

Europe's regions

Income disparities and regional policies

SUMMARY

In this paper we take a critical look at current European regional policies. First, we document the motivation for such policies, that is, the large income disparities across the regions of the EU15. Large disparities are certainly present. Second, we illustrate the various instruments adopted and discuss their underpinnings in established economic theories. Next, we look at available data, searching for three kinds of evidence: (1) if disparities are either growing or decreasing, we conclude they are neither; (2) which are the major factors explaining such disparities and, in particular, if they are the factors predicted by the economic models adopted by the Commission to justify current policies, we conclude this is most certainly not the case; (3) if there are clear signs that EU policies, as opposed to other social and economic factors, are actually reducing such disparities, we cannot find any clear sign of such desired impact. Our conclusion is that regional and structural policies serve mostly a redistributive purpose, motivated by the nature of the political equilibria upon which the European Union is built. They have little relationship with fostering economic growth. This casts a serious doubt on their social value and, furthermore, strongly questions extending such policies to future members of the European Union. A successful EU enlargement, in our view, calls for an immediate and drastic revision of regional economic policies.

— Michele Boldrin and Fabio Canova

Inequality and convergence in Europe's regions: reconsidering European regional policies

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1. INTRODUCTION

Assessing regions in terms of purchasing power, Eurostat reports that in 1995–7 Inner London was the richest region in Europe, with a GDP per resident of 229% the EU15 average. Hamburg followed, with 198%. Antwerp, in tenth position, had 138%. At the opposite extreme, the Ipeiros region in Greece had only 43% of the EU15 average. Second poorest, with 50%, were the Portuguese Azores islands. These are very large differences.

Although Ipeiros and Inner London are far apart, similar discrepancies exist even within countries. On 3/9/2000, the Spanish newspaper *El País* featured a comparison between the Spanish provinces of Cadiz and Lleida. In the former, unemployment is 29% and household disposable income is about Euro 6,000; in the latter, unemployment is 4.6% and household disposable income Euro 12 000. Yet Cadiz and Lleida are geographically close and both within Spain.

About 50 of the 211 regions into which Eurostat divides the European Union (NUTS2 – discussed in Section 2) have an income per capita less than 75% of the average. Regional economic inequalities within the EU are about twice those in the United States. It was not always so. Right after World War II, income and labour productivity differences within the United States were as large or larger than those now

prevailing within the EU15.¹ In reducing regional inequality, something good happened in the USA, but not in Europe.

Table 1 summarizes the 1996 European situation, and Map 1 shows this pictorially (European Commission, 1999). As future EU members are much poorer than current ones, the prospect of further enlargement of the EU dramatizes the political impact of the subject. **Does economic integration *per se* spur economic growth and convergence or not?** Does it leave existing differences unchanged or exacerbate them? Will EU enlargement *per se* provide a large enough payoff for the new members or entail another round of EU subsidies and related bickering? Are these transfers necessary to allow the new countries to grow, or should they be considered a pure ‘bribe’, alluring the newcomers to join the EU? If so, why do we consider such payments worthwhile?

Previous EU enlargements have brought about an increase in the public resources devoted to regional transfers. This seems an undisputed axiom of European politics; still one cannot help wondering why this is so. The experience of the USA shows that free trade, common fiscal and monetary policies and free mobility of factors induce income convergence quite quickly. More recently, NAFTA shows that, while free trade agreements are not easy to reach, they do not necessarily require large transfers from one country to the other. Yet the EU assumes enlargement will entail increasing subsidies. Hence, *de facto* postponement of further enlargement seems welcome by most current members. The stakes are large: the fiscal cost of the European cohesion policy for the period 1994–9 was ECU170 billion, a third of total EU budget. For the period 2000–6, the Berlin European Council (24–25 March, 1999) approved the reform of the Structural Funds and modifications to the Cohesion Funds regulation, after a tense debate. For the period 2000–6, these will cost Euro195 billion for the Structural Funds and Euro 18 billion for the Cohesion Funds (European Council, 1999a). In comparison, the same agreement allocated Euro 59 billion to the enlargement objective, while the agricultural policies receive over Euro 300 billion. The EU budget seems to be only about regional transfers! Are these transfers justified on any ground other than political expediency? Should they be increased, continued or discontinued?

First, we examine whether economic theory and available evidence support the idea that, without transfers, poor regions will remain poor forever. This entails two considerations. The first, grounded on economic efficiency, asks which policies would maximize *aggregate welfare or economic growth*. The other, based on inter-regional equality, asks which policies minimize income inequality. Second, we ask if the economic model underlying current EU regional policies is appropriate to the task, and whether general principles inspiring current policies are supported by compelling scientific arguments.

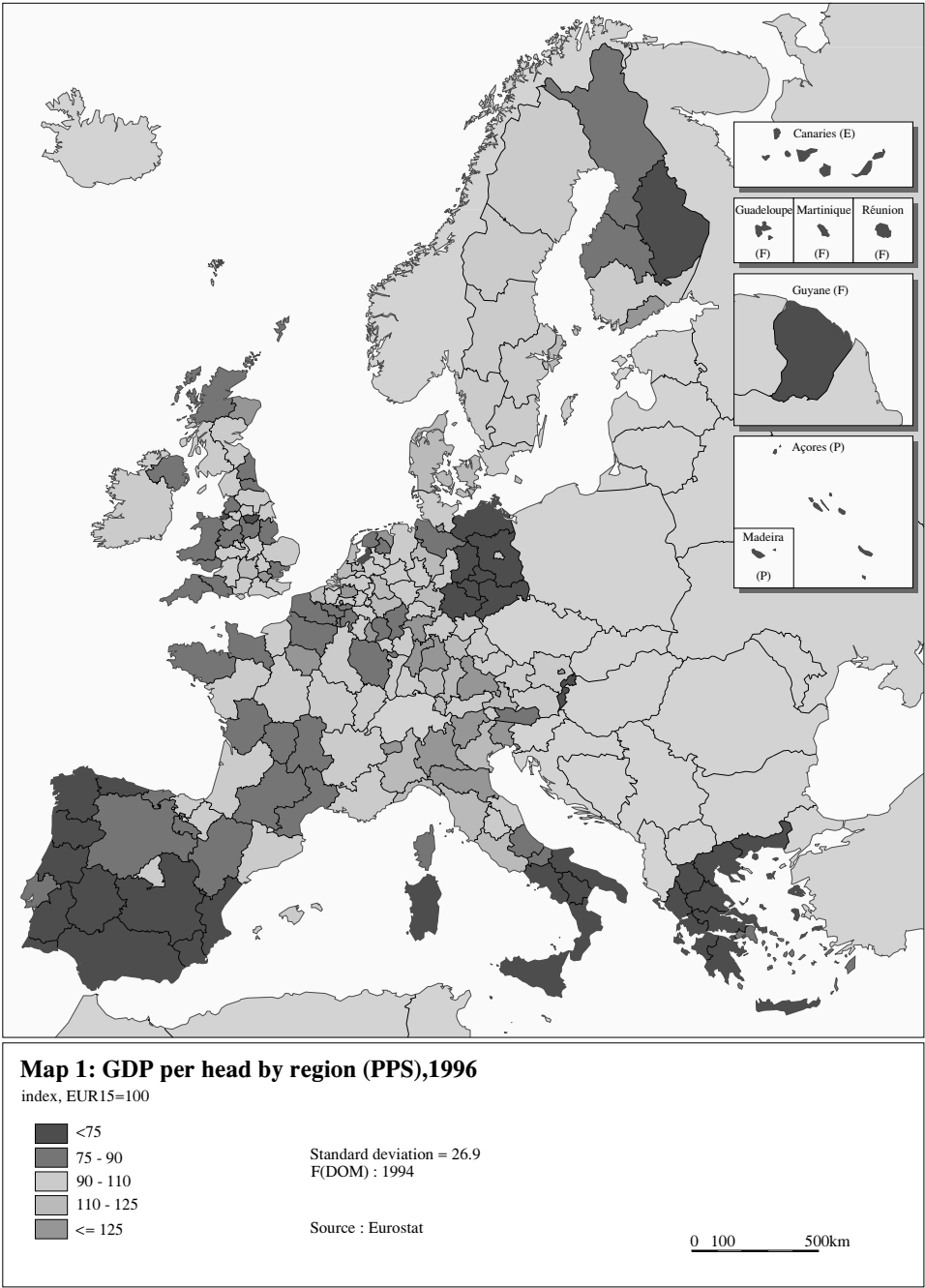
EU regional policies rely upon the positive (as opposed to normative) implications of very specific theories of trade and growth. These theories presuppose that market

¹ In what follows, and for the sake of brevity, we use the expression ‘European Union’ (or EU) to denote, depending upon the historical context, either the six and then nine states of the European Community, or the EU12, or the EU15.

Table 1. Summary data on per capita GNP and labour productivity

		GNP (EU15 = 1.00)			Labour productivity (EU12 = 1.00)			
		1996	1990	1982		1996	1987	
Top 10 regions	Hamburg	2.20	2.03	1.96	Bruxelles	2.07	2.05	
	Darmstadt	1.96	1.79	1.53	Hamburg	1.99	1.86	
	Wien	1.82	1.61	—	Luxembourg	1.86	1.31	
	Oberbayern	1.79	1.64	1.53	Corse	1.79	—	
	Brussels	1.75	1.59	1.72	Darmstadt	1.74	1.51	
	Île de France	1.75	1.68	1.77	Bremen	1.68	1.69	
	Bremen	1.70	1.64	1.64	Île de France	1.65	1.58	
	Stuttgart	1.55	1.58	1.47	Wien	1.60	—	
	Stockholm	1.52	1.70	—	Oberbayern	1.46	1.31	
	Denmark	1.46	1.31	1.29	Antwerpen	1.46	1.40	
Bottom 10 regions	Extremadura	0.45	0.44	0.36	Ipeiros	0.50	0.34	
	Peloponnisos	0.44	0.42	0.59	Voreio Aigaio	0.49	0.39	
	Dytiki Ellada	0.44	0.36	0.52	Ionia Nisia	0.49	0.38	
	Norte	0.42	0.31	—	Algarve	0.47	0.38	
	Centro	0.41	0.29	—	Makedonia	0.43	0.39	
	Alentejo	0.40	0.33	—	Alentejo	0.42	0.34	
	Voreio Aigaio	0.39	0.31	0.43	Norte	0.39	0.27	
	Madeira	0.37	0.25	—	Açores	0.37	0.28	
	Açores	0.34	0.26	—	Madeira	0.36	0.21	
	Ipeiros	0.33	0.29	0.44	Centro	0.33	0.26	
		GNP (EU15 = 1.00)			Labour productivity (EU12 = 1.00)			
		1996	1990	1982		1996	1990	1987
Countries	Denmark	1.46	1.31	1.29	Luxembourg	1.86	1.49	1.31
	Germany	1.24	1.29	1.26	Belgium	1.22	1.18	1.19
	Sweden	1.24	1.41	1.44	France	1.20	1.18	1.20
	Austria	1.22	1.08	1.06	Denmark	1.18	1.06	1.13
	France	1.14	1.10	1.20	Germany	1.15	1.17	1.21
	Belgium	1.14	1.03	1.04	Sweden	1.11	—	—
	Netherlands	1.10	0.99	1.16	Austria	1.10	—	—
	Finland	1.06	1.42	1.25	Finland	1.06	—	—
	Luxembourg	0.98	0.86	0.82	Italy	1.05	1.12	1.06
	Italy	0.91	1.00	0.84	Netherlands	0.99	0.98	1.08
	Ireland	0.89	0.70	0.65	Ireland	0.99	0.90	0.84
	United Kingdom	0.85	0.88	1.02	Spain	0.85	0.88	0.76
	Spain	0.66	0.68	0.57	United Kingdom	0.77	0.79	0.81
	Greece	0.51	0.43	0.56	Greece	0.56	0.49	0.45
	Portugal	0.48	0.36	0.32	Portugal	0.43	0.32	0.28

mechanisms cannot induce economic convergence but rather exacerbate existing inequality. If equality of regional per capita income is the prime policy objective, these predictions support the spending of considerable human and financial resources in less advanced regions. Examining whether previous empirical evidence confirms the predictions of these theories is an important step in assessing EU policies. Section 2 introduces the competing hypotheses and what we know about them. Section 3 describes EU policies and traces them back to belief in one of these theories. Section 4 summarizes



Map 1: GDP per head by region (PPS), 1996

previous empirical research on European regional convergence and provides our own examination of the data. Section 5 offers a final assessment.

We find no evidence that the policies adopted are the most appropriate. The substantial public resources funnelled by the Community to less developed regions do not appear to enhance the capacity of these regions, and hence offer no prospect that future transfers will no longer be needed. Instead, they simply redistribute income. If income distribution is a key concern, such transfers will therefore be needed in perpetuity.

Our results show that neither convergence nor divergence is taking place within the EU. Exception made for a couple of miracles and a few disasters; most regions are growing at a fairly uniform rate, irrespective of their initial conditions. One may argue that near uniform growth is the result of suitably designed policies, which have managed to prevent economic divergence from taking place. We agree with part of this: all available evidence points to increasing free trade among EU countries as such a beneficial policy. That, not regional transfers, may have been the source of higher growth in poorer regions. Historical counterfactuals ('what would have happened if transfers had not taken place') are hard to construct. However, nothing in the data supports the idea that, but for transfers, inequality would have increased. Factors claimed to be the source of agglomeration effects and growing inequality do not help to explain differences in growth rates. Hence, policies designed to target such factors are likely to be following irrelevant or misleading indicators. We also show that the evolution of labour and total factor productivity in the poorer European regions is not affected by the amount of European funds invested in them nor, apparently, by the dramatic increase in public capital experienced by those same regions during the last three decades. Most of the observed inequality in regional income levels can be accounted for by a combination of three factors: differences in total factor productivity, differences in employment level, and differences in the share of agriculture in regional income. Finally, we argue that the experience of Ireland since the mid 1980s suggests that more traditional, market-oriented policies remain the best conduit to sustained economic growth and fast convergence in per capita income.

We conclude that regional and structural policies mostly serve a redistributive purpose, motivated by the political equilibria upon which the EU is built, but have little effect in fostering economic growth at the EU level.

2. REGIONAL CONVERGENCE: ACADEMIC VIEWS

This is not a survey of the literature but an introduction to Brussels' views in the light of current theories of economic growth. We minimize references, with apologies to the colleagues not mentioned.

Differing predictions about the impact of trade on economic growth follow from different assumptions about the underlying 'engine of growth'. Broadly speaking, there are two conflicting hypotheses. One claims that, given free trade and reasonable

competition, technological improvements promote economic convergence. The other claims that the consequence is inequality and divergence of growth rates unless public policy intervenes.

Before addressing these theories in detail, one should ask about the *territorial size* of the regions examined. Those who assume technology exhibits constant returns to scale in the aggregate usually suppose that the size of the region is large enough to ‘convexify’ undeniable human indivisibilities and micro fixed costs. Conversely, aggregate increasing returns are inconsistent with interesting analysis of tiny regions. An interesting size of regions for analysis must be ‘reasonably large’ in population size and ‘reasonably heterogeneous’ in factor endowment. It seems also reasonable to look for convergence or divergence only among regions that are relatively similar to each other, if not in territorial size at least in the composition of their natural endowment, population, location, geographical structure, climate, access to natural resources, political regime and so on. All this is just common sense, though rarely spelled out in practical applications.

The European Commission uses specific regional units (‘Nomenclature of Statistical Territorial Units’ or NUTS 2 and 3)² as targets for the convergence process, and has defined NUTS2 as the geographical level at which the persistence or disappearance of unacceptable inequalities should be measured. Are such units of appropriate size, given the corresponding theories? Probably not, for three reasons.

First, almost all NUTS3 regions are neither ‘reasonably large’ nor have the ‘reasonably heterogeneous’ endowment of factors that would justify treating them as independent economic areas. This is true even for very many NUTS2 regions. Second, there is often little relationship between the activities taking place in a NUTS2 (*a fortiori* a NUTS3) region and what is reported by official statistics. The NUTS2 map of Italy and Spain gives the impression that R&D expenditure is highly concentrated in the capital cities, which is far from true. Rather the headquarters of large public and private companies are concentrated in the capital cities, and R&D expenditure is allocated to headquarters instead of specific plants and production lines. Similarly, the city of Hamburg is a NUTS2 region³ with a very high per capita income. Yet half of the population of the whole Hamburg metropolitan area lives in the nearby NUTS2 regions of Schleswig-Holstein and Lower Saxony, commuting to Hamburg for work. Hamburg’s value added is overstated of about 20% relative to its effective population, while those of Schleswig-Holstein and Lower Saxony (equal, respectively to 102 and 104% of the EU average) are understated. Similar arguments can be repeated, almost verbatim, for most large metropolitan areas – witness the differences between Ile de France (160%) and the Bassin Parisien (92.7%), Brussels (173%) and surroundings (around 110%), Comunidad de Madrid (101%) and neighbouring Castillas (66 and 76%), and so on. It is unclear that income convergence among statistical areas defined in such way should be a meaningful aim.

² The current nomenclature subdivides the EU into the 15 member states (NUTS 0), 77 NUTS1 regions, 211 NUTS2 basic administrative units, and 1031 NUTS3 subdivisions of basic administrative units.

³ Our thanks to E. Bode for the details of this example.

Third, while some NUTS2 regions are very large and with a broad endowment of productive factors, others are extremely small and with an extremely narrow set of natural resources. Some (e.g., Andalusia and the two Castillas in Spain, Aquitaine, Midi-Pyrénées or the Bassin Parisien in France, Lombardia and Sicilia in Italy) are very large and with a population 7–11 million people. Others are tiny (Molise and Valle d'Aosta in Italy, la Rioja and Cantabria in Spain, Ionia Nisia and Voreio Aigaio in Greece) and with equally tiny populations, often less than 200 000 people. Population density is also very heterogeneous. Expecting economic convergence across units that are so divergent in their underlying potential is implausible.

2.1. Convergence theories

The highly stylized, one-sector neoclassical growth model with exogenous technological change predicts unconditional convergence. Call this the *strong* version of the *convergence hypothesis*. In applied investigation, the basic 'capital, labour and total factor productivity [TFP]' setup is augmented to take into account the impact of human capital, natural resources, public goods and political stability. Widely quoted applications of this approach, claiming it explains the evidence fairly well, are Barro and Sala (1991, 1992) and Mankiw *et al.* (1992). While the data set used by Barro and Sala (1991) does not include most of the EU latecomers and all the current recipients of Cohesion Fund (i.e., Greece, Ireland, Portugal and Spain) they interpret their regression results as supportive of the finding that both within- and between-country convergence is taking place. In the case of Italy, for example, they write, 'A popular view is that the backward regions of southern Italy will always lag behind the advanced regions of northern Italy (and vice versa for the United Kingdom). Our overall findings do not accord with this type of story since we find substantial evidence of β and σ convergence across the regions of Europe' (p. 149). They argue that, over the period 1950–85, there is strong evidence that the poorer regions of the South of Italy grew faster than the richer ones in the North and that the initial gap in per capita income levels is being progressively eroded. Similar findings are reported for the United Kingdom. In Section 4, we briefly consider the currently available evidence and conclude that it leans strongly against convergence in levels.

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 be easily disrupted or retarded by the wrong set of sociopolitical conditions. Conditional upon the endowment of immobile factors, only free trade and competition lead to convergence in labour productivity and per capita income, (e.g., Boldrin and Levine, 2000; Harberger, 1998; Parente and Prescott, 2000; Prescott, 1998). Differences in TFP are endogenous and cannot be explained by 'lack of knowledge' in the poorer areas: 'Make no mistake, knowledge used in the United States is there to be used by the Indians to increase their total factor productivity. The reason that Indian workers are less productive after correcting for stocks of tangible and intangible capital is that this usable knowledge is not as fully exploited there as it is in the United States. A

successful theory of international income differences must explain why this is the case' (Prescott, 1998).

Decreasing returns to scale are easily exploited only when factors can move; if they can, an approximately uniform distribution of mobile factors is reached across regions. The introduction of different capital goods or a different organization of production often accompanies adoption of new and more efficient production techniques. The presence of artificial barriers to relative price equalization reduces the incentive to adopt the most efficient technique, thereby preserving enclaves of low total factor productivity. These models predict that a reduction in trade barriers or improvement of trade integration should increase factor productivity and income levels among *all* participants. As a corollary, 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

On this side of the fence, the basic workhorse is a theory assuming beneficial externalities at the micro level that generate increasing returns in the aggregate, in which case market competition induces divergence not convergence. We baptize this the *strong non-convergence hypothesis*. High fixed costs, widespread increasing returns and externalities, in this view, are the engines of economic progress; comparative advantage and competitive imitation play a secondary role. The theoretical background of this literature goes back to the early work in the theory of economic growth that inspired the development policies of the 1950s and 1960s (big-push theories, dual labour market, demand-driven poverty traps). Its recent revival hinges on the research of Paul Krugman in the theory of international trade (e.g., Krugman, 1991; Krugman and Venables, 1995), and of Paul Romer in the theory of endogenous growth (Romer, 1986, 1990). Grossman and Helpman (1991, 1994) are also important contributions to this line of research.

Whatever the actual source of increasing returns, if they can be realized at the regional level⁴ any increase in trade openness is likely to send the most productive factors flowing toward the advanced regions, where their return is higher, leaving the disadvantaged areas further behind. An extreme version of this approach predicts that construction of infrastructures for transportation and communication may harm the poorest areas, by facilitating migration of their productive factors (Martin, 1997).

Several strands of the 'new growth theory' postulate increasing returns and agglomeration effects. Fixed costs at the firm level are important and, with decreasing long-run cost curves, 'winners take all' is the intuition behind this approach. Particular cases identify fixed costs with the generation of innovations (R&D activities, external effects from human capital investment) or with the accumulation of minimum stocks of

⁴Notice, with reference to our criticism of NUTS2 and 3 regions as appropriate territorial units of convergence, the crucial importance of the size of the area in which external effects and increasing returns are operational.

physical capital and/or public infrastructures, without which private investment and labour effort cannot yield the rate of return the market requires.

An alternative but similar view argues that co-ordination failures inhibit industrialization and sustained economic growth because individual agents cannot co-ordinate their investment decisions. Due to strong beneficial externalities, individual projects are unprofitable if started in isolation. With a critical mass of projects implemented simultaneously, the realized returns are high enough to make them profitable. This may justify subsidies and financial support to firms located in poorer regions, *if* the aim is sustained growth in those regions rather than economic efficiency throughout the entire EU.

Traditional regional economics also gives many reasons why economic activity concentrates in a few areas leaving behind the rest: economies of scale and agglomeration, increase in labour market efficiency due to search-and-match effects, monopoly power generated by innovation leadership and, more generally, externalities associated to the generation of productive knowledge.

While the strong version of the non-convergence hypothesis implies that equality of initial conditions is necessary for equality of long-run 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. The policy implications of the strong and the weak version are rather different. Poverty traps and low-growth equilibria originate in the latter, not because the *ratio* between the poor and the rich region is below some critical value but, instead, because the poor regions have not managed to cross a threshold *level* in their endowment of the strategic inputs: human capital, public infrastructures, R&D activity and financial deepening. In the absence of political intervention, or when the latter is too weak, some form of 'club convergence' is to be expected. Regions will cluster within different clubs, which are determined by endowments of the strategic factors. Convergence within each one of these clubs may therefore be observed, with countries belonging to the same club growing (or stagnating) together, without much reduction of between-club inequalities.

This point of view has been translated into a statistical methodology and applied to both worldwide data sets and European regions. A number of authors (e.g., Canova, 1998; Canova and Marcet, 1995; Quah, 1996a, b, 1997; and, for a survey, Durlauf and Quah, 1999) claim there is evidence that European regions are dividing in four clusters, each one with its own asymptotically stable per capita income level. The evidence we report does not support this view.

An important remark must be added as to the policy implications of the non-convergence models. One must carefully distinguish between overall economic efficiency and inter-regional equality. If the EU15 is an economic unit within which capital and labour freely move and the objective of policy is the maximization of welfare for the average European citizen, almost all divergence models would recommend that *more*, not less, *regional concentration* of economic activity be supported. Non-convergence predictions reflect increasing returns to scale. Concentration of economic activity minimizes costs and maximizes productivity.

Things are different when regions are considered as separate entities to which labour is tied as a fixed factor. In this case, welfare weights must be attached to the utility of the citizens of each region. A reasonable assumption is that of equal welfare weights. If the planner is patient enough, some form of ‘equality in long-run consumption levels’ might be a goal of public policy. With beneficial externalities and increasing returns in aggregate technology, two solutions are possible. When lump-sum payments are possible, the planner should favour agglomeration of mobile factors to maximize total output, and redistribute it to the citizens of the different regions to equate the appropriate marginal utilities.⁵ If lump-sum side payments are impossible, optimum policy trades off aggregate efficiency and regional convergence of consumption levels. Some aggregate output is sacrificed by distortions that improve equality across regions. Under increasing returns in each region, this requires fostering growth in the poor areas while restraining the richest ones. In these circumstances, a suitable variation of the ‘infant industry protection’ argument leads to the conclusion that free trade is bad for poor regions. This is, after all, the message from a large portion of the divergence literature. The latter is a rather paradoxical conclusion for the EU, founded to facilitate trade within Europe. Hence, the surrogate solution of subsidizing growth in the poor regions: this may reduce overall efficiency but maximizes the aggregate welfare function *when immobility of labour is taken either as an assumption or a desideratum*.

2.3. Why are we testing for convergence versus divergence?

As usual, our empirical investigation is hampered by lack of the appropriate data, lack of controlled experiments, and a high degree of ‘observational equivalence’ between competing theories. The first two are obvious; the third needs more discussion. Convergence models predict convergence to a common long-run growth pattern. But, in general, this depends upon initial conditions and upon the endowment of natural and/or immobile factors. Different regions may be converging to different long-run growth rates just because of different initial conditions. Secondly, convergence models predict that rich countries should grow more slowly than poor ones only if one believes that technological progress is exogenous and constant. When technological adoption is endogenous, convergence models make no clear prediction as to the pattern that growth rates should follow.

Things are not easier on the divergence side. Single-country models with external effects also predict long-run convergence in growth rates, provided the maximum sustainable growth rate is finite. In fact, simple one-sector models of growth with either constant exogenous technical progress or external effects *predict the same thing: monotone convergence*, with rich countries growing slower than poor ones (see Boldrin and Rustichini, 1994). Hence, while interesting for accounting and data-organization purposes, convergence regressions of the kind popularized by Robert Barro and associates have

⁵ Should regional funds be interpreted this way? This is a distinct possibility that we discuss in the conclusion.

no implication whatsoever for deciding which class of models is the least inappropriate description of the real world!

Why, then, did we label with 'divergence hypothesis' those models incorporating external effects and increasing returns? For two reasons. First, and most importantly, because most scholars seem convinced that external effects and increasing returns play an essential role in modelling long-run differences in growth rates. This research agenda, put forward by Romer (1986) and Lucas (1988), has been followed by scores of researchers. This, by itself, would not be relevant for our purposes if it were not the case that, especially in policy circles, external effects, increasing returns and large fixed costs are constantly advocated as the explanation for persistent underdevelopment. As the next section shows, the European Commission clearly shares this view. Second, when aggregate increasing returns dominate, such models do predict stagnation for regions starting below a certain threshold level for the initial stock of capital. To the extent that the intellectual support for current policies is provided by this extreme view of the divergence hypothesis, it seems important to check if the evidence backs it up.

Efforts to measure external effects directly have also been made and, in general, have not found strong evidence of external effects. Ciccone (1997), Ciccone *et al.* (1999) and Acemoglu and Angrist (1999) are recent and particularly well-crafted efforts in this direction. Ciccone (1997) finds no evidence of human capital externalities across US counties. The evidence reported in Ciccone *et al.* overwhelmingly supports the idea that, at the city level, human capital externalities are too weak to overcome the usual effect of decreasing returns; evidence of physical capital externalities is even weaker. Acemoglu and Angrist use microeconomic evidence about schooling and returns on education to evaluate the difference between private and social returns. They find returns on education are relatively high, about 7%, but the difference between private and public returns are very small and statistically insignificant.

A final remark. Tests of the convergence/divergence hypotheses usually use data on per capita income, yet the theories make predictions about labour productivity not income. The key difference between the two theories has to do with the nature of the aggregate production function and its implications about labour productivity. Both divergence and convergence theories assume full employment, and make no predictions about unemployment and labour force participation rates. Yet, as we shall see, this makes all the difference in the analysis of data. And it allows for an interpretation of the results that we find both reasonable and interesting.

3. REGIONAL CONVERGENCE: BRUSSELS' VIEWS AND POLICIES

If increasing returns and local externalities dominate, the adoption of a common currency by countries with different economic potentials may fuel further divergence. In this case, common monetary policy and greater fiscal policy co-ordination will themselves enhance the need for more regional redistribution. The paradoxical idea that European integration – macroeconomic policy convergence and greater factor

mobility – will ‘cause’ divergence in regional income growth rates is explicitly stated in many policy-oriented studies and provides the logical backbone for most official reports of the European Commission (Emerson, 1990; European Commission, 1994a,b, 1996, 1999; Hannequart, 1992; National Institute of Economic and Social Research, 1992; Padoa-Schioppa, 1987). This is despite many statements to the contrary in the ‘Cecchini Report’ (Cecchini, 1988) and in the ‘Delors Report’ (Delors, 1989). This pessimistic view offers the most coherent interpretation of the Delors II budget proposal, agreed in December 1992 at the Edinburgh Summit, which led to the creation of the Cohesion Fund and inspired recent European Commission policies. The Berlin Accord of the Council of Europe in March 1999 confirmed the spirit and the substance of the current regional policies.

3.1. Policies

The EU’s views of both its aim (economic integration) and its advantages (more efficient resource allocation and higher incomes for all) have shifted since the late 1950s. The logical and factual link between deeper market integration/liberalization and higher income for *all participants* has been called into doubt. Currently, the basic presumption is that deeper economic integration may favour *some participants* at the expenses of other. Avoiding this requires deeper political integration and interventionist regional policies.

In setting criteria for regional policies, the EU has mostly adopted the 211 NUTS2 regions of the EU as the appropriate territorial units.⁶ Measures of income and labour employment dispersion across NUTS2 regions are currently taken as the yardstick against which the efficacy of regional economic policies is appraised (European Commission, 1994b, pp. 33–118; 1996, pp. 21–48 or <http://www.inforegio.cec.eu.int/wbover/overcon/oco2a-en.htm> for a constantly updated view). The unambiguous aim of EU regional policies is to achieve near uniformity of income and (relative) factor endowments at the NUTS2 level. Disparities among NUTS2 regions are measured by per capita income, unemployment, educational attainment, R&D activity, and amount of public infrastructures. Successful policies mean 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 that Asturias fell from 77% to 75% of the Community’s average income over the period 1983–93 and that Lisboa’s per capita income passed from 81% to 96% of the Community’s average, while neighbouring Alentejo moved only from 42% to 48% over the same interval of time.

If convergence of income *levels* is the objective of the Commission, a belief in the lack of ‘market driven’ economic convergence is the underlying justification for intervention. Theoretical models of economic divergence are the analytical tools through which data

⁶ NUTS3 regions are sometimes used as reference units, especially if labour market issues arise. Official Commission reports deem the overseas French provinces Guadeloupe, Guyane, Martinique and Réunion as part of the EU in official comparisons. Their per capita income is between 40 and 54% of the EU average, the next poorest French region (Languedoc-Roussillon) is 79%. Our statistical analysis ignores Guadeloupe, Guyane, Martinique and Réunion.

are interpreted and policies are first designed and then engineered. The key concept adopted for understanding regional economic development is that of 'competitiveness'. The regions and countries of the EU are seen as competing against each other (e.g., European Commission, 1991, p. 32) 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 competitive, that is, endowed with a number of fundamental characteristics currently displayed only by the most advanced regions. Lack of these characteristics makes poor or less favoured regions 'unable to participate in the world competition', as the General Director for Regional and Cohesion Policies put it.⁷ More recent documents (e.g., European Commission, 1999), 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.

In the 1989 Delors Report (p. 22) we read that 'Historical experience suggests ... that in the absence of countervailing policies, the overall impact [of more economic integration] on peripheral regions could be negative. Transport costs and economies of scale would tend to favor a shift in economic activity away from less developed regions, especially if they were at the periphery of the Community, to the highly developed areas at its center. The economic and monetary union would have to encourage and guide structural adjustment which would help poorer regions to catch up with the wealthier ones'. This summarizes the long-run political view on the matter.

To implement the 'structural adjustment' policies advocated in the Delors Report, the attention of the Community officials has centred upon a relatively small number of 'development indicators': (1) infrastructures (transportation, telecommunications and water supply especially); (2) a highly qualified labour force and a high school-attendance rate; (3) an advanced financial system; and (4) a high level of R&D activity or, at least, a high rate of R&D absorption. More recently, a keen concern for environmental and ecological issues has also characterized the allocation of the Cohesion Funds. For these funds, allocated only to Greece, Ireland, Portugal and Spain, the Commission has in fact indicated that a 50/50 split of resources should take place between transportation and environmental infrastructures (European Council, 1999b, c). In any case, the presence of the four factors listed above is systematically described as 'primordial' for economic development and for private investment to take place. If they are not provided by public intervention, it is unlikely that sustained economic growth will get started (European Commission, 1991, p. 12). These indicators correspond to those that old and new divergence theories suggest as the main sources of increasing returns.

In keeping with current fashion, the lack of 'local R&D activity' is perceived more and more as a major, if not *the major*, cause of slow growth in less developed regions. European expenditure for R&D is judged as being too concentrated in large countries

⁷ Preface of Mr Eneko Landaburu to Cuadrado Roura (1998).

(Germany, France, 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 special incentives to do so. 'What is more critical is the capacity to absorb and exploit new technology which is often lacking and which therefore implies a need to establish appropriate systems for technological transfer. A key difficulty in the weaker regions, however, is a lack of receptiveness to research and technological development (RTD); a failure of business both to recognize the importance of RTD and to establish a business ethos based on the continuous introduction of new products or processes. This suggests a role for the transfer of appropriately qualified personnel from stronger to weaker regions, demonstration projects and other measures which will help persuade firms of the relevance of RTD to their business prospects' (European Commission, 1994b, p. 11). A frequent criticism of member states' policies in this area is that, by pursuing the objective of maximizing nationwide payoffs in their choice of R&D projects, they concentrate funding in certain areas of the country and do not aim at an even regional distribution of public incentives for R&D (European Commission, 1996, p. 52).

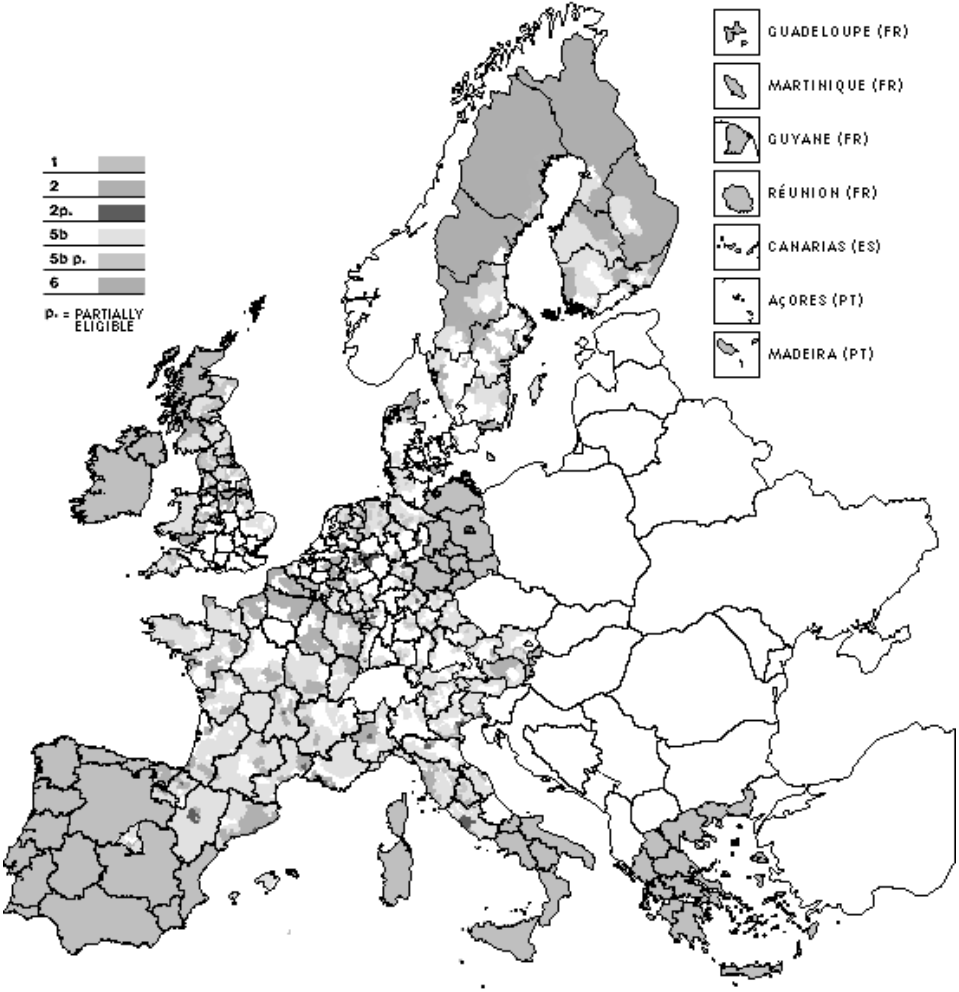
A second major concern of the Commission is labour mobility and inter-regional migration flows. On the one hand, the economic and social advantages of factor mobility are often praised. On the other hand, one can find a number of explicit statements according to which labour market flexibility and mobility of workers would not help the less prosperous regions, as skilled labour would concentrate in the advanced regions leaving the underdeveloped ones worse off. This concern for 'depopulation' of certain areas and the negative effects of migration is particularly strong in the Cohesion Reports. Yet such arguments are often developed for the territorially minuscule NUTS3 regions (e.g., European Commission, 1991). The Commission point of view is that migration flows, caused by disparities in income per capita and unemployment levels, are a 'bad' solution to the unemployment problem (European Commission, 1991, p. 12) as they cause 'congestion' and are 'socially disruptive'. Economic growth in the regions where unemployment rates are high must therefore be fostered. This policy target is explicitly mentioned in defining Objectives 2 to 6 of the Structural Funds.

3.2. Instruments

A detailed description of the criteria according to which regions are classified, and of the methodologies adopted in allocating the funds, can be found in a number of official publications, available at the *InfoRegio* Web site, www.inforegio.cec.eu.int. Here we summarize the essential information needed to make the forthcoming analysis understandable.

3.2.1. Structural Funds. The largest Structural Fund (SF), the European Regional Development Fund (ERDF), was established in 1975, after the incorporation of England,

Denmark and Ireland in the Community. Before it, European regional policy had already produced the European Agricultural Guidance and Guarantee Fund (EAGGF). Assistance was, and still is, oriented toward less favoured regions and focused mainly on productive investments, infrastructures and Small and Medium Enterprises (SME) development. Other Structural Funds followed. Over time and with the addition of new funds and countries, the scope and definition of 'less favoured region' expanded to the point that SF resources currently flow to almost all NUTS2 regions (see Map 2). In 1996 the ERDF budget amounted to ECU11.8 billion while that of the Cohesion Fund was ECU2.25 billion. Over the period 1994–9, Structural Funds' resources amounted to ECU154.5 billion at 1994 prices. This was roughly one-third of the Community budget, which absorbs almost 1.3% of Community GNP.



Map 2. NUTS2 regions that are Structural Funds recipients, by objective

Structural Funds are meant to target six objectives. Each corresponds to a different subset of regions of the EU, even if the Commission makes a distinction between 'regional objectives' (1, 2, 5b and 6) which concentrate about 85% of the budget, and 'non-regional objectives' (3, 4 and 5a). Objective regions are designated at either NUTS2 or NUTS3 level.

- **Objective 1. Economic adaptation of less developed regions, with a per capita GDP less than 75% of the Community average.** This group includes about 50 NUTS2 regions: the whole of Greece; Portugal; Ireland and Spain with the exception of the Comunidades de Madrid, Cataluña, Aragon, Baleares, Navarra, Pais Vasco (58.2% of the population of Spain); the five Länder of former East Germany (20.7% of the population of Germany); Sicilia, Sardegna, Calabria, Basilicata, Puglia, Campania, Molise and (until 1996) Abruzzi in Italy (36.6%); Corsique, Guadeloupe, Guyane, French portion of the Hainaut province, Martinique and Réunion in France (4.4%); Northern Ireland, Highlands and Islands and Merseyside in the UK (6.0%); Burgenland in Austria (3.5%); the province of Hainaut in Belgium (12.8%); Flevoland in the Netherlands (45%). That is a total of almost 92 million people, or about 25.0% of the total population of the Community. Objective 1 takes about two-thirds of total structural funding.
- **Objective 2. Economic recovery of regions affected by the industrial crisis** and which satisfy three eligibility criteria: an unemployment rate above the Community average; a percentage share of industrial employment higher than the Community average; and a decline in the employment level of the industrial sector. Objective 2 regions are designated at the NUTS3 (or even smaller) level. They cover 60.5 million people, or 16.4% of the population and account for 11% of total Structural Funds expenditure.
- **Objective 3. Fighting long-term unemployment.** This objective practically translates into facilitating the integration into working life of young people and of other persons exposed to long-term exclusion from the labour market. It includes, for example, the promotion of equal employment opportunities for men and women. The territorial application of the objective covers the whole of the Community, programmes are financed at various NUTS levels, mostly NUTS3. Over time, the population touched by programmes financed by Objective 3 adds up to about 4% of the Community's population. Funding is 9.4% of the total.
- **Objective 4. Facilitating the adaptation of workers to industrial changes and to changes in the production systems.** This objective also covers the whole of the Community; programmes are financed at various levels, most often NUTS2 and NUTS3. Resources available correspond to 1.6% of total available.
- **Objectives 5a, 5b. Speeding up the adjustment of agricultural structures** in the framework of the reform of the common agricultural policy and promoting the modernization and structural adjustment of the fisheries sector. Eligibility for Objective 5b is a low level of socio-economic development (measured

by GDP per capita) and two of the following three criteria: high share of agricultural employment, low level of agricultural income, low population density and/or significant depopulation trend. Objective 5a covers the whole of the Community, and has access to about 5% of total structural funding. Objective 5b is limited to areas meeting the criteria above, for a total of 33 million people (10 of which are in France and 8 in Germany). As a percentage of the total population covered by Objective 5, both Austria (29%) and Finland (21%) precede France (18%). The areas involved are typically even smaller than NUTS3 level and funds involved are equal to 4.9% of the total.

- **Objective 6. Regions corresponding to or belonging to regions at NUTS2 level with a population density of eight inhabitants per km² or less.** As the label suggests, this covers only regions in the northern parts of Finland and Sweden, with a population equal to 0.4% of the Community's total (17% of Finland and 5% of Sweden). The amount of funding involved is less than 1% of the total.

According to the March 1999 resolution of the European Council, new shares for the 2000–6 budget period will be: 69.5% for Objective 1, 11.5% for Objective 2, 12.3% for Objective 3, with the rest of the Euro 195 billion total to be divided among Objectives 4, 5a, 5b and 6.

The six objectives are pursued by means of various, specific programmes or funds. The generic label 'Structural Funds' covers, therefore, a variety of different programmes.

1. European Regional Development Fund (ERDF) established in 1975. Limited to less favoured regions, it focuses mainly on productive investments, infrastructures, SME's development, research and development projects. It should generate growth in capital stock, infrastructures, education, SME firms and expansion of R&D activity. Over the programming period 1994–9 the resources of the ERDF amount to ECU80.5 billion, more than doubling the ECU35.4 billion of the 1989–93 period. This corresponds to 49.5% of the total amount of funds available for structural interventions over the same period. Spain (24.1% of ERDF resources), Italy (15.2%), Greece (12.4%), Portugal (12.4%) and Germany (12.2%) are the largest beneficiaries. Exception is made for Germany; the same countries have been the major beneficiaries of ERDF funding during the last three programming periods. Funds going to Germany are targeted to the East Länder.
2. In 1986–7, the Single European Act and the addition of Title V to the Rome's Treaty led to the creation of the European Social Fund (ESF), designed for vocational training, improvements in the education systems and employment aids. This fund pretty much covers Objectives 2, 3 and 4 and portion of Objective 1. It should therefore generate: mobility of labour, rising employment of young people and women, growth in educational attainment, and an increase in R&D. ESF funds correspond to about 29.9% of Community intervention in the current period, for a total of about ECU50 billion. Spain (20%) and Germany (15.9%) are the largest beneficiaries.

3. The European Agricultural Guidance and Guarantee Fund (EAGGF) is the oldest fund. Its origins date back to 1962 as a part of the Common Agricultural Policy (CAP). It promotes the adjustment of agricultural structures and rural development measures. It should generate growth in farming employment, productivity and income, and employment of young people in farming. The EAGGF accounts for ECU23.7 billion, which corresponds to 17.7% of the Community structural funding. Major beneficiaries are France, Italy, Spain and Germany, which share about 75% of the total.
4. The Financial Instrument for Fisheries Guidance (FIFG) is a specific fund, established in 1994, aimed only at the fishing industry. It replaced a number of smaller, separate instruments dating back to 1976. It should generate growth in fishing employment, productivity, infrastructures and income. Its total budget over the 1994–9 programming period was 2.9% of total resources available. Spain, Italy, France and Portugal share about 70% of it.

Overall, Spain is the largest beneficiary of SF, receiving almost one quarter of the total (ECU34.4 billion, over the 1994–9 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 next to last and last, with 800 and 100 million respectively. The remaining countries are in between. All in all, it seems that every country member of the European Union is economically disadvantaged, at least along some dimension.

3.2.2. Cohesion Fund. This fund, established in 1993 as a consequence of the Maastricht Treaty signed a year before, provides financial support to particular projects of member states (as opposed to regions) with a GDP per capita below 90% of the Community average. The purpose of the Cohesion Fund (CF) is to facilitate the compatibility, for poorer countries, of the budgetary discipline required by the Treaty with the continuation of important investments in public infrastructures. It is unclear how long the CF will last, but already it has outlasted the introduction of the Euro.

Four countries have GDP per capita below the threshold (1995 data, EUR 15 = 100): Greece (65.8), Ireland (78.9), Portugal (72.3) and Spain (75.7).⁸ Only countries in line with the programme of economic convergence to the monetary union are eligible. This requirement was applied to Greece with some elasticity, but implied a drastic reduction in CF resources to Greece in 1997–8. Since 1999, funding to Greece resumed at a normal pace. Total funding for 1994–9 was ECU14.5 billion, allocated as follows: 16–20% Greece, 7–10% Ireland and Portugal, 52–58% Spain. For the 2000–6 budgetary period, Euro 18 billion have been allocated to the CF (European Council,

⁸ These official numbers in the First Cohesion Report, European Commission (1996) are highly debatable according to the Commission's own statistical documents. European Commission (1999; Table 1) gives, for 1995 in PPS, Greece = 66.4, Ireland = 96.8, Portugal = 70.1 and Spain = 78.6. Ireland had therefore passed the threshold when the CF programme was started. Since then, it has passed the 100% mark as well.

1999a). Ireland will be receiving funds under the CF programme over this period, despite having long surpassed 90% of the EU level in per capita income.

The CF provides financial support to two kinds of large, public or private investment projects and can contribute up to 80–85% of total public expenditure.

1. Environmental projects aimed at achieving the Community's environmental objectives. This should generate water treatment, transportation and environmental improvement.
2. Transport infrastructure projects, aimed at developing transport infrastructures within the Trans-European Transport Network (TEN). It should generate roads and railways.

3.3.3. European Investment Fund. Created in June 1994, it aims at long-term financing of projects related to the Trans-European Transport Network and to the development of small and medium-size firms. In 1995 the value of insured loans amounted to ECU686.8 million.

4. EUROPEAN INEQUALITY: GROWING OR DISAPPEARING?

In this section we look at the available evidence. Additional data and estimates mentioned in the text and which, for the sake of brevity, are not reported here can be found online at <http://www.econ.umn.edu/~mboldrin>.

4.1. Convergence regressions

Barro and Sala (1991, 1992) estimate different versions of the following regression equation

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

where y_t^i is per capita income, or value added, or productivity in either region or country i at time t . They find evidence for unconditional β -convergence across European regions. Possibly controlling for a number of individual characteristics included in the coefficient α_i , they claim that per capita income is becoming similar across countries and regions and that this convergence process is taking place at a 'universal' speed of convergence of around 2% a year. In cross-section regressions of data for the post-World War II period, a statistically significant negative value of the parameter β is calculated (hence β -convergence).

Barro and Sala were able to consider only a few Objective 1 regions, and their data end in the mid 1980s, before the European Structural Funds started really to operate. Using data for 185 NUTS2 regions during 1980–96 we estimate a number of different specifications for regression (1). The results are mixed, but not supportive of β -convergence for regional per-capita income (detailed results available at <http://www.econ.umn.edu/~mboldrin/regions>). We estimated (1) over various sub-periods and sub-samples, using both per capita GDP and labour productivity, in absolute value,

in logs and scaled by national or European averages, with and without national dummies. When y_t^i is *per capita GDP*, the point estimate of β is always either positive or statistically insignificant, or both. When, instead, y_t^i is *labour productivity*, the point estimate of β is both negative and statistically significant.

A number of studies have estimated convergence equations that recognize the existence of different steady states (Canova and Marcet, 1995). For each region (or group thereof) one computes an asymptotic distribution, and estimates a steady-state value. The collection of steady states so obtained is regressed against the initial conditions of each region. The estimated coefficient in this second regression tells us if convergence to a common steady state is expected or not. We apply this procedure to per capita income and labour productivity of the 185 NUTS2 regions mentioned above, and over the same time period. When per capita GDP is the variable of interest, the estimated coefficient (β) is 0.98 with an estimated standard deviation of 0.02. A coefficient of unity would imply neither convergence nor divergence, so our results are consistent with this. Using labour productivity instead of per capita GDP, we obtain a coefficient estimate of 0.82 and a standard deviation of 0.07, which implies a very small amount of convergence (but certainly rejects the divergence hypothesis which requires a coefficient above unity).

Researchers working within this framework have also reported the existence of a second form of convergence, ' σ -convergence', whereby various measures of dispersion in the distribution of regional per capita income decrease over time. The evidence is very mixed. Recent data fail to support σ -convergence. Figure 1, from European Commission (1999) show some form of σ -convergence for national incomes, but none for regional incomes. Our own estimates agree with this. The sample standard deviation of the distribution of regional per capita income goes from 0.27 in 1980 to 0.25 in 1996, but oscillates widely during the period; one should not interpret the small reduction as a signal of an ongoing process of σ -convergence. The same is true for labour productivity, which oscillates widely over the sample period and ends the period exactly where it started 16 years earlier. We have also computed the time series of the ratios of the highest to lowest quartile. For per capita GDP it goes from 1.32 in 1980 to 1.30 in 1996, for labour productivity the figures fall from 1.27 in 1980 to 1.21 in 1996. In both cases the ratios oscillate over the sample period. Nevertheless, this ratio for labour productivity goes above its initial value only once (in 1985 when it reaches 1.28) while the one for per capita GDP is above the 1980s value every year except in 1986 (1.31) and 1989 (1.30), reaching a maximum of 1.43 in 1990 and it is still at 1.33 in 1995.

These results and others of a similar nature provide an insight. Evidence of convergence weakens after the late 1970s or early 1980s. During 1950–73, there is a strong tendency for poorer countries (and, in the limited data available, also for the poorer regions) to catch up to the European average. This pattern is confirmed by a variety of other indicators, including our analysis (not reported here) of the sample distribution of national's relative income levels before 1974. Over the next two decades convergence largely stops. National patterns become dominant and convergence coefficients become insignificant in per capita income data.

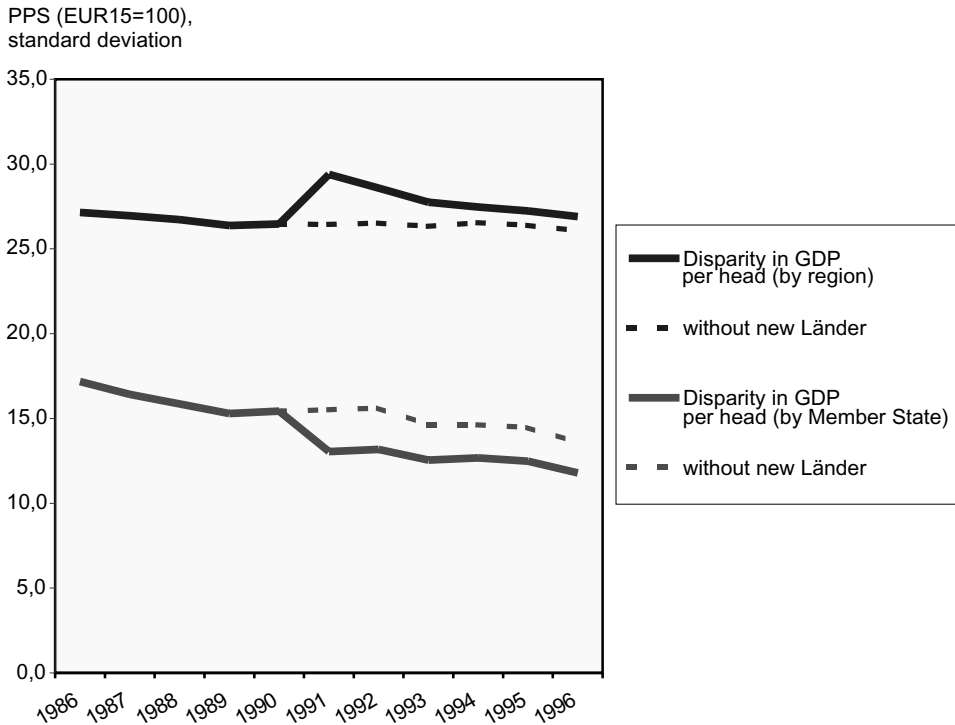


Figure 1. Disparities in GDP per head, 1986–1996

These are interesting results. Absent regional policies, the increase in trade of the 1950s and 1960s was associated to a fairly strong reduction in national and regional income disparities. With regional policies in place, increasing trade within the EU was no longer accompanied by convergence in per capita incomes. Labour productivity kept converging, but very slowly. This is very different from, and almost opposite to, what divergence theories predict should happen.

4.2. Distributions: income and unemployment

Regression analysis as in (1) cannot lead very far because it summarizes the dynamics in a single point estimate. The evolution of regional income inequality is multidimensional and inequality measures are notoriously ambiguous. Still, by looking directly at the sample distributions and at a variety of measures of dispersion, clearer conclusions can be reached. We begin by looking at measures of inequality in income per capita and unemployment rates.

4.2.1. Income per capita. Figure 2 reports the distribution of the log regional per capita income, scaled by the EU15 and the national averages respectively, in 1980 and in 1996 and the estimated long-run distribution resulting, should the same conditions continue in

Distributions at various dates

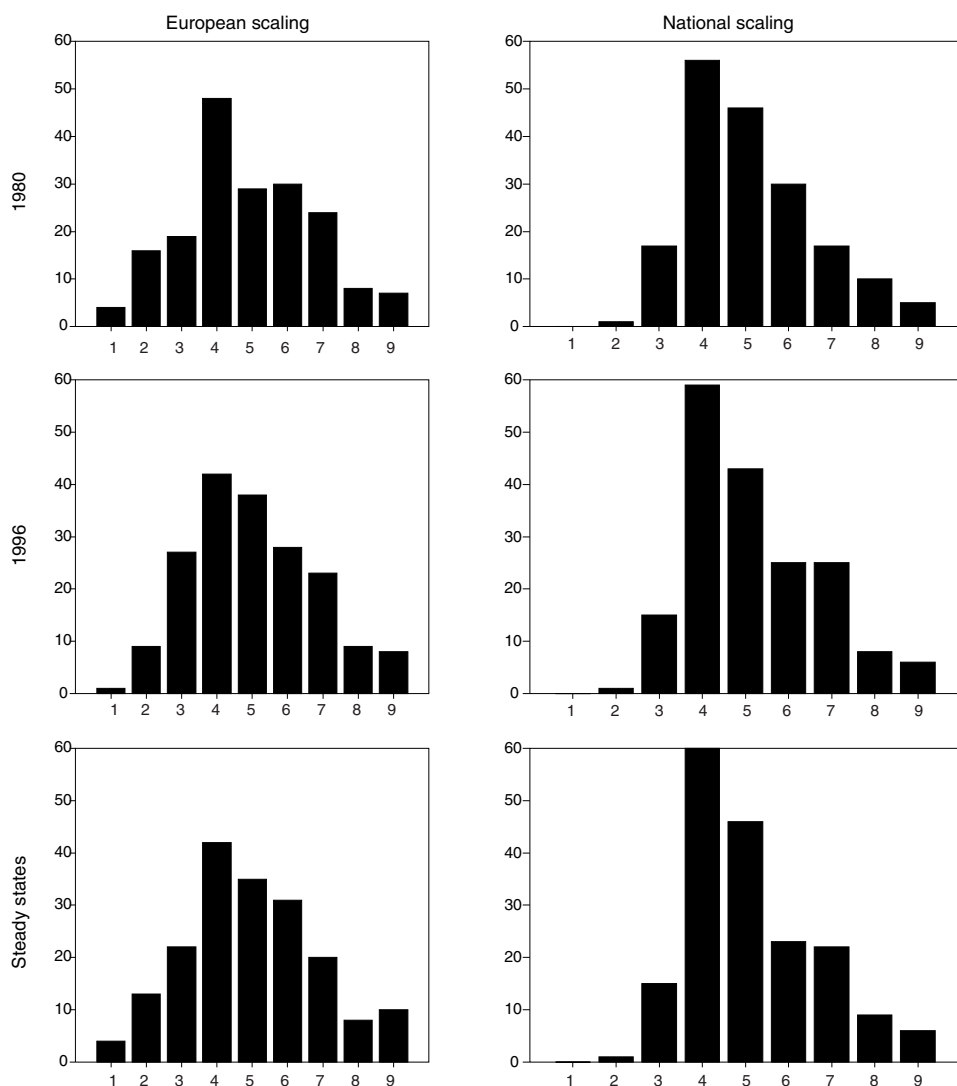


Figure 2. GDP per capita, European and national scaling

the future (see Canova, 1998 for technical details). In each box, the histograms group regions in nine (or less) classes of per capita income (up to 40%, 41–55%, 56–70%, 71–85%, 86–100%, 101–115%, 116–130%, above 131%) where 100 is the average (European or national) income for each year. For the steady state distribution, 100 is the level of regional per capita income which would obtain if unconditional convergence were taking place asymptotically.

Three facts are evident. First, there is no tendency for the 1996 or for the steady state distributions to collapse toward their central value, a tendency that would be consistent

with the concept of σ -convergence mentioned above. Second, the features of the distributions are very persistent. For example, the spread between the upper and the lower decile of the distribution at the beginning, the end of the sample or at the steady states is largely unchanged; we do not notice any form of systematic catching-up of poor regions ('miracles' do occur, though), and relative income inequalities are not reduced over time. Third, there is a tendency for units which started above the mean to regress toward or below the mean. The leftward shift of the overall distribution is quite evident both in 1996 and at the steady state. The number of regions with per capita income below the European average did not decrease over the 16 years considered, and the median per capita income is still well below the mean.

Examination of regional behaviour restricted to individual countries provides further evidence. Among the four Southern countries only Spain displays a (very weak) reduction in regional income inequalities; in the other three countries disparities did not decrease over the decade. New losers have appeared in some of the richest countries. At the EU level, the long-run distribution displays a very long right tail and a high concentration of regions on the left of the mean income point.

Non-decreasing regional inequality at the national level, paired with a certain reduction of inequality among countries, suggests that the following phenomenon could be observed. Within each country, rich regions grow faster than poor ones and the rich (relative to national average) regions of poor countries grow faster than those of countries that are already above the continental mean. This could produce the creation of 'convergence clubs' at the European level. If there is a tendency of regions which are well off relative to national average to cluster around an aggregation pole and for regions which are worse off to cluster around another aggregation pole, then scaling by the European average, which assumes the existence of only one attraction point, is likely to obscure the nature of the convergence process. Moreover if increasing economies of scale were active only for regions that are rich at the beginning of the period, we should see a tendency for the rich regions to move together as time goes by. In both cases, scaling income per capita by the national average should enable the correct characterization of the evolution of inequalities. With national scaling, the number of regions with income higher than their national average decreases between 1980 and 1996 and the tail of poorer than their national average regions tend to increase. This finding contradicts the idea that rich and poor regions are clustering together in two separate clubs.

To formally test the hypothesis that the initial and final (or steady state) distributions are the same we used a Kolmogorov–Smirnov test. This non-parametric test examines whether there is any significant difference between distributions by looking at their maximum discrepancy. The test confirmed that the distributions of income per capita are not statistically different over time (further details available from the authors on request).

Given these general characteristics, we would like to know more about the behaviour of specific regions: which among them transit from one position to another and which are completely immobile. Did regions with support from the European Commission,

either through structural or agricultural funds, show different behaviour? If EU funds make a difference, this should be reflected in a shift to the right of the overall distribution. Secondly, if divergence theories are correct, one should also see a reduction of income dispersion within the recipients themselves.

Figure 3, which reports these distributions for 1980, 1996 and for the steady state, suggests that the situation among funds' recipients is not particularly different from other regions, and that no visible evidence of accelerating growth rates appears. The

Distributions at various dates

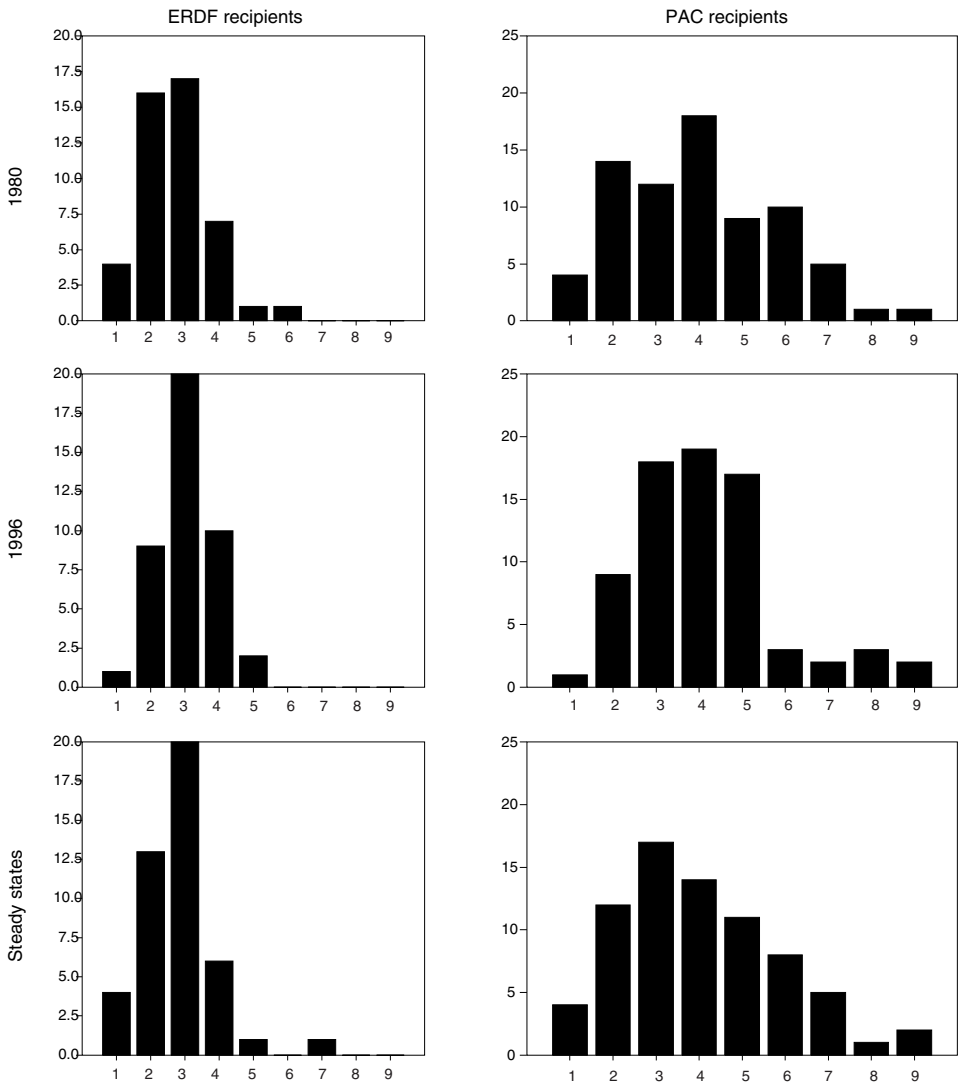


Figure 3. GDP per capita, ERDF and PAC recipients

distributions are quite similar across time and being a recipient of either EU (Figure 3) or national (unreported) funds does not seem to have changed, except in a very limited number of cases, the position of a region relative to the European average. Indeed, one may verify that all the action in the asymptotic distribution of the left panel of Figure 3 is due to the presence of Ireland. Analogous conclusions can be drawn from the (unreported) time series of median, quartiles and interquartile ratios (ratio of highest to lowest quartile) for the population, ERDF and CAP recipients. This is somewhat surprising for the case of ERDF funds since they are supposed to affect the basic determinants of the evolution of per capita income. On the other hand, the result was to be expected in the case of CAP funds, which have a purely redistributive function in favour of the agricultural sector. Indeed, as the right panel of Figure 3 shows, among the recipients of these funds, there are regions both (strongly) above and below the European average.

The patterns we have unveiled so far are very robust to other regrouping of the data. For example, one may be concerned with *continental uniformity*: results (not reported here) indicate that (a) inequality and dispersion do not show signs of reduction for any reasonable *a priori* partition of the continent; (b) there is an almost perfect immobility in the ranking of the southern regions, particularly in the Italian south which has been the object of so many special national policies over the last 50 years, (c) the 'center vs. periphery' cut, along the lines suggested in European Commission (1999), also does not display particular features: the distribution of periphery shifts slightly to the left with data up to 1992 but then moves to the right from 1992 to 1996. These findings also suggest that, if two or more asymptotic distributions are the final outcome, initial conditions are not sufficient to determine how regions split up between the asymptotic classes.

Because of the emphasis given by the EU to the need for equalizing educational levels and R&D levels across regions, we also split the sample into high and low education (measured by the percentage of secondary education completion relative to the European average) and into high and low R&D (measured in terms of patents granted on average per year relative to the European average). Once again, the lack of convergence and the stability in the ranking are evident. Quite remarkably, one finds poor regions with high levels of education and R&D, and rich regions in which those two indicators are substantially below average. More important, one finds higher than average growth rates in regions that have educational attainment levels below average, the Italian north-east being the most striking example.

To summarize, except for a few 'miracles' (Ireland, the Italian north-east, the East German Länder, Lisbon's metropolitan area and, Inner London) most of Europe seems to have achieved a form of *long-run convergence in growth rates*. Controlling for cyclical factors, most regions appear to grow at a pretty common rate, with poorer ones growing faster during expansions and slower during recessions. Factors specific to individual countries play a major role. Southern Italian regions grew more slowly than the Italian average, whereas Spain's poorest regions grew slightly faster than the national average.

4.2.2. Unemployment rates. Figure 4 graphs of the distributions of unemployment rates in 1983, 1997 and at the steady state, where we scale unemployment rates by either the European average or the national averages, display properties similar to those of per capita income. The shapes of the initial and of the steady state distribution are practically identical. One important feature is the substantial polarization of these distributions, with the largest classes being located toward the extreme. Also, the number of units in the extreme classes is for all purposes constant, and if there is any mobility it is typically in the

Distributions at various dates

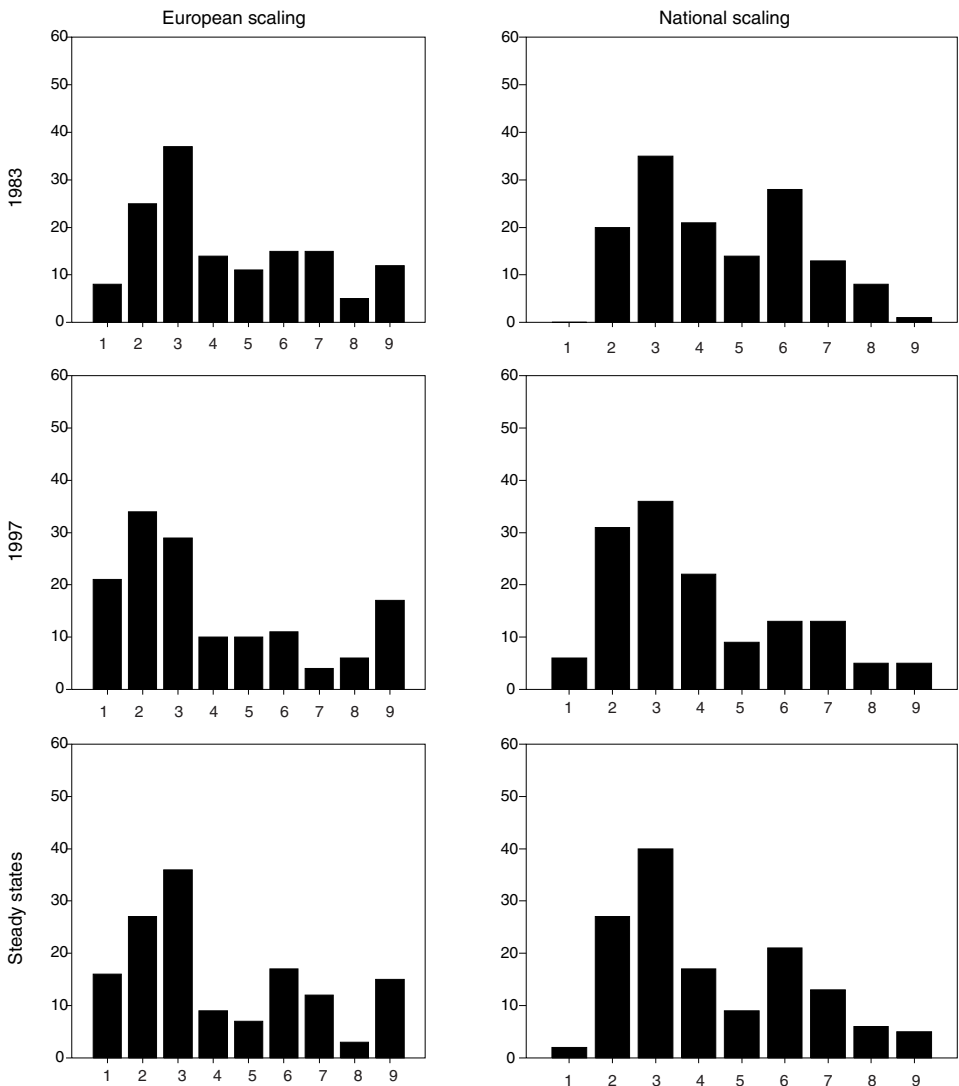


Figure 4. Unemployment rates, European and national scaling

central part of the distribution. Time series of median, quartiles and interquartile ratios for the whole population and for the restricted sub-groups of ERDF and CAP recipients tell a very similar story.

The distributions of unemployment rates of ERDF and CAP recipients (Figure 5) present some interesting features. The already substantial polarization of the ERDF distribution has increased substantially and the number of regions in receipt of Structural Funds but with high unemployment has increased. However, unemployment has fallen

Distributions at various dates

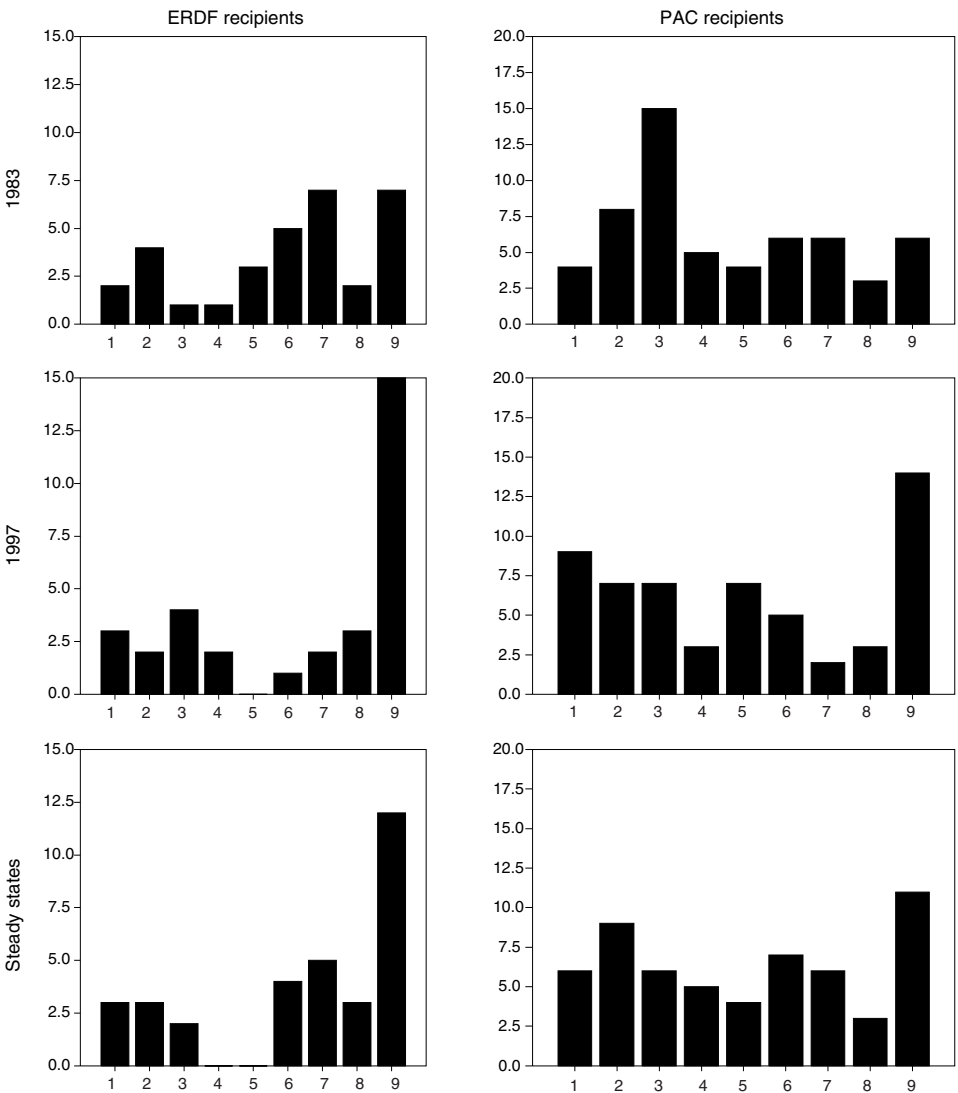


Figure 5. Unemployment rates, ERDF and PAC recipients

in some ERDF recipient regions. Which is attributable to regional policies: the success or the failure?

4.3. Productivity

Growth models concentrate on aggregate production functions and assume full employment. They make explicit predictions about labour productivity but not about the employment rate. We already reported that there are no signs of σ -convergence for labour productivity. Interquartile ratios provide a slightly more optimistic answer: the value for income decreases from 1.32 to 1.30 between 1980 and 1996, while that for labour productivity moves from 1.28 to 1.22. At the same time, the interquartile ratio for regional employment rates increases from 1.19 to 1.21. The idea that most regional inequality in income is due to unemployment rates while labour productivity may be actually converging fast is only mildly helpful in understanding the persistence of regional income inequalities. Labour productivity does converge a bit more and employment does diverge a bit more. But intermediate fluctuations are so wide, and the overall reduction so small, that it is hard to see a dominant trend in their behaviour.

In most growth models, low income is the effect of low aggregate labour, capital and total factor (TFP) productivities. For this reason, we now move to considering measures of productivity, bearing the following questions in mind.

- Are regional growth rates of labour and total factor productivity different between rich and poor regions? If so, can we say if initially rich regions are growing faster or slower than initially poor ones?
- Are capital–labour ratios systematically different across regions and are these differences helpful in explaining the differences in measured productivities? Does public capital play any special role?
- Do we observe a statistically significant relationship between regional indices of ERDF spending and subsequent increases in labour and total factor productivities?

The concentration on labour productivity and TFP is motivated by the following, intuitive reasoning. Both convergence and divergence theories use an aggregate production function as their main analytical tool. If one does not make explicit assumptions about the sources of TFP, a specification of the production function common to both classes of models is

$$Y_t = F(A_t, K_t, L_t) \quad (2)$$

where K is a measure of productive capital (either public or private or both), L is aggregate labour (sometimes multiplied by the level of human capital, H_t) and A is a general, catchall variable, which we can identify with total factor productivity.

Theories differ as to which the determinants of A_t are. Models predicting convergence identify A_t with technological progress and either treat it as exogenous or make it a function of prevailing market conditions and incentives to adoption of best-practice

production methods. When A_t is a function of the accumulated stock of capital, either physical or human, it is so in a way that keeps (2) a concave function of K_t , L_t and H_t , if the latter is introduced. In these circumstances, either institutional and microeconomic aspects persistently prevent A_t from converging across regions, or, in the long run, A_t is expected to behave identically in all regions. The latter amounts to strong convergence taking place. In general, the convergence hypothesis does not necessarily predict identical levels of A_t across regions. This is especially true when the sectoral composition of employment and/or natural comparative advantages are very different across regions. What distinguishes the convergence hypothesis is that it does not relate differences in A_t to differences in either capital-labour ratios or to the availability of public capital or 'social capital', at least once the level of the latter is above some minimum, which is currently surpassed by all NUTS2 regions in the EU15. Thus, convergence theories claim that differences in per capita income and labour 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 activities. In turn, these are induced by different levels of competition in the inputs and output markets.⁹

Models predicting divergence make A_t depend on either K_t or H_t and attributes it to the widespread presence of increasing returns and aggregate externalities. Alternatively, differences in A_t are explained by means of differences in the stock of public capital and infrastructure, and this is linked to either public capital entering the aggregate production function with some big coefficient or to the presence of large fixed costs and big-push effects. If the divergence hypothesis is correct we should be able to correlate different levels of A_t to differences in capital (either public or private) to labour ratios. Also, and more important, the movements over time of A_t , across different regions, should be explainable by movements in the capital-labour ratios, amount of infrastructures and flows of public investments. Many divergence models imply or are built upon some kind of 'threshold effect', in which case they predict that we should observe TFP growth only after the capital-labour ratios of a certain area passes a certain critical level. Finally, if Structural Funds are essential and effective in reducing regional differences, we expect to see labour productivity and TFP of recipient regions reacting strongly and positively to the variance in the flow of Structural Funds.

4.3.1. Labour productivity. One may expect Structural Funds to act upon the employment levels only indirectly and with some temporal delay. A possible chain of causation could be the following: funding which goes to training and mobility programmes, to improving infrastructures and increasing the capital stock will not necessarily increase employment immediately but will, at first, raise labour productivity and slowly but surely help create a more skilled labour force. It is this increase in

⁹Parente and Prescott (2000) contains a lucid presentation of this position that, while not directly concerned with EU15 regions, is in our view quite applicable to them.

average labour productivity of the poorer regions which, in turn, by attracting more private investments, generates employment opportunities, brings down unemployment levels and increase per capita income in the long run. If this mechanism is working we should observe changes in the distribution of labour productivity over the last decade, in particular a reduction in the dispersion of regional indices of labour productivity, especially among regions in receipt of ERDF. Yet our earlier estimates of β -convergence and σ -convergence suggest that convergence in average labour productivity is weak. These results are true also when we look at the distributions of NUTS2 regions containing one or more NUTS3 units receiving either ERDF or CAP funding. Initial differences do not go away (Figure 6) and, more importantly, the distribution does not shift to the right more than the distribution of labour productivity for the whole EU15 does (Figure 7). In fact, all the movement to the right visible in Figure 6 is due to Ireland.

For the same sample period we also computed the median and upper and lower quartiles levels as well as the ratio between the third and the first quartiles of regional labour productivity. The same results obtain. We have also tested for the relevance of the usual strategic variables (Education, North and South, levels of R&D, Center vs. Periphery) without finding any evidence in one direction or another. If the policy measures adopted until now are helping to reduce historical differences in labour productivity, this is happening very slowly.

Structural Funds are also supposed to foster capital accumulation. Most theories attribute lower labour 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. While the convergence hypothesis predicts that capital–labour ratios should converge across regions, the divergence hypothesis suggests that their divergence drives an ever-larger wedge between poor and rich areas.

These considerations led us to look at measures of capital–labour ratios across European regions. The results, once again, do not support the predictions of divergence models. First, we checked to what extent low income and high unemployment come with low capital–labour ratios. The positive correlation of only 0.37 across regions between income levels and capital intensity is smaller than one would expect. Lots of regions have very high capital–labour ratios but very low ranking in the per capita GDP scale. Southern Italian regions have large public investment/GDP ratios but low per capita GDP. Conversely, with the obvious exception of Berlin, all the capital cities of Europe's major countries have a large concentration of state governments and headquarters of large national companies, which abnormally inflates their GDP by attributing income to headquarters or central government offices even when production is taking place somewhere else.

In summary, there is very mild evidence of convergence across regions in average labour productivity. This β -convergence does not show up explicitly in changes of the overall distribution. Linking this change in labour productivity to capital–labour intensities is questionable. This finding is important because it suggests that, in the

Distributions at various dates

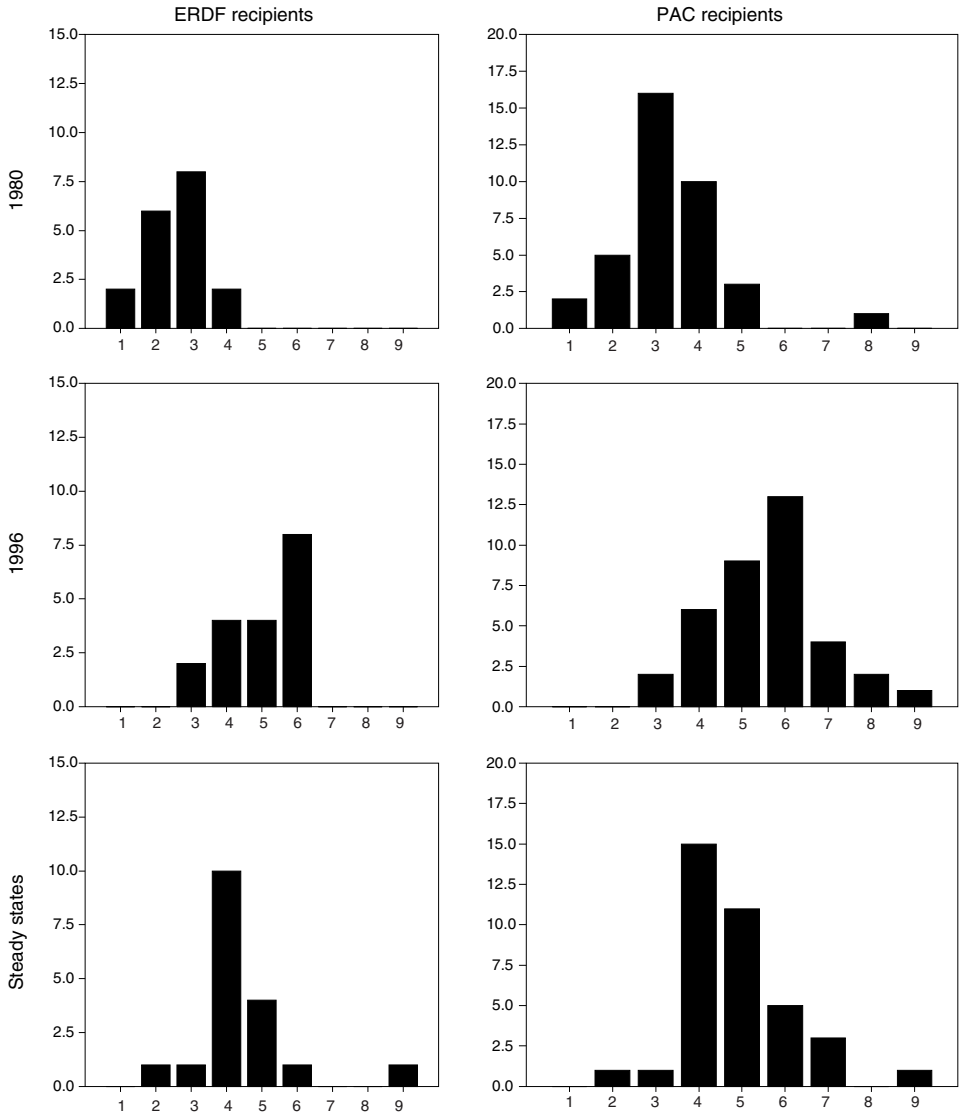


Figure 6. Labour productivity, ERDF and PAC recipients

data, the variable to which divergence theories attribute most of the variation in labour productivity fails to support the claim.

4.3.2. Total factor productivity. In a last-ditch effort to verify if aggregated data signal some causal link, one way or another, in the evolution over time of regional inequalities, we tried to compute indices of regional TFP. This is not easy, as the available data lack information necessary for a decent computation of TFP indices. In particular, we can use

Distributions at various dates

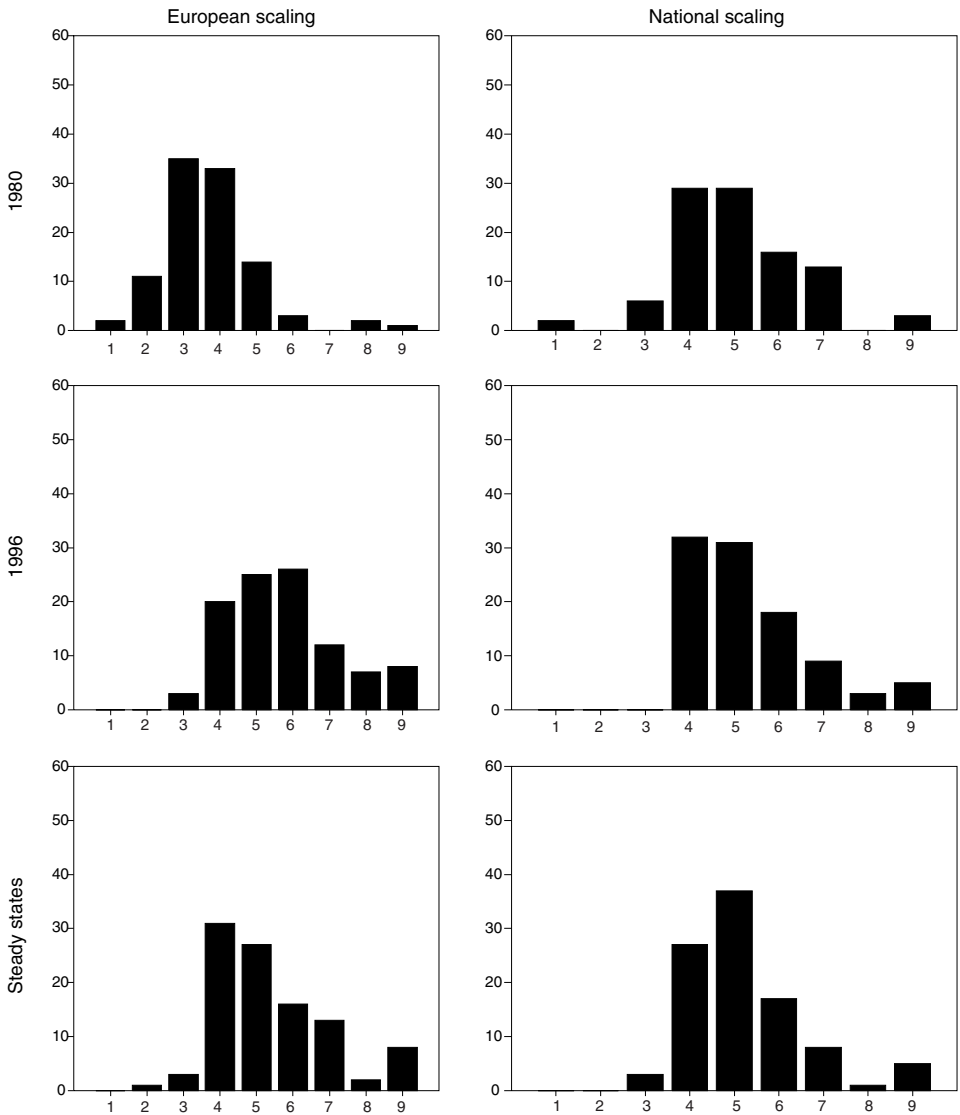


Figure 7. Labour productivity, European and national scaling

only data on wages and salaries as measures of labour income and we do not have access to a reliable measure of capital income at the regional level. Further, no data are available on the regional distribution of productive public capital. 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.

Despite these caveats, it is worth looking at our measures of TFP. We computed rank correlations with per capita GDP and obtained a value of 0.66, suggesting that TFP are

much more correlated to per capita income than capital–labour intensities are. Figures 8 and 9 report our usual measures of inequality in TFP for the 93 regions for which data are available over the period 1980–96. The picture is somewhat different from all the previous ones. The overall sample distribution does not display convergence and, in fact, the estimated asymptotic distribution seems to be undistinguishable from the initial one. Surprisingly a visible symptom of polarization is found when we restrict our

Distributions at various dates

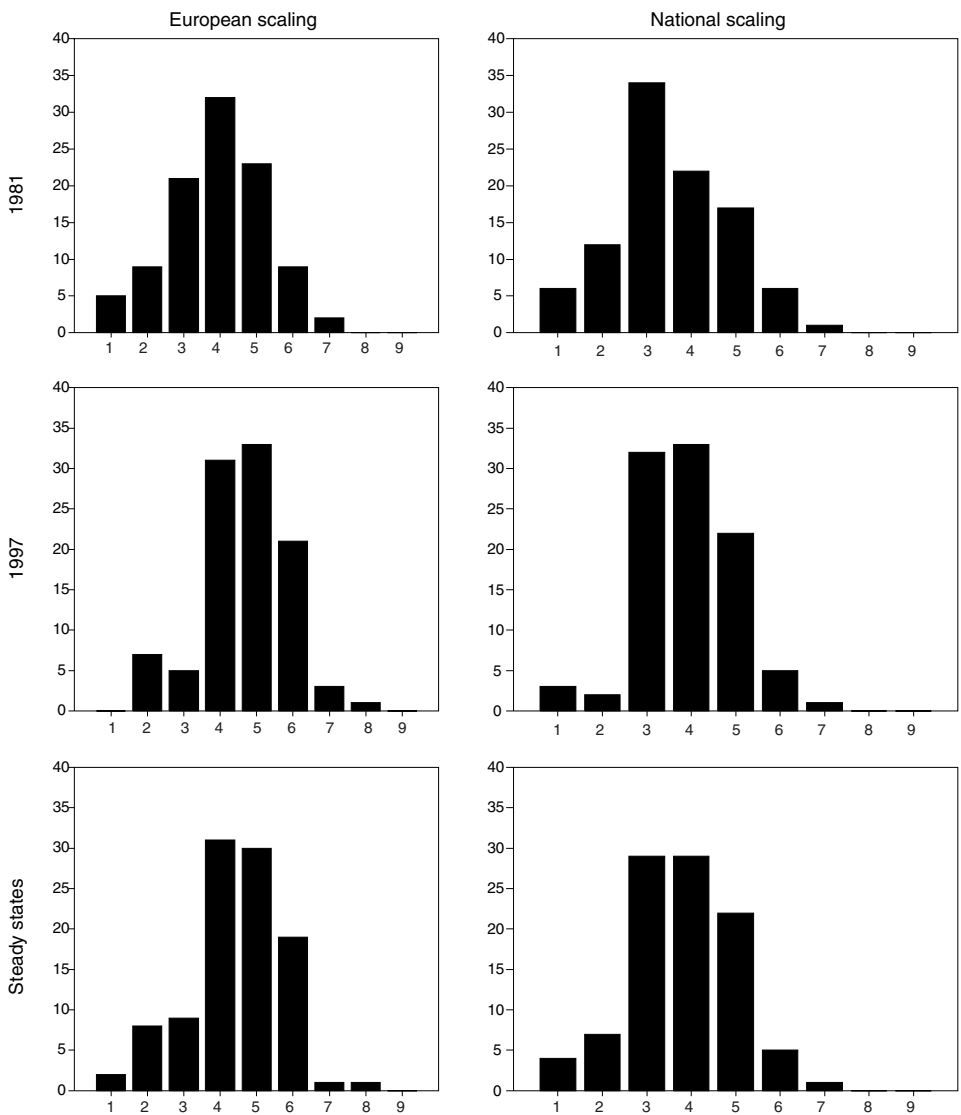


Figure 8. TFP, European and national scaling

estimation to the sub-sample of regions receiving Structural Funds (Figure 9) which, furthermore, does not shift as much to the right as one would expect. Structural Funds do not seem to increase measurable TFP in any sizeable way. The other usual cuts, using R&D, education and the north–south division as control variables, either confirm this tendency or display little movements.

Distributions at various dates

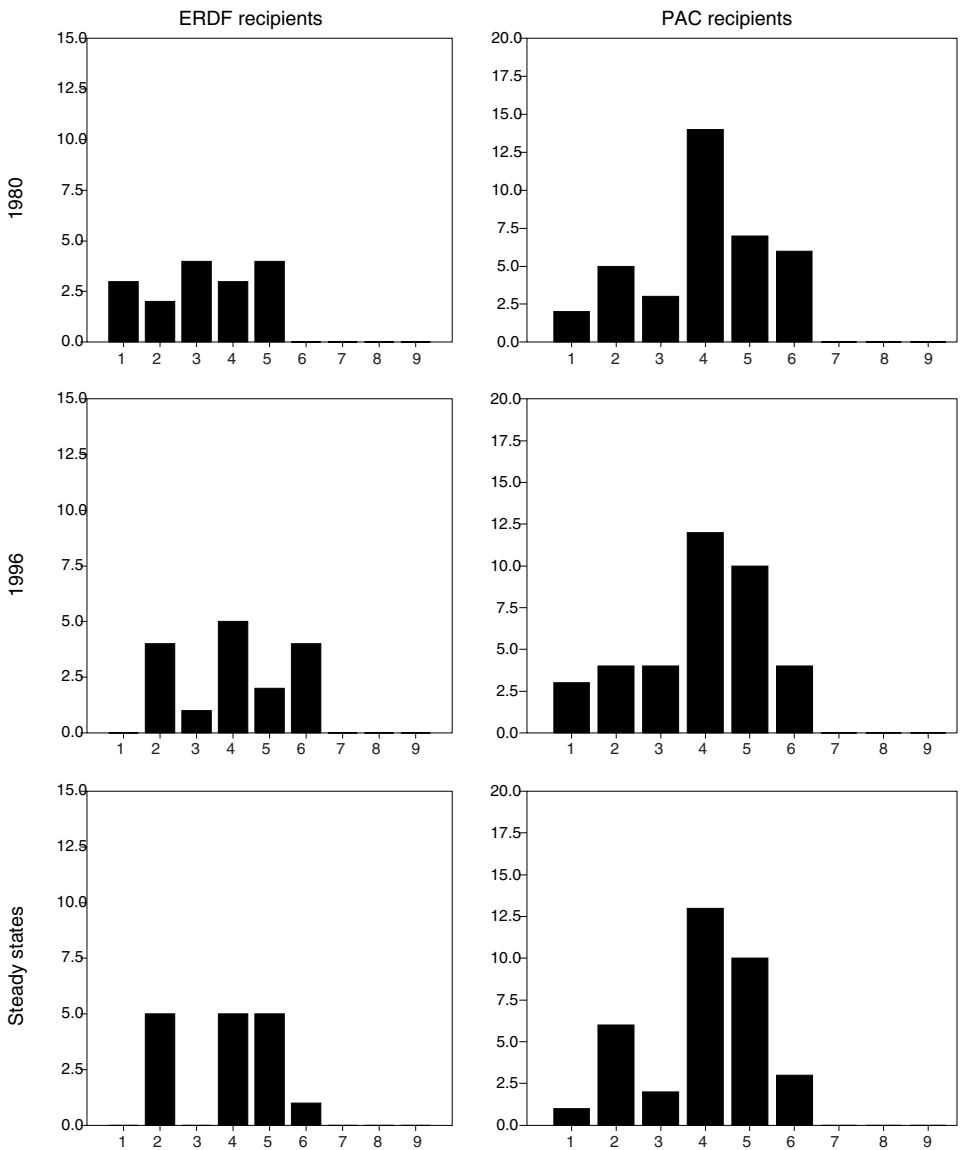


Figure 9. TFP, ERDF and PAC recipients

4.4. Summing up the evidence

This is, indeed, less than we bargained for. Our analysis of income per capita denies that fast convergence in levels is taking place. It suggests that, on average, uniform long-run growth rates are to be expected and relative differences will not disappear. It also rejects, quite strongly, the idea that divergence and polarization are driving the growth process and it does not show any indirect evidence that Structural and Cohesion Funds regions are behaving any differently from the remaining ones. In fact, time series data extending back to the pre-regional policies period suggest that much more convergence was taking place then than now.

When income per capita is decomposed between employment/unemployment rates and labour productivity, things become only slightly more interesting. There is clearly no action in unemployment rates and no sign of convergence either. Regions with higher than average unemployment rates in 1980 still have unemployment rates higher than average in 1996; likewise for those with lower unemployment rates. Within-country regional dispersion in unemployment rates is also constant. Labour productivity, instead, shows a mild tendency to converge. This is not yet very visible, one may say that it is not visible at all, in the sample distributions and in the estimated asymptotic distribution. It is visible, though, when unconditional β -convergence type of regressions are performed over the time interval 1980–96. The latter regressions are, we should add, restricted to a sample of 101 NUTS2 level regions, out of a total of 211. Some countries are almost completely missing, i.e., Austria, Finland, Germany's East Länder, Greece, Sweden and the UK. The extent to which this biases the estimate is hard to say: Objective 1 regions are found both in the excluded and the included set, same for regions richer than average. Overall, though, the available evidence shows that some form of convergence in labour productivity is taking place.

Explaining this convergence in labour productivity in accordance with the divergence theories that provide the backbone for EU regional policies is not easy. Movements in capital/labour ratios do not explain it, nor is it very visible in regions receiving Structural Funds. Variations in TFP across regions and over time are large, but bear little relationship to movements in capital–labour ratios or flows of Structural Funds. The microeconomic evidence suggests that convergence in labour productivity is taking place the 'usual and hard' way: by expelling labour from the unproductive and inefficient sectors, and by adopting more efficient production processes where flexible labour markets allow it. In the absence of substantial labour mobility across regions and given the rigid wage structures that characterize national labour markets, this process generates substantial amounts of long-term unemployment in the poorer regions and in those in which productivity gains are the larger (European Commission, 1999). Southern Italy and Southern Spain are two cases of this road to convergence; Ireland and, to a lesser extent, Portugal are examples of the more virtuous model in which flexible markets allow productivity gains to come together with an increase in employment.

We have also gathered time series data on regional per capita income, capital stock (both public and private), labour and capital income, employment levels and of the amount of European Structural Funds received for Greece and Spain. Similar data for Italy and Portugal, the other two countries containing the NUTS2 regions receiving the bulk of Objective 1 funds, was not possible. In both countries the following was observed (details and graphs available upon request). Both private and public capital to labour ratios in the poorer regions grew, over the sample period, to match the level of those same ratios in the rich ones. Total factor and labour productivity indices did not. When one runs simple univariate regressions between various indices of productivity and the flow of Structural Funds received (either contemporaneous or at various lags) one obtains either non-significative or negative correlation coefficients.

5. IMPLICATIONS FOR POLICY AND CONCLUSIONS

Our examination of the data shows that strong phenomena of either divergence or convergence were not taking place in the 1980s and the first half of the 1990s. This evidence is consistent with the idea that regional growth rates have a common mean and that convergence in growth rates, but not per capita income levels, has taken place. It is inconsistent with the idea that growth is driven by increasing returns and that growth rates should diverge. Our data do not suggest that further polarization and an increase in inequality is occurring. Most predictions of the increasing-returns and agglomeration literature are rejected by statistical analysis.

Whether these arguments and the evidence reported in the body of the paper should be interpreted in favour or against public EU support to the poorer regions via Structural Funds is an open question. Proponents of EU support may claim that, had intervention not been there, the distributions would have spread out further and inequalities become more marked and that policies that aim at preventing emigration from the poorer to the richer areas are the only ways of avoiding the further polarization in income that such migrations would cause. This may be true, as counterfactuals of this kind are almost impossible to test. Still, as our analysis of Greece and Spain shows, so far there is no statistical evidence that Structural Funds have had a positive impact upon the growth rates of either labour or total factor productivity in the poorer regions.

Hence our double headed conclusions: *if*, on the one hand, 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. On the other hand, that is: *if* 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 economic knowledge and hard statistical evidence. Furthermore, the empirical predictions of the analytical tools currently employed by the Commission, to design and evaluate its policies, are not supported by the facts. Increasing returns models

of spontaneous divergence are inconsistent with most of the stylized facts describing regional European economic growth during the last twenty years. All economic indicators we have checked suggest that initial relative positions remain largely unaltered in the long run, and that the process of economic growth affects most regions in the same proportional way. Where we have observed some change, *that is, in labour productivity and some TFP indices*, this change has been toward convergence, not divergence. Explicit divergence is never present in the data, very poor regions do not 'fall off the cliff', on the contrary some of them become richer than average (Ireland) when markets are allowed to operate.

Most definitely, massive convergence in levels has not occurred and probably cannot occur within the next two or three decades, given the present circumstances. Given that the lack of such convergence and the persistence of large per capita income disparities provide the political motivation for the existence of a Communitarian regional policy, one should ask if our findings of convergence in growth rates and not in levels reveal a situation that can be improved by good policies. Our overall evaluation is that, probably, this is neither possible nor reasonable, unless a policy of very massive transfers is implemented. That NUTS2 regions should be growing at roughly the same rate, with some 'luckier' ones improving their lot and some other, unluckier, worsening it, is exactly what one would expect on the basis of common sense and the following two, simple, considerations:

1. As we pointed out in Section 2, the territorial units over which economic inequality is measured are quite small and definitely not homogenous. Expecting that they should converge in per capita income levels is expecting a lot, even if one is a believer in the strong version of the convergence hypothesis. What one should reasonably expect at this level of disaggregation, are common growth rates with convergence in levels occurring for TFP, capital/labour intensities and unemployment rates when incentives to supply productive factors are equalized.
2. Even if one really believes that, by means of policy intervention, convergence in levels is achievable for territorial units as small as NUTS2 level, this must require free movement of labour and other productive factors. No model can predict convergence in levels without migration of labour and capital. While capital is moving around Europe, labour is most definitely not. It is unclear in what sense Objectives 1–6, which define European Regional policy, are meant to foster labour movements across the continent.

The latter point is often muted in the debate over economic convergence, which is hard to understand given that theoretical models regularly assume complete factor mobility in deriving convergence predictions. As we mentioned in Section 3, European policies appear to be somewhat schizophrenic on this issue. On the one hand, the whole project of completing the Common Market calls for more labour mobility within the regions of the Union. On the other hand, the analysis and policy prescriptions, as well as the effective actions in the regional policy area, are clearly aimed at reducing labour

mobility and, in particular at avoiding migration outflows from the poorest regions. This is hard to understand and somewhat at odds with all we know on this matter. We should recall here three, important facts.

1. Net labour and capital migration have characterized the initial post-war period of European growth, until about the mid 1970s. By any account this period was also characterized by the strongest tendency to economic convergence experienced since the creation of the EEC. This is strikingly similar to the USA experience: convergence among south–north states over the period 1880–90 was mainly driven by labour reallocation across sectors and states (Caselli and Coleman, 1999).
2. After that date, both net and gross labour migrations decreased rapidly. This has more or less equally affected migration flows within national boundaries and across national boundaries within the EU. European labour flows have practically come to a full stop in the last decade. Gross capital flows have not decreased during the same period, indeed they have grown remarkably. Net flows, though, are not equally large. Since the mid 1980s, of the four poorer European countries only Spain and Ireland have been net receivers of large foreign direct investments (FDI). The periods of larger FDI inflows have coincided with the periods of faster GDP per capita growth in these countries.
3. Immigration of foreign nationals from outside the EU borders has increased by orders of magnitude during the same period of time. While most of this flow is directed toward the most advanced areas of the Community, a sizeable portion settles 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 areas in which they settle in. The unemployment rate among foreign immigrants is not especially high, certainly not much higher than the reported unemployment rate among EU nationals in the poorer regions of the Community.

To evaluate if the amount of resources mobilized by the Community's regional policies is large or small by historical standards, we may compare it to the celebrated (and, by all accounts, highly effective) Marshall Plan. This lasted from 1948 to 1951 and it contributed about 2% of European GDP in each of those four years. Over the decade 1989–99 the European Community allocated about 6.5% of its GDP to the structural and cohesion policies. A grand total, covering the whole 1986–99 period, is close to 8% of total Community GDP. This corresponds, over a period of 15 years, to 50% of the GDP of the regions included in Objective 1 and in the Cohesion Funds. This is almost twice the ratio of transfers to GDP for the Marshall Plan.

One possibility has not been discussed so far, that 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 the questions raised in the introduction. Why does the EU need to '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 programmes become permanent when the

apparent reason for their initial establishment does not exist any more? Why does the process of European political decision making imply that, to reduce the size of the transfer, 'donor countries' must create new reasons for receiving transfers from Brussels, instead of just reducing the existing ones (Objectives 2, 3, 4 and 6 exist only because of this)? Why is the same pattern of 'bribing the newcomer' being repeated with the new enlargement process, according to which the EU is *already* transferring subsidies to future 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, possibly, allow the establishment of different decision making processes, aimed at mitigating the distortions and waste of public resources current policies appear to generate.

Discussion

Jörn-Steffen Pischke

London School of Economics

The main message of the paper is that European regional policy is based on a growth model that implies divergence and this model directly suggests that active intervention, mainly in the form of infrastructure investment, is needed to keep poor regions from falling even further behind. The authors conclude that there is little evidence that this model is true, and little evidence that the regional policies of the EU are effective. Instead, the basic inference from the data is that for the most part regions in Europe grow pretty much at the same rate, that is, neither convergence nor divergence seems to be taking place.

I think that the conclusion of the authors is probably correct. Nevertheless, the paper also points to many gaps in our knowledge, both theoretical and empirical, as well as to weaknesses in the data. So my confidence in just how much we know about this issue is also limited at this stage. I will mention some of the reasons for my skepticism below. But the paper contains a wealth of good information and insightful analysis, and several of my comments will simply highlight again some of the issues taken up in the paper as well.

I organize my comments around Figure 10, which displays GDP per capita of EU15 members relative to the EU15 average. While this deals with countries rather than regions (the paper's focus), it will be clear that my basic points carry over to regional data (there are just too many regions to graph the raw data). Now, because incomes are relative to the average, we can evaluate convergence by looking at either rich or poor countries. I focus on the four poorest EU countries – Spain, Portugal, Greece, and Ireland – and, for comparison, include one non-EU country (Turkey).

The figure highlights a number of points. First of all, it is obvious that there are very distinct periods in the growth experiences of the European countries. The 1960s and early 1970s were good times, where the poorest countries (except for Ireland) were

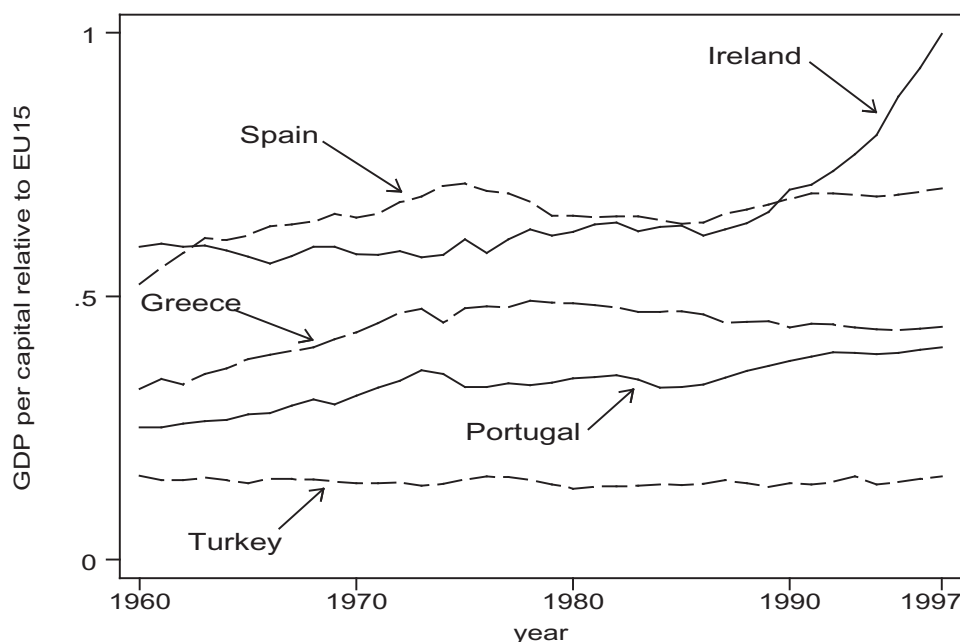


Figure 10. GDP per capita of EU15 members relative to the EU15 average

catching up (mostly at the cost of the two richest, Sweden and Denmark). The mid 1970s to mid 1980s were pretty dismal – the catching up process had not just stalled but was going in reverse, particularly for Spain. The 1990s were different again, being marked by quite heterogeneous catch-up behaviour. Here we see the Irish ‘miracle’, but also Portugal picked up some speed. Nevertheless, the 1990s look much less like a period of renewed convergence. Poor Greece does very poorly, while rich Denmark, which is not on the graph, does well.

The authors are quite aware that the sample period is important for the results obtained. It is a pity that their sample of regions runs only from 1980 to 1996, a period during most of which the poorest countries grew pretty much along with the EU average. Growth processes take a long time, sometimes get interrupted, or obscured by asynchronous business cycles. It will be hard to reach a firm conclusion on regional convergence without much longer time series. Nevertheless, convergence at a 2% rate in the absence of new shocks driving countries apart implies that the standard deviation of regional per capita GDP should have fallen by 25% in 16 years. This seems enough of an effect that something should have been detectable in the data, even subject to the caveats mentioned.

Even though we lack the data on regions, it is important to ask why the glorious times of the 1960s ended, when European economies converged pretty much at the celebrated 2% rate. The first thing that comes to mind is that the three broad periods I distinguished above seem to coincide with very different general macroeconomic experiences. The 1960s and early 1970s were periods of generally high growth. Then

came the two oil price shocks and the productivity slowdown, and growing unemployment started to plague more and more European economies. These two periods suggest that what seems to be true for poverty among individuals is also true for poverty among nations; a strong economy is the best anti-poverty programme. If this is correct, EU policies ought to be redirected from distributional considerations to simply promoting growth.

The 1990s were an episode where the macroeconomic experiences of individual countries started to diverge pretty sharply. Some seemed to be stuck with high unemployment and unimpressive growth rates while others had instituted reforms of various types, brought down unemployment and sometimes experienced remarkable booms. The disparate experiences of Spain and Ireland are just one vivid example. Hardly surprising, not just the continent-wide business cycle seems to matter, but domestic macro policies matter as well.

An alternative view might also reconcile the data with the theories. If forces of convergence were strong in the 1960s but then convergence stopped, maybe one set of theories was correct then and another one is correct now. Technologies exhibiting decreasing returns may have been important when growth in southern Europe was still based on workers shifting out of agriculture and into manufacturing. Nowadays, with the service sector so much more important, agglomeration externalities have taken over, and divergence theories may be the more correct explanation.

In fact, looking at the differences in the experiences of countries versus regions, for example Figure 1 in the paper, highlights that this may be true not only over time but also across space. Even though some poor countries have grown admirably in the 1990s, growth in the poor countries is not concentrated on the poorest regions. Lisbon is growing while other parts of Portugal do not seem to follow suit (the fact that all of Ireland is a single NUTS2 region does not help to shed light on these disparities). So maybe there are important local agglomeration externalities, but decreasing returns set in at a larger level. It is again hard to tell since the detailed regional data do not go back far enough to compare the recent experiences with earlier ones.

An important issue, which the authors touch on, is the interplay of public policy and economic forces. Growth theories, in particular the neoclassical ones, stress the role of free trade in the convergence process and this is something that finds relatively little attention in the paper. Hence, EU membership and the resulting access to export markets in the richer EU economies should have helped the poorer countries. There have been many changes over the past three decades, with new admissions to the EU. Nevertheless, a broad brush look at the data is discouraging. Greece, Portugal and Spain grew strongly in the 1960s when they were not part of the Common Market. Their entry in 1986 did not seem to have pushed things along. Compare Greece to Turkey, for example. Portugal may be an exception here, since Portuguese growth seems to have picked up right around the mid 1980s. Ireland, on the other hand, had been in the EU since 1973 and grew slowly for the first 10 or 15 years of its membership. Things turned around exactly at the time when three other competitors joined the Common Market.

But the Irish experience makes it also hard to believe that openness to trade does not matter at all. Irish growth seems so singularly based on export-oriented foreign investment that it is hard to believe that Ireland would have done as well if it were still outside the EU. This suggests that interaction effects may be important: free trade is not a panacea but it helps once other conditions are in place. Because of the curse of dimensionality such interactions will be hard to find in the limited time series on a few countries or regions.

Another aspect, which Boldrin and Canova mention, is that basically all the growth models, which underlie convergence or divergence theories, neglect the role of the government. But the public sector is important in Europe, and domestic and EU transfer policies may obscure natural growth trends. If the data show largely no convergence, and public policy is truly important, this could be consistent with two polar scenarios. In one there are strong natural forces of convergence, and maybe these forces were visible in the 1960s. But government actions, say by subsidizing poor regions and therefore preventing out-migration, have stopped the convergence process, and we see poor regions growing no faster than the rich. Alternatively, maybe the divergence theories are correct and the poor regions would have indeed fallen behind more and more, had governments not intervened with potent remedies. In this case, what we are observing is a success for transfer policies.

If anything, the first story seems slightly more plausible than the second. As the paper demonstrates, large-scale redistribution in Europe is a more recent phenomenon and therefore coincides with absence of convergence in the data. Nevertheless, without incorporating government policies into the various growth models and exploring auxiliary implications, we will have a hard time telling these scenarios apart. Of course, there is also a third intermediate possibility, which the authors favour: growth rates would have been more or less the same without EU regional policies, that is, these policies are largely ineffective in promoting or retarding growth. This seems quite plausible in the case of Greece, Spain, or southern Italy. But does this mean that these funds did not help in the case of Ireland? Interactions between regional transfers and other domestic policies could be important again in this case.

Diego Puga

University of Toronto

This paper offers an up-to-date view of the recent evolution of inequalities across the regions of the European Union, with special emphasis on differences in income per capita. While the paper also looks at European regional policies, which are intended to tackle those inequalities, only weak links are established between policies and outcomes. The difficulty of gathering adequate data makes this shortcoming difficult to address. Therefore, I think that the main contribution of the paper is positive rather than normative, a description of the recent evolution of regional inequalities across the EU rather than a study of the effectiveness of European regional policies. At the same time, given how little regional convergence appears to have taken place over a period in which

spending on regional policies has been substantial, it is hard to dismiss the paper's skeptical view of the effectiveness of such policies.

The paper starts with a review of theories of regional convergence and divergence. As part of this review, recent work in economic geography is presented as a 'divergence' theory, building on the tendency for productive factors to concentrate in richer regions. In fact, in these models a region can increase its income level by expanding activities with stronger external economies (arising, for instance, from the interaction between internal economies of scale, trade costs, and buyer–supplier relationships). However, such expansion can take place by drawing resources from other activities in the same region (as in Krugman and Venables, 1995), and through factor accumulation (as in Baldwin, 1999), as well as by drawing resources from other regions (as in Krugman, 1991). Therefore it is hard to establish the link between factor endowments and income levels that the paper attributes to these models. In fact, one of the conclusions of these papers is that regions can develop large differences in production structures and income levels which need not be related to differences in their factor endowments. Furthermore, these models predict similar effects on regional inequalities from economic integration and from improvements in transport infrastructure. Thus, it is not clear that they provide support for the view that regional policy interventions will counteract possible divergence effects of closer European integration.

But my main comment on the paper relates to its analysis of the evolution of regional inequalities. This builds mostly on a look at the distributions of variables for different groups of regions. I find this to be a useful starting point that yields interesting conclusions, such as the stark stability of the regional distribution of income per capita. At the same time, I feel that more details could have been provided by using additional tools. For instance, plotting continuous densities instead of histograms could yield additional details that are sometimes lost in the discretization of a continuous variable. More importantly, it would be useful to track not only changes (or the lack thereof) in the shape of each distribution but also individual mobility within that distribution. The histograms alone cannot discriminate between a situation in which regions roughly maintain their relative position over time, and another one in which the shape of the distribution changes little but the relative positions of particular regions change significantly over time. One way to do this is by looking at geographical maps illustrating a distribution of, for instance, income per capita for different points in time. A more systematic approach is to construct transition probability matrices (or their continuous equivalent, stochastic kernels) tracking changes over time in the relative position of regions within the distribution.

This is an exercise that a number of authors, including Quah (1999), have undertaken. Henry Overman and myself have used similar tools to look at the distribution of regional unemployment rates (Overman and Puga, 1999). This paper by Boldrin and Canova has prompted us to add to our work an analysis of the evolution of regional per capita income, in such a way that we can directly contrast this with the evolution of regional unemployment rates. Detailed findings will be presented at the April 2001 *Economic Policy*

Panel Meeting. However, preliminary results suggest there is a much stronger persistence in income per capita levels than in unemployment rates, particularly for regions around the middle of each distribution. Thus, when looking at income per capita, we see nothing like the marked polarization of regional unemployment rates experienced in Europe since the mid 1980s. Also, while there are strong geographical patterns in both distributions, the spatial pattern in income is well described by a centre-periphery gradient, while in the case of unemployment it takes instead the form of localized transnational clusters.

Panel discussion

The Panel expressed many doubts – based on statistical issues – about the reliability of the authors' findings. Charles Wyplosz said that, in the paper, GDP per capita is highest in inner London and lowest in Greece. However, there are enormous price differences between these two regions that are not compensated by the exchange rate. He was thus concerned about what is really measured in GDP per capita if the data is not adjusted for regional price levels. Alan Winters added that income per capita is determined by GDP divided by the number of people who work in a particular region, not by the number of people who live there. He argued that this skews the regression results. Maximiano Pinheiro stressed that the statistics are far from comparable across regions, even if they follow the same Eurostat rules. If there are large transfers to poorer nations, and at the same time regional statistics are needed, there is political pressure to influence the statistics in order to receive the structural funds. He argued that real GDP and unemployment are poor indicators for convergence. He suggested that more indicators are necessary for further robustness analysis. David Begg pointed out that the underground economy may further bias the results on convergence. Charles Wyplosz argued that there are revealed preferences as migration has declined, although the pictures showed that there are large differences in GDP per capita across regions. He felt that these are large enough to suggest that there should be migration and asked why this was not the case. He concluded that there is no case for subsidizing poorer regions and added that it is interesting to know, given the fears of enlargement. He claimed that it is far from obvious that there will be mass migration.

The Panel also discussed EU motives for introducing regional subsidies. Patrick Honohan suggested that the enlargement does not necessarily mean fiscal expansion. For instance, the expansion of structural funds in 1988 was related to the Single European Act. The Cohesion Fund was related to the establishment of the EMU. He argues that it was a convergence model and not a divergence model that was driving the decisions because the structural funds were agreed on in the mid 1980s, before the endogenous growth theory. He argues that the idea was instead to accelerate the

convergence and give a boost to the capital stock. Paul Collier argued that convergence may not be uniform for all kinds of trade blocks. He pointed out that one needs to distinguish between high-income trade blocks and low-income trade blocks. The high-income blocks are protecting the relatively poor from the very poor, allowing them to catch up to the richer regions. However, low-income trade blocks protect the relatively rich from the really rich, so we may see divergence. He suggested that a cautious note should be added in the paper pointing out that the analysis is not transferable to low-income trade blocks. David Begg asked whether the lack of correlation between the allocation of funds and the growth performance implies that the countries would have diverged very quickly and the subsidies were useful or whether it means that they would have converged in any case.

Several issues were raised about the use of funds. David Begg felt that the structure for allocating funds is very important. Samuel Bentolila added that, while some of it may be used for infrastructure, some of it may be wasted. David Wildasin pointed out that every country also has its own regional policies. He argued that an important issue in intergovernmental transfers is the real impact of grants from one government to another government. He wondered if the recipient government adjusts in some way that offsets the effects of the transfer. For instance if the EU decided to subsidize Sicily, the Italian government may feel less pressured to do so. In this sense, a grant by the EU to Sicily is really a grant by the EU to Italy. He thus suggested, that one should not expect to see a large impact of the transfer directly to a region showing up in a region's GDP. David Begg further suggested that one should analyse the political economy of fund allocation. Alan Winters felt that the EU regional funds are rather small compared to the regional policies in most countries. One should look at those regions that really benefited from the funds. He further suggested that participation rates are important. For instance, in the Irish experience there has been a big change in the participation rate. Hans-Werner Sinn felt that it may be useful to draw comparisons between the subsidization issue and the Dutch disease problem. One of the reasons why subsidies do not work can be a similar phenomenon. In both cases, people are withdrawn from other more productive activities. He suggested that it would be interesting to work this parallel out.

Some panel members commented on the technical implementation of the regression exercise. Samuel Bentolila suggested making the analysis of unemployment more formal by including regional dummies in the regression for specific programs to speed up convergence. Gylfi Zoega pointed out that it may be possible to do an explicit test of whether beta convergence as a function of subsidies.

Samuel Bentolila argued that the conditions of the regions that get the funds matter. For instance, in Ireland flexible labour markets or high education of the labour force is important. He suggested that the funds should target human capital, rather than physical capital. There could be something similar to IMF conditionality. Jorge de Macedo argued that, aside from fiscal policy, the size of the jurisdiction and the size of the market are also important.

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