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EMPIRICAL WEIGHTED MODELLING ON INTER-COUNTY INEQUALITIES EVOLUTION AND TO TEST ECONOMICAL CONVERGENCE IN ROMANIA

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Abstract:

During the last decades, the regional convergence process in Europe has attracted a considerable interest as a highly significant issue, especially after EU enlargement with the New Member States from Central and Eastern Europe. The most usual empirical approaches are using the β- and σ-convergence, originally developed by a series of neo-classical models. Up-to-date, the EU integration process was proven to be accompanied by an increase of the regional inequalities. In order to determine the existence of a similar increase of the inequalities between the administrative counties (NUTS3) included in the NUTS2 and NUTS1 regions of Romania, this paper provides an empirical modelling of economic convergence allowing to evaluate the level and evolution of the inter-regional inequalities over more than a decade period lasting from 1995 up to 2011. The paper presents the results of a large cross-sectional study of σ-convergence and weighted coefficient of variation, using GDP and population data obtained from the National Institute of Statistics of Romania. Both graphical representation including non-linear regression and the associated tables summarizing numerical values of the main statistical tests are demonstrating the impact of pre-accession policy on the economic development of all Romanian NUTS types. The clearly emphasised convergence in the middle time subinterval can be correlated with the pre-accession drastic changes on economic, political and social level, and with the opening of the Schengen borders for Romanian labor force in 2002.

Key words: *inequalities level and evolution, regional convergence, intra-national analysis, weighted coefficient, non-linear regression, statistical tests.*

JEL classification: C01, C52, O11, R11

1. INTRODUCTION

The regional convergence arose considerable interest on exploring the economical phenomena during the last decades, augmented after EU extension by the 2004 enlargement by the "A10" countries. Eight of these were part of the former Eastern Bloc (together sometimes referred to as the "A8" countries), characterized by planned economy and closed market system. Part of the same wave of enlargement was the accesion of Romania and Bulgaria in 2007, who were unable to join in 2004, but, according to the EU Commission, constitute part of the fifth enlargement. According to the general opinion, the mere access to the free market specific mechanisms couldn't by itself adjust the economies of the New Member States (NMS) and much less couldn't reduce the great, sometimes huge subsistent inequalities. There were necessary even drastic measures imposed by the risk of post-accession growing disparities, considered totally incompatible with the balanced and

profitable free market that EU envisaged on its establishment. Therefore, on the basis of worldwide economic research results, besides establishment of a common national statistical monitoring of each country, the EU has been involved in supporting the economic integration process of NMS by the Structural Funds Programme, too.
The effective economic cohesion policy aimed at reducing distances in development levels in Europe through the EU Structural Funds for disadvantaged countries and regions is based on the regional convergence studies. Economic phenomenon complexity, socio-cultural specificity, but especially the presure of finding a solution appropriate to the domestic and international events impact have triggered a series of scientific debate on both theoretical and empirical level in order to understand, define, and assess the regional convergence/ divergence process.
Regional convergence can be evaluated quantitatively and qualitatively through two concepts widely recognized in the literature: β-convergence [1] and σ-convergence [2][3]. While the first type, according to neo-classical theory defines the economic catching trend, due to the fact that approaching the "steady-state" economic level leads to lower development rate of the regional economy measured by GDP / capita, the second type of convergence emphasizes the temporal evolution of the disparities between the different lower level NUTS regions belonging to a given higher level NUTS region[4].
Romania's EU accession decision started a long process of integration, whose first effects we detected through the convergence analysis at different NUTS level. Using the most recent definitive statistical data provided by the National Statistics Institute for 1995-2011 period, we present an empirical convergence analysis of economic trend, covering three subperiods, namely before the pre-accession 1995-2002, pre-accession 2002-2006, and finally, the post-accession until 2011.
This paper presents the results of a cross-sectional comparative study of different statistical quantities temporal behaviour reflecting the economic convergent/divergent trend based on the statistical analysis of weighted and unweighted standard deviation, and double weighted coefficient of variation using the population percentage and GDP/capita calculated values in order to identify the economic development of and disparities trend between the different NUTS regions of Romania.
The Romanian research concerning economic convergence is only at the beginning [5][6][7]. The present paper is one of the first empirical studies and our conclusions are based on the comparison of the unweighted and weigthed statistical quantities time dependence and, meanwhile, of the statistical parameters numerical values listed in the tabels.

2. STATISTIC INSTRUMENTS AND METHODS

In statistics and theory of probabilitties, the **variance** measures the scattering degree of the numbers from a given group and it is equal with the mean value of the **dispersion**. A zero value variance is showing that all the numbers are identical, a low value is showing that scaterring of the points is small, in other words the numbers are closed to their mean value, but when the dispersion value is great it means that the points are quite scattered. The variance can have only positive values.
One important statistical quantity is the square root of the variance, called the **standard deviation** σ_{st}, and another one is a standardized measure of the dispersion of a probability distribution or frequency distribution, named **coefficient of variation** and defined as the ratio of the standard deviation to the mean. The coefficient of variation is sometimes prefered to standard deviation because the last one does not make sense unless given the mean value of the data set, while the coefficient of variation has the advantage of a direct interpretation. Furthermore, for a given value of standard deviation, the coefficient of variation (in %) indicates the degree of variability in relation to the mean.
In this study we chose to compare the population weighting influence on the behaviour of coefficient of variation, which, in order to avoid any confusion, we noted by

$$K_{PP} = \sigma_{st} / \mu,$$

where μ is the mean of the considered set of numerical data, and σ_{st} is the standard deviation.

As noted in the literature [8], σ-convergence is one of the defining parameters of economic development, this amount reflecting the temporal behaviour of statistical disparities between the administrative units, namely European units NUTS.

The choice of the NUTS units level and the availability of data are closely related issues. Clearly, there is a trade-off between the degree of regional disaggregation and the quantity of published statistical information. Generally speaking, NUTS1 are too large to capture truly regional growth processes. In our regional concept we put priority on the formation of economically sensible regions, namely NUTS3 for a more appropriate definition of functionally integrated units of observation. In this respect, our first step approach is similar to the concept of Functional Urban Regions [8] but, unlike the latter, it is not restricted to urban areas. Most analyses on regional growth in Europe use NUTS1 or NUTS2 units or a mixture of both concepts, as applied in this paper at the second level of our statistical analysis.

On the other hand, we decided to make a cross-sectional analysis considering the population as weighting parameter, and the mean value of the natural logarithm of the GDP/capita denoted by y. For a more accurate assessment of the impact of various NUTS3 regions (counties) on economic behaviour of the larger NUTS unit, we decided to apply a non-linear regression onto the weighted and non-weighted statistical quantities, for each of the clearly delimited time subintervals.

As both the factors in the coefficient of variation formula can provide a specific estimate, after a logical analysis considering all possible combinations, we decided to restrict our data processing on the following four combinations between the weighting factor applied to each NUTS3 and the logarithmic mean used at levels NUTS2, NUTS1 (grouped) and on the country level:

A – weighted by population percentage at the country level, the mean $\ln y$ calculated on the country level, too, and the coefficient of variation noted as K_{RoRo} ;

B – weighted by population percentage at the Western/Eastern half country level (each including 2 NUTS1 regions), the mean $\ln y$ calculated on the corresponding half country (NUTS1), too, and the coefficient of variation noted as K_{WW} , respectively K_{EE} ;

C – weighted by population percentage at the NUTS2 level, the mean $\ln y$ calculated on the corresponding NUTS2, too, and the coefficient of variation noted as K_{DD} ;

D – special case chose to investigate a possible greater impact of the relative number of inhabitants of a NUTS2 – weighted by population percentage at the NUTS2 level, the mean $\ln y$ calculated on the country level, and the coefficient of variation noted as K_{RoD} .

3. DATA PROCESSING

In order to study the evolution of disparities between Romanian counties, representing European NUTS3 administrative units, and to test the existence of an economic convergence, we conducted a cross-sectional statistical analysis after the population parameter.

Meanwhile, in order to emphasize the influence of population weighting, we conducted a comparative study between temporal variation of the standard deviation σst, its weighted value time-dependence, and the temporal behaviour of the double-weighted coefficient of variation, K_{PP} , for the period 1995-2011, the cross-sectional values being calculated refering the NUTS3 administrative regions population to the NUTS2, NUTS1 groups (W/E) [9], and the entire country population. Furthermore, the mean value of the natural logarithm of the GDP/capita was calculated on every NUTS level, and on the country level, too.

The type of the temporal behaviour convergence/divergence was highlighted by non-linear regression including the ANOVA statistical test application in MS Office Excel program.

4. REZULTS OBTAINED BY COMPARATIVE ANALYSIS

In the notation used in this paper, the first index denotes the cross-section level, meaning the NUTS area used to calculate the population weighting parameter (in percent), and the second index shows the specific NUTS region for which we calculated the mean logarithm of GDP/capita.

In the followings, we present briefly our results grouped in adjoining plots, and the numerical statistical specific indicators summarized in tables.
For the sake of logical presentation, we start with the last particular case of weighting combination.

4.1. The double weighting *RoD*

The cross-section analysis aimed the revealing of the country cross-section as the population percentage was calculated by refering every NUTS3 population to the population of the entire country. Meanwhile, the average value of the logarithms of GDP/capita was calculated for each of the 8 NUTS2 regions of Romania.
The results are shown in the Figures 1-3 and Table 1. In three of the NUTS2 regions the time dependence reveals a well defined convergence subinterval (see Fig. 1 *a,b,c*), which for the Western NUTS2 regions is including 3 years (2002-2004), and for the BI NUTS2 region (including the Capital) from the Eastern half of the country is spread on 5 years (2000-2004).

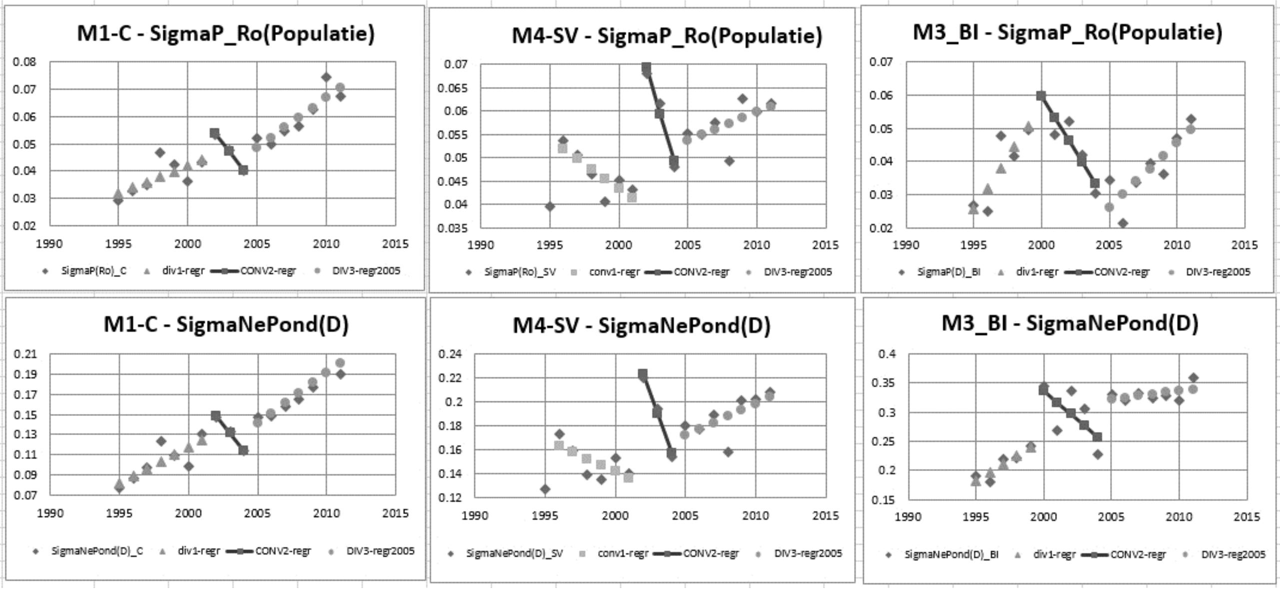

Fig. 1 a,b – Non-linear regression applied on the time dependence of the unweighted and weighted standard deviation σ_{st} for three of the NUTS2 showing the same distinct subperiods.

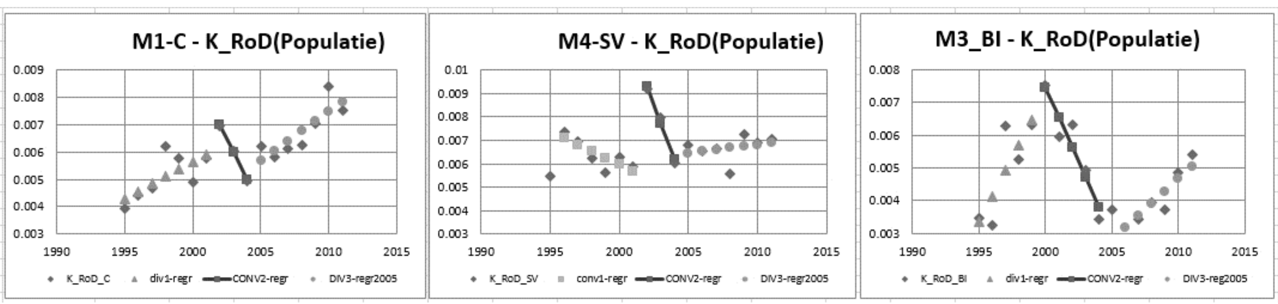

Fig. 1 c – Non-linear regression applied on the time dependence of the cross-sectional coefficient of variation for three of the NUTS2 regions is emphasizing the same three distinct subperiods with convergence in the middle subperiod as for the standard deviation.

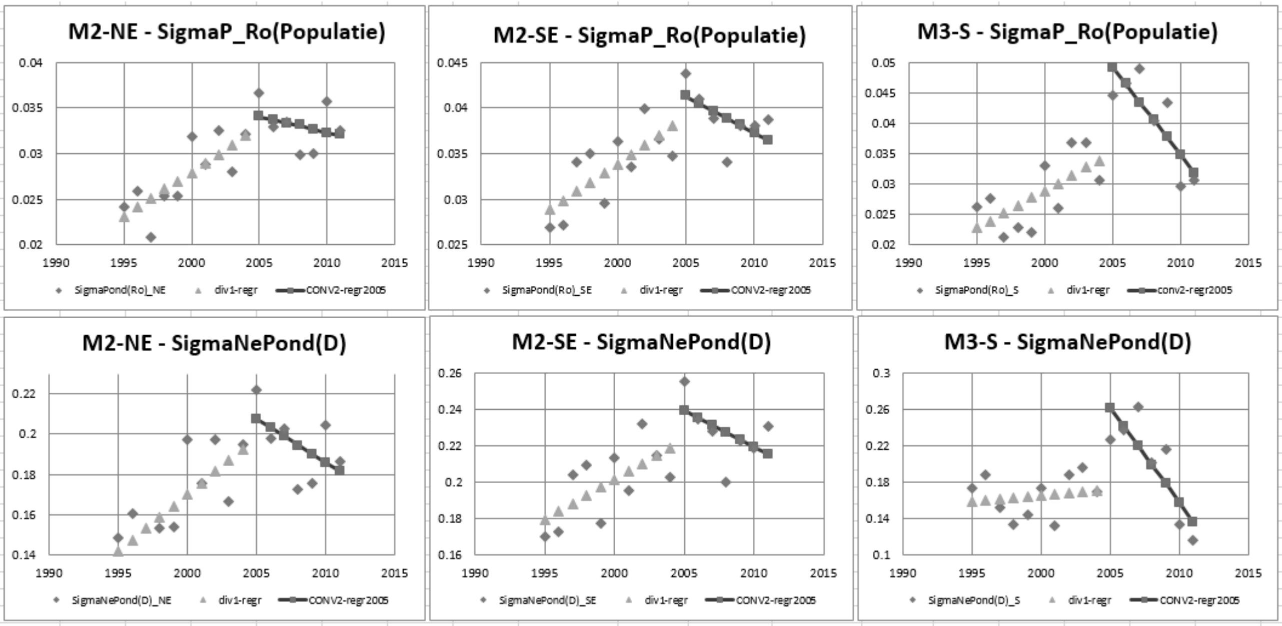

Fig. 2 a,b – Non-linear regression applied on the time dependence of the weighted and non-weighted standard deviation σ_{st} for three of the Estern NUTS2 showing the same distinct subperiods.

For all other 5 NUTS2 regions, the time dependence is showing only two subperiods. For the rest of 3 NUTS2 Eastern regions (see Fig. 2 *a,b,c*), the behaviour change year is 2005, and the first subperiod shows a divergence changing abruptly into convergence in the second subperiod. For the other two Western NUTS2 regions, as shown in Fig. 3 *a,b,c*, the change is in 2002, the final subinterval being divergent for both of them.

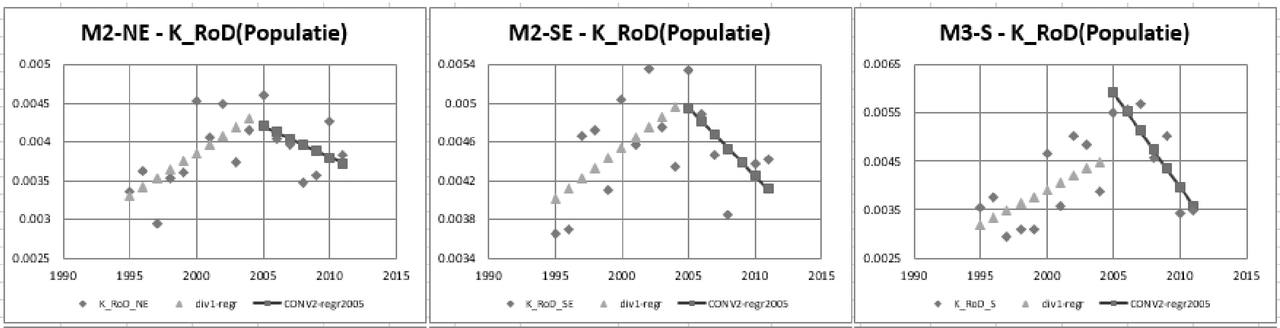

Fig. 2 c – Non-linear regression applied on the time dependence of the cross-sectional coefficient of variation for three of the Estern NUTS2 regions is emphasizing the same two distinct subperiods as the standard deviation, 2005 being the same year of the behaviour changing.

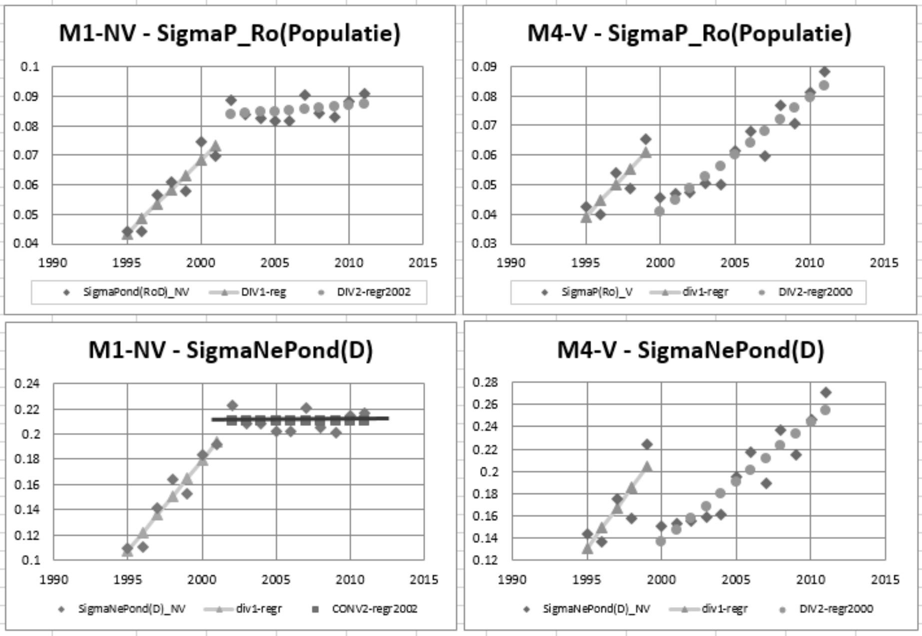

Fig. 3 a,b – Non-linear regression applied on the time dependence showing the same distinct subperiods for the weighted and non-weighted standard deviation σ_{st} of the other two Western NUTS2.

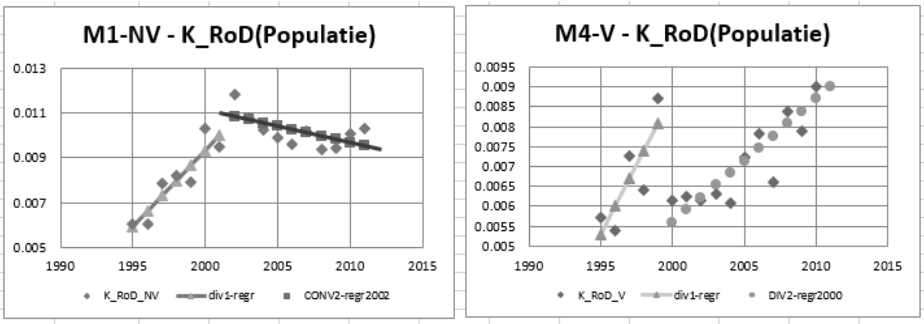

Fig. 3 c – Non-linear regression applied on the time dependence of the cross-sectional coefficient of variation for two Western NUTS2 regions is emphasizing the same two distinct subperiods as for σ_{st}, with the same year of the changing, but with different behaviour in the final subperiod.

One of the remarkable resulting characteristics is the great similarity between the time dependencies of all the three statistical values, weighted and non-weighted, the subperiod limiting years being identical, and the behaviour type the same, excepting the NUTS2 region M1-NV, for which the weighting by the country level population percent applied on the standard deviation σ_{st}_*RoD* modifies the convergent behaviour into a divergent one in the first subperiod, as can be noted in figures 3*a* and 3*b*.

4.2.The double weighting *DD*

In this second case (*C*-case), the cross-section analysis aimed the revealing of the population cross-section as the percentage was calculated by referring every NUTS3 population to the population of the corresponding NUTS2 region. Meanwhile, the mean value of the logarithms of GDP/capita was calculated for each of the 8 NUTS2 regions.

The results are presented only in Table 1. In three of the NUTS2 regions the time dependence revealed the same well defined convergence behaviour in the middle subinterval, which for the Western NUTS2 is including 3 years (2002-2004), but for the Eastern half BI NUTS2 area (including the Capital) is spread on, 5 years (2000-2004). All the other temporal dependencies are

revealing both the time limits and the convergent/divergent behaviour in every subperiod as can be seen in figures 1-3.
The remarkable observation is that *all* the results are quite similar for both the series: the first one obtained by weighting with the population percentage calculated for the entire country and the second population percentage series calculated by refering to the corresponding NUTS2 region. Even the exceptional behavioural changing generated by weighting the standard deviation calculated for the Western NUTS2 region M1-NV, from convergence into divergence in the first subperiod is present, too.
Therefore, from the statistical analysis conducted at the NUTS 3 territorial units, it is coming off a first important conclusion: the weighting applied with the population percentage calculated by referring to the population of the entire country and the weighting applied with the population percentage calculated by referring to NUTS2 territorial unit for each of the NUTS 3 European unit (Romanian counties) lead to the same type of time behaviour both for the standard deviation and for the derived statistical quantity – the double weighted coefficient of variation.

4.3. Double weighting *WW / EE*

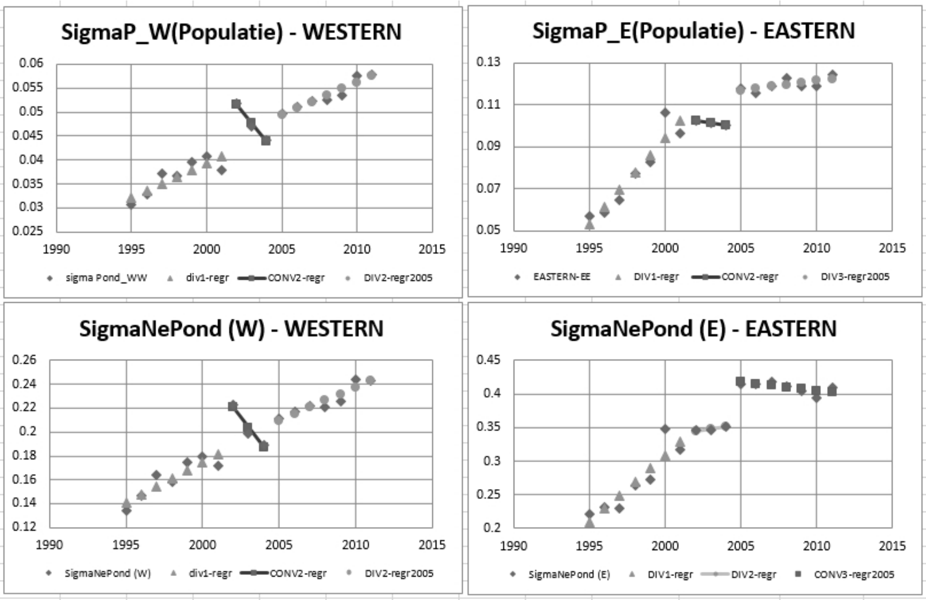

Fig. 4 a,b – Non-linear regression applied on the time dependence of the weighted and non-weighted standard deviation σ_{st} for the Western NUTS1 (M1 & M4) show the well-known three distinct subperiods, with the middle 2002-2004. For the Eastern NUTS1 the behaviour is changed by weighting.

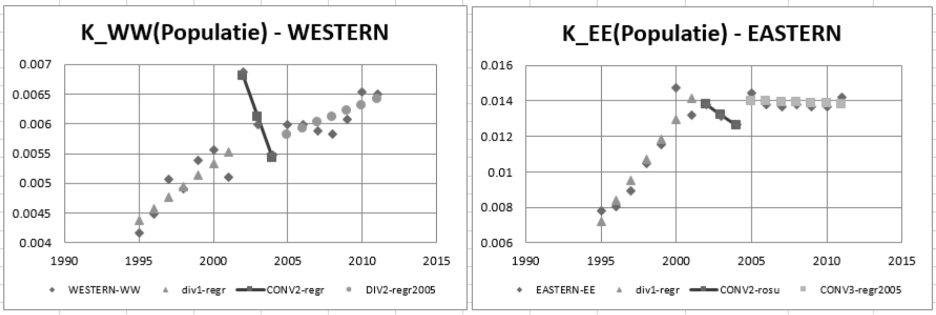

Fig. 4 c – Non-linear regression applied on the time dependence of the weighted coefficient of variance show the well-known three distinct subperiods, with the middle clear convergence in 2002-2004.

As shown in the Figure 4, for both pairs of territorial units NUTS1, the time dependencies are emphasizing the same three subintervals, but with different behavioural characteristics. Thus, it can be noted that for the two WESTERN territorial units NUTS1 the single or double weighting leaves unchanged the divergent or convergent behaviour, while for the two EASTERN territorial units NUTS1, the simple weighting of the standard deviation is changing the behaviour in the central subinterval 2002-2004 (see Fig. 4 *a,b*), and the coefficient of variation is showing a double behavioural change – in both the middle (2002-2004) and the final subinterval (2005-2011), as shown in the Figure 4 *c*.

4.4.Double weighting *RoRo*

Finally, in the case *A*, the cross sectional analysis aimed to reveal the impact of the country cross-section as the population percentage was calculated by referring every NUTS3 population to the population of the entire country. Meanwhile, the average value of the logarithms of GDP/capita was calculated for the entire country of Romania.

The remarkable observation is that for all three studied statistical quantities the temporal dependencies are similar to the previous case of the cross-sectional analysis in the Western and Eastern country halves formed by pairs of the NUTS1 units, both regarding the limits of the subintervals and the divergent/convergent behaviour in every delimited subinterval distinctly emphasized by the non-linear regression applied.

4.5.NUMERICAL RESULTS SUMMARIZING TABLES

Table 1 a,b – Non-linear regression numerical values for the slope standard error and F-significance for every subperiod delimited in the temporal dependence of the unweighted and weighted statistical quantities for the cases noted as RoD and DD

WESTERN	1995-2001						2005-2011		
M1-C									
K_RoD	2.69E-04	1.23E-04	8.10%	-1.01E-03	3.16E-05	1.99%	3.57E-04	1.09E-04	2.18%
K_DD	3.21E-04	1.46E-04	8.10%	-2.15E-03	2.65E-04	7.82%	1.23E-04	1.48E-04	44.37%
Sigma_RoD	2.01E-03	9.48E-04	8.69%	-6.62E-03	4.08E-04	0.67%	3.66E-03	8.22E-04	0.67%
Sigma_DD	2.40E-03	1.12E-03	8.55%	-1.36E-02	2.72E-03	12.57%	1.85E-03	1.09E-03	15.02%
Sigma NePond (D)	1.82E-02	7.31E-03	8.81%	-1.67E-02	1.77E-03	6.74%	9.94E-03	2.33E-03	0.80%
M4-SV									
K_RoD	-2.89E-04	1.01E-04	4.59%	-1.58E-03	1.93E-04	7.71%	7.48E-05	1.07E-04	51.66%
K_DD	-3.90E-04	1.38E-04	4.77%	-2.15E-03	2.65E-04	7.82%	1.23E-04	1.48E-04	44.37%
Sigma_RoD	-5.36E-03	2.80E-03	12.85%	-3.30E-02	3.90E-03	7.49%	5.30E-03	2.75E-03	11.23%
Sigma_DD	-2.85E-03	9.82E-04	4.39%	-1.36E-02	2.72E-03	12.57%	1.85E-03	1.09E-03	15.02%
Sigma NePond (D)	-5.36E-03	2.80E-03	12.85%	-3.30E-02	3.90E-03	7.49%	5.30E-03	2.75E-03	11.23%
M1-NV	panta	eroare.st.	F sign.	panta	eroare.st.	F sign.	panta	eroare.st.	F sign.
K_RoD	6.73E-04	1.31E-04	0.37%				-1.46E-04	6.74E-05	6.17%
K_DD	7.73E-04	1.50E-04	0.36%				-1.70E-04	7.69E-05	5.79%
Sigma_RoD	4.95E-03	9.04E-04	0.28%				3.86E-04	3.99E-04	36.20%
Sigma_DD	5.69E-03	1.04E-03	0.27%				4.25E-04	4.55E-04	37.69%
Sigma NePond (D)	1.44E-02	1.92E-03	0.07%				-4.05E-05	9.37E-04	96.66%
M4-V									
K_RoD	6.99E-04	2.73E-04	8.34%				3.11E-04	4.94E-05	0.01%
K_DD	1.17E-03	4.51E-04	8.12%				6.52E-03	6.69E-04	0.00%
Sigma_RoD	5.43E-03	1.96E-03	6.98%				3.87E-03	4.04E-04	0.00%
Sigma_DD	9.06E-03	3.24E-03	6.81%				6.52E-03	6.69E-04	0.00%
Sigma NePond (D)	1.82E-02	7.31E-03	8.81%				1.08E-02	1.28E-03	0.00%

EASTERN	1995-2001			2002-2004			2005-2011		
M2-NE	panta	eroare.st.	F sign.	panta	eroare.st.	F sign.	panta	eroare.st.	F sign.
K_RoD	1.10E-04	4.37E-05	3.56%				-8.08E-05	7.30E-05	31.91%
K_DD	2.49E-04	1.06E-04	4.61%				-1.96E-04	1.76E-04	31.59%
Sigma_RoD	9.81E-04	2.87E-04	0.92%				-3.49E-04	5.04E-04	52.04%
Sigma_DD	2.25E-03	6.96E-04	1.21%				-8.54E-04	4.74E-04	10.43%
Sigma NePond (D)	5.69E-03	2.01E-03	2.19%				-4.29E-03	3.08E-03	22.24%
M2-SE									
K_RoD	1.07E-04	5.19E-05	7.41%				-1.39E-04	7.44E-05	12.03%
K_DD	2.88E-04	1.43E-04	7.96%				-3.78E-04	2.05E-04	12.53%
Sigma_RoD	1.01E-03	3.42E-04	1.81%				-2.88E-03	9.09E-04	2.50%
Sigma_DD	2.75E-03	9.43E-04	1.96%				-2.12E-03	1.39E-03	18.64%
Sigma NePond (D)	4.39E-03	1.79E-03	4.02%				-4.00E-03	2.97E-03	23.49%
M3-S									
K_RoD	1.44E-04	7.24E-05	8.11%				-3.93E-04	9.61E-05	0.94%
K_DD	3.70E-04	1.84E-04	7.84%				-9.92E-04	2.47E-04	1.01%
Sigma_RoD	1.24E-03	5.20E-04	4.44%				-2.88E-03	9.09E-04	2.50%
Sigma_DD	3.17E-03	1.32E-03	4.28%				-7.24E-03	2.33E-03	2.67%
Sigma NePond (D)	1.31E-03	2.67E-03	63.81%				-2.09E-02	6.30E-03	2.10%
M3-BI									
K_RoD	1.10E-04	4.37E-05	3.56%	-9.13E-04	1.82E-04	1.53%	3.72E-04	1.25E-04	3.10%
K_DD	2.64E-03	1.03E-03	8.25%	-2.86E-03	5.72E-04	1.54%	1.11E-03	3.88E-04	3.52%
Sigma_RoD	1.31E-03	2.67E-03	63.81%	-6.54E-03	1.51E-03	2.26%	3.91E-03	1.16E-03	1.99%
Sigma_DD	2.11E-02	7.45E-03	6.60%	-1.17E-02	3.60E-03	2.25%	1.17E-02	3.60E-03	2.25%
Sigma NePond (D)	1.47E-02	3.69E-03	2.86%	-1.96E-02	1.37E-02	24.63%	2.82E-03	2.51E-03	31.14%

Table 2 a,b – Non-linear regression numerical values for the slope standard error and F-significance for every subperiod delimited in the temporal dependence of the unweighted and weighted statistical quantities for the cases noted as WW / EE and RoRo for the Western, respectively Eastern NUTS1

WESTERN	1995-2001			2002-2004			2005-2011		
	panta	eroare.st.	F sign.	panta	eroare.st.	F sign.	panta	eroare.st.	F sign.
K_RoRo	3.27E-05	2.48E-05	24.48%	-4.51E-04	2.06E-06	3.26%	1.83E-04	6.24E-05	3.26%
SigmaPond_RoRO	1.32E-03	4.28E-04	2.71%	-2.33E-03	7.35E-05	2.01%	6.54E-04	1.70E-04	1.21%
SigmaNePond_Ro	8.81E-03	1.99E-03	0.69%	-1.68E-02	1.95E-03	7.37%	4.40E-03	1.16E-03	1.28%
K_WW	1.89E-04	5.54E-05	1.90%	-6.95E-04	1.01E-04	9.20%	9.85E-05	3.84E-05	5.04%
Sigma_WW	1.42E-03	3.79E-04	1.34%	-3.84E-03	6.12E-04	10.07%	1.35E-03	1.81E-04	0.07%
Sigma NePond (W)	6.78E-03	1.46E-03	0.57%	-1.68E-02	4.47E-03	16.57%	5.58E-03	9.30E-04	0.18%

EASTERN	1995-2001			2002-2004			2005-2011		
	panta	eroare.st.	F sign.	panta	eroare.st.	F sign.	panta	eroare.st.	F sign.
K_RoRo	7.95E-04	1.37E-04	0.21%	-3.84E-04	6.33E-05	10.40%	-6.93E-06	1.55E-04	96.60%
SigmaPond_RoRO	5.78E-03	9.53E-04	0.18%	-5.08E-04	3.87E-04	41.44%	7.98E-04	1.58E-03	63.56%
SigmaNePond_Ro	1.74E-02	2.21E-03	0.00%	-3.03E-03	1.40E-03	8.25%	-3.03E-03	1.40E-03	8.25%
K_EE	1.15E-03	1.88E-04	0.17%	-5.82E-04	3.45E-05	3.77%	-3.41E-05	5.88E-05	58.70%
Sigma_EE	8.23E-03	1.29E-03	0.14%	-1.02E-03	2.11E-04	13.02%	9.40E-04	5.88E-05	58.70%
Sigma NePond (E)	6.78E-03	1.46E-03	0.57%	4.36E-03	1.29E-03	0.96%	-2.48E-03	1.22E-03	9.78%

5. CONCLUSIONS

1. Our exhaustive study demonstrate without any doubt that in the case of Romania, the population percentage weighting does not succeed to highlight any special contribution of one of European territorial units NUTS3, regardless of the percentage weighting factor reference, excepting the *EE* weighting combination.

2. Our study confirms the validity of using the standard deviation σ_{st} in the statistical analysis of economic convergence/divergence, instead using the coefficient of variation according to the opinion advanced in some recent papers [10,11], as evidenced by the large series of temporal plots, and in conjunction with the observation that for the vast majority [except for a few isolated cases] the non-linear regression shows much higher values of the *slope* [multiplication factors ranging between 5 and 300], accompanied by much lower values for the *slope error* and *F-significance* – as

emphasized in the tables 1*a,b* and 2*a,b* summarizing the numerical characteristic values of all the applied regressions.

3. The present statistical analysis emphasizes the predominance of a first divergent subinterval [excepting one single NUTS2 region, the M4-SV], followed in most cases by a narrow subperiod of convergence between 2002 and 2004 observed both at NUTS1&country levels (as seen on Fig. 4) and at lower territorial level NUTS2, independent of the weighting procedure.

4. One reason for the central subinterval of convergence could be preparatory drastic measures in the pre-adheration period – because Romania intended to join the first wave of EU enlargement. Another cause could be the more than 4% contribution to the state budget made by the massive wave of labor migration [*] triggered by the official opening of the Schengen borders allowing the free movement of the Romanian labor in the EU, following the decision of EU Council of Ministers of Justice and Home Affairs (JHA) in December 2001. As a matter of fact, only in 2002 there were registered over 600,000 Romanian migrants [**].

Our thoroughgoing empirical statistical study remains a subject opened to discussions and completion, challenging forward studies concerning identification of all different elements which influenced the economy, society, and technology of Romania during the 1995-2011 period.

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