Cuadrado-Roura, Juan R.; Garrido-Yserte, Rubén; Marcos-Calvo, Miguel Ángel

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DRAFT VERSION

Economic and Social Cohesion in the EU: a critical approach

Universidad de Alcalá

Universidad Rey Juan Carlos

Juan Ramón Cuadrado-Roura[1]
Universidad de Alcalá
jr.cuadrado@uah.es
Rubén Garrido-Yserte
Universidad de Alcalá
ruben.garrido@uah.es
Miguel Ángel Marcos Calvo
Universidad Rey Juan Carlos
marcos@fcjs.urjc.es

Abstract:

Economic and Social Cohesion is one of the principal aims of European Union according to the Treaty. Although it has a clear and rather well defined political dimension, there is not a unique definition that permit a technical definition. ¿An increasing of Economic and Social Cohesion has been observed in recent decades? ¿How could it be measured?. To answer these two questions it is necessary to define, first, what is the acceptable degree of regional inequalities and, second, which could be the variables or indexes to measure it properly (no only GDP per inhabitant).

The aim of this paper is to propose new answers to the problem, using REGIO data base and applying multicriteria methods. We have investigated a new empirical approach to the European Cohesion and we have also calculated the accomplishment of a higher Economic and Social Cohesion between the European regions. The period analysed is 1987-1999 and the results are rather shocking and suggestive, particularly compared to the ones arising from the most conventional analysis on the evolution of GDP per capita.

Key words: Social and Economic Cohesion; Regional Convergence; EU Regional Policy, multicriteria methods.

[1] Corresponding author: Facultad de CC. EE. – Plaza de la Victoria 2 – 28802 –Alcalá de Henares- Madrid – Spain - FAX: 918854219

1.- Introduction

Article 2 of the present Treaty of the EU includes economic and social cohesion and solidarity of the Member States among the most important objectives of the Community. The recently revised text states that the Community must act "to promote overall harmonious development", with the particular aim of "reducing disparities between the levels of development of the various regions and the backwardness of the least favoured regions or islands, including rural areas" (Article 158)

The recent culmination of a process such as that of the European Monetary Union, the latest milestone of European construction, together with the important challenges of the inclusion of East European countries, make the uncertainties about the necessity to continue with the effort of cohesion in the area of the enlarged European Union, particularly in those regions at present included in Objective 1, a more important matter for discussion than ever before.

The need to reform the Regional Policy in the light of this new scene of greater necessities makes the undertaking of a technical exercise, one which will admit elements of political reflection, advisable, in order to be able to evaluate, above all, two questions:

1.-Is the degree of economic and social cohesion in the European Union really being adequately evaluated?
2.-Once this has been answered, are the existing criteria for eligibility sufficient for determining the most needy regions?

The aim of this paper is not to give definitive answers to these two questions, only to offer some theoretical reflections and, above all, show the utility of the technique of multi-criteria decision for responding to the first of these. It is evident that to respond adequately to this question would require a precise and operative definition of Economic and Social Cohesion and this is the aim of the paper.

The paper is set out as follows. The second section poses the necessity to widen the evaluation of the concept of economic and social cohesion beyond that of mere economic convergence. The fourth and fifth sections present the principal results obtained from a study of the evolution of economic and social cohesion in a broad sense and of a more operative evaluation of this concept. Finally, the sixth, highlights the principal conclusions.

2.- From Economic Convergence to Economic and Social Cohesion

The importance of cohesion, and the key role to be played by regional policy in achieving it, is a result "of the quickening pace of integration. The Single European Market legislation introduced during 1989-92, its extension to some EFTA countries…, the prospect of the European Monetary Union in the years ahead and the likelihood of a wave of new entrants in the 1990s, have all combined to raise concern on the issue of cohesion" (Armstrong, Taylor and Williams, 1994).

To improve cohesion constitutes, without doubt, an intention of a political nature whose operative definition is not easy. The Reports on Economic and Social Cohesion published by the European Commission so far[2] make a better understanding of the different dimensions of this concept possible. Nevertheless, when the evolution of the European regions is analyzed "cohesion" is generally identified with the idea of ***convergence in income or GDP p.c***. In fact, the majority of analyses of regional disparities in Europe – as in other cases- refer to ***convergence*** taking as an indicator the evolution of this variable and, sometimes, that of productivity and employment, but not other variables which are, without doubt, indicative of the degree of development of a region or a country.

This approach shows the evolution of the processes of economic convergence or divergence in a relatively simple form, using well known models and techniques[3]. But it is evident that the use of the GDP pc. simplifies the analysis of convergence, because

[2] The First one in 1996; the Second in 2001 and the Third in February 2004.

[3] The concepts of 'sigma' and 'beta' convergence – conditioned or not-conditioned - are well known, as is the use of certain techniques to estimate these measures of convergence See interalia: Barro and Sala-i-Martin (1991), Cuadrado-Roura, Mancha and Garrido (1998 and 2000), Dewhurst and Mutis-Gaitan (1995), Dunford (1994), Molle and Boeckhout (1995), Neven and Gouyette (1994), Quah , (1995), Rodriguez-Pose, 1999.

implicitly it is assumed that if this variable tends to approximate two or more regions, their standards of living and welfare do also. At least, it is considered that 'convergence' of output per capita is representative of the overall performance of the regions, although it may well be that although convergence of GDP p.c. may arise in a specific period, other variables may indicate that there is no such regional convergence or that there is even divergence. In fact, the concept of 'economic and social cohesion', although not well defined in the texts previously cited, points to a *much wider vision* of the evolution of the *disparities among regions.*

Table 1 shows some correlation among GPD pc and some socio-economic variables. The disparity existing among the correlations serves to illustrate how the use of GDP pc as a "summary" indicator of all the economic and social aspects of a region does not offer a good snapshot of this.

It is evident that the correlation between the GDPpc levels and productivity must be high, although there are other relatively worrying values that show a negative relation between this variable and employment. The regions with a low GDPpc have a low rate of employment, especially female, high rates of unemployment and a sectorial structure more linked to primary activities. This scheme, characteristic of regions with low economic development levels, will not necessarily be corrected with time. In fact, some of our research shows quite clearly how the scheme of structural change of the European regions can be explained according to a model of *dual*[4] growth, where the advances in income per habitant do not correspond with significant improvements in participation in the labour market, unemployment or specialization in advanced productive activities

On the other hand, some social indicators do not show a high correlation with GDP pc either which implies that a high GDPpc or growth cannot therefore be considered synonymous to improvements in social allocations, indicating that economic convergence, if it arises, does not necessarily translate into greater economic and social cohesion.

[4] See Paci and Pigliaru (1997) for European Regions and Garrido (2002) for Spanish evidence.

Table 1. GDP per inhabitant and some socio-economic variables: a correlation

		GDP per cápita (PPS)
		Coef. of Correlation 1999
Productive Structure	Productivity	0,872
	Cost per worker	0,778
	Rate of male activity	0,272
	Rate of female activity	0,219
	Rate of female activity between 25 and 44	0,193
Labour market and unemployment	Participation of part time workers in male employment	0,131
	Participation of part time work in female employment	0,184
	Employment in Agriculture over total employment	-0,552
	Employment in Industry over total employment	-0,123
	Employment in Services over total employment	0,458
	Rate of occupation (Active /Inactive)	0,442
	Rate of male unemployment	-0,366
	Rate of female unemployment	-0,492
	Rate of young unemployment	-0,402
	Percentage of long term unemployment	-0,059
New technologies and I+D	Proportion of employment in high technology sector over total employment	0,412
	Number of patents registered per million inhabitants	0,490
	Participation in expense of I+D in the GDP	0,323
	Expense in I+D for institutional sectors: Business	0,301
	Expense in I+D for institutional sectors: Government	0,126
	Expense in I+D for institutional sectors: UNIVERSITY	0,044
Infrastructure and equipment	Kilometres of motorway or dual carriage way per1000 km2 of surface	0,558
	Hospital beds per 1000 inhabitants (year 1997)	0,206
Others	Consumption of industrial power(year 1997)	0,210
	Consumption of electric power in services (year 1997)	0,115
	Level of studies(higher)-(year 1997)	0,371
	Level of studies(higher)- (year 1997)	0,231

Source: The author from the chapter Regio Newcronos de Eurostat data base..

To summarise, from the political point of view, it is evident that the concept of economic and social cohesion between regions is nearer to the idea of reaching an approximate level (admissible inequality) of well being among all the regions than that of convergence in GDPpc levels. It would be necessary to consider purely economic indicators as social indicators (Labour market, education, health, etc). In addition, it does not seem logical to judge the regional success by one single indicator and simultaneously demand the compliance of employment obligations derived from the Lisbon summit or the improvement of equality of opportunity, when the reality shows that the achievements can be contradictory.

The first solution could lie in the elaboration of a synthetic indicator. In this option however, apart from the need to count on informative variables and determine their

importance (weight) in the final results, effects of compensation arise in the determination of the index which could translate into some excellent results in one variable hiding serious problems in other areas.

Additionally, the use of a single indicator to measure such a complex concept poses specific problems. It is an indicator that is used not only as a measurement of regional success but also as the criteria of eligibility for the European Regional Policy. This fact means that it can be affected significantly by extreme values (statistic effect for the addition of the new members).

All these elements justify the interest of the methodology proposed in the following pages. Firstly, as an analytical and theoretical exercise, the use of a technique to order and classify the European regions considered *as a whole* and *simultaneously* in a high number of socio-economic characteristics is proposed. Also, it does not permit compensation between bad and good results to arise in the allocation of socio-economic factors in one region when constructing a ranking. This allows the classification of a region in a more stable position in relation to the rest of the regions (defining bands of inequality less affected by the incorporation of extreme values) and where improvement is only considered when it takes place in all the variables.

Secondly, from the more operative and political point of view a technical application is also proposed for defining the new criteria of eligibility for the regions of cohesion.

3. The regions considered, database and the method: Discrete Criteria Decision ELECTRE methods.

3.1 Regions considered and the database.

Regional disparities in the EU -15 have usually been measured by taking as a reference NUTS 2 regions[5]. However, this division presents some specific problems due to the fact that some "regions" are extremely small. To reach greater homogeneity and as done in other already mentioned works (footnote n.5) some adjustments have been made in the cases of The Netherlands, UK and Greece, where it was considered advisable to take the NUTS 1 regions as reference, as they have a similar extension and population as the NUTS 2 of other countries. On the other hand, Ireland, Denmark and Luxembourg have been considered in each case as a single region, as it is at present accepted in many of the European Commission reports. Finally, some clearly atypical regions have not been included in the analysis as difficulties would arise for the interpretation of an analysis of the type we wish to undertake. This is the case of the French overseas territories, the Portuguese archipelagos of Azores and Madeira and the Spanish cities of Ceuta and Melilla[6].

Consequently, in our analysis we have worked with a division of the EU into 128 regions, whose names and countries are shown in the annex (Table A-1).

Regarding the data-base, we have used the only one available which offers a wide range of indicators produced by Eurostat, within the base REGIO, Newcronos. Specifically, with this it is possible to start from 63 different variables, the details of which are shown in the annex (Table A-2). The data we have taken into account cover the period 1987-1999/2000 and include aspects of demography, economy, employment and unemployment, R+D, transport, energy, life conditions, education and tourism.

[5] This refers to be average level of NUTS, a dimension that in most of the cases is equivalent to the real "regional" political and administrative division of each country. NUTS is the French acronym of "Nomenclature of Territorial Units for Statistics".
[6] Located in the North African coast.

Logically, in order to reach the objective which we have set ourselves it is necessary to handle *simultaneously* a set of variables and to interpret the results *jointly*. In order to facilitate both tasks the grouping of variables is a common practice for extracting the essential information. In other words, the usual practice is to calculate the minimum number of factors (groups of observable variables) to explain the greatest quantity of variability; in this case the differences existing among regions. Therefore, we start with the 63 available variables and by applying the Analysis of Principal Components we manage to synthesize 11 factors which cover at least 80% of the differences among the EU-15 regions. These factors, ordered according to importance[7], have been interpreted as follows: Ageing of the population (which explains 22.4% of the variability) Labour market (13.6%), Regional Dynamics (10.24%), Competitiveness (7.94%), Basic Factors of Development (5.88%), Residential and economic attraction (5.59%), Public R+D (4.3%), Development potential (4.02%), Education (3.49%), Degree of Urbanization (3.05%), Tourism Pressure on resident population (2.44%).(See Table 3-A in the annex).

A final observation: as the series has some missing values in certain cases, we have had to make some interventions and adjustments. These interventions were obligated on the basis of the requirements of the analytical technique to be used in our analysis, as it was necessary to have information of all the variables and for all the regions in order to be able to carry out the multidimensional analysis. In all cases we have tried to make the interventions as simple and reasonable as possible, so as to affect the analysis as little as possible and to make them consistent both from the horizontal (temporal) and transversal point of view. Specifically, to complete the lack of some values the technique of interpolation has been used. When some data were not available at the regional level chosen (NUTS 2) the decision taken was to assign them a higher regional level (NUTS 1); and when, in exceptional cases, this was not possible, the data were supplied by the corresponding value at national scale.

[7] Percentage of variability among regions explained for each one.

3.1 The method chosen using the discrete Multi_Criteria Decision ELECTRE methods

The decision to adopt the multidimensional approach (11 factors that summarize the regional socio-economic characteristics), requires the application of multi-variant techniques. Among these we have chosen to transfer two methods pertaining to the Discrete Multi-Criteria Decision to the regional analysis. On the one hand, the justification for this is that they permit an important flexibility in the characteristics of the incoming information[8] and, on the other, they reach the results of classification and ranking (in our case of the regions) considering all the factors *simultaneously*.

With these techniques, we attempt to study in detail the results produced by the exclusive use of GDP p.c. and that of a ranking and classification of economic and social factors simultaneously. Multi-criteria Decision seeks to provide methods that permit a satisfactory solution of problems of decision in which different and often possibly contradictory perspectives have to be taken into account. The satisfactory solution does not necessarily have to be the best from all points of view. This approach is seen as relevant to the problem at issue in as much as the *multidimensionality* of 'economic and social cohesion' is converted into significant advances in some areas (e.g. production level) but with possible reverses in other fields which are equally interesting (employment, infrastructure, health, education among others).

At the end of the 60s, B. Roy (1968) began to develop in France the Electre methods belonging to the so-called "Multi-Criteria Aid Decision"[9], forming part of the theory of discrete multi-criteria decision. His proposals have generated a theory based on binary relations called "outranking relations" and on the concepts of "concordance" and "discordance" with a hypothesis of given outranking relation.

Specifically, transferring these ideas to the regional field we can say that a region "a" outranks another region "b" if *a* is at least as good as *b* with respect to most of the

[8] It is possible to combine both qualitative and quantitative information.
[9] An alternative to this approach, is that proposed by Thomas Saaty from the American school (1977) known as Analytical Hierarchy Process (AHP) .

socio-economic factors, without being clearly much worse with respect to the other socio-economic factors. Therefore, the outranking is constructed from a condition of concordance, which obliges the region to present a good provision in a large number of socio-economic factors that outrank; and, on the other hand, a condition of non-discordance, that requires the non-existence of too strong a pressure in favour of inverse outranking, in some of the socio-economic factors of the remaining minority. These *outrankings do not concern more than two regions at a time,* so it is necessary to repeat the process with all the possible ranked pairs of the total group of regions.

It must also be pointed out that the Electre methods are called non-compensatory methods, that is to say, bad evaluations of a socio-economic factor cannot be compensated for by good evaluations of another socio-economic factor. For this reason, a well situated region, both in ranking and in classification, is a region that is better in the majority of the socio-economic factors than the rest. Among the different Electre methods[11] designed to respond to concrete problems[12], we have selected those called Electre TRI and Electre III, given that they permit us to answer the questions proposed in this paper on the classification of regions in levels of socio-economic development and the elaboration of a multidimensional ranking.

From the point of view of regional analysis certain points can be highlighted concerning the use of these methods. Regarding Electre TRI, it provides us with a classification of the regions by groups of reference that we can consider as hypothetical regions[13] (levels of socio-economic development), in such a way that the profiles are totally

[11] Electre 1 in Roy, B (1968),Electre II in Roy, B and Bertier P.(1971); Electre III in Roy, B. (1978);
Electre IV in Roy, B and Hugonnard, J.C. (1982); Electre IS in Roy,B. and Skalka,J.M. (1985) and Electre TRI in Yu, W (1992).

[12] The problem of *election* (α)of a single "better" alternative. That of *classification* (β) of the alternatives in categories. That of *ranking* (γ), of the alternatives or part of them. Finally, that of *description (δ)* of the alternatives and their consequences.

[13] The following requirements must be respected;
- No region can be indifferent to more then one profile of reference (region of reference).
-Every region must be attributed to one and only one category. Hypothesis of uniqueness.
-The assignation of a region does not depend on the attribution of the other regions. Hypothesis of independence.
- The assignment of a region to the categories must be in agreement with the conception of the profiles. Hypothesis of conformity.
- When two regions are compared in like manner with the profiles of reference they should be assigned to the same category. Homogeneity hypothesis.
- If *a* dominates over *b*, then *a* should be assigned to a higher category or to the same category as *b* .Hypothesis of monotony.
- The regrouping of two neighbouring categories should not modify the assignation of the unaffected regions. Hypothesis of stability.

comparable[14] among each other. In this case, the regions of reference (profiles) have been defined from quartiles of each one of the socio-economic factors already commented on. Also, we must clarify that this method (Electre TRI) offers two possible procedures of assignation namely *optimistic* and *pessimistic,* consisting of comparing each region with the profiles of reference.

Table 2. Procedure of assignment in Electre Tri

Assignment procedure	Pessimistic	Optimistic
Aim	Situate the regions in the lowest possible categories.	Situate the regions in the highest possible categories.
Procedure	Assign a category to a region so that it over-classifies ("at least as good as") the lowest profile of the category	Assign the region to a category so that the highest profile of the category is that preferred by the region
Direction	From top to bottom	From bottom to top

Source: Maystre, L.Y.; Pichet, J.; Simos, J. (1994). "Mèthodes multicritères ELECTRE". Presses Polytechniques et Universitaires Romandes.

The ranking of regional economies is a normal practice in specialized economic analysis as this permits the location of each region in the group as a whole. These rankings are usually elaborated by taking as a base a single variable (GDP p.c., productivity, unemployment…). The inconvenience is that a single variable is responsible for the position in the ranking. So, working with partial indicators also gives partial ranking information. Consequently, the utility of a ranking capable of taking into consideration a high number of variables simultaneously, is clear.

In this paper we have used the Electre III[15] to construct a ranking among regions, employing as ranking criteria all the 11 socio-economic factors synthesized jointly. The ranking obtained represents the behaviour of the regions in all the factors simultaneously. *The final result is a partial pre-ordering of the regions.* That is to say, ranking is obtained by levels from better to worse. The changes of level of a specific region in the ranking in the period analyzed allows us to highlight initially positive behaviour (improve position in the ranking) or negative (in the opposite case).

[14] For any given socio-economic factor, the value of a profile will be lower than the value taken in the higher profile and higher than the value it will take in the lower profile.

[15] This uses the same mathematical base as Electre TRI, e.g. the relations of out-ranking and the indexes of concordance and discordance.

4.-Economic and social cohesion in the wide sense: ElectreIII and Electre TRI results.

Before continuing, it is important to point out that the methodology used does not give a single value over the degree of cohesion nor any value for the region that permits the measurement of the distance between this and the point of cohesion. The technique chosen permits us to work simultaneously with many variables offering results by means of the construction of a ranking for levels and groups and a classification for a hypothetical region of reference.

4.1 Ranking of the regions according to the valuation as a whole of their allocation of socio-economic factors.

Table A3 of the annex shows the detailed results of the ranking carried out with Electre III for the year 1987 and the gains and losses of position of the regions in 1999.

It is necessary to remember that in all the rankings carried out, the regions are classified in groups that cannot be compared; i.e. the regions in any of the levels are neither better nor worse, with respect to their allocation of socio-economic factors, when compared with another of the same level. Thus, it is possible to observe groups of regions with very different socio-economic structures, but which have a joint valuation that is similar in all the factors of socio-economic development.

However, the methodology proposed allows us to show the differences existing between each one of the groups and to offer some explicative elements. For example, the regions in better positions in the ranking present, in general, a greater density of population (economies of town planning) and a notable participation in the labour market. However, this is not true of all. The Tyrol, Uusimaa (SU) or Brandenburg (G) are classified in good positions fundamentally due to a process of sustained growth.

Also, a comparative analysis between the rankings of 1987 and 1999 can be carried out. For example, the Basque country (S) and Trentino-Alto Adige (I) begin a similar socio-

economic level in 1987. However, their evolution in these 12 years has been very different. The first region dropped 17 points in the ranking of 1999, while the second improved by 38. The most notable differences between them to explain this behaviour are; but contrary evolution in the indicative variables of the *Participation in the Labour Market* and in the summary of the levels of *Competitiveness and Education.*

These are only two examples of what can be obtained from this methodology. In synthesis, it is possible to analyse both the position of a region in the ranking and also highlight some explicative factors that justify a significant improvement or worsening of their positions in the time.

If we consider that the GDPpc criteria (75% lower than the community average) is a good indicator for the backward regions, scant differences should be observed between a ranking based on this variable and that obtained with this methodology.

Table 3 shows the results of this comparison. Of the hundred and 28 regions considered, 54 show a contrary dynamic behaviour according to their GDPpc and their socio-economic level of development. 24 regions worsen in socio-economic terms but improve in GDPpc. On the other hand, there are 30 regions that in spite of losing positions in GDPpc, their socio-economic level improves in the ranking constructed.

Table3. *The relation between GDPpc results and socio-economic ranking in number of regions.*

		Gains or losses in the socio-economic ranking by ELECTRE III			
Gain or loss in % of GDP pc	Grupo PIBpc PPS 99	Gains in positions	Equal	Loss of position	General total
Improvement	>125%	3		5	8
	From 100% to 125%	11		5	16
	From 75% to 100%	6		7	13
	< 75%	11		7	18
Worsening	>125%	5	2	4	11
	From 100% to 125%	8		11	19
	From 75% to 100%	16		22	38
	< 75%	1	1	3	5
Total		61	3	64	128

Source: the author

4.2 Classification of the regions by allocation of socio-economic factors: Electre TRI

Taking economic and social cohesion as a basis we can postulate that the degree of disparity between different regions is politically and socially tolerable.

This approximation results in the concept of cohesion among regions based on the *comparison of each region with the groups defined a priori,* i.e. *the regions are not compared among themselves but in relation to a given profile.* In this way, it is possible to judge the region for itself independently from the rest of the regions.

Consequently, this permits the previous definition of what is understood as admissible inequality from the point of view of regional community policy and subsequently classifies the regions according to their degree of deviation with respect to this position. The displacement of a region in the time among different categories points to the evolution in one or other direction of the cohesion as a whole.

In this period, there have been four groups defined a priori which established from three thresholds situated in the percentiles 25,50 and 75 of the socio-economic factors studied. Each one of the regions is placed in only one of the four categories proposed. Category CI is identified by the highest level of socio-economic development and Category C4 corresponds to a lower level of development. The latter is denominated "*cohesion frontier"* and groups together the regions situated in the lowest socio-economic percentiles of development.

The method Electre TRI, applied in this case, permits the determination of the regions included in these predefined categories. Specifically, the assignation of any region is the result of comparing the socio-economic allocations of a region with the characteristics of a hypothetical region (threshold) which defines the limits of the categories.

On the basis of the results, two analyses are possible: the first directed at checking the degree of cohesion among European regions, observing how many regions can be

classified in category 4. The second, is dedicated to the analysis of the possible reasons for which one region has been classified in a category and not in another.

Table 4 synthesises the results obtained. In global terms, it is concluded that in the period 1987 to 1999 European regions have improved their degree of economic and social cohesion. In 1987, there were 54 regions in the lowest category whilst in 1999 there were only 45. It is convenient to point out that these 45 regions did not need to to have figured among the 54 regions of 1987. It is possible that some new regions may have joined the group that have lost position, as a consequence of problems in the Labour market, industrial decline, urbanisation recession etc and others that have improved for these and other reasons.

Table 4.- Electre TRI pessimistic

	Electre TRI for 1999			
Electre TRI for 1987	***Medium-High (C02)***	***Medium-Low(C03)***	***Low(C04)***	***Total***
Medium-High (C02)	12	7	1	20
Medium-Low (C03)	6	32	16	54
Low (C04)	5	21	28	54
Total	23	60	45	128

Source: The author

In this paper we are not going to study the reasons why each one changes its classification as this would require an exhaustive study case by case. It is sufficient to refer to one example. In 1987, the Madrid Community was classified in category 3 but in 1999, the region passed to category 4, due to a series of factors that have worsened in relative terms (basically unemployment), despite its having a very positive evolution in others[10]

This analytical exercise comes up against two relatively important inconveniences:

1-The selection of indicators. A large number of indicators have been used (63) in accordance with the available information, but, from the political point of view this

[10] These results are obtained from the application of a pessimistic criteria in the assignation (see table2).

choice is unviable for taking decisions: high number, reliability, rapid information, for example.

2-These indicators have to be resumed in others (factors) that are difficult to interpret, thus making their application in practical policy more complex.

These criticisms, however, refer mainly to the quality of the available information and to the selection of this rather than in the measurement itself. The method provides a measurement (the band of admissible inequality) which could be more attractive than that used until now.

For all these reasons, in the next section, a more pragmatic application is proposed. Assuming the limitation that the reality of the data poses, we adjust the application of the measure of cohesion to a more restricted concept: the application of the classification system (Electre TRI) using a reduced set of variables that are directly observable.

5.-Economic and Social Cohesion in a restricted sense: a more practical application.

The interest in carrying out the previous analysis of classification on original variables instead of on obtained factors are, rests in their greater and more easily interpretable operative character: able to be used as a complementary eligibility criteria to that of income (GDP) per habitant.

The selection of the variables used is not a random choice but responds to an exercise that indicates which variables best explain the regional differences observed[11]: together with the GDPpc, others linked to employment and unemployment have been selected.

[11] As a previous step to the Electre TRI analysis an Analysis of Principal Components (ACP) has been carried out, in first place in order to summarise the information in a small group of factors, not for use, but in order to rank the importance from greater to lesser (per cent of variance explained) of the factors and to extract the most relevant variable components observed. The results obtained (the results are not shown for lack of space) has enabled us to carry out the Electre TRI analysis using those original variables that are considered most important in the explanation of European regional differences: income per capita and those related to employment and unemployment.

The selection of these variables has two additional advantages:

1.-A good level of knowledge of the data relative to the labour market, the quality of these and their degree of homogeneity at European scale.

2.-The interest in itself for reducing the territorial differences in these spheres, in consonance with the principles of sustainable development and the political agreements derived from the Lisbon summit.

Table 5. A selection of observable variables for classification by Electre TRI

Cod_Var	Name of the variable
EPIBPC	GDP per capita in (PPS)
LTACTM	Rate of male activity
LTACTF	Rate of female activity
PTSAM	Rate of male unemployment
PTSAF	Rate of female unemployment
PTJUVE	Rate of juvenile unemployment
PTLARGA	Percentage of long term unemployment

Source: The author

One of the most important characteristics of the approach used here is the decision of relative importance *a priori* of each one of the variables to form the criteria of classification as a whole.

Table 6 gives some suggestions for the assignation of weightings. Specifically, four alternatives are proposed that allow us to highlight the possibilities offered by the method. From then on, only two of these will be used, number 1 and number 3, in order to analyse first how the method carries out the classification (highlight the eligible regions with the multiple criteria in observable variables) and, secondly study the differences among the classifications when using different structures of weightings (analysis of sensitivity).

Table 6. Examples of possible distributions of weightings of the observable variables in the Electre TRI classification.

Cod_Var	Name of the variable	Proposal l	Proposal 2	Proposal 3	Proposal 4
EPIBPC	GDP per capita in (PPS)	0,4	0,4	0,4	0,4
LTACTM	Rate of masculine activity	0,05	0,1	0,1	0,2
LTACTF	Rate of female activity	0,05	0,1	0,1	0,2
PTSAM	Rate of male unemployment	0,125	0,5	0,1	0,4
PTSAF	Rate of remale unemployment	0,125	0,5	0,1	0,4
PTJUVE	Rate of juvenile unemployment	0,125	0,5	0,1	0,4
PTLARGA	Percentage of long term unemployment	0,125	0,5	0,1	0,4

Note: In the Electre methods the weightings do not have to add up to 1. The significance of the weightings of the criteria can be understood as "number of votes" given in a voting. For this, a second set of weightings had been considered as a combination in which all the variables of rates of activity have the same importance and also the variables of unemployment.
Source: the author.

The classifications obtained by means of the two proposals (1 and 3) differ minimally[12], so attention is only paid to Proposal 1. In addition, between the two procedures (Pessimistic and Optimistic only the optimistic will be observed as according to this, the region is classified in the fourth category because its situation as a whole in income and labour market must be very unequal (inadmissible) to the group of European regions as a whole. Therefore, these regions will form the group of the most needy and backward (regions of cohesion)

In relation to this, the results also permit the establishment of the valuation of how Socio-Economic Cohesion has evolved among the regions of the European Union, using for this a group selected from seven variables that are those which determine the greatest differences and which are directly observable. Specifically, in this, the total number of classified regions in the fourth category increases between 1987 and 1999 concluding that in these variables, a certain worsening of socio-economic cohesion has been produced. This is due, basically, to the bad behaviour of the labour market in some regions of the European Union.

If we consider that these variables are important when evaluating Cohesion, the regions classified in category 4 should therefore be, the regions of cohesion: low level of

[12] This is valued positively. It is possible to speak of strength in the sense that the variations in weightings of the variables do not lead to great changes in the final classification.

economic development together with evident problems of participation in the labour market and in unemployment.

In accordance with our classification there would be a total of 15 regions in the EU -15 that are in a clearly inferior situation to the rest in a group valuation of the seven variables used.

Table 7. Relation between results in GDP pc and the classification for optimistic Electre TRI (Number of regions)

	Electre TRI for 1999 in directly observable variables				
Group GDP PPS 99	*High (C01)*	***Medium-High (C02)***	***Medium-Low(C03)***	***Low(C04)***	***Total***
>125%	19				19
From 100% to 125%	19	16			35
From 75% to 100%	10	15	21	5	51
< 75%	4	4	5	10	23
General total	52	35	26	15	128

Source: the author

From this relatively restricted approach, only 12% of the population of the EU 15 could be considered as a cohesion region (objective1 covers 22% at present). If the most pessimistic alternative is adopted (assigning the worst possible category to a region), the number of cohesion regions rises to 47 and the population covered is higher than 28%.

6.-Final Remarks

The aim of our paper was, as stated in section 2, to demonstrate whether contradictions can really exist between a concept of regional convergence restricted to the evolution of some simple macro economic variables, particularly GDPpc and the much wider concept of "economic and social cohesion" which figures as one of the most important targets to be achieved by the European Union.

Social and Economic Cohesion in the European Union, despite its importance, is a principle whose compliance is difficult to verify due to the lack of precise definition. Part of the analysis has consisted, firstly, in trying to establish an acceptable approximation for the measurement of the aforementioned concept of social and economic cohesion. For this purpose, using the extensive block of available indicators and by means of our methodology, we have shown that it is possible to measure the

improvement or worsening of social and economic cohesion among the regions of the Community because significant advances in some fields are contemplated simultaneously with others where levels of inequality have increased.

Definitively, the sequence of work has been:1-Definition of what we understand as social and economic cohesion among regions; 2-Show that GDPpc is a limited indicator for the analysis of this cohesion; 3-Propose a measurement of social and economic cohesion in a theoretical plane; 4.-Carry out a more practical application with a limited number of variables that are unquestionable from the statistical point of view and which have a clear relevance in the political plane, at the same time as being directly observable.

The results obtained are of dual interest. On the one hand, from a dynamic reading of cohesion it is possible to complement the studies on convergence, as an improvement in cohesion implies an improvement in real convergence, and, on the other hand, the results can serve as a basis for taking decisions on Regional policy, in as much as they can provide additional elements to support the necessity to widen the criteria of eligibility at present existing in Community Regional Policy.

References

Armstrong, H, Taylor, J. and Williams, A. (1994): "Regional Policy"; in: Artis, M.J. and Lee, N.: *The Economics of the European Union*, chapt. 7, Oxford U.Press.

Barro, R.J. and Sala-I-Martin, X. (1991): "Convergence across States and Regions"; *Brookings Papers on Econ. Activity*, 1:107-182

Cuadrado-Roura, J.R., Mancha, T. And Garrido, R. (1998): *Convergencia Regional en España. Hechos, tendencias y perspectivas*. Edit. Argentaria & Visor, Madrid.

---- (2000): "Regional Productivity Patterns in Europe: An Alternative Approach"; *The Annals of Regional Science,* 34, 3: 365-384.

---- (2002): "Regional Dynamics in the European Union: Winners and Losers"; in J.R. Cuadrado-Roura and M.Parellada (eds.): *Regional Convergence in the European Union. Facts, Prospects and Policies*, chapter 2, 23-52, Springer.

De Vicente y Oliva, M. (1999): *Ayuda Multicriterio a la Decisión: Problemática de los Criterios en los Métodos de Sobreclasificación,* Ed.: Dykinson, Madrid.

Dewhurst, J.H.L. and Mutis-Gaitian, H. (1995): "Varying Speeds of Regional GDP per capital convergence in the European Union, 1981-91"; in: H.W.Armstrong and R.W. Vickerman: *Convergence and Divergence among European Regions*, Pion Ltd., London.

Dunford, M. (1994): "Winners and Losers: The New Map of Economic Inequality in the European Union"; in: *European Urban and Regional Studies*, 1, 2: 95-114.

European Commission (1996): *First Report on the Economic and Social Cohesion*; Brussels and Luxemburg.

---- (2001): *Second Report on the Economic and Social Cohesion*. Brussels and Luxemburg.

---- (2003): *Second Intermediate Report on the Economic and Social Cohesion;* COM(2003), 34 final, January.
---- (2004): *A New Partnership for Cohesion. Convergence, Competitiveness, cooperation.* Third report on economic and social cohesion. Brussels and Luxemburg.
Garrido, R. (2002): Cambio estructural y convergencia regional en España. Pirámide. Madrid.
Lootsma ,F.A.(1996). "The Decision Maker and the Analyst in MCDA". Journal of Multicriteria Decision Analysis, Vol. 5, pags. 167-168.
Maystre, L., Pictet,J., Simos,J. (1994). Méthodes Multicritères ELECTRE. Presses Polytechniques et Universitaires Romandes.
Molle, W. and Boeckhout, S. (1995): "Economic Disparity under Conditions of Integration. A Long Term View of the European Case"; *Papers in Regional Science,* 74,2: 105-120.
Mousseau, V. (1992): "Analyse et Classification de la Littérature Traitant de l'Importance Relative des Critères en Aide Multicritère à la Décision". *Cahier du Lamsade* nº 109
Neven, D.J. and Gouyette, C. (1994): "Regional Convergence in the E.C."; *Discussion Papers,* CEPR, London.
Paci, R. y Pigliaru, F. (1997): "Is dualism still a source of convergence in Europe? Working Paper, CRENoS, U. de Cagliari.
Quah, D. (1996): "Empirics for economic growth and convergence"; *European Economic Review*, 40, 1353-1373.
Rodriguez-Pose, A.(1999): "Convergence or divergence? Types of regional responses to socio-economic change in Western Europe"; *Tijdschrift voor Economische en Sociale Geografie*, 90, 4: 363-378.
Roy, B. (1968). "Classement et choix en presence de points de vue multiples". R.I.R.O. 12º année, nº 8, p. 57-75 Roy,B. (1985). *Méthodologie Multicritère d'Aide à la Décision*. Economica. Paris
Roy, B. and Bertier, P. (1971). "La méthode ELECTRE II: une méthode de classement en présence de critères multíples". SEMA (Metra International), Direction scientifique, Nota de travail Nº 142, Paris, p. 25
Roy, B. (1978): "ELECTRE III: un algorithme de classement fondé sur une représentation flone des préférences en présence de critères multiples", Cahiers du CERO, vol. 20, nº 1, p. 3-24.
Roy, B.; Hugonnard, J-C. (1982). "Classement des prolongements de lignes de metro en banliene parisienne (présentation d´une mèthode multicritère originale). Cahiers du CERO, vol. 24, nº 2-3-4, p. 153-171.
Roy, B. and Skalka, J.M. (1985). "ELECTRE IS: aspects methodologiques et guide d´utilisation, université ". Paris-Danphine, Document du LAMSADE, nº 30.
Saaty, T. L.(1988). Some Mathematical Topics in the Analytic Hierarchy Process. Mathematical Models for Decision Support Computer Systems Sciencie, 48, 89-107.
Terrasi, M. (2002): "National and Spatial Factors in EU Regional Convergence"; in J.R.Cuadrado-Roura and M.Parellada: *Regional Convergence in the EuropeanUnion, o.c.,* chapter 9.
Vincke, P.(1992). "Multicriteria Decision-aid". Wiley.
Yu, W. (1992b). "ELECTRE TRI. Aspects mèthodologiques et manuel d`utilisation". Université Paris-Danphine, Document du Lamsade, nº 74, p. 80.

- ANNEXES

Table A-1. Selection of regions (combination of NUTS 2 and NUTS 1)

Austria (at)	at11 Burgenland at12 Niederösterreich at13 Wien at21 Kärnten at22 Steiermark at31 Oberösterreich at32 Salzburg at33 Tirol at34 Vorarlberg
Germany (de)	de1 Baden-Württemberg de2 Bayern de3 Berlin de4 Brandenburg de5 Bremen de6 Hamburg de7 Hessen de8 Mecklenburg-Vorpommern de9 Niedersachsen dea Nordrhein-Westfalen deb Rheinland-Pfalz dec Saarland ded Sachsen dee Sachsen-Anhalt def Schleswig-Holstein deg Thüringen
Italy (it)	it11 Piemonte it12 Valle d'Aosta it13 Liguria it2 Lombardia it31 Trentino-Alto Adige it32 Veneto it33 Friuli-Venezia Giulia it4 Emilia-Romagna it51 Toscana it52 Umbria it53 Marche it6 Lazio it71 Abruzzo it72 Molise it8 Campania it91 Puglia it92 Basilicata it93 Calabria ita Sicilia itb Sardegna
Finland (fi)	fi13 Itä-Suomi fi14 Väli-Suomi fi15 Pohjois-Suomi fi16 Uusimaa (suuralue) fi17 Etelä-Suomi
Sweden (se)	se01 Stockholm se02 Östra Mellansverige se04 Sydsverige se06 Norra Mellansverige se07 Mellersta Norrland se08 Övre Norrland se09 Småland med öarna se0a Västsverige
Holland (nl)	nl1 Noord-Nederland nl2 Oost-Nederland nl3 West-Nederland nl4 Zuid-Nederland
Denmark (dk)	dk Denmark
Ireland (ie)	ie Ireland
Luxembourg (lu)	lu Luxembourg
Spain (es)	es11 Galicia es12 Principado de Asturias es13 Cantabria es21 País Vasco es22 Comunidad Foral de Navarra es23 La Rioja es24 Aragón es3 Comunidad de Madrid es41 Castilla y León es42 Castilla-la Mancha es43 Extremadura es51 Cataluña es52 Comunidad Valenciana es53 Illes Balears es61 Andalucía es62 Murcia es7 Canarias (ES)
France (fr)	fr1 Île de France fr21 Champagne-Ardenne fr22 Picardie fr23 Haute-Normandie fr24 Centre fr25 Basse-Normandie fr26 Bourgogne fr3 Nord - Pas-de-Calais fr41 Lorraine fr42 Alsace fr43 Franche-Comté fr51 Pays de la Loire fr52 Bretagne fr53 Poitou-Charentes fr61 Aquitaine fr62 Midi-Pyrénées fr63 Limousin fr71 Rhône-Alpes fr72 Auvergne fr8 Méditerranée fr81 Languedoc-Roussillon fr82 Provence-Alpes-Côte d'Azur fr83 Corse
United Kingdom (uk)	ukc North East ukd North West (including Merseyside) uke Yorkshire and The Humber ukf East Midlands ukg West Midlands ukh Eastern uki London ukj South East ukk South West ukl Wales ukm Scotland ukn Northern Ireland
Portugal (pt)	pt11 Norte pt12 Centro (P) pt13 Lisboa e Vale do Tejo pt14 Alentejo pt15 Algarve
Belgium (be)	be1 Région Bruxelles-capitale/Brussels hoofdstad gewest be2 Vlaams Gewest be3 Région Wallonne
Greece (gr)	gr1 Voreia Ellada gr2 Kentriki Ellada gr3 Attiki gr4 Nisia Aigaiou, Kriti

Source: EuropeanCommission and own elaboration

Table A-2. Regional variables selected

Variables	
Area of the regions	Employment of Agriculture on total employments
Total Population	Employment of Industry on total employments
Population density	Employment of Services on total employments
Rate of annual variation of the population	Rate of occupation (Occupied/Assets)
Crude birth rate (per 1000 resident persons)	Unemployment rate: MALES (% of active population)
Crude death rate (per 1000 resident persons)	Unemployment rate: FEMALES (% of active population)
Infant mortality rate	Unemployment rate: LESS THAN 25 YEARS (% of active population)
Inhabitants' proportion between 0 and 24 years	Unemployment rate: 25 YEARS AND MORE (% of active population)
Inhabitants' proportion between 25 and 44 years	Proportion of employment in sectors of high technology with regard to the total employment
Inhabitants' proportion between 45 and 64 years	Total number of patent applications per million people in population
Inhabitants' proportion of 65 and more years	R&D expenditure all institutional sectors (Percentage ob GDP)
Men's proportion between 0 and 24 years	R&D expenditure Business enterprise sector (Percentage of GDP)
Men's proportion between 25 and 44 years	R&D expenditure Government sector (Percentage of GDP)
Men's proportion between 45 and 64 years	R&D expenditure Higher education sector (Percentage of GDP)
Men's proportion of 65 and more years	Kilometres of highway and railcar for every 1000 km2 of surface
Women's proportion between 0 and 24 years	Car Private vehicles
Women's proportion between 25 and 44 years	Number of deaths per million private cars
Women's proportion between 45 and 64 years	Electricity consumption by industrial sector (in gigawatt hours)
Women's proportion of 65 and more years	Electricity consumption by services sector (in gigawatt hours)
GDP.- Gross domestic product (Purchasing Power Standard per inhabitant)	Electricity consumption Total (in gigawatt hours)
GDP.- Gross domestic product (Millions of Purchasing Power Parities)	Total number of hospital beds (Thousands of inhabitants/Per 1000 inhabitants)
Rate of annual growth of the GDP (Purchasing Power Standard per inhabitant)	Average number of inhabitants for household
Productivity	Degree of urbanisation for number of households: Densely-populated area (at least 500 inhabitants/Km²)
Compensation of employees	Degree of urbanisation for number of households:Intermediate and Sparsely populated area (less than 499 inhabitants/Km²)
Males Activity rate	Nights spent by residents and non-residents per inhabitat
Females Activity rate	Percentage of students high level on total students: Men (Equal for primary and secondary education)
Females Activity rate between 25 and 35 years	Percentage of students high level on total students: Women (Equal for primary and secondary education)
Participation of the employment part-time in the masculine employment	Percentage of students high level on total students (Equal for primary and secondary education)
Participation of the employment part-time in the feminine employment	

Note: Deflactor: Index of compsumption prices of the European Union, base 1985. (CRENoS - Ricerche Economiche's Center Nord Sur of Cagliari's University)

Tabla A-3. Electre III Rankings				
Ranking 1987				Position changes
Code	Name	1987		(1999-1987)
de6	Hamburg	100		-22
fr1	Île de France	100		-4
de1	Baden-Württemberg	97		-12
fi16	Uusimaa (suuralue)	97		-8
de2	Bayern	94		-1
de7	Essen	94		-1
fr42	Alsace	91		-13
se01	Stockholm	91		-2
ukg	West Midlands	91		-21
at33	Tirol	89		-15
de3	Berlin	89		-15
nl3	West-Nederland	89		11
ukf	East Midlands	89		-15
de4	Brandenburg	86		-34
de9	Niedersachsen	86		-16
dea	Nordrhein-Westfalen	86		-16
deb	Rheinland-Pfalz	86		-5
nl2	Oost-Nederland	86		-5
uki	London	86		3
ded	Sachsen	83		-31
it2	Lombardia	83		2
dee	Sachsen-Anhalt	80		-50
dk	Denmark	80		20
ukd	North West (including Merseyside)	80		-17
de8	Mecklenburg-Vorpommern	77		-51
ukj	South East	77		23
at32	Salzburg	74		-7
de5	Bremen	74		0
ukh	Eastern	74		22
ukm	Scotland	74		-7
at13	Wien	71		10
at34	Vorarlberg	71		-1
be1	Région Bruxelles-capitale/Brussels hoofdstad gewest	71		-27
fi17	Etelä-Suomi	71		-19
fr43	Franche-Comté	71		-8
lu	Luxembourg	71		-4
nl4	Zuid-Nederland	71		18
at31	Oberösterreich	69		-6
fi15	Pohjois-Suomi	69		-39
it32	Veneto	69		9
it6	Lazio	69		12
se08	Övre Norrland	69		-39
uke	Yorkshire and The Humber	69		-21
at22	Steiermark	66		-10
be2	Vlaams Gewest	66		15
fr82	Provence-Alpes-Côte	66		8

	d'Azur			
it11	Piemonte	66		-3
se0a	Västsverige	66		-25
dec	Saarland	63		4
fi14	Väli-Suomi	63		-33
se02	Östra Mellansverige	63		-11
se09	Småland med öarna	63		-15
ukc	North East	63		-26
ukk	South West	63		15
deg	Thüringen	60		-19
fi13	Itä-Suomi	60		-49
fr23	Haute-Normandie	60		7
fr62	Midi-Pyrénées	60		-8
se07	Mellersta Norrland	60		-16
at21	Kärnten	57		2
def	Schleswig-Holstein	57		28
fr41	Lorraine	57		-13
fr52	Bretagne	57		6
it4	Emilia-Romagna	57		24
pt11	Norte	57		6
se04	Sydsverige	57		-5
se06	Norra Mellansverige	57		-27
at12	Niederösterreich	54		5
fr22	Picardie	54		-2
fr81	Languedoc-Roussillon	54		2
nl1	Noord-Nederland	54		-6
es3 (*)	Comunidad de Madrid	51		23
fr24 (*)	Centre	51		23
it12 (*)	Valle d'Aosta	51		23
it51 (*)	Toscana	51		8
fr72	Auvergne	49		18
gr3	Attiki	49		-8
it13	Liguria	49		18
at11	Burgenland	46		-9
fr61	Aquitaine	46		24
es21	Pais Vasco	43		-17
fr26	Bourgogne	43		13
fr3	Nord - Pas-de-Calais	43		1
fr51	Pays de la Loire	43		16
it31	Trentino-Alto Adige	43		38
ukl	Wales	43		-10
ukn	Northern Ireland	43		-2
fr25	Basse-Normandie	40		8
it33	Friuli-Venezia Giulia	40		30
it53	Marche	40		-7
pt12	Centro (P)	40		8
fr71	Rhône-Alpes	37		48
it71	Abruzzo	37		-15
pt13	Lisboa e Vale do Tejo	37		22
es51	Cataluña	34		10
fr21	Champagne-Ardenne	34		22
be3	Région Wallonne	31		2

fr53	Poitou-Charentes	31		25
it52	Umbria	31		17
it8	Campania	31		2
it91	Puglia	31		-9
es22	Comunidad Foral de Navarra	29		8
es23	La Rioja	29		-14
gr1	Voreia Ellada	29		-3
gr4	Nisia Aigaiou, Kriti	29		1
ie	Ireland	29		52
itb	Sardegna	29		-3
es52	Comunidad Valenciana	26		15
it92	Basilicata	26		-19
ita	Sicilia	26		0
es24	Aragón	23		3
es53	Illes Balears	23		40
es7	Canarias (ES)	23		14
es12	Principado de Asturias	20		-16
es13	Cantabria	20		-5
fr63	Limousin	20		24
gr2	Kentriki Ellada	20		21
pt15	Algarbe	20		43
es61	Andalucia	17		9
es62	Murcia	17		-13
es11	Galicia	14		5
it72	Molise	14		-3
it93	Calabria	14		5
es41	Castilla y León	9		6
es42	Castilla-la Mancha	6		5
es43	Extremadura	3		4
pt14	Alentejo	3		8

Nota: Los niveles presentados en este ranking se han obtenido tras homogeneizar las ordenaciones obtenidas mediante Electre III para cada año. El proceso de homogeneización ha sido proporcional, es decir, se ha dividido la posición en la ordenación original entre el total de niveles presentes en la ordenación original.
(*) Forman el grupo de regiones central o medio de la UE (15).
Fuente: Elaboración propia

Table A-4 Electre TRI Classiffication using original variables and differents distributions of weightings: proposal 1 and 3

		Pessimistic						Optimistic					
		Proposal 1			Proposal 3			Proposal 1			Proposal 3		
Code	Name	1987	1993	1999	1987	1993	1999	1987	1993	1999	1987	1993	1999
be1	Région Bruxelles-capitale/Brussels hoofdstad gewest	C3	C3	C4	C3	C3	C4	C1	C1	C1	C1	C1	C1
be2	Vlaams Gewest	C3	C2	C2	C3	C3	C3	C2	C1	C2	C2	C1	C2
be3	Région Wallonne	C4	C3	C4	C4	C3	C4	C3	C3	C4	C3	C3	C4
dk	Denmark	C1	C2	C2	C1	C2	C1	C1	C1	C1	C1	C1	C1
de1	Baden-Württemberg	C1	C1	C2	C1	C1	C2	C1	C1	C1	C1	C1	C1
de2	Bayern	C1	C1	C2	C1	C1	C2	C1	C1	C1	C1	C1	C1
de3	Berlin	C2	C3	C3	C2	C2	C3	C1	C2	C2	C1	C1	C2
de4	Brandenburg	C4	C4	C4	C4	C4	C4	C1	C3	C2	C1	C2	C2
de5	Bremen	C3	C2	C4	C3	C2	C3	C1	C1	C1	C1	C1	C1
de6	Hamburg	C3	C2	C3	C2	C2	C2	C1	C1	C1	C1	C1	C1
de7	Hessen	C1	C1	C2	C2	C1	C2	C1	C1	C1	C1	C1	C1
de8	Mecklenburg-Vorpommern	C4	C4	C4	C4	C4	C4	C2	C3	C2	C1	C2	C2
de9	Niedersachsen	C2	C2	C3	C2	C2	C3	C2	C2	C2	C2	C2	C2
dea	Nordrhein-Westfalen	C2	C2	C3	C2	C2	C3	C1	C1	C1	C1	C1	C1
deb	Rheinland-Pfalz	C2	C2	C2	C2	C2	C2	C1	C1	C1	C1	C1	C2
dec	Saarland	C3	C2	C3	C3	C3	C3	C2	C2	C2	C2	C2	C2
ded	Sachsen	C4	C4	C4	C4	C4	C4	C1	C3	C3	C1	C3	C2
dee	Sachsen-Anhalt	C4	C4	C4	C4	C4	C4	C2	C3	C3	C1	C2	C2
def	Schleswig-Holstein	C2	C2	C2	C2	C2	C2	C2	C1	C2	C2	C1	C2
deg	Thüringen	C4	C4	C4	C4	C4	C4	C1	C3	C2	C1	C2	C2
gr1	Voreia Ellada	C4	C4	C4	C4	C4	C4	C2	C3	C4	C2	C3	C4
gr2	Kentriki Ellada	C4	C4	C4	C4	C4	C4	C2	C3	C4	C2	C3	C4
gr3	Attiki	C4	C4	C4	C4	C4	C4	C2	C3	C4	C4	C3	C4
gr4	Nisia Aigaiou, Kriti	C4	C4	C4	C4	C4	C4	C1	C1	C3	C1	C2	C3
es11	Galicia	C4	C4	C4	C4	C4	C4	C3	C4	C4	C3	C4	C4
es12	Principado de Asturias	C4	C4	C4	C4	C4	C4	C4	C4	C4	C4	C4	C4
es13	Cantabria	C4	C4	C4	C4	C4	C4	C4	C4	C4	C4	C4	C4
es21	Pais Vasco	C4	C4	C4	C4	C4	C3	C3	C2	C2	C3	C2	C2
es22	Comunidad Foral de Navarra	C4	C3	C3	C4	C3	C3	C3	C2	C2	C3	C2	C2
es23	La Rioja	C3	C3	C3	C4	C3	C4	C3	C3	C2	C3	C3	C2
es24	Aragón	C4	C4	C3	C4	C4	C3	C3	C3	C2	C3	C3	C3
es3	Comunidad de Madrid	C4	C4	C3	C4	C4	C3	C3	C2	C1	C3	C2	C1
es41	Castilla y León	C4	C4	C4	C4	C4	C4	C4	C4	C3	C4	C4	C4
es42	Castilla-la Mancha	C4	C4	C4	C4	C4	C4	C4	C4	C3	C4	C4	C3
es43	Extremadura	C4	C4	C4	C4	C4	C4	C4	C4	C4	C4	C4	C4
es51	Cataluña	C4	C4	C3	C4	C4	C3	C3	C2	C2	C3	C2	C2
es52	Comunidad Valenciana	C4	C4	C3	C4	C4	C3	C4	C4	C3	C4	C4	C3
es53	Illes Balears	C4	C4	C2	C4	C4	C2	C2	C2	C2	C2	C2	C2
es61	Andalucia	C4	C4	C4	C4	C4	C4	C4	C4	C4	C4	C4	C4
es62	Murcia	C4	C4	C4	C4	C4	C4	C4	C4	C3	C4	C4	C3
es7	Canarias (ES)	C4	C4	C4	C4	C4	C3	C4	C4	C3	C4	C4	C3
fr1	Île de France	C2	C2	C3	C2	C2	C2	C1	C1	C1	C1	C1	C1
fr21	Champagne-Ardenne	C3	C3	C3	C3	C3	C3	C2	C2	C2	C2	C2	C2
fr22	Picardie	C3	C3	C4	C3	C3	C3	C3	C3	C3	C3	C3	C3

		Pessimistic						Optimistic					
		Proposal 1			Proposal 3			Proposal 1			Proposal 3		
Code	Name	1987	1993	1999	1987	1993	1999	1987	1993	1999	1987	1993	1999
fr23	Haute-Normandie	C3	C3	C3	C3	C3	C3	C1	C1	C2	C1	C1	C2
fr24	Centre	C3	C3	C3	C3	C3	C3	C2	C2	C3	C2	C2	C3
fr25	Basse-Normandie	C3	C3	C3	C3	C3	C3	C3	C3	C3	C2	C3	C3
fr26	Bourgogne	C3	C3	C3	C3	C3	C3	C2	C2	C3	C2	C2	C3
fr3	Nord - Pas-de-Calais	C4	C3	C4	C4	C3	C4	C3	C3	C3	C3	C3	C3
fr41	Lorraine	C3	C3	C3	C3	C3	C3	C3	C2	C3	C3	C2	C3
fr42	Alsace	C2	C2	C2	C2	C2	C2	C1	C1	C2	C1	C1	C2
fr43	Franche-Comté	C3	C3	C3	C3	C3	C3	C2	C2	C2	C2	C2	C2
fr51	Pays de la Loire	C3	C3	C3	C3	C3	C3	C2	C2	C2	C2	C2	C2
fr52	Bretagne	C3	C3	C3	C3	C3	C3	C3	C2	C2	C3	C2	C2
fr53	Poitou-Charentes	C3	C3	C3	C3	C3	C3	C3	C3	C3	C3	C3	C3
fr61	Aquitaine	C3	C3	C3	C3	C3	C3	C2	C2	C3	C2	C2	C3
fr62	Midi-Pyrénées	C3	C3	C3	C3	C3	C3	C2	C2	C3	C2	C2	C3
fr63	Limousin	C3	C3	C3	C3	C3	C3	C2	C2	C2	C2	C2	C2
fr71	Rhône-Alpes	C2	C3	C3	C2	C2	C3	C1	C2	C2	C1	C2	C2
fr72	Auvergne	C3	C3	C3	C3	C3	C3	C3	C2	C2	C3	C2	C3
fr81	Languedoc-Roussillon	C4	C4	C4	C4	C4	C4	C3	C3	C4	C3	C3	C4
fr82	Provence-Alpes-Côte d'Azur	C3	C3	C4	C3	C3	C4	C2	C2	C3	C2	C2	C3
fr83	Corse	C3	C3	C4	C3	C3	C4	C3	C3	C3	C3	C3	C3
ie	Ireland	C4	C4	C2	C4	C3	C2	C3	C3	C1	C3	C3	C1
it11	Piemonte	C3	C3	C3	C3	C3	C4	C1	C1	C1	C1	C1	C1
it12	Valle d'Aosta	C2	C1	C2	C2	C1	C2	C1	C1	C1	C1	C1	C1
it13	Liguria	C3	C4	C4	C4	C4	C4	C1	C1	C1	C1	C1	C1
it2	Lombardia	C2	C2	C2	C2	C2	C2	C1	C1	C1	C1	C1	C1
it31	Trentino-Alto Adige	C2	C1	C1	C2	C1	C1	C1	C1	C1	C1	C1	C1
it32	Veneto	C2	C2	C2	C3	C2	C2	C1	C1	C1	C1	C1	C1
it33	Friuli-Venezia Giulia	C3	C3	C2	C3	C3	C2	C1	C1	C1	C1	C1	C1
it4	Emilia-Romagna	C3	C2	C2	C3	C2	C2	C1	C1	C1	C1	C1	C1
it51	Toscana	C3	C3	C3	C3	C3	C3	C1	C1	C1	C1	C1	C1
it52	Umbria	C3	C3	C3	C3	C4	C4	C2	C2	C2	C2	C2	C2
it53	Marche	C2	C2	C3	C2	C3	C3	C2	C2	C2	C2	C2	C2
it6	Lazio	C3	C4	C4	C3	C4	C4	C1	C1	C1	C1	C1	C1
it71	Abruzzo	C3	C4	C4	C3	C4	C4	C3	C3	C3	C3	C3	C3
it72	Molise	C4	C4	C4	C4	C4	C4	C3	C4	C3	C3	C4	C3
it8	Campania	C4	C4	C4	C4	C4	C4	C4	C4	C4	C4	C4	C4
it91	Puglia	C4	C4	C4	C4	C4	C4	C3	C4	C4	C3	C4	C4
it92	Basilicata	C4	C4	C4	C4	C4	C4	C4	C4	C4	C4	C4	C4
it93	Calabria	C4	C4	C4	C4	C4	C4	C4	C4	C4	C4	C4	C4
ita	Sicilia	C4	C4	C4	C4	C4	C4	C4	C4	C4	C4	C4	C4
itb	Sardegna	C4	C4	C4	C4	C4	C4	C4	C4	C3	C4	C4	C3
lu	Luxembourg	C1	C1	C1	C1	C1	C2	C1	C1	C1	C1	C1	C1
nl1	Noord-Nederland	C3	C2	C2	C3	C2	C2	C2	C2	C1	C2	C2	C1
nl2	Oost-Nederland	C3	C3	C2	C3	C3	C2	C2	C1	C1	C2	C1	C1
nl3	West-Nederland	C2	C2	C1	C2	C2	C1	C1	C1	C1	C1	C1	C1
nl4	Zuid-Nederland	C3	C2	C1	C3	C2	C1	C2	C2	C1	C2	C2	C1
at11	Burgenland	C4	C4	C4	C4	C4	C4	C1	C1	C1	C1	C1	C1

		Pessimistic						Optimistic					
		Proposal 1			Proposal 3			Proposal 1			Proposal 3		
Code	Name	1987	1993	1999	1987	1993	1999	1987	1993	1999	1987	1993	1999
at12	Niederösterreich	C3	C2	C2	C3	C2	C2	C1	C1	C1	C1	C1	C1
at13	Wien	C1	C1	C2	C2	C2	C2	C1	C1	C1	C1	C1	C1
at21	Kärnten	C3	C3	C2	C3	C3	C2	C1	C1	C1	C1	C1	C1
at22	Steiermark	C3	C3	C2	C3	C3	C2	C1	C1	C1	C1	C1	C1
at31	Oberösterreich	C2	C2	C2	C2	C2	C2	C1	C1	C1	C1	C1	C1
at32	Salzburg	C1	C1	C1	C1	C1	C1	C1	C1	C1	C1	C1	C1
at33	Tirol	C2	C1	C1	C2	C1	C1	C1	C1	C1	C1	C1	C1
at34	Vorarlberg	C2	C1	C1	C2	C1	C1	C1	C1	C1	C1	C1	C1
pt11	Norte	C4	C4	C4	C4	C4	C4	C1	C1	C1	C1	C1	C1
pt12	Centro (P)	C4	C4	C4	C4	C4	C4	C2	C1	C1	C2	C1	C1
pt13	Lisboa e Vale do Tejo	C3	C3	C2	C3	C3	C2	C3	C2	C2	C2	C2	C2
pt14	Alentejo	C4	C4	C4	C4	C4	C4	C3	C2	C2	C4	C3	C2
pt15	Algarve	C4	C4	C4	C4	C4	C4	C1	C1	C1	C2	C1	C2
fi13	Itä-Suomi	C3	C4	C4	C3	C4	C4	C1	C3	C3	C2	C3	C3
fi14	Väli-Suomi	C3	C4	C3	C3	C4	C3	C1	C3	C3	C2	C3	C2
fi15	Pohjois-Suomi	C3	C4	C4	C3	C4	C3	C1	C3	C3	C1	C3	C2
fi16	Uusimaa (suuralue)	C1	C4	C2	C1	C3	C2	C1	C1	C1	C1	C1	C1
fi17	Etelä-Suomi	C2	C4	C4	C2	C3	C3	C1	C3	C2	C1	C2	C2
se01	Stockholm	C1	C2	C1	C1	C1	C1	C1	C1	C1	C1	C1	C1
se02	Östra Mellansverige	C2	C3	C3	C2	C3	C3	C1	C1	C2	C1	C1	C1
se04	Sydsverige	C2	C3	C3	C2	C3	C3	C1	C2	C2	C1	C1	C2
se06	Norra Mellansverige	C2	C3	C3	C2	C3	C2	C1	C2	C2	C1	C1	C1
se07	Mellersta Norrland	C2	C3	C3	C1	C2	C2	C1	C1	C2	C1	C1	C1
se08	Övre Norrland	C2	C3	C3	C2	C2	C2	C1	C2	C2	C1	C2	C2
se09	Småland med öarna	C2	C2	C2	C2	C2	C2	C1	C1	C1	C1	C1	C1
se0a	Västsverige	C2	C2	C3	C2	C2	C3	C1	C1	C2	C1	C1	C2
ukc	North East	C3	C3	C4	C3	C3	C4	C3	C2	C2	C3	C2	C2
ukd	North West (including Merseyside)	C3	C3	C3	C2	C3	C3	C2	C2	C1	C2	C2	C2
uke	Yorkshire and The Humber	C3	C3	C3	C3	C3	C3	C2	C2	C1	C2	C2	C1
ukf	East Midlands	C2	C3	C2	C2	C2	C2	C2	C2	C1	C2	C1	C1
ukg	West Midlands	C3	C3	C3	C3	C3	C3	C2	C2	C1	C2	C2	C1
ukh	Eastern	C2	C2	C2	C2	C2	C2	C1	C2	C1	C1	C2	C1
uki	London	C3	C3	C2	C2	C3	C2	C1	C1	C1	C1	C1	C1
ukj	South East	C2	C2	C1	C2	C2	C1	C1	C2	C1	C1	C1	C1
ukk	South West	C2	C2	C3	C2	C2	C3	C1	C2	C1	C1	C2	C1
ukl	Wales	C3	C3	C3	C3	C3	C3	C2	C2	C1	C2	C2	C2
ukm	Scotland	C3	C3	C2	C3	C2	C2	C2	C2	C1	C2	C2	C1
ukn	Northern Ireland	C4	C4	C4	C3	C3	C4	C3	C3	C3	C3	C2	C2
	Total Regiones	**128**	**128**	**128**	**128**	**128**	**128**	**128**	**128**	**128**	**128**	**128**	**128**
	Nº Regiones clasificadas C1	**9**	**10**	**9**	**8**	**10**	**9**	**58**	**47**	**52**	**57**	**51**	**51**
	Nº Regiones clasificadas C2	**29**	**26**	**29**	**32**	**29**	**33**	**31**	**40**	**35**	**33**	**41**	**39**
	Nº Regiones clasificadas C3	**48**	**45**	**43**	**45**	**45**	**42**	**25**	**24**	**26**	**22**	**19**	**22**
	Nº Regiones clasificadas C4	**42**	**47**	**47**	**43**	**44**	**44**	**14**	**17**	**15**	**16**	**17**	**16**