VARIATIONS OF REGIONAL INEQUALITIES IN ROMANIA IN THE LONG RUN

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Abstract

The economic, social and political significance of regional inequalities has been long and widely recognized. Given that Romania is also confronted with an upward trend in inequalities, this paper aims to explore their variations at county level, over 1965-2015. The empirical analysis employs a variety of statistical methods, including Gini coefficient, Ricci-Schutz coefficient, Atkinson's measure, Kolm's measure, Theil's entropy measure, the coefficient of variation, etc. This option for multiple statistical measures might help mitigate the drawbacks of different individual indicators by giving a multi-sided and more balanced picture of the inequality phenomenon. The analysis revealed that significant gaps between the well-developed counties and the laggard ones persisted in Romania throughout different phases of the economic cycle and successive changes of political regimes. There is also empirical evidence supporting the steady increase in regional disparities in the last two decades.

Keywords: *regional inequalities, inequality indicators, county, Romania.*

JEL Classification: R19, J21, J64

1. Introduction

Regional economic theory and empirical research have long approached the topic of economic inequalities as a negative phenomenon and an impediment to regional development. Under these circumstances, it is natural that many economic strategies and programs aim to curb the regional disparities by allotting supplementary funds to certain regions, by adopting specific economic legislation and applying various tax incentives to stimulate growth in underdeveloped zones, by stimulating the investment inflows, etc. In Romania, despite a relatively long period of economic growth (except for temporary downward fluctuations in the context of the recent economic crisis), the regional inequalities grew constantly over the past two decades. From a territorial perspective, the Romanian development picture is very unbalanced, with Bucharest-Ilfov Region and a few areas surrounding several big municipalities lying way ahead. Moreover, there is a long economic divide between the more developed Western part of the country and the underdeveloped Eastern Romania.

The topic of regional inequalities has been extensively addressed in Romanian empirical literature (e.g., Dachin, 2008; Goschin et al, 2008; Patache and Grama, 2011; Ailenei et al., 2012; Antonescu, 2012; Boldea et al., 2012; Zaman et al., 2013; Goschin, 2014 and 2015, etc.) using various statistical indicators and methods such as multidimensional regional rankings, composite indices, convergence analysis, etc. Although the results differ from one study to another, most authors point to a significant rise in regional development gaps since the 90th. The recent economic and financial crisis added new economic challenges to regional development, redesigning the geographical distribution of economic disparities (Goschin and Constantin, 2010; Busega, 2016).

In this context our paper undertakes a very long term approach to this topic by comparatively analyzing the evolution of regional inequalities in Romania both during the communist regime and after the transition to market economy. The rationale for this research is to provide a larger perspective than previous research by exploring the long term territorial variation of inequalities in Romania. Moreover, a wide range of inequality indicators are employed in our research in order to fully grasp the amplitude of the phenomenon and provide new data for policy-makers.

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The reminder of this paper proceeds as follows. The next section briefly reviews previous studies that tackled the issue of regional inequalities in Romania. Section 3 presents the inequality indicators to be estimated and section 4 displays and discusses the results, covering a long time span: 1938 to 2015. Section 5 concludes.

2. Literature review

Economic inequalities gradually became a topic of growing interest in Romanian regional research in the context of increasing development gaps since the 90th (e.g. Dachin, 2008; Goschin et al, 2008; Patache and Grama, 2011; Antonescu, 2010 and 2012; Boldea et al, 2012, Zaman et al., 2013).

Various regional strategies and development plans that addressed this issue couldn't stop the constant rise in economic disparities, both at regional and county level. Structural and cohesion funds also failed to narrow the development gaps among Romanian regions by stimulating higher economic growth in underdeveloped zones. On the contrary, accession to European Union contributed to higher inequalities because developed regions were more fitted to access the structural and cohesion funds (Zaman and Georgescu, 2009). Foreign Direct Investment flows also went mainly towards developed regions, especially Bucharest-Ilfov region (Zaman et al., 2011), adding to development gaps. FDIs have been envisaged both as a cause of regional disparities (Danciu et al., 2010; Nistor, 2012), as well as a consequence (Pauna and Dumitrescu, I. (2005). Another factor that is believed to support regional inequalities on the long-run is the preponderance of traditional economic activities with low productivity (i.e. agriculture) in certain regions (Dachin and Popa, 2011). In the same register, Busega (2016) showed that Romanian industry-led regions are more competitive than the agriculture-led ones, the economic specialization thus perpetuating disparities.

The recent economic crisis had different effects from one region to another, according to the structure and degree of specialisation of their economies (Goschin and Constantin, 2010), as well as in relation to their specific resilience to economic shocks (Zaman and Goschin, 2014b). Therefore the crisis led to higher economic imbalances among Romanian regions (Busega, 2016).

Most studies used GDP per inhabitant as variable of choice in order to assess and compare the development level of Romanian regions. Various statistical indicators and methods have been employed, such as multidimensional regional rankings, composite indices, convergence analysis, etc. Multisided methodological approaches offer better assessment of economic disparities, compared to the analyses using individual indicators. For instance, Goschin (2015a and 2015b) introduced a composite inequality measure by combining GDP/capita, labour productivity and life expectancy into a synthetic index and found a cointegrating relationship between GDP and this index of territorial inequalities (Goschin, 2015a). Such results are suggesting that the regional development in Romania is systematically unbalanced and the disparities have the tendency to widen with economic growth.

Past empirical evidence on Romania had largely indicated increasing "center-periphery" polarization of regional economies, the deepening of territorial disparities and the inefficiency of economic policies aiming to counter these trends (Goschin and Constantin, 2010; Zaman and Goschin, 2014b; Busega, 2016).

In sum, previous studies on regional inequalities in Romania confronted questions such as their amplitude and variation in time, their factors of influence, the negative effects of the recent economic and financial crisis, the convergence/divergence trends on the long run, possible policy measures against territorial gaps and their effects, etc. This paper aims at bringing new insights on these issues on a longer period of time, including the current post-crisis economic environment.

3. Methodology and data

This paper undertakes a county-level research on territorial inequalities in Romania in the long-run, using a wide range of classic inequality indicators. The coefficient of variation, Herfindahl and Gini indices, Theil entropy index, Hoover index and Atkinson index are among the most common methods employed in empirical research that are going to be used in this research as well.

The Gini index (Gini, 1939) is a very popular method to measure disparities, being largely accepted as a standard indicator in empirical research. It has several computation formulas. In this paper we use the following formula for Gini index (GI):

$$GI_t = \frac{\sum_{i=1}^{n}(2i - n - 1) \cdot X_{it}}{n \sum_{i=1}^{n} X_{it}}, \tag{1}$$

where X_{it} is a measure of economic development (GDP per capita preferably) in year t and region i, n being the number of regions. The values X_{it} have to be ordered upwards. Gini index ranges between 0 and 1. Since Gini is a relative indicator, neglecting absolute disparities, it can be sometimes misleading by indicating the same value for a rich and a poor country/region alike, if their distributions of income are similar. However, in absolute terms the situation is quite different and the quality of life is far superior in the more developed countries/regions. Therefore the Gini index can only indicate increases or declines in disparities as a trend, independent of absolute values.

In order to compensate for Gini's limits, we are going to use several other inequality indicators besides it. For instance, entropy indices such as Theil and Atkinson are useful for comparing a given distribution with the maximum possible entropy.

The Theil index is:

$$TI_t = \frac{1}{n} \sum_{i=1}^{n} \frac{X_{it}}{\overline{X_i}} \ln \frac{X_{it}}{\overline{X_t}}, \tag{2}$$

where $\overline{X_t}$ stands for the average value in year t. The values lie in the $[0, \ln(n)]$ interval, 0 meaning equality and $\ln(n)$ maximum inequality. The higher the index, the further away from uniformity is the distribution of X.

The Atkinson index (Atkinson, 1970) measures the "social utility" (ranging between 0 and 1) that can be obtained by completely redistributing the income so as to achieve equality. It uses an "inequality aversion" parameter that starts from 0 (meaning any level of inequality is acceptable) and increases with the degree of social opposition to inequality. The Atkinson index is as follows:

$$AI = 1 - \frac{1}{\overline{X}}(\frac{1}{n}\sum_{i=1}^{n} X_i^{1-\varepsilon}) \text{ for } 0 \leq \varepsilon \neq 1 \quad \text{and} \tag{3}$$

$$AI = 1 - \frac{1}{\overline{X}}(\frac{1}{n}\prod_{i=1}^{n} X_i)^{1/n} \text{ for } \varepsilon = 1,$$

where ε is the "inequality aversion" parameter.

Its values indicate how much income should be redistributed in order to achieve total equality. Similar to Atkinson is the Kolm index, which determines the absolute amount of variable X that would be saved, with social indifference, in case of equalitarian distribution.

The Ricci-Schutz coefficient is known under several alternative names, such as Hoover index (Hoover and Giarratani, 1984), Robin Hood index, or Pietra's measure. It determines the percentage that needs to be redistributed from richer to poorer regions in order to get a uniform (equalitarian) distribution of variable X throughout the country. The formula of Ricci-Schutz coefficient RS is as follows:

$$RS_t = 1/2 \frac{\sum_{i=1}^{n} |X_{it} - \overline{X}_t|}{\sum_{i=1}^{n} X_{it}} \tag{4}$$

. The Herfindahl Index HI (also known as Herfindahl-Hirschman) measures absolute inequality/concentration:

$$HI_t = \sum_{i=1}^{n} (\frac{X_{it}}{\sum_{i=1}^{n} X_{it}})^2 \tag{5}$$

The values range between 1/n (uniformity) and 1(maximum concentration: one region gets the whole X). Its main limit is the sensitivity to higher values of X. For instance bigger countries/regions, are influencing stronger the values.

When computed out of county level data, the Herfindahl Index ranges between 0.0238 and 1 in Romania.

Opposite to Herfindahl Index, the Rosenbluth index RI (Rosenbluth, 1955) gives more importance to smaller values of X. Its formula is as follows:

$$RI_t = \frac{1}{2\sum_{i=1}^{n} r(\frac{X_{it}}{\sum_{i=1}^{n} X_{it}})^2 - 1}, \tag{6}$$

where r = 1,2,…,n represents the rank (from highest to lowest X) of X values. This rank gives higher significance for lower values because they have bigger "r"s. Likewise the Herfindahl index, the Rosenbluth index ranges between 1/n and 1.

Finally, we are going to test the sigma (σ) convergence/divergence hypothesis based on Barro and Sala-i-Martin (1991) standard method, using the coefficient of variation, as follows:

$$\sigma_t = \frac{\sqrt{\frac{\sum_{i=1}^{n} (X_{it} - \overline{X}_t)^2}{n}}}{\overline{X}_t} \tag{7}$$

where $\overline{X}_t$ stands for the average GDP/cap in year t and n is the number of counties. Sigma convergence occurs when GDP dispersion across counties diminishes over time.

The analysis of in this paper relies on oldest and newest data accessible at county level, combining data from the Yearbooks published during the communist regime with online databases provided by the Romanian Institute of National Statistics (TEMPO database). Own computations were also required to compute GDP per capita and to transform all values in constant RON.

4. Results and discussion

Our research was severely impaired by the limited official data available at regional level, especially for the period of the communist regime. Therefore, the computations of inequality measures used GDP per capita (largely acknowledged as the best indicator of economic performance in geographic comparisons) only for 1995-2015 and industrial production data for 1950-1990. During the communist regime industry has been the main sector of the Romanian economy, accounting for the largest share in total production and this makes it a good indicator for inequality comparisons among the counties.

Several inequality indices have been computed for the Romanian counties, over a long period of time: 1938-2015 and the results are largely in agreement. Regardless the specific computation formula employed, all indices point to a steady but moderate decrease in disparities during the communist regime, from 1960 to 1990, followed by a strong reversal of this trend starting with the transition to the market economy (Table 1).

Table 1. Various inequality indices for the Romanian counties, 1938-2015
(selected years)

	Theil	Herfindahl	Rosenbluth	Gini	Ricci-Schutz	Atkinson	Kolm
1938	0.4280	0.0541	0.0479	0.4907	0.3625	0.1940	0.2261
1950	0.4272	0.0540	0.0478	0.4895	0.3649	0.1929	0.3886
1960	0.4768	0.0585	0.0503	0.5151	0.3810	0.2140	2.1716
1965	0.4373	0.0553	0.0481	0.4934	0.3583	0.1975	4.7504
1970	0.3888	0.0490	0.0466	0.4766	0.3537	0.1835	8.9264
1975	0.3784	0.0515	0.0450	0.4583	0.3313	0.1710	17.4046
1980	0.3214	0.0476	0.0418	0.4170	0.2921	0.1443	25.7149
1985	0.2802	0.0443	0.0401	0.3923	0.2819	0.1250	30.0482
1990	0.2598	0.0437	0.0387	0.3691	0.2644	0.1138	26.8998
1995	0.2050	0.0400	0.0345	0.3093	0.2231	0.0864	109.4074
2000	0.3708	0.0622	0.0388	0.3869	0.2748	0.1425	122.6604
2005	0.4041	0.0657	0.0404	0.4107	0.2922	0.1557	161.6728
2010	0.4464	0.0728	0.0413	0.4239	0.3059	0.1681	187.0259
2015	0.5058	0.0800	0.0438	0.4565	0.3373	0.1900	216.4920

Source: own processing

From the mid-90th onwards the rise in inequalities is constant and strong. Depending on the specific index, the strengths of development gaps differs. For some indices this increase is quite strong, for instance Theil index was more than double in 2015 compared to the minimum of 1995, while Herfindahl and Kolm doubled in the same period (Table 1). Another general observation is that for most indicators 2015 represents a maximum, or is close to the historic maximum, suggesting the current situation of regional inequalities deserves more attention from the Romanian decision-makers.

Although Gini index had a relatively smaller increase, its values are alarming, indicating high inequality. There is a consensus in the literature against very high inequality, which clearly hinders economic development in poor countries (e.g. Barro, 1999), but there are also opinions in support of moderate inequality (Cornia and Court, 2001). The question is how much inequality is acceptable? Although the answer to this question is far from simple or

straightforward, to the 'efficient inequality range' of 0.25 to 0.40 established for Gini coefficients (Cornia and Court, 2001). Romania was situated within this efficient range only for a short period of time: 1885-1995. The most recent value of Gini (0.4565 in 2015) is far above the upper limit, positioning Romania among the high inequality countries.

Figure 1 illustrates that the Romanian counties followed a sigma convergence process over 1950-1990 and sigma divergence trend over 1995-2015, only shortly interrupted by small deviations. Since we have carried out the sigma convergence analysis with data on industry production for 1950-1990 period and GDP per capita for the 1995-2015 period, the figures are not directly comparable and different graphs have been built for these two sub-periods.
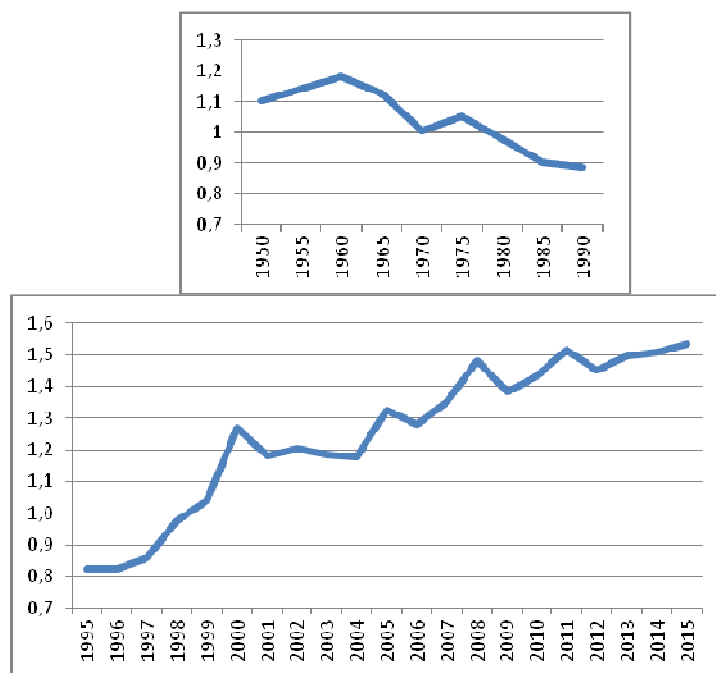

Figure 1. Sigma convergence over 1950-1990 and sigma divergence over 1995-2015
Source: own processing

In sum, the results from the inequality indices, as well as from applying the sigma convergence method, are largely in accordance with the mainstream empirical literature and our expectations, indicating a worrying upwards trend in economic disparities at county level.

5. Final remarks

Given that all inequality indices that have been computed for the Romanian counties provide similar results, i.e. steady but moderate decrease in disparities during the communist regime, from 1960 to 1990, followed by a strong reversal of this trend starting with the transition to the market economy, our findings are quite strong and unequivocal. The sigma convergence method, applied for the period 1950-2015, reinforced these conclusions as well.

It is natural that the regions differ in their natural, human and capital endowments and therefore display different dynamics and have different capacity to adapt to the challenges of a constantly changing economic environment. The problem of Romanian regional development is not the mere existence of inequalities, but their amplitude and the steady upwards trend. The persistence of severe spatial inequalities in Romania calls for appropriate regional policies able to stimulate a faster economic growth of underdeveloped counties, firstly by putting to good use the available local resources.

Since the both global and local economic environments are under constant change, further research will be needed to explore the developments in this area, as new data and information will become available. Another useful direction for future study might be the decomposition of inequalities by territorial level, so as to better understand specific geographical contributions to total disparities.

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