

ISAE Istituto di Studi e Analisi Economica

**REGIONAL INEQUALITIES AND COHESION  
POLICIES IN THE EUROPEAN UNION**

by

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## **ABSTRACT(\*)**

In spite of the huge amount of public aids to poor regions, relative movements in the distribution of income, labor productivity and employment rates across European regions show no positive relation with the distribution of the Structural Funds. Specifically, widening employment gaps and a growing positive correlation between productivity levels and employment rates are brought to light. Furthermore, although the distribution of Funds committed by the Commission appears conform to equity and cohesion principles, once the total cost of projects – which includes the contribution of national authorities - is considered, the image of equity is blurred. This bias in the allocation process may have contributed to the scarce efficiency of EU regional policy carried out during the nineties.

JEL classification: O18, O40, R23, R53, R58

Keywords: Economic Growth, Regional Labour Markets, Infrastructures, Regional Development Policy

*(\*) Though this paper is the result of the joint research of the authors, only for administrative reasons Section 1 can be attributed to Roberto Basile and Alessandro Girardi, Sections 2, 3 and 4 to Roberto Basile and Section 6 to Sergio de Nardis.*

## NON-TECHNICAL SUMMARY

This paper focuses on regional convergence in Europe and on the role of public effort to reduce regional inequalities. The empirical evidence confirms that in the late-eighties and the nineties there was no regional convergence of real *per capita* incomes, analyzed in its two components, namely the employment rate and labor productivity. The lack of convergence is mainly due to the rise of employment gaps. Labor productivity has shown weak convergence. Besides, a growing positive nexus between productivity and employment rate arose, widening regional income inequalities.

The paper also analyzes the impact of public infrastructures on regional growth. The evidence shows that the infrastructure endowment has a positive influence on regional productivity, but exerts no direct effect on the employment rate. An indirect effect of infrastructures on employment growth however occurs: investments in infrastructure projects help create a more skilled labor force, which, in turn, by attracting more private investments, generates employment opportunities. A sort of “development trap” arises, since an inadequate level of infrastructures favor a relatively low level of productivity, which may imply a poor employment dynamics, lower than average.

Then, an exercise has been undertaken to determine whether the disbursement of the EU’s regional program funds has conformed to basic regional macroeconomic criteria. The results confirm that the allocation of Structural Funds committed between 1988 and 1999 has acted in compliance with equity and cohesion principles pursued by the EC. Once the total cost of the projects - which includes the contribution of national authorities - is considered, the image of equity is blurred.

These allocation problems may have contributed to the inefficiency of EU regional policy during the nineties. A further analysis has shown that during the period 1988-98 the relative movements in the regional distribution of *per capita* incomes, productivity levels and employment rates registered no positive relation with the allocation of Structural Funds.

The analytical discussion of the empirical results leads to some policy implications. Firstly, infrastructural investments, the main targets of Structural Funds, tend to act uniquely on labor productivity. However, in presence of a low propensity to regional labor mobility and an insufficient regional wage differentiation, investments in infrastructure may modestly contribute to the catching up of poorer regions. These remarks highlight the need to join infrastructural policies to labor market reforms, in order to favor the convergence in employment levels. Labor market policies aimed at promoting regional convergence should favor the wage differentiation, by shifting for example the wage determination from the centralized to the firm level wage bargaining process.

As far as the EU Structural Funds inefficiency is concerned, the chain linking public financing, investment in infrastructure and productivity growth must be improved: Structural Funds do not always mean *good* infrastructures. Besides, the overall amount of public resources is *de facto* not distributed on the basis of cohesion criteria. To improve the quality of public support, the administrative efficiency and the regions' planning and spending abilities should be enhanced, particularly those of less favored regions. To this end, a changeover of the administrative personnel cannot be avoided and efficiency-improving mechanisms must be adopted. Incentive systems, such as the premium reserves, as well as the adoption of careful monitoring mechanisms, might be useful to respect the program ends. Besides, more decentralization of the decision-making process would considerably increase the efficiency of public intervention.

The main problem of conceiving a new regional policy within an enlarged EU remains open. With a 27-member EU, the average *per capita* GDP would considerably decrease. Many regions which at present benefit from Objective 1 Funds would be excluded, and not for a real improvement of their situation but for uniquely statistical reasons. Different solutions have been proposed to solve this problem. However, they appear either hardly acceptable by less developed regions, or "dangerous" for the Union budget.

# **DIVARI REGIONALI DI SVILUPPO E POLITICHE DI COESIONE NELL'UNIONE EUROPEA**

## **SINTESI**

Nonostante il notevole ammontare di fondi pubblici impiegati per sostenere lo sviluppo delle regioni arretrate, i movimenti relativi nella distribuzione tra le regioni europee del reddito pro capite, della produttività e dell'occupazione non hanno evidenziato alcuna relazione positiva con la distribuzione dei Fondi Strutturali impegnati. Si rileva, in particolare, un aumento nella dispersione dei tassi di occupazione e una crescente correlazione positiva tra livelli di produttività (fortemente connessi ai livelli di infrastrutture) e tassi di occupazione. Si dimostra inoltre che, mentre l'allocazione dei fondi impegnati dall'Unione Europea ha risposto a principi di equità e coesione, la distribuzione regionale del Costo totale dei progetti da finanziare (comprensivo dei contributi nazionali) è solo debolmente correlata con il livello iniziale di PIL pro capite e con la dotazione di infrastrutture. Tale distorsione nel processo allocativo può aver contribuito all'inefficienza delle politiche regionali dell'UE condotte durante gli anni novanta.

Classificazione JEL: O18, O40, R23, R53, R58

Parole chiave: Crescita economica, Mercati regionali del lavoro, Infrastrutture, Politiche di sviluppo regionale

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## INTRODUCTION

Over the past fifteen years, income differences across European Union (EU) member States have fallen, but inequalities between regions within these countries have risen. The persistence of significant regional differentials in face of economic and monetary integration poses two questions. The first one concerns the effects of a closer integration (macroeconomic policy convergence and greater factor mobility) on regional inequalities; the second one regards the efficiency of the regional policies carried out by the European Commission (EC) since the late-eighties. These questions take up a still greater importance in the light of a future EU enlargement to countries with *per capita* incomes lower than the present EU average: development gaps will further widen and a reform of the cohesion policy could not be avoided.

With regards to the effects of the European integration, the risk that it may be associated with increased inequality between regions has long been a key concern of policy makers. Indeed, a message of the “new economic geography” (see Fujita, Krugman and Venables 1999) and of “the new growth theory” (Lucas 1988; Romer 1990; Grossman and Helpman 1991) is that, in presence of increasing returns and local externalities, a greater integration may fuel further regional divergence. The dismantling of trade barriers (including the adoption of a common currency) reduces transactions costs between regions and leads to the spatial agglomeration of productive activities in the richest and most thickly populated areas<sup>1</sup>. “Clustering together” represents a strong advantage for firms, as they have access to a wide supply of specialized inputs, large pools of skilled labor, high quality infrastructures and technological knowledge evolving in the close firms (i.e. the so-called pecuniary and technological externalities). Besides, concentration is favored by (internal) increasing returns: it is always profitable to produce in richer area, the larger market (the Center), in order to maximize the benefits of economies of scale. When transaction costs between regions fall, business firms can then exploit these economies of scale while also selling on the small market (the periphery) which is less protected by high transaction costs. In addition, when income inequalities between regions increase, industrial agglomeration likewise increases, since economies of scale give firms an incentive to locate where demand is strongest and income consequently highest.

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<sup>1</sup> The asymmetric distribution of population and productive activities in Europe is well described by the example of the hot banana, i.e. the strong concentration of lights in the Center, namely in the area from Northern London to Northern Italy, shown by satellite photos.

Agglomeration forces lead to increase the distance between the Center and the periphery. The heart of the economic activities will lie in the Core regions, while those activities closely linked to the exploitation of local natural resources (typically agriculture) and non-tradable production (mainly services) will remain in the periphery. These tendencies are associated to two well-known features of the EU territory: i.e. a low propensity of the population to move “between and within” the Member States and an inadequate inter-regional differentiation of wages due to various types of institutional constraints. Hence, the Core/periphery pattern, induced by economic integration, is mirrored in the widening of income gaps and, even more, in unemployment gaps.

However, endogenous growth models and new economic geography do not lead to the result that a Core-periphery structure of economic activities is unambiguously bad from an efficiency point of view. Spatial concentration has indeed an impact on the rate of innovation and hence on the long term growth of the overall economy, because the cost of innovation in the richer region falls as the agglomeration of economic activities increases (Martin 1999: 13).

Public intervention, instead, can be defended on welfare grounds (Martin and Ottaviano 1996). The uneven, and socially unacceptable, spatial impact of economic integration justifies indeed EU public support in favor to backward regions. Structural Funds and the Cohesion Fund aim to contrast the “natural” trends of productive localization by trying to achieve near regional uniformity of income and (relative) factor endowments. EC’s approach is not simply to transfer resources in a bargaining game between countries. Rather, it consists of creating favorable environmental conditions in the peripheral areas “thorough investment to strengthen the economic base in recipient regions” (EC 1996). Thus, Structural Funds are widely used (more than 60%) to finance investment project for public infrastructures in backward regions, since in EC’s view the infrastructure gap represents one of the main causes for regional inequalities. Instead, institutional choices which affect regional development gaps (first of all domestic labor market institutions) are left to single Member States.

Taking into account all the factors considered above, this paper analyses the efficiency of EU regional policies - as they have been carried out since 1988 - as against the objective to support regional cohesion. The work is organized as follows. Section two reports some evidence on regional disparities in Europe for the period 1975-98, based on a sample of 119 EU regions (NUTS2 level). Section three presents an empirical investigation of the effect of public infrastructures on regional productivity growth. Section four proposes an analysis of the macroeconomic determinants of Structural Funds allocation in



order to verify the respect of the equity principle in the regional distribution of public resources. In section five an attempt is made to evaluate the impact of EU regional policies on the change of the overall distribution of *per capita* incomes, productivity levels and employment rates. Section six resumes the main empirical results. The last section discusses the policy implications.

# 1. “REAL” REGIONAL CONVERGENCE: PER CAPITA INCOMES, LABOR PRODUCTIVITY AND EMPLOYMENT RATES

## CONVERGENCE IN PER CAPITA GDP LEVELS

The level of *per capita* GDP, measured in PPP, is the main economic indicator adopted by the EC, as well as by other international institutions (World Bank, IMF, OECD, United Nations), to compare the development levels of different countries and regions. In this paper too, the investigation of EU regional development is based on the examination of *per capita* GDP (or incomes)<sup>2</sup>.

The dynamics of regional development in Europe mirror both the specific trends of those dynamics and the trends of the countries to which the regions belong. These two behaviors - both regional and national - exerted different influences on the regional convergence process in different phases of the European integration. The available evidence shows that, in the period of strong inter-regional and international labor mobility going from 1950 till the mid-seventies, regional *per capita* income gaps have been gradually diminishing, reflecting the real convergence of specific regional components<sup>3</sup>. In the decade 1975-85, the regional disparities widened and have narrowed again since the mid-eighties. Unlike what happened in the period 1950-75, the gradual but considerable thinning of the gaps between countries uniquely caused the recent narrowing of regional differences. In other words, over the past fifteen years, the differentials between countries have been diminishing again, while those between regions of different countries remained almost unchanged. The convergence between European regions observed over the past few years was but the fruit of the catching up process started by some Member States.

For the examination of the different convergence processes between the EU-12 regions and within each country<sup>4</sup>, the two classical methods of convergence analysis were adopted, that is  $\sigma$  convergence and  $\beta$  convergence. The former method consists of computing the standard deviation of the natural logarithm of

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<sup>2</sup> In the text, the words *per capita* GDP, income and gross value added (GVA) are used as synonyms to evaluate the regional development levels.

<sup>3</sup> Over the past few years, many contributions to the analysis of convergence process between European regions were published. Among these, Barro and Sala i Martin (1991 and 1995), Armstrong (1995), Fageberg and Verspagen (1995), Neven and Gouyette (1995), Quah (1996), Paci and Pigliaru (1997), Acconcia (2000), Terrasi (2000) and Boldrin and Canova (2001).

<sup>4</sup> The evaluations of regional gaps are based on Cambridge Econometrics data concerning 119 regions NUTS-2 and NUTS-1 (see Appendix illustrating the regional details of the data bank used).

*per capita* incomes (measured in terms of deviation from the EU-12 average): the  $\sigma$  convergence takes place when the standard deviation tends to fall over time. **Table 1** shows how regional dispersion of *per capita* GDP may be synthetically measured by its standard deviation. This measure clearly shows how the total variability of regional *per capita* incomes tends not to reduce significantly during the years. The analysis by country shows a considerable divergence of *per capita* GDP levels between Italian regions during the nineties, and a substantial invariance of the disparities within Germany, France, Spain and United Kingdom. A reduction of the domestic gaps is observed for Portuguese regions (limited to the period 1985-98) and Greek regions (limited to the decade 1975-85). Since 1985, *per capita* income dispersion across Greek regions has increased again. The level of *per capita* real income of Ireland rose from 56% of the EU-12 average in 1988 to 90% in 1998<sup>5</sup>.

*Table 1: Standard Deviation of per Capita Income and Percentage Ratio Between the Average Income Level of Each Area and the Center*

	1975	1980	1985	1990	1995	1998
EU-12 Regions	59.92	60.17	60.17	58.44	59.01	57.76
Italy	24.36	25.53	24.72	27.43	28.63	29.44
Germany	20.73	20.62	21.13	20.30	20.84	22.29
France	15.35	13.80	14.74	14.34	13.76	13.83
United Kingdom	12.42	14.07	13.49	14.67	14.14	14.49
Greece	22.09	17.99	14.37	15.63	17.84	18.44
Spain	22.62	20.61	20.47	21.02	20.67	20.88
Portugal	28.35	30.40	32.87	25.89	18.98	20.33
BENELUX	19.20	18.55	18.66	17.33	16.03	16.35
Center	27.20	28.59	28.52	26.41	24.93	24.57
Intermediate Regions	19.83	22.87	22.03	21.28	21.58	20.52
Northern periphery	19.77	23.93	23.18	19.09	14.81	13.60
Northern periphery (without Ireland)	15.89	20.98	18.27	17.43	14.58	14.66
Southern periphery	62.66	59.48	59.25	57.50	59.40	57.71
Intermediate Regions/Center	85.51	88.76	88.66	89.44	90.71	90.01
Northern periphery/Center	65.96	65.31	65.39	66.80	70.13	71.63
Northern periphery (without Ireland) / Center	69.60	69.26	69.97	69.97	72.27	71.41
Southern periphery / Center	47.60	44.77	43.79	45.46	45.98	46.08

Note: The variable used for the standard deviation computation is the natural logarithm of *per capita* income in 1990 PPP (deviation from EU-12 average). The values of the standard deviation were multiplied by 100.

Source: Based on Cambridge Econometrics data.

<sup>5</sup> The evaluations reported in the text look at the real convergence and are therefore based on data on *per capita* incomes expressed in constant PPP of the base year (1990). Hence, they differ from those based on current PPP to which the EC normally refers in its official documents.

The empirical literature on economic growth has widely adopted the notion of “ $\beta$  convergence”. A process of “absolute”  $\beta$  convergence takes place whenever all regions converge towards the same long-run level of *per capita* GDP. This occurs if the average growth rates of regions are negatively related to initial *per capita* GDP. The engine of this re-equilibrium process is a market mechanism based on decreasing returns to scale in capital (see, for example, Barro and Sala i Martin 1995), thus leaving no room to regional policies, as it can automatically lead to the elimination of spatial disparities. The empirical specification of the neo-classical growth model is the following:

$$g_i^r = \alpha + \beta \ln Y_{i,0}^r + u_i ,$$

where  $g_i^r = \frac{(\ln Y_{i,T}^r - \ln Y_{i,0}^r)}{T} * 100$ ,  $\ln Y_{i,t}^r = \ln Y_{i,t} - \ln Y_{EU,t}$ ,  $Y$  is the GDP *per capita*,  $u_i$  is the stochastic error term,  $i$  is the region, EU is the EU-12 average and  $T$  is the time horizon. All the variables (expressed in logarithms) were measured as differences from the EU-12 average, as indicated by the apex  $r$ . The hypothesis to test is that the coefficient  $\beta$  be negative, while the convergence speed ( $\lambda$ ), - that is the intensity of the system dynamics while nearing its original steady state - is measured through the following expression:

$$\lambda = 1 - \left( \frac{\beta T}{100} + 1 \right)^{1/T}$$

The neo-classical convergence property has been subject to many debates. Some authors have emphasized that the growth theory does not imply identical long-run *per capita* incomes for all regions, and that one has to control for factors that influence this long-run level of income other than the initial condition. A way to test this hypothesis consists of including dummy variables, which indicate the countries each region belongs to (the so-called “country fixed effects”):

$$g_i^r = \alpha + \beta \ln Y_{i,0}^r + \sum_{j=1}^P \gamma_j D_{ij} + u_i$$

where the index  $j$  refers to the country.

The regression estimates show the lack of convergence in *per capita* incomes (**Table 2**). Though in the so-called absolute convergence estimates there is a negative and significant coefficient of the initial level of *per capita* GDP

(limited to the period 1985-98), the goodness of fit of the regression is very limited ( $R^2=0.07$ ), as the coefficient value ( $\beta$ ) is very small, which shows an extremely slow regional convergence speed ( $\lambda=0.27$ ). In the so-called “conditional  $\beta$  convergence” estimates, including country-dummies to take into consideration the national peculiarities of each region, the correlation degree is higher, which confirms the non-negligible role of country effects. The results referring to single Member States (which are not reported here) are substantially in keeping with those of the standard deviation dynamics. Apart from few exceptions, a below-average *per capita* value added does not guarantee by itself a growth performance over the Union average.

Table 2: Absolute and Conditional  $\beta$  Convergence of per Capita Income  
(coefficients and t-test in parenthesis)

	1975-98		1975-85		1985-98	
Constant	-0.03 (-0.55)	0.91*** (5.32)	-0.07 (-0.80)	0.09 (0.17)	-0.02 (-0.31)	1.55** (2.34)
<i>per capita</i> VA <sub>0</sub>	-0.26** (-2.22)	-0.92*** (-4.09)	-0.12 (-0.52)	-0.99** (-2.33)	-0.47** (-2.04)	-0.97** (-2.25)
Country dummy		yes		yes		yes
$\lambda$	0.27	1.03	0.12	1.04	0.48	1.03
AIC	1.712	1.604	2.994	2.533	2.328	2.295
F test	9.29***	4.31***	0.53	9.28***	8.51***	10.31***
R <sup>2</sup> adj.	0.07	0.22	0.00	0.41	0.08	0.44

Note: The country dummies, used as regressors, refer to Belgium, Germany, Greece, Spain, France, Italy, Holland, Portugal e United Kingdom.

Source: Based on Cambridge Econometrics data.

An even more articulated interpretation of regional gaps shows that EU regions might have been interested not to a global convergence process - that is, convergence of *per capita* incomes of all regions towards a common steady state - but to a convergence by “clubs”, having common geographical (i.e., Center-periphery or North-South) or social-economic peculiarities (i.e., human capital, unemployment rate, public infrastructure, R&D activity, financial deepening). In other words, convergence within each club may be observed, without much reduction of between-club inequalities<sup>6</sup>. Following upon a spatial criterion, EU regions have been classified in four groupings: Center, intermediate regions,

<sup>6</sup> This view is coherent with the non-convergence hypothesis, according to which some minimum level of the externalities-inducing factors (human capital, public infrastructures, R&D activity and financial deepening) must be obtained to make the process of economic growth self-sustained. In the absence of political intervention, or when the latter is inefficient, some form of “club convergence” may occurs: regions will cluster within different clubs, which are determined by endowments of these strategic factors.

South periphery, and North periphery<sup>7</sup>. A glance at European economic geography makes clear that the richest regions are indeed clustered together in the north west part of the continent (the Center). The four countries with the lowest GDP *per capita* are located at the periphery of Europe: Ireland, Greece, Portugal and Spain (that is the four Cohesion countries) to which can be added the Southern part of Italy (Mezzogiorno).

The analysis of the longitudinal dispersion of *per capita* value added levels shows that, since 1985, a clear process of convergence has been emerging within the Center and the North periphery. The results on this last club significantly vary according to whether Ireland is included or not. The convergence process between intermediate regions appears weaker, while there is no gap narrowing within the South periphery.

The ratio was also computed between the average *per capita* income levels of the peripheral areas plus intermediate regions and the average *per capita* incomes of the Center so as to verify the presence of catching up processes between clubs. The results show that only intermediate regions (in the period 1975-85) and those of the North periphery (in the period 1985-98) registered a convergence process towards central regions.

#### *CONVERGENCE IN PRODUCTIVITY AND EMPLOYMENT RATES*

The observed inequalities in regional income levels can be accounted for by a combination of three factors: differences in labor productivity, in employment rates, and in the interaction between productivity and employment rates. These relations are based on the following identity:

$$\frac{Y}{P} \equiv \frac{Y}{E} \frac{E}{P},$$

where  $Y$  is the value added;  $P$  indicates the population;  $E$  is the employment level. In logarithms, it takes up an additional form:

$$\ln(Y/P) = \ln(Y/E) + \ln(E/P).$$

By applying the variance operator to both members, one obtains:

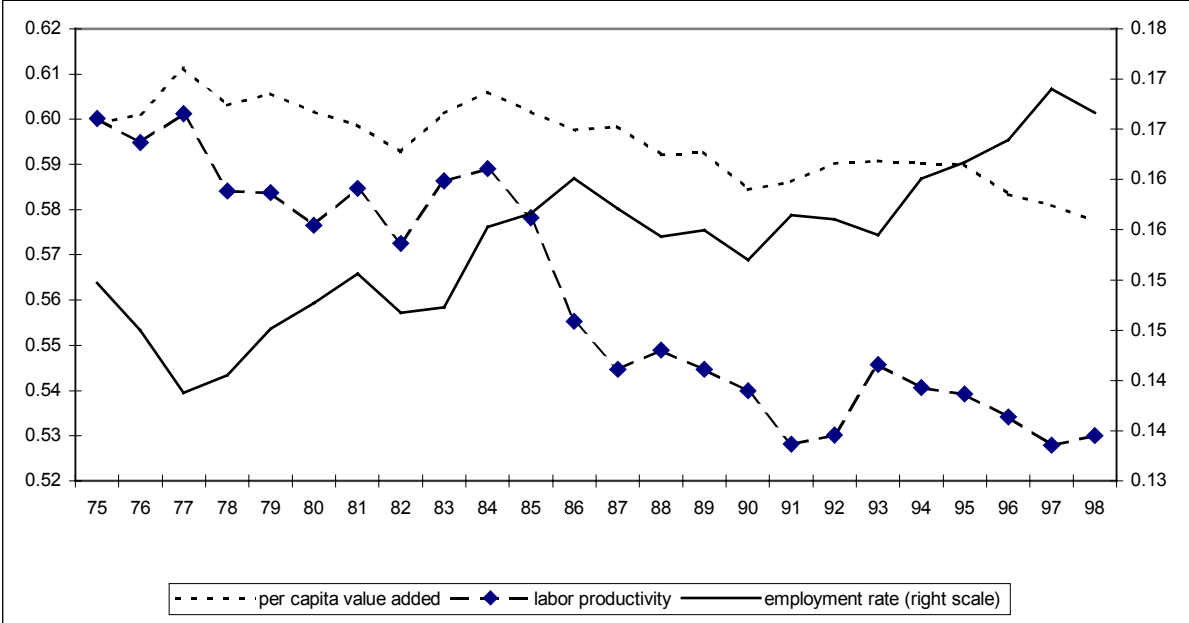
$$\text{var}[\ln(Y/P)] = \text{var}[\ln(Y/E)] + \text{var}[\ln(E/P)] + 2\text{cov}[\ln(Y/E), \ln(E/P)].$$

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<sup>7</sup> The regions belonging to each grouping are indicated in the Appendix.

This expression shows that the variability of *per capita* incomes depends on labor productivity variance, on employment rates variance and on the covariance between productivity and employment rates. The combination of these three effects may determine either convergence, divergence or invariance in the regional distribution of *per capita* incomes<sup>8</sup>. The standard deviation analysis shows weak convergence across regions in average labor productivity; only in the late-eighties a stronger convergence occurred (**Figure 1**). Looking at the single geographical areas (**Table 3**), a net convergence process only occurs within the group of the South periphery: this club of regions has indeed not shown a recovery towards central regions.

Figure 1: EU-12 Regions – Standard Deviation of per capita Income, Labor Productivity and Employment Rate



Note: The natural logarithm of the deviation from the EU-12 average has been used for the computation of the standard deviation.

Source: Based on Cambridge Econometrics data.

<sup>8</sup> Tests of the convergence/divergence hypothesis usually use data on *per capita* GDP, yet growth theories make predictions about labor productivity not income. Growth models concentrate on aggregate production function and assume full employment. Thus, they make no predictions about unemployment and labor force participation. Yet, as also suggested in other studies (Acconcia 2000; Boldrin and Canova 2001), this makes all the difference in the empirical analysis and allows for an interesting interpretation.

Table 3: Standard Deviation of per Labor Productivity and Percentage Ratio Between the Average Productivity Level of Each Area and the Center (1)

	1975	1980	1985	1990	1995	1998
EU-12 Regions	60.02	57.65	57.82	53.99	53.93	53.01
Italy	15.74	16.52	16.82	17.17	16.45	15.17
Germany	11.49	10.39	10.70	10.72	11.67	12.77
France	12.18	11.18	11.16	9.92	9.91	10.05
United Kingdom	6.69	7.50	4.93	5.65	8.02	6.93
Greece	33.09	22.54	17.55	19.67	17.03	16.05
Spain	22.38	19.22	17.22	15.18	12.61	12.24
Portugal	26.33	30.22	33.98	32.88	24.59	30.26
BENELUX	12.04	10.62	11.64	13.18	15.05	16.89
Center	22.25	23.00	22.30	22.26	22.11	24.35
Intermediate Regions	21.42	24.69	21.55	22.52	22.29	21.32
Northern periphery	20.30	24.53	21.75	21.96	20.68	20.33
Northern periphery (without Ireland)	19.49	24.78	21.59	23.31	22.08	21.91
Southern periphery	70.25	67.08	68.47	61.57	62.79	60.35
Intermediate Regions/Center	89.59	94.68	95.32	96.13	96.55	95.51
Northern periphery/Center	72.52	73.12	76.52	79.42	79.57	79.78
Northern periphery (without Ireland) / Center	74.82	75.34	78.87	80.46	80.40	79.92
Southern periphery / Center	56.27	58.72	58.69	59.85	59.74	57.98

Note: See note to Table 1.

Source: Based on Cambridge Econometrics data.

$\beta$  convergence analysis shows that in the case of labor productivity the absolute convergence process is slightly quicker (0.70%) and the model has a higher explicative power ( $R^2 = 0.28$ ) than in the case of *per capita* incomes (Table 4). The inclusion of country-dummies considerably raises the goodness of fit, the size of the initial coefficient ( $\beta$ ) and the convergence speed ( $\lambda$ ). All the country-dummy variables included proved significant, thus indicating the existence of specific factors for each country influencing the regions' growth process.

Table 4: Absolute and Conditional  $\beta$  Convergence of Labor Productivity (coefficients and t-test in parenthesis)

	1975-98		1975-85		1985-98	
Constant	-0.03 (-0.68)	0.19 (0.83)	0.02 (0.22)	-0.07 (-0.18)	-0.07 (-1.22)	0.38 (0.88)
Prod <sub>0</sub>	-0.65*** (-5.41)	-2.33*** (-7.25)	-0.54** (-2.30)	-3.24*** (-4.70)	-0.78*** (-3.61)	-2.17*** (-4.14)
Country dummy		yes		yes		yes
$\lambda$	0.70	3.28	0.55	3.84	0.82	2.52
AIC	1.900	1.471	3.020	2.716	2.427	2.106
F test	46.55***	16.20***	10.37***	7.77***	36.83***	12.01***
R <sup>2</sup> adj.	0.28	0.56	0.07	0.36	0.23	0.48

Note: The country dummies, used as regressors, refer to Belgium, Germany, Greece, Spain, France, Italy, Holland, Portugal e United Kingdom.

Source: Based on Cambridge Econometrics data.



Given the relative productivity convergence, the persistence of wide regional income gaps should reflect either a larger dispersion in the employment rate, or an increase in the correlation between productivity and employment rate or both. Indeed, the employment rate standard deviation signals a growing dispersion over time. Referring to single areas, one observes for the South periphery a slight reduction in the gaps between 1975 and 1990, followed by a strong increase over the past decade (**Table 5**).

*Table 5: Standard Deviation of Employment Rate and Percentage Ratio Between the Average Employment rate of Each Area and the Center*

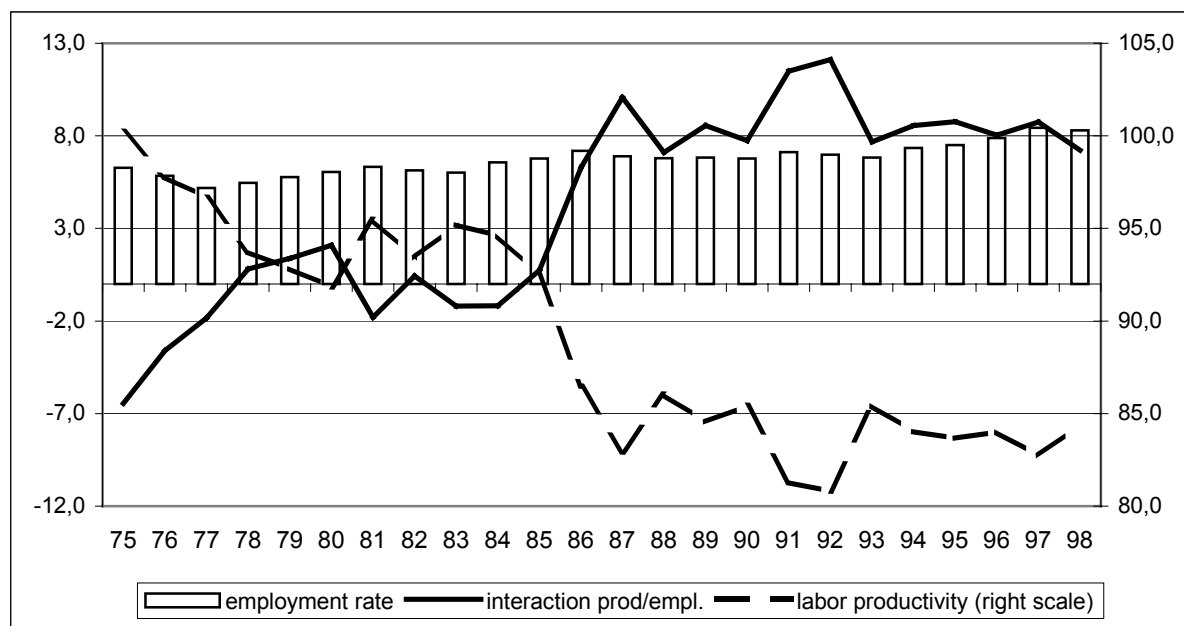
	1975	1980	1985	1990	1995	1998
EU-12 Regions	14.97	14.77	15.66	15.20	16.18	16.67
Italy	14.98	12.02	11.54	11.97	14.38	17.15
Germany	11.22	11.38	11.87	10.87	11.44	11.42
France	7.91	7.69	7.77	7.73	6.67	6.73
United Kingdom	9.38	9.60	11.42	10.62	8.49	9.84
Greece	22.86	13.14	7.45	8.61	14.25	14.66
Spain	11.69	10.99	11.67	11.02	12.05	12.52
Portugal	8.08	1.59	3.04	12.16	10.47	13.34
BENELUX	17.31	17.05	17.75	18.26	19.70	21.54
Center	16.55	17.46	18.15	17.93	17.71	18.85
Intermediate Regions	7.75	7.33	7.92	9.02	9.03	9.38
Northern periphery	9.96	8.92	10.02	10.50	10.02	9.67
Northern periphery (without Ireland)	9.89	7.62	7.44	9.22	10.33	10.19
Southern periphery	17.73	13.23	14.48	10.81	13.01	14.32
Intermediate Regions/Center	95.45	93.75	93.02	93.04	93.96	94.24
Northern periphery/Center	90.95	89.32	85.46	84.12	88.13	89.77
Northern periphery (without Ireland) / Center	93.01	91.93	88.73	86.97	89.89	89.35
Southern periphery / Center	84.59	76.24	74.62	75.96	76.97	79.47

Note: See note to Table 1.

Source: Based on Cambridge Econometrics data.

**Figure 2** shows the trend of the components of *per capita* incomes variance, represented by labor productivity variance, employment rate variance and the covariance between these two variables. It shows the progressively growing weight reached by employment rate variance and, particularly over the past decade, by the interaction between employment and labor productivity: in the nineties, the employment rate grew more in the high-productivity regions. A higher labor productivity allowed to attract more private investments, thus generating employment opportunities. The slight productivity convergence (particularly concentrated within the Southern periphery) was not able to tackle this trend.

Figure 2: UE-12 Regions – Variance Decomposition of per capita Income (percentage values)



Note: ‘Productivity’ indicates the ratio between the variance of labor productivity and the variance of *per capita* GDP; ‘employment rate’ indicates the ratio between the variance of employment rate and the variance of *per capita* GDP; ‘prod./empl. interaction’ indicates the ratio between the productivity/employment covariance (times 2) and the variance of *per capita* GDP.

Source: Based on Cambridge Econometrics data.

To deeply analyze this interaction, the employment growth rate was regressed on the productivity level. The initial level of the employment rate was also included as control variable. The results indicate the existence of a positive relation between the growth of employment and productivity levels (**Table 6**).

Table 6: Absolute and Conditional  $\beta$  Convergence of Employment Rate (coefficients and t-test in parenthesis)

Constant	-0.02 (-0.34)	0.52*** (4.37)	-0.13 (-1.43)	-1.56*** (-8.27)	0.02 (0.29)	2.08*** (13.4)
Empl <sub>0</sub>	-1.49*** (-2.80)	-1.79*** (-3.19)	-2.30*** (-2.61)	-3.32*** (-3.42)	-1.82*** (-3.83)	-0.26 (-0.56)
Prod <sub>0</sub>	0.37*** (2.93)	0.40* (1.78)	0.38** (2.02)	-0.42 (-1.46)	0.38** (2.20)	0.92*** (3.14)
Country dummy		yes		yes		yes
AIC	1.737	1.634	3.013	2.437	2.582	2.136
F test	20.30***	8.27***	9.72***	16.18***	9.85***	12.79***
R <sup>2</sup> adj.	0.25	0.36	0.13	0.54	0.13	0.47

Note: The country dummies, used as regressors, refer to Belgium, Germany, Greece, Spain, France, Italy, Holland, Portugal e United Kingdom.

Source: Based on Cambridge Econometrics data.

All in all, a very mild process of productivity convergence has interested the EU-12 regions. *Per capita* incomes have indeed not fully drawn benefits from this process, owing both to a divergence in regional employment rates and to the growing interaction between productivity and employment rates.

## **2. PRODUCTIVITY INEQUALITIES AND THE INFRASTRUCTURE GAP**

The rationale for the EU intervention in favor of backward regions poses on the persistence of substantial regional income gaps. The Structural Funds and the Cohesion Fund are mostly bound to finance infrastructure projects, considered as major tools to promote regional convergence. The emphasis put on infrastructure (transport, communications, energy and education) is justified in part on the ground that disparities in infrastructure in the EU are greater than in incomes. An adequate level of public infrastructures is, indeed, an important condition for the accumulation of private capital and for the birth of new firms<sup>9</sup>. The social capital stock exerts a positive effect on labor productivity, as it is a production factor complementary to private inputs. At the same time, social capital influences the market width by giving room to a larger number of firms: hence a direct impact on the employment rate in the region.

Public infrastructures (and thus Structural Funds) may also have an indirect and delayed effect on the employment growth. Funding devoted to training and mobility programs, to improving infrastructures and to increasing the capital stock will not necessarily increase employment immediately. It will, at first, raise labor productivity and slowly but surely help create a more skilled labor force. This, in turn, helps attract more private investment, thus generating employment opportunities. As public infrastructures have a significant impact on the productivity level of a region, the lack of infrastructures lays the basis for a vicious circle between poor infrastructures, low labor productivity and, hence, the failure to raise the number of employed people. These considerations induce to verify the real impact of social capital on the level and growth of regional productivity.

The infrastructure gap, for 1970 and for 1985 (EU-12 = 100), is measured through a synthetic indicator based on the aggregation of four categories: transport (roads, railways, ports, airports), communications (telephones, telex), energy (electro transmission lines, electric plants, oil pipelines, petrol

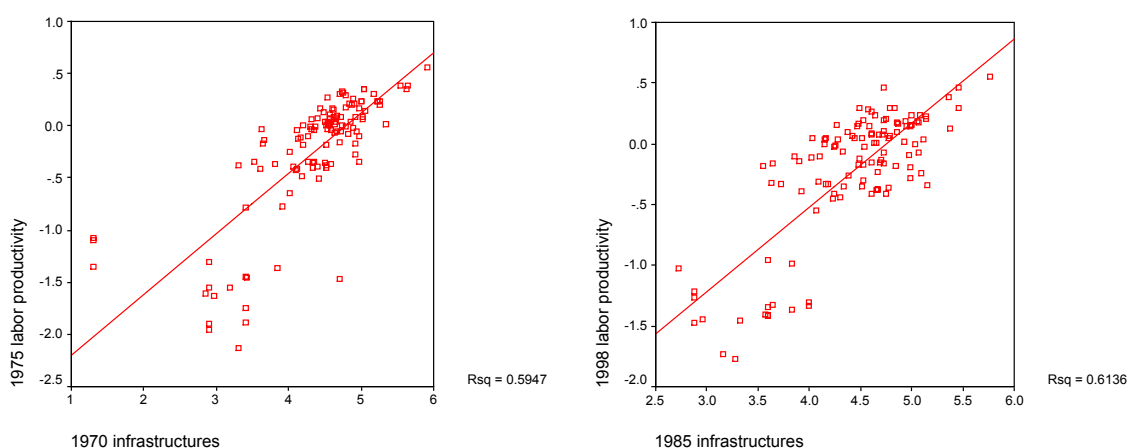
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<sup>9</sup> A recent work made at ISAE has shown how the stock of infrastructures positively and significantly influences FDI in the Italian provinces (Basile 2001).

refineries, gas pipelines) and education (number of university students, number of students of high professional schools).

The correlation between productivity level and infrastructure level in the two periods examined, the seventies and the nineties, is relatively strong (0.59 and 0.61, respectively).

Figure 3: EU-12 Regions – Relation Between Infrastructures and Labor Productivity Levels



Note: The variables, expressed in logarithms, measure the deviation from the EU-12 average.  
 Source: Based on Cambridge Econometrics and Di Palma (1990) data.

Therefore, one may hypothesize that the infrastructure endowment significantly affects the steady state level of labor productivity, and thus the regional growth rate. This hypothesis was verified by including the infrastructure gap variable in the productivity growth equation (Table 7). The result confirms that the infrastructure endowment significantly fosters regional development<sup>10</sup>. The share of agricultural employment on total employment was also included in the empirical equation, in order to control for the effect of the regional economic structure. Indeed, the productivity dynamics may also be influenced by the structural changes generating labor force shifts from low-productivity sectors (agriculture) to high-productivity sectors (industry and

<sup>10</sup>Recent theoretical and empirical works have surveyed the impact of social capital on growth and development in the economy. With regard to empirical works, see Aschauer (1989), Demetriades and Mamuneas (2000), Easterly and Rebelo (1993), Holtz-Eakin and Schwartz (1995), Khan and Kumar (1997), Acconcia and Del Monte (1998) and Acconcia (2000).

services)<sup>11</sup>. The existence of a structural effect on productivity growth rates seems substantially confirmed by the estimate<sup>12</sup>.

Table 7:  $\beta$  Convergence of Labor Productivity (1975-98)  
(coefficients and t-test in parenthesis)

Constant	-2.10*** (-4.20)	-0.85* (-1.84)
1975 Productivity	-0.87*** (-5.44)	-2.40*** (-7.34)
1970 Infrastructures	0.47*** (4.30)	0.30*** (2.85)
1975 Agriculture	0.25*** (3.97)	0.07 (1.04)
Country dummy		yes
$\lambda$	0.97	3.43
Number obs.	118	118
AIC	1.746	1.589
F test	26.96***	12.44***
R <sup>2</sup> adj.	0.40	0.52

Source: Based on Cambridge Econometrics and Di Palma (1990) data.

All of these results justify a public intervention to finance infrastructure projects and thus to prompt productivity growth in less developed regions. The following step is the *ex post* evaluation of the efficiency of Structural Funds and of the Cohesion Fund and, in particular, of the impact of infrastructure policies carried out within the EU. Before facing this specific problem, it is useful to review the Structural Funds allocation criteria and to make a macroeconomic analysis of them.

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<sup>11</sup>In the absence of substantial labor mobility across regions and given the rigid wage structures that characterizes national labor markets, the labor force expulsion from low-productivity areas generates substantial amounts of long-term unemployment (structural unemployment) in the poor regions. The South of Italy and the South of Spain are two examples of this road of convergence. Ireland and, to a lesser extent, Portugal are examples of the more virtuous development model, where the market flexibility enables to reach productivity gains and employment at the same time (see also Boldrin e Canova 2001).

<sup>12</sup>The coefficient of the variable “agriculture” is less significant after the insertion of the dummies indicating the “national belongings” of each region.

### 3. THE EUROPEAN UNION'S REGIONAL PROGRAMS: ALLOCATION OF FUNDS BY BASIC MACROECONOMIC INDICATORS

The amount of resources mobilized by the EU regional policies in the period 1989-99 contributed about 6.5% of annual Community GDP. As a reference point, one may consider that the Marshall Plan aids, granted in the period 1948-51 for the post-war reconstruction in Europe, was equivalent to 1% of US GDP per year<sup>13</sup>.

What is important is not only the amount, however considerable, of resources devoted to regional aid, but also the allocation criteria adopted by the EC for the distribution of Structural Funds. According to these criteria, the distribution of Funds should be inversely proportional to the development degree of the regions. It is, however, possible that what does the EC plan is then lost in the bargaining process within and between countries of the EU.

In order to determine whether and to what extent EU's regional assistance has conformed to basic macroeconomic criteria, the cumulated amount of Structural Funds committed over the period 1989-99 was regressed on a set of variables generally used by the EC to measure regional disparities. Thus, we elected to use the region's *GVA per capita*, infrastructure adequacy, the long-term unemployment rate (beyond twelve months), the share of employed in the agricultural sector and the population density in a parsimonious model to ascertain the degree to which allocations have been predicted on such straightforward measures. In effect, we searched for a tacit decision rule guiding EU disbursement. All the variables (expressed in logarithms) were measured as differences from the EU-12 average. The presence of strong correlation between variables suggested to estimate different specifications in order to avoid multicollinearity inconveniences. The results confirmed the respect of the equity principles advocated by the EC (**Table 8**).

The spending commitments of the EU represent however only part of the public intervention connected to Structural Funds. Owing to the additionality rule - which meets the double need to add, and not to replace, the Union resources to national funds and to maintain at the same time the full involvement of local authorities - the EU commitments are a fraction of the overall resources aimed at covering the total project costs. In other words, they co-finance the total value of the investments approved by adding to the national/regional resources.

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<sup>13</sup> See also EC Report (1996) and Martin (1997).

Table 8: The European Union's Regional Programs: Allocation of Funds by Basic Macroeconomic Indicators (1989-99)  
(coefficients and t-test in parenthesis)

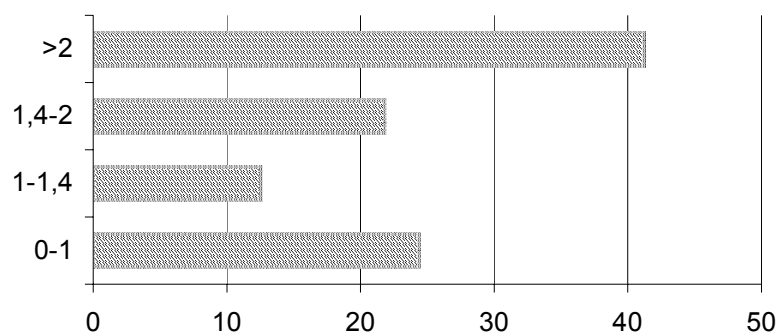
	Structural Funds		Total costs		
Constant	2.21* (1.97)	-0.37 (-0.23)	-0.41 (-0.27)	-0.35*** (-3.65)	-1.17 (-1.06)
1988 <i>per capita</i> income		-0.65** (-2.12)	-0.40 (-1.64)	-0.38** (-2.11)	
1985 infrastructures	-0.73** (-2.59)	-0.18 (-0.51)	0.01 (0.03)		-0.32 (-1.31)
1988 long run unemployment rate	0.55*** (3.66)	0.58*** (3.86)	0.57*** (4.19)	0.57*** (4.23)	0.55*** (4.01)
1988 agriculture	0.06 (0.71)	-0.01 (-0.03)	0.04 (0.21)	0.02 (0.11)	0.08 (0.43)
1988 population density	-0.54*** (-3.42)	-0.63*** (-3.91)	-0.64*** (-3.71)	-0.67*** (-3.94)	-0.59*** (-3.49)
Number of observation	118	118	118	119	118
AIC	3.001	2.979	2.926	2.909	2.924
F test	30.33***	25.90***	20.80***	26.98***	25.39***
R <sup>2</sup> adj.	0.50	0.52	0.46	0.47	0.45

Source: Based on data from OFCE, Cambridge Econometrics, Eurostat and Di Palma (1990).

When the total cost of the projects is considered the “fair distribution” observed at European level falls short. The amount of resources committed by national and local authorities generally varies according to the Objective (Objective 1 implies a larger European co-financing and thus the national intervention is lower than for other Objectives), the kind of project and the aid modality (tax allowances for private firms’ investments or direct financing of the infrastructure construction). In many cases, the global amount of the national resources financing exceeds the Union co-financing.

A simple distribution by class of the national contribution rate (meant as the ratio between the amount of resources committed by national authorities and the amount committed by the EU) shows that about 3/4 of the EU-12 regions benefited from a national contribution exceeding that from Structural Funds (**Figure 4**). On average, the regions registered a national contribution rate equaling 1.4%. About 13% of regions belong to the national contribution class comprised between 1 and 1.4; about 22% to the class between 1.4 and 2; about 41% to the class over 2 (thus showing that the national contribution has more than doubled the EU Structural Funds).

Figure 4: EU-12 Regions – Regional Distribution by National Contribution Class (percentage values)



Source: Based on OFCE data.

In the light of these considerations, the econometric exercise was reiterated for the total cost of the projects. The equity witnessed in the analysis of Structural Funds was not confirmed by the analysis of total costs. Indeed, there was no evidence of a statistically significant relation between the cumulated amount of total costs and the endowment of public infrastructures. Less robust appears also the result on per capita value added.

Given the particular regional distribution of the total value of the investment projects, grounded doubts emerge on the real effectiveness of public intervention as against the objective of favoring the convergence of less favored regions. This topic is faced in the following section.

#### 4. THE IMPACT OF STRUCTURAL POLICIES ON REGIONAL CONVERGENCE IN 1989-99

In spite of the growing attention on the process of convergence in Europe, empirical studies of the Structural Funds impact on regional growth are still rare<sup>14</sup>. Generally speaking, there is a wide divergence between the (positive) judgments of the EC and the (more critical) ones expressed in other works. We can give a preliminary answer to the question whether regional policies can help convergence in Europe by analyzing the impact of Structural Funds on the dynamics of the regional distribution in *per capita* incomes, productivity and employment rates. A simple instrument to represent the dynamics of regional

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<sup>14</sup> Among the most significant works recently published, see the EC Reports (1999, 2001) and the papers by Fayolle and Lecuyer (2000), Boldrin and Canova (2001) and Puga (2001).



inequalities is the transition matrix. This instrument enables us to verify whether the regions, which have improved their relative positions, compared to the EU-12 average are also those which have received most help from structural policies.

The transition matrix for the *per capita* GDP is reported in **Table 9**. It highlights the shifts of the regions between the various *per capita* income classes between 1988 and 1998. The first column of the matrix shows the number of regions which were in a given distribution class in 1988. The second column indicates the distribution classes. The diagonal shows the share of regions, which located in the same class in the two years considered. The presence of “large numbers” in this diagonal shows a strong persistence of the relative regional income levels between 1988 and 1998.

One observes from the first line of the Table that in the 17 regions having a *per capita* GDP 30% lower than the EU-12 average, only one (Notio Aгаio) improved its relative position in 1998, by passing to the income class between 30 and 80%. The improvement in the relative position of this Objective 1 region is, however, very small.

Table 9: Transition Probability Matrices of per capita Income, Labor Productivity and Employment Rate Relative to EU-12 Average (percentage values)

		1998 Per capita income					
		Number of regions	0-0.3	0.3-0.8	0.8-1	1-1.2	1.2+
1988 Per capita income	17	0-0.3	0.94	0.06 <sup>a</sup>	0.00	0.00	0.00
	35	0.3-0.8	0.03 <sup>b</sup>	0.74	0.23 <sup>c</sup>	0.00	0.00
	22	0.8-1	0.00	0.00	0.77	0.23 <sup>d</sup>	0.00
	24	1-1.2	0.00	0.00	0.12 <sup>e</sup>	0.71	0.17 <sup>f</sup>
	19	1.2+	0.00	0.00	0.00	0.32 <sup>g</sup>	0.68

<sup>a</sup> Notio Agaio (ob.1); <sup>b</sup> Sterea Ellada (ob.1); <sup>c</sup> Scotland (ob.1), South West, Madrid, Cataluna, Pais Vasco, La Roja, Friesland, Ireland (ob.1); <sup>d</sup> Drenthe, Basse Normandie, Gelderland, Oost Vlaanderen, Noord Brabant; <sup>e</sup> Limburg, Lorene, Zeeland; <sup>f</sup> Veneto, Friuli-Venezia Giulia, Noord Holland, Luxembourg; <sup>g</sup> Berlin, Rheinland-Pfalz, Alsace, Piemonte, Trentino Alto Adige, Lazio.

		1998 Productivity					
		Number of regions	0-0.3	0.3-0.8	0.8-1	1-1.2	1.2+
1988 Productivity	14	0-0.3	0.93	0.07 <sup>a</sup>	0.00	0.00	0.00
	26	0.3-0.8	0.08 <sup>b</sup>	0.85	0.08 <sup>c</sup>	0.00	0.00
	23	0.8-1	0.00	0.13 <sup>d</sup>	0.65	0.21 <sup>e</sup>	0.00
	33	1-1.2	0.00	0.00	0.18 <sup>f</sup>	0.70	0.12 <sup>g</sup>
	21	1.2+	0.00	0.00	0.00	0.24 <sup>h</sup>	0.76

<sup>a</sup> Alentejo (ob.1); <sup>b</sup> Ditiki Makedonia (ob.1), Attiki (ob.1); <sup>c</sup> Basilicata (ob.1), Ireland (ob.1); <sup>d</sup> Gelderland, Navarra, Region Bruxelles; <sup>e</sup> Lussemburgo (Belgio), Basse Normandie, Limousin, Abruzzo (ob.1), Campania (ob.1); <sup>f</sup> Umbria, Puglia (ob.1), Zeeland, Luxembourg, Drenthe, Noord Holland; <sup>g</sup> Oost Vlaanderen, Bayern, Niedersachsen; <sup>h</sup> Limburg, Berlin, Piemonte, Valle d'Aosta, Trentino Alto Adige.

		1998 Employment					
		Number of regions	0-0.8	0.8-0.9	0.9-1	1-1.1	1.1+
1988 Employment	13	0-0.8	0.69	0.23 <sup>a</sup>	0.08 <sup>b</sup>	0.00	0.00
	27	0.8-0.9	0.15 <sup>c</sup>	0.48	0.26 <sup>d</sup>	0.11 <sup>e</sup>	0.00
	39	0.9-1	0.03 <sup>f</sup>	0.15 <sup>g</sup>	0.64	0.13 <sup>h</sup>	0.05 <sup>i</sup>
	22	1-1.1	0.00	0.00	0.36 <sup>l</sup>	0.32	0.32 <sup>m</sup>
	16	1.1+	0.00	0.00	0.00	0.19 <sup>n</sup>	0.81

<sup>a</sup> Cantabria (ob.1), Castilla la Mancha (ob.1), Murcia (ob.1); <sup>b</sup> Ireland (ob.1); <sup>c</sup> Ditiki Makedonia (ob.1), Ipeiros (ob.1), Sterea Ellada (ob.1), Basilicata (ob.1); <sup>d</sup> Notio Agaio (ob.1), Madrid, Pais Vasco, Aragon, Cataluna, Valence (ob.1), Liguria; <sup>e</sup> Attiki (ob.1), Navarra, Zeeland; <sup>f</sup> Peloponnisos (ob.1); <sup>g</sup> Dytiki Ellada (ob.1), Galicia (ob.1), Bretagne, Poitou Charentes, Abruzzo (ob.1), Molise (ob.1); <sup>h</sup> Kriti (ob.1), Friesland, Drenthe, Lisboa Vale do Tejo, Northern Ireland (ob.1); <sup>i</sup> Overijssel, Limburg; <sup>l</sup> Niedersachsen, Nordheim Wetsfal., Rheinland-Pfalz, Saarland, Makedonia Thraki (ob.1), Ionia Nisia (ob.1), Algarve (ob.1), North East; <sup>m</sup> Valle d'Aosta, Trentino Alto Adige, Gelderland, Utrecht, Noord Brabant, Centro (ob.1), Yorkshire et Humbershire; <sup>n</sup> Berlin, Hessen, Ile de France.

Source: Based on Cambridge Econometrics data.

In top income classes there is higher mobility. Net of few exceptions, there emerge no bet improvements in the relative position of the regions, which received the larger assistance from the EU structural policy. The second class mainly comprises less backward Objective 1 regions. Among these, Sterea Ellada falls down to the first income class, while Scotland and Ireland (considered as a region) jump to the third class (between 80 and 100% of the EU-12 average). Within the initial income class comprised between 30 and 80% of the EU-12 average, there are also some regions with a slightly larger income than that indicated by the EC for eligibility to Objective 1. Some of these regions - together with Scotland and Ireland - passed to the third income class: namely the South West, Friesland and some Spanish regions. These last, sustained by the Cohesion Fund but not by the Funds of Objective 1, have witnessed a considerable improvement of their relative position in the decade considered.

The movements observed from the third to the fifth line of the matrix exclusively concern central and intermediate regions. Obviously, these regions are not part of Objective 1, but are often beneficiaries of the Structural Funds of Objective 2, as well as of remarkable national structural aids. One may observe that four central regions and one intermediate region passed from the third to the fourth income class; two central and two intermediate regions (localized in the North-Western area of Italy, the area of industrial districts) passed from the fourth to the fifth class. Conversely, three regions showed a movement in the opposing direction. Finally, for the last income class, there was receding for three central regions and for three intermediate regions in Italy.

As already said, it is useful to compare the distribution of *per capita* incomes with that of its two components (namely productivity and the employment rate). Also in the case of productivity, the movements between classes seem very limited. For the Objective 1 regions, the number of improvements of the relative position is counterbalanced by recedings. There is indeed no clear path of convergence. In this context too, the only exception is Ireland, which registered a strong leap forward of its relative productivity level. The improvement revealed by the other Objective 1 regions (Alentejo, Basilicata, Abruzzo e Campania) is instead very limited. Smaller stability in the distribution was registered in the last three classes of productivity mainly hitting central and intermediate regions.

The less encouraging information on the dynamics of regional development gaps are drawn from the employment rate transition matrix. During the nineties, the dispersion in the employment rates considerably increased. This gap widening was due to a strong polarization of the regional employment rates. As a result of

the movement of regions with initial employment rates at an intermediate level towards the extreme parts of the distribution pattern, in 1998 a larger number of regions registered either very low or very high employment rates. In particular, regions with relatively high productivity levels in 1988 in a decade moved towards the high-employment classes; while regions with initially very low productivity rates moved towards the lowest employment rate classes. This is perfectly consistent with the evidence of a higher positive correlation between employment rate rises and initial productivity levels.

For the group of the regions lagging behind, different employment growth paths are evident. “Virtuous” Ireland makes two leaps forward, jumping to the employment rate bracket between 90 and 100%. Comparing the employment rate dynamics of Greek and Spanish regions, one may observe an upgrading of all regions in Spain, excepting Galicia; in Greece, instead, the regions closer to the EU-12 average registered an improvement, and those ones with higher unemployment rates experienced a further worsening.

In synthesis, in spite of the effort made to sustain the development of the less-favored regions through the use of Structural Funds and through the Cohesion Fund, regional inequalities between 1988 and 1998 showed no narrowing<sup>15</sup>. The relative movements in the regional distribution of *per capita* incomes, productivity levels and employment rates registered no positive relation with the allocation of Structural Funds. Indeed, at first sight the effect of the Cohesion Fund allocated for Greece, Spain, Portugal and Ireland seems different. But in this case too, it was not a process of regional gap narrowing: the gap reduction as against the EU-12 average concerned single cohesion countries, but there was no narrowing of the regional gaps within them.

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<sup>15</sup> A further confirm of the small impact of structural policies on the development of backward regions comes from the results (not reported here) of the correlation analysis between the growth rates of income, productivity and employment, on the one side, and the variables measuring the allocations of Structural Funds and total projects, on the other. The correlations were computed for the whole sample of regions considered, for each Member State, for the four geographical clubs (South periphery, North periphery, intermediate regions and Center) and for the two groups of Objective 1 and Objective 2 regions. In synthesis, a positive and significant correlation emerges between the employment rates and the resources committed (both with Structural Funds and with national contributions) for the sub-group of intermediate regions, for that of North periphery and for the French regions. For the whole sample and for all other sub-groups, there is no significant positive relation, or a negative significant relation is registered. This is the case of Italy and of the United Kingdom (for *per capita* income) and of the group of the Objective 2 regions (for productivity).

## 5. CONCLUDING REMARKS

This paper is focused on regional convergence in Europe and on the role of public effort to reduce regional inequalities. The empirical evidence confirms that in the latest period (late-eighties and nineties) there was no regional convergence of real *per capita* incomes, analyzed in its two components, namely the employment rate and labor productivity. The lack of convergence is mainly due to the failed reduction, indeed to the rise, of employment gaps. Labor productivity has shown weak convergence. Besides, a growing positive nexus between productivity and employment rate arose, widening regional income inequalities. Particularly over the past decade, the regions experiencing productivity level lower than the EU-12 average have also experienced employment rises lower than the rest of the Union.

EU regional policies have been mostly acted at funding infrastructure investments, following the idea that infrastructure gaps represent one of the main causes of regional disparities. The impact of public infrastructures on regional growth has been analyzed. The evidence shows that the infrastructure endowment has a positive influence on regional productivity, but exerts no direct effect on the employment rate. An indirect effect of infrastructures on employment growth however occurs: investments in infrastructure projects raise labor productivity and help create a more skilled labor force, which, in turn, by attracting more private investments, generates employment opportunities. A sort of “development trap” arises, since an inadequate level of infrastructures favor a relatively low level of productivity, which may imply a poor employment dynamics, lower than average.

Then, a simple exercise has been undertaken to determine whether the disbursement of the EU’s regional program funds has conformed to basic regional macroeconomic criteria. The econometric results confirm that the allocation of Structural Funds committed between 1988 and 1999 has acted in compliance with equity and cohesion principles pursued by the EC. The distribution of these Funds was found to be inversely proportional to *per capita* income, infrastructure endowment, population density and directly proportional to long-term unemployment rate and the weight of agriculture on the regional economy. Once the total cost of the projects - which includes the contribution of national authorities - is considered, the image of equity is blurred. The amount of the national contribution strongly influences the overall cost of the projects: about three quarters of the regions have reckoned on a national financing larger than the EU-12 average. Given the relevance of the national contribution, the regional distribution of the total cost of the projects is only weakly correlated to the regional *per capita* income level and has no significant relation with the

infrastructure endowment. The framework is even more pessimistic if one considers payments rather than committed Funds. Emblematic is the case of Italy, where the percentage of resources actually allocated to the South in the period 1994-99 was smaller than the one allocated to the North.

The biasing effect of national co-financing may have contributed to the inefficiency of EU regional policy (Structural and Cohesion Fund) during the nineties. A transition matrix analysis has shown that during the period 1988-98 the relative movements in the regional distribution of *per capita* incomes, productivity levels and employment rates registered no positive relation with the allocation of Structural Funds. At first sight the effect of the Cohesion Fund allocated for Greece, Spain, Portugal and Ireland seems different. But in this case too, it was not a process of regional gap narrowing: the gap reduction as against the EU-12 average concerned single cohesion countries, but there was no narrowing of the regional gaps within them.

## 6. POLICY IMPLICATIONS

The analytical discussion of the empirical results reported in this paper leads to some policy implications. Firstly, infrastructure investments, which are the main targets of Structural Funds, tend to act uniquely on one aspect of regional convergence, namely labor productivity. However, in presence of a low propensity to regional labor mobility and an insufficient regional wage differentiation, investments in infrastructure may modestly contribute to the catching up of poorer regions. As the experience of the past two decades shows, these rigidities amplify the unemployment rate gaps and there is the risk that also the improvement of transport infrastructure connecting the Center with the periphery runs counter the aim of reducing regional inequalities<sup>16</sup>.

As integration grows and transport costs fall, the scarce labor mobility<sup>17</sup> may be a favorable condition for the re-localization of business firms from the Center to the periphery. Indeed, the industrial concentration implies not only benefits for firms, but also congestion-linked burdens taking the form of growing factor costs (particularly labor costs). The periphery, endowed with a large pool of unutilized labor, may attract again a certain number of firms, provided this offers adequate benefits in terms of wage differentials compared to the more developed regions.

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<sup>16</sup> The improvement of the connection between two regions with different development levels may favor either one or the other of the two extremes of the connection line. This provides firms of the poorer regions with a better access to the input supply and to the market of the least developed regions. However, a better connection enables firms of the richer area to supply the backward (but thickly populated owing to the low migration level) region at more favorable transport costs, thus increasing the Center/periphery gap (see Martin and Rogers 1995). With reference to this point, Faini (1983) showed how the reduction of transport costs between the North and South of Italy - obtained in the sixties through the construction of the major Italian highways - eliminated the “protection against high transport costs” allowance which was granted to Southern firms before, thus accelerating the de-industrialization process of the *Mezzogiorno* of Italy.

<sup>17</sup> Many causes were outlined to explain the net reduction in the inter-regional labor mobility experienced in Europe compared to the fifties and sixties. The lower differences in the regional *per capita* incomes, occurred up to the seventies, may have increased the degree of attraction exerted on “potential” emigrants by their places of origin (de la Fuente 1999). The reduction in the migration propensity, particularly amidst the young, may have been influenced by the larger support ensured by the households’ incomes and by public transfers which fuelled that income (Attanasio and Padoa Schioppa 1991). Finally, in some countries (particularly Spain), the distortions of the unemployment schemes may have disincentivated the geographical labor mobility (Antolin and Bover 1997).

These remarks highlight the need to join infrastructure policies to labor market reforms, in order to favor the convergence in employment levels. Labor market policies aimed at promoting regional convergence should favor the wage differentiation, by shifting for example the wage determination from the centralized to the firm level wage bargaining process<sup>18</sup>.

As far as the EU Structural Funds inefficiency is concerned, the chain linking public financing, investment in infrastructure and productivity growth must be improved. Labor productivity improvements are, indeed, positively influenced by the endowment of infrastructure, as the evidence confirms. For the moment, the huge sums that finance infrastructure in poor regions are based on the ad hoc reasoning that any transfer must be good for the receiving poor regions. Yet, Structural Funds do not always mean *good* infrastructures. Besides, as documented in this work, the overall amount of public resources is *de facto* not distributed on the basis of cohesion criteria. To improve the quality of public support, the administrative efficiency and the regions' planning and spending abilities should be enhanced, particularly those of less favored regions. To this end, a changeover of the administrative personnel cannot be avoided and efficiency-improving mechanisms must be adopted.

Incentive systems, such as the premium reserves, as well as the adoption of careful monitoring mechanisms, might be useful to respect the program ends. This kind of approach, aimed at maximizing the efficiency of the administrative project running inspires the Structural Fund Program for 2000-06. It is necessary to proceed in this direction<sup>19</sup>.

Besides, more decentralization of the decision-making process would considerably increase the efficiency of public intervention. The "merit" of the political choices should be left to local authorities and operators, with the aim of favoring the creation of development environments so as to attract private resources from outside. The EC should only take super-national decisions on the project financing, on monitoring and on the granting of efficiency premia (i.e. an effective supervision of the best use of Funds), as well as on policies aimed at enhancing the infrastructure endowment within the whole Union territory (such as the connection networks between regions and countries).

The main problem of conceiving a new regional policy within an enlarged EU remains open. With a twenty-seven-member EU - including all present candidates except for Turkey - the average *per capita* GDP would considerably

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<sup>18</sup> See Faini (1999) on this point as well.

<sup>19</sup> See Barca and Pellegrini (2000).



decrease. Many regions which at present benefit from Objective 1 Funds would be excluded, and not for a real improvement of their situation but for uniquely statistical reasons. To this end, the *Second Report on Social and Economic Cohesion* proposes four types of behaviors for the “after 2006”: (a) maintaining the threshold of 75% for the Objective 1 regions; (b) gradually abandoning the present beneficiaries of Objective 1 which are no longer eligible in the enlarged EU; (c) raising the threshold over 75%; (d) defining two thresholds, one for the EU-15 and one for the other candidate States. Proposals (a) and (d) are hardly acceptable, respectively for present beneficiaries (which would be roughly out of the European support) and for the regions of the new Member States (which would be relegated in a sort of second-brand category). Proposals (b) and, particularly, (c) would cause new “tensions” in the Union budget.

Apart from the proposals at stake, the new regional support framework cannot be discussed without facing the problem of an objective evaluation of the results obtained so far by the regional policies in the EU. Aiming at the full homogenization of the European territory is a lost battle and, indeed, - in its extreme consequences - it is an economic absurdity. The agglomeration of economic activity is by itself an efficient result of integration. A realistic regional cohesion policy should “limit” itself to contribute to the creation of a favorable environment for regional development. This means not only quality infrastructures, but also more fluid factor markets, namely labor. In the light of these considerations, an extension of the Nice mandate is hopeful. The agenda for 2007-12, that will be discussed by the present EU Member States within this mandate, should take into account the almost-twenty-year-old-long experience of the Union regional policies and make a thorough evaluation of the tasks, which a modern policy aimed at restoring a geographical equilibrium within strong economic integration may realistically pursue.

## APPENDIX

The data on EU regions for the period 1975-98 are taken from Cambridge Econometrics' European Regional Databank, which is itself based on the (nominal prices, local currency) EUROSTAT series. Cambridge Econometrics fill gaps by interpolation, establish consistency with national series, and deflate by using the national deflators, in the absence of regional deflators. The Cambridge Econometrics data bank covers the following phenomena: Gross Value Added (GVA) measured in constant (1990) euro, employment (millions of employed people), population (thousands of inhabitants), surface (squared kilometers), investments (millions of euro 1990) and households' consumption (millions of euro). Since the price levels differ considerably within the EU, the data on GVA per capita were transformed in terms of PPP. Lacking estimates on the PPP at a regional level, the correction was based on national price levels. This procedure leaves a potential margin of error given that within some countries (such as Italy) the cost of life strongly varies across regions.

Since the aim of the work was to assess the performance of regions assisted during the overall period 1989-99, the sample used in the empirical analysis was restricted to the group of regions belonging to the EU-12 countries, thus excluding Austria, Finland and Sweden regions, which entered the Union only in 1995. The NUTS-1 level was used for Germany (which does not comprise Eastern Lander) and the United Kingdom, while Denmark, Ireland and Luxembourg were considered one-region countries (level NUTS-0). The outermost regions of France (Departement d'Outre Mer, Guadeloupe, Martinique, Guyane, Reunion) and Spain (Ceuta and Melilla, the Balearic and Canary Islands) were excluded from the sample. Other three regions were excluded for different reasons: Namur (Belgium), Groningen and Flevoland (Netherlands). The list of 119 regions included in the sample is reported below. The regions were divided into four groups on the basis of a spatial criterion (see Terrasi, 2000): (1) Southern Periphery, (2) Northern Periphery, (3) Intermediate regions, (4) Center. The area to which each region belongs to is indicated in parenthesis.

**Belgium:** Région Bruxelles (4), Antwerpen (4), Limburg (4), Oost Vlaanderen (4), West-Vlaanderen (4), Hainaut (4), Liège (4), Luxembourg (4); **Deutschland:** Baden Württemberg (4), Bayern (3), Berlin (4), Bremen (4), Hamburg (4), Hessen (4), Niedersachsen (4), Nordrhein Wetsfal (4), Rheinland-Pfalz (4), Saarland (4), Schleswig Holstein (3); **Denmark** (3); **Spain:** Galicia (1), Asturias (1), Cantabria (1), Pais Vasco (1), Navarra (1), La Rioja (1), Aragon (1), Madrid (1), Castilla y Leon (1), Castilla la Mancha (1), Extremadura (1), Cataluna (1), Valence (1), Andalucia (1), Murcia (1); **France:** Ile de France

(4), Champagne Ard (3), Picardie (3), Haute Normandie (3), Center (3), Basse Normandie (3), Bourgogne (3), Nord Pas de Calais (4), Lorraine (3), Alsace (4), Franche Comté (3), Pays de Loire (3), Bretagne (3), Poitou Charentes (2), Aquitaine (2), Midi Pyrénées (2), Limousin (2), Rhône Alpes (3), Auvergne (3), Languedoc,R. (2), PACA (3), Corse (1); **Greece**: Makedonia Thraki (1), Kentriki Mak (1), GR13 Ditiki Makedonia (1), GR14 Thessalia (1), Ipeiros (1), Ionia Nisia (1), Dytiki Ellada (1), Sterea Ellada (1), Peloponnisos (1), Attiki (1), Voreio Agaio (1), Notio Agaio (1), Kriti (1); **Ireland** (2); **Italy**: Piemonte (3), Valle d'Aosta (3), Liguria (3), Lombardia (3), Trentino Alto-Adige (3), Veneto (3), Friuli-Venezia Giulia (1), Emilia Romagna (3), Toscana (3), Umbria (3), Marche (3), Lazio (3), Abruzzo (1), Molise (1), Campania (1), Puglia (1), Basilicata (1), Calabria (1), Sicilia (1), Sardegna (1); **Portugal**: Norte (1), Centro (1), Lisboa Vale do Tejo (1), Alentejo (1), Algarve (1); **United Kingdom**: North East (3), North West (3), Yorkshire et Humbershire (3), East Midlands (4), West Midlands (4), East Anglia (3), Greater London (4), South East (4), South West (3), Wales (3), Scotland (2), Northern Ireland (2); Luxembourg (4); **Netherlands**: Friesland (3), Drenthe (4), Overijssel (4), Gelderland (4), Utrecht (4), Noord Holland (4), Zuid Holland (4), Zeeland (3), Noord Brabant (4), Limburg (4).

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