The influence of regional autonomist government on the territory environmental and economic performances

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Abstract

In the last decade there's been a growing interest in the Regions with special autonomy, in particular from a political point of view, and less from a scientific one.

In Italy, some Regions were given special autonomy after the coming into force of the Republican Constitution. In Spain, such regions are called "Comunidades Autònomas". They are similar to the Italian Regions, but with big differences concerning their provisions and power to make decisions.

The few scientific contributions available have analysed these territorial structures mainly from a normative and managerial point of view. Some sporadic attempts at economic analysis have been made, but always from a merely theoretical point of view.

In this context, there seems to be a lot of space for the development of a trend of research aiming at a quantitative analysis of these regions, in comparison with less autonomist areas. Such quantitative investigations on the competitiveness, socio-economic development, quality of life, social welfare, and environmental performance of these areas with special autonomy, are issues still open and not entirely analysed.

As a consequence of this void in the research, the present contribution aims at analysing how much influence the autonomy of a territory can have on the changes in its performances. We've taken into consideration some Italian and Spanish regions (both with special autonomy and not).

In order to attain this objective, we have used those statistical indicators that can synthesise the above mentioned aspects and point out the similarities and dissimilarities among the considered areas between 1995 and 2006. From the methodological point of view, we have used the multi-varied analysis techniques, in order to analyse the territorial homogeneities and heterogeneities, and the parametric and non-parametric tests, to verify whether, some conditions being equal, the autonomist aspect can produce changes in the performances of the analysed territories.

Keywords: regions with special autonomy, classification, graduation, territorial comparisons.

1 Introduction

The competitiveness of an area, its economic, social, and environmental development, its quality of life and welfare, represent the main attractive aspects of a territory.

In this context, it seems possible to assume that more autonomous systems of a territory government, than the standard of the country it belongs to, can create more wealth, more control of the territory, better environmental development, and therefore, better conditions of life.

There are few scientific contributions aiming at verifying such thesis; they are mainly theoretical, not empirical.

As a consequence of this void in the research, the present contribution aims at analysing how much influence can the autonomy of a territory have on the changes in its performances.

In order to attain this objective, we have used those statistical indicators that can synthesise the above mentioned aspects and point out the similarities and dissimilarities among the considered areas between 1995 and 2006. Moreover, the graduation techniques and the non-parametric statistical tests have generated the conclusive analyses of this work.

2 The sources, the data, and the indicators

The starting point of this analysis is the collection of data and the selection of the indicators used. The latter include:

- *Environment*

Public water provided per capita - Rubbish collection per capita - % of rubbish going to final distribution

- *Economic Aggregates*

Gross value added to basic prices per branch - A_B Agriculture, hunting, forestry and fishing - C_E Mining and quarrying, manufacturing and electricity - F Construction - G_H_I Wholesale and retail trade, repair of motor vehicles, motorcycles and personal and household goods; hotels and restaurants; transport, storage and communication - J_K Financial intermediation; real estate, renting and business activities - L_to_P Public administration and defence, compulsory social security - education; health and social work; other community, social and personal service activities; private households with employed persons

- *GDP*

GDP in SPA per inhabitant - Average growth of regional GDP in percentage

- *Family Accounts*

Per capita family income, in PPCS - Family income as percentage of GDP -

- *Employment and Unemployment*

Persons in employment – men (1000)/Male pop. Age 15-64 - Persons in employment – women (1000)/Female pop. Age 15-64 - Persons in employment – full time (1000)/Persons in employment – total - Persons in employment – part time (1000)/Persons in employment – total

- *Unemployment*

Total – Female - <25 years old - Long term unemployment as % of unemployment. - Trend in unemployment rate, average annual increase (%) - Trend for unemployed people, average annual increase (%) - Trend in work-force, average annual increase (%)

- *Population*

Born (°/oo) - Dead (°/oo) - Net migration (°/oo) - Change of population (°/oo) - Density of population - Birth-rate - Death-rate per 1000 inhabitants, 1000 - Population natural increase rate - Young age dependency ratio $(0 – 19)(20 – 59)$ - Old age dependency ratio $(60+)(20 – 59)$

- *Transport*

Railways (km) total/territory - Railways with more than double quantity of lines (km)/tot railways - Railways – electrical lines/tot railways - Motorways (km)/territory - Other roads (Km)/territory - Number of deaths per million of inhabitants

- *Tourism*

Establishments/total establishments - Bedspace/establishments - Arrivals of residents /tot arrivals - Arrivals of non-residents/tot arrivals - Nights spent by residents/tot nights - Nights spent by non-residents/tot nights.

The data used have been taken from the classification of European regional areas NUTS 2 (European Commission Regions, 2003 and 2007 – Atkinson et al. 2001, Guarini 1998). In particular, we will refer to 208 regions of the EU-15 for 1995, and to 343 regions of the EU-27 for 2006, classified on the base of 48 indicators (variables).

The first selection of variables has been determined from the uniformity and completeness of the data matrixes in comparison with the considered variables. Some indicators have been cancelled because of the series incompleteness (75 out of 123). In all, we have created a data base of 208 regions (year 1995) and 343 regions (year 2006) for 48 referred variables expressing environmental, social, and economic development.

The use of such indicators has provided the first information on the environmental, social, and economic development of the analysed territory.

3   The methodology employed

The 208 and 343 regions have been classified through the metric procedure of classification *k-means*. (This procedure allows one to identify groups of relatively homogeneous cases in relation with the selected features, using an algorithm which can handle a great number of cases. Such algorithm needs the number of clusters.) In relation to the 48 indicators (as variables effect) chosen and selected with the principal components method. The cluster analysis allowed us to aggregate the homogeneities of the analysed territories in 5 clusters.

Since the simple aggregation has resulted in a little significant representation, in order to define a list of distances between one territorial unit and the others, it was necessary to build an algorithm GDM (*Graduate Distance from Matrix*). In particular, the procedure adopted to generate a comprehensive measure d_i of the

effect induced by environmental and economic development (where i represents the ith territorial unit), was based on the remodulation of some indicators according to the reciprocal calculus, as to generate a uniform datum reading for all the variables used. Then we standardised the variables in relation to the mean and the mean-square deviation. Moreover, we applied the PLS methods to the initially selected variables, in order to generate the loadings p_j which have been used in the composition of the final indicator for each jth variable.

The indicator we built is given by

$$d_i = \sqrt{\sum_{i=1}^{n}\sum_{j=1}^{m}(x_{ij} - \min_j)^2 p_j}$$

where x_i represents the standardised values in comparison with the jth variable in relation to the jth territorial unit, while min_j represents the minimum value of the distribution associated to the jth variable.

The use of such indicator has allowed us to provide an assessment of the degree of environmental and economic development. Through d_i we could generate a comprehensive classification of the 208 (1995) and 343 (2006) regional areas of European countries. Being the mere reading of the list quite simplistic in comparison with the initial objectives, we tried to represent the 5 clusters of the European regions according to the estimated level of the environmental and economic development. Assuming a scale of development degree divided into 5 classes (low, medium-low, medium, medium-high, high), we built a graphic representation of the quantities on the base of the following function:

$$\beta = d_{i*}\, \sigma_k$$

where β represents the distance from the centre (point of minimum estimated economic and environmental development), d_i an increasing measure in comparison with the level of the environmental and economic development in the ith region, and σ_k an also increasing scale factor, while the angular coefficients have been considered uniform. The scale factor σ_k represents the mean-square deviations between the territorial units of d_i in comparison with the mean M_{dk} :

$$\sigma_k = \sqrt{\frac{1}{k}\sum_{i=1}^{k}\left(d_i - M_{dk}\right)^2}$$

where M_{dk} represents the arithmetic mean of the levels d_i for each $i=1...n$ and $k=2...n-1$. By using such criterion, it was possible to represent the classification of the 208 regional areas on the base of the environmental and economic development, estimated d_i within each class of level, which could extrapolate the closest distances in comparison with the furthest, starting from the matrix of distances and similarities. In this way, it was possible to build a mapping of distances, and to verify how far is an ith region from the nth, pointing out the position of areas with special autonomy in such context (*see fig. 1 and 2*).
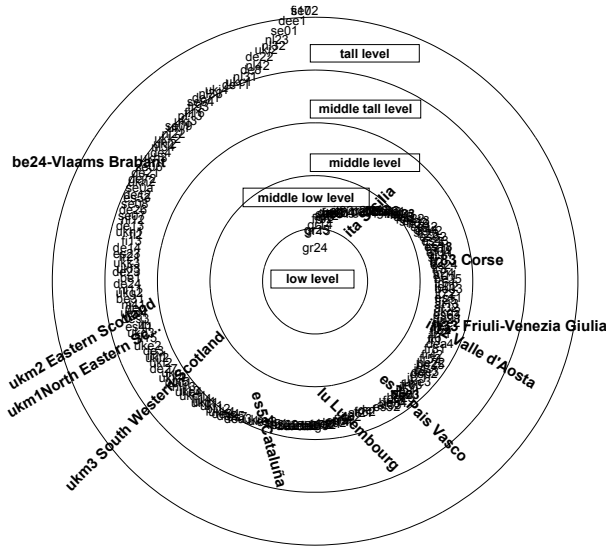
Figure 1:   Classification of the 208 regions EU-15 (year 1995) per levels of environmental and economic development.
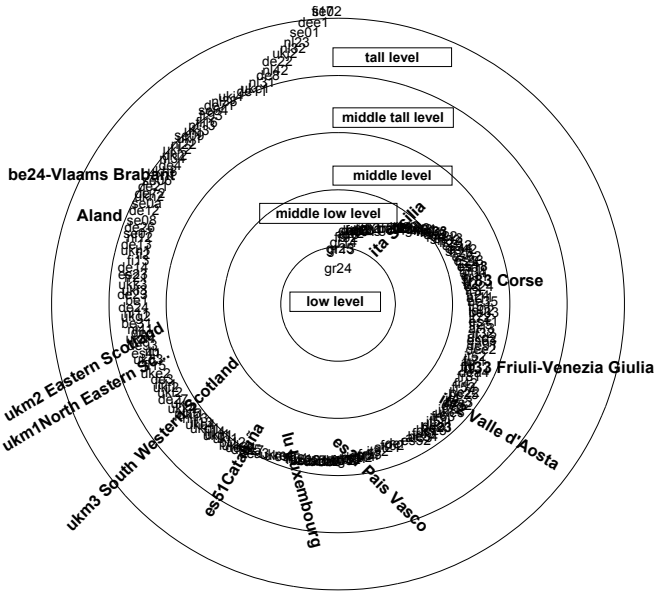

Figure 2:   Classification of the 343 regions EU-27 (year 2006) per levels of environmental and economic development.

In this way, it was possible to point out the levels of the considered development in single autonomous regions, and their distance from the minimum and maximum estimated level.

4 The results

Through the analyses carried out, it was possible for us to define the measure of the environmental and economic development. In particular, through the methodologies of classification we generated 5 groups which provided a comprehensive picture of the similarities and dissimilarities among the regions in relation to the economic and environmental indicators considered (*see tab. 1*).

In this way, it was possible to define the positioning of the regions with special autonomy in comparison to the other regions of the European countries within each cluster.

The analysis we adopted and the particular graphic representation allowed a better reading of the state of economic and environmental development of the analysed regions, with particular attention to the positioning of those with special autonomy and to the change which took place between 1995 and 2006 (*see fig. 1 and 2*).

By comparing the regions with special autonomy to other regions with similar numerousness of population, it was possible to point out that between 1995 and 2006 the most significant changes were recorded in the first ones. The application of the Wilcoxon test has established the statistical significance of such differences (*see tab. 2*).

On the base of such considerations, it is possible to confirm that autonomous regions make more significant performances of development than non-autonomous regions, structural conditions being equal. However, in certain cases (like in Sicily or Corse) this doesn't happen. But this result also depends on the national context they belong to.

5 Conclusions

With relation to the analyses carried out, it is possible to confirm the assumption that, in the presence of regions with special autonomy, the performances of development present significant indexes of change, both in time and in comparison with regional areas with similar structural features (population). We proved that belonging to a cluster is not representative of the region performances classification with relation to its government. Instead, we found that comparisons in the two lists are significant (most of the autonomous regions present quite good positioning), particularly those comparisons between couples of regions with similar features but with kinds of government and indicators of development that are, in some cases, very different.

The possibility to interpret this phenomenon and the simple reading of the results are encouraging to carry out other studies, hoping that the matrixes of the data and the indicators will be complete.

Table 1:   Results of the cluster analysis and regions with special autonomy in bold.

Cluster 1
fr91 Guadeloupe (FR) - fr92 Martinique (FR) - fr93 French Guiana (FR)- ie01 Border, Midlands and Western - fr94 Reunion (FR)

Cluster 2
be25 West-Vlaanderen - be31 Brabant Wallon - be32 Hainaut - be33 Liège - deb1 Koblenz - dee3 Magdeburg - def Schleswig-Holstein - deg Thüringen - es22 Comunidad Foral de Navarra - es23 La Rioja - es24 Aragón - es3 Comunidad de Madrid - fr63 Limousin - fr72 Auvergne - it11 Piemonte - nl11 Groningen - fi16 Uusimaa (suuralue) - fi2 Åland - se01 Stockholm - ukc2 Northumberland, Tyne and Wear - ukj2 Surrey, East and West Sussex - ukj3 Hampshire and Isle of Wight - ukj4 Kent - ukk1 Gloucestershire, Wiltshire and North Somerset - de14 Tübingen - de21 Oberbayern - de72 Gießen - de73 Kassel - gr22 Ionia Nisia - gr23 Dytiki Ellada - gr24 Sterea Ellada - gr25 Peloponnisos - es53 Illes Balears - es61 Andalucia - es62 Murcia - es63 Ceuta y Melilla (ES) - nl31 Utrecht - nl32 Noord-Holland - nl33 Zuid-Holland - nl34 Zeeland - uke2 North Yorkshire - uke4 West Yorkshire - ukf1 Derbyshire and Nottinghamshire - ukf2 Leicestershire, Rutland and Northants - **ukm1 North Eastern Scotland - ukm2 Eastern Scotland - km3 South Western Scotland** - ukm4 Highlands and Islands - fr53 Poitou-Charentes - fr62 Midi-Pyrénées - fi14 Väli-Suomi - fi15 Pohjois-Suomi - be35 Namur - de11 Stuttgart - de12 Karlsruhe - de13 Freiburg - gr12 Kentriki Makedonia - gr13 Dytiki Makedonia - gr14 Thessalia - gr21 Ipeiros - es42 Castilla-la Mancha - es43 Extremadura - **es51 Cataluña** - es52 Comunidad Valenciana - nl13 Drenthe - nl21 Overijssel - nl22 Flevoland - gel Gelderland - nl23 Flevoland - ukk3 Cornwall and Isles of Scilly - ukk4 Devon - ukl1 West Wales and The Valleys - ukl2 East Wales - de94 Weser-Ems - dea1 Düsseldorf - dea2 Köln - dea3 Münster - gr41 Voreio Ai gaio - gr42 Notio Ai gaio - gr43 Kriti - es11 Galicia - es12 Principado de Asturias - es13 Cantabria - ukg3 West Midlands - uke1 East Riding and North Lincolnshire - ukh3 Essex - ukj1 Berkshire, Bucks and Oxfordshire - fi13 Itä-Suomi - ukh1 East Anglia - ukd4 Lancashire - ukd5 Merseyside - fr51 Pays de la Loire - fr52 Bretagne - be34 Luxembourg (B) - gr11 Anatoliki Makedonia, Thraki - es41 Castilla y León - fi12 Friesland - ukd1 Cumbria - ukk2 Dorset and Somerset - de8 Mecklenburg-Vorpommern - gr3 Attiki - es7 Canarias (ES) - nl41 Noord-Brabant - ukf3 Lincolnshire - ukn Northern Ireland - ukh2 Bedfordshire, Hertfordshire - ukd3 Greater Manchester - fr1 Île de France - pt12 Centro (PT) - ukg1 Herefordshire, Worcestershire and Warks - dea5 Arnsberg - fr21 Champagne-Ardenne - pt13 Lisboa e Vale do Tejo - ukg2 Shropshire and Staffordshire - **es21 Pais Vasco** - pt14 Alentejo - **be24 Vlaams Brabant - it12 Valle d'Aosta - - it33 Friuli-Venezia Giulia**

Cluster 3
at21 Kärnten - at22 Steiermark - at31 Oberösterreich - at33 Tirol - uke3 South Yorkshire - uki1 Inner London - uki2 Outer London - at32 Salzburg - ie02 Southern and Eastern - at11 Burgenland - at12 Niederösterreich - at13 Vienna - at34 Vorarlberg - pt2 Açores (PT) - pt3 Madeira (PT) - ukd2 Cheshire

Cluster 4
be21 Antwerpen - be22 Limburg (B) - be23 Oost-Vlaanderen - - fr24 Centre - fr25 Basse-Normandie - fr26 Bourgogne - fr3 Nord - Pas-de-Calais - it52 Umbria - it53 Marche - it6 Lazio - it71 Abruzzo - de3 Berlin - de4 Brandenburg - de5 Bremen - de6 Hamburg - fr81 Languedoc-Roussillon - fr82 Provence-Alpes-Côte d'Azur - **fr83 Corse - - ita Sicilia** - itb Sardegna - lu Luxembourg - pt11 Norte - de23 Oberpfalz - de24 Oberfranken - de25 Mittelfranken - de26 Unterfranken - fr41 Lorraine - fr42 Alsace - fr43 Franche-Comté - fr61 Aquitaine - it72 Molise - it8 Campania - it91 Puglia - it92 Basilicata - de71 Darmstadt - de91 Braunschweig - de92 Hannover - de93 Lüneburg - it13 Liguria - it2 Lombardia - it31 Trentino-Alto Adige - it32 Veneto - pt15 Algarve - fr23 Haute-Normandie - it4 Emilia-Romagna - it51 Toscana - de27 Schwaben - fr71 Rhône-Alpes - it93 Calabria - fr22 Picardie

Cluster 5
de22 Niederbayern - dea4 Detmold - deb2 Trier - deb3 Rheinhessen-Pfalz - nl42 Limburg (NL) - fi17 Etelä-Suomi - se02 Östra Mellansverige - se04 Sydsverige - ded1 Chemnitz - ded2 Dresden - ded3 Leipzig - dee1 Dessau - se07 Mellersta Norrland - se08 Övre Norrland - se09 Småland med öarna - se0a Västsverige - dec Saarland - se06 Norra Mellansverige - dee2 Halle - ukc1 Tees Valley and Durham

Table 2:   Results of p-value with the Wilcoxon Test on the delta 1995-2006 among regions with similar numerousness of population in relation to the environmental and economic variables - *non-significant test for p value > 0,05.

	Transport	Tourism	Environment	Economic aggregates
Prov. Vlaams Brabant **Prov. Liège**	0,023	0,0012	0,012	0,027
Pais Vasco **Castilla y León**	0,03	0,005	0,034	0,049
Cataluña **Andalucia**	0,076	0,041	0,023	0,038
Corse **Martinique (FR)**	0,89*	0,0034	0,54*	0,555*
Valle d'Aosta **Molise**	0,02	0,004	0,0005	0,005
Friuli-Venezia Giulia **Abruzzo**	0,031	0,005	0,05	0,0075
Sicily **Lazio**	0,78*	0,745*	0,56*	0,575*
Malta **Luxembourg (Grand-Duché)**	0,026	0,0042	0,015	0,03
Åland **Pohjois-Suomi**	0,0056	0,021	0,034	0,049
North Eastern Scotland **Lincolnshire**	0,045	0,01	0,023	0,038
Eastern Scotland **West Wales and The Valleys**	0,048	0,013	0,034	0,049
South Western Scotland **Gloucestershire, Wiltshire and N.S.**	0,0057	0,022	0,033	0,048
	GDP	Family accounts	Employment	Unemployment
Prov. Vlaams Brabant **Prov. Liège**	0,022	0,017	0,012	0,007
Pais Vasco **Castilla y León**	0,044	0,039	0,034	0,029
Cataluña **Andalucia**	0,033	0,028	0,023	0,018
Corse **Martinique (FR)**	0,55*	0,545*	0,54*	0,535*
Valle d'Aosta **Molise**	0,01	0,005	0,50*	0,495*
Friuli-Venezia Giulia **Abruzzo**	0,007	0,065	0,06	0,055
Sicily **Lazio**	0,587	0,567	0,456	0,235
Malta **Luxembourg (Grand-Duché)**	0,025	0,02	0,015	0,01
Åland **Pohjois-Suomi**	0,044	0,039	0,034	0,029
North Eastern Scotland **Lincolnshire**	0,033	0,028	0,023	0,018
Eastern Scotland **West Wales and The Valleys**	0,044	0,039	0,034	0,029
South Western Scotland **Gloucestershire, Wiltshire and North Somerset**	0,043	0,038	0,033	0,028

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