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Are EU Policies Fostering Growth and Reducing Regional Inequalities?

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1. Introduction

According to the February 2000 Eurostat release, averaging over the years 1995-1997 and taking into account purchasing power standards, Inner London was the richest region in Europe, with per capita GDP equal to 229 percent the EU15 average, followed by Hamburg with 198 percent. At the opposite extreme, Ipeiros in Greece, was reported to be the least prosperous, with per capita GDP equal to 43 percent of the EU15 average. About one-fourth of European regions had an income per capita below 75 percent of the EU15 average, while about one-fifth had income per capita above 120 percent of the same benchmark. These are fairly large differences. In fact, regional income inequalities within the EU are twice as large as those in the United States, when measured either by the standard deviation of regional per capita income or by the ratio of top to bottom decile across regions (states in the USA).

The size and persistence of European regional income inequalities has attracted some attention in recent years. Since future member countries are likely to have per capita income well below the current EU average, it is important to know what effects economic integration within the EU will have on the economic performances of the newcomers. One question dominates all others: are the elimination of trade barriers and adoption of common trade, industrial, fiscal and monetary policies spurring economic growth and convergence? Do they leave existing differences unchanged or do they exacerbate them? To put it differently: will the enlargement of the EU entail another increase in the amount of subsidies that the richest areas must transfer to the poorer ones?

The post-1973 experience shows that every single enlargement of the EU has brought about an increase in the amount of public resources devoted to regional policies and transfers; once they are in place, they are hard to scale back, even when the initial motivation has all but disappeared (see, for example, the Cohesion Fund). If further enlargements are not followed by a rapid reduction of income differences, current EU policies will impose a substantial fiscal burden on the rich members since they have to provide resources for an even larger pool of less developed countries, while the poorest among current EU15 members will face a sharp reduction in their share of EU aid, unless the total amount of transfers increases out of proportion.

The financial resources involved are large. The European Cohesion Fund, for example, had an endowment of ECU 170 billion for the period 1994-1999, one-third of total EU budget. The resources assigned to the Cohesion Fund for the period 2000-2006 will be 213 billion Euros, almost the same as the resources devoted to agricultural

policies. These figures are relevant because the Cohesion Fund provides almost entirely a net subsidy for the recipients and because EU regional policies provide guidelines and justifications for similar policies at the national level in countries with a substantial number of less developed regions, e.g. Italy, Spain, and Germany after the reunification. Altogether, national and EU regional policies transfer from one region to another substantial portions of EU product. Are these transfers justified on the ground of economic efficiency? Should they be continued, discontinued, or increased?

There are three sides from which such questions can be approached. In the first place, one can ask if economic theory and the available evidence support the idea that, without transfers, poor regions will remain poor forever. Secondly, one can ask if the economic model underlying current EU regional policies is appropriate and if the general principles inspiring them are supported by compelling scientific arguments. In the third place, one may also ask if, conditional upon the assumptions they are designed to satisfy, current EU policies are effective.

In this essay we attempt to address these questions. The next section summarizes the academic viewpoint on convergence and lists a number of factors which may affect the process. In section 3 we describe the view of the European Community on the matter and the type of measures used to foster convergence. Section 4 reviews the existing empirical evidence concerning convergence in the EU and section 5 discusses the implications of the results for current and future policies.

2. Regional Convergence: Academic Views

The impact of free trade among regions at different levels of economic development on their growth depends on the assumptions made about the “engine of growth”. In the theoretical literature one can identify two conflicting hypotheses. The optimistic one claims that technological improvements operate in such a way that, in the presence of free trade and relatively unrestrained market competition, economic convergence will eventually take place. The pessimistic view claims that the nature of modern technologies is such that market forces, when left to themselves, lead almost unavoidably to inequality and divergence.

Both theories are concerned with the process of convergence or divergence only for regions that are relatively similar, at least in the composition of their natural endowment, population, location, geographical structure, climate, access to natural resources and political regime.

The European Commission has elected specific regional units (NUTS, or “Nomenclature of Statistical Territorial Units”, level 2 and 3) as the geographical level at which the persistence or disappearance of unacceptable inequalities should be measured. This choice appears to be unfortunate for two reasons. First, almost all NUTS3 regions are neither “reasonably large” nor have a “reasonably heterogeneous” endowment of factors, to justify treating them as independent economic areas. Second, while some NUTS2 regions are very large and with a broad endowment of productive factors (e.g. Andalusia and the two Castillas in Spain, Aquitaine, Midi-Pyrenees or the Bassin Parisien in France, Lombardia and Sicilia in Italy with populations

ranging from 7 to 11 million people), others are extremely small and have an extremely narrow set of available resources (Molise and Valle d'Aosta in Italy, la Rioja and Cantabria in Spain, Ionia Nisia and Voreio Aigaio in Greece, with populations between 100 and 200 thousand people). Expecting common growth performances across units that are so different in their underlying potential, violates common sense, if not basic economic theory.

2.1. Convergence Theories

In the highly stylized setting of the one-sector, neoclassical growth model with exogenous technological change, one can predict that capital/labor ratios become eventually identical across regions and that a uniform growth rate of Total Factor Productivity (TFP) will drive the growth process everywhere. Most other models of sustained economic growth predict, at most, convergence in growth rates, and only under very special circumstances convergence in levels.

Coherently with this, the **strong** version of the convergence hypothesis, based on an optimizing version of the classical Solow and Swan growth models, states that a common level of economic well-being will be achieved in the long run, independently of initial conditions and of the details of national monetary and fiscal policies, as long as the diffusion and adoption of technological innovations is not seriously restrained. In applied investigations, the basic setup is augmented to take into account the effects that human capital levels, availability of land, natural resources, public goods, and political stability, may have on the process of economic growth. From the viewpoint of this model the issue is that of the speed at which convergence occurs and whether other variables,

beside capital and labor, explain the convergence mechanism. Two of the most widely quoted applications of this approach, claiming that evidence is supportive of the claim that convergence in per capita income levels is occurring at an average rate of about 2 percent per year, are Barro and Sala-i-Martin's [1992] and Mankiw, Romer and Weil [1992]. European nations and regions are no exception. Barro and Sala-i-Martin's [1991] data set excludes most of the latecomers in the EU and all the current recipients of the Cohesion Fund resources (i.e. Greece, Ireland, Portugal and Spain). Nevertheless they interpret the evidence as supportive of the fact that both within- and between-country convergence is taking place.

The **weak** version of the convergence hypothesis insists that, while the adoption of technological innovations is the key determinant of economic growth, the adoption process itself can easily be disrupted or retarded by the wrong set of politico-institutional conditions.

Under this view, achieving similar capital/labor ratios or common levels of human capital accumulation are neither necessary nor sufficient conditions for convergence in income levels. The adoption of the most efficient production techniques and, therefore, convergence in Total Factor Productivity for the same industry across different countries, can be obtained only if the forces of market competition are let free to generate strong enough incentives for the mechanisms of comparative advantages and competition-driven imitation to play their role. Conditional upon similar endowments of immobile factors, free trade and competition lead to convergence in labor productivities and per capita incomes (e.g. Boldrin and Levine [1997], Parente and Prescott [2000]). According to these

theories, differences in the aggregate stocks of human and physical capital can only partially explain observed differences in income and labor productivity. Efficient allocation of productive factors is what really matters.

This point of view is relevant for the European case. The amount of scientific knowledge available to the average citizen of southern Europe is not so different from that available to the average citizen of Hamburg or the Netherlands. Nevertheless, their measured total factor productivities are about three times apart¹. Traditional explanations of such differences appeal to differences in the stocks of public capital and infrastructures or, alternatively, to some form of intangible social or human capital available in one region and not in the other (as, for example, in Putnam et al. [1993]). Surprisingly, these differences seem to play a small role.

Free trade of goods and, especially, free movement of productive factors are an important precondition for convergence to obtain in these models, for two reasons. Decreasing returns to scale are easily exploited only when factors can move from regions in which they are relatively abundant to those in which they are relatively scarce. Moreover, the adoption of new, more efficient, techniques of production is typically accompanied by the introduction of different capital goods or a different organization of production. The presence of artificial differences in relative prices may reduce or altogether eliminate the incentive to adopt the most efficient technique, thereby preserving an enclave of low factor productivity. These models predict, therefore, that any reduction in trade barriers and any improvement of trade integration, should increase factor productivity and income levels among *all* participants.

Following trade integration, growth rates will be higher the lower are transfers aimed at reducing factor mobility and/or preserving differences in relative prices not attributable to differences in productivity or marginal cost.

2.2. Divergence Theories

Divergence theories are based on models predicting that, under conditions of market competition, convergence cannot spontaneously take place. We label this the **strong** non-convergence hypothesis. High fixed costs, widespread increasing returns and external effects are the engines of economic progress, while comparative advantages and competitive imitation play a secondary role. The background of this literature goes back to the early work in the theory of economic growth which inspired the development policies of the fifties and sixties (big-push theories, dual labor market, demand-driven poverty traps). Its recent revival hinges on the work of Krugman and Venables [1995], Romer [1986, 1990] and Grossman and Helpman [1991] and [1994].

If increasing returns can be realized at regional level, any increase in the degree of trade openness is likely to send the most productive factors flowing toward the advanced regions, where their return is higher, leaving the disadvantaged areas behind.

Several strands of the “new growth theory” have argued for various sources of increasing returns and agglomeration effects. The idea that fixed costs at the firm level are important and that, with decreasing long run cost curves, “the winner takes it all” is the leading intuition behind this approach. Particular cases of this line of research identify the fixed costs with the

generation of innovations (R&D activities, external effects from human capital investment) or with the accumulation of minimum stocks of physical capital and/or public infrastructures, without which private investment and labor effort cannot yield the minimum rate of return the market requires.

An alternative, but similar view, argues that industrialization and sustained economic growth may not take place because individual agents are unable to coordinate their investment decisions. Due either to the presence of positive external effects of one investment project upon the other, or to some form of “minimum size” condition, individual projects are not profitable when started in isolation. Only if a minimum number of projects are implemented simultaneously, realized returns will be high enough to justify the allocation of productive capital to the enterprise. This justifies the active policy of subsidies and financial support to firms located in poorer regions, *if* sustained growth in those regions is the policy objective.

While the strong version of the non-convergence hypothesis implies that equality in income and inputs level is a necessary condition for equality of growth rates, the **weak** version of the non-convergence hypothesis argues that some minimum absolute level of the externalities-inducing factors must be obtained to make the process of economic growth self-sustained. Poverty traps and low-growth equilibria originate here not because the ratio between the poor and the rich regions is below some critical value but because the poor regions have not managed to cross a threshold level in their endowment of human capital, public infrastructures, R&D activity and financial deepening. In the absence of political

intervention regions will cluster within different clubs, which are determined by upper and lower bounds in the endowments of the strategic factors. Convergence within each one of these clubs may be observed, with regions belonging to the same club growing (or stagnating) together in the long run, without much reduction of in-between-club inequalities. This point of view has been translated into a statistical methodology and applied to both worldwide data sets and to the case of European regions².

In discussing the policy implications of non-convergence models one must carefully distinguish between overall (European) economic efficiency and inter-regional economic equality. If the former is the objective of policy, then all the models in this class recommend that *more* regional concentration of economic activity should be supported. Obviously, taking overall efficiency as the policy objective requires considering the EU15 as an economic unit in which capital and labor may freely move and assuming that policy pursues the maximization of the welfare of some average European citizen. It is not clear if this is the actual philosophy inspiring the Commission's policies; it is certainly the one purported in a number of its official documents.

Things are different when regions are considered as separate economic entities in which labor is localized as a fixed factor. In this case, either we assume that compensating monetary transfers can take place from one region to another, or some appropriate welfare weights must be attached to the utility of the citizens of each different region. A reasonable assumption is that, when citizens of different regions are treated as different because they cannot or are not willing to move, then they should be given equal welfare weights. In this case “equality in long-run

consumption levels” should result as the aim of public policy. If the aggregate technology is characterized by external effects and increasing returns, then two solutions are possible. If lump-sum compensating payments are possible, policy should favor agglomeration to maximize total output for given expenditure of resources and redistribute output to the various regions in order to equate the appropriate margins.

If lump-sum side payments are not possible, then maximization of aggregate output should be sacrificed in exchange for approximate equality in per capita output and consumption across regions. This requires fostering growth in the poorer areas and restraining in the richest ones. Hence subsidizing growth in the poor regions reduces overall efficiency but may raise aggregate welfare *when immobility of labor is taken as an assumption or a desideratum*.

3. Regional Convergence: EU Views

Free factor mobility among economic units coupled with common fiscal and monetary policies should produce uniform rates of return on investment. To the extent that the accumulation of capital (physical or human) is the main determinant of economic growth, equality in growth rates should eventually emerge. Together with free factor mobility, convergence of national monetary and fiscal policies should therefore be a sufficient condition for achieving convergence in the growth rates of national income. If, instead, increasing returns and local externalities are dominant, further economic integration, including the adoption of a common currency, may end up fueling further divergence. In this case, economic integration needs to be tempered by compensating interventions.

The European Community's view has shifted since the late fifties. While in the original documents free trade and economic integration were seen as important prerequisites for convergence, the basic presumption currently is that deeper economic integration may favor some participants at the expenses of others³. Avoiding this outcome requires deeper political integration and appropriate regional policies.

The main objective of EU regional policies is unambiguously defined as that of achieving convergence in income and (relative) factor endowments at the NUTS2/NUTS3 level. Measures of income, labor employment, educational attainment, R&D activity and amount of public infrastructures dispersions are currently used to appraise the efficacy of regional economic policies⁴. Successful performances are measured by the extent to which the growth rates of all the major indicators are higher for the poorer regions than for the average. For example, the "First Cohesion Report" (1996) cites as signals of the lack of convergence the fact that Asturias' income fell from 77% to 75% of the Community's average income over the period 1983-93, or that Lisboa's per capita income passed from 81% to 96% of the Community's average while neighboring Alentejo moved from 48% to 42% over the same interval of time.

If convergence of income *levels* is the objective, a strong belief in the lack of "market driven" economic convergence seems to be the underlying justification of every policy adopted. Coherently with this hypothesis, theoretical models of economic divergence are the analytical tools through which data are interpreted and policies are designed and engineered. The regions of the EU are seen as competing against each other and the necessity

of making the poorest regions more "competitive" is made more urgent by the introduction of the Euro (European Commission [1994b], p.14). Economic areas can grow only if they are endowed with a number of fundamental characteristics which are currently displayed only by the most advanced regions. Lack of these characteristics makes poor or less favored regions "unable to participate in the world competition"⁵. More recent documents confirm this view, while adopting a somewhat less extreme notion of "competitiveness" and a slightly more optimistic view of European regional convergence and of the overall process of economic growth.

To implement the "structural adjustment" policies, the attention of the Community has centered upon a relatively small number of "development indicators": (i) rich supply of infrastructures (transportation, telecommunications and water supply); (ii) a highly qualified labor force and a high school-attendance rate; (iii) an advanced financial system; and (iv) a high level of R&D activity or R&D absorption. These indicators correspond to those that old and new theories of non-convergence suggest as the main sources of increasing returns and economic divergence. More recently, a keen concern for environmental and ecological issues has also characterized the allocation of the Cohesion Funds. In any case, the presence of these factors is systematically described as "primordial" for economic development and for private investment to take place. If not provided by public intervention, it is unlikely that sustained economic growth will get started.

The lack of "local R&D activity" is perceived as a *major* cause of slow growth in less developed regions. European R&D expenditure is

judged as too concentrated in large countries (Germany, France, the UK) and in large metropolitan areas. Entrepreneurs from less developed regions are perceived as unable to appreciate and acquire technological knowledge and should therefore be provided with fiscal or other incentives to do so. A frequent criticism of Member States' policies is that, by pursuing the objective of maximizing nationwide payoffs, they concentrate funding in certain areas of the country and do not aim at an even regional distribution of public R&D incentives⁶.

The second major concern of the Commission is that of labor mobility, inter-regional migration and depopulation. On the one hand, the economic and even social advantages of factor mobility are often stressed. On the other hand, a number of explicit statements indicate that labor market flexibility and mobility of workers can damage less prosperous regions, as skilled labor would concentrate in the advanced regions leaving the underdeveloped ones worse off. Reliable data about recent, interregional migration flows in the EU15 area are hard to obtain. Unsystematic evidence suggests that migration flows, both among countries and regions of the EU, are probably smaller than one would desire and, if they occur, flows from the poorer to the richer regions are small. To the extent that "depopulation" is taking place, it appears to be a secular phenomenon, which is unreasonable to counteract by means of fiscal incentives or income transfers. Still, the Commission's point of view is that migration flows are not a desirable solution to the unemployment problem as they cause "congestion" and are "socially disruptive". Economic growth in the regions where unemployment rates are high must therefore be fostered.

Structural and cohesion funds are the instruments that the EU has used to foster regional growth. Four programs are included into the label "structural funds": the European Regional Development Fund (ERDF), the European Social Fund (ESF), the European Agricultural Guidance and Guarantee Fund (EAGGF) and the Financial Instrument for Fisheries Guidance (FIFG). The first two are the largest: ERDF is limited to less favored regions, it focuses mainly on productive investments, infrastructures, Small and Medium Enterprise (SME) development, research and development projects, ESF is designed for vocational training, improvements in the education systems and employment aids. Overall, Spain is the largest beneficiary of structural funds, receiving almost one quarter of the total (34.4 billion ECU, over the 1994-99 period, at 1994 prices), Germany and Italy are second with 21 billion each, while France, Greece, Portugal and the UK are all at about 15 billion. Denmark and Luxembourg are the last two, with 800 and 100 million respectively. On the other hand, the cohesion funds (CF) were established following the Maastricht Treaty to support environmental and transport infrastructure projects in Greece, Portugal, Spain and Ireland (nations with a GDP per capita below 90% of the Community average) to promote investments within the budgetary discipline required by the Treaty.

4. Empirical Evidence

As we have seen in section 3, EU regional policies rely upon the positive implications of a specific class of non-convergence models. These models are predicated upon the idea that market driven mechanisms are bound to increase inequalities. Therefore, if interregional equality is

the policy objective, that view would call for the spending of considerable human and financial resources in fostering economic activity in less developed regions; in the absence of such transfers, economic differences will increase. In this section we review available evidence to see whether the predictions of these models are satisfied or not for EU regions.

The empirical literature has mostly tested a simple dichotomy: convergence versus divergence. If the data show that countries with higher income per capita in the initial period, display a lower growth rate in the subsequent periods, then convergence is taking place. If convergence is taking place, this must be along the lines of some, properly augmented, version of the neo-classical, exogenous growth model. If the data, instead, show that *long run* growth rates do depend upon initial conditions, then convergence is not taking place and the world is better described by models with increasing returns and agglomeration externalities. Both chains of thoughts are, however, incorrect as the prediction that long-run growth rates are a decreasing function of initial income or capital stock, is common to both Solow-like models and to the basic class of endogenous-growth, external effects models. Symmetrically, the prediction that initial differences in levels are maintained in the long run, is common to models where external effects are present, and to many perfectly competitive, growth models of technology adoption.

Furthermore, economic convergence is the prediction of certain models of long-run economic growth under the hypothesis that economic activity takes place in conditions of nearly unfettered competition and the non-existence of a large interventionist government. We are not aware of any theoretical model which

predicts “convergence no matter what”. Testing this prediction requires controlled experiments in which trade opportunities are suddenly increased without any compensating public intervention taking place. In the EU, major enlargement experiences such as the 1973 admission of Ireland and the United Kingdom and the 1986 admission of Portugal and Spain, etc., have been followed by very large transfer programs within the EU. Moreover, in most European countries public expenditure is equal to about half of GDP, a share which is hardly negligible.

Because of these problems, the evidence reported here is descriptive, but as we will see later on, it allows us to disprove the validity of the simple non-convergence model upon which EU policies are based.

4.1. Convergence Regressions

Barro and Sala-i-Martin’s [1991, 1992] estimate different versions of the following regression equation

$$\Delta \log(y_t^i) = \beta \log(y_{t-1}^i) + \gamma x^i + \varepsilon^i, \quad (1)$$

where y_t^i is per capita in either country or region i at time t . They find that, after controlling for a number of individual characteristics included in the vector x^i , and using data for the post World War II period, a statistically significant negative value of the parameter β is calculated, indicating that income per capita are becoming more similar (hence the term β -convergence) and that this convergence process is taking place at a “universal” speed of 2% a year.

Such estimation results have been replicated, with important qualifications, by other researchers; see e.g. Armstrong and Vickermans

[1995] and Tondl [1997] for recent appraisals. Others have raised objections. In particular, a number of studies have estimated convergence equations in which conditioning for the existence of different steady states is taken care of⁷. The econometric debate has centered around the issue of convergence to common versus convergence to different steady states: if fixed effects capturing specific factors are allowed, the evidence favors fast convergence but to very different steady states; if these are not allowed, estimates support the idea that there is slow but inexorable convergence to some common steady state. These statements depend on the period used and on the variable considered: income, labor productivity or value added. For example, if one uses European regional data up to 1992, the evidence supporting β -convergence is weaker than with data up to 1996. Likewise, evidence of β -convergence is much weaker for GDP data than for labor productivity data⁸.

Researchers have also been interested in the existence of a second form of convergence, labeled σ -convergence, whereby various measures of dispersion in the distribution of regional per capita income decrease over time. Also in this case, the evidence is mixed and the more recent one fails to support the hypothesis of clear σ -convergence.

Despite many shortcomings, regression-based analysis of the convergence issues has provided two important types of information: it reveals the crucial role played by national variables in the process of economic growth and it allows us to build a periodization of “convergence” phases. The presence of a “national factor”, often captured by significant national dummy variables in linear regressions such as (1), is an important finding of this literature⁹. In fact, Table 3 of the

European Commission [1999] shows that inequality across countries is declining even after the middle 1980s but inequality *within* countries does not seem to be following suit: between 1986 and 1996, regional disparities in per capita GDP have decreased only within Portugal and the UK. The recent literature on economic convergence has paid relatively little attention to the fact that the reduction in regional inequality across Europe is due to the convergence of national per capita income levels and has not studied whether differences in national economic policies affect the evolution of regional inequalities.

By computing estimates of β over different sample periods one may get a feeling of the broad changes in the underlying dynamics of regional per capita growth. Most observers agree that from 1950 until 1973-74 there was a strong tendency for poorer countries (and, in the limited data available, also for the poorer regions) to catch up to the European average.

However, most of the reduction in regional disparities up to 1974, is due to the relative performances of the southern European countries, and to the fact that in Italy and Spain within-country dispersion did not increase until the second half of the seventies. The next two decades witnessed dramatic changes¹⁰, and the evidence does not signal a continuation of the “convergence” process. National patterns become dominant and the convergence coefficients become insignificant when estimation is restricted to the subset of poorer Mediterranean regions.

4.2. The Evolution of Distributions

A) Income Per capita

Boldrin and Canova [2001] study the behavior of the distribution of the regional per capita income for the period 1980-1996 and construct an estimate of the long-run distribution which would result should the conditions of the 1980-96 period continue in the far future.

Four facts emerge from their investigation. First, there is no tendency for the 1996 or for the steady-state distributions to collapse toward their central value, a tendency which would be consistent with the concept of σ -convergence. Second, the features of the distributions are very persistent over time: the spread between the upper and the lower decile of the distribution is largely unchanged and there is no evidence of systematic catching-up of poor regions ("miracles" do occur, though). Third, among the four southern countries only Spain displays a weak form of reduction in regional income inequalities in the sample period, while in Italy, Portugal and Greece territorial disparities have not decreased. Fourth, new losers have appeared within some of the richest countries, e.g. Germany, France and the Benelux.

Non-decreasing regional inequality within countries, coupled with a certain reduction of inequality among countries, suggests that within each country rich regions may grow faster than poor ones and, relative to national average, rich regions of poor countries grow faster than those of countries that are already above the continental mean. This tendency could produce "convergence clubs" at the European level: regions which are well off relative to national average will cluster around an aggregation pole and regions which

are worse off will cluster around another one. Canova [1998] investigates this possibility and finds that four different clubs will emerge in the long run, with the very rich and the very poor located far away from the EU average.

Given these general characteristics, one would like to know whether regions enjoying support from the EU, showed any differential behavior within the sample period. In looking at relative per capita income of regions that are funds recipients, one would expect that their income per capita should move toward the average over time, if EU funds make a difference. If non-convergence theories are correct, one should also see a reduction of income dispersion within the recipients. The evidence reported in Boldrin and Canova suggests that the situation among funds recipients is not particularly different from the rest of the other regions, and that no visible evidence of accelerating growth rates appears. While this result was to be expected in the case of agricultural funds, which have a purely redistributive function in favor of that sector, we find it somewhat surprising for structural funds since they are supposed to affect the basic determinants of per capita income.

These patterns are robust with respect to several regroupings of the data. For example, one may be concerned with *continental uniformity*: does the process of economic convergence occur all over Europe or is it limited to some particular areas, for example, along the "center vs periphery" subdivision, suggested in European Commission [1999]? Or alternatively, and because of the emphasis given by the EU to the need of equalizing educational levels and R&D levels across regions, do high and low education regions (measured by the percentage of secondary education completion relative to the

European average) and high and low R&D regions (measured in terms of patents granted on average per year relative to the European average) differ in their growth rates? Furthermore, does the growth pattern of the initially rich regions differ from the pattern of the initially poor ones? In general, inequality and dispersion do not show any sign of reduction for any reasonable *a priori* partition of the continent; inequality has slightly increased in northern Europe, while there is hardly any change in the ranking of the southern; inequality has also sharply increased among the formerly rich regions but no change appears in the poor ones. Finally, one may find higher than average growth rates in regions that have educational attainment or R&D levels below average, the Italian north-east being the most prominent example.

To summarize, income inequalities are, on average, persistent and convergence of income levels is certainly not taking place. The immobility features of the sample are so strong that extrapolating to the future the dynamics experienced so far reproduces, almost exactly, the same initial distribution. The provision of structural or agricultural funds does not seem to have generated, at least until now, the push needed by the poorer, Mediterranean or peripheral regions to catch up, nor has helped to significantly reduce the dispersion of income per capita within Europe. Poor, Mediterranean and peripheral regions stay almost as poor, relative to the average, as they started¹¹. On the other hand, while most of the very rich regions maintain their ranking in the top of the income distribution, there is a tendency for a considerable number of rich, north European regions to regress below the average both in 1996 and at the steady state. Finally, while there is no tendency toward convergence in levels, one does not observe any tendency for overall inequality to

increase either: growth rates are very similar across regions, independently of their initial ranking in the distribution and of their endowment of “strategic” factors. With the exception of a few “miracles” (Ireland, the Italian north-east, Lisbon's metropolitan area), most of Europe seems to have achieved a form of *long-run growth rate convergence* with factors specific to individual countries playing a major role in the convergence process.

B) Unemployment Rates

Income per capita is the product of labor productivity, one minus the unemployment rate and the participation rate. The participation rate is very similar across regions in Europe. Hence, it may be useful to examine the behavior of the productivity and unemployment separately to see whether it is the former or the latter that explains the existence and permanence over time of large interregional differences in per capita income.

Regional inequality in unemployment rates has not changed or changed very little in the period under consideration: the shapes of the initial and steady state distribution's are practically identical. Boldrin and Canova [2001] show that one important feature of these distributions is their extreme polarization, with the two largest classes being always located at the extreme. If there is any mobility it is typically in the central part of the distribution. Overall, apart from the trend increase in unemployment, shared by almost all regions, neither external shocks, nor policy actions have modified the overall ranking. The distributions of unemployment rates of structural and agricultural funds recipients present the same features, even though the polarization of these distributions increases, instead of decreasing, since the mid-eighties.

The distribution of unemployment rates for a number of other regroupings shows features which are strikingly similar to those we have discussed for the income variable. Recent analysis by the European Commission [1999, pages 14-25], confirms this conclusion. Noticing that part of the differences in unemployment levels is due to regional imbalances in demand and supply, the report appears to miss interregional labor mobility as obvious solutions to be fostered by European policy. It prefers, instead, to concentrate on creating incentives for labor demand to move to regions with higher unemployment rates and, at the same time, activating in-site retraining of the unemployed to provide a better match with the skill requirements of the forthcoming demand.

C) Productivity Measures

The models considered in section 2 assume full employment and constant labor force participation. Hence, predictions about convergence in per capita income should be more correctly interpreted as predictions about labor productivity.

In most growth models, low income is the result of low aggregate labor, capital and Total Factor Productivities (TFP). One is therefore led to suspect that, by looking at labor productivity or TFP directly, one may find support and justification for the policies adopted and the models they are based upon. Models predicting convergence claim that, under the conditions currently prevailing in the EU15, differences in per capita income and labor productivity are mostly due to differences in TFP. The latter are due in small part to differences in public infrastructures, external effects and “social capital”, and in large part to different work practices and choice of activities¹². Models

predicting divergence make TFP a function of either physical or human capital and attribute it to the widespread presence of increasing returns and aggregate externalities. If the divergence hypothesis is correct we should not only observe different levels of TFP between poor and rich regions, but more importantly, movements over time in TFP across regions should be explainable by movements in the capital-labor ratios, amount of infrastructures, flows of public investments, etc. Divergence models built on some kind of “threshold effect”, on the other hand, predict that TFP should grow only after the capital-labor ratios of a certain area have passed a certain critical level. If structural funds are essential and effective in reducing regional differences, labor productivity and TFP of recipient regions should strongly and positively react to the variance in the flow of structural funds.

Hence, the following questions are of interest:

- a)** Are regional growth rates of labor and total factor productivity different within each country? If so, are initially richer regions growing faster than initially poor ones?
- b)** Are capital-labor ratios systematically different across regions and are these differences helpful in explaining the differences in productivities? Does public capital play a role?
- c)** Do we observe a statistically significant relationship between regional indices of structural spending and subsequent increases in labor and TFP?

One may expect structural funds to act upon the employment levels only indirectly and with some temporal delay. Funding which goes to training programs as well as to improving

infrastructures will not necessarily increase employment immediately but will, at first, raise labor productivity and slowly help to create a more skilled labor force. It is this increase in average labor productivity which, in turn, by attracting more private investments, will generate employment opportunities, bring down unemployment levels and increase per capita income in the long run. If this mechanism is in place and working we should expect a reduction in the dispersion of regional labor productivity, in particular, one among the regions which are recipients of structural funds.

The distribution of labor productivity reported by Boldrin and Canova [2001] show that, also in this case, inequalities are very persistent and that there is no evidence of convergence in levels. This remains true also when looking only at the subset of regions which receive structural or agricultural funds: initial differences do not go away and the overall distribution does not shift to the right. There is some movement among regions receiving structural funds, but it is too small and too unstable to suggest any tendency to reduce relative inequalities over time. Divisions based on strategic variables (education, north vs south, levels of R&D, center vs periphery) present similar patterns. If the policy measures adopted until now are helping to reduce historical differences in labor productivity, this is happening very slowly.

Structural funds are also supposed to foster capital accumulation. Most theories attribute lower labor productivity and low employment to the scarcity of capital stock. The latter not only reduces employment opportunities but also forces workers to operate with older and less efficient equipment. Also, while the strong convergence hypothesis predicts that capital-labor ratios should be converging across regions, the strong non-

convergence hypothesis suggests that they should be diverging, thereby driving an ever larger wedge between poor and rich areas. The data indicates that the predictions of divergence models are not supported. First, there is a positive but small correlation between income levels and capital intensity (0.37). Second there is no significant change in private capital-labor ranking in the overall sample even though there is a tendency to reduce capital-labor ratio inequalities between the top and bottom deciles. However, inequality increases among structural funds recipients. Among the latter group the middle of the road among the poorer regions have caught up with the better off among the poorer, while the very poor ones have remained definitely behind. Quite remarkably, there is a tendency for the distribution of capital-labor ratios to become more heterogeneous among regions with a higher educated work force, contradicting the idea that a better educated work force should attract more private investments.

In order to verify if aggregated data signals some causal link in the evolution over time of regional inequalities, Boldrin and Canova [2001] also computed indices of regional TFP. These are only partial measures since above the usual limitations for estimates of this type obtained from very aggregated data, only data on wages and salaries is available while the regional distribution of productive public capital is unavailable. This is not a minor nuisance, given the importance that the theories we are considering place upon public infrastructures and capital in fostering regional productivities. The distributions of TFPs for the regions for which data is available are somewhat different from all the previous ones. The estimated long run distribution seems to converge to a very polarized shape, with most of the regions at one of the two

extremes regardless of the scaling used. Surprisingly, this polarization is also found in the sub-sample of regions that are receiving structural funds. The usual cuts, using R&D, education and the north-south division as control variables, either confirm this tendency or display little movements. Overall, the story may be more complicated than a simple polarization, and the results may well be due to an anomalous behavior of the data or to the mismeasurement we have mentioned above.

5. Implications for Policy and Conclusions

The empirical evidence indicates that in Europe neither strong divergence or convergence is taking place. The 1980's and the first half of the 1990's constitute a period when the spread of the distribution of income per capita, of the unemployment rates and of labor productivity have remained roughly constant. In the last few years stronger signs of β -convergence emerge, particularly in labor productivity but it is too early to say if this is a cyclical or a more long run phenomena and if it appears because of national or of regional effects. The evidence is therefore consistent with the idea that convergence in growth rates has taken place; moreover, since no increase in inequality is occurring, most of the predictions of the increasing-returns and agglomeration literature are not borne out by statistical analysis. More importantly, the evidence does not show that regions receiving structural and cohesion funds are behaving any differently from the remaining ones.

Whether these arguments should be interpreted in favor or against public EU support to the poorer regions is an open question.

Proponents of EU support may claim that, had intervention not been there, inequalities would have become more marked and policies aiming at preventing emigration from the poorer to the richer areas are the only ways to avoid further polarization in income. In addition, since the bulk of EU support for structural interventions is very recent and the amount of redistribution achieved in the 1980's was relatively small, the proponents would expect to see changes trickling down until the middle of the 1990's¹³. This may be true. Still, the evidence for Spain shows, that structural funds had little impact upon the growth rates of either labor or total factor productivity in the poorer regions.

What can we conclude? *If* the objective of the EU regional policies is to maximize aggregate economic growth in the EU15 *then*, according to the models that inspire the Commission's own reports, current policies are not appropriate and should be reversed, that is subsidies should be directed to foster agglomeration and divergence. *If*, on the other hand, the true objective of regional economic policies is to foster economic growth in the poorer regions and promote convergence, *then* the policies adopted by the Community are not justifiable in the light of current statistical evidence. The empirical predictions of the analytical tools employed by the Commission to design and evaluate actual policies, are not supported by the facts.

Given the present circumstances, convergence in level is not present, nor does it appear possible, within the next two or three decades. Given that the lack of such convergence and the persistence of per capita income disparities, provide the political motivation for sustained transfers to poorer regions and for the overall existence of EU regional policies, one can ask if

the existing situation can be improved by good policies. The answer is negative. That NUTS2 regions should be growing at roughly the same rate, with some “luckier” and some “unluckier”, is not surprising given that the territorial units over which economic inequality is measured are quite small and heterogeneous and that convergence in levels could be achieved only if free movement of labor and other productive factors are allowed. While capital is moving around Europe, labor is most definitely not. In support of the latter point we recall three important facts.

1) Net labor and capital migration have characterized the initial post-war period of European growth, until about the middle seventies. By any account this period was also characterized by the strongest tendency to economic convergence since the creation of the EEC.

2) After that date, both net and gross labor migrations have decreased very rapidly. European labor flows have practically come to a dead halt in the last decade. Gross capital flows during the same period have grown remarkably. Net flows, though, are not equally large and since the mid-eighties, only Spain and Ireland have been net receivers of large Foreign Direct Investments (FDI), not surprisingly the two countries with fastest GDP per capita growth in the continent.

3) Immigration of foreign nationals from outside the EU borders has increased during the same period of time. While most of these foreign nationals flow toward the most advanced areas of the Community, a sizable portion settle in relatively disadvantaged areas. The human capital and skill levels of these foreign immigrants is not particularly high, in fact, it is certainly below the average of the natives of the areas where they decide to settle. The unemployment rate among

foreign immigrants does not appear to be different from the reported unemployment rate among EU national in the poor regions of the Community.

One possibility not discussed here is that the true aim of European regional policies is something other than fostering aggregate or regional economic growth, in which case current policies may be perfectly justifiable. This observation brings us back to some basic questions. Why does the EU “bribe” newcomers by means of subsidies, when one should expect them to be willing to pay for joining a free trade area? Why do temporary transfer and support programs become permanent when the apparent reason for their initial establishment wanes (see, for example, cohesion funds)? Why does the process of European political decision-making imply that, in order to reduce the size of the transfer, “donor countries” must create new reasons for receiving transfers from Brussels, instead of just reducing existing ones? Why is the pattern of “bribing the newcomer” being repeated with the new enlargement process, according to which the EU is already transferring subsidies to future East-European members (European Council [1999a])?

Answering these questions is crucial for guiding the future evolution of European regional policies. Understanding where the faulty mechanism resides may allow the establishment of different decision-making processes, aimed at mitigating the distortions and the waste of public resources current policies appear to generate.

Footnotes

- (1) See Boldrin and Canova [2001].
- (2) See e.g. Canova [1998], and Quah [1996a, 1996b, 1997] and Durlauf and Quah [1999] for a survey.
- (3) See e.g. European Commission [1994a,b, 1996, 1999].
- (4) See European Commission [1994b, pp. 33-118; 1996, pp. 21-48] or www.info regio.cec.eu.int/wbover/overcon/oco2a-en.htm for a constantly updated view.
- (5) See the preface of Mr. Eneko Landaburu to Cuadrado Roura [1998].
- (6) European Commission [1996], p. 52.
- (7) See Canova and Marcet [1995], Caselli et al. [1996].
- (8) See e.g. Boldrin and Canova [2001].
- (9) See Quah [1996a].
- (10) See e.g. Armstrong and Vickerman [1995], Canova and Marcet [1995].
- (11) See Canova and Marcet [1995].
- (12) See Parente and Prescott [2000].
- (13) See e.g. De la Fuente and Vives [1995].

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