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Centre-Periphery and Specialization in the E. U.: An Analysis From a New Economic Geography Perspective

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Centre-Periphery and specialization in the E.U.: An analysis from a New Economic Geography Perspective

H. Caraveli and J. Darzentas*

ABSTRACT

This paper attempts an assessment of a number of basic statistical indicators of EU regions and countries from a New Economic Geography (NEG) perspective. After a brief overview of the underlying theoretical framework, two important hypotheses of NEG's theoretical models are examined for the case of EU regions: (a) the existence of a center-periphery pattern, with the use of indicators measuring the "home market effect"; (b) the existence of Marshall-type "economies of localization", as well as of "dynamic external economies", on the basis of "knowledge-intensive" and "human capital" indicators. This analysis takes place on a regional scale. An assessment of the evolution of specialization in EU countries is also undertaken with the use of an index of "regional specialization". The analysis provides clear indications that, the deepening of European integration led to both phenomena described by NEG models: (a) the strengthening of two types of concentrations – "the enlargement of the home market" and "local external economies" - in the traditional industrial centres of the EU; (b) an increase in the degree of specialization of its member-states. Policy implications point to the strengthening of factors that could lead to the development of new dynamic centres in peripheral EU regions.

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1. Introduction

The widening income disparities among EU regions since the mid' 1980s, led to an intense debate on the impacts of increased economic integration, on a regional or global scale (in the latter case, of globalization) on regional growth rates of members or non-members of a regional trading block. On a theoretical level, this phenomenon has led to the revival of older theories on economic development, convergence and divergence, mainly within the framework of two strands of thought (or theoretical approaches): *the new growth theory* (NGT) and the *new economic geography* (NEG), also known as *new location theory*.

This paper attempts the interpretation of some basic statistics of EU countries or regions, from a NEG perspective. First, the validity of a basic hypothesis underlying NEG's models is examined for the case of EU regions: the existence of a centre-periphery pattern within the framework of a more or less integrated economy. Its assessment is based on the observation of two important, in this analysis, underlying factors: (a) the "home market effect" and (b) the "local external economies" (of the Marshall-type), as well as the "dynamic external economies" effect (defined by knowledge-intensive or human capital variables). Second, the evolution of the degree of specialization of EU countries is assessed with the use of a "regional specialization" index.

The theoretical framework of the analysis, which determines the methodology adopted, is described in the next section, through a brief review of the insights and assumptions of the general NEG model. The third part of the paper presents the data used to measure the model's determining variables, in order to examine the existence of "economies of agglomeration" or "economies of localization" in the EU. The fourth part explains the "specialization index" and presents the results of its application in the case of selected EU countries. Finally, the last part draws the conclusions and refers to policy implications.

2. The theoretical framework: A brief Review

New Economic Geography (NEG), which appeared in the beginning of the '90s, could be defined as the study of location of production¹ under conditions of increasing economic integration on a regional or global scale² (in the latter case of globalisation) and imperfectly competitive market structures. NEG is, in particular, focused on the tendency of economic activity to cluster in space and form big agglomerations, which lead to the creation of central and peripheral areas, thus, to unequal development or diverging income patterns. Within this

¹ This is why it is also known as *New Location Theory*.

²In the same decade, the formation of "regional trading blocks" was accelerated: In 1993, the Maastricht Treaty, or Treaty of the European Union, was set in operation, aiming at the further deepening of the EU economic and political integration. In 1994, NAFTA was set in operation, aimed at the integration of the North American market, as well as at its expansion to South American countries, to create a Free Trade Area of the Americas by 2005. In 1995, another Treaty of South American countries was set in, Mercosur, which was considered as the most important sub-regional agreement among Latin American countries. At the same time, two other important regional organizations were strengthened, the ASEAN and the APEC, both in southeastern Asia, through their expansion to include new countries (Caraveli, 2005).

framework, it also examines the conditions under which economies can converge in real income and general welfare terms. NEG then contains elements of older or contemporary theories on location (which form part of the so-called *urban and regional economics*³) and growth. The recent theory on growth, known as the *new growth theory* (NGT), was formulated in the '80s, aiming at contributing to the theoretical investigation of regional income convergence and divergence. NEG also contains elements of the new theory of international trade, known as the *new trade theory* (NTT), which is based on the theories of industrial organization, developed in the '70s and '80s (Krugman, 1991a,b) aimed at introducing the assumption of imperfect competition in the traditional analysis of international trade. We could say that the theoretical contribution of economic geography, which renders it a new field of economics, is the application of tools provided by the recent theories of international trade and industrial organization on the traditional location theory, with the purpose of constructing a general equilibrium model in the field of *spatial economics*.

The new version of economic geography is associated with the names of P. Krugman and A. Venables, and, in particular, with the following works: Krugman 1991a,b,c & 1993a,b; Krugman & Venables 1990; Krugman & Venables 1995, 1996; Venables 1995, 1996; Fujita & Krugman 1995; Krugman 1998; Fujita, Krugman & Venables 1999. These are only part of the rich bibliography on the subject.

According to NEG's theorists, all previous theoretical analyses related to the economics of location lacked the microeconomics foundation, which would allow them to study the market structures leading to specific spatial formations (Krugman, 1993a,b, 1998; Fujita et al, 1999; Junius, 1999). This implies that these analyses lacked the theoretical tools and assumptions required to study spatial issues, which is why such issues were neglected in the framework of conventional economic theory.

The basic determinants in NEG's theoretical model are *trade costs* and *economies of scale*, which are used in a general equilibrium framework as endogenous factors. The underlying assumption is that the spatial distribution of industrial production results from the interaction between economies of scale in the central region and interregional trade costs involved in the transfer of goods. Trade costs include both transport costs and other obstacles to free trade (e.g. tariffs or quantitative obstacles) and they are diminished with the deepening of economic integration among regions. Thus, the impact of economic integration in the location of industry is the central issue of NEG's models.

With high trade costs, i.e. a low degree of regional interaction, firms choose to sacrifice economies of scale in order to save (trade) costs, by locating on a peripheral area and serve its local market. A spatial structure then appears, in

³ The first model of spatial distribution of economic activity was Von Thünen's *Isolated State* (1826). This model has formed the basis for the prevailing urban & regional economic theory. Geographical models, like Christaller's "Central Place theory" (1933) and Lösch's urban model (1940), were based on the observation that cities form a hierarchy of "central places" and the assumption that the distribution of economic activities in space is a function of different degrees of economies of scale. Economic development theories of the 1950s and 1960s – e.g. those of Myrdal (1957), Perroux (1955) and Hirschman (1958) – used conceptions and terms also appearing in NEG's models, like *cumulative cyclical causation* (a term associated with Myrdal) and *forward & backward linkages* (terms introduced by Hirschman).

which both regions produce industrial goods, in strict analogy to their population. For zero trade costs (obviously corresponding to an advanced stage of economic integration), location does not matter and any spatial structure can appear. For intermediate levels of trade costs (denoting intermediate levels of economic integration, like that which the EU is currently facing), concentrating production in one region offsets transport costs to distant markets and results in lower overall costs. Therefore, the emerging spatial organization favours the regional concentration of firms and the creation of a center-periphery pattern. When the ‘central’ region corresponds to an urban center (e.g. a large metropolis), this analysis refers to the formation and evolution of cities.

NEG’s models include both types of economies of scale: *internal* and *external* economies of scale, both leading to *economies of agglomeration*. Internal economies (or increasing returns) to scale induce the location in large markets, which concentrate a *critical mass* of business and consumers. This corresponds to the “home market effect”, which reflects “backward linkages”, or demand linkages: a high demand for an industry’s product will induce a relatively higher increase in this industry’s regional production *ceteris paribus* (Krugman, 1998), thus, also to higher real wages and levels of employment. The concentration of a *critical mass* (or a sufficient number) of producers in a particular region results in the concentration of a substantial number of producers of specialized inputs, or of non-tradable producer services, in this region. This corresponds to “forward linkages” or cost linkages: the high availability of inputs in a single market area implies lower costs for final producers. The overall cumulative process leads to a bigger variety of goods⁴ and to higher levels of welfare. The concentration of industry can also support a large local labour market, especially of skilled labour, and lead to *technological external economies*, through which knowledge-spillovers take place. These three elements associated with the geographical clustering of economic activity (demand and cost linkages, a large market (pool) of skilled labour and knowledge or information spillovers) correspond to Marshall’s three sources of local external economies (Marshall, 1920), known in the literature as *economies of localisation*.

Thus, internal economies of scale cause the emergence of external economies of scale, which lead economic units to cluster in space, strengthening the tendency toward agglomeration. The cumulative process of industry location has therefore a circular character, resulting in a center-periphery pattern and diverging rates of growth. Historical factors (“history” according to Krugman) can play a very important role in this framework. Such factors correspond to favourable *initial conditions*, which give the region a *head start*. The total of “forces” leading to the clustering of activity in space (*centripetal forces*) can be offset at a certain stage of agglomeration by “forces” working to the opposite direction (*centrifugal forces*), leading firms and workers to move away from the central area. Such forces are the rise in land prices (as demand for limited land increases) and “pure external diseconomies”, like atmospheric pollution and congestion. Moreover, demand from “immobile factors”⁵ can be so important as to “pull” businesses towards a distant location, where the majority of such factors are found. In this location, called the “periphery”, competition between firms for sales in the local market is less intense than in the

⁴ Variety of goods is implied in the assumption of “product differentiation”, an important assumption of imperfectly competitive market models.

⁵ “Immobile factors” of production are land, natural resources and unskilled labour (usually farm labour). Demand from these factors naturally comes from farm labourers.

centre. This corresponds to the so-called “competition effect”, which is higher in higher levels of trade costs. Thus, a firm’s location decision depends on whether centripetal or centrifugal forces will prevail.

The NEG’s theoretical framework describes the world’s division into an industrial center and a rural periphery, when applied to a global scale, while it corresponds to all the views expressed in the public debate on “globalisation”, which, in the model, are simply different stages in the process of economic integration. At a mature stage of economic integration (the case of zero trade costs), there will be convergence in the rates of growth and levels of development among central and peripheral regions. This observation is in accordance with both the arguments for further market integration through trade and foreign direct investment, and the assumptions of the conventional neoclassical model.

This theoretical framework also explains regional specialization: initially, the center specializes in industrial production and the periphery in agricultural production. At a more advanced level of economic integration, however, which corresponds to a higher level of economic development, regions can specialize in different industrial products. In NEG’s models, demand and cost linkages, as well as “economies of localization” constitute prerequisites for industrial specialisation.

It is generally accepted, that the creation of new fields in economics follows three stages (Junius, 1999): The first is the formation of a theory; the second is the empirical testing of the new theory; the third is drawing conclusions and policy implications. We assume that NEG, being a relatively new field of economics, is found somewhere between the first and the second stage of its life cycle. However, as far as both empirical research and policy formulation are concerned, NEG’s contribution is still very limited (or non-existent). There have been however some recent efforts to derive policy guidelines from NEG’s models. As these models imply that the geographical distribution of economic activities is endogenous to most policy interventions, they also imply that most policy measures have “regional-side” effects. Thus, competition policy, by reducing the market power of firms, would lead to a more balanced distribution of firms. The models moreover imply that regional policies would become more efficient with economic integration, which increases the number of “footloose” or mobile firms (OTTAVIANO, 2003).

On the other hand, **NTT** – directly related to NEG – is already offered for the formulation of *trade policy* options (Helpman and Krugman 1992, 1996, Krugman 1996). An important question within the framework of this analysis is, if under imperfectly competitive market conditions, a *strategic trade policy* is justified, on the grounds that it can bring *strategic benefits*⁶. Such “benefits” include the creation of favourable conditions in one region (or country) - through, for example, protecting local industrial production - which could offset the trade superiority of another region, thus causing a reallocation of economic activity and growth.

Furthermore, a number of recent models combining NEG with NGT provide arguments in favour of policy measures, which could strengthen or reverse trends toward concentration in a specific region. This theoretical approach stresses the link between degree of concentration of economic activities and growth, with particular emphasis in the importance of human capital for the creation of circular cumulative

⁶ In the theory of industrial organization, a strategic move by one firm can have the effect of discouraging prospective competitors to enter the market (Helpman and Krugman, 1992).

growth processes in one region. The accumulation of knowledge, or “learning”, corresponding to “dynamic learning economies”, is perhaps the most important source of technological change, which is a process of increasing returns, taking place in imperfectly competitive markets. *Technological* or *knowledge spillovers* can strengthen concentration trends in a particular region, leading to specialization patterns, which offer the region an important competitive advantage in the long run (Baldwin, 1992, 1999, Krugman, 1996, Martin και Ottaviano, 1999). The new or endogenous growth models then clearly offer support for the argument that investment in R&D and education can induce technological change and “endogenous growth” in a region. This implies that the diffusion of knowledge (or the technological diffusion) among regions with different innovating capacity (and growth levels) in the course of economic integration (which fosters trade in goods incorporating new technology and capital movements), through the proper regional or other type policies, could be an important mechanism for the reallocation of industrial activity in the longer run and of regional income convergence.

Obviously, new theoretical methods and empirical works appear in the literature, but a lot more are required to draw the proper conclusions for economic policy.

3. Indications of “concentration” and “localisation” in the EU

Tables 1 to 3 offer clear indications for the existence of a strong *center-periphery pattern*, as well as of *economies of localisation* and *dynamic external economies* in EU regions.

TABLE 1
Indications for the *home market effect* in EU regions

REGIONS	Per capita GDP as a percentage of the EU average, 1999	Percentage of employment, 1998
CENTRAL		
BRUSSELS	221	51.2
STUTTGURD	140	60.8
OBERBAYERN	161	62.7
DÜSSELDORF	128	53.5
ILE DE FRANCE	163	61.3
PAIS DE LA LOIRE	92	56.8
SOUTHERN NETHERLANDS	116	61.4
INNER LONDON	260	61.7
DENMARK	144	65.1
STOCKHOLM	159	72.3
BERLIN	106	60.7
DRESDEN	76	59.7
RHONE- ALPES	108	57.2
PROVENCE- ALPES- COTE D' AZUR	96	53.1
VENETO	106	51.1

LATIO	101	47.1
VIENNA	155	60.7
EAST SCOTLAND	109	63.4
NON-CENTRAL		
ATTICA (GREECE)	59	51.1
MADRID	91	51.5
ANDALUCIA	49	47.6
SICILY	112	:
IRELAND	58	41.9
LISBOA E VALE DI TEJO	69	58.7
CENTRO	39	65.2

SOURCE: (a) EUROSTAT 2002; (b) STATISTICS IN FOCUS & EUROSTAT 2002; (c) STATISTICAL YEARBOOK FOR THE REGIONS.

In Table 1, GDP per capita and level of employment are used as proxies for the “home market effect”, which leads to a cumulative process of economic activity and population clustering. The comparison of these indicators between central and non-central or peripheral regions in 1999 reveals greater concentration in regions, where the traditional economic centres of Europe are found. Central regions include STOKHOLM and EAST SCOTLAND, despite their non-central geographical position. Thus, the higher values of indicators appear in the regions of BRUSSELS, ILE DE FRANCE, INNER LONDON, and STOKHOLM, followed by other central areas. IRELAND also shows a high GDP per capita, despite its peripheral geographic location.

Table 2 reveals a similar pattern, by showing the correlation between geographical clustering of economic activity and population with the density of the transport network (klm/klm²) in EU regions. Clearly, the density of the road network (measured by klm/klm²) in central areas, which include the dynamic urban centres (BRUSSELS, LONDON, VIENNA) is by far greater than the corresponding indicator in peripheral areas. This confirms the suggestion that “transports are characterized by economies of scale” (Krugman, 1991a,b). Therefore, firms that choose to locate in central regions have better access in all regions (including peripheral regions).

TABLE 2
Indications for the *home market effect* in EU regions

ROAD NETWORK (klm/klm²)	
CENTRAL REGIONS	
BRUSSELS	10.10
GERMANY	1.79
SOUTHERN NETHERLANDS	3.96
LONDON	8.46
VIENNA	6.57
EAST SCOTLAND	0.34
SOUTHWESTERN SCOTLAND	0.88
NON-CENTRAL REGIONS	

IPIROS	0.33
ATTICA	0.37
NORTHERN AEGEAN	0.35
ARAGONIA	0.21
MADRID	0.42
ANDALUCIA	0.28
CENTRO	0.92
LISBOA E VALE DI TEJO	0.95

SOURCE: (a) EUROSTAT 1997; (b) STATISTICS IN FOCUS.

In table 3, employment in “knowledge-intensive” sectors and patents are considered as an indication of Marshall-type external economies, or economies of localisation, in the sense that they induce the diffusion of knowledge, thus, also the clustering of firms in the regions with the higher values of these indicators. It appears that this type of external economies, which also reveal regional specialisation and differentiation, characterise again central regions: Brussels, London and Stockholm (with a clear head of Stockholm), Ile de France, Southern Netherlands, Denmark, Berlin, Vienna and East Scotland.

TABLE 3

Indications of local and dynamic external economies in EU regions

REGIONS	Employment in “knowledge- intensive” sectors, 1998 (%)	No. of patents per 1000 inhabitants, 1998	Percentage of population with higher education, 1997
CENTRAL			
BRUSSELS	45.91	157.31	33
STUTTGURD	28.40	555.01	23
OBERBAYERN	33.36	622.83	27
DÜSSELDORF	29.19	291.35	17
ILE DE FRANCE	43.45	263.60	28
PAIS DE LA LOIRE	29.68	51.72	15
SOUTHERN NETHERLANDS	41.49	137.84	21
LONDON	48.40	82.35	29
VIENNA	40.05	129.49	14
EAST SCOTLAND	40.12	91.00	22
DENMARK	40.63	139.71	29
BERLIN	40.35	148.38	32
HALLE	26.06	49.74	28
RHONE- ALPES	33.36	212.73	21
PROVENCE- ALPES- COTE D' AZUR	36.56	89.53	16
STOCKHOLM	52.33	538.41	38
FRIULI- VENEZIA GIULIA	24.29	100.82	7
NON-CENTRAL			
LATIO	32.82	43.40	12
ATTICA	29.59	14.16	21
MADRID	33.52	31.18	26
ANDALUCIA	23.70	5.72	15
IRELAND	30.00	55.21	23
SICILY	29.07	12.28	8
CENTRO	14.69	2.57	9
LISBOA E VALE DI TEJO	24.70	3.77	16

SOURCES: (a) EUROSTAT, 2002.; (b) STATISTICAL YEARBOOK FOR THE REGIONS; (c) EUROSTAT 1997, EDUCATION ACROSS THE EUROPEAN UNION, STATISTICS AND INDICATORS.

The same variables, in combination with the “Percentage of population with higher education”, also given in Table 3 for 1997, and used as a “human capital” indicator, can be considered as an indication of dynamic external economies, which have similar effects with localization economies.

Given that services infrastructure is a prerequisite for any type of economic activity concentration, especially on a local scale, a high proportion of services in a regional economy is probably an indication of strong economies of localisation. To this fact we must add the observation that a great part of contemporary high tech industries have more the characteristics of services rather than those of industries, in the traditional sense (Krugman, 1991a,b, 1998). These arguments are in accordance with the sectoral structure of employment in the EU on a regional scale, shown in Table 1 of the Appendix.

3. The pattern of specialization in the EU

To examine the evolution to the degree of industrial specialization and differentiation in EU countries, we applied an indicator of “regional specialization” or “national deviation” in pairs of selected EU countries: France, Germany and the UK were chosen as representatives of the traditional industrial center of Europe, whereas Italy, as a country of the European South, with a relatively developed industrial sector in its northern part though (thus not so representative of Southern countries⁷). The same indicator was used by Krugman (1991a) to compare the degree of industrial specialization between US states and EU countries. This indicator, which can be denoted as I , is a combination of the indices Hirschman-Herfindahl (which measures the degree of spatial concentration of a particular industrial sector) and Duranton-Puga (which measures the degree of regional specialization and differentiation)⁸, takes the following form:

$$I = \sum_i |s_i - s_i^*|$$

Where:

s_i = the share of industrial sector i in total industrial employment in a country or region;

s_i^* = the share of the same industrial sector in total industrial employment of another country or region.

Therefore, I equals the sum of the absolute value of the difference of the two shares referred above. This means that if two countries have similar industrial structures, then for every “ i ”, we will have $s_i = s_i^*$, or $I = 0$. If, on the other hand, the two regions have completely unrelated industrial structure, then $I = 2$, since each region will comprise the whole of industrial employment, i.e. its share will be equal to 1 (so that $1+1 = 2$). High values of this indicator point to a high regional specialization and differentiation.

⁷ The reason for this choice is data availability.

⁸ The two indices are referred in Macann (2002), chapter 3.

The results of the estimates of I for 6 pairs of EU countries in three time periods (1970, 1980, 1995) appear in Table 5.

TABLE 5
Indicators * of industrial specialization in selected EU countries

	1970	1980	1995
FRANCE-GERMANY	0,19	0,18	0,19
FRANCE-UK	0,14	0,14	0,21
GERMANY-UK	0,16	0,13	0,22
ITALY-FRANCE	0,25	0,3	0,42
ITALY-GERMANY	0,32	0,37	0,48
ITALY-UK	0,35	0,27	0,33

*Indicator I

Source: Own calculation in Eurostat data (see Appendix, Table 2)

The general trend denotes an increase in specialization over the years, both between countries belonging to the industrial center of the EU (France-UK and Germany- UK), and between Italy and central countries (France, Germany), with more marked results in the second case. The higher degree of specialization between Italy and central countries, relatively to the pairs among central countries, is also evident when comparing I “vertically”, for example in year 1995. A sectoral analysis of industrial employment in the EU, by member-state, appears in Table 2 of the Appendix. This analysis reveals a “center-periphery” pattern, in which the selected central countries (Germany, France, UK) are superior in heavy industry, as well as in high-tech industrial sectors (office equipment and electric machines), whereas Italy is superior in light, labour-intensive industry (e.g. textiles). The evolution of this industrial structure between 1970 and 1995 confirms the above pattern, as well as the results of applying index I.

These results imply, on the one hand, greater “polarization” in industrial specialization between the North and the South, i.e. a strengthening of the existing industrial pattern, and, on the other hand, the emergence of new industrial centres, in regions of Southern (and eventually of Eastern) Europe (like the “Third Italy”, or regions in Southern France and Northern Spain), with the parallel decline of old industrial centres of central and Northern Europe. The first case represents a rather negative result as far as income levels and welfare of people in Southern Europe. The second case represents a positive development, since it leads to the creation of “multiple centres” in the single European economy, and therefore, to the perspective of regional income convergence. Many more years of economic integration in the EU should elapse to determine if the first or the second tendency will prevail

3. Conclusions and further considerations

This paper attempted an interpretation of a number of EU statistics, from a new Economic Geography perspective.

In the first place, an assessment of the existence of a *center-periphery pattern* in the EU was undertaken, with the use of GDP per capita and employment indices – which were used as proxies for the “home market effect”. The comparison of these indices among regions offers clear indications for greater concentration in regions that comprise the traditional industrial centres of EU-15.

Next, an assessment of the existence of *localization economies* and *dynamic external economies* in EU-15 regions was attempted. The comparison of indices measuring *knowledge-intensive* variables and *patents* - considered as an indication of Marshall-type local external economies, or economies of localization, and reflecting regional specialization and differentiation – reveals again concentration of these variables in central EU regions: Brussels, London and Stockholm (with Stockholm being ahead of the others), followed by Ile de France, Southern Netherlands, Denmark, Berlin, Vienna and East Scotland. The same variables, in combination with a “human capital” indicator can be considered as an indication of dynamic external economies, which have similar impacts with localization economies.

We can then generally conclude, that the deepening of the integration process in the EU-15, after the 1993 Single Market Programme, led to the maintenance or strengthening of “concentration” trends in regions comprising the traditional industrial centres of the EU, thus the maintenance or strengthening of a *center-periphery pattern*. This is reflected in both the growth of the *home market* and the existence of *localisation economies*, as well as *dynamic external economies* in these centres. Our conclusions converge with those of the empirical study of Caraveli et al. (2005), which shows that the unequal distribution of “knowledge-intensive variables” (with the exception of employment in high-tech sectors) contributes to the maintenance of the center-periphery pattern in the EU.

Concerning the degree of specialisation, our results confirm a possible scenario of Krugman (1991b,c) and Krugman & Venables (1996): the rise in the degree of economic integration in the EU market leads to an increase in the degree of specialization and differentiation on a regional and country level, following the pattern of the US economy. This implies two parallel, though opposite developments: on the one hand, a greater polarisation between the North and the South, and, on the other, the creation of new industrial centres in regions of Southern and Eastern Europe, with the parallel decline of old centres in the traditional industrial core of the EU. Yet, the questions posed by the two important economists remain: where will the industrial clusters in Europe of the 21st century take place? In other words, in which European country will Silicon Valley or Wall Street be formed? And will the formation of such clustering raise the overall welfare of European economy? Finally, during the adjustment process, will there be one or more European centres (one or more *equilibria*, in the NEG terminology)? Answering these questions will be complete after many more years of EU integration, while the evidence presented in this paper is likely to be substantially differentiated when the impacts of the latest enlargement are felt.

Proposals for the most suitable economic policy for EU peripheral areas, resulting from the above analysis, point to the strengthening of factors leading to (or encouraging) the formation of new dynamic development centres in peripheral EU regions. Such factors are knowledge-intensive variables, the diffusion of which can

take place either through a more “dynamic” regional policy, or through other policies, indirectly affecting regional development.

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APPENDIX

TABLE 1

**Percentage Structure of Employment by Sector of Production in EU Regions,
1995**

REGIONS	AGRICULTURE	INDUSTRY	SERVICES
CENTRAL			
BRUSSELS	0.1	15.8	84.1
STUTTGURD	2.7	44.6	52.7
OBERBAYERN	3.7	31.8	64.5
DÜSSELDORF	1.7	34.6	63.7
ILE DE FRANCE	0.5	20.9	78.6
PAIS DE LA LOIRE	8.1	32.6	59.4
SOUTHERN NETHERLANDS	3.4	18.6	78.1
SOUTH-EAST LONDON	0.9	22.1	77.0
DENMARK	4.4	27.1	68.5
BERLIN	0.8	24.8	74.4
BRADENBURG	4.4	35.6	60
RHONE- ALPES	4.3	31.8	64.0
PROVENCE- ALPES- COTE D' AZUR	2.8	19.6	77.5
LATIO	4.6	20.5	74.8
STOCKHOLM	0.6	17.6	81.8
BIENNH	0.6	25.6	73.9
VENETO	6.0	40.5	53.5
NON-CENTRAL			
SCOTLAND	2.7	26.3	71.0
ATTICA	1.1	26.9	72.0
MADRID	0.9	25.4	73.2
ANDALUCIA	12.0	22.7	65.3
IRELAND	12	27.8	60.2
SICILY	13.2	18.4	68.4
LISBOA E VALE DI TEJO	3.1	25.7	71.2
CENTRO	23.9	31.1	45.0

SOURCE: STATISTICS IN FOCUS, REGIONS, EUROPEAN LABOUR FORCE SURVEY, 1996.

TABLE 2**EVOLUTION OF THE PERCENTAGE STRUCTURE OF EMPLOYMENT BY INDUSTRIAL SECTOR IN SELECTED EU COUNTRIES, 1970-1995**

	GERMANY			FRANCE			ITALY			UNITED KINGDOM		
	1970	1980	1995	1970	1980	1995	1970	1980	1995	1970	1980	1995
Ferrous and non ferrous ores and metals	5,2	4,3	2,6	4,9	4,5	3	4,2	3,9	2,8	:	:	:
Manuf of other non metallic mineral products	4,9	4,6	4,1	5,3	4,9	4,4	7,4	6,4	6,9	:	:	:
Chemical products	5,5	6,2	6,3	5,7	6,1	7	5,6	5,3	5,5	5	6,2	6,1
Products apart from machinery	10,9	10,9	11,2	10,2	9,8	9,8	9,8	11	10,4	7,5	11,3	10,6
Machinery and equipment	12,3	12,4	12,9	8,7	8,5	8	7	8,5	8,9	14,8	10,7	10,1
Office equipment	3,2	3,5	3,8	2	2,2	2,8	1,7	1,8	1,9	2,8	4,5	5
Electrical equipment	11,9	12	12,7	8,1	9,7	10,7	6,5	7,1	6,8	9,8	7	7,2
Transport equipment	7,2	10,4	11,6	11,7	13,4	12,5	7,1	7,6	6,3	11,2	11,4	8,6
Food products	9,9	10	10	10,8	10,9	13,5	7,9	7,4	7,8	9,6	10,3	10,9
Manuf of textiles	13,2	8,9	4,6	16,5	12,7	8,2	24,9	22,9	23	13,5	11,9	9,7
Manuf of paper, publishing and printing	6	7,3	9	6,4	6,4	8,2	4,6	4,8	5,3	7,5	8	11,5
Manuf of rubber and plastic products	3,8	3,8	5,1	3,4	4,1	5,1	3,2	3,7	4,2	3,2	3,8	5,7

Source: EUROSTAT, National Accounts ESA, 1970-1995.