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**The Trade-off Efficiency-Equity as an Explanation of the Mitigated  
Success of the European Regional Development Policies**

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## **Abstract:**

The objective of this paper is to demonstrate that the European regional development funds do not allow simultaneous achievement of goals of efficiency and equity when they are dedicated to financing transportation infrastructures. The paper first gives some insights on the origin of regional policies. Then we focus on the degree to which Ireland, Spain and Portugal (but not Greece), the main beneficiaries of regional funds, have been able to move to the European average (in terms of per capita income) since their membership in the EU, which also corresponds to the time when regional assistance was initiated in these countries. Empirical evidence also reveals that income disparities are increasing among regions within each of these countries and this raises the question as to whether the impact of regional funds is or is not rather favorable to this particular convergence pattern, given that one of the primary objectives of regional funding has been to ensure greater cohesion over the whole European territory. The answer comes mainly from the type of infrastructure regional funds finance. Since a significant part of regional funds is devoted to transportation issues, their impact on regional development has to be seen in the light of characteristics of the transport sector and the specific requirements in transport of each individual sector. The paper concludes that transportation infrastructures promote the country's aggregate growth but cannot be seen as an efficient instrument to reduce interregional disparities in Europe.

## **1. Introduction**

The European Union (EU) devotes about one third of its budget and 0.46% of its GDP to the implementation of regional development policies (euro 195 billion at 1999 prices over 2000-06). This is astonishing in view of the fact that there is little underlying theoretical support for such policies. The following section presents an overview of the theories that help to justify the implementation of regional policies. Section 3 reports empirical tests of whether the four poorest European countries (Ireland, Spain, Greece and Portugal, also called cohesion countries) have succeeded in catching-up to the European average since their membership in the EU, which also corresponds with the implementation of regional assistance in the country. A sign of catching-up would reflect more cohesion among members and that, in this case, regional assistance generated a positive impact. The convergence pattern among regions within each cohesion country is investigated as well. Section 4 provides some explanation of the convergence process described in section 3 and then focuses on the trade-off efficiency-equity introduced by regional funds when they are devoted to transportation infrastructures. In other words, since a significant part of regional funds is devoted to this type of infrastructure, their impact on regional development clearly depends on changes in the field of transport and on the specific requirements in transport of each individual sector. Section 5 summarizes the main findings and adds some concluding comments.

## **2. What Could Justify the Community Intervention?**

In a neoclassical growth framework based on Solow (1956), a higher level of physical capital per worker corresponds to a higher steady state income. However, due to the decreasing marginal product of capital, the rate of investment must decline towards the steady state income, where the stock of capital per person is constant. The investment rate is then equal to effective capital depreciation; therefore, a higher investment rate in poorer regions may increase their convergence speed to rich regions, but it is only transitional and does not raise the steady state income in the long run. On the other hand, endogenous growth theory lends an important role to public policies in the determination of growth rates in the long run. For instance, Aschauer (1989) and Barro (1990) predict that if public infrastructures are an input in the production

function, then policies financing new public infrastructures increase the marginal product of private capital, hence fostering capital accumulation and growth. However, the addition of public capital in the production function does not allow one to look explicitly at the impact of regional policies on industry localization, as firms choose to relocate according to Community transfers of purchasing power to the poorest regions and on their effects on capital returns and trade costs between and inside regions. Note that Keynesian theory, with its focus on demand, is not efficient either to ground current regional policies, as they have a high supply effect in the long run. Only the new trade theory can provide some support for regional policies since Krugman (1991) posits that the volume of trade among countries with similar per capita incomes but also with different factor endowments will be higher, if some goods are produced with constant returns and others with increasing returns, and there is incomplete specialization in some sectors. Under this assumption, the rich European countries may have an incentive to foster the catching-up of the less prosperous countries.

Public interventions through regional development policies may reflect the fact that the market by itself will not generate a reduction in regional income gaps. Departing from this point of view, the first step to justify regional policies is therefore to identify market failures. According to Martin (1998), when interregional transport infrastructures are developed (respectively 30% and 60% of structural and cohesion funds are dedicated to transport infrastructures), they allow poor and remote regions to be linked to the core market. The result of these investments may be a change in firms sensitivity to regional differentials in domestic infrastructures (i.e. intra-regional transaction costs) and thus possibly alter location decision-making. Capital and mobile workers will move to the rich region where their returns are higher, without taking into account the fact that the welfare of immobile agents will decrease because they are penalized both as consumers and workers. A second market failure is the fact that firms do not consider the positive impact of their relocation on local spillovers and innovation rates. In fact, a higher concentration favors technological spillovers, as they are based on interactions between agents since they are spatially limited, and pecuniary externalities, which occur when the innovating sector uses inputs from the manufacturing sector. Hence, concentration reduces transaction costs and then innovation costs. Space itself can contribute to market failure, as spatially distant firms enjoy a monopolistic market power on the consumers located close to them. As soon as these

barriers fall with new transportation infrastructures, economic agents operating both within a region as well as between regions will be affected. This process is discussed more fully in section 4.

The origin of regional development policies may therefore be found in the successive enlargements and the way Europe has evolved. Initially, the European Community wanted to ensure market integration, so that cohesion among member states and the reduction of regional inequalities were not a priority. It is only with the first enlargement of 1973, to Ireland, Denmark and the United-Kingdom, that the idea of setting-up a regional policy appeared, as it was a condition to their accession. With enlargement then focused on the poorer southern countries, in 1981 to Greece, 1986 to Portugal and Spain, the lack of cohesion became obvious, and generated a demand for structural aid. The process of accelerating deeper integration also required greater efforts towards cohesion among members; the 1986 Single Act was the basis of the Single Market that would ensure free circulation of goods and people among member countries. A necessary condition for the success of this policy was thought to be the creation of transportation infrastructures that could link to the core even the most remote regions. Moreover, with the enlargement to southern countries, the differences in infrastructures among countries were revealed to be even more important than the differences in per capita incomes. The European Commission still considers this lack of infrastructure as the main reason for low convergence, and this helps explain why funds are directed towards the finance of new infrastructures in transport, telecommunication, energy and education. The amounts allocated to regional development policies were doubled after the 1992 Maastricht Treaty that defined the criteria for a high degree of convergence between economies of members, one of the main prerequisites for introducing a common currency. In the poorer countries, it meant that heavy investments in public infrastructures were necessary to reduce the development gap, but this process had to be accomplished under the constraint of lower public debt or budget deficits. Hence, the only solution was for other member states to reinforce their financial help; as a result, cohesion funds have been allocated since 1994 to Ireland, Greece, Portugal and Spain.

In order to determine more effectively the eligibility of regions for Community interventions over 2000-2006, the European Council of March 1999 reduced the number of its structural

objectives from six to three. Objective 1 is for the development and structural adjustment of NUTS II (Nomenclature of Territorial Units for Statistics) level regions whose development is lagging behind (regions whose per capita GDP is below 75% of the Community average). Almost 70% of total Community structural funds are dedicated to this objective. Objective 2 supports the economic and social conversion of regions affected by industrial decline (high long-term unemployment rate, a high level of poverty, low level of education). Objective 3 supports the adaptation and modernization of systems of education, training and employment.

Cohesion funds provide financial support to countries having a GNP per capita in Standard of Purchasing Power below 90% of the Community average, i.e. Spain (which benefits from 61-63.5% of these funds), Portugal (16-18%), Greece (16-18%) and Ireland (2-6%). Total commitments amount to euro 18 billion at 1999 prices for 2000-06. Even if the EU Commission tries to balance the use of these funds, 60% of them finance transportation infrastructures and only 40% support environmental objectives.

### **3. The Convergence Pattern in Europe**

#### **3.1 Testing for the Existence of a Process of Catching Up in the Cohesion Countries**

To test for the existence of a process of catching up, we analyze inter-temporal differences in GDP per capita (calculated in Purchasing Power Parity) of each cohesion country to the European average from 1960 to its admission date, and from this date to 2001. All the data are derived from Chelem-CEPII (2001). Recall also that the admission date corresponds to the implementation of regional assistance in the considered country, as the cohesion countries received this help from the very first year of their membership.

The convergence measure adopted here is based on a relationship that describes the dynamics of the differentials of the respective GDP per capita. That is to say, for a cohesion country  $i$  with observations spanning over  $t$  time periods, as the system is as follows:

$$(X_{i,t} - \bar{X}_t) = \alpha_i + \phi(X_{i,t-1} - \bar{X}_{t-1}) + \mu_{i,t} \quad (1)$$

where  $\overline{X}_t$  is the log of the yearly Community average, calculated according to the method of the European Commission (ratio of the total UE12 GDP in PPP on the total UE12 population),  $X_{i,t}$  is the cohesion country  $i$ 's log of income per capita in year  $t$ ,  $\alpha_i$  is the constant and  $\mu_{i,t}$  is an error term. Adding a constant suggests that each country shifts to its own steady state, reflecting the differences in investment rates, public expenditure, opening rates, and in education levels. Cadoret and Tavéra (1999) evaluated European convergence by formalizing their model with a constant that is justified in this way as well.

Convergence in the above context requires that the differentials in the respective variables become smaller and smaller over time. For this to be true,  $\phi$  must be less than one. On the contrary, if  $\phi$  is greater than one, this indicates a divergence of this differential. The value of  $\phi$  itself represents the degree of convergence. From the construction of the test, it follows that, as the value of the statistically significant coefficient  $\phi$  approaches zero, the convergence effect becomes greater. Implicitly, as the value of the statistically significant coefficient  $\phi$  approaches unity, the convergence effect decreases and vanishes. The interest focuses on the value of  $\phi$  after joining the EU, in comparison with its value prior to membership. If the first value of  $\phi$  is higher than the second value, it would imply that convergence prior to membership was less strong than the convergence after membership, in other words that catching-up has occurred.

The convergence coefficient  $\phi$  for a particular group of countries can be obtained using the Dickey and Fuller test (1979) on the estimates of equation (1). The augmented version of this test (ADF) is used in order to remove possible serial correlation from the data. Denoting the differential of variable  $X_{i,t}$  as  $d_{i,t} = X_{i,t} - \overline{X}_t$ , and its difference as  $\Delta d_{i,t} = d_{i,t} - d_{i,t-1}$ , the equation for the ADF test is written:

$$\Delta d_{i,t} = \alpha_i + (\phi - 1)d_{i,t-1} + \sum_{j=1}^k \gamma_j \Delta d_{i,t-j} + z_{i,t} \quad (2)$$

where the subscript  $j = 1, \dots, k$  indexes the number of lagged differences,  $\alpha_i$  is the constant and  $z_{i,t}$  is a white noise.

Equation (2) permits tests for a unit root in the differentials of variables. The null hypothesis of a unit root is rejected in favor of the alternative of level stationarity if  $(\phi-1)$  is significantly different from (less than) zero. In the current context, this tests whether the convergence coefficient  $\phi$  is significantly different from (less than) one. To evaluate the statistical significance of the convergence coefficient  $\phi$ , the critical values for unit-root tests tabulated by Dickey and Fuller (1979) were used. The number of lagged differences ( $k$ ) in equation (2) is determined using the parametric method proposed by Campbell and Perron (1991) and Ng and Perron (1995). An upper bound of  $k_{\max}$  is initially set at 4 ( $k_{\max} = 4$ ) because of the relatively short studied period. The regression is estimated and the significance of the coefficient  $\gamma_k$  is determined. If the coefficient is not found to be significant at the 10% level, then  $k$  is reduced by one and the equation (2) is re-estimated. This procedure is repeated with a diminishing number of lagged differences until the coefficient is found to be significant. If no coefficient is found to be significant in conjunction with the respective  $k$ , then  $k = 0$  and a standard form of the Dickey-Fuller test is used in the analysis. The advantage of the recursive t-statistic method over alternative procedures lies in its simplicity, its applicability to relatively short groups of countries, and its utility to compare the results of different periods of time.

The second step is to test for each country whether the values of the unit-roots are significantly different from each other. This test can be written in the following form:

$$t = \frac{\phi_1 - \phi_2}{\sqrt{\left(\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}\right)}} \quad (3)$$

where  $\phi_1$  is the value of the unit root before membership,  $\sigma_1$  the standard deviation and  $n_1$  the number of observations (similarly, the index 2 denotes the period after membership).

### 3.2 Empirical Results

The results of the test are presented in table 1. Recall that the closer  $\phi$  is to zero, the stronger the convergence, and conversely the more  $\phi$  tends to one, the less strong the convergence of GDP per capita is between the studied cohesion country and the Community average (EU 12). If membership to the EU favors convergence, then  $\phi$  must be lower after joining the Union than before.

<<insert table 1 here>>

The results show that the value of the unit root after membership is significantly different from the one prior to membership for the three cohesion countries, but not Greece<sup>1</sup>.

Interpretation of the results suggests that convergence increases after 1986 for Spain and Portugal, as the value of  $\phi$  diminishes strongly after they joined the EU. The membership and the reforms associated with the Single Market increased the attractiveness of Spain and Portugal for industry location and foreign direct investments. As regards Greece, there is no evidence of stronger convergence to the European average. The value of  $\phi$  is not significantly different prior to and after membership. Greece seems handicapped by its lack of competitiveness and geographical proximity with the EU. The degree of peripherality of this country increases with economic integration, since the potential of the center increases, almost by definition, faster than any other with the enlargement of the integrated area. Moreover Greece joined the EMU later (January 1, 2001) and this may have delayed potential investments until now. A strong and increasing presence of multinational firms that occurred in Ireland over the last two decades enhanced its catching-up to the EU average. The country also took advantage of its strong trade relation with the United-Kingdom (UK) and of the fact that free trade with the UK was established a long time before free trading with the European Community. Ireland had a GDP per capita that was very low before joining the EU in 1973. The value of  $\phi$  after membership is greater than one, but it is due to the specification of the model, which measures  $\beta$ -convergence

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<sup>1</sup> For Spain:  $t = 6,50808$ ; for Portugal:  $t = 2,89575$ ; for Greece:  $t = -0,03603$ ; for Ireland:  $t = -3,21592$ .

but does not consider  $\sigma$ -convergence (decrease in variances). Ireland does not only converge to the European average, but has exceeded it, reaching 102% of the EU in 1997, and increased even more after this time. As a result of this impressive catching-up Ireland should in principle no longer be eligible for the allocation of cohesion funds. However, cohesion funds have already been allocated to it for the 2000-06 programming period in order to sustain long-run investment and because the methodology of the European Commission bases the calculation of the European per capita GNP on the Community data of the three previous years. For example, when the allocation decision was made at the end of 1999, the EU average was based on 1996-1998 data<sup>2</sup>.

Joining the EU generated a series of changes in macro-economic policies, trade, in the production and investment structures, that have interfered with the efficiency of the European structural assistance and have generated important changes in production levels in peripheral countries. These effects are more fully discussed in Baldwin and Seghezza (1998). On the other hand, dynamic effects depending on human and physical capital accumulation and on technical progress are more difficult to measure because of the short period of time since the countries of interest joined the EU.

### **3.3 Lack of Cohesion within Each Country**

The previous results highlight one aspect of the convergence process that has been occurring in cohesion countries for more than fifteen years; a closer look into the convergence process among regional incomes within each cohesion country is necessary. Figure 1 represents the evolution of the dispersion of regional per capita GVA (Gross Value Added), at 1990 million euro, within each cohesion country; the data considered are at the NUTS II level. Convergence occurs among

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<sup>2</sup> The European Commission, which also uses a per capita GDP in PPP, concludes that there has been a catching-up of Ireland, Spain and Portugal and divergence for Greece. The manner in which the purchasing power parity is estimated is however fragile. If the Greek PPP GDP appears relatively stable in comparison with that of the EU over a decade after its adhesion, it corresponds to an 11% appreciation of the Greek Standard of Purchasing Power (SPP) rate, because of a deep modification in the price structure. That counterbalances a decrease of the Greek GDP per capita to 7 percentage points over 1981-1991. The convergence process of Ireland is partially due to a very favorable evolution of its relative prices as well. For Spain and Portugal, their catching up occurs after 1986 even if their SPP rate depreciated. As a conclusion, if domestic prices were evaluated in another way, the estimations of PPP GDP could be different. In the present case, the same conclusions are drawn when GDPs are estimated in constant dollars.

regions of a particular country whether the dispersion of the distribution reduces over time. All the regions of Ireland, Portugal and Greece have been financed as objective 1 targets for the period 1989-1999, i.e. they had a per capita GDP below 75% of the European average. For Spain, only 7 regions out of 18 had a per capita GDP beyond this threshold, the others being also financed, but as objective 2 targets.

<<insert figure 1 here>>

Regional inequalities have increased in Spain: the European integration has benefited at first the relatively prosperous regions. Except for the regions of Melilla and Baleares, there is no net relation between the development gap and the catching-up speed. The region of Extremadura, for instance, is the poorest one and its regional income has been around 65% of the national average for more than fifteen years. On the other hand, Rioja, Aragon, Madrid and Cataluna have established a significant gap. In Portugal, regional inequalities increase strongly too: the regions of Madeira and Azores have not caught up with the country average, while the regions of Norte, Centro and Algarve have developed rapidly. In Ireland, inequalities seem to have increased, but it should be noted that Ireland is composed of only two NUTS II regions, Border and Southern and Eastern. Thus, when the share of the regional income in the national one decreases for one region (Border), it automatically increases the share of the other region (Southern and Eastern). Concerning Greece, regional income disparities have been constant over time. The region of Ipeiros has remained the poorest, whereas both Notio Aigaio and Kriti have dramatically increased their regional incomes. The convergence pattern described above confirms the results of Esteban (1994), Neven and Gouyette (1995), Quah (1996), and more recently Martin (1999) and Fayolle and Lecuyer (2000).

The increase in regional inequalities is not a phenomenon specific to the poorer countries. Regional disparities have increased in almost all the European countries, at different rates. Italy is the country where they are the greatest. The Mezzogiorno has failed to catch up with the dynamic and developed regions of the north-eastern part of the country. In France, Ile-de-France maintains its great distance from the other French regions. In the UK, regional inequalities seem to decline, but this result is due to the decline of manufacturing industry in almost all the regions

of the country. Only in Germany, the Netherlands, and Belgium have regional disparities decreased.

## **4. What May Explain this Particular Convergence Pattern?**

### **4.1 Existence of Additional Funds**

By law, regional or national co-financing must accompany structural funds dedicated to particular projects (this is the principle of additionality that reduces the temptation of regions to present non viable projects as they have to finance a part of the total costs<sup>3</sup>). Therefore it turns out that co-financing doubles the European aid in poor regions, whereas it can triple or quadruple funds in regions with medium or high income levels, as they are more able to accompany structural funds (Fayolle and Lecuyer, 2000). As the co-financing is adopted for all regions, one can also add that a region that has already attracted numerous firms enjoys higher tax revenues, and these additional sources of revenue allow it to sustain continued development initiatives more easily. Higher public expenses may then attract more firms and foster industry concentration again. Until now, the European Commission has adopted no measure to reduce this “anti-redistributive” bias, but one could imagine structural funds might be allocated under the constraint that national governments reduce regional divergence inside their country through additional funds.

### **4.2 Lack of Labor Mobility**

Low labor mobility, due to linguistic and cultural barriers, is equally a factor that does not favor reduction in spatial inequalities in income in Europe. Only about 1.5% of European inhabitants live in a country different from their country of birth, a strong contrast with the interstate

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<sup>3</sup> Funds devoted to Objective 1 financed over 1994-99 a maximum 75% of the total cost, but 80% in cohesion countries and 85% in the most remote regions and the outlying Greek islands. The other Objectives financed a maximum 50% of the total cost. For the current programming period, the differentiated ceilings are maintained, but the rate of assistance also depends on the Community interest in term of environmental protection and of the promotion of equality between men and women. Lower ceilings are specific to the case of investment in business or infrastructure generating revenue (respectively up to 35% and 40% in Objective 1 areas, and 15 and 25% in Objective 2 areas).

mobility within the United-States. However, the lack of international labor mobility may be protecting the economic advantage of lower real wages in Southern countries. International labor mobility could reduce the extent of wage differentials and increase concentration in and market size of the core (Krugman and Venables, 1996). However, the lack of labor mobility is also found within countries, and this may prove to be just as a much handicap in smoothing regional income inequalities. In Europe, the wage structures that characterize the labor markets are more rigid within each country than between countries, due to laws that prevent wage differentials in a single sector at the national level. Therefore, if wage differentials do not reflect the economic standing of a region, then unemployment rate differentials do (Puga, 1999). Moreover, a high national unemployment rate that reduces the probability of finding a job and unemployment insurance payments do not provide enough incentive to move outside one's own region.

### **4.3 Characteristics of Transportation Infrastructures**

Transportation infrastructures improvement plays a key role in efforts to reduce regional and social disparities according to the European Commission. Recall that regional funds devoted to transportation infrastructures represent respectively 30% and 60% of structural and cohesion funds. From a theoretical as well as empirical point of view, their impact on regional development is not clear. On the one hand the endogenous growth models *à la* Aschauer (1989) and Barro (1990) predict that if public infrastructures are an input in the production function, then policies financing new public infrastructures increase the marginal product of private capital, fostering thus capital accumulation and growth. On the other hand, the economic geography theoretical works developed by Martin and Rogers (1995) and Martin (2000) demonstrate when transportation infrastructures are financed, they affect the process of industry location and lead to involuntary effects: financing intra-regional transport infrastructures in the poorest regions increases the probability of firms locating there, but reduces the country's aggregate growth rate and increases regional income inequalities, whereas interregional transport infrastructures foster the aggregate growth, but lead to greater concentration in the core (Dall'erba and Hewings, 2002).

More precisely, the impact of regional funds on regional development has to be seen in the light of changes in the field of transport. An increasing part of the new transport infrastructures planned for the development of the trans-European network tends to be built within and between core regions, where transport demand is the highest (Vickerman, 1991, 1996). Only the regions that belong to the main network will gain in accessibility, whereas the regions that do not belong to it or are located at the edge of it will not. Vickerman *et al.* (1999) show that this is particularly relevant in a transport network composed of hub-and-spoke interconnections, like the high-speed rail network<sup>4</sup>. The relationship between gain in accessibility and economic development in peripheral regions is not clear and requires further research, since it depends on the specific requirement in transport cost of each singular sector. It is stated however that gains in accessibility due to interregional transport infrastructures will always be relatively higher in the core region than in the peripheral one. Venables and Gasiorek (1999) give an empirical evaluation of it. They use a general equilibrium approach to evaluate the impact of several road projects financed by the Cohesion Fund. The main advantage of this approach is the detailed microeconomic structure included in the analysis. A first case study is the Tagus Crossing in Lisboa (Portugal). This infrastructure may favor regional development since it acts as a public infrastructure capital, but its benefits concern mainly local transport costs since they are small outside the region of Lisboa. This can be explained by the peripheral location of this region, and by the fact that this infrastructure does not improve the access to the main network, of which Madrid is the hub. Their analysis provides another example, but this one has large positive spillovers: the Madrid Ring Road enhances Madrid's hub position whereas the main Spanish motorways are spokes. In this particular framework, there is primarily an increase in the access of Madrid itself, which benefits from its central location, and of the cities on the spokes (the motorways), while the areas located far from the motorway network do not benefit of it.

Another aspect to consider is the transport requirements of each individual sector. Since these requirements differ across sectors, the possibility of drawing lessons for regional development policies is reduced. Consequently, current research focuses on measuring empirically these effects. Some examples of empirical studies are given here. Lafourcade (1998) notices that for

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<sup>4</sup> The role of railways in the TEN-T is increasing. Funds devoted to railways are respectively twice and six times as important as those devoted to roads and airports.

certain products transport costs are so high that the market potential is more or less limited to the demand within the region of production, whereas for other products, which are less sensitive to transportation costs, market potential extends across many regions. She provides an example of the influence of transportation costs on different goods, focusing on goods with high/low quality. Her analysis suggests that developing an infrastructure network induces a decrease in unitary transport costs and in delivery delays as well. She shows for instance that constructing a highway in France considerably reduces unitary transport costs (about 15%), while gains are weaker for the other types of road. The influence of transport costs depends in her model on the nature of the goods sold (equipment good, usual consumption good, heavy industry). Transport costs become less important as the quality (or value) of the transported good increases, in which case other factors become much more important in location decision-making.

The model of Midelfart-Knarvik *et al.* (2000) is more sophisticated in so far as it includes estimates of how in 33 industries in 14 EU countries industry and country characteristics counteracted to determine the location of production over 1980-97. (Note that they assume all industries to be perfectly competitive, which is not a current assumption of economic geography models). Their calculations show evidence that the backward linkage has become less strong through time, while the forward linkage has become stronger. This implies that sectors highly intensive in intermediate goods are moving towards central locations to obtain better access to these goods. Industries intensive in labor tend to locate in peripheral countries where the labor is cheaper. The coefficient on market potential interacts with transport costs; this suggests that industries intensive in transport costs tend to locate in countries with higher market potential.

## **5.- Conclusion**

The convergence process in Europe is characterized by the catching-up of the poorest countries, but also by an increasing divergence among regions within a country. The gains of integration have thus benefited mainly the richest regions within the poorest countries. Regional development funds did not prevent this pattern from emerging. One reason is given by the characteristics of public infrastructures they finance: the European Commission says that the improvement of transport infrastructures plays a key role in efforts to reduce regional and social

disparities. But current and new transport infrastructures that will contribute to the development of the trans-European network are planned to be built within and between core regions, connecting the major centres of population and activity, where transport demand is highest. These new infrastructures will increase hub-and-spoke interconnections, leading to a higher agglomeration in the hub, since accessibility to any spoke location is made easier than from one spoke to another. In terms of accessibility changes, only the regions that belong to the network will gain in accessibility, whereas the regions that do not belong to it or are located at the edge of it will not. The relationship between gain in accessibility and economic development in peripheral regions has been advanced theoretically but still requires considerable empirical investigation especially given the variations in transportation demands by sector. It is stated however that gains in accessibility due to interregional transport infrastructures will always be relatively higher in the core region than in the peripheral one. Peripheral regions have generally lower unit costs than core regions that may attract activities to locate there. However, this also depends on the supply of transport infrastructure, the lack of which impedes the development of growth potential in periphery, but the improvement of which does not necessarily promote its growth. Transportation infrastructures thus promote the country's aggregate growth but cannot always be seen as an efficient instrument to reduce interregional disparities in Europe. The European Commission should therefore focus on the other aspects of regional policies since transportation infrastructures are only one part of the program for balanced regional development. Cohesion countries also call for a reform of the objectives and criteria of regional policy, otherwise the future enlargement to the poor Central and East European countries will considerably modify the map of less developed regions.

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**Table 1-** Conditionnal  $\beta$ -convergence of GDP per capita of cohesion countries with the European average

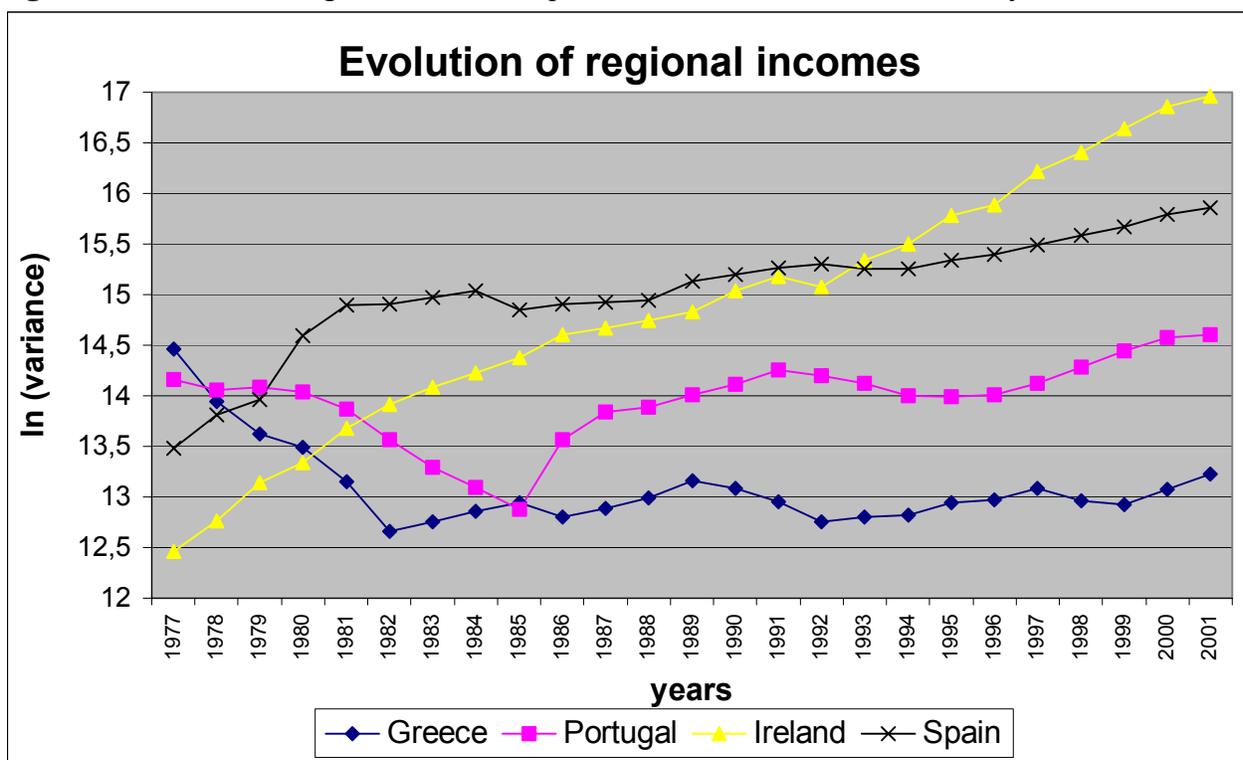
			ADF					DF				
		k	alpha	talpha	$\phi$	t	T	alpha	talpha	$\phi$	t	T
Spain	1960-2001	4	-0.056	-3.413	<b>0.782</b>	-3.496	-15.957	-0.065	-5.465	<b>0.748</b>	-6.038	-10.342
	1960-1985	4	-0.049	-2.640	<b>0.806</b>	-2.685	-8.979	-0.062	-4.180	<b>0.753</b>	-4.812	-6.177
	1986-2001	0	/	/	/	/	/	-0.141	-3.448	<b>0.461</b>	-3.516	-8.088
Portugal	1960-2001	4	-0.042	-2.476	<b>0.885</b>	-3.255	-2.700	-0.025	-1.744	<b>0.930</b>	-2.527	-2.852
	1960-1985	4	-0.074	-2.020	<b>0.829</b>	-2.600	-1.736	-0.043	-1.515	<b>0.906</b>	-1.995	-2.354
	1986-2001	0	/	/	/	/	/	-0.137	-5.369	<b>0.635</b>	-5.651	-5.468
Greece	1960-2001	3	-0.042	-2.184	<b>0.903</b>	-2.258	-6.073	-0.047	-2.794	<b>0.887</b>	-3.219	-4.646
	1960-1980	1	-0.016	-0.652	<b>0.911</b>	-1.733	-1.021	-0.023	-0.959	<b>0.912</b>	-1.834	-1.756
	1981-2001	0	/	/	/	/	/	-0.044	-2.109	<b>0.918</b>	-1.752	-1.643
Ireland	1960-2001	0	/	/	/	/	/	0.051	4.858	<b>1.099</b>	3.846	4.086
	1960-1972	0	/	/	/	/	/	-0.176	-1.548	<b>0.633</b>	-1.529	-4.399
	1973-2001	0	/	/	/	/	/	0.048	4.158	<b>1.081</b>	2.558	2.265

Source: Chelem-CEPII (2001)

Note: Calculations of the author, k is the significant lagged difference, / show that k is null, the results are then estimated according to DF. The ADF results are significant at 10% level according to Dickey and Fuller tables

Note: The same test has been performed without considering the studied cohesion country in the EU average. This second test eliminates the autocorrelation effect due to the presence of the studied country in the EU average. The results are not significantly different from these ones, which may be justified by the fact that cohesion countries are small countries that have little influence on the value of the EU average.

**Figure 1-** Evolution of regional income disparities within each cohesion country



Source: Cambridge Econometrics (2001)