E C O N O M I C S B U L L E T I N

The Geographic Concentration of Population and Income in Europe: Results for the Period 1984-1999

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Abstract

In this paper we use the Gini index to analyze the spatial concentration of income and population across European Union regions over the period 1984-1999. The results of our analysis show an slow but increasing pattern of geographic concentration of population and income. The critical threshold where the effects of the geographic concentration become remarkable is when we reach the 45-50% band of the richest population.

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1. Introduction

A striking fact about world economic development is that economic activity seems to cluster (Porter 2000). In the case of Europe, a set of adjacent regions stretching from southeast England, through the Benelux countries, North France and Southwest Germany to Northeast Italy has been denoted the "Blue Banana". These regions are characterised by high levels of income (López-Rodríguez and Faiña 2004, 2006). Other regions, generally peripheral ones, experience lower economic welfare. Important questions are whether the clustered economic landscape in Europe strengths or weakens over time. Numerous researchers have examined the data in a quest for robust evidence on geographic concentration patterns in Europe (Barrios and Strobl 2004, Brülhart 2001, Ciccone, 2002, Combes and Overman 2004, Mukkala 2004, Overman et al. 2003).

In this paper we analyse this issue by means of the Gini index (Gini 1935) and the associated Lorenz curves, carrying our computations for the years 1984, 1994, 1995 and 1999. The results of our analysis show that the spatial concentration of population and income increases although slowly over time.

The remaining part of the paper is structured as follows: Section 2 describes the methodology and data used in our analysis, section 3 contains the results and section 4 contains the main conclusions.

2. Methodology and Data

A simple formulation of the Gini coefficient is given by the following mathematical expression:

$$I_G = \frac{\sum_{i=1}^{n-1}(p_i - q_i)}{\sum_{i=1}^{n-1} p_i}$$

Applied to our analysis, p_i is the cumulated proportion of the area variable, q_i is the cumulated proportion of the population or income variable and n is the number of geographical units. The income variable is proxied by Gross Domestic Product (GDP) in the form of Purchasing Power Parities (PPP) in constant 1985 and according to ESA[1]79 for the years1984 and 1994 and ESA95 for the years 1995 and 1999. Due to this fact, we must compare the evolution of the Gini Coefficient for the years 1984 and 1994 separately of the results for the years 1995 and 1999. The division of the European regions at NUTS[2]2 level is taken as geographical unit of analysis. In the computations of the Gini Coefficient for the years 1984 and 1994, The Finish and the Swedish regions and also the French dominions were excluded from the analysis. For the computations of the years 1995 and 1999 all NUTS 2 regions in the EU15 were taking into account.

The data for our variables come from the Eurostat Regio database

3. Spatial Concentration of Population and income in Europe: Results for the years 1984, 1994 and 1995, 1999.

Table 1 gives the results for the Gini index for the years 1984 and 1994. It can be seen that there has been a little increase in the spatial concentration of GDP within the interim period since the value of the Gini index has risen from 0.35 to 0.36. Similarly, although the increase is somewhat greater, it can be observed that the index values for spatial concentration of population went from 0.22 to 0.24.

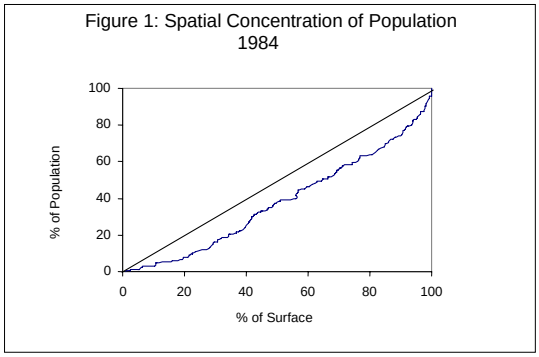
[1] European System of Accounting

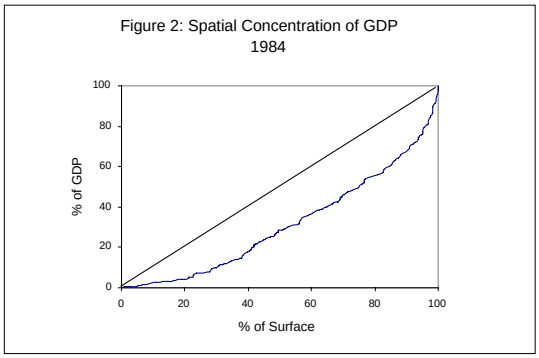
[2] Nomenclature of Territorial Units for Statistics.

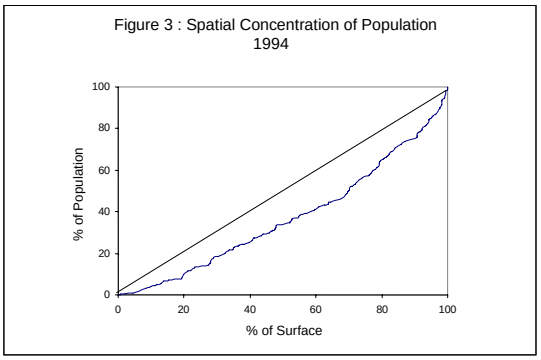
Table 1: Spatial Concentration of Population and GDP (1984 and 1994)

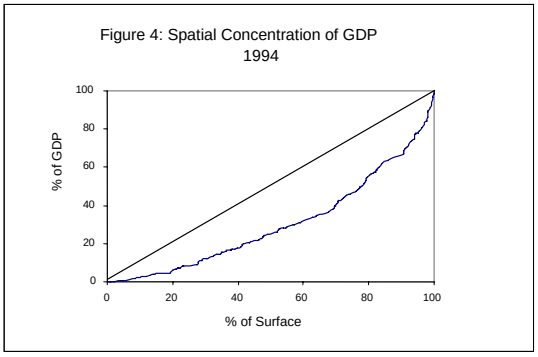
	GDP	Population
1984	0.35	0.22
1994	0.36	0.24

Figures 2 to 5 represent the Lorenz curves that correspond to the Gini indices calculated for 1984 and 1994. A glance at the graphs reveals that the geographical concentration of the GDP is greater than the geographical concentration of the population. Further, as the curve plainly shows, this concentration increases in 1994. The calculations carried out and presented in table 1 reconfirm this dynamic.









Tables 2 and 3 give the relative distribution in percentages of population, physical space, and GDP for the 50% of the EU population with the highest income levels in the years 1984 and 1994.

Table 2: Spatial Concentration 1984 (Population- Space-GDP)

% Pop.	% surface	% GDP
4.29	0.68	7.39
10.08	2.39	15.69
15.60	4.73	22.80
20.34	7.78	28.47
25.19	11.68	34.01
30.13	14.94	39.53
33.98	19.28	43.79
39.79	25.26	50.06
45.19	30.75	55.67
49.75	35.68	60.24
50.46	36.69	60.94

Table 3: Spatial Concentration 1994 (Population- Space-GDP)

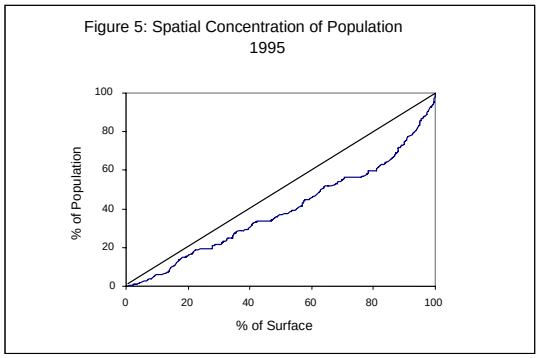
% Pop.	% surface	% GDP
5.23	0.99	8.78
10.27	2.40	15.93
14.94	4.81	21.88
20.35	7.80	28.34
26.25	13.01	35.10
30.64	16.69	40.01
34.70	19.55	44.41
40.26	22.69	50.28
45.05	27.13	55.14
49.40	29.72	59.39
50.70	30.47	60.64

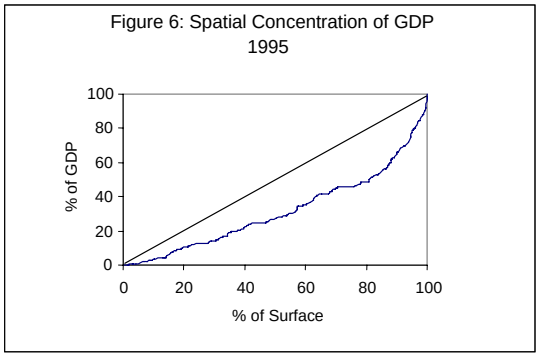
From tables 2 and 3 we can have the following conclusions:
First, the spatial concentration of population and GDP keeps stable at the top of the rank of the richest population for the years 1984 and 1994.
Second, the spatial concentration of population and GDP starts when we reach the band of the 40% of the richest population and it becomes clearer in the band of 50% (approximately half of the population took up 6.22% less space in 1994 than in 1984 thus augmenting population concentration.
The identification of the regions that correspond to each of the population bands up allow us to see a stable structure for the regions in which the income levels are highest. Out of the 14 regions which in 1984 represented 15% of the richest European population, in 1994, 11 of these regions remain the same. This coincidence becomes more accentuated in those regions that represent 5-10 % and 10-15% of the richest population.
Secondly the Gini indices were calculated for the years 1995 and 1999. In this case the values calculated were based on the new accounting system ESA 95 and, in contrast to the previous evaluation, all the NUTS 2 regions in the EU were used.
The Gini indices were calculated again for the years 1995 and 1999. In this case the values calculated were based on the new accounting system ESA95 and, in contrast to the previous exercise, all NUTS 2 regions in the EU15 were used.

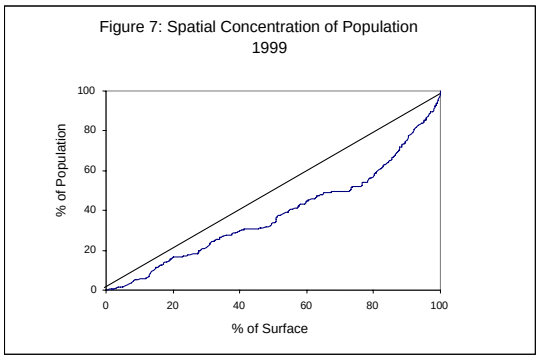
Table 5: Spatial Concentration of Population and GDP (1995 and 1999)

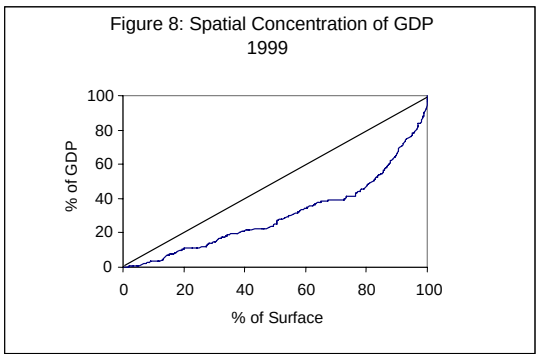
	GDP	Population
1995	0.33	0.19
1999	0.35	0.21

Although the data in the tables 1 and 4 are not strictly comparable, it remains clear that the overriding dynamic of a growing concentration, both in terms of population and GDP, remains the same in the sense that the trend which characterized the years 1984 and 1994 appears to be continuing. Figures 6 to 9 represent the Lorenz curves that correspond to the Gini indices for 1995 and 1999.









Graphically it can be observed that the Lorenz curve is more pronounced in 1999 than in 1995 both with respect to the concentration of population and concentration of GDP a fact that suggest that there is a constant process of spatial concentration of the economic variables being analysed. At the same time the distance to the diagonals is greater in those Lorenz curves that make reference to the concentration of GDP thus ratifying the values calculated for the Gini indices.

Tables 6 and 7 offer a more detailed view of the distribution in percentage form of the population, physical geographical space and GDP for the 50% of the EU population with the highest incomes in the years 1995 and 1999.

Table 6: Spatial Concentration in 1995 (Population-Space-GDP)

% Population	% Surface	% GDP
4.89	0.5	8.62
10.85	2.89	17.04
15.25	5.05	22.73
20.6	7.04	29.32
24.92	9.76	34.43
30.36	12.19	40.47
35.77	15.76	46.21
40.49	**19.18**	**51.08**
45	30.04	55.65
50.237	**37.2**	**60.71**

Table 7: Spatial Concentration in 1999 (Population-Space-GDP)

% Population	% Surface	% GDP
4.49	0.49	7.89
10.23	2.43	16.08
15.06	4.97	22.39
20.83	8.19	29.38
25.69	10.4	35.1
30.19	12.69	40.15
35.08	15.12	45.4
40.53	**19.06**	**51.04**
45.88	23.18	56.42
50.227	**27.2**	**60.98**

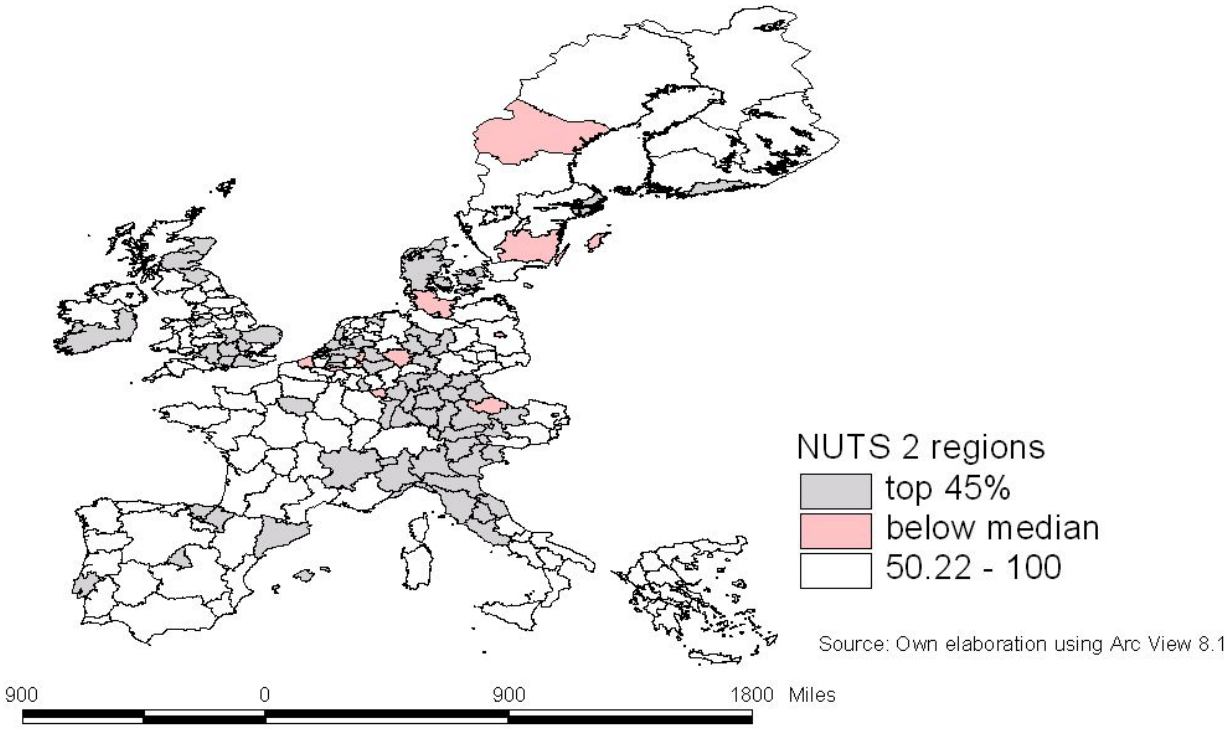
From tables 6 and 7 we can have the following conclusions:

First, the spatial concentration of population and GDP still keeps stable at the top of the rank of the richest population for the years 1995 and 1999.

Second, again, the spatial concentration of population and GDP starts when we reach the band of the 40% of the richest population and has a much stronger impact in the band of the

of 50% (approximately half of the population took up 10% less space in 1995 than in 1999, thus substantially augmenting population concentration and concentrates more GDP than in 1995).
These results allow us to conclude that there is a critical frontier or threshold that is situated at the 45-50% band of the richest population where we see a process of spatial concentration of population and GDP (more in terms of population than GDP).
Again, it can be observed that there is a stable structure in the ranking of the regions that represent 15% of the richest population. Of the 25 regions, which in 1995 made up this 15%, 23 remain in 1999. On looking at the first 5% of the richest population we find that there is absolute coincidence in the regions.
The following map provides a graphic representation of the values given in the tables 6 and 7. The representation is based on the localization of those regions that, taken as a whole, accumulate 45% of the richest population. In the map these regions are drawn as areas in grey. The areas drawn in violet represent the following band of aggregate population that is those regions that do not form part of the top 45% but are in the range 45-50%. The rest of the regions are drawn in white.

Map 1: Spatial Concentration of Population in 1999



4. Conclusions

The results of this paper describe a process in which the European Union population and income is slowly becoming more geographically concentrated. Analysing into detail this concentration pattern we discovered that where the spatial concentration of population and income becomes more remarkable is when we reach the 45-50% population band of the richest population. On the other hand, our results also show a high level of stability over time with respect to the proportion of the population that is below this threshold.

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