ifov	Mureș	Mureș	Sibiu
Arad	Galați	Suceava	Galați	Sibiu	Sibiu	Galați
Sibiu	Hunedoara	Hunedoara	Suceava	Galați	Suceava	Mureș
Hunedoara	Sibiu	Sibiu	Sibiu	Suceava	Hunedoara	Hunedoara
Gorj	Gorj	Ifov	Hunedoara	Hunedoara	Galați	Suceava
Dâmbovița	Dâmbovița	Gorj	Dâmbovița	Dâmbovița	Dâmbovița	Gorj
Ifov	Ifov	Dâmbovița	Gorj	Gorj	Alba	Dâmbovița
Neamț	Vâlcea	Buzău	Neamț	Alba	Gorj	Alba
Maramureș	Buzău	Maramureș	Vâlcea	Vâlcea	Maramureș	Maramureș
Vâlcea	Neamț	Neamț	Maramureș	Maramureș	Vâlcea	Buzău
Buzău	Maramureș	Vâlcea	Alba	Neamț	Neamț	Neamț
Alba	Alba	Alba	Buzău	Buzău	Buzău	Vâlcea
Satu Mare	Satu Mare	Olt	Satu Mare	Satu Mare	Olt	Brăila
Brăila	Olt	Satu Mare	Olt	Olt	Caraș-Severin	Olt
Teleorman	Caraș-Severin	Brăila	Caraș-Severin	Harghita	Satu Mare	Caraș-Severin
Olt	Brăila	Caraș-Severin	Brăila	Caraș-Severin	Harghita	Satu Mare
Harghita	Harghita	Teleorman	Harghita	Vrancea	Brăila	Harghita
Caraș-Severin	Teleorman	Vrancea	Bistrița-Năsăud	Brăila	Bistrița-Năsăud	Teleorman
Vrancea	Botoșani	Harghita	Teleorman	Bistrița-Năsăud	Teleorman	Bistrița-Năsăud
Botoșani	Vaslui	Ialomița	Vrancea	Teleorman	Botoșani	Vrancea
Bistrița-Năsăud	Vrancea	Bistrița-Năsăud	Botoșani	Botoșani	Vrancea	Botoșani
Vaslui	Bistrița-Năsăud	Vaslui	Ialomița	Vaslui	Sălaj	Vaslui
Covasna	Mehedinți	Botoșani	Vaslui	Ialomița	Vaslui	Ialomița
Ialomița	Ialomița	Mehedinți	Mehedinți	Mehedinți	Mehedinți	Mehedinți
Mehedinți	Tulcea	Călărași	Sălaj	Sălaj	Covasna	Călărași
Tulcea	Covasna	Covasna	Covasna	Tulcea	Ialomița	Sălaj
Sălaj	Sălaj	Tulcea	Tulcea	Covasna	Tulcea	Tulcea
Călărași	Călărași	Giurgiu	Călărași	Călărași	Călărași	Covasna
Giurgiu	Giurgiu	Sălaj	Giurgiu	Giurgiu	Giurgiu	Giurgiu

Appendix 4

Gross Added Value by Counties

	mii milioane lei current prices						
	2002	2003	2004	2005	2006	2007	2008
Alba	2126.5	2964.9	3772.6	4161.8	5336.6	7126.9	7841.2
Arad	3093.4	4071.2	5438.5	6185.0	7402.1	8960.1	9983.1
Argeş	4215.2	5422.1	6998.6	8535.3	10391.5	12022.9	15718.9
Bacău	4057.4	5053.1	6377.0	6643.2	7491	8740.1	10742.6
Bihor	4209.1	5213.8	6556.5	7052.4	8348.0	10184.9	12240.9
Bistriţa-Năsăud	1529.9	2001.6	2428.6	3034.1	3603.5	4399.5	5083.5
Botoşani	1636.6	2091.3	2358.7	2739.9	3136.1	4187.6	4842.2
Brăila	1878.5	2305.9	3006.2	3187.2	3659.6	4626.9	6142.6
Braşov	4893.5	6010.6	7127.5	8281.9	9927.5	12519.9	14962.9
Bucureşti	25498.4	32391.8	40396.1	51653.5	60777.8	75676.5	104302.6
Buzău	2133.9	2995.9	3885.0	3942.8	4695.9	5523.3	6844.2
Călăraşi	1119.6	1506.7	2268.2	1992.9	2367.3	2806.9	4085.7
Caras-Severin	1828.8	2446.5	3009.7	3310.6	3946.3	4744.6	5443.4
Cluj	5289.7	6781.5	8650.9	10143.2	11948.9	15929.3	17770.1
Constanţa	5951.7	7303.5	9338.1	11051.2	12901.1	14494.8	18497.4
Covasna	1404.6	1658.1	2159.2	2238.5	2449.6	3128.1	3552.6
Dâmboviţa	2540.7	3315	4057.9	4718.5	5640.8	7295.8	8035.7
Doj	3195.0	4522.4	5840.4	6401.2	7789.4	9441.6	12084.0
Galaţi	3231.8	3983.2	5429.8	5681.0	6299.7	7596.1	9681.1
Giurgiu	1069.9	1261.9	2124.3	1879.3	2182.7	2339.2	3262.7
Gorj	2908.1	3663.6	4374.0	4743.1	5592.0	6820.1	8600.9
Harghita	1866.5	2266.7	2800.1	3168.1	3933.9	4636.0	5337.5
Hunedoara	3037.1	3730.2	4725.5	5178.5	6130.6	7752.2	9277.3
Ialomiţa	1387.1	1843.3	2586.4	2584.2	2944.9	2956.1	4176.8
Iaşi	4194.6	5467	6504.6	7634.1	8840.8	10664.9	13403.8
Ifov	2426.4	3291.5	4562.4	5725.8	7655.7	8915.7	11767.8
Maramureş	2441.4	3032.9	3874.5	4288.6	5278.2	6233.5	7136.8
Mehedinţi	1331.6	1966.1	2355.1	2383.3	2888.4	3328.5	4149.7
Mureş	3557.9	4830.3	5541.5	6072.6	7206.3	8350.5	9654.1
Neamţ	2379.2	2919.2	3772.4	4360.9	5153.5	5884.4	6704.8
Olt	1862.5	2475.1	3297.0	3468.0	4018.6	4919.3	6019.9
Prahova	4954.9	6244.7	7166.3	9972.1	12153.4	14530.3	17928.5
Sălaj	1178.6	1628.5	1918.8	2244.9	2689.2	3430.9	3927.4
Satu Mare	2031.8	2537.3	3236.2	3535.6	4138.9	4721.6	5405.8
Sibiu	3021.7	3657.5	4611	5378.1	6730.3	7979.6	9997.0
Suceava	3286.5	4098.7	4887.5	5508.6	6223.3	7846.8	8743.2
Teleorman	1886.7	2200.0	2871.3	3012.9	3395.8	4276.8	5280.6
Timiş	5513.1	7430.8	9433.3	11034.1	14151.7	16656.4	19844.5
Tulcea	1262	1678.1	2126.9	2212.8	2663.6	2870.2	3730.0
Vâlcea	2145.5	3098.7	3767.0	4358.5	5301.8	6045.4	6529.0
Vaslui	1471.1	2085.3	2360.8	2456.6	3008.4	3368.7	4457.8
Vrancea	1758.4	2057.3	2783.7	2897.4	3677.7	4091.8	4942.1

Appendix 5

GAddV by Romanian counties 2002-2008

2002	2003	2004	2005	2006	2007	2008
Bucuresti	Bucuresti	Bucures ti	Bucuresti i	Bucuresti i	Bucureş ti	Bucureşti
Constanța	Timiș	Timiș	Constanța	Timiș	Timiș	Timiș
Timiș	Constanța	Constanța	Timiș	Constanța	Cluj	Constanța
Cluj	Cluj	Cluj	Cluj	Prahova	Prahova	Prahova
Prahova	Prahova	Prahova	Prahova	Cluj	Constanța	Cluj
Brașov	Brașov	Brașov	Argeș	Argeș	Brașov	Argeș
Argeș	Iași	Argeș	Brașov	Brașov	Argeș	Brașov
Bihor	Argeș	Bihor	Iași	Iași	Iași	Iași
Iași	Bihor	Iași	Bihor	Bihor	Bihor	Bihor
Bacău	Bacău	Bacău	Bacău	Dolj	Dolj	Dolj
Mureș	Mureș	Dolj	Dolj	Ifov	Arad	Ifov
Suceava	Dolj	Mureș	Arad	Bacău	Ifov	Bacău
Galați	Suceava	Arad	Mureș	Arad	Bacău	Sibiu
Dolj	Arad	Galați	Ifov	Mureș	Mureș	Arad
Arad	Galați	Suceava	Galați	Sibiu	Sibiu	Galați
Hunedoara	Hunedoara	Hunedoara	Suceava	Galați	Suceava	Mureș
Sibiu	Gorj	Sibiu	Sibiu	Suceava	Hunedoara	Hunedoara
Gorj	Sibiu	Ifov	Hunedoara	Hunedoara	Galați	Suceava
Dâmbovița	Dâmbovița	Gorj	Gorj	Dâmbovița	Dâmbovița	Gorj
Maramureș	Ifov	Dâmbovița	Dâmbovița	Gorj	Alba	Dâmbovița
Ifov	Vâlcea	Buzău	Neamț	Alba	Gorj	Alba
Neamț	Maramureș	Maramureș	Vâlcea	Vâlcea	Maramureș	Maramureș
Vâlcea	Buzău	Alba	Maramureș	Maramureș	Vâlcea	Buzău
Buzău	Alba	Neamț	Alba	Neamț	Neamț	Neamț
Alba	Neamț	Vâlcea	Buzău	Buzău	Buzău	Vâlcea
Satu Mare	Satu Mare	Olt	Satu Mare	Satu Mare	Olt	Brăila
Teleorman	Olt	Satu Mare	Olt	Olt	Caraș-Severin	Olt
Brăila	Caraș-Severin	Caraș-Severin	Caraș-Severin	Caraș-Severin	Satu Mare	Caraș-Severin
Harghita	Brăila	Brăila	Brăila	Harghita	Harghita	Satu Mare
Olt	Harghita	Teleorman	Harghita	Vrancea	Brăila	Harghita
Caraș-Severin	Teleorman	Harghita	Bistrița-Năsăud	Brăila	Bistrița-Năsăud	Teleorman
Vrancea	Botoșani	Vrancea	Teleorman	Bistrița-Năsăud	Teleorman	Bistrița-Năsăud
Botoșani	Vaslui	Ialomița	Vrancea	Teleorman	Botoșani	Vrancea
Bistrița-Năsăud	Vrancea	Bistrița-Năsăud	Botoșani	Botoșani	Vrancea	Botoșani
Vaslui	Bistrița-Năsăud	Vaslui	Ialomița	Vaslui	Sălaj	Vaslui
Covasna	Mehedinți	Botoșani	Vaslui	Ialomița	Vaslui	Ialomița
Ialomița	Ialomița	Mehedinți	Mehedinți	Mehedinți	Mehedinți	Mehedinți
Mehedinți	Tulcea	Călărași	Sălaj	Sălaj	Covasna	Călărași
Tulcea	Covasna	Covasna	Covas na	Tulcea	Ialomița	Sălaj
Sălaj	Sălaj	Tulcea	Tulcea	Covasna	Tulcea	Tulcea
Călărași	Călărași	Giurgiu	Călărași	Călărași	Călărași	Covasna
Giurgiu	Giurgiu	Sălaj	Giurgiu	Giurgiu	Giurgiu	Giurgiu

Appendix 6

PLR by Romanian counties 2005-2008

	2005	2006	2007	2008		Δ > 20% (30%)
București	București	București	București	București		București
Constanța	Constanța	Constanța	Constanța	Timiș		Timiș
Prahova	Timiș	Timiș	Timiș	Cluj		Cluj
Cluj	Cluj	Cluj	Cluj	Constanța		Constanța
Iași	Prahova	Bihor	Prahova	Prahova		Prahova
Timiș	Iași	Iași	Iași	Iași		Iași
Brașov	Bihor	Prahova	Brașov	Brașov		Brașov
Bihor	Bacău	Brașov	Argeș	Argeș		Argeș
Galați	Brașov	Argeș	Bihor	Bihor		Bihor
Bacău	Suceava	Bacău	Dolj	Mureș		Mureș
Dolj	Argeș	Suceava	Suceava	Dolj		Dolj
Argeș	Dolj	Dolj	Bacău	Bacău		Bacău
Hunedoara	Galați	Galați	Mureș	Suceava		Suceava
Suceava	Mureș	Mureș	Galați	Galați		Galați
Mureș	Hunedoara	Sibiu	Sibiu	Hunedoara		Hunedoara
Arad	Arad	Arad	Hunedoara	Ifov		Ifov
Maramureș	Buzău	Hunedoara	Arad	Sibiu		Sibiu
Buzău	Neamț	Maramureș	Ifov	Arad		Arad
Sibiu	Sibiu	Neamț	Maramureș	Neamț		Neamț
Neamț	Maramureș	Dâmbovița	Neamț	Maramureș		Maramureș
Dâmbovița	Dâmbovița	Buzău	Dâmbovița	Buzău		Buzău
Botoșani	Vrancea	Vaslui	Vâlcea	Vâlcea		Vâlcea
Olt	Botoșani	Vâlcea	Buzău	Dâmbovița		Dâmbovița
Vâlcea	Ifov	Ifov	Olt	Vaslui		Vaslui
Teleorman	Vâlcea	Botoșani	Vaslui	Olt		Olt
Ifov	Olt	Olt	Alba	Vrancea		Vrancea
Gorj	Vaslui	Alba	Botoșani	Alba		Alba
Alba	Alba	Gorj	Vrancea	Gorj		Gorj
Brăila	Gorj	Teleorman	Gorj	Botoșani		Botoșani
Vrancea	Caraș-Severin	Satu Mare	Satu Mare	Teleorman		Teleorman
Vaslui	Teleorman	Vrancea	Teleorman	Satu Mare		Satu Mare
Bistrița-Năsăud	Harghita	Harghita	Harghita	Harghita		Harghita
Satu Mare	Satu Mare	Caraș-Severin	Brăila	Brăila		Brăila
Caraș-Severin	Brăila	Brăila	Caraș-Severin	Caraș-Severin		Caraș-Severin
Harghita	Bistrița-Năsăud	Bistrița-Năsăud	Bistrița-Năsăud	Bistrița-Năsăud		Bistrița-Năsăud
Călărași	Mehedinți	Tulcea	Mehedinți	Giurgiu		Giurgiu
Mehedinți	Tulcea	Mehedinți	Călărași	Mehedinți		Mehedinți
Tulcea	Călărași	Sălaj	Tulcea	Sălaj		Sălaj
Ialomița	Sălaj	Giurgiu	Sălaj	Călărași		Călărași
Sălaj	Ialomița	Călărași	Giurgiu	Ialomița		Ialomița
Giurgiu	Covasna	Ialomița	Ialomița	Tulcea		Tulcea
Covasna	Giurgiu	Covasna	Covasna	Covasna		Covasna