



Munich Personal RePEc Archive

**Spatial patterns of regional regional  
inequalities in European Union in  
pandemic time. Empirical evidence from  
NUTS-2 regions**

Daniela, Antonescu and Ioana, Florescu

Institute of National Economy

3 November 2023

Online at <https://mpra.ub.uni-muenchen.de/120224/>  
MPRA Paper No. 120224, posted 22 Feb 2024 14:51 UTC

**Spatial patterns of regional inequalities in  
European Union in pandemic time:  
Empirical evidence from NUTS 2 regions**

PhD. Daniela ANTONESCU

PhD. Ioana Cristina FLORESCU

Institute of National Economy – Romanian Academy

# **Spatial patterns of regional inequalities in European Union in pandemic time: Empirical evidence from NUTS 2 regions**

**PhD. Daniela ANTONESCU**

**PhD. Ioana Cristina FLORESCU**

## ***Abstract:***

The outbreak of COVID-19 has induced economic and financial disruptions to global economies, consistent with those experienced during previous episodes of economic or financial crises. This article offers a global perspective into the spread of the virus by investigating the convergence patterns of COVID-19 across 242 regions NUTS 2 in European Union, in period 2019 - 2022.

The analysis presents regional imbalances evaluated by statistical techniques and methods that can reflect the evolution concerning the main economic aspects. Using the Gini coefficient for the last four years we demonstrated there was a slow convergence process in the NUTS 2 regions interrupted by the pandemic global crisis. Also, the evolution of the GDP per capita in PPS at regional level in the case of all the Member States for the 1997-2021 was analyzed in order to show the intensity between the crises. The pandemic crisis was also compared to the economic crisis (2008-2009) which demonstrated that the COVID-19 didn't have the same impact as the financial one, pandemic had the lower intensity.

**Keywords:** regional convergence, Gini Coefficient, NUTS 2 Regions, COVID-19 pandemic crisis, economic-financial crisis

**JEL Classification:** R11, R12, F02

## 1. Introduction

In general, disparities between regions and inside them occur as result of some concentration, agglomeration, trends triggered by external phenomena, globalization, integration, or by internal ones, clustering, emergence of growth/development poles, involvement of local institutions in various aspects of economic life, etc. As a rule, regional disparities take the shape of differences between the level of incomes per capita and determine, at a given moment, a chain reaction of companies, authorities, inhabitants, etc., that attempt to counteract their escalation.

Within the European Union, the principle of cohesion and reform of Structural Funds 1989 represent core elements supporting permanently the balanced development at regional level. This fact is proved also by the constant increase of allocations from structural funds for economic and social cohesion, practically, after 1980, they were doubled in real terms. The actual allocations corresponding to cohesion represent 347 billion Euros current prices from which the sums allotted for promoting convergence have about 81.5% from total. Moreover, the existence of a compromise between efficiency and equity leads to the idea of a possible maximization of general growth, in parallel with reaching the convergence of outcomes and productivity at regional level. In the following, the outcomes of the analysis for the convergence process are presented at the level of the EU regions, with the help of the first method dispersion and the Lorenz-Gini concentration curve.

## 2. Literature review

In the scientific literature, the convergence concept has generated a boom of scientific studies and research elaborated at international, national and regional level as result of its increased economic importance. Some studies in economics, geography, sociology and political science have attempted to provide answers to the emergence, persistence and more noticeable spatial imbalances in the field of incomes.

The issues regarding inequalities, convergence and dynamics of spatial distribution play an important role in the present economic literature, even though the approach to these topics remains still insufficiently explored.

In the scientific literature (Iancu, 2008, 2009; Albu, 2012), three types of convergence specific to some fields of application can be identified:

1. Real convergence for closing the gaps between countries or regions in the development level given by the income per capita and labor productivity.
2. Nominal convergence applied to monetary policy for obtaining economic stability and switching to the euro.
3. Institutional convergence presupposes rendering the institutions compatible from the viewpoint of structures and functioning.

In general, theoretical approaches to regional convergence have focused on catching-up process: less developed regions make considerable efforts to catch up with rich regions (Kaitila, 2004).

The recent trends in the regional convergence process – agglomeration and dispersion – are analyzed and interpreted in accordance with some recent approaches of regional theory: endogenous growth (R. Lucas, P. Romer, P. Nijkamp), new economic geography (P. Krugman) and institutional theory (W.R. Scott, P. Dimaggio, W. Powell).

The theories regarding regional disparities and convergence indicate a relative variety of techniques and analyses that can reflect this fact. The integration of economic methods in spatial analyses highlights the effects of spatial dependence and heterogeneity on convergence. It can be stated that regional science “borrowed” from statistics techniques that can contribute to scientific substantiation of some outcomes and in particular to identifying the trends in the convergence process within a community of states (Jula, 2007).

The analysis of regional convergence by using statistical territorial analysis methods is based on a system of specific indicators, corresponding to the nature of terms and pursued purpose (Biji, M, Biji, E., Lilea, E., Anghelache, C., 2002; Begu, L.S.; Tusa, E., 2018).

In context of the Member States, the aspects of convergence led to the establishment of a set of common indicators and criteria that contributed to a unitary vision on evaluating the impact of certain community interventions. The scientific research and analysis methods take into account the fact that identifying regional disparities can be done, mainly, by means of convergence and its characteristic indicators (GDP per capita).

### 3. Empirical evidence

European Union (27 Member States) is divided into 242 regions<sup>1</sup> according to the NUTS 2 classification. It is well known that western regions are more developed than south-east regions.

The analysis framework of the study consists of NUTS 2 regions, a statistical system regulated in the European Union by the Directorate of Statistics (EUROSTAT). NUTS (Nomenclature Units for Territorial Statistics) are a common statistical information system used to sustain the cohesion and regional development policy (after the '80s).

The importance of the NUTS 2 level becomes actually relevant after the reform of structural funds, this level turning into the backbone of designing and implementing specific actions for areas with development problems. Within the cohesion policy, the NUTS 2 regions are eligible for accessing structural funds for objective 1 considered as the most appropriate level at which community action might be taken and to which the principle of subsidiary can be efficiently and effectively applied.

At NUTS 2 level, there is wide empirical evidence of convergence research. Most of them have examined convergence/divergence processes utilizing econometric or statistical models of linear specification as suggested by the neoclassical theory.

The assessment of regional inequalities in NUTS 2 regions provides empirical answers to a number of questions concerning the territorial impact of the European economic integration: is real the convergence process at regional NUTS 2 in period 2010-2021? If yes, how the both crisis (financial-2008 and sanitary-2020) affected the convergence process?

In order to study the convergence in NUTS 2 regions in the period 2010-2022, we first analyzed the dynamics of GDP per capita in euro (PPS) of minimum and maximum value, compared to the average across the EU. According to the higher level in Luxembourg (68,300 euro per capita) and the lowest level in Mayotte (6,300 euro per capita), we present a graphical representation in Table 1 for the period 1997-2021. Also, we present in this table the minim and maxim values of GDP per capita (PPS) of NUTS 2 regions compared to the EU average (table 1).

Table 1: Evolution of GDP per capita, 1997-2021 (euro/capita, PPS)

	2013	2014	2015	2016	2017	2018	2019	2020	2021	
Average	24,843	25,359	26,213	26,704	27,732	28,619	29,499	28,382	30,640	
Max	72,600	75,200	77,600	78,500	78,900	78,900	78,700	78,500	87,100	
Min	6,900	7,200	7,800	8,000	8,400	8,300	8,700	8,700	9,100	
	<b>1997</b>	<b>2000</b>	<b>2002</b>	<b>2004</b>	<b>2006</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>
Average	15,26	18,74	19,99	21,10	23,04	24,29	22,82	23,80	24,44	24,61

<sup>1</sup>The current NUTS 2021 classification is valid from 1 January 2021 and lists 92 regions at NUTS 1, 242 regions at NUTS 2 and 1166 regions at NUTS 3 level.

	2013	2014	2015	2016	2017	2018	2019	2020	2021	
e	5	3	6	9	4	9	5	9	2	0
Max	49,30 0	69,60 0	75,70 0	78,90 0	88,80 0	85,10 0	75,90 0	68,30 0	70,20 0	71,30 0
Min	3,200	1,300	1,600	1,900	2,400	3,000	2,900	6,300	6,400	6,400

Source: Own calculations based on EUROSTAT data.

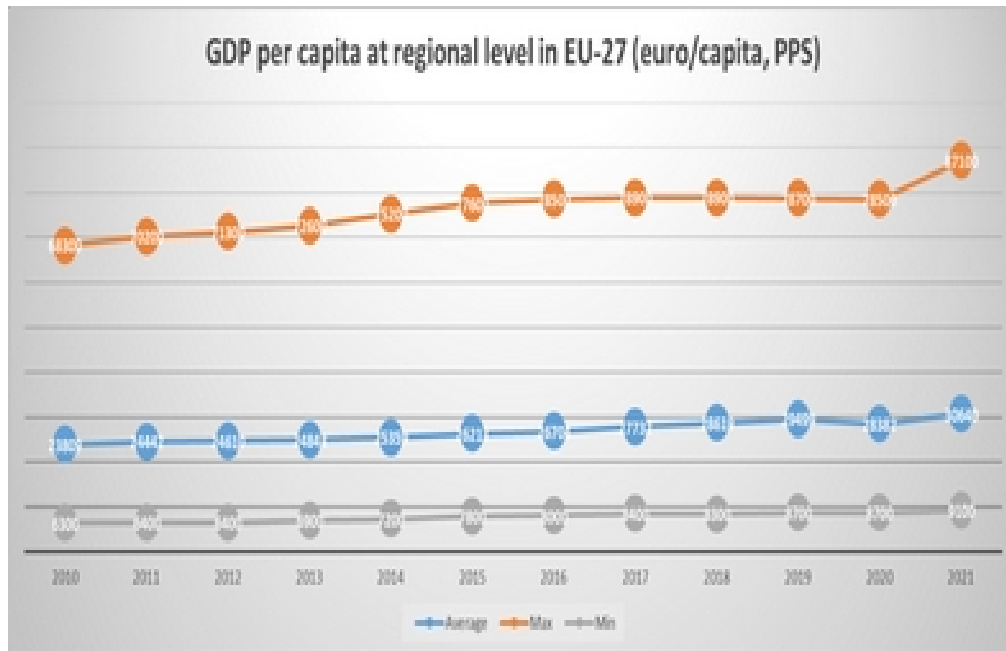
The difference between *the maximum value and the minimum one* of the GDP per capita in the period 1997-2009 increased from 15:1 to 26:1. In the period 1997-2009, the maximum value of regional GDP was in 2006 (88,800 euro/hab.), after that it decreased by 14,52% (75,900 euro/hab.), while the minimum value of the indicator decreased from 3,200 to 2,900 (1997 vs. 2009) (-9,3%) (Antonescu, 2010, 2012).

In the period 2009-2021, the difference between the *maximum value and the minimum one* of the GDP per capita decreased slowly from 10:1 to 9,6:1.

During the pandemic crisis, 2020, the following regional GDP developments (average, minimum and maximum values were recorded):

1. in 2020, the minimum value was similar to that of 2019 (8,700 euro/capita), followed by an increase in 2021 of 4.59% (9,100 euro/capita); in the period 2010-2021, GDP/capital increased from 6,300 euro/capita at 9,100 euro/capita (+44.4%);
2. the maximum value decreased in the pandemic year 2020 compared to 2019 from 78,700 euro/capita (-0.25%), while in 2021 compared to 2019, the maximum value continued to increase by 10.67%, reaching a maximum regional value of 87,100 euro/capita; in the period 2010-2021, the maximum value increased from 68,300 to 87,100, meaning an increase of 27.52%;
3. the average value decreased in 2020 by -3.8% compared to 2019 (from 29.499 euro/capita at 28.382 euro/capita), which will increase in 2021 by 3.87% (30,640 euro/capita); in the analyzed interval, 2010-2021, the average value increased by 23,809 euro/capita at 30,640 euro/capita (+28.7%);
4. in 2021, the highest increase was the maximum value (+10.67%) compared to the minimum (+4.6%);
5. in the period 2010-2021, the value of GDP per capita increased the most for the minimum value (+44%), the maximum increased by 27.52% and the average increased by 28.7%;
6. in the pandemic year 2020, the largest decrease was the average value (-3.8%), the maximum decreased by 0.25%, while the minimum value remained the same;
7. it can be said that the pandemic affected in a relatively high proportion the maximum value, in a small proportion the average value and did not influence the minimum value at all; thus, the less developed regions were more resilient compared to the developed ones;
8. during the analysis period, 2010-2021, the largest growth was recorded by the regions with a GDP/capita lower (+44.4%), while developed regions increased by 28.7% (figure 1).

Figure 1: GDP per capita (PPS) at regional level (euro/capita)

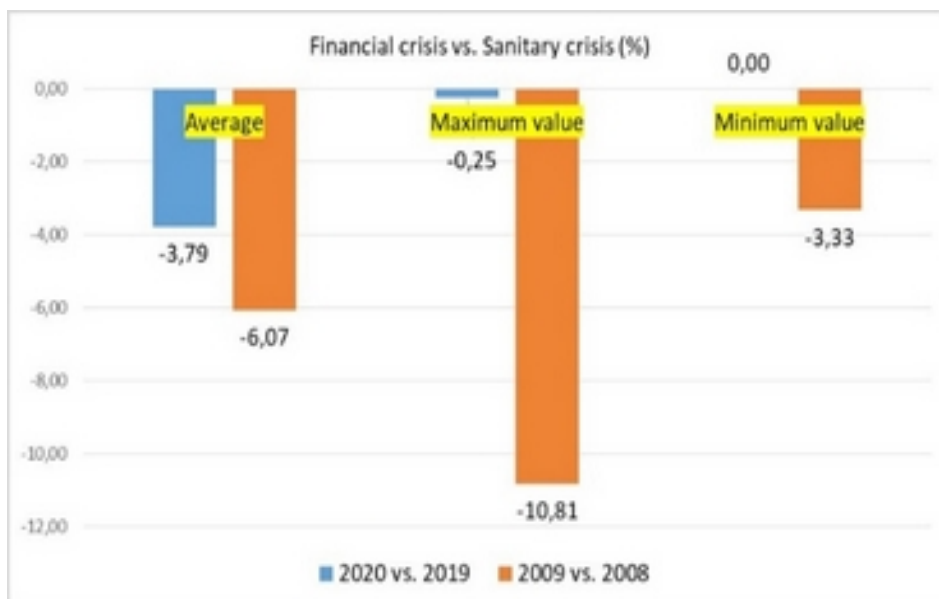


Source: Own computations based on EUROSTAT data.

In a comparative analysis of the two periods of crisis (2008-2009 and 2020-2021), it can be seen that during the health crisis there was a lower decreasing trend of the maximum value compared to that during the financial crisis. At the same time, the minimum value remained constant during the health crisis, and during the financial crisis it had a decrease of -3.33%.

In conclusion, it can be stated that the recent health crisis has not reached the amplitude of the financial-global one at the level of GDP/capita from NUTS 2 (figure 2) regions.

Figure 2: GDP per capita (PPS) at regional level (euro/capita)



Source: Authors' computations based on EUROSTAT data.

In addition to the qualitative analysis of GDP/capita, we further propose a quantitative analysis, which consists in identifying the number of regions in different positions in an EU-27 ranking, depending on the value of the mentioned indicator. The analysis will target two classification periods: 1997-2009 and 2010-2021.

In 1997, 145 registered a GDP per capita above the community average (53.5% of the total), while the number of regions under this average amounted to 126 (46.5% of the total). Also, the number of non-eligible regions for community assistance (over 75% of the GDP per capita average) was 202 (74.5% of the total). The average value of GDP per capita in the year was 15,265 euro per capita, registered in 176 regions of the EU-27 (64.9%), while the maximum value of GDP per capita was 49,300 euro per capita. The ratio of the maximum value of GDP per capita (London) to the minimum one of 3,200 euro per capita (Severozapaden) was 15:1. Out of the total number of regions, about 25% required assistance from the community funds.

In 2010, out of the 271 NUTS 2 regions, the number of regions above the Community average decreased from 145 to 119, while the number of regions below the average decreased from 126 to 152. The relative regional equilibrium trend was accompanied by an increasing trend in the number of very rich regions (by over 75% of the average) – from 202 to 204 – and decrease in the number of regions by less than 75% of the Community average - from 69 to 67. The average value of GDP per capita had an increasing trend up to the year 2008, and then the effects of the crisis at regional level resulted in a decrease of this indicator by about -3.13% (in 2010 as compared with 2008) (Table 2).

The difference between the maximum and the minimum value in the period 1997-2009 was 58.35%, showing that there has been a growing trend of divergence between the NUTS 2 regions of the EU-28, despite the efforts made at Community level through the allocations from the Structural and Cohesion Funds for regional development policy.

The effects of the global crisis stopped the entire growth of the less developed regions during the years 2010. Even if the differences between the most developed and less developed regions diminished, they continue to remain very high.



Table 2: Evolution of number of NUTS 2 regions in period 1997-2009 (no, %)

	1997	2002	2008	2009
No. total NUTS 2 regions	271	271	271	271
No. of regions above average	145	151	139	135
% in total regions	53.51	55.72	51.29	49.82
No. of regions below average	126	120	132	136
% in total regions	46.49	44.28	48.71	50.18
No. of regions above 75% average	202	193	199	198
% in total regions	74.54	71.22	73.43	73.06
No. of regions below 75% average	69	78	72	73
% in total regions	25.46	28.78	26.57	26.94
Average (euro/capita)	15,265	19,996	24,299	22,825
Max (euro/capita)	49,300	75,700	85,100	75,900
Minim (euro/capita)	3,200	1,600	3,000	2,900
Variation (euro/capita) (Max-Min)	46,100	74,100	82,100	73,000

Source: Authors calculations based on EUROSTAT data.

The analysis by categories of regions of the territorial convergence shows that out of the total of 242 regions, about 43.8% are regions with a GDP per capita higher than the average of the indicator, 56.2% are below the average value, 71.5% are above the value established for the allocation of Structural Funds/Cohesion of 75% and 28.5% are below 75%. The trend registered in the period 2010-2021 regarding the average GDP per capita is one of growth (+28.7%), from 23,809 euro/capita to 30,640 euro/capita. There is also a reduction in the number of NUTS 2 regions with GDP per capita above the average value (from 45.9% to 43.8%) and an increase in the number of those below average from 54.1% to 56.2% (table 3).

Table 3: Evolution of number of NUTS 2 regions in period 2010-2021 (no. %)

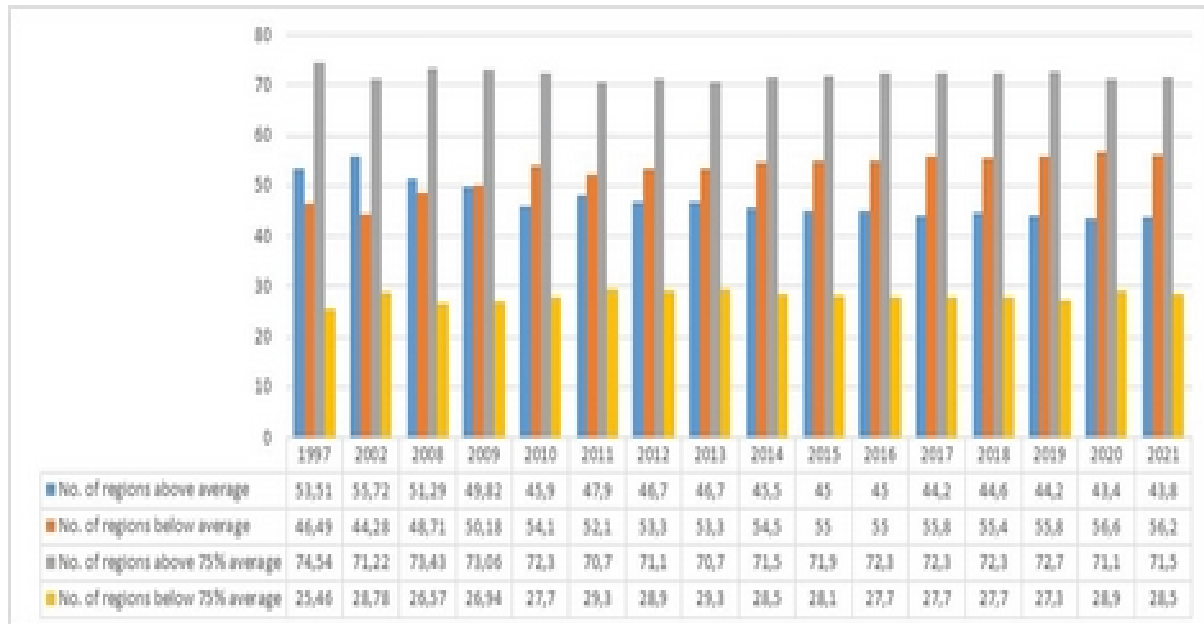
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
No. NUTS regions	242	242	242	242	242	242	242	242	242	242	242	242
Average of GDP per capita (PPS)	23809	24442	24610	24843	25359	26213	26704	27732	28619	29499	28382	30640
No. reg. above average	111	116	113	113	110	109	109	107	108	107	105	106
%	45.9	47.9	46.7	46.7	45.5	45.0	45.0	44.2	44.6	44.2	43.4	43.8
No. reg. under average	131	126	129	129	132	133	133	135	134	135	137	136
%	54.1	52.1	53.3	53.3	54.5	55.0	55.0	55.8	55.4	55.8	56.6	56.2
No. reg above 75%	175	171	172	171	173	174	175	175	175	176	172	173
%	72.3	70.7	71.1	70.7	71.5	71.9	72.3	72.3	72.3	72.7	71.1	71.5
No. reg under 75%	67	71	70	71	69	68	67	67	67	66	70	69
%	27.7	29.3	28.9	29.3	28.5	28.1	27.7	27.7	27.7	27.3	28.9	28.5
Maxim (euro/capita)	68,300	70,200	71,300	72,600	75,200	77,600	78,500	78,900	78,900	78,700	78,500	87,100
Minim (euro/capit	6,300	6,400	6,400	6,900	7,200	7,800	8,000	8,400	8,300	8,700	8,700	9,100

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
a)												
Difference (Max-Min)	62,00 0	63,80 0	64,90 0	65,70 0	68,00 0	69,80 0	70,50 0	70,50 0	70,60 0	70,00 0	69,80 0	78,00 0

Source: Author calculations based on EUROSTAT data/

The analysis of the difference between the maximum and the minimum value shows that it increased from 62,000 euro/capita (2010) to 78,000 euro/capita (+25.8%). Compared to the period 1997-2010, a reduction of territorial differences from 58.35% to 25.8% can be observed, with a decrease of 32.55 percentage points (figure 3).

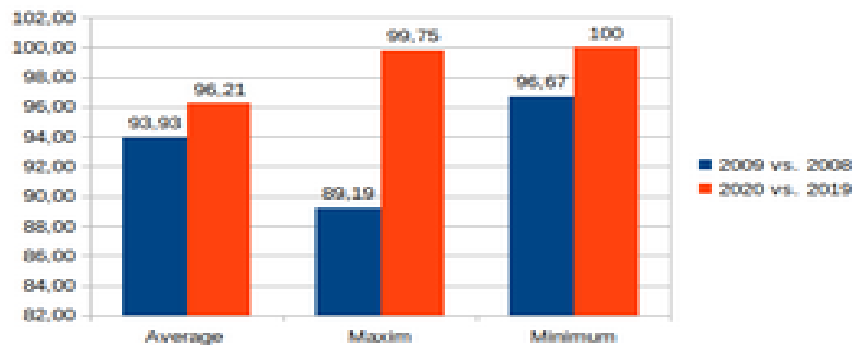
Figure 3: Evolution of number of NUTS 2 regions in period 2010-2021 (%)



Source: Own computations based on EUROSTAT data.

In the period 2010-2021, however, a real process of convergence can be observed, the minimum value of GDP per capita increased by the highest percentage (44.44%) compared to the maximum value (27.53%) and the average value (27.53%). A constant trend during this period is the one of increasing GDP/capita, both the average value, and the maximum and minimum ones, which means that, as a whole, the regional development level increased. At all three values of the indicator (maximum, minimum and average), a process of resilience can be found in 2021 compared to 2019 (after sanitary crisis) (figure 4).

Figure 4: Comparisons between the crises in EU-27 regions NUTS-2 - financial and health (dynamic, %)



Source: Own computations based on EUROSTAT data.

#### 4. The Gini coefficient in the case of GDP distribution at NUTS2 regions

In scientific literature, there are a lot of models that can assess regional disparities. One of the methods commonly used in practice is related to the calculation and analysis of the degree of concentration of activities within a region. The increase or decrease of concentration in economic activities or regions provides information on the level of overall economic development, economic development and growth rate, the specific features of the region, the potential, local traditions, etc. Changes of concentration degree on period could be a measure of the convergence process (Dobrescu E., 2004).

One of the common methods used in specialized literature in the evaluation of regional concentration/diversification degree is also known as Gini coefficients method.

In the European Union, at NUTS 2 regional level, the relative convergence trend is supported by the value of the Lorenz-Gini concentration curve.

The Gini index measures the area between the Lorenz curve and a hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line. Thus, a Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality<sup>2</sup>. It was developed by the Italian statistician Corrado Gini and published in his 1912 paper "Variabilità e mutabilità" ("Variability and Mutability").

The Gini index is the Gini coefficient expressed as a percentage and is equal to the Gini coefficient multiplied by 100. The Gini coefficient measure the extent to which the distribution of income or consumption expenditure among individuals or households within an economy deviates from a perfectly equal distribution.

Also, the Gini coefficients confirm this low decreasing trend in regional level NUTS 2 concentration of economic performance expressed by means of the GDP per capita, from 0.431 in 1997 to 0.403 in 2009.

At the national level (EU-27), the Gini coefficient of equalized disposable income, decreased from 30.6% to 29.6%, almost 1 p. p. (2013 vs. 2022) (table 4).

This value, even if it remains relatively high, shows a clear trend of the EU-27 Member States' revenue concentration decline. It is also found that in 2020, when the health crisis began, the concentration decreased to 30%, followed by an increase to 30.2% and again by a decrease to 29.6%.

Table 4: Gini coefficient of equivalence disposable income at national in EU-27, 2013-2022

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
EU - 27	30.6	30.9	30.8	30.6	30.3	30.4	30.2	30.0	30.2	29.6

Source: : Own computations based on EUROSTAT data<sup>3</sup>

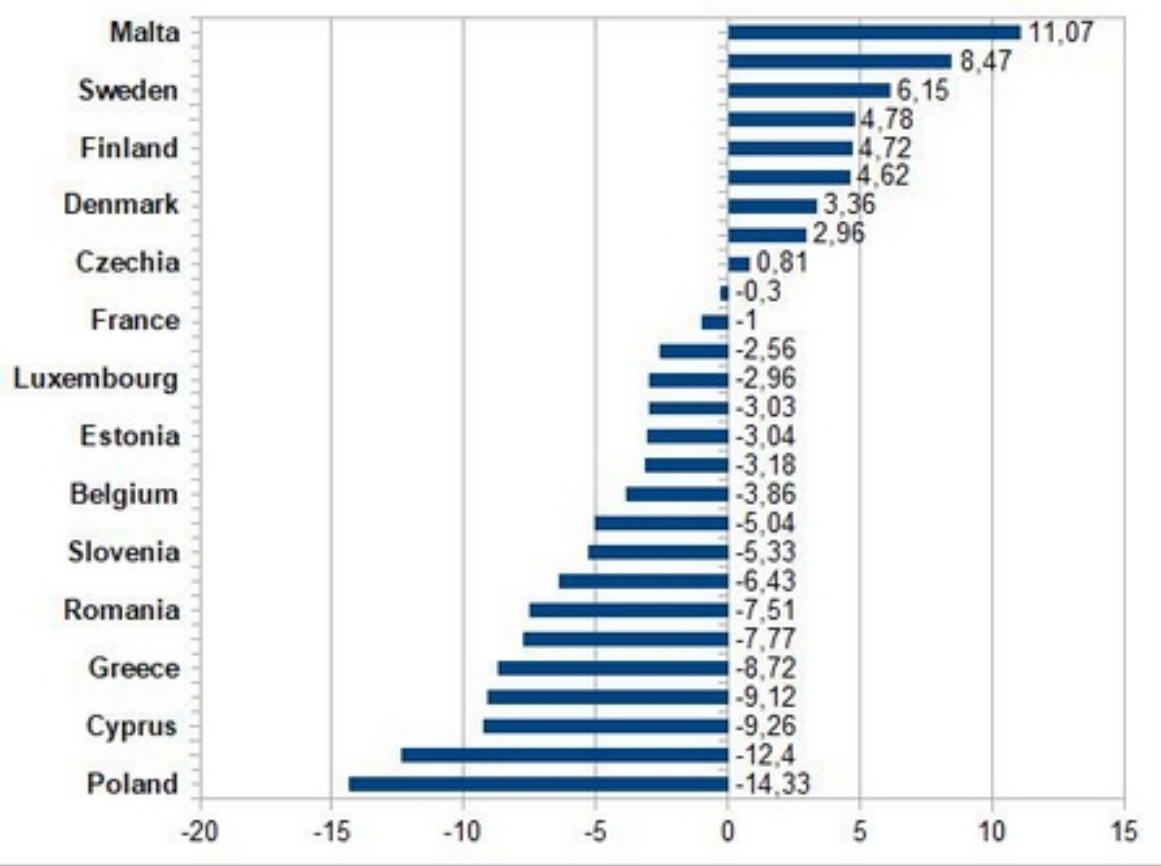
In the case of the European Union, from the analysis of the EUROSTAT data at the level of the 242 NUTS 2 regions results that for the last 11 years there has been a slow convergence trend at different "speeds" between economic territories and national level. Still, the differences between wealthy and poor regions remain very high, despite the European Union's efforts to balance the economic and social development at territorial level and to promote convergence and cohesion between Member States.

It can be seen that a number of countries have had increases in the concentration of revenues (Malta, Bulgaria, Sweden, the Netherlands, Finland, Lithuania, Denmark, Austria, the Czech Republic), while others have seen significant reductions in their concentration (Poland, Slovakia, Cyprus, Ireland, Romania) (figure 5).

<sup>2</sup> <http://data.worldbank.org/indicator/SI.POV.GINI>

<sup>3</sup> [https://ec.europa.eu/eurostat/databrowser/view/ILC\\_DI12/default/table?lang=en](https://ec.europa.eu/eurostat/databrowser/view/ILC_DI12/default/table?lang=en)

Figure 5: Dynamics of Gini Coefficient at national level, in 2022 vs. 2013 (%)



Source: Own computations based on EUROSTAT data<sup>4</sup>.

## 5. The actual regional policy and the convergence (2021-2027)

In the case of the regional development, the NUTS 2 regions benefit of the European Regional Development Funds, the allocations being in reverse proportion to the level of GDP per capita. Thus, the less developed regions (GDP per capita smaller than 75% of the EU-27 average) continue to be a priority of the cohesion policy. Regional convergence and recovery of economic and social lags shall imply sustained efforts in the long term. Another group of regions that shall receive assistance also in the future is represented by the regions in transition (GDP per capita between 75-90% of the EU-27 average).

The regions with a high development level (GDP per capita less than 90% of the EU-27 average) shall also benefit of Community assistance for meeting the challenges of globalised competition in the knowledge-based economy and for shifting to the low-carbon emissions economy.

The transitioning or the less developed regions shall receive an allocation from Structural Funds equal to at least two-thirds of allocation for 2007-2013.

Another regional financial support – European Structural Funds (ESF) – will allotted a minimum quota for each category of regions (25% for less developed regions, 40% for regions in transition and 52% for developed regions). This minimum global quota represents 25% of the budget allocated to the cohesion policy (84 billion euro).

<sup>4</sup>[https://ec.europa.eu/eurostat/databrowser/view/ILC\\_DI12/default/table?lang=en](https://ec.europa.eu/eurostat/databrowser/view/ILC_DI12/default/table?lang=en)

The NUTS 2 regions will receive differentiated support depending on their level of economic development (GDP per capita), a clear distinction being made between “less developed” and the “more developed” regions.

With respect to the regions with a similar level of economic development, the possibility shall be given to implement support gradually, by a simplified system that will include a new intermediate category of regions, which will contain eligible regions (currently under the convergence objective), but for which the GDP per capita is higher than 75% of the European Union average (Daianu, 2003).

In the current programming period, regional policy is in accordance with the “2020 Europe Strategy” which has as interconnected priorities the smart growth, by strengthening knowledge and innovation; sustainable growth – presupposing the achievement of the economy based on efficient, sustainable, and the competitive use of existing resources; the growth based on supporting social inclusion – involving competences’ development for all citizens, full labor force employment, and poverty alleviation, etc.

The regional policy is implemented by Structural Funds supported based on the yearly contributions of the Member States to the Community budget, a contribution that might represent up 70% of the total income of the EU budget.

For the period 2014-2020, the total value of the financial support the total value of the financial support of the European Union by Structural and Cohesion funds is 351,8 billion euro, representing about 33% from the European Union budget. The budget dedicated to financing the regional development policy knew fluctuations over time. As compared with the period 2007-2013, the current budget of the cohesion policy increased by 1.53% from 351,8 billion euro to 346,5 billion euro.

The regions benefit from the ERDF financing, and from the ESF ones, the allocations being in direct proportion to the level of the GDP per capita. Regarding the ERDF financing, the support is granted to less developed regions, with a GDP per capital below 75% of the EU-27 average, as they are regarded as the zero priority of the territorial cohesion policy. Here are included, as well, the regions in transition with a GDP per capita between 75 and 90% from the EU-27 average, and also the developed regions, for which the GDP per capita is below 90% of the EU-27 average (for the latter regions, the support is granted for adjustment to new challenges generated by global competition in the knowledge-based economy and for transitioning to low carbon economy).

Regarding the support received from the European Structural Fund (ESF for regions are determined minimum financing shares for each category of regions: 25 % for less developed regions, 40 % for regions in transition, and 52 % for developed regions. ESF avails itself of a global minimum share representing 25 % from the cohesion policy budget (it reaches about 84 billion euro).

The main objective of the cohesion policy is represented by the regional convergence and recovering economic and social gaps between regions, the main support instrument being ERDF. The main instrument for implementing the current regional policy is represented by the European Regional Development Fund (ERDF) that has as strategic objective to strengthen economic, social and territorial cohesion of the EU by improving existing imbalances between the regions.

At the level of each member state, the allocations by regional policy over the two programming periods are presented in the table hereunder. It might be seen that for some countries the allocations of the preceding period were maintained (Bulgaria, Poland, Romania, Greece, Austria, Belgium, Luxembourg, and the Netherlands), whereas funds’ diminished are recorded for other countries (Slovenia, Estonia, Hungary, and Malta, etc.).

Regarding the allocation on categories of regions, an analysis was realized on the three categories mentioned before. Thus, the less developed regions benefit of 162,6 billion

euro, the more developed regions 53,1 billion euro, and the regions in transition about 39 billion euro, while for territorial cooperation were allotted 11,7 billion euro. To these was added an additional distribution of funds for ultra-peripheral regions and to those in the northern part of Europe, of 0.9 billion euro. As compared with the preceding programming period, it is found that both less developed regions and the more developed ones have received less funds, concomitantly with increased financing for regions in transition.

The regional policy and cohesion for 2021-2027 have a number of five thematic objectives, as follows:

- Objective 1 - *Smarter Europe* by innovation, digitalization, economic change and supporting small- and medium-sized enterprises;
- Objective 2 - *Greener Europe* with lower carbon emissions, by enforcing the Paris Agreement and by investments in the energy transition, renewable sources, and fighting against climate change;
- Objective 3 - *More interconnected Europe*, with strategic transports and digital networks;
- Objective 4 - *More social Europe* fulfilling the objectives of the European Pillar of Social Rights and supporting quality jobs, education, competences, social inclusion, and equal access to health care services;
- Objective 5 - A closer to the citizens' Europe by supporting development strategies under local responsibility, and sustainable urban development for the entire EU.

The proposed budget for supporting the objectives of the new regional policy will be by 1,135 billion euro (commitment appropriations, in 2018 prices), the equivalent of 1.11% from the gross national income of EU-27. The level of appropriations is by 1,105 billion euro (1.08 % from Gross National Income) in commitment appropriations (prices 2018). This includes the integration into the EU budget of the European Development Fund, a new financial instrument that aims to financing the cooperation with developed countries from Africa, the Caribbean Area and Pacific. The future budget is comparable with the one of the current programming period (if inflation is taken into account).

As regards support and financing by the European Regional Development Fund (ERDF) and by the Cohesion Fund (CF) these will be directed to the first two priorities. Taking account of the gross national income (GNI) per capita, the member state would need to invest between 65% and 85% from the received allotments to the two funds for the first two priorities (innovation and environment).

The urban areas will dispose of 6% from ERDF and will invest preponderantly in sustainable development. For the financial framework 2021-2027 the European Urban Initiative will be created, a new instrument of cooperation-innovation and for strengthening the capacity of cities: migrants' integration, housing, air quality, poverty and energy transition, etc. Allocations will be made also by taking account of the GDP per capita, but new criteria will emerge, such as unemployment among youths, the low level of education, climate change and migrants' reception and integration.

Regarding the allocation rate it can be observed that the less developed regions are the ones that would get the most funding both regarding the Cohesion Fund and the ERDF/ESF+ (75%), followed by the transition regions and the more developed regions.

Table 4: Types of funding for the Member States of the European Union - 27 for the period 2021-2027 (%)

<b>Fund/Type of region</b>	<b>2021-2027</b>
Cohesion Fund	13 %
ERDF/ESF+ Less developed regions	62 %
ERDF/ESF+ Transition regions	14 %
ERDF/ESF+ More developed regions	11 %
<b>Total</b>	<b>100 %</b>
<i>Share CF + ERDF/ESF+ Less developed regions</i>	75 %

Source: European Court of Auditors report, 2019.

Out of all the total allocation per countries regarding the ESF funding in the period 2021-2027, on the first places receiving the most amount of funds there are three developed countries namely: Italy with 16,15% (15,011 million euro), Poland (15,38% meaning 14,297 million euro) and Spain with 13% (12,084 million euro). On the opposite poll regarding funding and registering the lowest amount allocated there is Luxembourg with 0.02% (21%). Romania, a transition country, has 9.02% allocated funds meaning 8,385 million euro. The total amount of the ESF allocated to the Member States is 92,949 million euro.

Just like in the previous case regarding the European Structural Funds, in the case of the European Regional Development Fund, the first three countries that requested the highest share of funds are Poland (21.02% meaning 45,300 million euro), followed by Italy (12.72% - 27,411 million euro) and Spain (11.78% the equivalent of 25,377 million euro). Just like in the previous case Luxembourg is the country that is situated on the last position with 0.01% amounting 21 million euro out of the total 215,507 million euro dedicated to this fund. Romania has 17,323 million euro (8.04%) allocated funds.

In the case of the Cohesion Funds the situation regarding the first 3 countries that had the most amount of funds allocated changes, Poland being the one of the first place with 26.09% (12,144 million euro). The Czech Republic with 13.85% (6,444 million euro) and Romania with 9.67% (4,499 million euro). All the other countries are below the threshold of 10%, on the last place being Malta with 0.47% (219 million euro). Belgium, Denmark, Germany, Ireland, Spain. France, Italy, Luxembourg, Netherlands, Austria, Finland and Sweden have no allocated Cohesion Funds.

## Conclusion

In this paper, the analysis of regional convergence at NUTS 2 regions in EU-27 for the periods 1997-2009 and 2010-2021. The results reveal a slight convergence trend at the NUTS 2 regions. Thus, the difference between the maximum and the minimum value of GDP per capita (PPS) diminished up to the year 2008 (the ratio decreased from 15:1 to 12:1). After this year, the discrepancies between very developed and the less developed regions deepen, the main reason being the current crisis which affects especially the areas less prepared to face ongoing adjustments to the new conditions (difficulties emerging on the labour market, unemployment increase, demand decrease, etc.).

The future regional development strategy shall be conceived so that funds allocated by the EU and intended for diminishing territorial economic and social imbalances shall be spent entirely with visible spatial outcomes. The main purpose should be not only effective spending of the Community funds, but also efficiency in attracting these resources.

The COVID-19 crisis had a lower financial impact than the economic crisis from 2008-2009. Volatility and lack of predictability are the features of the last decade. However, the Covid-19 pandemic has by far generated the greatest uncertainty.

As a response to the COVID-19 crisis several types of funds were allocated by the European Union in order to help with the convergence and regional development process that was affected in the period 2019-2022: The European Regional Development Fund, the European Social Fund and the Cohesion Fund, the less developed regions of the Member States being the main target and the ones that will receive the majority of the funding. These financial funds will help these regions on the long run to catch up to the transition and the developed regions of the countries from the European Union.



## References

- Albu L., L., 2012, The convergence process in the EU estimated by Gini Coefficients, in Romanian Journal of Economic Forecasting – 4/2012.
- Antonescu D., 2010, The Analysis of Regional Disparities in Romania with Gini/Struck Coefficients of concentration, Romanian Journal of Economics, Institute of National Economy, vol. 31(2(40)), pages 160-182, December.
- Antonescu D., 2012, Measuring Regional Convergence - An Application To The European Union And Romania, Economic Journal, Lucian Blaga University of Sibiu, Faculty of Economic Sciences, vol. 0(1), pages 46-59.
- Begu, L.S.; Tusa, E., 2018, Theoretical and Economy Statistics, ASE Publishing House, Bucharest ([www.biblioteca-digitala.ase.ro](http://www.biblioteca-digitala.ase.ro)).
- Biji, M, Biji, E., Lilea, E., Anghelache, C. 2002, Treaty of Statitics, Economic Publishing House, Bucharest.
- Daianu, D. 2003, Economic convergence. Requirements and possibilities, in Aurel Iancu (coord.), Economic Development of Romania. Competitiveness and integration in the European Union, Bucharest, Romanian Academy Publishing House.
- DiMaggio P. J., Powell W. W., 1983, The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. American Sociological Review, 48, 147-160.
- Dobrescu, E. (coord.), 2004, Macroeconomic Modeling Seminar, Center for Economic Information and Documentation.
- Florescu C. I., 2015, Technological revolution, labor markets and income distribution in the knowledge economy, Theoretical and Applied Economics, AGER, vol. 0(2(603), S), pages 293-302.
- Iancu, A. 1993, Treatise on economics, volumes I and III, Bucharest Economic Publishing House.
- Iancu, A. 2008, Economic convergence, vol. 1, Publishing House of the Romanian Academy and Beck.
- Iancu, A. 2009, Economic convergence, vol. 2, Publishing House of the Romanian Academy.
- Iancu, A. 2009, The problem of economic convergence in problems of economic integration, <http://oeconomica.org.ro/files/pdf/93.pdf>.
- Jula, D. 2007, European integration. Macroeconomic convergence scenarios, Mustang Publishing, ISBN 978-973-8315-78-6.
- Kaitila Ville, 2004, Convergence of real GDP per capita in the EU15- how do the accession countries fir in? ISBN 92-9079-467-4, in European Network of Economic Policy Research Institute, Working Paper No. 25/January 2004, [http://aei.pitt.edu/1843/1/ENEPRI\\_WP25.pdf](http://aei.pitt.edu/1843/1/ENEPRI_WP25.pdf).
- Krugman P, 1990, Increasing Returns and Economic Geography, NBER Working Papers 3275, National Bureau of Economic Research, Inc.
- Lucas R. 1988, On the mechanics of economic development. J Monet Econ 22(1):3–42.
- Nijkamp, P., Poot, J. 1997. Endogenous Technological Change, Long Run Growth and Spatial Interdependence: A Survey. In: Bertuglia, C.S., Lombardo, S., Nijkamp, P. (eds) Innovative Behaviour in Space and Time. Advances in Spatial Science. Springer, Berlin, Heidelberg. [https://doi.org/10.1007/978-3-642-60720-2\\_11](https://doi.org/10.1007/978-3-642-60720-2_11)
- Romer P M., 1994, The Origins of Endogenous Growth. Journal of Economic Perspectives. 8 1:3–22.
- Scott W. R., 2005, Institutional Theory: Contributing to a Theoretical Research Program, [https://www.researchgate.net/publication/265348080\\_Institutional\\_Theory\\_Contributing\\_to\\_a\\_Theoretical\\_Research\\_Program](https://www.researchgate.net/publication/265348080_Institutional_Theory_Contributing_to_a_Theoretical_Research_Program)

[http://ec.europa.eu/regional\\_policy/what/future/proposals\\_2014\\_2020\\_en.cfm](http://ec.europa.eu/regional_policy/what/future/proposals_2014_2020_en.cfm)

<http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/themes>

<http://epp.eurostat.ec.europa.eu/tgm/table.do?>

[tab=table&init=1&plugin=1&language=en&pcode=tgs00004](http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tgs00004)

[http://europa.eu/geninfo/legal\\_notices\\_en.htm](http://europa.eu/geninfo/legal_notices_en.htm)