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Lessons for regional policy from the new economic geography and the endogenous growth theory

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Helmut Karl; Ximena Fernanda Matus Velasco

Lessons for Regional Policy from the New Economic Geography and the Endogenous Growth Theory

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1. Introduction

The configuration of the European Union has produced a deep transformation in all its Member States. Particularly, the geographic structure in all the area has changed with the disappearance of political and economic frontiers. Now, regions compete beyond their national borders, they compete for the European and international markets. Within this restructuring process, the spatial development in the European Union is characterised by the division between dynamic centres with high economic activity and those with low economic activity. This structure of the territory has been identified at different levels: the core-periphery divide, the north-south divide and with the process of European enlargement the east-west divide.

The regional unbalances in economic growth and in the spatial distribution of economic activities have become an unquestionable reality. However, the causes which yield in some regions to more growth than others; as well as the forces leading to spatial agglomeration are still controversial. The role of the European institutions is another relevant topic of the discussion in the political and academic arena. The regional disparities leads to the question, if they can and should influence this process. And in the case that interventions are possible and desirable, what kind of instruments are the most adequate to break with regional economic unbalances.

To deal with these issues this work considers two theoretical approaches: the economic geography theory – for the spatial aspects – and the endogenous growth theory for the growth processes. The major concern of this work is to find to what extent these studies are able to explain: a) the actual spatial organisation of the economic system in the European Union; b) the forces behind regional economic growth; c) the limits we confront when we stay with these lines of research and d) the policy recommendations derived from these two approaches.

The remainder of this work is organised as follows. The next section presents some of the main predictions of the economic geography theory regarding the effects of integration processes. This is followed by a brief review of the endogenous growth theory, approach which can provide some insights respect to the location of economic activities and, hence, in terms of the spatial development. The next section shows some of the limits of these theories followed by an empirical discussion. The last section deals with the policy implications derived from these theories.

2. New Economic Geography Theory

The understanding of the factors relevant for economic development has been at the centre of economic analysis. Different approaches have appeared with the aim to provide a framework capable to explain the process of economic growth and its distribution. One of them is the neo-classical theory. The neo-classical framework considers a world dominated by constant returns to scale, perfect competition and perfect mobility of production factors. This theory predicts that under free markets the geographical differences in income per capita and economic growth in the long-run will disappear. However as empirical evidence demonstrates these differences tend to persist over time. To correct the limitations of the neo-classical model some refinements have been undertaken. The extended approaches consider the existence of markets dominated by economies of scale and imperfect competition. Within this framework, it is now possible to analyse the persistence in the differences in standards of living among countries.

In the improved approaches the role of the economic space come also into play. Understanding the location of economic activities across a territory constitutes as well an important element in regional development analysis. When productive activities concentrate more in certain regions than in others, regional imbalances tend to emerge. Such uneven development is seen as undesirable if it has a negative effect on the economic progress and on the social and political stability of a territory. Especially, for the European Community, this aspect is of particular importance since one of its objectives consists precisely in the promotion of a balanced development of economic activities across the territory.¹ Until now, it is still not clear whether the effects of such socio-economic process induces economic activities and economic growth to concentrate in the core (central high income countries) or in the periphery (low income countries). This section summarises some of the theoretical findings of the new economic geography models.

The analysis of the role of the space and the forces driving location decisions is not a topic in economic sciences that has emerged just recently. The starting point goes back to the classical location theory. This line of research emphasised that geographical variables should be part of regional economic analysis. Besides time, the space should not be forgotten. The work of Weber, von Thünen, Christaller and Lösch among others provided the basis of this theory. They tried to build a framework able to explain a general spatial localisation pattern of production and human settlements. Distance to or access to markets (transport costs), size of the markets and their characteristics (quality of goods and services) were considered as central elements to explain location decisions and advantages from agglomeration².

Despite the relevance of the issues addressed by these studies, they were not included in the predominant economic theory. Transport costs were only seen as relevant for

¹ Treaty Establishing the European Community 2002 (consolidated version), Part one: Principles “Article 2”.

² Agglomeration is understood as the geographical concentration of economic activities and population.

those sectors where the transportation of a product represents a major part of total costs. As Kaldor noticed: “transport costs can only help to explain location in those particular activities which convert bulky goods, where transport costs are an important element, and where processing itself greatly reduces the weight of the materials processed” (Kaldor 1970: 340). One of the major deficiencies of these early studies was the absence of an adequate framework to model transport costs and agglomeration economies. With the analytical developments in the industrial organisation and international trade theories this has changed dramatically and the line of research which integrates these advances is known as the new economic geography theory.³

Similar to traditional regional science, the new economic geography analyses the impact of trade costs on the spatial distribution of factors and firms. These costs are seen as barriers to do business across space (Krugman; Venables 1993: 3). They exist due to physical reasons (transport and telecommunication costs), institutional arrangements (trade and fiscal policies) or language and cultural differences. In contrast to the traditional regional science, the new economic geography explains location decisions and the existence of regional clusters with economies of scale and imperfect competition. Having economies of scale implies that firms can reduce their (average) costs by increasing production output. The geographical concentration of production allows them to realise these gains.

Based on these two elements – trade costs and economies of scale – the new economic geography analyses patterns of geography concentration (agglomeration) by the interaction of centrifugal and centripetal forces. The economic geography follows Marshall 1895 who describes the elements behind these counter-acting tendencies as follows: On the one side, *centripetal forces* induce economic activities to concentrate in one or few regions. These forces are present in regions with access to large markets (market size effects) and an abundant supply of labour that offers specialised knowledge and skills.

The existence of external effects is responsible for centripetal forces. External effects appear when the output of a firm depends not only of factors of production needed internally, but also on the activities of others firms, the size of the region, the industry structure or on the proper characteristics of the region (quality and quantity of products and inputs supplied, infrastructure facilities, business environment). These external effects are also known as interdependencies among actors and can be transmitted through market (pecuniary externalities) or non-market interactions (pure or technological externalities).

The way centripetal forces operate can be summarised as follows. A region with access to a large market offers advantages for firms that produce goods subject to economies of scale. This type of firms can reduce costs by concentrating production at one site and serving other markets from that particular place. Large markets favour vertical linkages (forward and backward linkages) between producers (upstream) and users (downstream) of intermediate inputs, too. The higher variety of intermediate inputs offered reduces the cost for downstream industries. Firms take advantage of such a location because of the access to specialised labour force and because of the variety of inputs available. The high number of different firms and the proximity among them facilitates the diffusion of new ideas and technologies (knowledge spillovers), increasing the attractiveness to be located in those markets. A region with these characteristics is attractive also for consumers since the variety of products they can acquire is higher.

³ Some authors prefer to use the term of geographical economics instead of the new economic geography. See Fujita; Thisse 1996 and Brackman et al. 2000.

At the other extreme, *centrifugal forces* spread economic activities in the space. These forces can be explained by immobile factors of production (land, specific resources, labour force) or congestion effects (pure external diseconomies) like high concentration of population, high land rents, high labour costs, crime, pollution, etc. Confronted with these adverse effects, some firms may have the incentive to locate outside such regions to avoid competition in product and labour markets; to gain access to the demand of the immobile population or to avoid any form of congestion (urban costs).

To formalise these ideas, the economic geography models consider an economy with two regions (countries). Each region has two sectors; one is perfectly competitive (agriculture) which produces homogeneous goods and the other is imperfectly competitive (industry) which produces differentiated goods. Each region has two factors of production (industrial and agricultural workers). While agricultural goods can be freely traded, firms incur in costs when they trade industrial goods. Taking into account these considerations the spatial equilibrium is determined by the level of trade costs, economies of scale and the proper characteristic of the economy.

In the model of Krugman (1991) whether or no concentration occurs depends particularly on the demand for manufactured goods (share of income on manufactured goods). When the levels of trade costs (transport facilities) are high, firms tend to disperse their production. As the level of trade costs begins to decrease due to improvements in transport infrastructure, the concentration of production becomes profitable. When the number of firms in one of the region increases, the demand for factors of production will also increase. The higher varieties of the products offered and the higher real wages in this region will attract the mobile labour. This effect will be stronger the higher the preferences of mobile workers for these products are. In this model, the interaction of these effects induces a self-reinforcing process in which economic activity concentrates in one of the locations.

An alternative way to see the forces leading to economic agglomeration is through vertical linkages between upstream and downstream industries (Venables 1993). In the previous model an increase in the number of firms in one region increases the demand for output of local firms through the expenditure of industrial workers attracted from other regions. In this model, where labour is immobile, an increase in the number of firms implies a higher variety of intermediate inputs. The firms which are intensive users of intermediate inputs in final production will move to that region. In this setting the interaction of trade costs, increasing returns to scale and the share of intermediate goods in final production drive concentration of economic activity.

The predictions derived from these models respect to the possible coexistence of an industrialised core and a de-industrialised periphery in a territory have been at the centre of the discussion in regional science. This result is especially relevant for analyses concentrated on the regional effects of market integration processes like the European Union. Within this model a closer market integration accompanied by lower levels of trade costs (transport and telecommunication costs) would give rise to a pattern of uneven development along with an increase in income inequalities among the Member States.

In the past years, some refinements in the analytical framework of the economic geography theory have been undertaken. This has helped to bring the theoretical models closer to the empirical reality. Principally the assumptions concerning the mobility of the labour force, the role of congestion effects and individuals preferences have been revised. Some studies instead of considering perfect labour mobility, assumed either no labour mobility (Krugman; Venables 1995) or partial mobility (Lammers; Stiller 2000), while others include urban costs (Junius 1999). With these adjustments, important

changes in the predictions of the economic geography models have emerged. In these extended models, as the level of trade costs begins to decrease industry concentration first increases and as trade costs continues to decrease (e.g. as the integration process proceed) concentration begins to decline. This result is represented by a non-monotonically relationship between the level of trade costs and the concentration of economic activity (Krugman; Venables 1995).

From the above review it can be seen that the new economic geography theory offers a framework to analyse the spatial organisation of economic activities. Through the interaction of centripetal (market sizes effects) and centrifugal forces (urban costs) this line of research shows how economic agglomeration or dispersion may emerge. Crucial elements behind this process are the level of trade costs (tariffs, transport and telecommunications costs), economies of scale and the economic environment of the region or country. Considering the European integration experience, one of the tasks of the European Community is to pursue social and economic cohesion. However if we take into account the predictions of this approach, it can not be expected that the objective of cohesion will be attained automatically. Therefore to understand the spatial effects of this process, it may be useful to consider the tools offer by the new economic geography theory.

3. Endogenous Growth Theory

Another line of research which has made important contributions in the analysis of regional development is the growth theory. This approach pays special attention to the factors relevant for economic growth, particularly human capital (education, skills, specialised knowledge) and technological progress (investment in research and development, diffusion of knowledge and innovations) as well as factors related to convergence processes. Looking at the European integration, these issues are also of great relevance since one of the tasks of the European Community is to foster a sustainable growth and convergence of economic performance across the Member States.⁴ Therefore, this section reviews some of the theoretical developments of the growth theory.

The foundations of the growth theory are in the analytical framework developed by Solow (1956) and Swan (1956). In these studies capital and labour are the main factors to explain the income and the growth rate of a country. The main prediction of the standard theory is that, in the long run, income differentials disappear. This transitional behaviour is known as absolute convergence. According to this framework, countries with less capital per worker – due to the higher rate of return – will grow faster than countries with higher capital per worker.

With the development of empirical studies the predictions of the neo-classical theory were questioned. Particularly, some studies invalidated the convergence in absolute terms. This happens because countries which do not share the same economic environment (technology, human capital, saving rate, preferences and institutional framework) do not necessarily converge to the same equilibrium (income level). Therefore, with a heterogeneous sample of countries, conditional convergence instead of absolute convergence should be expected. (Barro; Sala-y-Martin 1995)

The failure to explain the persistence in the differences of standards of living is another limitation of the neo-classical growth theory. These findings motivated economic

⁴ Treaty Establishing the European Community 2002 (consolidated version), Part one: Principles “Article 2”.

researchers to refine the neo-classic framework.⁵ At the centre of the new growth literature are endogenous growth models in which private and public preferences are taken into account (Romer 1994). In this literature two types of models can be distinguished: on the one side those models in which the accumulation of a wide variety of human capital explains growth and its persistence and on the other side those in which technological progress is at the centre of economic growth.

Human Capital and External Effects

Besides the stock of capital and labour, differences in the quality of labour (Schultz 1961), their skills and knowledge (Uzawa 1965) are considered important elements for the development of a nation. Unequal performance across countries may reflect differences in investment decisions in respect to education and training-programs. It may also reflect differences in investments in physical capital. Through investments in physical capital, some authors believe that the stock of knowledge can be increased (Arrow 1962). This process is called “learning by doing”. It implies that by acquiring experience the level of productivity and as a consequence the rate of growth of a country can be increased.

Models of endogenous growth based on human capital accumulation explain differences in economic development through the presence of external effects, too (Lucas 1988). These effects emerge when the output of each firm depends not only on the human capital of its labour force, but also on the average value of human capital per worker in the economy. When firms take their investment decisions, they do not realise the effects that their actions have on the whole economy. As a consequence, the private level of investment in human capital tends to be lower than the social desirable level. An economy with this characteristics is expected to have an output level below the social optimum with a slow rate of growth.

Technological Change

A great deal of endogenous growth studies consider that the allocation of resources to innovative activities is the main reason for income and growth rate differentials across countries. This literature emphasises the importance of investments in research and development (R&D) to discover new products and improve production processes. The endogenous growth theory is not the first to recognise the role of technological change. The neo-classical theory was aware of the relevance of technological progress for growth. In the standard theory, technological change was considered as an exogenous variable. Within this framework improvements in technology were explained by public investment in R&D. However, private preferences regarding investments in R&D play also a role (Romer 1990). The development of models including private preferences requires to modify the assumption of perfect competition. This is because firms need to realise profits to cover the high investment costs that the creation of new ideas entails. In this literature, different models have been developed with the aim to capture the effects that technological improvements may have on the economic growth of a country:

Technological Change with Knowledge Spillovers

This type of externalities appear when a new idea (knowledge) can be used without any costs by other agents. When private actors know that not all the benefits of their invest-

⁵ In the neo-classical framework the production function is characterized by constant returns to scale, constant saving rate, constant rate of growth of population, constant technology, perfect competition and diminishing returns to productive factors.

ments can be appropriated, their incentives to invest tend to decrease. This opens a gap between the private and the social desirable level of investment affecting the growth rate of a country (Romer 1986).

Knowledge spillovers do not always have negative effects on the economic development of a country, however. Knowledge spillovers may favour countries with low barriers to international trade, like in the case of the European Member States. The exchange of goods is seen as a mechanism which facilitates the diffusion of ideas between regions or countries. Local producers learn new techniques and new production forms (Romer 1986, Grossman; Helpman 1991). For the diffusion of knowledge, some authors believe that multinationals have a special role (Baldwin et al. 1999). Multinational firms can transmit to national producers entrepreneurial abilities and technological skills (e.g. by training programs).

An important point made in these studies is that even if countries are able to attract investments, they will not take advantages of them if under-qualified labour predominates. These countries will not have the capacity to assimilate specialised knowledge (absorptive capacity).⁶ Therefore, if these countries do not increase the stock of qualified labour, they will tend to specialise in activities that demand less qualified skills.

Endogenous Technological Change

As in the case of the new geography theory, the developments in international and industrial organisation theories allowed the creation of models with endogenous technological change and in which private preferences come into play. Increasing returns to scale and imperfect competition turns to be one of the main characteristics of these models.

The basic framework to explain the mechanism in which technological change affects the level of income per capita and a sustainable growth rate, differentiates among three sectors (Romer 1990):

- 1) a research and development sector which produces new knowledge or ideas. The human capital of researchers and the stock of knowledge in the entire economy are the inputs of this sector;
- 2) an intermediate goods sector that provides differentiated inputs in an imperfect competitive market. The main inputs of this sector is capital and the new knowledge produced by the R&D sector and
- 3) a sector which produces goods for final consumption.

Labour, human capital and intermediate products are the inputs utilised in this sector. Within this setting, technological knowledge is considered as a non rival and partially excludable input. This means that through a patent system, the firm which creates the new idea can limit its use to other firms. Thus rival firms can not use the new idea to produce intermediate goods. Nevertheless, the actors involved in innovative activities (researchers) can use the new idea as basis to improve or to produce new knowledge (knowledge spillovers).

The framework of this model shows the relevance that human capital and the level of knowledge of the R&D sector have on the growth rate of a country. On the one side, by assigning more human capital into this sector the creation of new knowledge (ideas) can be increased. On the other side, the new knowledge increases the stock of knowledge of

⁶ This ideas go back to the works of Nelson; Phelps 1966 which considers that human capital affect growth not only through innovation but also through the adoption of technologies.

the entire economy and as a consequence brings an increase in the productivity of the individuals (researchers) involved in R&D activities. Therefore, it may be expected that countries with low levels of human capital will contribute less to innovative activities and as a consequence they will tend to have a lower rate of growth.

As we can see the endogenous growth theory offers important insights to understand the differences in growth rates and its persistence among countries. The analytical tools of this theory may also be useful to analyse the process of development in the European Union. In particular, considering that both specialized knowledge and technology are heterogeneously distributed across the European territory.

4. New Economic Geography and Endogenous Growth Theories

In the past years the new economic geography and growth theories have made important contributions to explain regional differences and economic development. However the analytical framework of both theories still has limitations. (Neary 2001, Sternberg 2001, Zoltan; Varga 2002). The following points show some of them:

Location of High Technology Industries: The new economic geography models based on pecuniary externalities are not able to explain the location of high technology industries. Understanding the location of these industries matters because as the endogenous growth models show the high technology sector plays a relevant role in economic development. The access to specialised knowledge (tangible and intangible) is crucial in this type of industries. Therefore, the elements related to the diffusion of knowledge (knowledge spillovers) need to be taken into account. The frequency and the quality of interactions (connectivity) and thus on the access to external knowledge (know-how) is a vital element of such technological externalities.

Relevance of institutions: One of the main deficits of the new economic geography and the endogenous growth theories is the lack of attention paid to the institutional framework.⁷ Differences in institutions as well as social and cultural factors are relevant elements to understand the economic development among countries (Sternberg 2001). Institutions determine the kind of economic activity by forming the structure of incentives within a country. Complex institutionalised markets are likely to show imperfections which might lead to lower than socially optimal levels of activities. Therefore, these theories by including this aspect may gain insights concerning the functioning of:

- **Labour markets:** Low mobility of the labour force is especially true for the European Union. Studies which look at labour market institutions predict that inflexible labour markets (e.g. when labour has substantial bargaining and political power) tend to reduce the mobility of the labour force, the incentives to undertake education as well as the growth rate of a country (Bertola 1994, Andersen 1997).⁸
- **Innovation process:** Innovation involves social and economic institutions. Different institutional rules determine whether and how effectively individual and groups are motivated to acquire new knowledge and adopt innovations (North 1996). Institutions that support R&D activities influence the building up of technological infra-

⁷ In the endogenous growth literature, there exist some studies which consider the role that institutions have on the growth rate of a country (See Hall; Jones 1998).

⁸ Empirical evidence shows that mechanisms of labor flexibility supported the rapid industrialization in Italy in 1970 and 1980. This permitted a substantial increase in employment consistent with productivity growth and competitiveness. With the appearance of some rigidities in the labor market at the beginning of the nineties, the adjustment capacity of the Italian labor market decreased, however. See Garonna et al. 1997.

structure within countries or regions. This technological infrastructure provides the basis to facilitate innovative activity and the competitiveness of a region (Feldman 1994).

- In the innovation process tacit knowledge (know-how, intangible knowledge) plays an essential role. Social institutions (social networks between firms, private and public research institutions, inter-regional and intra-regional links, trans-border co-operation etc.) determine the way in which access to tacit knowledge occurs at the local, national and international level. In the new economic geography and endogenous growth theories the role of tacit knowledge as well as the mechanism behind its acquisition have been ignored so far.⁹

In recent years an increasing interest to integrate the new economic geography and endogenous growth theories could be observed (Walz 1995, Martin; Ottaviano 1996, Baldwin; Forsild 1999). Synergies from combining these theories can be realised since both lines of research share common elements (increasing returns of scale and imperfect competition).¹⁰ Analytical insights in terms of the spatial effects of economic growth can be gained (Easterly 1998). Recent research suggests that factor accumulation can be a reason for the geographical concentration of production (Baldwin; Forsild 1996). At the same time, the effects of changes in the spatial organisation of economic activities in terms of economic growth can be part of the integrated models. For instance, increases in the size of the market due to the concentration of firms may affect the level of income and the rate of growth by having a positive effect on R&D activities (Romer 1990).

With the interest to take advantages of both theories quite a number of new models have appeared. As in the new geography models, in these studies, geographical concentration is determined by the interaction of centripetal forces and centrifugal forces. The main prediction of some of these studies is that economic integration may increase regional concentration of production and growth.

The basic framework of these models is similar to those of the new economic geography and endogenous growth theories. However, in the improved models differences regarding the labour force are included (skilled and unskilled labour). The production of the intermediate sector requires now specialised knowledge that depends on the level of R&D. The stock of human capital (number of ideas) determines the number of differentiated goods. Some studies assume that knowledge or new ideas spread equally within and between regions (Walz 1995), while others assume that regions differ in terms of the stock of human capital (Martin; Ottaviano 1996). Taking into account this aspect, the geographical concentration of growth and production depends on the effects that knowledge spillovers have on individuals preferences.

In the case of global knowledge spillovers production and growth spread in both regions. Global knowledge spillovers implies that once an idea is discovered, it is available to everybody. Since firms can enter without restrictions into R&D activities, as long as new firms are continuously founded, the profits in the R&D sector are driven to zero. Hence, the invention of a new idea reduces the future costs in R&D activities for other researchers in both regions. These effects induce the movement of some firms from the large region to the small one with the aim to avoid competition effects (centrifugal force) in the R&D sector.

⁹ In the endogenous growth literature, recent studies have started to look at the role that tacit knowledge has on the innovation process. See Cheshire et al. 2000.

¹⁰ For a discussion respect to the complementarities of the new economic geography and endogenous theories see Knaap, 1998.

Under local knowledge spillovers production and growth concentrate in few regions. The invention of a new idea reduces the costs of investment in R&D, but now in the region with the highest number of industries (highest stock of human capital). Thus R&D activities cluster in the region with the highest number of firms. Geographic proximity plays a relevant role because firms and research institutions can easily learn from each other. Within this framework, the rate of growth is expected to be higher the higher the level of industry concentration is. In this setting, the region which starts with less new ideas or human capital will have permanently lower income and expenditure, fewer firms in that location and therefore a lower growth rate.

In the context of the European integration (enlargement), some authors point out that potential entrant regions – even when they possess small differences (technological capacity, business environment) compared to the regions already integrated – may have the danger to end in the group of the peripheral regions (Walz 1995). Under this perspective, economic integration is seen as a polarisation force. However, there are studies which take the opposite point of view. This literature considered that economic integration by reducing the costs of trading goods and the costs of trading information supports the process of inter-regional learning spillovers across the territory and therefore economic integration is seen as an stabilising force (Baldwin; Forsild 1999).

5. Empirical Background and Discussion

In recent years, empirical studies have appeared with the aim to contrast the predictions of the new economic geography and endogenous growth theories. Particular attention has been paid to the European integration experience. Of great concern for policy makers is to find out if the benefits of this process are uneven distributed and if inequalities and divergences processes predominate. This section presents some of the empirical results.

I. European Integration Increases Divergences across Member States

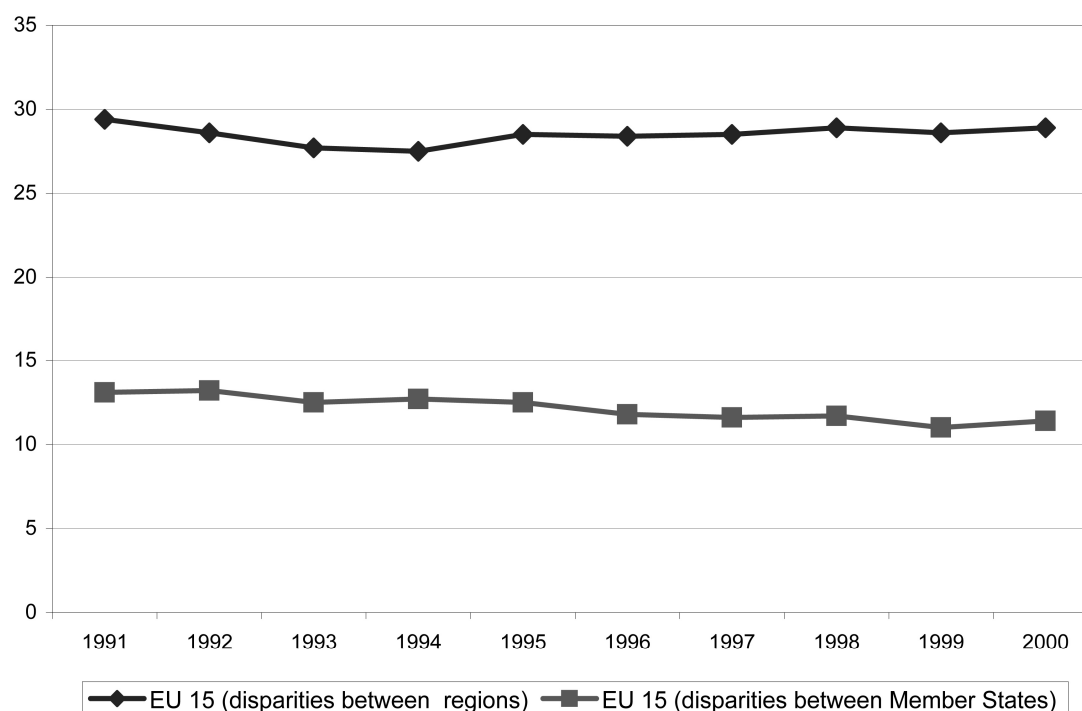
In the past years a catching up process has been observed across the Member States. Low income countries (countries in the periphery) like Ireland, Spain, Greece and Portugal have showed a positive income performance compared to the EU average income. The reduction of income disparities across Member States is product of this positive economic development. However, convergence in income per capita is less evident at the regional level. Some studies have found a low convergence across European regions. In fact, the disparities in income per capita between European regions has been higher than the disparities between Member States (see Figure 1).¹¹ At the same time empirical studies show that the disparities in income per capita inside the countries have tend to increase.¹² With this tendency, the structure of income disparities in the area is been determined by inequalities within countries rather than between them.¹³

¹¹ See the contributions of Dormard.

¹² European Commission (2000): EU Economy Review: Chapter 5 on “Regional convergence and catching-up in the EU”.

¹³ European Commission (1999): Sixth period report: Part 1 on “The Situation in the Regions.”

Figure 1: Disparities in GDP per capita (PPS), 1991-2000
(standard deviation EU-15=100)



Source: Eurostat

Explanations for this uneven performance have been related to the concentration of benefits in the high income regions (rich urban centres, capital cities). Esteban 1994 finds empirical evidence supporting this prediction. The author shows that for the period of 1980-1989 the high income regions in the low income countries (peripheral countries) were the ones who most benefit from economic integration. These regions acquired a better geographical location due to their access to the European market. The dynamic economic performance of these regions improved their position in the European ranking and favoured the reduction of inequalities across EU countries. Nevertheless, it seems that the rapid growth of these regions increased the income inequalities at the regional level inside these countries.

II. European Integration Increases the Concentration of Economic Activity

Until now, the empirical literature has been inconclusive respect to the effects of the European integration on the geographical concentration of economic activities. Some studies show that during the period of 1976-1989, geography concentration of industrial activity increased (Amiti 1998). The types of industries experiencing geographical concentration were found to be either those with high share of intermediate inputs in final production or with high economies of scale. Besides the positive correlation between economies of scale and industry concentration, it could have been shown, that concentration happened in the central countries of the European Union (Brülhart; Torstensson 1996). This last result was also found at the regional level of the EU.

Analysing the period of the nineties, other studies show a decrease in geography concentration of industrial production (Liikanen 1999). Particularly, some industries inten-

sive in research and qualified labour have decreased their geographical concentration (Aiginger et al. 1999). Countries classified as being in the periphery of the European Union like Finland and Ireland have been able to increase their share in these industries. In the case of Ireland, the presence of multinational firms have favoured the development of this industry. This seems to go in line with the endogenous growth literature which considers multinationals as an important mechanism for the diffusion of technology, skills and entrepreneurial capabilities.

III. European Integration tends to Favour the Core Countries at Expenses of the Peripheral Countries

Until now, no empirical evidence has been found supporting a core-periphery spatial structure of economic activities at the country level for the European Union. Not only the countries in the core with high income have taken advantage from European integration, also the countries in the periphery with low income have benefited. In general, it is observed that the Cohesion Countries have increased their share in manufacturing activity. (Midelfart et al. 2000). Some countries in the periphery of Europe have increased their share of labour intensive industries (e.g. Italy and Portugal), while others have attracted industries active in the high technology sector (e.g. Ireland and Finland). At the regional level, development in the European Union are mainly some empirical studies show that the regions which have experienced a slow economic middle income regions, old industrial regions as well as rural and geographically isolated areas.

6. Policy Implications of New Economic Geography and Endogenous Growth Theories

6.1 Objectives of Regional Policy

The main objective of regional policy of every nation is to improve the socio-economic environment at the local level. Especially of great interest is to foster the economic development of the regions lagging behind. According to the economic theory, the intervention of the government through regional policy is justified by two reasons. These are either because of efficiency considerations or because equity concerns. Following the neo-classic theory, it is expected that free markets yield to an efficient allocation of resources. However when market failures come into play, the efficiency and as a consequence the social desirable equilibrium will not be attained. To correct for market failures, the active involvement of the government is considered as necessary.

Even in markets where efficiency predominates, government interventions can be justified. This is the case when income per capita is uneven distributed. Under this perspective, it is considered that by overcoming regional disparities the welfare of a nation can be increased. In the case of the new economic geography and the endogenous growth theories, policy interventions are justified under distributive considerations. The analytical framework of both theories shows the risk of increases in regional disparities. Disparities which may be observed in the spatial distribution of economic activities, in income per capita and in growth rates. Therefore, if one of the priorities of the European Community is to have a territory without polarisation, the predictions derived from these theories may provide some of the basis to fight against this process.

6.2 Policy Implications of the New Economic Geography Theory

Parallel to the interest in developing models which explain the spatial effects of regional integration processes, recent studies reveal a concern towards their implications for re-

gional policy. Following the new economic geography literature, regional policy interventions are primarily justified under distributive considerations, because the new economic geography does not analyse or indicate market failures.

For instance, Lammers and Stiller (2000) explain that these disparities may appear when both transport cost and worker's regional preferences are low. Within this scenario, the income level of the periphery is lower than the income in the core and the economic disadvantage of the integration process concentrates on the immobile labour force. Krugman and Venables (1995) show that decreasing transport costs incentives firms to move from the periphery to the centre since the market size in the centre allows to exploit economies of scale. On the other hand, decreasing transport costs makes it possible to move from the centre to the periphery, since the periphery offers lower costs for the immobile factor and less competition pressures. Therefore, integration in terms of the Krugman-Venables model leads first to divergence and then to convergence.

As the models reveal, economic integration through changes in the level of trade costs (e.g. transport costs) modifies the incentives of location of factors of production and as a consequence the income level and the employment rates across countries and regions. Looking at the predictions of this line of research respect to possible increases in regional differences two main issues are relevant for regional policy:

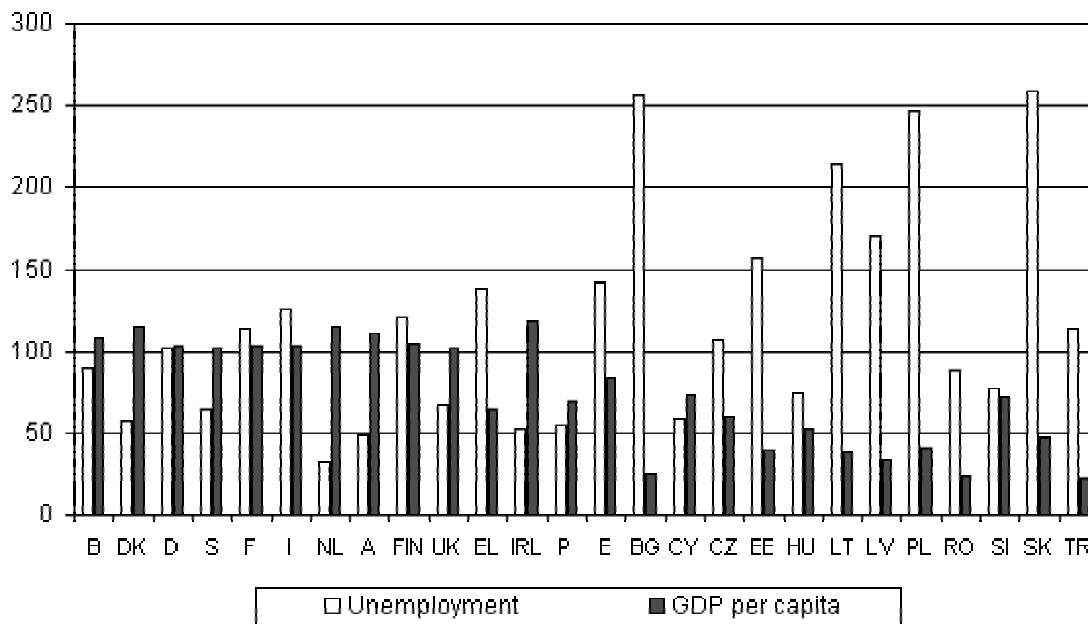
Regional policy should pay attention to the economic restructuring process. The non-monotonically relationship between industry concentration and transport costs highlights the potential transitional problems in which some European regions may be exposed. One of these transitional effects is in terms of employment. Regions suffering from the movement of industries, from industry decline or with inefficient industries are more vulnerable than other regions to increases in unemployment.

This complex environment will be accentuated with the accession of new countries since the number of old industrial areas as well as regions with a predominant agricultural base will increase. The European Enlargement will add other territorial dimensions, the east-west divide and the metropolitan-non metropolitan divide. Avoiding the widening of regional differences in terms of income and employment remain a great challenge to regional policy (see Figure 2). Within this scenario, measures supporting economic and social restructuring will continue to have a relevant role in regional policy.

Regional policy has primarily to rethink their infrastructure policies. Since the accession of Spain, Greece and Portugal in 1988, the European regional policy has paid special attention to transport infrastructure initiatives. This is because the fears towards increases in regional differences have been accentuated with the deepening of European integration. Fears which again appear because of the accession of the Central and Eastern European countries.

Traditionally improvements in transport infrastructure have been considered as a desirable policy measure to avoid income divergences. Having good transport networks is important for the well functioning of the regional economic environment. All economic agents gain from better transport connections since they can realise more efficiently their daily activities by confronting lower transactions costs (saving in travel time). At the same time, the regional productivity and capital inflows can be fostered allowing the recovery of the regional industrial base. Besides good transport, infrastructure facilitates trade between and within countries.

Figure 2: Unemployment rate (Unemployed persons as share of total active population) and GDP per capita (PPS) EU-15 and Candidate Countries 2001 (EU-15=100)



Source: Eurostat

Notwithstanding, as the regional science literature notes some caution need to be paid respect to transport infrastructure policies. In particular, the attempt to improve the economic environment in lagging regions by supporting transport infrastructure cannot be realised straight away. The attraction of capital inflows into lagging regions depends not only of the quantity and quality of transport facilities. There exist a wide range of factors which influence location decisions of the relative mobile firms. For instance, for firms the grade of substitution of inputs across regions matters. This means that the quality of the inputs and services supplied (human capital, communication facilities, financial services, research institutes) in the lagging regions need to be at least as good as the one offered to potential entrant firms in their actual location.

Recent new economic geography studies agree with this view. These studies highlight that contrary to the expectations, improvements in transport infrastructure in lagging regions may induce to more, rather than less, concentration of economic activities and therefore to increases in regional divergences (Martin; Rogers 1994). Some studies explain that when larger cities are better communicated, the cities in the centre gain better access to the rest of the regions, but the regions in the periphery gain access only towards the regions which are close to them. This type of location structure is known as a hub-and-spoke interconnection (Puga; Venables 1995). It is also emphasised that transport facilities like high speed railway lines, more than affecting industrial location, influences the location of business centres (Puga 2001).

Against this background a critical aspect which need to be taken into account is the spatial side effects that policy instruments have on international and inter-regional trade, industrial location and convergence, specially those strategies which pursuit to improve the transport networks (roads, airports, ports, high-speed trains). According to the new economic geography literature, it is not obvious that lower transport costs will promote convergence. Indeed this literature shows that the spatial equilibrium depends on par-

particular economic characteristics of the regions and on the type of infrastructure projects. This is a very important issue which must be deeply discussed since one of the main instruments of the actual EU regional policy is the improvement in public infrastructure.

6.3 Policy implications of the Endogenous Growth Theory

Following the growth theory, three fundamental implications are important for regional policy. First, the growth rate of less developed regions is higher than the growth rate of developed areas (and their regions convergence in terms of σ -convergence). Second, the growth rate of the per capital income increases as more the economy is far away from their steady-state equilibrium (β -convergence). Third, the growth rate depends exogenously on the rate of population growth and technical progress.

Against the background of the first proposition relatively homogenous (in terms of production functions, saving rates etc.) regions converge over the time and economic integration supports this process via factor mobility. Due to different agglomeration levels, saving and population growths rates, human capital qualification levels, technological levels, economical and political institutions, relatively heterogeneous regions do not converge in terms of σ -convergence, however β -convergence is still possible. Since regional policy tries to balance regional growth, their interventions in lagging regions try to change one of the above mentioned key factors. The West European Countries and their regions are converging in terms of β - and σ -convergence. Irrespective of this trend regional policy could be still justified by interest in balanced economic growth, while against the background of the neo-classical growth model policy interventions are not well founded by market failure.

Although the endogenous growth theory deals with market imperfections, knowledge spillovers etc., there is no systematic indication for regional policy to prevent market failure. However, if agglomeration externalities, increasing economies of scale and knowledge spillovers exist, the scepticism of regional economics about the convergence mechanism is well justified. In particular the regional growth effects of product and factor mobility are not generally predictable and the results depend on specific assumptions or circumstances. Nevertheless, it seems almost certain that the political and economical gains from integration exist and the endogenous growth theory offers no arguments to stop the integration process. Therefore, regional policy is still designed to support sustainable economic growth across the European territory. But against the background of the economic theory of growth we have to rethink our regional policy approach. This leads to the question, what does divergence in regional growth cause?

It makes still sense to reduce capital costs in regions with growth deficits, to make them more attractive for investors. However, not always a deficit of private capital primarily causes underdevelopment. It is difficult to identify the specific regional bottlenecks. Do regions have a lack in product innovation or is the production process inefficient? Do they have wages above the marginal productivity etc?

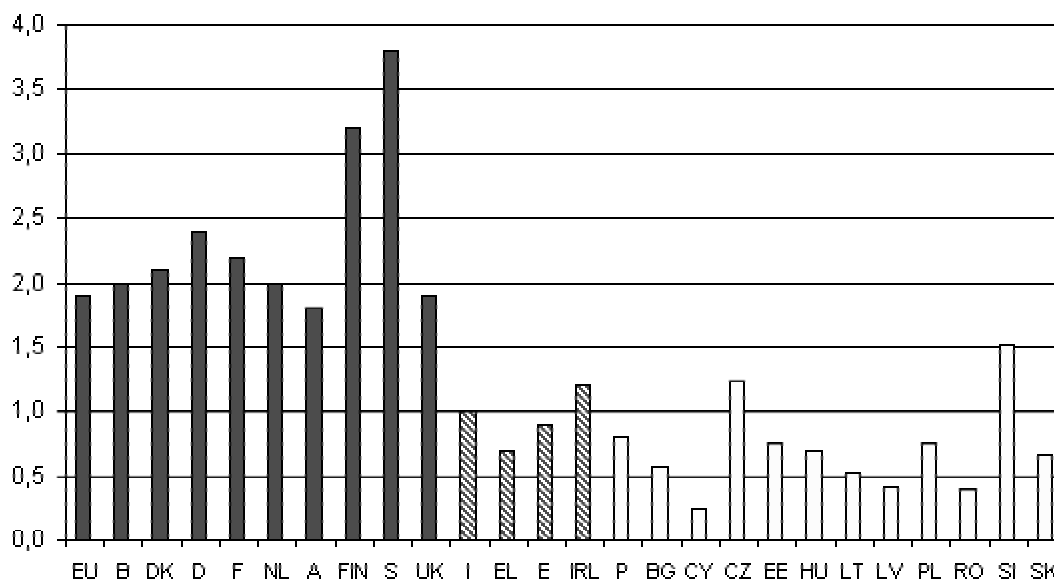
It is still necessary to improve the public infrastructure investments and public initiatives for regional development strategies, as well as qualification measures for the labour force.

The endogenous growth theory emphasises the role of knowledge for economic development. Tacit knowledge tends to increase divergence (if labour is immobile), meanwhile codified and interregional available knowledge decreases divergence. Therefore regional policy should try on one hand to reduce communication and imitation costs, because this improves the competitiveness of the entire territory. It should be also analysed the knowledge transfer via products, capital and labour mobility.

■ **Lessons for Regional Policy from the New Economic Geography and the Endogenous Growth Theory**

Regional policy should promote the power to innovate, because innovation has a key role in determining the competitiveness of a nation as well as its output growth. Within the European Union the expenditure in research and development is very low, there is an insufficient level of human capital involved in research activities and there is also a lack of co-operation among actors (see Figure 3). All these factors provide an unfavourable environment for innovation promotion. In particular the regional policy approach has to keep in mind the basic results of the new industrial economics and the regional specialisation and network theory (see the Contributions of Cappellin, Rollet).

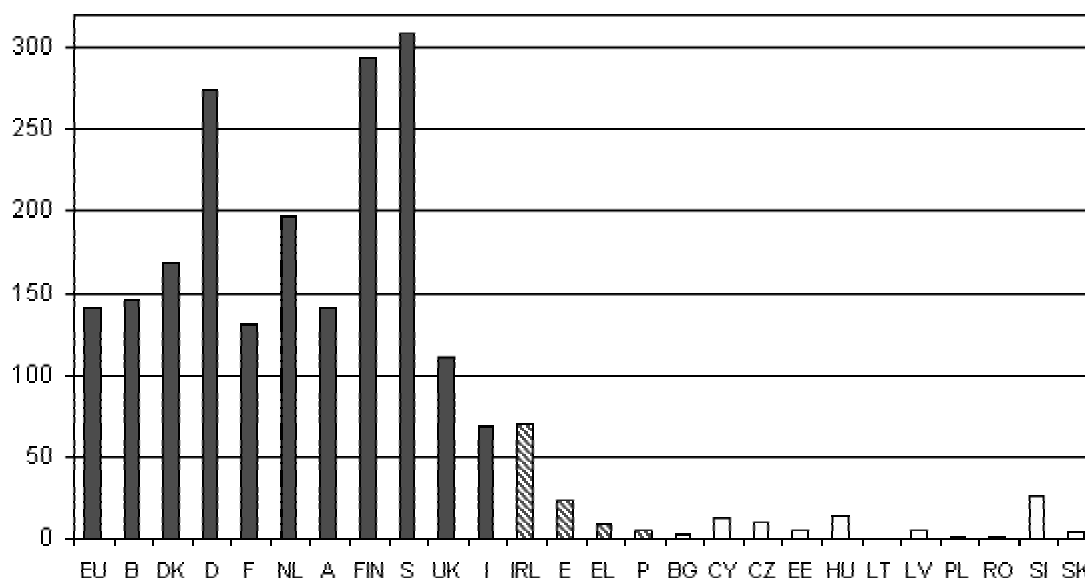
Figure 3: R&D expenditure as a% of GDP EU-15 and Candidate Countries, 1999



Source: Eurostat

Considering the EU experience, there exists a clear uneven distribution of innovation across countries and regions (see Figure 4). The production of innovation and indeed the location of research centres and industry are concentrated in few regions. Different policy measures have been suggested with the aim to reduce the concentration of leading knowledge, some of them are: development of an infant-region policy (Walz 1995), provision of subsidies for universities, promotion of technical colleges and high-technological industrial parks (Baldwin; Forsild 1999); support to increase the ability of the periphery to assimilate the knowledge created in the core (Currie et al. 1996) and the development of innovative strategies (Cooke et al. 2000). However, it should also keep in mind that to encourage the growth performance across a territory, it is necessary to complement these strategies with an adequate institutional framework. Particularly the conditions offer in the labour market are critical to determine whether or not individuals continue with training activities, acquiring new knowledge and skills.

Figure 4: European Patent application per million inhabitants EU-15 and Candidate Countries, 1999



Source: Eurostat

Within the current international environment the innovative capacity has a relevant role in the economic development of regions and countries. Under this scenario, the role of regional policy should not only be the distribution of welfare, it should be a spatial regional policy with an innovative perspective. A key challenge of the EU regional policy is to promote the regional innovative capacity of the entire territory. Particularly, the endogenous capabilities of regions need to be fostered in order to enhance their competitiveness. They need to be able to adjust their socio-economic institutional structure to rapid economic and political changes and learn to work in a co-operative way. Ignoring these aspects will reduce the power of regional policy to attain social and economic cohesion across the European territory.

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