

EU development policies and the socio-economic disadvantage of European regions

Riccardo Crescenzi
Università degli Studi “Roma TRE”
E-mail: rcrescen@uniroma3.it

*Paper submitted to 46th Congress of the
European Regional Science Association (ERSA)
Volos (Greece), August 30th – September 3rd 2006.*

Abstract

Two different strands of literature have analysed the role of socio-economic factors in explaining the differential growth performance of the EU regions and the impact of structural funds on such performance. This paper aims at combining these strands of literature by directly comparing the (lack of) socio-economic preconditions for successful regional development with the correlated allocation of structural funds. In order to reach this objective the spatial distribution of both the sources of socio-economic disadvantage and the regional allocation of structural funds will be compared, thus uncovering a potential inconsistency between policy objectives (favouring disadvantaged areas) and the beneficiaries of the funds. In addition, an empirical model (specifically an Heckman two-step selection model) to assess to what extent regional funds are, in fact, associated (in a statistically significant way) with the above-mentioned sources of competitive “disadvantage” is developed. The paper shows that the sources of disadvantage are more spatially concentrated than the funds devoted to compensating such disadvantage. The weak association between structural disadvantage and EU funds suggests a potential explanation for the reduced impact of the EU regional policy.

Keywords: Regional Policy, Regional development, socio-economic factors, spatial analysis, Heckman selection models, Regression models.

[DRAFT PAPER]

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1.0 Introduction

The debate over the EU budget 2007-2013 made clear the need for an in-depth understanding of the structure and the impact of the EU development funds. The scarce resources available need to be targeted more effectively towards the real requirements of EU countries and regions in order to deliver the expected benefits. Regional development policies have become even more important after the enlargement of the European Union which has, on one hand, reduced the available resources in comparison to the target areas and, on the other, heightened economic disparities between the member states. However, the urgency for a highly cost/effective EU development policy should take account of the evidence, provided by a number of empirical studies, of a very limited or even insignificant impact of structural fund expenditure on the economic performance of the assisted areas. Empirical evidence of an impact by the structural expenditure is so weak as to induce Boldrin and Canova (2001) to conclude that: “regional and structural policies serve mostly a redistributive purpose, motivated by the nature of the political equilibria upon which the European Union is built”. Conversely, an appropriate counterfactual scenario (“what would have happened without an active regional policy? Could inequalities possibly have risen even more?”) while crucial for such a policy assessment is very hard to construct and heavily dependent upon its underlying assumptions.

On the basis of such considerations this paper has adopted a different perspective by focusing its attention upon the “a priori” structure of the policy rather than on its impact. Consequently this paper analyses the regional allocation of the EU funds in order to assess whether (and to what extent) it is consistent with the factors that have been shown to hamper the local economy’s capability to grow and develop at an adequate pace. In order to reach this objective this paper aims at bringing together two separate strands of literature: the literature on the analysis of the regional policies of the EU and that on the role of underlying socio-economic conditions in the explanation of differential regional growth performance. While the results of some of the former are biased by the abovementioned counterfactual problem, the latter has been rarely fully exploited to draw direct economic policy implications. This paper aims at filling the gap between these two strands of literature by directly comparing the socio-economic preconditions for successful regional development with the correlated allocation of structural funds. On the basis of the evidence provided by the literature and in order to maximise its chance of success, the EU regional funds should be allocated according to the geography of such sources of competitive disadvantage. In other words, given that a set of socio-economic conditions have been proven responsible for hampering the economic success of many EU regions, the EU funds should be allocated in order to

“compensate” the structural disadvantage of the assisted areas. However, the “redistributional purposes” needed by the “political market” equilibrium can “dilute” the targeting of the funds and thus produce an a priori reduction in the effectiveness of the policy (irrespective of the counterfactual used to assess its impact).

This paper aims at assessing precisely this potential bias in the geographical allocation of the structural funds (Objective 1 and 2) under both the 1994-1999 and 2000-2006 programming periods in order to shed some light on the coherence of the policy pursued up to now and draw some implication for the forthcoming programming period.

More specifically, in this paper:

- a) the spatial concentration of structural expenditure as an important prerequisite for its effectiveness is analysed. A low degree of spatial concentration of development funds may support the hypothesis of a distribution based on political equilibrium rather than effectiveness;
- b) the spatial concentration of EU funds is contrasted with a specifically developed indicator of socio-economic disadvantage of the EU regions. This analysis will allow us to investigate the coherence of the EU regional policies with regard to the structural disadvantage of EU regions thus uncovering a potential inconsistency between policy objectives (favouring disadvantaged areas) and the beneficiaries of the funds;
- c) an empirical model to assess to what extent regional funds are, in fact, associated (in a statistically significant way) with the above-mentioned sources of competitive “disadvantage” is developed.

This paper is organized into three sections. In the first section we briefly review some of the most relevant literature of the two strands that we are attempting to join in our empirical analysis in order to highlight their synergies and set the foundation for a subsequent analysis. In the second section we present the methodology followed to assess the spatial structure of both funds and socio-economic disadvantage and outline our empirical model to measure the adherence of such funds to the latter factor. In the third section the empirical results are discussed together with some implications for the design of regional policies.

2.0 Regional policy and structural disadvantage

2.1 The EU regional development policy, its objectives and the controversy over its effects

The Treaty Establishing the European Community in 1958 stated that “(...) the Community shall aim at reducing the 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 same objective was restated almost half a century later by the EU draft Constitution (article III-220).

The financial resources devoted to pursue this objective have grown substantially over the years. From the Brussels European Council in 1988, which allocates ECU 68 billion (at 1997 prices) to structural funds, to the Edinburgh European Council in 1993 which allocates almost ECU 177 billion (at 1999 prices) for the same purpose, the contributions to regional funds have grown from €8 billion per year in 1989 to €2 billion per year in 1999. After the Berlin European Council’s reform of the structural funds the expenditure was adjusted to €28 billion per year between 2000 and 2006, i.e. €195 billion over seven years¹ (all at 1999 prices) (European Commission website). Altogether the expenditure for regional policy is particularly significant when assessed as a percentage of the GDP of many lagging regions: 2.7% (of national GDP) in Greece, 2.8% in Portugal, 1% in Spain, 0.7% in Ireland in the year 2000 (E.C. 2000).

However, while the amount of resources devoted to the objective of promoting an “overall harmonious development” of the Union has not been negligible, the evidence of the influence of such resources on the actual level of territorial cohesion of the EU is rather mixed. In particular the literature has emphasized:

- a) the lack of upward mobility of Objective 1 regions, which have remained almost the same from 1989 to 2005 (with the only exception of Abruzzo²).
- b) the absence of convergence across EU regions in contrast with that observed across the member states which dominated the past twenty-five years of the European growth history (Boldrin and Canova, 2001; Magrini, 1999; Puga, 2002). Rather, a process of “club convergence” would be in place across the EU regions thus leading to the formation of clusters of regions with persistently different income levels (Canova, 2004; Quah 1996 and 1997).

¹ In addition the Cohesion Fund distributes resources for about €2.5 billion per year from 2000 to 2006, for a total of €18 billion (at 1999 prices).

² Only Abruzzo in Italy lost its Objective 1 status in 1997.

On the basis of such evidence, which is undoubtedly the results of a complex set of forces in place in the EU economy, many of which not related to any policy action, some empirical studies have attempted to single out the link between structural funds and regional economic development in order to assess their impact (if any) on the regional economy.

These contributions focused upon different factors which seem to prevent regional policy from delivering its intended benefits. Midelfart-Knarvik and Overman (2002)'s analysis highlights the distortion produced by structural funds on the location decision of R&D intensive firms. Structural funds provide an incentive for firms to locate in assisted regions with a poor endowment of human capital, thus producing an inefficient outcome for both firms (that cannot benefit from an adequate labour pool in the local area) and workers (who do not benefit from an increase in labour demand due to skill mismatch). Thus, EU aid should be focused "on helping regions change their endowments and specialize according to the resulting comparative advantage" (p.352). Though produced in differential theoretical frameworks³, this evidence is not far from the results of Cappelen et al. (2003). who concluded that impact of structural funds is positive but "crucially dependent on the receptiveness of the receiving environment" (p.640). These findings emphasize the role of relatively more favourable contextual conditions/endowment which lead to a paradoxical situation whereby the EU funds fail to work precisely where they are most needed.

Rodriguez-Pose and Fratesi (2004) by more directly assessing the impact of structural funds on regional growth performance, find that such impact crucially depends on the distribution of resources across axes. Where fund allocation more closely addresses such contextual conditions, i.e. by being channelled towards human capital enhancement, its effects tend to be positive and significant while this is not the case when other objectives are pursued (i.e. infrastructure).

However, in addition and "in combination" with the underlying socio-economic conditions, the spatial structure of the funds is relevant in terms of the maximisation of their impact: not only is the level of expenditure in the objective region itself relevant but also that in its neighbouring regions (Dall'Erba, 2005). By this we mean that the spatial externalities produced by the implementation of regional development programmes of whatever nature need to be taken into account as an insufficient spatial "concentration" of the funds may reduce their impact by reducing the amount of such externalities "flowing" within the assisted areas.

Thus, the evidence briefly reviewed above suggests that different kinds of "mismatches" might be a cause for the weak impact of the investments pursued up to now. Consequently we find "operational" mismatches between policy targets and the real needs of the lagging regions when financial resources are divided among the different axes and then translated into concrete actions

³ While Midelfart-Knarvik and Overman (2002) focuses the determinants of firms' location Cappelen et al. (2003) develop a "new growth theory" model with a Schumpeterian perspective.

and “spatial” mismatches between areas where the factors of disadvantage are concentrated and areas where the resources (and their externalities) are channelled by the policy.

These fundamental mismatches in the structure of the policy reinforce the hypothesis of Boldrin and Canova (2001) that “regional and structural policies serve mostly a redistributive purpose, motivated by the nature of the political equilibria upon which the European Union is built”.

2.2 A policy “diluted” by budget and power equilibria

By the end of the 1960s the idea of an EU-level regional development policy emerged from the EU political debate. In 1969 the European Commission took the political initiative for the establishment of a supra-national regional development policy. Such a change in the political mood towards a European regional policy might be explained by the increase in regional disparities which came along with rapid European growth in the post-war period. However, the absence prior to 1969 of a supranational regional policy did not imply the lack of regional development as an area of public policy action. On the contrary almost all European Countries pursued national policies aimed at reducing internal regional disparities and promoting economic development: “indeed the 1960s were the golden age of development policies at the national level” (Rodriguez-Pose, 2002 p.43). In addition in this area the need of a “supra-nationalisation” was much weaker than in the case of agricultural policies where the establishment of the common market necessarily required a supra-national policy. However, the evolution of the EU regional development policies went far beyond the mere coordination of the development policies pursued at the national level⁴ (e.g. in the area of the big transnational infrastructures where the need for such coordination is stronger), progressively absorbing a larger share of the EU budget at the expenses of the common agricultural policy. The turning point which established this trajectory was the enlargement of the then European Community (EC) to include Denmark, the United Kingdom and Ireland. If the accession of these three new countries (and Ireland in particular), sharpened the degree of existing disparities, the key political pressure for the establishment of the EC development policy arrived from the UK which put this issue at the centre of accession negotiations with the EC. “In a Community whose budget was heavily skewed towards the support of continental agriculture, the UK, with less than 2 per cent of its working population active in the primary sector, considered the establishment of a Regional Fund as a way of recovering some of the payments delivered to the EC budget” (Rodriguez-Pose, 2002 p.44). The European Regional Development Fund (ERDF) was initially designed as a subsidiary source of financing for national policies and allocated on the basis of a system of national quotas which emphasized its “compensatory” nature rather than being translated into a

⁴ The European Regional Development Fund (ERDF) was initially designed as a subsidiary source of financing for national policies and allocated on the basis of a system of national quotas

truly supranational policy. In the 1980s the accession of Greece, Spain and Portugal emphasized both Union-wide regional disparities and the demand for a more favourable redistribution of financial resources through the EU budget since their agricultural specialisation patterns prevented them from taking full advantage of the Agricultural Policy then in place in the EU. These new members of the Union together with Ireland used their bargaining power within the EU in order to increase the expenditure in favour of “poor regions” and “offset the burden of the single market for southern countries and other less favoured regions.” (European Commission’s web site, http://europa.eu.int/comm/regional_policy/intro/regions2_en.htm). The increase in the resources devoted to regional policies was justified as a compensation for the asymmetric distribution of the socio-economic costs of the process of integration which seemed to sharpen territorial disparities which, in turn, would have been a source of tension among member states (Armstrong and Taylor, 2000). Since then, the growth (in absolute and relative terms) of structural spending has come along with further integration of the EU and its subsequent enlargements. However, as Baldwin and Wyplosz (2003) put it, “since 1994 the connection between poor nations and structural spending has been greatly diluted (as) large parts of Finland and Sweden were designated as eligible, and even some Austrian regions, together with all of the former East Germany”(par.9.5). The pressure for setting aside of budget resources aimed at financing the eastward enlargement of the EU played an important role in the Agenda 2000 reform of the structural funds by forcing a reduction in both the areas eligible for assistance and the community initiatives (Armstrong, 2001). Such a reduction was inspired by the principle of territorial and financial concentration: the relatively scarce resources available for the EU development policies should have been channelled more specifically where they were needed most in order to maximise their effectiveness.

2.3 Where are the funds most needed? Evidence from the literature.

As we have discussed in the previous section the EU regional development policies have, since their very beginning, been shaped by the compromise between “true” development objectives and the need for financial equilibrium in the net-position of the budget. Such a “compromise” might a priori have prevented the funds from going where they were needed most. In this section we present the factors that the literature focusing on the effect of socioeconomic conditions for regional economic performance have shown to be structural sources of competitive dis/advantage for the local economy.

Lagging regions in the EU, notwithstanding the profound differences under many respects, share a common set of analogous social conditions whose role is emphasized by the economic restructuring

accelerated by the process of European integration (Rodríguez-Pose 1994 and 1998a). While some economic factors (such as capital and technology) seem more able to adjust in response to the challenges of the EU integration (by virtue of their relatively higher mobility), social conditions tend to remain much more stable. Consequently it is possible to identify a specific set of “structural” conditions that are persistently associated with poor economic performance and that are very slow to endogenously adjust. These factors concern, to different extents, the labour force features, the employment of local resources, the demographic structure and change, the accumulation of human capital (Rodríguez-Pose 1998b).

However, the distinctive role of underlying socio-economic conditions has been fully appreciated when assessed in a theoretical framework where innovation is explicitly considered as the driving force of the growth process. When the Romer’s endogenous growth model is reformulated in order to explicitly recognise growth as a multivariate process, human capital accumulation but also sectoral specialisation of the labour force, migration, university education and geographical location emerge as relevant factors for economic performance (Fagerberg et al. 1997; Cheshire and Magrini, 2000).

More generally, the role of socio-economic conditions in the translation of innovation into regional growth has been treated in a systematic way by the introduction of the concept of “social filter” (Rodríguez-Pose, 1999): the interaction of a complex set of economic, social, political and institutional features that makes some regions “prone” and others “averse” to innovation.

The multifaceted socio-economic conditions of the EU regions are introduced in our analysis by means of a set of variables describing the local socio-economic realm. In particular, the variables which seem to be more relevant for shaping the regional responsiveness to economic change are those related to three main domains: educational achievements, productive employment of human resources and demographic structure (Rodríguez-Pose and Crescenzi, 2005).

In our perspective, these factors provide a picture of the geography of the structural disadvantage of the EU regions, which seems to remain relatively stable over time and able to condition persistently the resulting economic geography of the Union. As a consequence, it seems reasonable that from both an equity and efficiency perspective, the geographical allocation of regional funds should follow the spatial structure of these factors. This is true from a spatial equity perspective, because such a distribution of resources across regions should compensate the residents of “disadvantaged” regions for their unfavourable starting condition. And this is also reasonable from an efficiency perspective, since addressing the structural sources of competitive disadvantage of assisted regions seems the only effective way to promote the full employment of local resources.

In what follows we aim at measuring the “distance” between these structural factor and the actual allocation of EU structural funds.

3 Where do the funds in fact go?

In order to investigate the spatial structure of the allocation of the EU structural funds and their relationship with the sources of structural disadvantage discussed in the previous section we will, in a first instance, present a descriptive spatial analysis of both these phenomena. This analysis will be followed by a model of empirical analysis aimed at singling out the importance (statistical significance) of the socio-economic factors in the distribution of the Eu structural funds (Objective 1 and 2) under both the 1994-1999 and 2000-2006 programming periods, in order to shed some light on the coherence of the policy pursued up to now.

In this section the methodology followed to pursue such analysis is briefly presented together with the corresponding dataset. The empirical results will be discussed in the fourth section.

3.1 A measure for the socio-economic conditions

The variables which seem to be more relevant for describing the social conditions of a regional space are those related to three main domains: educational achievements, productive employment of human resources and demographic structure (Rodriguez-Pose, 1999; Rodriguez-Pose and Crescenzi, 2005). From the first domain, tertiary educational attainment (of both the population and the labour force) and participation in Lifelong Learning programmes are assumed as a measure for the accumulation of skills at the local level. From the second area the percentage of labour force employed in agriculture and the long-term component of unemployment are included in the analysis in order to capture the amount of human resources excluded from productive employment. On the one hand, long term unemployment represents the incidence of people whose possibilities of being productively involved in the labour market is persistently hampered by inadequate skills. On the other hand, agricultural employment is frequently synonymous of “hidden unemployment” and a backward structure of the local economy. In addition, from the third area, the percentage of population aged between 15 and 24 was considered as a proxy for the flow of new resources entering the labour force, thus “renewing” the existing stock of knowledge and skills. These factors will be autonomously introduced into the analysis in order to assess their individual weight. However, in order to assess their “global” relationship with the allocation of structural funds, while minimising the problems of multicollinearity⁵, the socio-economic variable are combined by mean

⁵ Which prevents their simultaneous introduction into the regression equation.

of Principal Component (PC) Analysis (Jolliffe, 1986). Following a procedure similar to Rodriguez-Pose and Crescenzi (2005) the set of variables discussed above is “reduced” to an individual variable able to preserve as much as possible of the initial information (variability) (see Appendix B for the results of the PC analysis and technicalities). Such procedure allows us to handle an individual variable which “summarize” the multifaceted nature of the socio-economic conditions of each region.

3.2 The empirical model for the allocation of funds across regions

This section outlines the empirical model for the analysis of the role of socio-economic disadvantage in determining the allocation of structural funds. The model aims at reproducing a “hidden” decision function of the European policy maker in the allocation of the structural funds across regions. Such a “decision function” would reflect the “rationale” of the policy but also the political equilibrium reached in the bargaining process between the Commission, the national governments, the local governments and the various pressure groups. The estimation of such a model, by regressing the per capita regional commitments of the structural funds on the sources of socio-economic disadvantage identified above, will allow us to “measure” what is the role of these factor in the actual allocation of the funds. A reduced weight of these factors in the allocation decision can reflect an overwhelming role of the “power” factors in the design of the policy and might be a possible explanation for their reduced impact.

Two models will be estimated in our empirical analysis. A first model will analyse the allocation of Objective 1 and Objective 2 funds separately (Equations 1 and 2), while a second model will consider the overall regional distribution of the structural funds (Equation 3).

Consequently, the first part of the empirical analysis is based on a two-stage Heckman selection model (Heckman, 1979; Green 2003). In the first stage the “eligibility” as Objective 1 (Objective 2) area is determined. Such a decision is based on specific criteria which should improve the territorial concentration of the funds and a priori select the most disadvantaged areas coherently with each objective’s “mission”. However, such a decision can, in fact, reflect the redistributive purposes discussed in the previous section. Consequently, the first step of the Heckman selection model aims at assessing, through a probit model, how the factors of socio-economic disadvantage in fact influence the probability of a region of being assisted (or not). The model is estimated separately for Obj1 regions and for Obj2 regions in both the programming periods considered.

The estimated model is the following:

$$w_i = Z_i' \mathbf{g} + e_i \quad (1)$$

where

$w_i=1$ if the region i is an assisted region and $w_i=0$ if the region is not assisted;

and

$$\Pr(w_i = 1) = \Phi(\mathbf{g}'Z_i) \text{ and } \Pr(w_i = 0) = 1 - \Phi(\mathbf{g}'Z_i);$$

where $\Phi(x)$ is the normal cumulative distribution function, Z_i is a set of socio-economic explanatory variables described above, \mathbf{g} is a vector of parameters, and \mathbf{e}_i is the error term.

In a second step the level of support is regressed on its potential determinants while taking into account the selection bias introduced in the sample by the a priori selection of eligible areas.

Consequently, the following second-step H-C OLS model is estimated:

$$y_i = \mathbf{a}'X_i + \mathbf{e}_i \quad (2)$$

Where $y_i (>0)$ is the level of per capita commitment in region i , \mathbf{a} is a parameter vector, X are the explanatory variables and \mathbf{e}_i is the error term.

The set of explanatory variables includes: the socio-economic conditions, a set of national dummy variables (to estimate a potential “national” bias in the distribution of the funds) and the Inverse Mills Ratio (IMR). The IMR is calculated from the first stage probit model and is used in the second step as an instrument for the latent variable that determines whether an area is eligible or not. In other words the IMR links the participation of the regions to the distributions of the funds (1st step) with the amount of funds received (2nd step).

The second part of the empirical analysis will focus on how the socioeconomic factors drive the observed level of regional expenditure per capita (Objective 1 and Objective 2). As discussed in the previous section of the paper, the interaction of Objective 1 and Objective 2 purposes might further “dilute” the policy targeting.

Consequently, we will estimate an OLS model regressing the commitment level per capita under both Objective 1 and 2 on the socioeconomic variables and a set of national dummy variables:

$$y_i = \mathbf{a}'X_i + \mathbf{e}_i \quad (3)$$

Where y_i (that this time includes all the regions included in the sample) is the level of per capita commitments in region i , \mathbf{a} is a parameter vector, X are the explanatory variables (socio-economic factors + national dummies) and \mathbf{e}_i is the error term.

3.3 The dataset

Under the constraint of data availability, but also for reasons of homogeneity and coherence in terms of relevant institutional level, the analysis is based upon NUTS1 regions for Germany, Belgium

and the UK and NUTS2 for all other countries (Spain, France, Italy, the Netherlands, Greece, Austria, Portugal, Finland, Czech Republic, Hungary, Poland, Slovakia).

Countries without a relevant regional articulation (Denmark, Ireland, Luxemburg, Estonia, Latvia, Lithuania, Slovenia, Malta and Cyprus) were necessarily excluded from the analysis⁶. In addition, regional data on many variables are not available for Sweden. The data for the socio-economic conditions of the EU regions are available from Eurostat and stored in the REGIO databank. The data on the regional distribution of commitments⁷ for structural funds expenditure was collected by the author on the basis of the information provided by the European commission on its website (Inforegio) and takes into account all structural funds. In addition we relied upon the Annex of the EC report “The impact of structural policies on economic and social cohesion 1989-99”. For the sake of comparability between programming periods, Objective 1 and Objective 6 data on one hand and Objective 2 and Objective 5b on the other are combined for 1994-1999 commitments.

4.0 Empirical results

4.1 Spatial concentration: structural funds vs socio-economic disadvantage

The analysis of the spatial distribution of the variables is pursued by calculating the value of the Moran’s I (see appendix A for technicalities). The Moran’s I is a measure for the global spatial autocorrelation of the variables (Cliff and Ord, 1981). When the Moran’s I is significantly different from zero the variable of interest exhibits a systematic spatial pattern. A positive value of this index means that areas with a high (low) level of per capita structural expenditure tend to be clustered close to other areas with high (low) expenditure. The same line of reasoning is valid for the factors of socio-economic disadvantage, where a positive value of the index means a pattern of clustering of regions with similar high/low values. The magnitude of the indicator provides a measure for the strength of the spatial pattern i.e. the extent of the clustering process of similarly high/low values.

Table 1 shows the value of the Moran’s I for regional expenditure under Objective 1 and 2 and for total structural funds expenditure. The table shows that a clear spatial pattern is identifiable in the distribution of both funds and socio-economic conditions. Moran’s I is positive and significant in all cases, thus showing a positive spatial autocorrelation: regions with a high (low) level of expenditure

⁶ As far as specific regions are concerned, no data are available for the French *Départments d’Outre-Mer* (Fr9). Uusimaa (Fi16) and Etela-Suomi (Fi17) were excluded from the analysis due to the lack of data on socio-economic variables. Etela-Suomi (Fi17) and Trentino-Alto Adige (IT31) were excluded from the analysis as they have no correspondent in the NUTS2003 classification, thus preventing us from matching data available only in the new NUTS classification. Islands (PT2 Açores, PT3 Madeira, FR9 Departments d’Outre-Mer, ES7 Canarias) and Ceuta y Melilla (ES 63) were excluded from the analysis as time-distance information, necessary for the computation of spatial weights (appendix A), is not available.

⁷ Only data for commitments rather than expenditure are available. However the use of commitments data is coherent with our theoretical framework, as we aim at analysing the a priori structure of the policy rather than estimating the impact of the actual expenditure.

(socio-economic disadvantage) tend to be clustered together. If the results are examined in further details by considering the magnitude of the index, it is possible to note that Objective 1 tends to be more concentrated than Objective 2 expenditure where the latter seems to respond more weakly to the principle of territorial concentration (in both the programming periods). However, it must be noted that the overall territorial concentration of expenditure has increased after the Agenda 2000 reform of the structural funds: the Moran's I for Objective 1, 2 and total expenditure has increased from one programming period to the other. However, as we discussed in the previous sections, the territorial concentration of the funds should be compared with that of the socio-economic sources of competitive disadvantage. This benchmark is provided by the last line of table 1 which shows the Moran's I for the "Social Factors" variable which is calculated through the Principal Component Analysis from the whole set of socio-economic variables previously discussed. The comparison between the magnitude of the Moran's I of the "Social Factors" and that of structural expenditure shows that the former are more spatially concentrated than the latter. Thus, even if the territorial concentration of expenditure increased with the reform of the structural funds it seems to be still insufficient when compared to the spatial pattern of the sources of structural disadvantage.

4.2 A model for the regional allocation of structural funds

In the previous paragraph the spatial distribution of the structural funds has been analysed. In what follows we discuss the estimation results for our empirical model, which aims at understanding more directly the weight of the observed socio-economic factors in the "implicit" decision function for the regional allocation of structural funds. Following the specification presented in par. 3.2 we estimated the two-stage Heckman selection model for the allocation of Objective 1 (Tab.2) and Objective 2 (Tab.3) funds. The tables show the estimations results for the programming periods 1994-1999 (on the left hand side of the table) and 2000-2006 (right hand side). For each programming period we estimate the equations (1) and (2) by regressing the funds on the "Social Factors" variable (a) and on some its components (b).

When looking at the results for the Probit Selection Model (lower part of the tables) we should keep in mind that the magnitude of the parameters estimated by the probit technique does not have a direct meaning in terms of the extent of the corresponding effect. However, they are informative as far as their signs and significance is concerned.

As far as Objective 1 funds are concerned (Tab.2), the social factors variable shows a negative sign and a high significance level in both the programming periods thus implying that favourable socio economic conditions (i.e. a high value of the social factors variable) reduce, as expected, the probability of being considered an eligible area (column a). This seems to confirm that the actual

eligibility criteria, based on per capita income, is a good approximation of the socio-economic realm of the local economy. However, if the factors influencing the probability of becoming an eligible region are considered in further details (column a), we notice that the “traditional” sources of disadvantage are more “rewarded” by this system: the “percentage of labour force concentrated in agriculture” and “long term unemployment” significantly increase the chances of becoming an Objective 1 region. On the contrary, other sources of disadvantage such as the “the percentage of young population” and “tertiary education attainments” are not significant (the former) or much less significant (the latter) than other factors.

In the second step of the model, the amount of funds received (by eligible areas) is analysed (Equation 2). The empirical results show that, while significant for the acquisition of the status of assisted region, the socio-economic factors are not significant for determining the level of the funds received (column a). In other words, the distribution of the funds across the eligible areas does not seem to reflect their actual differentiated socio-economic status. When considering the specific socio-economic factors (column b) we notice that only the education level variable shows a high level of significance in 2000-2006: a relatively higher percentage of tertiary education achievements seems to reduce the amount of funds received in favour of less well endowed regions. The national dummies seems to highlight a certain degree of nation bias in the allocation of the funds in favour of some members states, but this bias seems to disappear when the socio-economic conditions are fully accounted for.

Table 3 presents, in the same way as in the previous table, the results for the estimation of the two-step Heckman selection for Objective 2 funds. The results for the probit selection model show that, as expected, objective 2 regions tend to present relatively more favourable socio-economic conditions: the socio-economic factors variable is positive and significant. In addition, as expected, objective 2 regions are mainly industrial regions (an high % agriculture labour force tends to reduce the probability of being “selected”) and the population is relatively younger than in other areas. However, the present eligibility criteria seem unable to discriminate the areas with relatively less abundant skilled population, as shown by the non-significance of the education variable in 2000-2006. When we move on to the analysis of the determinants of the amount of funds allocated to the regions, we find no sign of any correlation with the underling socio-economic conditions of the assisted areas (except for the education variable in 2000-2006). This seems to confirm the “compensatory” nature of these financial resources as discussed in the previous sections.

In table 4 the overall allocation of structural funds under both Objective 1 and 2 is assessed, thus focusing upon their interactions and “composition effect” as parts of a single EU policy action.

The results for the regression of the level of structural funds per capita on the socio-economic conditions (Equation 3) are presented. The empirical results show that the overall amount of funds allocated to the EU regions partially reflects their underlying socio-economic conditions, even if the percentage of the overall variability explained by such factors is relatively small (the R-squared increase of the regressions increases from 1994-1999 to 2000-2006 but it is still relatively small). When considering the specific socio-economic factors influencing the distribution of the funds we notice that agricultural labour force, as a “traditional” source of disadvantage still seems to be the main driver of the funds at the expenses, for example, of the level of human capital accumulation which, instead, has been shown to be particularly relevant in the context of a knowledge based economy. The national dummies, while minimising the problem of spatial autocorrelation, highlight a certain degree of national bias in the distribution of the funds in favour of the “cohesion countries”. A bias which, in the 1994-1999 period, has particularly favoured Germany as well.

5.0 Conclusions: a hardly surprising performance

This essay has combined two different strands of literature by comparing a set of socio-economic conditions (which have been proven responsible for hampering the economic success of many EU regions) with the regional allocation of structural funds.

The theoretical discussion supported the idea that the EU funds should be allocated in order to “compensate” the structural disadvantage of the assisted areas thus maximising their effectiveness. However, it also showed how the “redistributional purposes” needed by the EU “political market” equilibrium have, in fact, “diluted” the targeting of the funds over the historical evolution of the European Union itself.

Our empirical analysis allowed us to assess the bias in the geographical allocation of the structural funds (Objective 1 and 2) under both the 1994-1999 and 2000-2006 programming periods. The low degree of spatial concentration of the development funds seems to support the hypothesis of a distribution based on political equilibrium rather than effectiveness. However, the Agenda 2000 reform of the structural funds was able to increase the territorial concentration of the funds.

Where the spatial concentration of EU funds is contrasted with a specifically developed indicator of socio-economic disadvantage of the EU regions, the empirical evidence suggests that such disadvantage is more concentrated than the associated funds.

Furthermore, the empirical model uncovered the weak association of regional funds with the above-mentioned sources of competitive “disadvantage”, in particular as far as the problem of human capital accumulation is concerned.

These empirical results seem to suggest that the reduced impact of the EU regional policy (highlighted by the economic literature) might be explained in terms of the a priori allocation of the financial resources which seems to suffer from the “political dilution” of the policy objectives.

Tab.1 - Objective 1 and Objective 2 Funds per capita, 1994-1999 and 2000-2006; Social Factors variable.

Variables	I	E(I)	sd(I)	z	p-value*
Programming Period 1994-1999					
Objective1	0.102	-0.008	0.009	11.649	0
Objective 2	0.039	-0.008	0.009	5.061	0
Total expenditure	0.095	-0.008	0.009	10.929	0
Programming Period 2000-2006					
Objective1	0.142	-0.008	0.009	15.911	0
Objective 2	0.094	-0.008	0.009	10.781	0
Total expenditure	0.149	-0.008	0.009	16.658	0
Social Factors+	0.223	-0.008	0.009	24.329	0
*1-tail test					

*This variable is the linear combination of the socio-economic variables described in the text and is calculated through the Principal Component Analysis

Tab.2 - Heckman Selection model, Objective 1 Funds per capita, 1994-1999 and 2000-2006.

Programming Period 1994-1999							Programming Period 2000-2006					
Variables	Equation (2)			Equation (2)			Equation (2)			Equation (2)		
	Coef.	Std. Err.	P> z	Coef.	Std. Err.	P> z	Coef.	Std. Err.	P> z	Coef.	Std. Err.	P> z
	(a)			(b)			(a)			(b)		
Social Factors*	3622.424	21602.14	0.867				1218.957	10951.03	0.911			
Education				-4988.11	2562.976	0.052				-1913.78	456.1678	0
Agriculture				-1348.16	1043.342	0.196				-312.165	222.0423	0.16
L.T.Unempl.				-574.539	588.8321	0.329				-89.498	110.8817	0.42
Young Pop				-3218.96	2456.867	0.19				-1067.57	503.5399	0.034
National Dummies												
de	1286.602	3153.09	0.683	1044.413	362.087	0.004	264.6077	1293.069	0.838	291.6251	68.56178	0
it	10.02819	2446.981	0.997	-119.275	215.7996	0.58	83.11813	1066.923	0.938	49.53745	46.58662	0.288
at	198.3732	3683.407	0.957	309.7738	279.0372	0.267	142.7548	1579.302	0.928	180.4558	60.11469	0.003
be	498.6349	3469.236	0.886	281.757	304.0943	0.354	100.9242	1514.511	0.947	95.4871	62.36345	0.126
pt	-248.376	2651.336	0.925	-362.557	186.396	0.052	157.058	1134.62	0.89	123.3903	38.62917	0.001
nl	512.8831	3378.771	0.879	369.2325	316.798	0.244	122.9396	1487.263	0.934	134.3599	66.7445	0.044
uk	745.6835	3216.694	0.817	398.8849	227.0967	0.079	193.8667	1310.763	0.882	129.0245	43.20416	0.003
es	621.0167	2306.694	0.788	634.0799	288.4948	0.028	252.0606	997.5152	0.801	319.0792	59.05076	0
gr	192.1769	2456.519	0.938	224.2701	187.8398	0.233	-21.8073	1054.395	0.983	-1.55839	39.39773	0.968
fi	534.0902	2926.159	0.855	233.248	286.6558	0.416	0.204899	1271.065	1	-32.9576	57.13414	0.564
Constant	3561.73	14885.26	0.811	2025.47	659.4408	0.002	1614.26	11007.22	0.883	574.4937	137.1147	0
<i>Probit Selection Model (Equation 1)</i>							<i>Probit Selection Model (Equation 1)</i>					
Social Factors*	-1.41589	0.348857	0				-1.03702	0.329578	0.002			
Education				5.044067	2.89385	0.081				5.754955	2.826307	0.042
Agriculture				17.32992	3.535073	0				15.12283	3.218646	0
L.T.Unempl.				3.435833	1.171702	0.003				2.609007	1.091462	0.017
Young Pop				5.912144	4.973609	0.235				6.068956	4.78766	0.205
Constant	0.265963	0.17737	0.134	-4.737	1.13581	0	0.16692	0.172587	0.333	-4.25439	1.07249	0
<i>Inverse Mills Ratio (IMR)</i>							<i>Inverse Mills Ratio (IMR)</i>					
IMR	-4846.97	23328.48	0.835	-358.795	178.5998	0.045	-2111.38	15897.1	0.894	-65.866	41.52635	0.113
rho	-1			-1			-1			-0.94973		
sigma	4846.965			358.7948			2111.375			69.35247		
lambda	-4846.97	23328.48		-358.795	178.5998		-2111.37	15897.1		-65.866	41.52635	

*This variable is the linear combination of the socio-economic variables described in the text and is calculated through the Principal Component Analysis

Tab.3 - Heckman Selection model, Objective 2 Funds per capita, 1994-1999 and 2000-2006.

Programming Period 1994-1999							Programming Period 2000-2006					
Equation (2)							Equation (2)					
Variables	Coef.	Std. Err.	P> z	Coef.	Std. Err.	P> z	Coef.	Std. Err.	P> z	Coef.	Std. Err.	P> z
	(a)			(b)			(a)			(b)		
Social Factors*	41.24806	979.3314	0.966				15.24312	360.1518	0.966			
Education				-1473.4	2604.039	0.572				-219.959	86.8514	0.011
Agriculture				-2313.08	5708.642	0.685				146.9052	213.0774	0.491
L.T.Unempl.				-292.403	1097.94	0.79				45.70872	53.61375	0.394
Young Pop				-2649.94	4296.254	0.537				-95.0998	299.439	0.751
National Dummies												
de	-14.1343	61.11901	0.817	-21.8045	131.9588	0.869	-15.2183	25.85857	0.556	-16.5432	5.622292	0.003
it	13.79382	83.21526	0.868	18.6619	147.3966	0.899	-41.2794	38.36847	0.282	-43.8702	7.736061	0
at	-31.6908	69.25755	0.647	42.80739	211.879	0.84	-20.1437	27.39351	0.462	-5.56321	9.046899	0.539
be	-4.40015	124.5079	0.972	-54.1565	220.7587	0.806	-6.2263	61.19157	0.919	-17.4202	11.50549	0.13
nl	74.98787	81.38781	0.357	116.1177	221.6512	0.6	1.86291	43.41586	0.966	-1.35525	12.65517	0.915
uk	51.9274	82.03706	0.527	46.94875	139.8897	0.737	15.96409	35.93839	0.657	6.896866	6.055499	0.255
es	151.6018	72.02708	0.035	123.0932	218.1189	0.573	25.25797	30.96621	0.415	20.99423	10.78373	0.052
fi	77.1801	113.6932	0.497	70.01067	235.5529	0.766	-28.5619	49.59434	0.565	-33.2919	11.58116	0.004
Constant	-66.0253	1528.65	0.966	726.9151	1291.69	0.574	-34.9188	511.2596	0.946	52.246	67.34726	0.438
<i>Probit Selection Model (Equation 1)</i>							<i>Probit Selection Model (Equation 1)</i>					
Social Factors*	1.121132	0.330526	0.001				1.331961	0.343357	0			
Education				-7.02116	2.844077	0.014				-3.15919	2.750046	0.251
Agriculture				-16.0497	3.350845	0				-14.7694	3.387493	0
L.T.Unempl.				-3.23574	1.131636	0.004				-3.56761	1.134586	0.002
Young Pop				-10.283	4.739716	0.03				-19.6541	5.100463	0
Constant	-0.22104	0.173643	0.203	5.339909	1.114868	0	-0.38479	0.178404	0.031	6.028806	1.164758	0
<i>Inverse Mills Ratio (IMR)</i>							<i>Inverse Mills Ratio (IMR)</i>					
IMR	214.6384	1720.033	0.901	363.2897	714.9973	0.611	96.03772	517.8416	0.853	1.456141	28.80728	0.96
rho	1			1			1			0.11154		
sigma	214.6384			363.2897			96.03772			13.05521		
lambda	214.6384	1720.033		363.2897	714.9973		96.03772	517.8416		1.456141	28.80728	

*This variable is the linear combination of the socio-economic variables described in the text and is calculated through the Principal Component Analysis

Tab.4 - Heteroskedasticity-Consistent OLS model, Objective 1 and Objective 2 Funds per capita, 1994-1999 and 2000-2006.

Variables	Programming Period 1994-1999						Programming Period 2000-2006					
	Coef.	Std. Err.	P> t	Coef.	Std. Err.	P> t	Coef.	Std. Err.	P> t	Coef.	Std. Err.	P> t
Social Factors*	-327.894	129.8615	0.013				-162.214	42.01456	0			
Education				771.8936	863.6608	0.373				-10.0642	231.26	0.965
Agriculture				1846.892	566.4197	0.001				703.0175	195.4019	0
L.T.Unempl.				363.4748	264.9683	0.173				119.7216	81.18214	0.143
Young Pop				3029.142	1395.854	0.032				1200.057	494.6487	0.017
National Dummies												
de	294.7922	111.1332	0.009	205.139	81.83613	0.014	65.45534	27.4801	0.019	35.56319	20.35761	0.083
it	57.38723	80.60264	0.478	46.11072	96.23988	0.633	-9.09578	27.36722	0.74	-22.1725	26.60234	0.406
at	-37.8744	63.17935	0.55	-71.8916	99.93928	0.473	-17.1091	25.62074	0.506	-40.7265	37.53585	0.28
be	153.1352	100.7441	0.131	-15.7337	119.9024	0.896	54.42931	26.19563	0.04	-2.24039	30.53526	0.942
pt	-58.9707	73.48608	0.424	-69.3652	93.02556	0.457	179.3968	42.1867	0	167.1739	52.87925	0.002
nl	91.98157	61.66183	0.138	-194.286	107.3449	0.073	20.23761	19.88387	0.311	-95.4172	36.32245	0.01
uk	214.5534	83.53881	0.011	60.30519	56.59665	0.289	102.6423	27.09222	0	33.96666	22.9845	0.142
es	460.8256	87.2242	0	130.3368	130.6492	0.321	173.652	36.87841	0	50.1997	47.33312	0.291
gr	348.8422	96.97734	0	61.27249	152.8804	0.689	-9.13357	25.41967	0.72	-114.086	52.04321	0.03
fi	233.367	83.44499	0.006	82.88095	102.4067	0.42	-15.2933	10.75426	0.158	-78.7236	27.42229	0.005
Constant	247.3297	60.25865	0	-596.29	307.5034	0.055	111.9031	18.47053	0	-178.189	89.55031	0.049
R-squared	0.37			0.46			0.46			0.56		
F-stat	8.71			5.47			17.38			7.62		
Prob.	0.000			0.000			0.000			0.000		

*This variable is the linear combination of the socio-economic variables described in the text and is calculated through the Principal Component Analysis

APPENDIX A - The weight matrix and the Moran's I

The Moran's I is calculated on the basis of the following formula:

$$I = \frac{\sum_{i=1}^n \sum_{j=1}^n (x_i - \bar{x}) w_{ij} (x_j - \bar{x})}{\sum_{i=1}^n (x_i - \bar{x})^2}$$

Where w_{ij} is a sequence of normalised weights that relate observation i to all the other observations j in the data. Values of I larger (smaller) than the expected value $E(I) = -1/(n-1)$ signal the presence of positive (negative) spatial autocorrelation.

In our empirical application the element w_{ij} of the matrix of the normalised weights is:

$$w_{ij} = \frac{\frac{1}{d_{ij}}}{\sum_j \frac{1}{d_{ij}}}$$

where d_{ij} is the average trip-length (in minutes) between region i and j calculated by the IRPUD (2000) for the computation of the Peripherality Indicators and made available by the European Commission.

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