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## ARTÍCULOS









## **Delocation in the manufacturing sectors in the EU. A regional overview**

M.<sup>a</sup> Elisa Álvarez López \*, Rafael Myro Sánchez \*\* y Josefa Vega Crespo \*

**ABSTRACT:** The question of delocation in main industrial regions across the EU is approached here, and its effects on job losses estimated. Seventy five regions are selected following the double criteria of size of the manufacturing industries and high per capita income levels. Delocation affected half of them in the period 2000-2005 when competition in the international markets rose and is of higher intensity in most of the British, French and Italian regions although its aggregate effect on employment seems to have been offset by growth in the other sectors. On the other hand, regions located in the continental area with more market potential have the highest concentration of location effects. Therefore delocation has changed the location of European manufacturing industry, benefitting those latter regions and perhaps bringing higher spatial concentration.

**JEL Classification:** L6, R3, O4.

**Keywords:** manufacturing industry, delocation, regions, European Union.

### **Deslocalización en los sectores manufactureros de la UE. Un panorama regional**

**RESUMEN:** En este trabajo se evalúa la incidencia de la deslocalización, en términos de empleo afectado, en las principales regiones industriales de la Unión Europea, confrontando lo ocurrido en cada una de ellas con lo acontecido en el plano nacional. Los resultados obtenidos, relativos al periodo 2000-2005, muestran que los efectos de deslocalización han sido especialmente intensos en regiones situadas en Francia, Reino Unido e Italia, en tanto que las regiones finesas y algunas de las alemanas y holandesas son las que presentan efectos de localización de mayor magnitud.

**Clasificación JEL:** L6, R3, O4.

**Palabras clave:** industria manufacturera, deslocalización, regiones, Unión Europea.

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## 1. Introduction

Throughout the last decade delocation of manufacturing activities has increased very rapidly, mainly in the developed countries due both to a more globalized and competitive international environment and the emergence of China, India and other big countries as new industrial powers with the help of a large list of multinational corporations which have been locating new plants in their territories since around 1990.

We give the name «delocation» to a process going beyond the process of moving companies offshore, as it also includes the closure of plants as a result of fierce competition, following the idea suggested by Baldwin and Robert-Nicoud who defined delocation as «a loss of manufacturing jobs to trading partners» in the presence of a process of opening up to foreign competition (Baldwin and Robert-Nicoud, 2000). In our view, delocation refers to manufacturing activities as a whole, not only to companies exporting jobs, as offshoring does.

While offshoring of companies has received great attention from researchers in the last years (Antràs and Helpman, 2005; Olsen, 2006; Helpman *et al.*, 2008), delocation of manufacturing activities has not, perhaps because the latter is not shown as different from the changes in production and trade patterns deriving from extended international trade (Bhagwathi *et al.*, 2004; Grossman and Rossi-Hansberg, 2006), or can just be considered as a special case of the location theory, now arising with the development of economic geography following the seminal work by Krugman and Venables (1990), Krugman (1999), Fujita *et al.* (1999) and Puga (1999)<sup>1</sup>.

The aim of this paper is to measure the effect on labour employment of the delocation process in the manufacturing sectors throughout the main industrial regions in the EU, from 2000 to 2005. As such a process affects each manufacturing section in a very different way, the branch-by-branch analysis is indicated but data availability is an obstacle to taking this path, suggesting instead an initial view at the aggregate level. Even with that restriction, it will be an important task to obtain the required data.

In order to register the delocation patterns in European regions this paper takes as reference those territories with a strong industrial sector, high level of economic development and homogeneous space dimension. So the sample contains only geographical areas at NUTS 2 level<sup>2</sup>, whose industrial production represents, at least, 0.4% of total EU manufacturing GVA and, at the same time, has a per capita income of over 90% of the EU-15 average. Therefore, they are developed regions that have a powerful industry at the Community level.

<sup>1</sup> The relationship between new geography and location is summarized in Puga (2002).

<sup>2</sup> The term NUTS corresponds to the French acronym for Nomenclature of Statistical Territorial Units used by the European Union. This classification has a hierarchical structure at three levels which, among other factors, comes from demographic thresholds. In particular, the NUTS2 level covers regions of an average size between 0.8 and 3 million inhabitants. In Spain, the nineteen units included in this level coincide with the different AACC more than Ceuta and Melilla.



Consistently, the resulting list from applying to the set of EU-27 territories the three already mentioned selection criteria includes a total of seventy-five regions of thirteen Member States, distributed as follows: 23 from Germany, 14 the United Kingdom, 10 from France, 7 from Italy, 4 Holland, 4 Sweden, 3 Spain, 2 from Austria, Belgium, Denmark and Finland, 1 Greek and 1 Irish. On the whole, they accounted for 64% of real GVA in 2005 and almost three-fifths of manufacturing employment in the EU-15 (60 and 45%, respectively, taking as reference the EU-27). The complete catalogue of regions grouped by country and their characteristics are set out in Appendices 1 and 2. As is shown there, regions included in the sample are principally in sizes over 0.5% of EU-15 industrial production and above the average EU-15 per capita income, although a significant number of them lie below those levels, particularly in the per capita income. Looking more closely at the industrial size, we see that although most of the NUTS 2 examined move in around 0.5% there is a group of fifteen regions located in Italy, Germany, Ireland, France and Spain with a strong industrial sector (more than 1%), among them Lombardy, in Italy, with about 4% of total EU-15 manufacturing GVA.

After this first introductory section, the paper is organized as follows. In a second section, the model to capture the delocation patterns is introduced. Then, in a third section, the data sources are commented on. In section four we try to assess the impact of delocation in each region in terms of jobs affected and examine whether their location patterns have altered its position in the European industrial scene, contrasting country trends with regional performances. Concluding remarks round up the paper.

## 2. Measuring delocation

As was posed in the introduction, following Baldwin and Robert-Nicoud (2000), delocation of manufacturing activities has to be assessed in terms of losses of productive activity within each region. The variables which approximate these losses are gross added value and number of jobs or total manufacturing employment. The first one is the most suitable, since the latter is dependent on advances registered in labour productivity, mainly in the face of strong competitive pressures forcing companies to achieve greater efficiency gains.

In spite of that, jobs continue to be a useful measure since their calculation is simpler and is often more reliable. In addition this indicator has received greater attention and is more easily interpreted by the analysts and, especially, the social partners.

Nevertheless if evolution of jobs is chosen as a measure of delocation, it is necessary to discount the effect on it of an increase in labour productivity (which reduces the need for labour) and of the economic cycle (which may reduce or expand the existing employment). The remaining reduction in the number of jobs measures the delocation effect on employment.

Furthermore, when average values for quite a long time interval are taken, it is possible to ignore almost completely the impact of the cycle that, otherwise, would



be estimated using econometric techniques to isolate the trend. In this way, the delocation effect can be just approximated after deducting the change in jobs caused by the increase in labour productivity. All in all, the possible incidence of the cycle on variation in manufacturing employment stemming from the evolution of industrial value will be seen.

Therefore, the change in total manufacturing employment may be split up into two effects, one of them due to the increase in manufacturing labour productivity and the other to a location effect —delocation if it is negative—. Box 1 shows that decomposition.

**Box 1**

$$\begin{aligned}
 &GVA = \text{Labor Productivity} \cdot \text{Employment} \\
 &GVA = \pi \cdot N \\
 &\text{where } \pi \text{ represents productivity and } N \text{ employment} \\
 &N = \frac{GVA}{\pi} \\
 &\hat{N} = \hat{GVA} - \hat{\pi}, \\
 &\text{where a hat over the variable denotes its rate of change} \\
 &\Delta N = \hat{N} \cdot N(0) \\
 &\Delta N = \frac{\hat{GVA} \cdot N(0)}{\downarrow \text{Delocation Effect}} - \frac{\hat{\pi} \cdot N(0)}{\downarrow \text{Productivity Effect}}
 \end{aligned}$$

In fact, the location effect reflects the impact on jobs of an increase or decrease in manufacturing value added estimated through the primitive rate of labour productivity, and, as has been mentioned above, may be positive (location) or negative (delocation). In the first case, an expansion in activity has taken place, while, in the second, a reduction of the productive scope has occurred.

Delocation of activities that can result from this calculation is compatible with the absence of offshoring companies, and it may be due, as noted above, to the closure of establishments as a result of their being uncompetitive. In the same way, the location of activities in a territory is compatible with the offshoring of companies.

Thus, analysis of delocation does not necessarily tell us much about the importance of firms' offshoring, a matter that has to be studied on a different basis. However, when offshoring reaches a large-scale dimension it affects the extension of manufacturing industries.



Moreover, the work will also examine whether regions which have witnessed a fall in employment in manufacturing have been able to offset this loss by creating jobs in other areas of activity or not. Thus, the aim is to ascertain which regions have shown themselves to be the most active ones in dealing with delocation, either by replacing industrial employment by employment in other sectors, restructuring their manufacturing sector via productivity increases or both of these concurrently.

### **3. Database**

As was said before, to achieve aggregate data on manufacturing activities by regions, even just those of real GVA and total employment, has demanded a laborious task of collecting information provided by Eurostat (REGIO database) and the National Statistical Offices of member countries to which the different regions belong, as well as the estimation, in most cases, of the product in real terms.

Looking first at the GVA, since the data offered by REGIO include those related to energy and mining, only access to the National Statistics of every member country has allowed us to isolate the manufacturing sectors. Nevertheless, additional work has been applied to transform the data of manufacturing GVA into real values, as only Germany, Spain, Finland, Holland and Italy provide such information or at least indexes of volume. In the rest of the countries real values of manufacturing GVA have been estimated by applying the national price deflators to the regional series at current values.

As regards total manufacturing employment, significant discrepancies between the data published by Eurostat and that country itself (particularly in the United Kingdom) are found, as well as the gaps found in several NUTS 2 of some Member States, such as in Germany, where they are obliged to complete regional series and correct such deficiencies with the help of the information coming from the National Statistics Offices.

To sum up, most of the information used, (especially production data), comes from National Statistical Offices, but this is commonly close to the Eurostat database, as this is constructed mainly with data coming from the regional accounts of each country.

Incidentally, one of the problems arising from taking the National Statistics as the main source of data is that the time intervals for which they provide information do not always coincide. That explains the fact that, despite having more recent data from some areas, the analysis must conclude in 2005.

### **4. Delocation of manufacturing industries in European regions**

As noted above in the introduction, the group of regions examined reached just over 64% of EU-15 industrial GVA and about 60% of jobs in 2005, figures slightly lower than



in 2000. Thus, despite nearly half of regions' industrial output at constant prices having achieved positive growth rates, the group accumulated throughout the period a decrease of about 1%, similar to EU-15 average<sup>3</sup>. Regarding employment, the evolution has been even more negative. Throughout the first five years of the current century, destruction of jobs in the aggregate industry has been a common feature in the vast majority (90%) of the seventy-five NUTS 2 examined, as well as for each of the Member States where they are located, except Spain, accumulating the total sample a decline of close to 8%.

Focusing on manufacturing employment, the most dynamic areas are located mostly in France, Spain and Austria, while the Netherlands and especially the British regions show the largest job losses (table 1).

**Table 1.** Importance of manufacturing delocation in European regions, 2001-2005  
(Decomposition of change in employment)

Regions		Number of jobs (thousands)			Percent share of 2000 employment		
		Total effect	Producti- vity effect	Location effect	Total effect	Produc- tivity effect	Location effect
at22	Steiermark	3.72	-1.08	4.80	3.6	-1.1	4.7
at31	Oberösterreich	0.97	-8.37	9.34	0.6	-5.6	6.2
	<i>Austria</i>	<i>-11.04</i>	<i>-26.49</i>	<i>15.45</i>	<i>-1.8</i>	<i>-4.2</i>	<i>2.5</i>
be21	Prov. Antwerpen	-10.10	0.79	-10.89	-7.0	0.5	-7.5
be23	Prov. Oost-Vlaanderen	-7.50	-6.27	-1.23	-7.4	-6.1	-1.2
	<i>Belgium</i>	<i>-57.40</i>	<i>-22.19</i>	<i>-35.21</i>	<i>-8.4</i>	<i>-3.2</i>	<i>-5.1</i>
de11	Stuttgart	-31.57	-82.44	50.87	-4.8	-12.5	7.7
de12	Karlsruhe	-20.36	-35.85	15.50	-5.7	-10.1	4.4
de13	Freiburg	-12.91	-13.01	0.11	-4.5	-4.5	0.0
de14	Tübingen	-5.85	-18.05	12.19	-2.3	-7.2	4.9
de21	Oberbayern	-16.30	-79.76	63.46	-3.7	-17.9	14.2
de22	Niederbayern	-4.90	-32.70	27.81	-3.3	-21.8	18.6
de23	Oberpfalz	-5.38	-17.16	11.78	-3.8	-12.0	8.3
de24	Oberfranken	-19.57	-31.31	11.75	-11.6	-18.6	7.0
de25	Mittelfranken	-11.84	-17.70	5.86	-5.3	-8.0	2.6
de26	Unterfranken	-8.19	-31.57	23.38	-4.9	-18.9	14.0
de27	Schwaben	-9.32	-33.35	24.03	-4.1	-14.8	10.6
de60	Hamburg	-7.60	-12.22	4.63	-6.0	-9.7	3.7

<sup>3</sup> It must be noted that the EU average has been calculated from the aggregate industrial GVA at constant prices of thirteen countries included in the sample. Thus, Portugal and Luxembourg have been excluded and the values from other countries have been estimated by adding figures of all their regions. So, the above mentioned growth rate differs from that provided by Eurostat, exhibiting a positive increase of 4,6%.



Table 1. (Continue)

Regions		Number of jobs (thousands)			Percent share of 2000 employment		
		Total effect	Producti- vity effect	Location effect	Total effect	Produc- tivity effect	Location effect
de71	Darmstadt	-53.43	-47.20	-6.23	-14.9	-13.2	-1.7
de73	Kassel	-10.59	-13.96	3.36	-7.8	-10.3	2.5
de91	Braunschweig	-9.47	-5.00	-4.47	-4.7	-2.5	-2.2
de92	Hannover	-19.00	-15.44	-3.56	-10.6	-8.6	-2.0
dea1	Düsseldorf	-62.72	-87.87	25.15	-12.6	-17.7	5.1
dea2	Köln	-54.28	-49.71	-4.57	-15.0	-13.7	-1.3
dea4	Detmold	-30.26	-31.12	0.86	-10.7	-11.0	0.3
dea5	Arnsberg	-58.24	-55.02	-3.22	-12.9	-12.2	-0.7
deb3	Rheinessen-Pfalz	-20.99	-30.16	9.17	-10.6	-15.2	4.6
dec0	Saarland	-3.60	-18.10	14.50	-3.2	-16.0	12.8
def0	Schleswig-Holstein	-18.67	-24.85	6.17	-10.1	-13.5	3.3
	Germany	-603.00	-1,122.75	519.75	-7.4	-13.8	6.4
dk01	Hovedstaden	-13.00	-12.16	-0.84	-13.4	-12.5	-0.9
dk04	Midtjylland	-20.00	-16.22	-3.78	-14.6	-11.8	-2.8
	Denmark	-61.00	-34.28	-26.72	-13.0	-7.3	-5.7
es21	País Vasco	18.40	-3.31	21.71	7.4	-1.3	8.7
es30	Comunidad de Madrid	-10.60	-21.80	11.20	-3.1	-6.3	3.2
es51	Cataluña	6.60	-19.14	25.74	0.9	-2.5	3.4
	Spain	139.70	-39.27	178.97	4.7	-1.3	6.0
fi18	Etelä-Suomi	-18.07	-71.59	53.52	-8.6	-33.9	25.3
fi19	Länsi-Suomi	-7.01	-38.86	31.85	-5.4	-29.7	24.4
	Finland	-17.98	-120.06	102.08	-4.3	-28.6	24.3
fr10	Île de France	126.52	178.68	-52.16	21.8	30.7	-9.0
fr23	Haute-Normandie	-24.18	-10.93	-13.25	-17.1	-7.7	-9.4
fr24	Centre	-20.16	-1.20	-18.96	-10.6	-0.6	-10.0
fr42	Alsace	-24.89	-9.88	-15.01	-15.4	-6.1	-9.3
fr51	Pays de la Loire	-2.17	17.94	-20.11	-0.8	6.7	-7.5
fr52	Bretagne	-4.15	-2.15	-2.00	-2.3	-1.2	-1.1
fr61	Aquitaine	-1.99	7.42	-9.41	-1.4	5.0	-6.4
fr62	Midi-Pyrénées	2.09	33.18	-31.09	1.5	24.5	-22.9
fr71	Rhône-Alpes	-29.19	27.59	-56.78	-6.1	5.7	-11.8
fr82	Provence-Alpes- Côte d'Azur	-0.97	2.62	-3.59	-0.6	1.8	-2.4
	France	-153.06	315.66	-468.72	-4.0	8.3	-12.3



**Table 1.** (Continue)

Regions		Number of jobs (thousands)			Percent share of 2000 employment		
		Total effect	Producti- vity effect	Location effect	Total effect	Produc- tivity effect	Location effect
gr30	Attiki	-3.60	-50.72	47.12	-1.7	-23.4	21.7
	<i>Greece</i>	-7.3	-119.89	112.59	-1.4	-22.2	20.8
ie02	Southern and Eastern	-18.40	-99.85	81.45	-7.8	-42.6	34.7
	<i>Ireland</i>	-24.20	-122.74	98.54	-7.6	-38.7	31.1
itc1	Piemonte	-68.69	25.39	-94.07	-12.9	4.8	-17.7
itc4	Lombardia	-79.40	-76.82	-2.58	-6.3	-6.1	-0.2
itd3	Veneto	-39.67	-2.11	-37.56	-6.2	-0.3	-5.8
itd5	Emilia-Romagna	-8.60	-8.40	-0.20	-1.6	-1.6	0.0
ite1	Toscana	-36.20	0.78	-36.97	-9.8	0.2	-10.1
ite3	Marche	1.64	-5.55	7.19	0.8	-2.8	3.6
ite4	Lazio	-7.33	9.56	-16.89	-3.6	4.7	-8.2
	<i>Italy</i>	-217.61	63.10	-280.71	-4.5	1.3	-5.8
nl22	Gelderland	-21.64	-25.06	3.41	-17.8	-20.6	2.8
nl32	Noord-Holland	-15.55	-20.34	4.79	-13.8	-18.0	4.2
nl33	Zuid-Holland	-17.34	-39.80	22.46	-12.9	-29.6	16.7
nl41	Noord-Brabant	-35.39	-55.15	19.76	-17.3	-26.9	9.6
	<i>Netherlands</i>	-147.67	-246.90	99.23	-16.1	-27.0	10.8
se11	Stockholm	-15.70	-41.83	26.13	-13.6	-36.3	22.7
se12	Östra Mellansverige	-21.70	-23.87	2.17	-15.1	-16.6	1.5
se22	Sydsverige	-10.10	-6.90	-3.20	-9.1	-6.2	-2.9
se23	Västsverige	-4.60	1.34	-5.94	-2.6	0.7	-3.3
	<i>Sweden</i>	-75.00	-94.00	19.00	-9.5	-11.9	2.4
ukd3	Greater Manchester	-49.00	-19.07	-29.93	-23.2	-9.0	-14.2
ukd4	Lancashire	-46.00	-50.82	4.82	-31.7	-35.0	3.3
uke4	West Yorkshire	-37.00	-11.92	-25.08	-18.6	-6.0	-12.6
ukf1	Derbyshireand Nottinghamshire	-37.00	-49.65	12.65	-17.9	-24.0	6.1
ukf2	Leicestershire, Rutland and Northant	-44.00	-36.07	-7.93	-23.3	-19.1	-4.2
ukg3	West Midlands	-87.00	-49.99	-37.01	-31.3	-18.0	-13.3
ukh1	East Anglia	-25.00	-12.92	-12.08	-13.7	-7.1	-6.6
uki1	Inner London	-19.19	-13.81	-5.38	-14.2	-10.2	-4.0
uki2	Outer London	-44.81	11.06	-55.87	-27.1	6.7	-33.8



**Table 1.** (Continue)

Regions		Number of jobs (thousands)			Percent share of 2000 employment		
		Total effect	Producti- vity effect	Location effect	Total effect	Produc- tivity effect	Location effect
ukj1	Berkshire, Bucks and Oxfordshire	-46.00	-38.98	-7.02	-24.6	-20.8	-3.8
ukj3	Hampshire and Isle of Wight	-11.00	-6.89	-4.11	-8.1	-5.1	-3.0
ukk1	Gloucestershire, Wiltshire and Bristol	-34.00	-12.53	-21.47	-16.9	-6.2	-10.7
ukm2	Eastern Scotland	-11.00	14.02	-25.02	-9.1	11.6	-20.7
ukm3	South Western Scotland	-34.00	-21.07	-12.93	-20.7	-12.8	-7.9
	United Kingdom	-898.00	-485.74	-412.26	-19.6	-10.6	-9.0

Source: Elaborated from Eurostat and National Statistical offices.

Registered unemployment seems to be related to good performance in labour productivity, pointing to the fierce competition faced by the manufacturing sector in the analyzed period. Thus higher job losses are found in regions with stronger labour productivity increases. However, some French and most of the British regions escaped from this rule, as large losses in employment are not accompanied by significant gains in labour productivity, suggesting delocation effects of a particular intensity.

That reveals a very different growth path in employment and industrial labour productivity by regions, differences which can be explored in more detail to isolate the attractive regions to locate manufacturing activities from the others characterized by a delocation process.

To go deeply into this latter question, table 1 contains the results of estimating the impact on total employment of location and delocation forces in the manufacturing sectors across the seventy-five regions included in the sample over the period 2001-2005, by using the procedure proposed in the second section, that is, discounting from the total change in jobs the reduction corresponding to the increase in labour productivity. Therefore, the location effect shows the effect on employment of GVA change, calculated by applying the initial rate of industrial labour productivity.

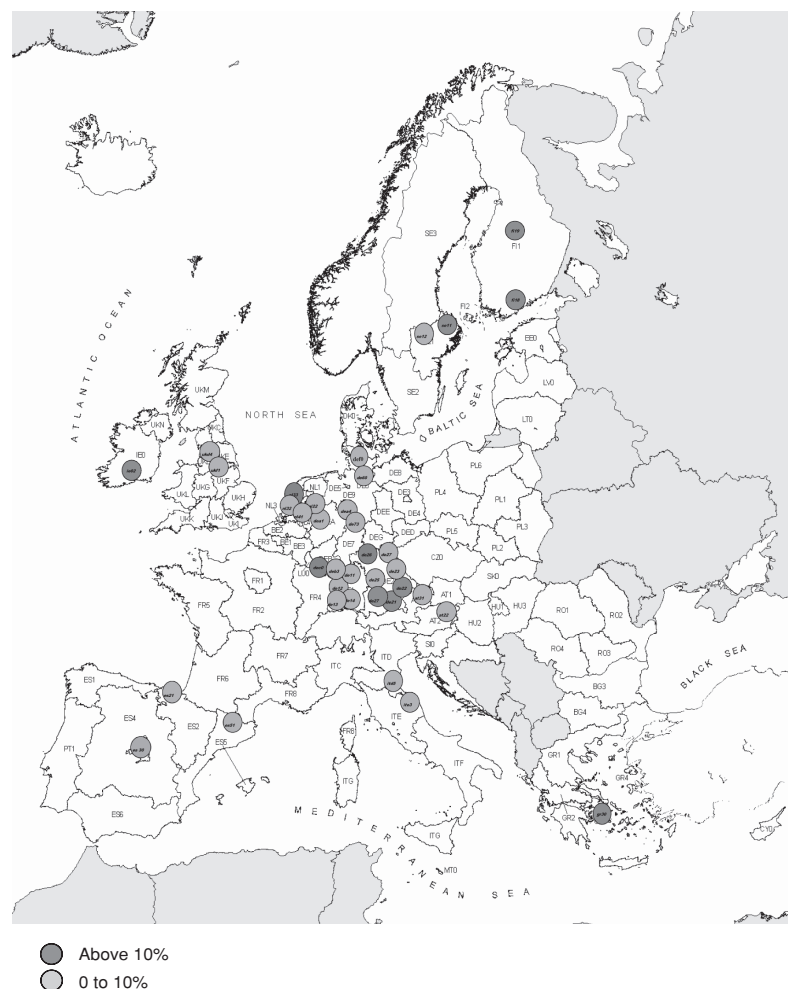
In about half of the regions with job losses, all of those considered in the Netherlands, Finland, Greece and Ireland, three-quarters of the Germans, two British, two Swedish and Madrid in Spain, the decline in industrial employment has been due entirely to increased labour productivity, so a positive effect of location appears. This behaviour extends to Finnish, German and Swedish economies as a whole, as well as Greece, Ireland and Austria. Therefore, all those regions have proved attractive for the location of manufacturing firms.



By contrast, thirty-eight remaining regions that also show reductions in manufacturing employment have been affected by delocation processes to different extents, although only in a small number of them have they been accompanied by decreases in labour productivity, which could make the prospects for economic growth tougher, (four from France; Piedmont, Toscana and Lazio in Italy, Greater London and Eastern Scotland in the United Kingdom, the Swedish Västsverige and Antwerp in Belgium).

Regions with positive location effects are shown in figure 1. Most of them are large industrial regions and are located in the traditional industrial growth cen-

**Figure 1.** Regions with a positive location effect (% of 2000 employment)



Source: Own calculation.



tres<sup>4</sup>, those characterized by high market potential (Combes and Overman, 2003), although there are also some intermediate and peripheral territories, mainly located in the north of Italy, United Kingdom and Spain and in the south of Sweden and Norway. This means that the delocation process has contributed to concentrating the European manufacturing industries in that privileged area of faster growth, apart from some other changes inside every country.

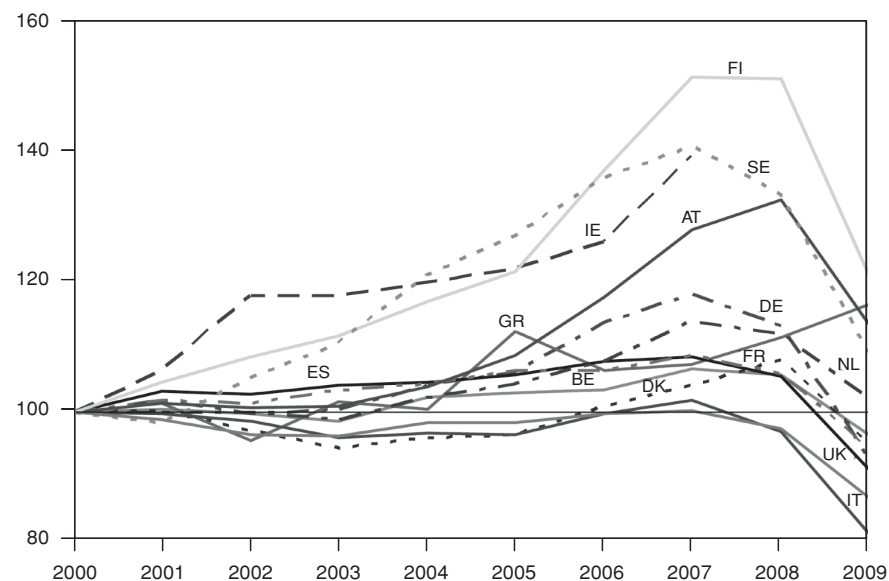
Now, to compare the intensity of such effects of location and delocation across regions, avoiding the differences they have in size, we built a relative measure of them: the ratio of job losses in the period to the volume of manufacturing employment in the first year, 2000 (table 1).

Following this ratio, delocation effects are revealed to be particularly strong in France, United Kingdom, Italy, and in one region of Belgium, with reductions in employment exceeding 20% in some of them.

Conversely, the regions of Finland and several of the German and the Dutch ones exhibit strong location effects.

In the cases of the British and Italian economies, as well as the Danish one, bearing in mind that by 2005 they had not recovered from the industrial crisis resulting from the *dotcom* bubble (figure 2), part of the registered loss of employment in the

**Figure 2.** Real manufacturing GVA growth rates in selected countries, 2001-2005 (Index, 2000 = 100)



Source: Elaborated from Eurostat.

<sup>4</sup> Note that the map of winning regions is clearly influenced by the large number (30%) of German NUTS 2 in the sample.



manufacturing sector (around 2% in the case of the United Kingdom and 3.5% for Italy and Denmark) could be attributed to the effect of the cycle. Nonetheless, at regional level, the heavy loss of employment seen in many British areas (Greater Manchester, West Yorkshire, West Midlands, Greater London and Eastern Scotland) and Italian ones (Piedmont, Tuscany and Lazio) indicate that there was scant incidence of the economic cycle in the drop in industrial production.

In any case, as was pointed out above, the importance of location effects seems to lie in their manufacturing labour productivity gains. In fact higher increases in productivity (over 15%) are found precisely in those regions of Ireland, Finland, Sweden, Netherlands and Germany, besides the Greek Attiki, where the location effect has in general, reached its greatest extent (figure 3).

Nevertheless, productivity also grows faster in most of the regions belonging to the United Kingdom, Belgium and Denmark in spite of the strong delocation effects registered, which disturbs the above-mentioned positive relationship, suggesting the harsh process of industrial restructuring involved.

In contrast, the industrial productivity decline in half of the French and Italian regions, albeit with a positive impact on employment, is largely offset by destruction of industrial activity, except in the Île de France and Midi-Pyrénées, the two territories in which productivity has a more negative trajectory.

These results closely match those reported by Cuadrado-Roura *et al.* (2000) based on the growth rates for regional productivity and employment during the period 1980-1993, grouping European regions in four typologies comparing the growth rates of these two variables with their respective European averages.

According to this approach and including the location effect in the analysis, the group of regions that are examined in this work would be categorized as follows (table 2).

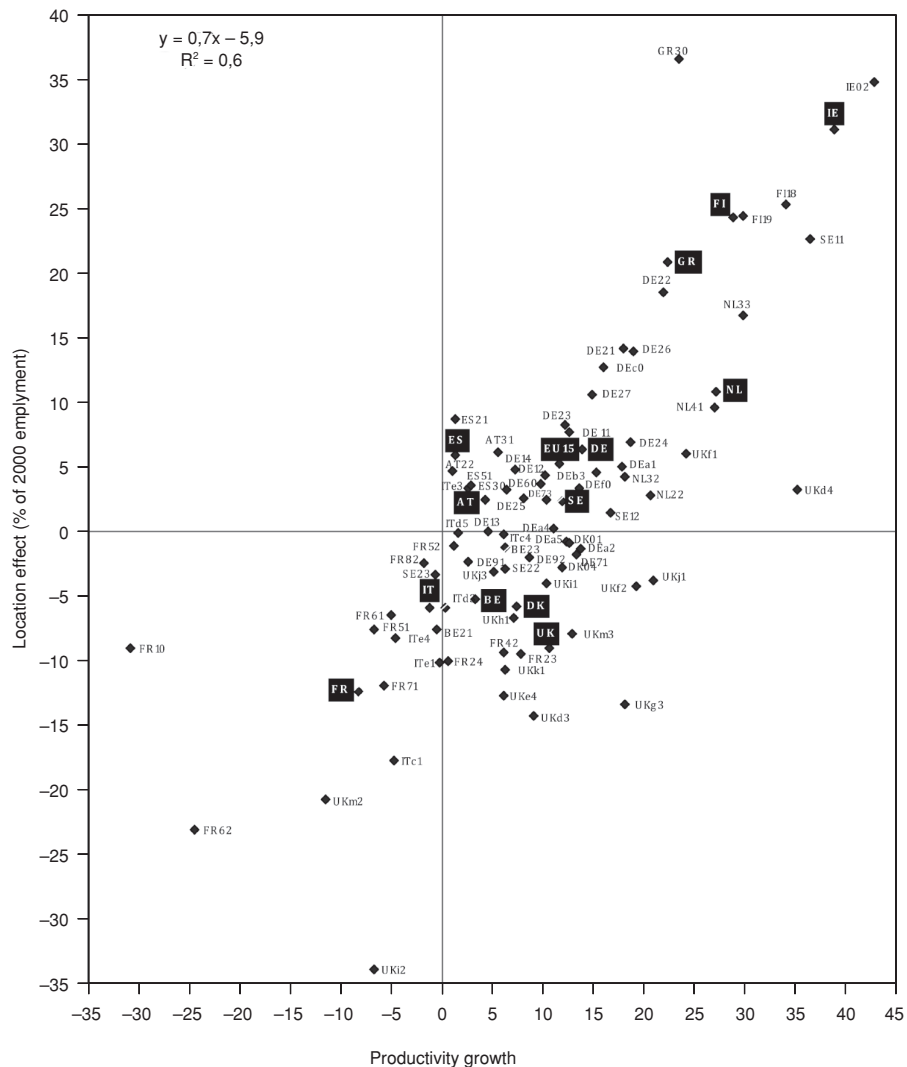
The first group includes areas with productivity and manufacturing employment growth rates above sample average and show positive location effect (quadrant 1). So, as has been underlined in that work, possibly this reflects the fact that the technological and organizational changes introduced during the period would have been successful, promoting the diversification and specialization in activities with high growth levels and attracting new investments which are less labour-intensive.

In a second stage are those regions which, as the above mentioned authors suggest, have implemented restructuring processes to eliminate the most inefficient outputs, achieving higher levels of industrial productivity and, in about half of them, increased industrial production, at the expense of a notable decline in employment (quadrant 4) They named this typology «restructuring via productivity».

With a few exceptions (those where the location effect is negative), the regions in both groups are the winners of industrial dynamic during the period. Most of them are large industrial regions and are located in the traditional industrial growth centres. As demonstrated above, they are mainly Finnish, German and Dutch, as well as Greek and Irish regions.



**Figure 3.** Location effect and productivity growth in select regions' manufacturing sector, 2001-2005 (percentages)



Source: Elaborated from Eurostat and National Statistical offices.

In contrast, another large group of regions, due to different factors (see Cuadrado-Roura *et al.*, 2000), have opted for more labour-intensive industrial models which in a few cases (especially in Spanish and Austrian regions) have been accompanied by output increases, so they can also be included among the winners (figure 1), while in others the result has been a loss of productive activity (quadrant 2).



**Table 2.** Employment and productivity growth rates in select regions  
manufacturing sector, 2001-2005  
(Averages of all regions: 7.4% productivity; -7.7% employment)

	<i>Productivity growth &gt; Average value</i>			<i>Productivity growth &lt; Average value</i>		
	(1)	Employ- ment	Producti- vity	(2)	Employ- ment	Producti- vity
<i>Employment growth &gt; Average value</i>	<i>de11 Stuttgart</i>	-4.8	12.5	<i>at22 Steiermark</i>	3.6	1.1
	<i>de12 Karlsruhe</i>	-5.7	10.1	<i>at31 Oberösterreich</i>	0.6	5.6
	<i>de21 Oberbayern</i>	-3.7	17.9	<i>be21 Prov. Antwerpen</i>	-7.0	-0.5
	<i>de22 Niederbayern</i>	-3.3	21.8	<i>be23 Prov. Oost-Vlaanderen</i>	-7.4	6.1
	<i>de23 Oberpfalz</i>	-3.8	12.0	<i>de13 Freiburg</i>	-4.5	4.5
	<i>de25 Mittelfranken</i>	-5.3	8.0	<i>de14 Tübingen</i>	-2.3	7.2
	<i>de26 Unterfranken</i>	-4.9	18.9	<i>de91 Braunschweig</i>	-4.7	2.5
	<i>de27 Schwaben</i>	-4.1	14.8	<i>es21 País Vasco</i>	7.4	1.3
	<i>de60 Hamburg</i>	-6.0	9.7	<i>es30 Comunidad de Madrid</i>	-3.1	6.3
	<i>dec0 Saarland</i>	-3.2	16.0	<i>es51 Cataluña</i>	0.9	2.5
	<i>fi19 Länsi-Suomi</i>	-5.4	29.7	<i>fr10 Île de France</i>	21.8	-30.7
	<i>gr30 Attiki</i>	-1.7	23.4	<i>fr51 Pays de la Loire</i>	-0.8	-6.7
				<i>fr52 Bretagne</i>	-2.3	1.2
				<i>fr61 Aquitaine</i>	-1.4	-5.0
				<i>fr62 Midi-Pyrénées</i>	1.5	-24.5
				<i>fr71 Rhône-Alpes</i>	-6.1	-5.7
				<i>fr82 Provence-Alpes-Côte d'Azur</i>	-0.6	-1.8
				<i>itc4 Lombardia</i>	-6.3	6.1
				<i>itd3 Veneto</i>	-6.2	0.3
				<i>itd5 Emilia-Romagna</i>	-1.6	1.6
				<i>ite3 Marche</i>	0.8	2.8
				<i>ite4 Lazio</i>	-3.6	-4.7
				<i>se23 Västsverige</i>	-2.6	-0.7



Table 2. (Continue)

	Productivity growth > Average value			Productivity growth < Average value		
	(4)	Employment	Productivity	(3)	Employment	Productivity
Employment growth < Average value	<i>de24</i> Oberfranken	-11.6	18.6	<i>fr24</i> Centre	-10.6	0.6
	<i>de71</i> Darmstadt	-14.9	13.2	<i>fr42</i> Alsace	-15.4	6.1
	<i>de73</i> Kassel	-7.8	10.3	<i>itc1</i> Piemonte	-12.9	-4.8
	<i>de92</i> Hannover	-10.6	8.6	<i>ite1</i> Toscana	-9.8	-0.2
	<i>dea1</i> Düsseldorf	-12.6	17.7	<i>se22</i> Sydsverige	-9.1	6.2
	<i>dea2</i> Köln	-15.0	13.7	<i>uke4</i> West Yorkshire	-18.6	6.0
	<i>dea4</i> Detmold	-10.7	11.0	<i>ukh1</i> East Anglia	-13.7	7.1
	<i>dea5</i> Arnsberg	-12.9	12.2	<i>uki2</i> Outer London	-27.1	-6.7
	<i>deb3</i> Rheinhessen-Pfalz	-10.6	15.2	<i>ukj3</i> Hampshire and Isle of Wight	-8.1	5.1
	<i>def0</i> Schleswig-Holstein	-10.1	13.5	<i>ukk1</i> Gloucestershire, Wiltshire and Bristol	-16.9	6.2
	<i>dk01</i> Hovedstaden	-13.4	12.5	<i>ukm2</i> Eastern Scotland	-9.1	-11.6
	<i>dk04</i> Midtjylland	-14.6	11.8			
	<i>fi18</i> Etelä-Suomi	-8.6	33.9			
	<i>fr23</i> Haute-Normandie	-17.1	7.7			
	<i>ie02</i> Southern and Eastern	-7.8	42.6			
	<i>nl22</i> Gelderland	-17.8	20.6			
	<i>nl32</i> Noord-Holland	-13.8	18.0			
	<i>nl33</i> Zuid-Holland	-12.9	29.6			
	<i>nl41</i> Noord-Brabant	-17.3	26.9			
	<i>se11</i> Stockholm	-13.6	36.3			
	<i>se12</i> Östra Mellansverige	-15.1	16.6			
	<i>ukd3</i> Greater Manchester	-23.2	9.0			
	<i>ukd4</i> Lancashire	-31.7	35.0			
	<i>ukf1</i> Derbyshire and Nottinghamshire	-17.9	24.0			
	<i>ukf2</i> Leicestershire, Rutland and Northants	-23.3	19.1			
	<i>ukg3</i> West Midlands	-31.3	18.0			
	<i>uki1</i> Inner London	-14.2	10.2			
	<i>ukj1</i> Berkshire, Bucks and Oxfordshire	-24.6	20.8			
	<i>ukm3</i> South Western Scotland	-20.7	12.8			

Note: Shaded areas indicate regions with positive location effect.  
Source : Elaborated from Eurostat and National Statistical offices.



Finally the worst results can be seen in a fourth type of region with growth rates of GVA and industrial productivity below average and serious job destruction (quadrant 3). This would occur in regions with problems in restructuring their manufacturing sector or with low levels of activity. So, together with those that are either restructuring via productivity or via employment, but without achieving a positive location effect, they are clearly the losers. These include mainly British, French, Italian, Belgian and Danish regions.

To sum up, these results confirm the direct relationship between growth in labour efficiency and progress in the creation of productive industrial activity as pointed out above, and which can be seen more clearly by looking at figure 3. In other words, regions with higher levels of productivity growth in general show a greater attractiveness for new manufacturing firms.

These differences in the behaviour of productivity and manufacturing employment across regions have led to remarkable disparities in rates of change of their industrial output during the period. Thus, while a few increased their real manufacturing GVA by more than 20%, in the less dynamic ones the loss of industrial output is between a sixth and a third of the initial value. So, significant changes had taken place in the relative position of some of them (figure 4).

Growth is led by a group of twenty regions located in Ireland, Finland, Greece, Germany, Sweden, Netherlands, Spain and Austria, with real GVA growth rates that are more than five points above average. As a result they increased their share in the industrial output of the sample. Looking at the complete list, we see that the growth deviation from the mean exhibits positive values in just over half of the regions examined, among them seven of the ten with the largest industrial scale in 2005. Thus, the top ten regions have increased their share from 32 to 33 percent in the last five years.

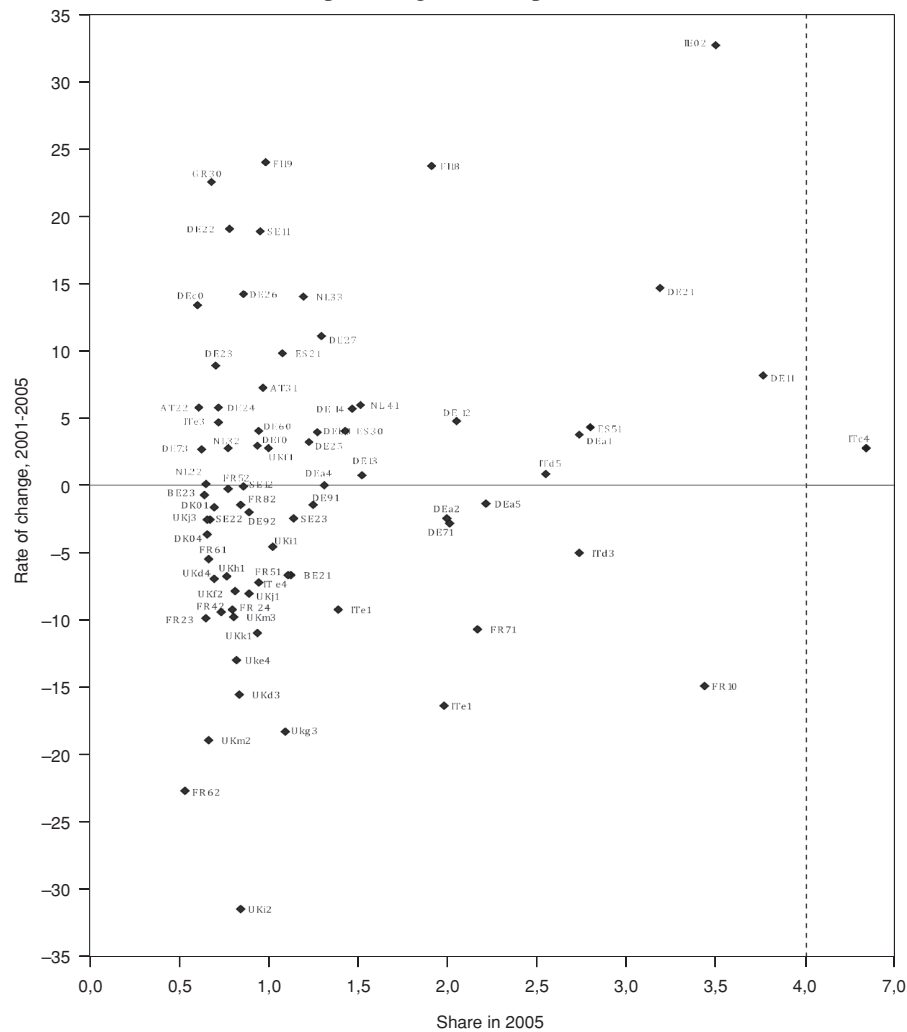
Conversely, among the less dynamic regions are found a great number of British and some French and Italian ones, which, consequently, have fallen back in the ranking of NUTS 2 arranged by their contribution to aggregate manufacturing output.

Between both groups there are approximately twenty regions, mainly in Germany, with growth rates not far from the average, so their positions have hardly changed during the last five years.

Finally, when the question is analyzed at Member State level (table 1), it is possible to check out the disparities among the above mentioned regions. Thus, while in some countries such as Spain, manufacturing growth has been clearly labour-intensive, something which can be extended to its regions, the same also occurs in Greece and Austria, which both boast positive location effect and a job destruction rate far below the average. In others, such as Holland, Sweden and, to a lesser extent, Belgium, Ireland and Finland, an increase in industrial activity is only due to advances in productivity, so it has been accompanied by heavy job losses, and these are patterns repeated in most of their regions, with noticeable importance in the Netherlands. As for the United Kingdom, Belgium and Denmark, all share declining industrial production together with strong job cuts, a pattern that is replicated in many of their regions. In this situation we find the bulk of French and Italian NUTS 2, just like the



**Figure 4.** Regional shares in the total sample manufacturing GVA  
(percentage at 2000 prices)



Source: Elaborated from Eurostat and National Statistical offices.

countries to which they belong, although in this case, job destruction has been much less pronounced, and below the group average. Close to this mean is Germany, as well as most of their regions.

Thus, the analysis at Member State level also confirms the positive relationship between the advance of industrial productivity and the attractiveness for new manufacturing firms. As demonstrated for their regions, Ireland, Finland, Netherlands and



Greece, following at quite a distance from Germany, are Member States showing a better performance in productivity and with high location effects (see figure 3).

In fact similarities between performances in the regions and in the Member States they belong to suggest that the trend in regional industrial employment is to some extent influenced by belonging to the same country; in other words, the locational attractions of each area and its effort to improve productivity is partly due to national specificities, or idiosyncratic factors. In fact, as shown in Appendix 3, most European industrialized regions follow the location patterns of the country they belong to, reproducing its productivity behaviour, too. In summary, the evolution of these variables in each region seems to have a clear «country effect», that is, different behaviours motivated by specific factors and/or differentiated industrial policies.

For example, in order to correctly interpret the results for Spanish regions it can not be overlooked that during the period analyzed, as in the whole country, regions have absorbed large numbers of immigrants, which has boosted the proliferation of lower productivity and lower wages in industrial activities. However, it may be thought that this phenomenon has tended to conceal productivity increases in larger and better equipped firms; which could have been significant, in the light of their results<sup>5</sup>. On the other hand, countries like Finland or Ireland, with the lowest population increase, have opted for high-tech manufacturing sectors as a way to improve national competitiveness (see Álvarez *et al.*, 2007). Nonetheless, this positive location effect has not reached in NUTS 2 enough magnitude in these countries to offset completely the job losses arising from productivity improvements.

On the other hand, this «national effect» has also played an important role in explaining the economic outcomes of European regions in terms of per capita GDP, in accordance with the results obtained by Cuadrado-Roura (2001), using the data available for 109 EU regions over the 1977-1994 period.

This importance of the «national effect» should allow us to make a better approach to the determinants of above-mentioned delocation patterns in future research. One of these determinants might be found in the different importance and performance by countries of some manufacturing branches particularly affected by the increase in global competition as their development has been receiving strong support in emerging countries from both domestic policies and the location of big multinational companies. This is the case of IT manufacturing sectors or that of automobiles, clothes, textiles and shoes (Sachwald, 2004). Table 3 shows how the exports of these key sectors have evolved in some of the European countries considered here. It is amazing to see the poor results registered by IT sectors in United Kingdom, France and Ireland compared to the other countries mentioned, Germany in particular. This evolution could be behind the stronger effects of delocation in France and the United Kingdom although it must have produced similar results in the case of Ireland. Furthermore, on such a basis what has happened in Italy would remain unexplained as the selected key sectors do not show a bad performance in terms of exports in the latter country.

<sup>5</sup> For details, see Myro *et al.* (2008).



**Table 3.** Export growth in key sectors by countries, 2000-2005 (percentages)

	<i>IT</i>	<i>Auto</i>	<i>Textile</i>	<i>Clothes</i>	<i>Shoes</i>	<i>Total</i>	<i>Impact IT on Total</i>
Spain	6.5	9.1	7.2	15.8	3.8	11.1	0.4
Germany	11.6	13.8	6.1	11.1	11.1	13.0	1.4
United Kingdom	0.9	8.5	2.9	3.2	2.3	6.1	0.2
France	-0.9	10.2	2.5	9.4	11.8	7.8	-0.1
Ireland	-0.9	-10.2	0.1	2.5	-3.4	7.7	-0.3
Finland	4.7	15.2	4.5	4.9	5.6	7.3	1.3
Italy	4.0	8.8	4.1	9.0	5.6	8.9	0.2
EU-15	7.0	14.1	5.9	9.1	6.7	11.1	1.1

Source: Elaborated from *Comtrade*.

One reason for such contradictory results lies in the possibility that production instead of export reflects accurately what has been happening in every sector in terms of activity. However Álvarez *et al.* (2007) show very similar patterns in production and export specialization from 1995 to 2005 except in the case of Ireland, which thus appears as a very particular one. This is because IT specialization in production increases at the same time as it decreases in exports. Perhaps the strong growth in domestic demand prevents IT exports from growing. The opposite case could be that of Italy, where slow growth in domestic demand might have been pushing up IT exports<sup>6</sup>.

Anyway, further developments on the determinants of delocation patterns require the preparation of disaggregated data on production, a task beyond the objectives of this paper. That could allow us to update the available manufacturing specialization analysis. As the two countries exhibiting the highest delocation effects, France and the United Kingdom, showed the lowest rates of specialization compared with the EU (Milderfart and Overman, 2002; Combes and Overman, 2003). This suggests something could have changed in the last few years, which would merit a fresh look based on more recent data.

On the other hand, it is now clear that insofar as delocation in manufacturing activities has affected each country in a different way, a relocation process inside the EU and between countries has taken place. This process deserved to be deeply analyzed, including a perspective by sectors, updating what we know about changes in the distribution of manufacturing industry in the EU and offering the possibility of exploring whether the European Common Policy has influenced them in some way, as was already suggested by Milderfart-Knarvik and Overman (2002).

One last question that deserves consideration is the effect of the industrial delocation process on the regional economies. Surprisingly, manufacturing job losses have

<sup>6</sup> In Finland IT activities grow much more in production than in exports, but in both aspects a positive growth is registered.



not been transformed into total employment which exhibits positive growth for all the regions included in the sample, with the exceptions of all the Netherlands, 11 from Germany, Lancashire in the United Kingdom and Östra Mellansverige in Sweden which, nevertheless, and has already been highlighted (tables 1 and 2), have managed to extend their industrial base thanks to this spurt in productivity.

That means the regions have been able to compensate for the negative effect of the delocation process on the employment from a shrinking manufacturing base by allocating more resources inside the other sectors (figure 5). But, in addition to creating employment in other activities, two-thirds of these regions (10 from the United Kingdom, 5 from Germany, 4 from France, 3 from Italy, the two Danish ones, Oost-Vlaanderen in Belgium and Sydsverige in Sweden) have reacted in the face of delocation by increasing their industrial productivity, as was stated previously. As a result, the good news is that in all the regions considered it is possible to discover an active response to delocation, either by setting up industrial restructuring processes which tend to eliminate the least efficient production, or by raising productivity and/or replacing employment in manufacturing by employment in other sectors.

## 5. Concluding Remarks

A comparative analysis of industrial location patterns for a large sample of European regions —characterized by having an upper-middle level income and a strong industrial sector—, during the last few years, has revealed that only half of them have shown locational attractions for manufacturing activities. The regional patterns found clearly show the influence of «national effect», the regions showing location effects corresponding to most of those located in Austria, Germany, the Netherlands, Ireland, Finland, Sweden, Spain and Greece.

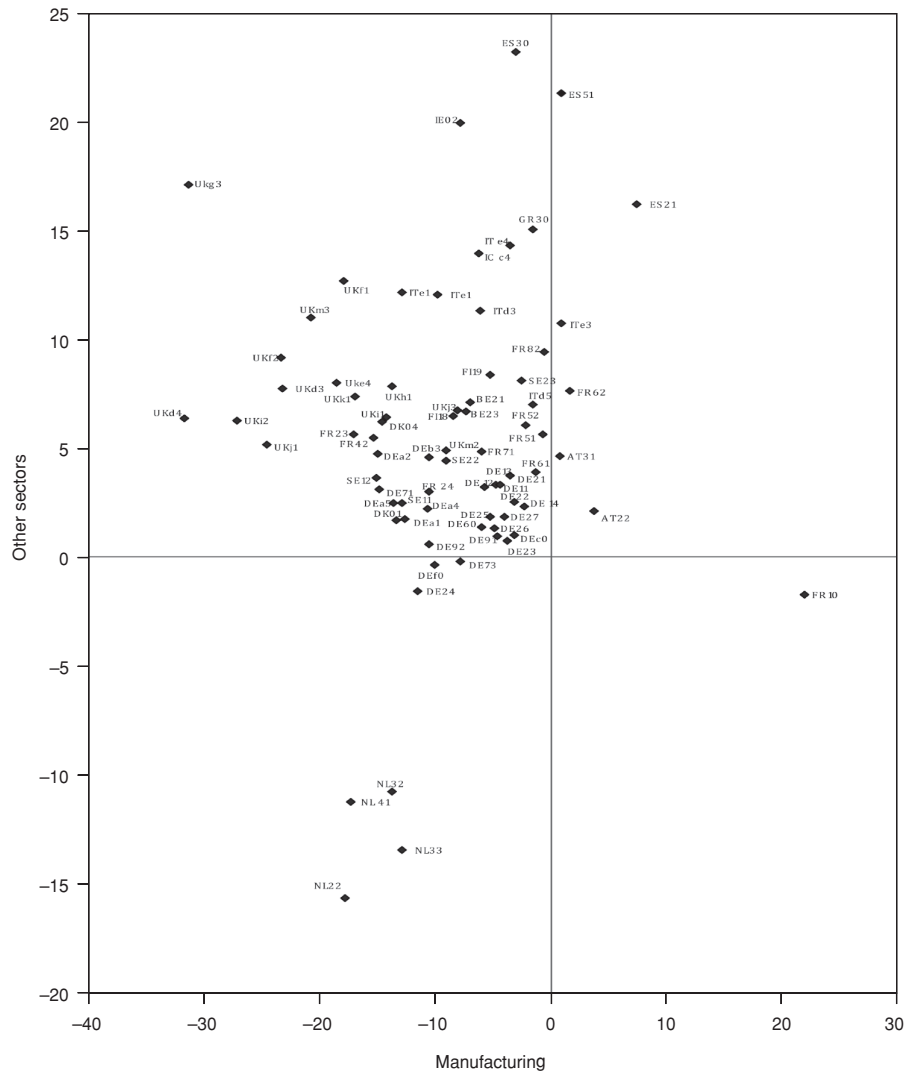
On the contrary, the delocation process has affected another half of the regions included, most of them French, British and Italian. Therefore, delocation has contributed to concentrating the European manufacturing industry in the areas with the highest market potential, in the centre of continental Europe. It has contributed, furthermore to relocating manufacturing activities inside every country, something that requires further analysis from future research.

Attractiveness for the location of manufacturing industries has been encouraged by significant increases in labor productivity, so in most of the regions showing positive location patterns production increases have been compatible with a decline in aggregate manufacturing total employment. More specifically, in this situation are all regions in the Netherlands, Finland, Greece and Ireland, three quarters of the German ones, two from the United Kingdom, two from Sweden and Madrid in Spain.

On the contrary, in the regions where delocation has taken place the increase in industrial labour productivity has been lower. In fact twelve of such regions show reductions in labour productivity, five of them located in France, three Italian, the British Eastern Scotland and Greater London, Västsverige in Sweden and the Belgian



**Figure 5.** Employment growth rates in selected regions, 2001-2005: manufacturing and the other sectors (percentages)



Source: Elaborated from Eurostat and National Statistical offices.

Antwerp. Besides, the positive impact of this rare performance on employment has been largely offset by destruction of industrial activity, except in the Île de France and Midi-Pyrénées, the two territories in which productivity has a more negative trajectory.



The positive link between location and manufacturing labour productivity increase confirms the result obtained by other authors, particularly Cuadrado-Roura *et al.* (2002), who, referring their analysis to previous years, distinguish two groups of winners among the European regions, the first grouping regions with increased employment and labour productivity, perhaps reflecting the success of technological and organizational changes introduced during the period, promoting the diversification and specialization in activities with high growth levels and attracting new investments less labour-intensive, and a second one formed by regions capable of implementing restructuring processes to eliminate the most inefficient outputs, achieve higher levels of productivity and increased industrial production, at the expense of a notable decline in employment.

Nevertheless, discrepancies in delocation patterns outlined above and different achievements in terms of productivity improvement have not only been the result of companies' response to intensified competition in each region, but also of differential features. On the one hand is size, which in larger regions, like some of Italy, Germany, France and Spain, reduces the chances of scoring high growth rates. On the other hand, are the national specificities, such as the massive migrations received by the Spanish regions, a key to explain their model of industrial growth and the different public policies. The influence of the two latter factors appears remarkable, given the similarities among the location patterns of each of the regions examined and the Member States they belong to.

Anyway, the lack of data has prevented us from going further into a preliminary explanatory analysis of the delocation patterns found when looking at the different manufacturing activities but the role played by the IT manufacturing sector and other branches affected by intense international competition (automobile, clothes and textiles and shoes) might have been important.

Finally, we would just like to point out that the regions have been able to compensate for the negative effect of the industrial delocation process on the employment by creating jobs in the other sectors. But, in addition, two-thirds of these regions have reacted in the face of delocation by increasing their industrial productivity. Thus, the result is that in all the regions considered in this paper it is possible to discover an active response to increasing competition in the international markets, either by extending their industrial base thanks to productivity increases, or by raising productivity and/or replacing employment in manufacturing by employment in other areas of activity.



**Appendix 1.** European regions NUTS 2 in the sample

<i>Code NUTS 2</i>	<i>Region name and country to which it belong</i>	<i>Code NUTS 2</i>	<i>Region name and country to which it belong</i>
at22	Steiermark	es21	País Vasco
at31	Oberösterreich	es30	Comunidad de Madrid
	<i>Austria</i>	es51	Cataluña
			<i>Spain</i>
be21	Prov. Antwerpen		
be23	Prov. Oost-Vlaanderen	fi18	Etelä-Suomi
	<i>Belgium</i>	fi19	Länsi-Suomi
			<i>Finland</i>
de11	Stuttgart		
de12	Karlsruhe	fr10	Île de France
de13	Freiburg	fr23	Haute-Normandie
de14	Tübingen	fr24	Centre
de21	Oberbayern	fr42	Alsace
de22	Niederbayern	fr51	Pays de la Loire
de23	Oberpfalz	fr52	Bretagne
de24	Oberfranken	fr61	Aquitaine
de25	Mittelfranken	fr62	Midi-Pyrénées
de26	Unterfranken	fr71	Rhône-Alpes
de27	Schwaben	fr82	Provence-Alpes-Côted'Azur
de60	Hamburg		<i>France</i>
de71	Darmstadt		
de73	Kassel	gr30	Attiki
de91	Braunschweig		<i>Greece</i>
de92	Hannover		
dea1	Düsseldorf	ie02	Southern and Eastern
dea2	Köln		<i>Ireland</i>
dea4	Detmold		
dea5	Arnsberg	itc1	Piemonte
deb3	Rheinhessen-Pfalz	itc4	Lombardia
dec0	Saarland	itd3	Veneto
def0	Schleswig-Holstein	itd5	Emilia-Romagna
	<i>Germany</i>	ite1	Toscana
		ite3	Marche
dk01	Hovedstaden	ite4	Lazio
dk04	Midtjylland		<i>Italy</i>
	<i>Denmark</i>		



**Appendix 1.** (Continue)

<i>Code NUTS 2</i>	<i>Region name and country to which it belong</i>	<i>Code NUTS 2</i>	<i>Region name and country to which it belong</i>
<i>nl22</i>	Gelderland	<i>uke4</i>	West Yorkshire
<i>nl32</i>	Noord-Holland	<i>ukf1</i>	Derbyshireand Nottinghamshire
<i>nl33</i>	Zuid-Holland	<i>ukf2</i>	Leicestershire, Rutland and Northant
<i>nl41</i>	Noord-Brabant	<i>ukg3</i>	West Midlands
	<i>Netherlands</i>	<i>ukh1</i>	East Anglia
		<i>uki1</i>	Inner London
<i>se11</i>	Stockholm	<i>uki2</i>	Outer London
<i>se12</i>	Östra Mellansverige	<i>ukj1</i>	Berkshire, Bucks and Oxfordshire
<i>se22</i>	Sydsverige	<i>ukj3</i>	Hampshire and Isle of Wight
<i>se23</i>	Västsverige	<i>ukk1</i>	Gloucestershire, Wiltshire and Bristol
	<i>Sweden</i>	<i>ukm2</i>	Eastern Scotland
		<i>ukm3</i>	South Western Scotland
<i>ukd3</i>	Greater Manchester		<i>United Kingdom</i>
<i>ukd4</i>	Lancashire		

**Appendix 2.** GDP per Capita and region's share in EU-15 manufacturing GVA, 2005

		<i>Manufacturing GVA (% of total EU-15)</i>	<i>GDPpc (Index, EU-15=100)</i>
<i>at22</i>	Steiermark	0.40	96.47
<i>at31</i>	Oberösterreich	0.63	106.41
<i>be21</i>	Prov. Antwerpen	0.64	127.80
<i>be23</i>	Prov. Oost-Vlaanderen	0.40	95.89
<i>de11</i>	Stuttgart	2.41	122.96
<i>de12</i>	Karlsruhe	1.32	116.74
<i>de13</i>	Freiburg	0.99	100.18
<i>de14</i>	Tübingen	0.95	107.80
<i>de21</i>	Oberbayern	2.05	146.84
<i>de22</i>	Niederbayern	0.51	100.90
<i>de23</i>	Oberpfalz	0.46	104.75
<i>de24</i>	Oberfranken	0.47	98.85
<i>de25</i>	Mittelfranken	0.79	120.22
<i>de26</i>	Unterfranken	0.56	102.83
<i>de27</i>	Schwaben	0.84	105.93



## Appendix 2. (Continue)

		Manufacturing GVA (% of total EU-15)	GDPpc (Index, EU-15=100)
de60	Hamburg	0.62	179.22
de71	Darmstadt	1.30	139.85
de73	Kassel	0.41	100.06
de91	Braunschweig	0.81	96.75
de92	Hannover	0.58	100.00
dea1	Düsseldorf	1.76	113.97
dea2	Köln	1.29	103.87
dea4	Detmold	0.85	97.42
dea5	Arnsberg	1.43	93.95
deb3	Rheinhessen-Pfalz	0.82	95.05
dec0	Saarland	0.40	97.78
def0	Schleswig-Holstein	0.61	90.99
dk01	Hovedstaden	0.43	182.87
dk04	Midtjylland	0.41	135.81
es21	País Vasco	0.70	99.77
es30	Comunidad de Madrid	0.93	102.13
es51	Cataluña	1.80	93.10
fi18	Etelä-Suomi	1.23	130.09
fi19	Länsi-Suomi	0.64	99.54
fr10	Île de France	2.21	158.21
fr23	Haute-Normandie	0.43	93.33
fr24	Centre	0.52	92.11
fr42	Alsace	0.48	96.64
fr51	Pays de la Loire	0.72	93.53
fr52	Bretagne	0.51	91.24
fr61	Aquitaine	0.44	92.76
fr62	Midi-Pyrénées	0.40	92.21
fr71	Rhône-Alpes	1.40	103.49
fr82	Provence-Alpes-Côted'Azur	0.55	97.15
gr30	Attiki	0.39	91.44
ie02	Southern and Eastern	1.96	160.68
itc1	Piemonte	1.28	99.73
itc4	Lombardia	3.90	118.63
itd3	Veneto	1.76	107.47
itd5	Emilia-Romagna	1.64	111.32



**Appendix 2.** (Continue)

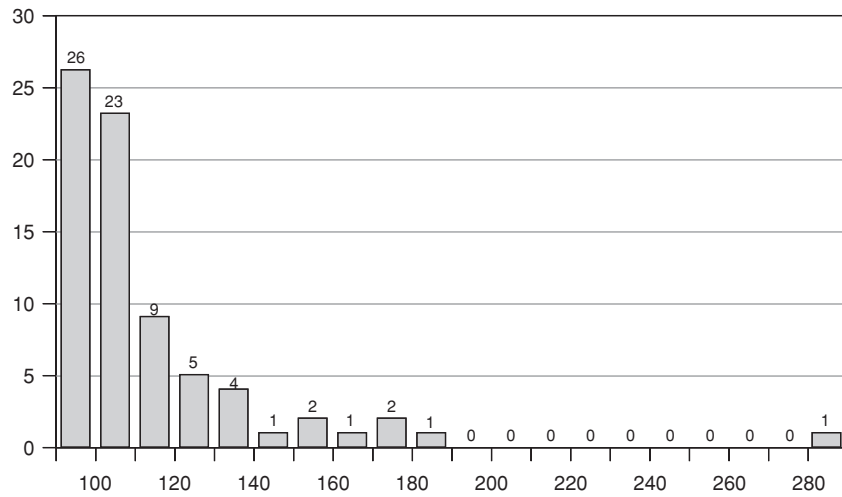
		<i>Manufacturing GVA (% of total EU-15)</i>	<i>GDPpc (Index, EU-15=100)</i>
<i>ite1</i>	Toscana	0.90	99.29
<i>ite3</i>	Marche	0.47	90.78
<i>ite4</i>	Lazio	0.62	111.23
<i>nl22</i>	Gelderland	0.43	98.92
<i>nl32</i>	Noord-Holland	0.51	138.04
<i>nl33</i>	Zuid-Holland	0.77	120.03
<i>nl41</i>	Noord-Brabant	0.98	117.22
<i>se11</i>	Stockholm	0.62	170.37
<i>se12</i>	Östra Mellansverige	0.56	104.33
<i>se22</i>	Sydsverige	0.44	108.65
<i>se23</i>	Västsverige	0.74	117.43
<i>ukd3</i>	Greater Manchester	0.55	103.74
<i>ukd4</i>	Lancashire	0.46	91.61
<i>uke4</i>	West Yorkshire	0.54	103.78
<i>ukf1</i>	Derbyshireand Nottinghamshire	0.65	102.83
<i>ukf2</i>	Leicestershire, Rutland and Northant	0.53	111.79
<i>ukg3</i>	West Midlands	0.71	105.96
<i>ukh1</i>	East Anglia	0.50	101.69
<i>uki1</i>	Inner London	0.67	285.35
<i>uki2</i>	Outer London	0.55	102.31
<i>ukj1</i>	Berkshire, Bucks and Oxfordshire	0.58	158.36
<i>ukj3</i>	Hampshire and Isle of Wight	0.43	113.34
<i>ukk1</i>	Gloucestershire, Wiltshire and Bristol	0.61	126.28
<i>ukm2</i>	Eastern Scotland	0.44	109.47
<i>ukm3</i>	South Western Scotland	0.53	100.97

Source: Elaborated from Eurostat and National Statistical offices.

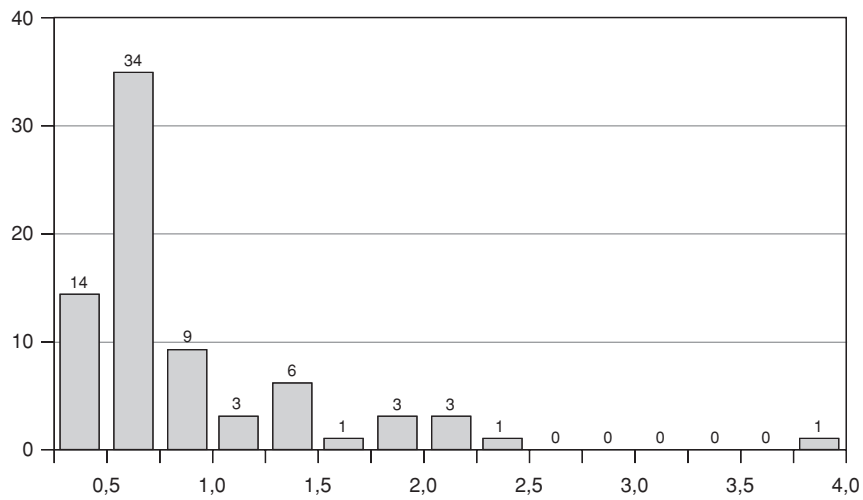


**Appendix 2. (Continue)**

**Regional GDP per capita (EU-15 = 100): Histogram**

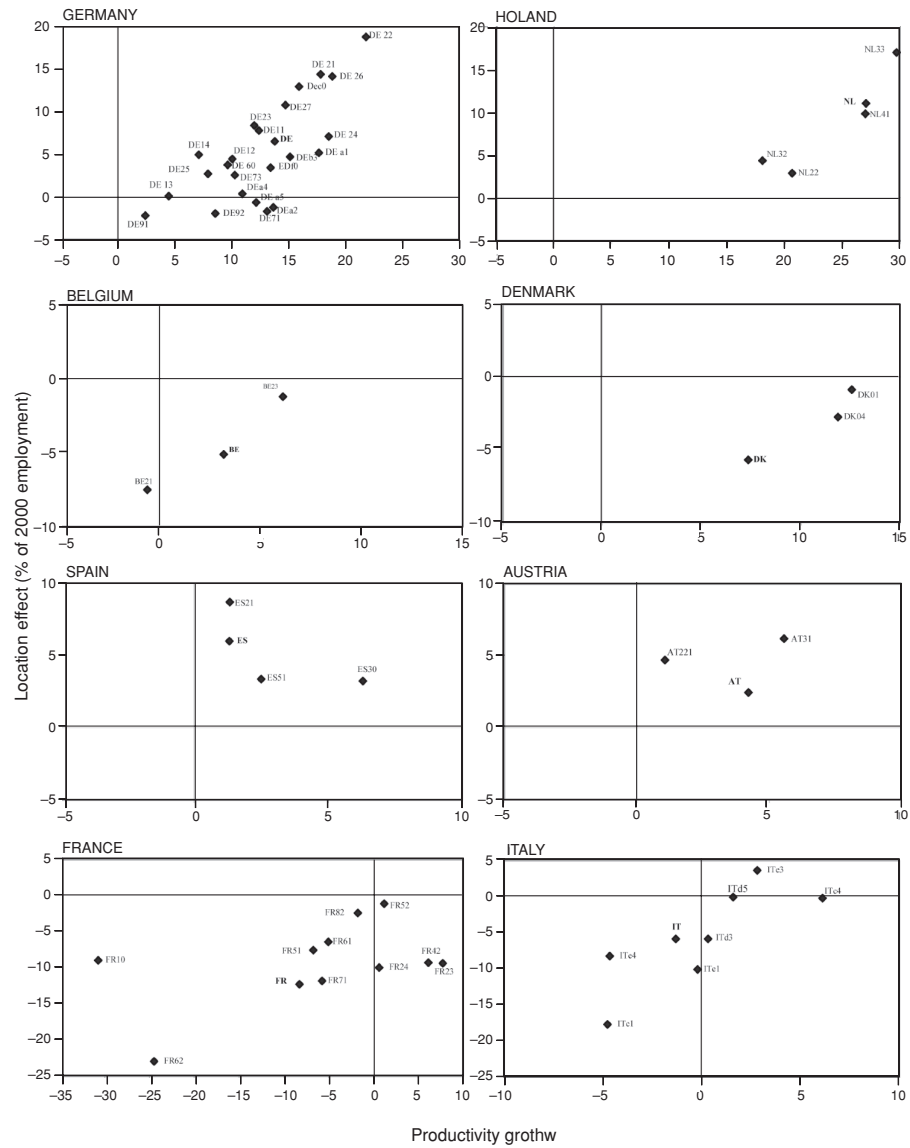


**Industrial size of selected regions (% of EU-15 manufacturing GVA): Histogram**



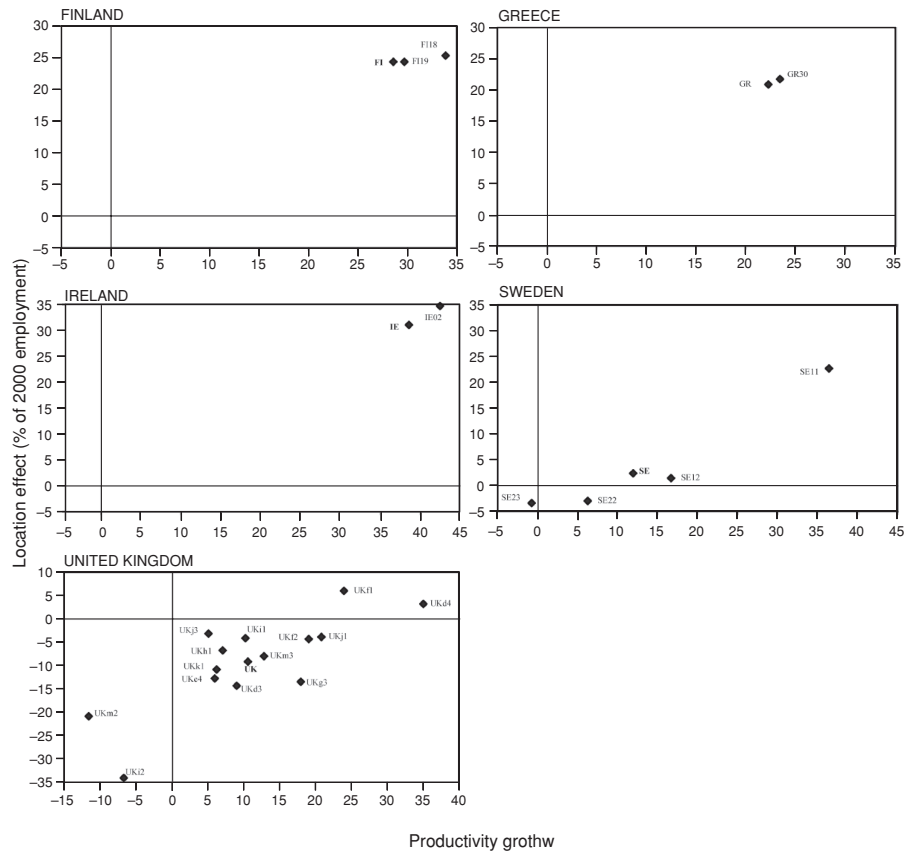


### Appendix 3. Location effect and productivity growth rates in European manufacturing sector (percentages)





### Appendix 3. (Continue)



Source: Elaborated from Eurostat and National Statistical offices.

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