Undermining the principle of concentration?: European Union regional policy and the socio-economic disadvantage of European regions

Undermining the principle of concentration? European Union Regional Policy and the Socio-economic Disadvantage of European Regions

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Abstract

This paper sets out to analyse the regional policy of the European Union by assessing whether the actual distribution of funds to the regions undermines the principle of territorial concentration. The empirical analysis shows that, due to either political equilibriums or inaccurate assumptions about the most cost-effective allocation of the funds, the sources of structural disadvantage are more spatially concentrated than the funds devoted to compensating this disadvantage and reveals a weak association between socio-economic disadvantage and EU funding. Corrections in allocation mechanisms are recommended in order to increase fund concentration and more adequately earmark resources to disadvantaged regions.

Keywords: Regional Policy, Regional development, socio-economic factors, European Union, Regions, Economic Growth

JEL Classifications: C24, O18, R11, R58

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 EU development funds. A more effective targeting of the scarce regional resources in response to the real needs of EU countries and regions would deliver greater results – and justify this use of public money – especially at a time when the eastward enlargement of the EU is, on the one hand, reducing the available resources in comparison to the target areas and, on the other, increasing economic disparities across member states. The urgency for a highly cost/effective EU regional policy has stimulated a significant amount of scientific work aiming at assessing the structure, implementation and impact of the policy and identifying potential room for further improvement. As suggested by Batchtler and Wren (2006): "During the past 15 years, the Cohesion Policy of the European Union has become one of the most intensively evaluated policies in Europe" (p.143). However, notwithstanding this activity, major methodological barriers have prevented the literature from reaching a consensus on the magnitude of the impact of structural funds on territorial cohesion (Bradley, 2006). In particular what makes it conceptually hard for "macro-models" to extract the pure impact of structural expenditure from the "background of all the other domestic and external shocks that affect the economy at the same time" (Bradley p.189), is the lack of an appropriate counterfactual scenario ("what would have happened without an active regional policy? Could even more inequalities have possibly arisen?"). Such counterfactual analysis while crucial for any policy assessment (Colin and Wren, 1999; Wren, 2005), is hard to construct and heavily dependent upon the assumptions that underlie it. In addition there are also major difficulties associated with the quality of the data available for any evaluation exercise (Baslé, 2006; Martin and Tyler 2006).

On the basis of these considerations this paper has approached the assessment of the EU structural policy from a different standpoint i.e. by focusing its attention upon the *à priori* structure of the policy rather than upon its impact. In so doing, the paper focuses its attention on one of the "core

principles" of the structural funds since the 1989 reform: concentration and, in particular, territorial concentration. In 2004 the publication of the Third Cohesion Report (CEC 2004) presented concentration, together with programming and partnership as the "core principles" FOR improving the effectiveness of structural expenditure. However, the same report concluded that, as concerns concentration, "in the sense of focusing funds on the areas most in need, (…) evaluations suggest that resources are still sometimes spread too widely and thinly" (CEC 2004 p.xxii). In this perspective this paper sets out to test the existence of an *à priori* bias in the geographical allocation of the funds that undermines the principle of concentration and prevents intervention from fully targeting the real sources of competitive disadvantage of the EU regions. In line with this objective the 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 the 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 underling socio-economic conditions in explaining differential regional growth performance. While the results of some of the former are biased by the counterfactual problem discussed above, the latter has rarely been fully exploited for the purpose of drawing 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, 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 shown to be factors 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.

This paper aims at assessing precisely this potential bias in the geographical allocation of the structural funds (Objective 1 and 2) in both the 1994-1999 and 2000-2006 programming periods[1] in order to shed some light on the coherence of the policy hitherto pursued and draw some implications for the future evolution of European regional policy.

More specifically, in this paper:

a) the spatial concentration of structural expenditure is analysed. A low degree of spatial concentration of regional funds would contradict the principle of territorial concentration introduced in the 1989 reform of the funds as an important prerequisite for their effectiveness;

b) the spatial concentration of EU funds is contrasted with an indicator of the socio-economic disadvantage of the EU regions. This analysis will allow us to investigate the coherence of the EU regional policies in terms of 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;

d) a simple convergence analysis is pursued in order to show that increasing the concentration of the funds and investing in the most disadvantaged areas could be the best strategy to promote cohesion.

A weak territorial concentration and a reduced correlation between the geographical allocation of the funds and the structural disadvantage would suggest that even before their operational translation into actual development policies, the impact of the funds may have been reduced by the inability to correctly select their targets i.e. the regions where socio-economic disadvantage is more severe.

[1] As will be discussed when presenting the dataset, major data limitations prevented us from including the 1989-93 programming period.

This paper is organized into five further sections. In the first section the approach adopted in the paper will be placed in the context of the academic literature on EU regional policy thus showing how the analysis of the spatial allocation of the funds can highlight inconsistencies in the structure of the policy that existing analyses have overlooked. In addition, the sources of regional socio-economic disadvantage identified by the literature on regional growth in the EU are briefly reviewed thus allowing us to single out some simple indicators to be used as a benchmark for the assessment of the correlation between structural funds and needs of the regions. In the second section the methodology followed to assess the spatial structure of both funds and socio-economic disadvantage is presented and an empirical model to measure the correlation between regional funds and socio-economic disadvantage outlined. In the third section the empirical results are discussed. The fourth section discusses some implications for the design of regional policies. The final section sets out some conclusions.

2.0 Regional policy and structural disadvantage

2.1 The EU regional policy, its objectives and the inconsistencies potentially reducing its impact

The European Community Treaty states 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 is included in the EU draft Constitution (article III-220).

The financial resources devoted to the pursuit of this objective have grown substantially over the years: from ECU 68 billion (at 1997 prices) allocated by the Brussels European Council in 1988 for the 1989-1993 period to the Euro 195 billion (at 1999 prices) of the 2000-2006 programming period[2] (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, even if the amount of resources devoted to the objective of promoting an "overall harmonious development" of the Union has not been negligible, the empirical literature has been unable to reach a consensus on the influence that the expenditure of such resources has had on the actual level of territorial cohesion of the EU. Although a comprehensive review of the terms of this debate lies outside the scope of this paper, we shall, nevertheless, refer to some of these empirical analyses - irrespective of their final conclusions on actual policy impact – in order to highlight the factors that may have prevented the policy from maximising its impact on territorial cohesion.

While Leonardi (2006) finds that the policy has "favoured the convergence of less developed regions toward the EU mean in terms of annual economic growth, employment level and unemployment between 1988 and 1999 and thereafter" (p.164) with a general trend towards convergence both at the national and at the regional level, Martin and Tyler (2006) – where

[2] 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).

assessing the possible effect of the policy on cumulative regional employment by explicitly addressing the counterfactual problem - conclude that "at the very worst, the Structural Funds may have helped to prevent a further widening of employment gap between the Objective 1 regions and the prosperous regions" (p.209). Conversely, other authors have emphasized both the lack of upward mobility of Objective 1 regions (which remained almost the same between 1989 and 2005 with a few exceptions[3]) and the absence of convergence across EU regions in contrast with the convergence observed across the member states that dominated the past twenty-five years of European growth (Boldrin and Canova, 2001; Magrini, 1999; Puga, 2002): a process of "club convergence" would seem to be in place across the EU regions, leading to the formation of clusters of regions with persistently different income levels (Canova, 2004; Quah, 1996 and 1997).

In the light of this debate, some empirical studies have attempted to explicitly address the different factors that may influence the capacity of regional policy to deliver its intended benefits, by providing an important tool for the improvement of actual policies. Midelfart-Knarvik and Overman (2002)'s analysis highlights the potential distortion generated by structural funds on the location decisions of R&D intensive firms. Structural funds provide an incentive for firms to locate in assisted regions with a poor endowment of human capital, 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 the skill mismatch). Thus, EU aid should be focused "on helping regions change their endowments and specialize according to the resulting comparative advantage" (p.352). Albeit produced using different theoretical frameworks[4], this evidence is not far removed from the results of Cappelen et al. (2003), who conclude that the impact of structural funds is positive but "crucially dependent on the receptiveness of the receiving environment" (p.640). In line with these results, Bondonio and Greenbaum (2006) find that

[3] Abruzzo (Italy) lost its Objective 1 status in 1997. A few regions and areas lost their Objective 1 status with the 2000-2006 programming period but received transitional support under Objective 1 of the Structural Funds for the period from 1 January 2000 to 31 December 2005 or 2006 (Commission Decision 1999/502/EC).

[4] While Midelfart-Knarvik and Overman (2002) focus on the determinants of firms' location, Cappelen et al. (2003) develop a "new growth theory" model with a Schumpeterian perspective.

Objective 2 programmes have proven more effective where pre-policy disadvantage is less accentuated. These findings emphasize the role of relatively more favourable contextual conditions/endowments, which in turn, lead to a paradoxical situation whereby EU funds fail to work precisely where they are most needed.

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

The evidence briefly reviewed above suggests the potential efficiency-loss caused by any "operational" mismatch 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. In this paper we aim to contribute to this debate by, instead, analysing the potential "spatial" mismatches between areas where the factors of disadvantage are concentrated and areas where the resources are being channelled by a policy design which may *à priori* reduce the funds' capability of delivering the expected benefits and tackling the "structural deficiencies in key factors of competitiveness" (CEC 2004). As a consequence, the paper will follow the existing literature and contribute to the ongoing debate by assessing a specific potential weakness of the EU regional policy and suggesting how potential improvements can be made. This will be done from a perspective that tends to be overlooked by the existing literature i.e. by focusing on the *à priori* allocation of the funds rather than on their ex-post impact. The empirical analysis of the convergence process of the EU regions will bring to light the importance of an allocation of funds that really reflects the actual socio-economic disadvantage (or "structural deficiencies" in Commission's words) of the EU regions.

2.2 Territorial concentration and correlation with structural disadvantage: a necessary pre-condition for policy impact.

Structural funds are designed to foster economic and social cohesion in the EU by promoting the economic development of lagging regions (Objective 1) and assisting economic and social restructuring in areas experiencing structural difficulties (Objective 2). However, "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" (Baldwin and Wyplosz, 2006, p.242). This process may be the result of the tendency of spatially targeted policy to spread and lose focus over time (Greenbaum and Bondonio, 2004), thus suggesting that "while making territorial discriminations, EU cohesion policy (…) has essentially been a policy for economic and social development for much of the last 30 years" (Bachtler and Polverari, 2007, p. 107). It was the pressure for setting aside budget resources aimed at financing the eastward enlargement of the EU that forced a reduction in both the areas eligible for assistance and community initiatives in the Agenda 2000 reform of the structural funds (Armstrong, 2001). Such a reduction was explicitly inspired by the principle of territorial and financial concentration: i.e. the relatively scarce resources for the EU regional policies should be channelled more specifically to where they are most needed in order to maximise their effectiveness. Over time the need for an increase in the geographical concentration of the structural funds expenditure has become progressively more apparent and "concentration" has been re-asserted, within the "framework for cohesion policy 2007-2013", among the key leading principles for the new programming period[5].

But why is geographical concentration so important for the impact of the policy? Intuitively a smaller number of beneficiaries may allow a larger amount of resources to flow in selected regions.

[5] COMMUNICATION FROM THE COMMISSION, Brussels, 05.07.2005 COM(2005) 0299, "Cohesion Policy in Support of Growth and Jobs: Community Strategic Guidelines, 2007-2013", p.8.

However, not only is the level of expenditure in the objective region relevant in itself 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 because an insufficient spatial "concentration" of the funds may decrease their impact by reducing the amount of such externalities "flowing" within the assisted areas. In this respect Bradley (2006) highlights that without such external effects there is no evidence of long term benefits from the structural funds: Structural Funds (SFs) externalities boost the impact of the SFs programmes while "benefits from structural funds *in isolation* are modest thus drawing attention to the fact that the real, long-term benefits of the SFs are more likely to be associated with the way in which each of the lagging economies responds to opportunities arising in the rest of the EU" (p.197).

In addition, the importance of the "capacity to respond" to external opportunities suggest that the spatial structure of the funds needs to be assessed in combination with the underlying socio-economic conditions of the assisted regions. In order to maximise their impact the funds should be directed where persistent factors of disadvantage prevent the local economy from fully expressing its potential (Mairate 2006) i.e. the geography of the funds should reflect as much as possible the geography of the structural disadvantage of the EU regions.

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

A specific set of factors has been shown by the literature to act as structural sources of competitive disadvantage for the local economy. Lagging regions in the EU, notwithstanding their, in many respects, profound differences, 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, 1998a). While some economic factors (such as capital and technology) seem more able to adjust to the challenges of the EU integration (by virtue of their relatively higher mobility), social structures tend to be much less flexible. Consequently, it is possible to identify a specific set

of "structural" conditions that are persistently associated with poor economic performance and which are very slow to adjust themselves endogenously. These factors concern, to different extents, features of the labour force, the employment of local resources, demographic structure and change, and the accumulation and quality of human capital (Rodríguez-Pose, 1998b).

However, the distinctive role of underling socio-economic conditions must be assessed in a theoretical framework where, in line with the Lisbon Agenda[6], innovation is explicitly considered the driving force for growth. The objective of an innovation-based growth model for the Union has guided the implementation of the EU structural policies and the assessment of their results since the year 2000. With the drawing up of the Community Strategic Guidelines "Cohesion Policy in Support of Growth and Jobs: Community Strategic Guidelines, 2007-2013" - which set out a framework for new programmes for the current programming period - "knowledge, innovation and the optimisation of human capital" are explicitly assumed as means whereby Europe can "renew the basis of its competitiveness, increase its growth potential and its productivity and strengthen social cohesion" (Presidency conclusions, European Council, March 2005 and incipit of the above-mentioned Community Strategic Guidelines). In addition the role played by the cohesion policy in pursuing the Lisbon agenda has increased in 2007-2013 programming period Financial Perspective, which concentrated expenditure on the Lisbon objectives (Presidency conclusions, European Council, December 2005).

In this political framework a variety of contributions have reformulated Romer's endogenous growth model in order to explicitly recognise growth as a multivariate process where human capital accumulation but also sectoral specialisation of the labour force, migration, university education

[6] The European Council, which met in Lisbon in 2000, set the goal of making the EU "the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion" (Presidency Conclusions, par. 5). The regional dimension of social cohesion is, together with full employment, explicitly mentioned as the ultimate expected outcome of the strategy. Crucially, the Lisbon strategy relies on the capability of knowledge to be translated into growth in order to deliver economic development. Furthermore, by focusing policy efforts on the creation and diffusion of knowledge, growth is not only supposed to be increased but also qualitatively improved in terms of sustainability, quality of employment, and (social and regional) cohesion.

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 the "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.

In line with the evidence produced by this strand of literature, 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. Innovation averse socio-economic conditions, by persistently hampering the growth capabilities of some areas, trace out the geography of the structural disadvantage of the EU territories (Rodríguez-Pose and Crescenzi 2008; and Crescenzi, Rodríguez-Pose and Storper 2007 for an EU-US comparative analysis). As a consequence, it seems reasonable that in terms of both equity and efficiency, the geographical allocation of regional funds should follow the spatial structure of these factors. Thus, regarding equity, such a distribution of resources across regions should compensate the residents of "disadvantaged" regions for unfavourable starting conditions (Bachtler and Polverari, 2007). And in terms of efficiency, giving adequate attention to the structural sources of competitive disadvantage of assisted regions seems the most effective way of promoting the full employment of local resources.

Altogether spatial concentration and correlation with the factors of disadvantage are necessary – though not sufficient - conditions for "ensuring that the impact of Structural Funds is not dissipated through resources being spread too thinly (…) geographically (…), while at the same time making sure that all regions with serious structural problems receive assistance" (CEC 2004, p. 164).

3.0 Where do the funds actually go? Assessing their territorial concentration and the coherence of their geographical allocation.

In the previous section we discussed the importance of the territorial concentration and geographical distribution of the funds in relation to the structural disadvantage of the EU regions for the success of any EU policy aimed at promoting regional convergence. This section sets out to outline an empirical strategy 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. The descriptive spatial analysis of both phenomena will be followed by an empirical analytic model that singles out the importance (statistical significance) of the socio-economic factors in driving 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 hitherto pursued.

In this section the methodology followed in the analysis is briefly presented together with the corresponding dataset. The empirical results are discussed in the fourth section.

3.1 A measure for socio-economic conditions: the "Socio-Economic Factors" variable

The variables that the existing literature has shown to be more relevant for describing the socio-economic disadvantage of a regional space – as discussed above - are those related to three main domains: educational achievements (Lundvall, 1992; Malecki, 1997), the productive employment of human resources and its demographic structure (Fagerberg et al. 1997). 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. In the second domain, 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. Long term unemployment represents the incidence of people whose possibilities of being productively involved in the labour market are persistently hampered by inadequate skills (Gordon, 2001). Agricultural employment is frequently

synonymous with "hidden unemployment"[7] and a backward structure of the local economy (Federico, 2006). For the third domain, the percentage of population aged between 15 and 24 is assumed as a proxy for the flow of new resources entering the labour force, thus "renewing" the existing stock of knowledge and skills (European Commission 2006) (see Appendix A for a detailed description of the variables). These factors are 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 multicollinearity[8], the socio-economic variables are combined by means of Principal Component (PC) Analysis (Jollifee, 1986). Consequently, the set of variables discussed above is "reduced" to an individual variable that is 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 to handle an individual variable that "summarizes" the multifaceted nature of the socio-economic conditions of each region. In the remaining part of the paper, this variable will be referred to as the "Socio-Economic Factors" variable.

3.2 The empirical model for the allocation of funds across regions

The empirical model aims at estimating 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, uncovering the coherence of the policy design with the identified sources of structural disadvantage. The final decision on the allocation of the funds is the result of a complex set of interactions between the Commission, the Council and the member states (also members of the Council) which may dilute the policy objectives originally set out in the strategic policy guidelines. Once the specific objectives and fields of intervention of the regional policy are translated into the necessary regulatory framework (Council Regulation) and general budget

[7] Where long term unemployment tends to be persistently high and labour mobility low, less skilled workers tend to move to the countryside to be employed, with a very low marginal productivity, in (frequently family owned) small farms thus allowing an easier access to primary goods.

[8] Which prevents their simultaneous introduction into the regression equation.

allocations (in their turn the result of complex multi-level bargaining process, see e.g. Bachtler and Wishlade, 2005 for a reconstruction of the 2007-2013 negotiation round) decided, the breakdown by member state of the commitment appropriation are calculated, for Objective 1, on the basis of a formula that takes into account the overall development of the country (national prosperity), the gap between the GDP per capita of the country's eligible regions and the Community average (regional prosperity) and the level of unemployment. This formula yields the "per capita aid" which is then applied to the population of the Member State's eligible regions (those with a GDP per capita, measured in purchasing power parities, below 75% of average Community GDP) thus providing the commitment appropriations for each member state. Once the national amounts are defined, the magnitude of each region's financial commitment is the result of the interaction between the Commission and the national and regional plans and priorities.

These complex institutional procedures, leading to the actual allocation of the funds to the regions often result in a final outcome not necessarily coherent with the principle of concentration evoked in the general framework of the policy. As a consequence, the assessment of the territorial concentration of the funds should not be limited to the designation of eligible areas but must also take into account the actual financial allocations to the regions.

Coherently, our empirical 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" the role of these factors in the actual allocation of the funds. The reduced weight of these factors in both the eligibility and the allocation decisions, which contradicts the principle of territorial concentration, can reflect:

a) the predominant role of "power" factors in the design of the policy where the present allocation of the funds might be the result of the political equilibrium reached in the bargaining process between the Commission, the Council, the national governments, the local governments and the various pressure groups (Lehman, 1994 suggests a "historical" tendency of spatially targeted policy to be "diluted" over time. See also Bachtler and

Wishdale, 2005 and Bachtler and Mendez, 2007 for a comprehensive analysis of these political dynamics in the negotiations for the various programming periods);

b) the willingness of the European policy-maker to privilege, in the distribution of the funds, the relatively more advantaged regions on the basis of the (questionable, as we will discuss later) assumption that this category of regions would show a better potential for growth and development.

Two models will be estimated in the empirical analysis. A first model analyses the allocation of Objective 1 and Objective 2 funds separately, while a second model considers the overall regional distribution of the structural funds. Our methodology will, up to a certain extent, follow Greenbaum and Bondonio (2004) who assess the territorial focus of spatially targeted policies in the US (Federal Empowerment Zones) and in the EU (Objective 2 programmes). Greenbaum and Bondonio develop an empirical model that estimates the probability that an area may become eligible for policy support as a function of that area's pre-designation characteristics. However, in accordance with our previous consideration, we have developed a more comprehensive model that assesses the territorial focus of the policy by simultaneously taking into account the eligibility criteria and the amount of funds allocated to this areas. Consequently, the first part of the empirical analysis is based on a two-stage Heckman selection model (Heckman, 1979; Green, 2003). The first stage determines "eligibility" as an Objective 1 (Objective 2) area. Such a decision is based on specific criteria that should improve the territorial concentration of the funds and, *à priori*, select the most disadvantaged areas according to each objective's "mission". However, such a decision can, in fact, be biased for the reasons discussed above. 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:

$$w_i = Z_i'\gamma + \varepsilon_i \qquad (1)$$

where

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

and

$\Pr(w_i = 1) = \Phi(\gamma' Z_i)$ and $\Pr(w_i = 0) = 1 - \Phi(\gamma' Z_i)$;

where: Φ(x) is the normal cumulative distribution function; Z_i is a set of socio-economic explanatory variables: the Socio-Economic Factors variable computed by means of Principal Components Analysis, some of its individual components and a set of national dummy variables; γ is a vector of parameters; and ε_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 *à priori* selection of eligible areas.

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

$$y_i = \alpha' X_i + \varepsilon_i \qquad (2)$$

Where y_i (>0) is the level of per capita commitment in region i, α is a parameter vector, X are the explanatory variables and ε_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 socioeconomic factors drive the observed level of total regional expenditure per capita (under both Objective 1 and Objective 2): the "composition effect" generated by interaction of Objective 1 and Objective 2 expenditure might even further "dilute" the policy targets.

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:

$$y_i = \alpha' X_i + \varepsilon_i \qquad (3)$$

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

3.3 The dataset

Since the objective of the analysis is to assess the coherence of the spatial allocation of structural funds with the sources of competitive disadvantage of the EU regions it is necessary to identify the most appropriate spatial scale of analysis in order to consider homogeneous and (to the extent possible) functionally "self contained" units in terms of both their capacity to receive funds (and exert political pressure for this purpose) and their socio-economic structure. Where funds are allocated to areas without any corresponding governance level and a reduced functional self-consistency, a leakage effect seems to prevail (due to the functional links of the area with the rest of the region) thus forcing us to assume that the entire region is a beneficiary of the funds. Consequently, given the constraint of data availability, but also for reasons of homogeneity and coherence in terms of the relevant institutional level discussed above, the analysis is based upon NUTS1 regions for Germany, Belgium and the UK and NUTS2 for all other countries[9] (Spain, France, Italy, the Netherlands, Greece, Austria, Portugal, Finland). This choice for the unit of analysis, while coherent with the objective of focusing the attention on "self-contained" functional regions of institutional relevance, may seem in contrast with the areas actually eligible for Objective 2 funds: designated areas are groups of contiguous cities or towns. The adoption of such a fine geographical level has proven problematic for the empirical analysis of both the structure and the

[9] Countries without a relevant regional structure (Denmark, Ireland, Luxemburg) were necessarily excluded from the analysis. In addition, regional data on many variables are not available for Sweden. 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 C), is not available.

impact of Objective 2 policies. The development of socio-economic indicators for actual Objective 2 designated areas would imply aggregating data from the appropriate NUTS5 level however - as highlighted in almost all similar existing research on structural funds - comprehensive data for the EU regions are only provided by Eurostat at the NUTS2 level (and, in some cases, not even at this level). Consequently, all the "macro" analyses of structural policy have been forced to rely on a larger (inevitably sub-optimal and partially arbitrary) scale of analysis (see Martin and Tyler 2006, p.204; Baslé 2006 p.226; Armstrong and Wells 2006 p. 270; CEC 2004 p.168). While, in this respect, our empirical analysis shares the limitation of all other empirical exercises on this same topic, this constraint does not fundamentally bias the results of the analysis. Viewing a map of Objective 2 areas it is immediately apparent that they cover a large part of the non-Objective 1 areas thus making the average per capita commitment at the NUTS 2 level, a reasonably good proxy for the actual commitment at the provincial or sub-provincial level. This idea is explicitly tested and empirically confirmed by Greenbaum and Bondonio (2004) who analyse the correlation of Objective 2 funds with their intended target in both NUTS3 level regions for the entire EU and in NUTS5 regions for the case of Italy (for which they find appropriate data from national sources). The results of the analysis are similar in the two cases but "at a finer geographical level it became much more difficult to distinguish treated from untreated areas" (p.331) i.e. finding a correlation between economic distress and Objective 2 eligibility. This evidence suggests that, when moving the focus of the analysis from larger areas to small geographic units (without any functional economic meaning) the level of correlation between funds and economic distress tends to decrease. As a consequence, our analysis, by considering large institutionally relevant units of observation may, at worst, overestimate the actual level of correlation. This potential upward bias of our results further reinforces the claim for increasing concentration that we will put forth in the subsequent analysis.

The data on the regional distribution of commitments[10] for structural fund expenditure stems from the European Commission website (Inforegio) and takes into account all structural funds[11]. In addition, the analysis relies upon an 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 the one hand, and Objective 2 and Objective 5b, on the other, are combined together for the 1994-1999 commitments.

The Operational Programmes (OP) and Single Programming Documents (SPD) for both programming periods have been associated to the appropriate NUTS region, providing the total committed expenditure in each region. The total commitment has been divided by the average population of the region during the respective programming period in order to obtain per capita expenditure. Unfortunately the analysis could not cover the first cycle of regional policy (1989-1993) since data on commitments provided by the European Commission (1997) do not include regional information for Greece, preventing any *à priori* comparability with the analysis pursued for the subsequent programming periods. Furthermore data on the socio-economic indicators for the 1988-89 reference year are only available for a few regions.

The data source for the socio-economic conditions of the EU regions is Eurostat's REGIO databank (see Appendix A for a detailed description of the variables). The year 1994 is assumed as reference year for the socio-economic conditions variables in order to minimize any potential endogeneity between higher (lower) funds and better (worse) socio-economic conditions.

4.0 Empirical results

4.1 Spatial concentration: structural funds vs. socio-economic disadvantage

[10] 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 *à priori* structure of the policy rather than estimating the impact of actual expenditure.

[11] The European Regional Development Fund (ERDF), the European Social Fund (ESF), the Guidance section of the European Agricultural Guidance and Guarantee Fund (EAGGF-Guidance) and the Financial Instrument for fisheries guidance (FIGS).

The analysis of the spatial distribution of the variables is pursued by calculating the value of Moran's I (see appendix C for technicalities). Moran's I is a measure of the global spatial autocorrelation of the variables (Cliff and Ord, 1981). When 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 cluster 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 of the strength of the spatial pattern i.e. the extent of the clustering process of similarly high/low values.

[Insert Table 1 around here]

Table 1 shows the value of Moran's I for regional expenditure under Objective 1 and 2 and for total structural fund expenditure. The table shows that a clear spatial pattern is identifiable in the distribution of both funds and indicators of socio-economic disadvantage. Moran's I is positive and significant in all cases, thus showing a positive spatial autocorrelation: regions with a high (low) level of expenditure (socio-economic disadvantage) tend to be clustered together. This result is in line with the principle of concentration of funds repeatedly claimed by the European Commission. However, if the results are examined in greater detail by considering the magnitude of the index, it is possible to note, as was expected, that Objective 1 tends to be more concentrated than Objective 2 expenditure which seems to respond more weakly to this principle of concentration (in both the programming periods). It must be noted, though, that the overall territorial concentration of expenditure has increased after the Agenda 2000 reform of the structural funds: Moran's I for Objective 1, Objective 2 and total expenditure has increased from one programming period to the other thus confirming the capacity of this reform to impact upon the final outcome of the bargaining process leading to the regional allocations of the funds. 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, in the last line of table

1, by the Moran's I for the Socio-Economic 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 Moran's I of the "Socio-Economic Factors" and that of structural expenditure shows that socio-economic factors are more spatially concentrated than structural funding. Thus, even if the territorial concentration of expenditure increased with successive reforms of the structural funds it seems to be still insufficient when compared to the spatial pattern of the sources of structural disadvantage. This provides the first evidence in support of our hypothesis of there being a "spatial mismatch" between the factor of structural disadvantage and regional funds, encouraging further analysis of the geographical allocation of the funds, and it also confirms the possibility of achieving greater spatial concentration while allowing for the regional allocation of the funds to be driven by the bargaining process between the Commission and the national and regional governments. However, as argued in the previous section, the existence of a clear spatial pattern in the allocation of the funds per se might not be sufficient for the policy to deliver the expected benefits; closer adherence to the regional sources of structural disadvantage might also be necessary.

4.2 The drivers of the regional allocation of structural funds

Following the specification presented in par. 3.2 we estimate a two-stage Heckman selection model for the allocation of Objective 1 (Tab.2) and Objective 2 (Tab.3) funds, highlighting the weight of the observed socio-economic factors in the "implicit" decision function for the regional allocation of structural 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 equations (1) and (2) are estimated by regressing the funds on the "Socio-Economic Factors" variable (column a) and on some of its individual components[12] (column b).

[12] As noted previously multicollinearity prevents the simultaneous inclusion of all these variables into the regression.

When looking at the results for the Probit Selection Model (lower part of the tables), which analyses the probability for a region of being eligible for Objective 1 (or Objective 2 in Tab.3) support, it should be borne 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, the parameters are informative as far as their signs and significance are concerned and provide information on how the factors of socio-economic disadvantage in fact influence the probability of a region of being assisted (or not)

[Insert Table 2 around here]

As regards Objective 1 funds (Tab.2), the Socio-Economic 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 criterion, based on per capita income, is a good proxy for weak socio-economic conditions. However, if the factors influencing the probability of becoming an eligible region are considered in greater detail (column b), we shall 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 being under the 75% of the EU average per capita income (thus becoming an Objective 1 region). On the contrary, other factors are less accurately proxied by the actual income-based eligibility criteria. The "percentage of the young population" is not significant while "tertiary education attainments" shows a positive sign meaning that in many cases the regions selected for assistance are not those with a relatively poorer human capital endowment.

In the second step of the model, the amount of funds received (by eligible areas) is analysed (Equation 2), assessing whether (and to what extent) the amount of funds allocated to each eligible regions is correlated with the magnitude of the regional socio-economic disadvantage. 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 by assisted regions (column a). In other words, the distribution of funds across the eligible areas does not seem to reflect their actual differentiated socio-economic status i.e. more disadvantaged regions do not receive more funds than regions with relatively more favourable conditions. When considering 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 educational achievements seems to reduce the amount of funds received in favour of less well endowed regions. The national dummies highlight a certain degree of national bias in the allocation of the funds in favour of some member states (in particular Germany and Spain in 1994-1999 and Spain in 2000-2006), but this bias seems to disappear when the socio-economic conditions are fully accounted for by the Social Factors variable. Such national bias can be considered the result of the systematically higher disadvantage of the regions of these countries (which the distribution of the funds is able to reflect), rather than the result of a more favourable treatment in favour of these countries.

Such evidence supports the idea that even if the present eligibility criterion is able to pursue a (rough) discrimination in favour of the relatively more disadvantaged regions, the amount of funds transferred to assisted regions is not correlated to the extent of their actual socio-economic disadvantage. This lack of correlation undermines the principle of concentration which, is regarded by the European Commission as a key pre-condition for maximising the impact of structural funds expenditure (CEC 2004).

[Insert Table 3 around here]

Table 3 presents, in the same way as in the previous table, the results for the estimation of the two-step Heckman selection model for Objective 2 funds. The results for the probit selection model (column a) show, as expected, that Objective 2 regions have 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[13] (a high % agriculture labour force tends to reduce the probability of being "selected"), suggesting that Objective 2 actions are still very much focused on industrial areas even after the merger with the former rural-area-oriented Objective 5b (column b). Furthermore the population of selected Objective 2 regions is relatively older in comparison with other areas (a high percentage of young people reduces the probability of eligibility) in accordance with the aim of providing support to less dynamic areas where ageing is a significant source of disadvantage. However, the present eligibility criteria seem unable to fully discriminate the areas with a relative scarcity of skilled labour, as shown by the non-significance of the education variable in 2000-2006 and, in particular, those where the long-term component of unemployment is higher (negative and significant signs in both programming periods). When we move on to the analysis of the determinants of the amount of funds allocated to the regions (Equation 2), 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 evidence supports the idea of an overall weakening of the coherence between the structural funds and their ideal targets operated by means of the expenditure under the Objective 2. On the contrary, where aiming at favouring the socio-economic "restructuring" of declining regions, Objective 2 funds should follow the geography of socio-economic disadvantage. If the existing eligibility criteria – being explicitly based upon a set of structural indicators –have been able to target the funds coherently with at least some of the sources of socio-economic disadvantage, the subsequent distribution of the funds to the eligible regions seems to be markedly in contrast with the principle of concentration. The bargaining process for the allocation of the funds seems again able to significantly dilute the policy objectives (in line with the conclusions of Greenbaum and Bondonio 2004 for Objective 2).

[Insert Table 4 around here]

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.

[13] For 1994-1999 Objective 5b funds, targeted towards rural areas, are combined with the Objective 2 funds, targeted towards "urban and industrial" areas, for sake of comparability with the 2000-2006 programming period when the two areas are put together under Objective 2.

The results for the regression of the level of total (Obj.1 + Obj.2) structural funds per capita on the socio-economic conditions (Equation 3) are presented. The overall amount of funds allocated to the EU regions partially reflects their underlying socio-economic conditions (column a), even if the percentage of the overall variability explained by such factors is relatively small. This suggests that, when the distribution of Objective 1 and Objective 2 funds is assessed jointly and in a systematic way, the focus of the financial resources on structural factors of disadvantage tends to be rather low. However, it is worth noticing that the R-squared shows an increase from 1994-1999 to 2000-2006 thus confirming that Agenda 2000 succeeded in increasing the level of territorial concentration and the overall correlation between the amount of funds and the magnitude of regional structural disadvantage. In this dynamic perspective, the EU regional policy seems potentially able to escape the "spatially targeted policy trap", as warned by Lehman (1994) and highlighted by Greenbaum and Bondonio (2004) for the case of Objective 2 funds i.e. the tendency towards losing focus and diluting the territorial concentration of the funds over time. While the territorial concentration of the funds still seems sub-optimal, this trend towards increasing concentration over time in response to the emphasis placed by the European Commission on this objective suggest that the claim for an increase in territorial concentration is a realistic achievement. When considering the specific socio-economic factors that influence the distribution of the funds (column b), we notice that the agricultural labour force, as a "traditional" source of disadvantage, still seems to be the main driver of the funds at the expense, 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 for which, in the 1994-1999 period, Germany also received particular benefit.

Overall this analysis of the "hidden" determinants of the allocation of the structural funds confirms a weak association between the funds and the structural disadvantage of the EU territories. While the reinforcement of the principle of territorial concentration has not only increased the spatial

concentration of the funds but also improved their adherence to these factors of disadvantage, the analysis highlights that there is still much more room for further improvement in both respects. In addition, while the general socio-economic structure of each regions should be taken into account by the allocation mechanism of the funds, some specific factors deserve greater attention in the context of the knowledge based economy. This is especially true for human capital accumulation, whose deficiency has been shown insignificant to determine the amount of resources received by the regions but which has become a key source of competitive advantage for both the development of Objective 1 and the restructuring of Objective 2 regions.

4.3 Socio-economic disadvantage and regional convergence

In the previous section it was argued that a potential explanation for the lack of correlation observed between the factors of socio-economic disadvantage and the amount of funds received by the EU regions might be explained in terms of the desire to privilege, in the distribution of funds, the relatively better endowed regions. This choice could find its theoretical justification in the emphasis on the receptiveness of the local economy as a prerequisite for successful regional policies. This standpoint, developed in the framework of the neo-Schumpeterian literature, regards relatively more favourable socio-economic conditions as necessary for the investment to deliver (Cappellen et. 2003) and, consequently, the policymaker may find it more cost-effective to channel funds towards relatively better-off regions (those supposed to show the better development potential) in order to maximise their impact. However, the empirical evidence on the economic performance of the Objective 1 regions over the 1994-2003 period (i.e. from the first year of implementation of the 1994-1999 programming to the most recent year for which regional GDP data are currently available) explicitly contradicts this assumption. When sigma-convergence is considered, by assessing the change in the total variance of the regional income per capita from 1994 to 2003, the lack of convergence for both the whole Europe and the subset of Objective 1 regions is apparent (Table 5).

[Insert Table 5 around here]

However, the comparison between the T_1 statistic[14] (i.e. the initial year variance/final year variance ratios) for all the EU regions and that for the Objective 1 only shows that dispersion of regional per capita income increased more significantly in the EU as a whole than in the Objective 1 regions, thus supporting the idea of there being a variety of "clubs" developing at different rates. The lack of a trend towards generalised (unconditional) convergence in the EU regions is confirmed by the simple beta-convergence analysis *à la* Barro-Sala-i-Martin (1992) presented in table 6.

[Insert Table 6 around here]

The regression shows a negative coefficient for the log of the initial level of the GDP per capita (Eq.1). However the evidence of unconditional convergence becomes much weaker and almost insignificant when a set of national dummies is introduced into the analysis (Eq.2) thus both controlling for the "national growth" effect and minimising the extent of spatial autocorrelation. The picture changes when the sub-sample of Objective 1 regions is considered separately: the degree of convergence is not only stronger (Eq.3) but it also remains significant after the introduction of the national dummy variables (Eq.4). This confirms the idea of a process of "club convergence" (Quah, 1996) among the Objective 1 regions which explicitly contradicts the idea of a better growth potential of the relatively more well-off regions (in line with Rodríguez-Pose and Fratesi 2004). On the contrary, the initially more disadvantaged Objective 1 regions seem to grow faster than other potentially better endowed areas in line with the evidence provided by Martin and Tyler (2006) on the capacity of structural funds to at least prevent a further widening of existing gaps . The catching up of the former with the latter uncovers the growth potential of the poorest Objective 1 regions, a potential that would have been more effectively emphasized by a higher degree of concentration of the structural funds thus allowing the maximisation of those externalities that Bradley (2006) has shown to be necessary if any long term impact is to be achieved. In

[14] The T_1 statistics is : $T_1 = \hat{\sigma}_1^2 / \hat{\sigma}_T^2$. Where $\hat{\sigma}_1^2$ is the variance of regional income per capita at time 1; $\hat{\sigma}_T^2$ is the variance at time t. This statistic is distributed as a F with (n-1; n-1) degrees of freedom (Lichtenberg, 1994).

addition, as shown above, such reduced concentration has been coupled with a lack of correlation between the funds and the factors of structural disadvantage. The growth potential of more disadvantaged regions is confirmed when disadvantage is assessed in terms of socio-economic factors and becomes very apparent when considering the Objective 1 subset alone (compare Fig.1 and Fig.2 where regional growth rates are scattered against socio-economic factors for all the EU15 regions and for the Objective 1 regions only).

[Insert Fig.1 and 2 around here]

However, when convergence is assessed on the basis of socio-economic factors (Tab.6; equations 5-8), the evidence suggests that, when national effects are controlled, many socio-economically disadvantaged regions are not able to catch-up with the EU as whole (Eq.7) and with the Objective 1 "club" (Eq.8). In other words, in line with the literature on the socio-economic preconditions for regional growth, we find that such factors have hampered the capacity of Objective 1 regions to converge. Consequently, while there is no evidence to encourage the targeting of resources towards relatively better endowed regions (the contrary is in fact true), there is plenty of evidence to support the necessity for the EU regional funds to tackle structural disadvantage. In consequence, the geographical correlation between such disadvantage and the allocation of the funds is confirmed to be a necessary condition for their effectiveness.

5.0 Some policy implications: how socio-economic factors could complement GDP per capita for a more effective allocation of the funds.

As extensively discussed in the previous sections the present allocation mechanism relies heavily on GDP per capita (at Purchasing Power Standard, PPS) to drive the allocation of regional funds: GDP per capita is not only the key determinant of the breakdown by member state of the commitment appropriation[15] but it is also used to grant eligibility to Objective 1 regions. However, where the

[15] It should be born in mind that, as discussed in details in section 3.2 the allocation of the funds at the country level are calculated on the basis of a funding formula, while the actual commitments at the regional level are based on the Operational Programmes which are the result of a bargaining process between the Commission, the national and the regional governments.

actual correlation between GDP per capita (at PPS) and the structural funds per capita allocated to the regions is assessed - as in table 7 – it becomes immediately apparent that the final outcome of the process of allocation of the resources to the regions is only a weak reflection of the underlying GDP conditions. Table 7 shows that the correlation between GDP per capita (at PPS) at the beginning of the programming period and total funds per capita (Obj1 + Obj2), though statistically significant, is far from perfect: the correlation coefficient is -0.65 for 1994-1999 and -0.59 for the 2000-2006 programming period. Furthermore this correlation sharply decreases when the sub-sample of Objective 1 regions is considered separately, the correlation between Objective 1 funds per capita and GDP per capita (at PPS) falls to -0.46 for 1994-1999 and -0.28 for 2000-2006 programming period.

[Insert Table 7 around here]

On the basis of this evidence it might be tempting to suggest improving territorial concentration and resource targeting by reinforcing this relationship between low GDP per capita (at PPS) and the amount of funds available, thus relying even more on this simple and readily available indicator. However, while our convergence analysis highlighted - in line with a significant body of literature - that socio-economic disadvantage should be the target of EU regional policy in order to promote convergence, the regression analysis of the regional allocation of the funds revealed that the present GDP-based allocation mechanism is ineffective in channelling funds towards structural socio-economic disadvantage, suggesting that a low level of GDP per capita per se would be a misleading driver for regional funds (lower level of GDP does not necessarily mean lack of convergence capabilities). In addition, table 7 also shows that the correlation between GDP per capita (PPS) and our measure of Socio-Economic disadvantage is rather low (slightly above 0.4): GDP per capita would also be a poor proxy for the underlying socio-economic disadvantage. This is confirmed when looking at Fig.3, where Objective 1 regions' GDP per capita is scattered against the Socio-Economic factors variables.

[Insert Fig.3 around here]

The scatter clearly shows that despite similar per capita GDP (at PPS) values there are extremely differentiated regional socio-economic conditions. Figure 3 is also helpful for the detection of the imbalances allowed by the current allocation mechanism, which becomes immediately apparent when regions are differentiated on the basis of their structural disadvantage. The graph combines information on GDP per capita (at PPS) (x-axis), Socio-Economic environment (y-axis) and the corresponding 2000-2006 Objective 1 funds per capita (the area of the symbols in the graph is proportional to the funds per capita allocated to each region) in Objective 1 regions. It provides us with visual confirmation of the lack of a systematic relationship between the support's magnitude and both GDP per capita and endogenous socio-economic conditions thus allowing us to identify the inconsistencies produced by the present allocation mechanism. Some regions show a similar level of GDP per capita and benefit from a comparable level of support, however, when their socio-economic environment is more carefully assessed (i.e. by means of our Socio-Economic factors indicator), marked differences become apparent. This is – for example - the case of the regions Campania (Italy) and Thüringen (Thuringia, Germany). In figure 3 both regions are close to each other on the x-axis (i.e. they have a similar GDP per capita in PPS) and are represented on the graph by a symbol of a similar size (i.e. in the 2000-2006 programming period benefited from a similar amount of resources per capita). However, their different y-coordinates (i.e. the value of the Socio-Economic factors variable) uncover intrinsic structural differences in terms of their capacity to converge: while Campania shows critical socio-economic conditions, Thüringen shows a relatively more favorable situation thus probably needing comparatively fewer resources to tackle its economic backwardness. Symmetrically, figure 3 allows the detection of regions benefiting from a significantly different level of support per capita while showing similarly unfavorable socio-economic conditions, as in the case, for example, of Alentejo (Spain) and Kriti (Crete, Greece). Even though these regions show a similar value in terms of their Socio-Economic factors variable (y-axis) a significantly higher amount of resources was committed to Alentejo .

The observed allocation of the EU funds is, as extensively discussed in this paper, the result of a complex bargaining process between the Commission, the member states and the regions in which power equilibriums and the differentiated capability of each region to "attract" (and lobby for) additional resources play a significant role. While this mechanism is to be preserved, as it provides an incentive for the capability of the regions to design and plan the policy measures to be actually implemented, the present analysis calls for a corrective mechanism able to increase territorial concentration and channel more resources towards relatively more socio-economically disadvantaged regions. Precisely the most disadvantaged (and institutionally weak) regions might be less able to effectively compete for the EU funds. The analysis pursued in this section has also highlighted the unsuitability of GDP per capita - where regional policy is seen as a tool to promote convergence - as a "driver" for an effective allocation of the EU regional funds. In the light of all this, how might the current mechanism be improved in order to achieve an allocation of the funds which is more in line with the regional sources of structural disadvantage? Of course, any change in the present allocation mechanism has to be balanced against the significant difficulties arising when any reform is to be negotiated among 27 Member States. However, our results suggest that – even while preserving the actual institutional procedure for the allocation of the funds and keeping largely unaffected the current allocation mechanism - significantly better targeting of the available resources could be achieved by combining GDP per capita with further information on the socio-economic conditions of the target areas. As shown in the empirical analysis, '75% of the EU's average per capita income (at PPS)' threshold for Objective 1 eligibility has guaranteed a certain degree of territorial concentration of the funds. However, the eligibility criteria based upon the level of GDP per capita provides only a rough assessment of the highly differentiated development capabilities of the local economies. Consequently, once eligibility is granted on the basis of this rule, areas (and the associated funds) should be further differentiated on the basis of a wider set of socio-economic indicators by "reserving" to the most socio-economically disadvantaged regions a

larger share of the available "convergence" (Objective 1 in the "old" terminology) resources. By differentiating the available resources into various "segments" made available to the regions according to their degree of structural disadvantage, the "fit" between the spatial distribution of the fund and the sources of socio-economic disadvantage would be improved.

This mechanism would help reduce the endogeneity of the actual allocation mechanism, which inevitably tends to favour actors with a better institutional endowment but, at the same time, it would maintain the final level of financing related to the planning capabilities of each region. The final commitments would still depend upon the plans presented by the assisted areas even though the pool of resources made available to the regions would vary according to their socio-economic conditions.

An example of the subdivision of total available resources into different "pools" made available to different "categories" of areas – though still "categorised" on the basis of their GDP per capita – has been already introduced in the 2007-2013 General Regulation for the structural funds[16]. A specific amount of the resources devoted to the Convergence Objective, remains earmarked to the 16 regions whose GDP per capita is 75% below the EU 15 average but greater than 75% of the per capita income of the EU 25 average (i.e. the regions loosing their eligibility due to the "statistical effect"). This subdivision in the allocation of the convergence funds aims at reducing the resources devoted to these regions considered, on the basis of their GDP, more advantaged than other convergence regions. However, in this case, the application of the GDP criteria has granted "automatic" eligibility to a very heterogeneous set of regions, thus allowing funds to flow towards relatively more advantaged areas at the expense of others where, although the GDP per capita is above 75% of the EU average, the socioeconomic conditions are more critical than in some of the other 86 convergence regions. The same is true for the complex of the 86 convergence regions, which includes, without any differentiation almost the entire territory of the new member states,

[16] COUNCIL REGULATION (EC) No 1083/2006 of 11 July 2006 laying down general provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund and repealing Regulation (EC) No 1260/1999

although a vast amount of literature has highlighted an astonishing variety in the socio-economic situations within these countries. Conversely, the application of a wider set of socio-economic indicators to further differentiate among these convergence regions, would have allowed for a finer *à priori* targeting of the resources.

The mechanism designed for the 2007-2013 programming period suggests that an agreement among the member states on "gradual" changes of the allocation mechanism is actually feasible. Our results suggest that a significant improvement in the present allocation mechanism would be achieved by integrating GDP with additional indicators able to take into account the differences that the literature and the convergence analysis have shown to be crucial for regional convergence capability, and which remain outside the scope of GDP per capita (PPS).

6.0 Conclusions

This paper sets out to investigate the coherence of the allocation of the structural fund to the regions with the principle of territorial concentration. While some contributions have suggested that the nature of the policies implemented within the EU regional policy framework might have curbed the impact of the structural expenditure at the level of territorial cohesion, this paper suggests that potential inconsistencies in the policy as regards the objective of territorial cohesion might have arisen at a more upstream phase i.e. in the allocation mechanism of the funds to the regions. This mechanism might not only have led to an insufficient territorial concentration of the expenditure but also to an insufficient correlation between the funds and the set of socio-economic conditions that shown to be responsible for hampering the economic success of many EU regions.

Our empirical analysis investigated both these issues in order to test this possibility which, where violating the principle of territorial concentration, might have prevented the structural funds from maximising their cost-effectiveness in terms of territorial cohesion. The results reveal that the regional distribution of the structural funds shows a degree of spatial concentration in compliance with the principle of concentration. However, while the theoretical discussion supported the idea

that the EU funds should be allocated in order to "compensate" for the structural disadvantage of the assisted areas (thus maximising their effectiveness), empirical results suggest that the disadvantage is more spatially concentrated than the associated funds: in this perspective the present level of concentration of the funds can be judged insufficient. Furthermore, the empirical model uncovered a weak association between the amounts of regional funds and the above-mentioned sources of competitive disadvantage, especially as far as the problem of human capital accumulation is concerned.

Such an inconsistent spatial allocation of the EU funds is likely to have reduced their capability to impact upon the regional growth performance of assisted regions and has inevitably produced a bias in the allocation of national resources as well, due to the co-financing mechanism[17], which forced the national co-financing of community funds.

The policy analysis suggests that such a geographical allocation of funds may be either the result of the political dilution of the policy objectives (required by EU political equilibriums) or the effect of an intentional focus on relatively better endowed regions. However, the empirical evidence casts doubt on the rationale of such a bias in favour of the areas believed to represent a more favourable condition of receptiveness for the funds.

Consequently, every effort should be produced not only to promote the spatial concentration of the expenditure (which is a necessary but not sufficient condition for increased effectiveness) but also to increase its capability to target the factors of socio-economic disadvantage. Furthermore, while not undermining the robustness of the analysis discussed so far, it is necessary to bear in mind that the analysis is based on Structural Funds data on financial commitments rather than on actual spending (the latter are not available until well after the programme periods have ended). As a consequence, actual expenditure, given the differentiated spending capacity of the various regions, might further accentuate the bias in the geographical distribution of the funds given that the more

[17] "Each euro spent at the EU level by cohesion policy leads to further expenditure, averaging 0.9 euros, in less developed regions (current Objective 1) and 3 euros in regions undergoing restructuring (current Objective 2)" COMMUNICATION FROM THE COMMISSION, Brussels, 05.07.2005 COM(2005) 0299, "Cohesion Policy in Support of Growth and Jobs: Community Strategic Guidelines, 2007-2013", p.7.

socio-economically disadvantaged regions are also more likely to record a relatively worse performance in terms of their capacity to translate commitments into actual expenditure.

The analysis has allowed the identification of simple improvements in the mechanism of allocation of the funds to the regions which, if implemented, would significantly increase territorial concentration and help channel more resources towards the most socio-economically disadvantaged areas. In the 2007-2013 programming period the "Convergence Objective" funds have been sub-divided into two different "pools", in order to further differentiate the resources devoted to eligible areas on the basis of their GDP per capita conditions. Our analysis suggested that the introduction of a similar differentiation of the resources available made to the eligible regions - where based instead on a proxy for socio-economic structural disadvantage – would provide an allocation of the funds more in line with the EU's regional policy objectives. It must be acknowledged that these critical issues (and geographical concentration in particular) have been explicitly considered by the European Commission when assessing the weaknesses of the past programming periods. However, when the Commission's analysis has to be balanced against not only the claims of individual countries in terms of budget equilibriums but also inaccurate diagnoses on where investment is more worthwhile, implementing concrete corrective measures turns out to be a very gradual process.

In conclusion, the discussion of the implication of the potential benefits of a more effective operationalisation of the principle of territorial concentration should not hide the crucial importance of the regional policy implemented. An increase in the territorial focus of the financial resources, by channelling more resources to the most disadvantaged regions does not per se necessarily imply an increase in their capability to converge (as the standard neo-classical framework would suggest). An increase in the Structural funds' focus on more socio-economic disadvantaged areas needs to be matched by appropriate actions for the reinforcement of their local governance and translated into

tailor-made local policies able to tackle the sources of structural disadvantage of each individual region in particular with respect to the challenges posed by the knowledge-based economy.

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APPENDIX A - Description of the variables

Variable	Definition
Structural Funds	
Objective 1 / Objective 2 Funds per capita	Total committed expenditure under Objective 1/Objective 2 in each region divided by the average population of the region during the programming period (1994-1999 or 2000-2006).
Socio-Economic Factors	
Life-Long Learning	Rate of involvement in Life-long learning - % of Adults (25-64 years) involved in education and training
Education Labour Force	% of employed persons with tertiary education (levels 5-6 ISCED 1997).
Education Population	% of total population with tertiary education (levels 5-6 ISCED 1997).
Agricultural Labour Force	Agricultural employment as % of total employment
Long Term Unemployment	Long term unemployed as % of total unemployment.
Young People	People aged 15-24 as % of total population
Socio-Economic Factors	The index combines, by means of Principal Component Analysis, the variables describing the socio-economic realm of the region (listed above).
Convergence Analysis	
Regional Growth Rate	Annual growth rate of real regional GDP (1994-2003).
Ln GDP 94	Natural logarithm of regional GDP per capita in 1994

APPENDIX B – The results for the Principal Component Analysis: the "Socio-Economic Factors" variable.

The principal component analysis (PCA) is "a statistical technique that linearly transforms an original set of variables into a substantially smaller set of uncorrelated variables that represents most of the information in the original set of variables: (…) a smaller set of uncorrelated variables is much easier to understand and use in further analysis than a larger set of correlated variables" (Duntenam, 1989 p.9). Through the PCA the original variables (in the case of our analysis the variables shown in literature as representative of the socio-economic disadvantage of the EU regions) are linearly combined by means of a set of "weights" (a_1, a_2, …, a_k) calculated in order to maximise (under the constraint of that the sum of the squared weights is equal to one) the variability of the resulting indicator, i.e of the principal component (our Social Factors variable).

Consequently the i-th principal component is:

$$y_i=a_{i1}x_1+ a_{i2x2}+\ldots+a_{ip}x_p$$

where (a_{i1},a_{i2} a_{ip}) are the wights and x_1, x_2, … ,x_k are the k variables.

It is possible to calculate as many PCs as the original variables under the constraint of non-correlation with the previous ones. Anyway the PCs are able to account for a progressively decreasing amount of the total variance of the original variables. Consequently, the procedure allow us to concentrate our attention on the first and limited number of PCs, which are the most representative of the phenomenon under analysis.

Table B-1 shows the Eigenanalysis of the Correlation Matrix. The first PC alone accounts for around 43% of the total variance with an Eigenvalue significantly larger than 1, the second PC accounts for an additional 22% of the total variability with an Eigenvalue still larger than 1. The first two principal components therefore explain a significant part of total variability (65%).

Tab. B-1 - Eigenanalysis of the Correlation Matrix

Eigenvalue	2.566	1.3311	0.8847	0.6542	0.5381	0.0259
Proportion	0.428	0.222	0.147	0.109	0.09	0.004
Cumulative	0.428	0.65	0.797	0.906	0.996	1

The coefficients of the first PC (Table B-2) assigns a large weight to the educational achievements of the population (0.576) and the labour force (0.551) and to the participation in Life Long Learning Programmes (0.383). A negative weight is, as expected, assigned to the agricultural labour force (-0.446) and, with a smaller coefficient, long-term unemployment (-0.139). The weight of the young population (0.006) is much smaller but positive. This first principal component provides us with the "joint measure" for each region's socio-economic conditions. Consequently, the first principal

component's scores are computed from the standardised[18] value of the original variables by using the coefficients listed under PC1 in table B-2.

Tab. B-2 - Principal Component Analysis: Principal Components's Coefficients

Variables	*PC1*	*PC2*	*PC3*
Education Population	0.576	-0.218	-0.043
Education Labour Force	0.551	-0.318	0.05
Life-Long Learning	0.383	0.326	0.355
Agricultural Labour Force	-0.446	-0.227	0.068
Long Term Unemployment	-0.139	-0.505	0.802
Young People	0.006	0.662	0.471

[18] Standardised in order to range from zero to 1

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

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

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

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 their *European Peripherality Indicators (E.P.I.).* and made available by the European Commission.

Tab.1 – Moran's I for Objective 1 and Objective 2 Funds per capita and Socio-Economic Factors.

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		
Socio-Economic 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 (Appendix B)

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

Programming Period	**1994-1999**		**2000-2006**	
			Equation (2)	
Variables	Coef.	Coef.	Coef.	Coef.
	(a)	*(b)*	*(a)*	*(b)*
Socio-Economic Factors§	3622.424		1218.957	
	(21602.14)		*(10951.03)*	
Education Population		-4988.11*		-1913.78***
		(2562.976)		*(456.1678)*
Agricultural Labour Force		-1348.16		-312.165
		(1043.342)		*(222.0423)*
Long Term Unemployment		-574.539		-89.498
		(588.8321)		*(110.8817)*
Young Population		-3218.96		-1067.57**
		(2456.867)		*(503.5399)*
National Dummies				
de	1286.602	1044.413***	264.6077	291.6251
	(3153.09)	*(362.087)*	*(1293.069)*	*(68.56178)*
it	10.02819	-119.275	83.11813	49.53745
	(2446.981)	*(215.7996)*	*(1066.923)*	*(46.58662)*
at	198.3732	309.7738	142.7548	180.4558***
	(3683.407)	*(279.0372)*	*(1579.302)*	*(60.11469)*
be	498.6349	281.757	100.9242	95.4871
	(3469.236)	*(304.0943)*	*(1514.511)*	*(62.36345)*
pt	-248.376	-362.557*	157.058	123.3903***
	(2651.336)	*(186.396)*	*(1134.62)*	*(38.62917)*
nl	512.8831	369.2325	122.9396	134.3599***
	(3378.771)	*(316.798)*	*(1487.263)*	*(66.7445)*
uk	745.6835	398.8849*	193.8667	129.0245***
	(3216.694)	*(227.0967)*	*(1310.763)*	*(43.20416)*
es	621.0167	634.0799**	252.0606	319.0792***
	(2306.694)	*(288.4948)*	*(997.5152)*	*(59.05076)*
gr	192.1769	224.2701	-21.8073	-1.55839
	(2456.519)	*(187.8398)*	*(1054.395)*	*(39.39773)*
fi	534.0902	233.248	0.204899	-32.9576
	(2926.159)	*(286.6558)*	*(1271.065)*	*(57.13414)*
Constant	3561.73	2025.47***	1614.26	574.4937***
	(14885.26)	*(659.4408)*	*(11007.22)*	*(137.1147)*
		Probit Selection Model (Equation 1)		
Socio-Economic Factors §	-1.4158***		-1.0370***	
	(0.348857)		*(0.329578)*	
Education Population		5.044067*		5.754955***
		(2.89385)		*(2.826307)*
Agricultural Labour Force		17.32992***		15.12283***
		(3.535073)		*(3.218646)*
Long Term Unemployment		3.435833***		2.609007***
		(1.171702)		*(1.091462)*
Young Population		5.912144		6.068956
		(4.973609)		*(4.78766)*
Constant	0.265963	-4.737***	0.16692	-4.25439***
	(0.17737)	*(1.13581)*	*(0.172587)*	*(1.07249)*
rho	-1	-1	-1	-0.94973
sigma	4846.965	358.7948	2111.375	69.35247
lambda	-4846.97	-358.795	-2111.37	-65.866*
	(23328.48)	*(178.5998)*	*(15897.1)*	*(41.52635)*
*, ** and *** denote significance at a 10%,5% and 1% level respectively. SE in parentheses				

§This variable is the linear combination of the socio-economic variables described in the text and is calculated through the Principal Component Analysis (Appendix B)

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

Programming Period	**1994-1999**		**2000-2006**	
			Equation (2)	
Variables	Coef.	Coef.	Coef.	Coef.
	(a)	*(b)*	*(a)*	*(b)*
Socio-Economic Factors §	41.24806		15.24312	
	(979.3314)		*(360.1518)*	
Education Population		-1473.4		-219.959**
		(2604.039)		*(86.8514)*
Agricultural Labour Force		-2313.08		146.9052
		(5708.642)		*(213.0774)*
Long Term Unemployment		-292.403		45.70872
		(1097.94)		*(53.61375)*
Young Population		-2649.94		-95.0998
		(4296.254)		*(299.439)*
National Dummies				
de	-14.1343	-21.8045	-15.2183	-16.5432***
	(61.11901)	*(131.9588)*	*(25.85857)*	*(5.622292)*
it	13.79382	18.6619	-41.2794	-43.8702
	(83.21526)	*(147.3966)*	*(38.36847)*	*(7.736061)*
at	-31.6908	42.80739	-20.1437	-5.56321
	(69.25755)	*(211.879)*	*(27.39351)*	*(9.046899)*
be	-4.40015	-54.1565	-6.2263	-17.4202
	(124.5079)	*(220.7587)*	*(61.19157)*	*(11.50549)*
nl	74.98787	116.1177	1.86291	-1.35525
	(81.38781)	*(221.6512)*	*(43.41586)*	*(12.65517)*
uk	51.9274	46.94875	15.96409	6.896866
	(82.03706)	*(139.8897)*	*(35.93839)*	*(6.055499)*
es	151.6018**	123.0932	25.25797	20.99423**
	(72.02708)	*(218.1189)*	*(30.96621)*	*(10.78373)*
fi	77.1801	70.01067	-28.5619	-33.2919***
	(113.6932)	*(235.5529)*	*(49.59434)*	*(11.58116)*
Constant	-66.0253	726.9151	-34.9188	52.246
	(1528.65)	*(1291.69)*	*(511.2596)*	*(67.34726)*
		Probit Selection Model (Equation 1)		
Socio-Economic Factors §	1.121132***		1.331961***	
	(0.330526)		*(0.343357)*	
Education Population		-7.02116**		-3.15919
		(2.844077)		*(2.750046)*
Agricultural Labour Force		-16.0497***		-14.7694***
		(3.350845)		*(3.387493)*
Long Term Unemployment		-3.23574***		-3.56761***
		(1.131636)		*(1.134586)*
Young Population		-10.283***		-19.6541***
		(4.739716)		*(5.100463)*
Constant	-0.22104	5.339909***	-0.38479***	6.028806***
	(0.173643)	*(1.114868)*	*(0.178404)*	*(1.164758)*
rho	1	1	1	0.11154
sigma	214.6384	363.2897	96.03772	13.05521
lambda	214.6384	363.2897	96.03772	1.456141
	(1720.033)	*(714.9973)*	*(517.8416)*	*(28.80728)*

*, ** and *** denote significance at a 10%,5% and 1% level respectively. SE in parentheses

§This variable is the linear combination of the socio-economic variables described in the text and is calculated through the Principal Component Analysis (Appendix B)

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

Programming Period	**1994-1999**		**2000-2006**	
Variables	Coef.	Coef.	Coef.	Coef.
	(a)	*(b)*	*(a)*	*(b)*
Socio-Economic Factors §	-327.894***		-162.214***	
	(129.8615)		*(42.01456)*	
Education Population		771.8936		-10.0642
		(863.6608)		*(231.26)*
Agricultural Labour Force		1846.892***		703.0175***
		(566.4197)		*(195.4019)*
Long Term Unemployment		363.4748		119.7216
		(264.9683)		*(81.18214)*
Young Population		3029.142**		1200.057***
		(1395.854)		*(494.6487)*
National Dummies				
de	294.7922***	205.139**	65.45534**	35.56319*
	(111.1332)	*(81.83613)*	*(27.4801)*	*(20.35761)*
it	57.38723	46.11072	-9.09578	-22.1725
	(80.60264)	*(96.23988)*	*(27.36722)*	*(26.60234)*
at	-37.8744	-71.8916	-17.1091	-40.7265
	(63.17935)	*(99.93928)*	*(25.62074)*	*(37.53585)*
be	153.1352	-15.7337	54.42931*	-2.24039
	(100.7441)	*(119.9024)*	*(26.19563)*	*(30.53526)*
pt	-58.9707	-69.3652	179.3968***	167.1739***
	(73.48608)	*(93.02556)*	*(42.1867)*	*(52.87925)*
nl	91.98157	-194.286*	20.23761	-95.4172***
	(61.66183)	*(107.3449)*	*(19.88387)*	*(36.32245)*
uk	214.5534***	60.30519	102.6423***	33.96666
	(83.53881)	*(56.59665)*	*(27.09222)*	*(22.9845)*
es	460.8256	130.3368	173.652***	50.1997
	(87.2242)	*(130.6492)*	*(36.87841)*	*(47.33312)*
gr	348.8422	61.27249	-9.13357	-114.086**
	(96.97734)	*(152.8804)*	*(25.41967)*	*(52.04321)*
fi	233.367***	82.88095	-15.2933	-78.7236***
	(83.44499)	*(102.4067)*	*(10.75426)*	*(27.42229)*
Constant	247.3297	-596.29*	111.9031***	-178.189**
	(60.25865)	*(307.5034)*	*(18.47053)*	*(89.55031)*
R-squared	0.37	0.46	0.46	0.56
F-stat	8.71***	5.47***	17.38***	7.62***

*, ** and *** denote significance at a 10%,5% and 1% level respectively. SE in parentheses

§This variable is the linear combination of the socio-economic variables described in the text and is calculated through the Principal Component Analysis (Appendix B)

Tab.5 – Testing sigma-convergence of regional GPD per capita, 1994-2003

Test for sigma convergence

	1994	2003	T_1	p
		All regions		
Sigma^2	33376383.85	43887527.32	0.760498	0.94
		Objective 1 regions		
Sigma^2	9532911.765	11726050.54	0.812969	0.77

Tab.6 – Regression analysis for beta-convergence

Dependent Variable: growth rate of regional GDP per capita, 1994-2003

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
Constant	0.1207***	0.0702***	0.1582	0.1368**	0.017575***	0.01273***	0.02049***	0.1323**
	(0.0133)	*(0.0202)*	*(0.0267)*	*(0.054)*	*(0.00066)*	*(0.00144)*	*(0.00101)*	*(0.0645)*
LnGDP'94	-0.0108***	-0.00406*	-0.01494***	-0.0128**				
	(0.00140)	*(0.00208)*	*(0.00292)*	*(0.00565)*				
Socio-Economic Factors					-0.000966**	6.88E-05	-0.001790***	-0.00017
					(0.00041)	*(0.00056)*	*(0.00052)*	*(0.00129)*
National Dummies	no	yes	no	yes	no	yes	no	yes
Regions	All	All	Obj.1	Obj.1	All	All	Obj.1	Obj.1
R-Sq	31.60%	59.5%	33.9%	60.5%	4.00%	58.20%	18.4%	60.5%
R-Sq (adj)	31.10%	55.7%	32.6%	49.9%	3.30%	54.30%	16.8%	48.7%
F-stat	59.63***	15.86***	26.18***	5.71***	5.44**	15.04***	11.51***	5.11***

*, ** and *** denote significance at a 10%, 5% and 1% level respectively. SE in parentheses

Table 7 - Correlation analysis, GDP per capita (pps), Socio-Economic Factors and Regional Funds

	GDP per capita (pps) 1993	GDP per capita (pps) 1999	Socio-Economic Factors	GDP per capita (pps) 1993	GDP per capita (pps) 1999	Socio-Economic Factors
	Correlation coefficient			Spearman Rank Correlation (Rho)		
All regions						
Socio-Economic Factors	0.4221*	0.4557*		0.3786*	0.4107*	
	0.0000	*0.0000*		*0.0000*	*0.0000*	
Total Funds per capita 94-99	-0.6460*		-0.2816*	-0.7782*		-0.3229*
	0.0000		*0.0011*	*0.0000*		*0.0002*
Total Funds per capita 00-06		-0.5892*	-0.3369*		-0.7700*	-0.3524*
		0.0000	*0.0001*		*0.0000*	*0.0000*
Objective 1 Regions - 1994-1999						
Obj.1 Funds per capita 94-99	-0.4624*		-0.0210	-0.4204*		-0.0043
	0.0006		*0.8838*	*0.0021*		*0.9764*
Objective 1 Regions - 2000-2006						
Obj.1 Funds per capita 00-06		-0.2849*	-0.2705		-0.1923	-0.2047
		0.0386	*0.0501*		*0.1677*	*0.1414*

* correlation coefficients significant at the 5% level or better

Fig. 1 – Regional growth rate (94-03) vs. socio-economic factors, all regions

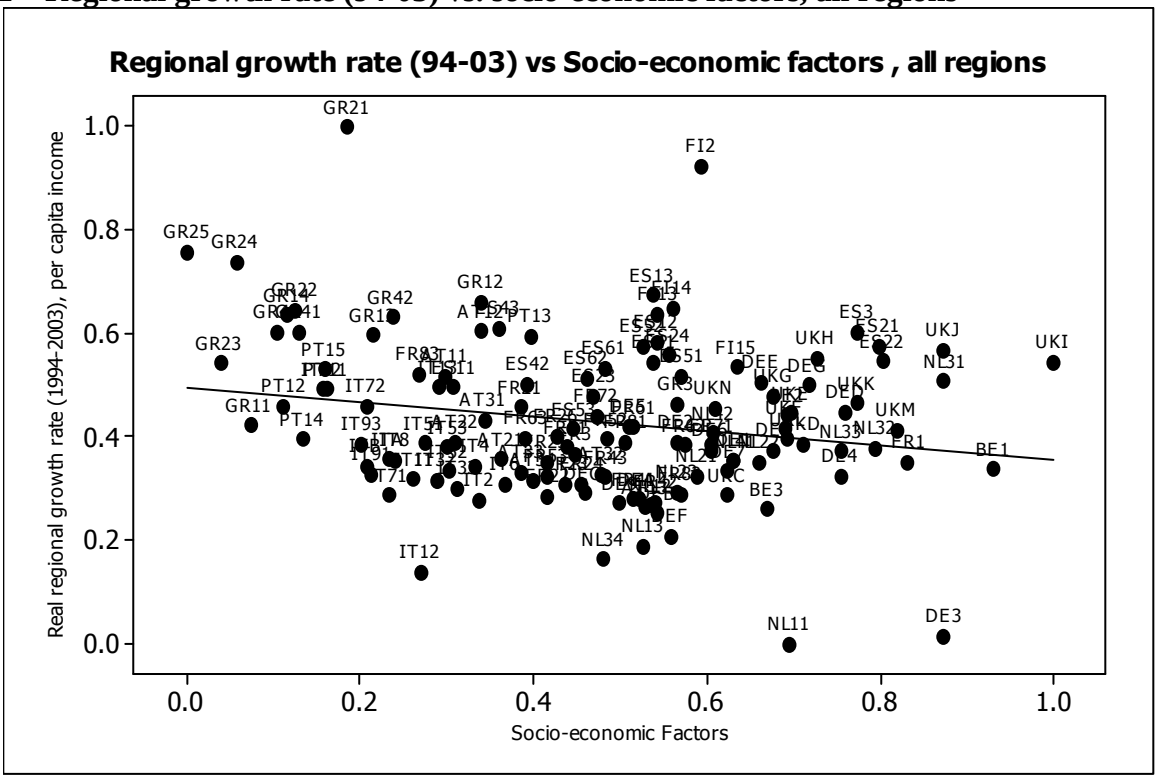

Fig. 2 – Regional growth rate (94-03) vs. socio-economic factors, Objective 1 regions

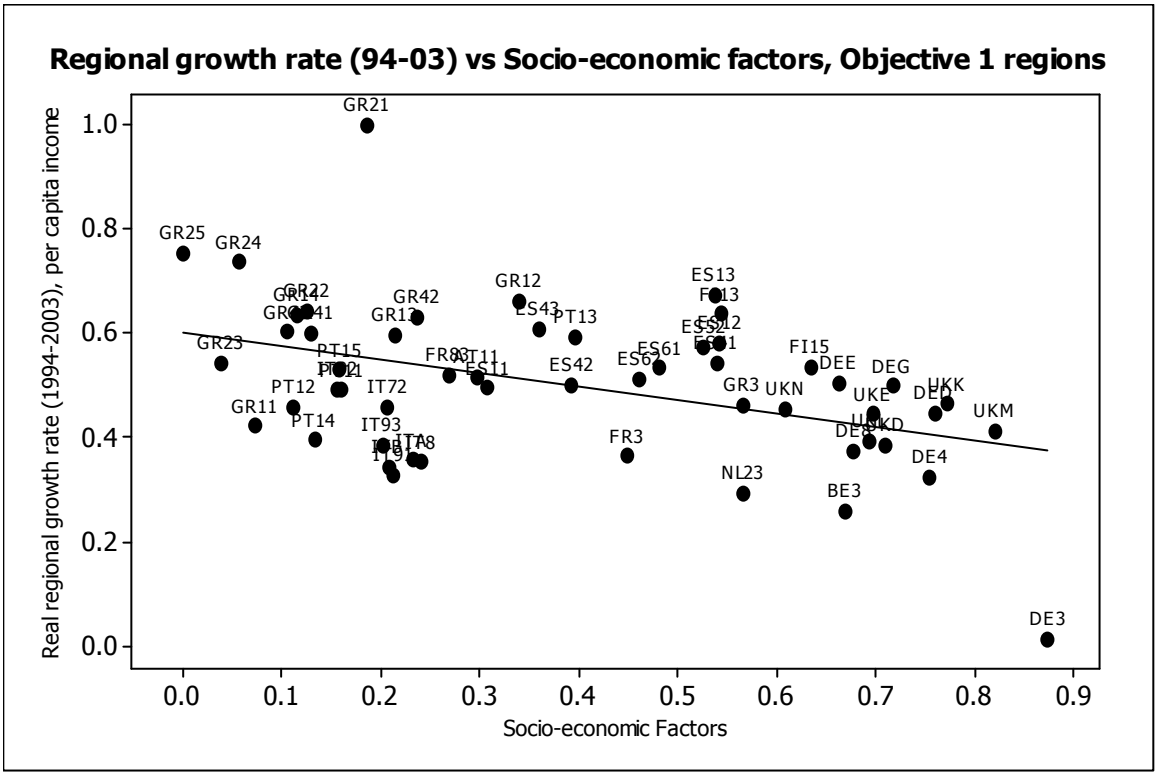

Fig. 3 – GDP per capita, Socio-Economic Factors and Obj.1 Funds