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**Conference Paper**

## Spatial Industrial Dynamics - An Empirical Test of the Lead-Lag Model

41st Congress of the European Regional Science Association: "European Regional Development Issues in the New Millennium and their Impact on Economic Policy", 29 August - 1 September 2001, Zagreb, Croatia

**Provided in Cooperation with:**

European Regional Science Association (ERSA)

*Suggested Citation:* Karlsson, Charlie (2001) : Spatial Industrial Dynamics - An Empirical Test of the Lead-Lag Model, 41st Congress of the European Regional Science Association: "European Regional Development Issues in the New Millennium and their Impact on Economic Policy", 29 August - 1 September 2001, Zagreb, Croatia, European Regional Science Association (ERSA), Louvain-la-Neuve

This Version is available at:

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Spatial Industrial Dynamics in Sweden –  
An Empirical Test of the Lead-Lag Model

by

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Draft  
April 2001

Paper to be presented at the 41<sup>st</sup> Congress of the European Regional Science Association,  
29 August – 1 September 2001 in Zagreb

## 1. Introduction

One fundamental hypothesis within the field of spatial industrial dynamics is the idea that in most countries it is possible to identify a limited number of leading urban regions. They keep their lead by continuously initiating, imitating and developing activities that over time to a substantial degree tend to diffuse to other locations in a hierarchy of functional urban regions. There are a number of forces that might propel diffusion processes of this kind. One force often mentioned is the maturing of products and industries, which makes them less dependent upon the external economies offered by the large urban regions. Another force is the change in the type and the organisation of production taking place over time in the non-leading regions, which, for example, produce an increased demand for producer services. A third force worth mentioning is the secular rise in the real incomes in non-leading regions which give rise to an increased demand for various consumer services due to an income elasticity of demand greater than one.

Given the above hypothesis a number of questions may be formulated: Is it possible to document these kinds of decentralisation processes? If so, what are their characteristics? How rapid are they? What differences are there between different products, different industries, and different technologies? Are the follower regions catching up over time? These questions have been studied in a number of studies in Sweden using data for the period 1980 to the early 1990s (Forslund, & Johansson, 1995; Karlsson, 1997; Karlsson, 1999).

In the above studies it was shown that the Stockholm region was the leading region in Sweden (and in the whole Nordic region) during the period 1980-1993. It continuously introduced new products and industries, which were mainly lacking in other regions in Sweden. When such products and industries were imitated and developed in other regions the Swedish economy was renewed. Industries that had a high specialisation in the Stockholm region had a statistically significant tendency to grow in other parts of the country. More than 80 per cent of all industries that had a high specialisation in the Stockholm region in 1980 grew in the rest of the country during the following decade. Industries that had a high specialisation in the Stockholm region during the whole period 1980-1993 increased their employment in the rest of the country with more than 40 per cent. More than 80 per cent of all industries that 1980 had a low specialisation in the Stockholm region experienced a decrease in their employment in the rest of the country during the following decade.

The results from these previous studies give us no reason to reject the basic hypotheses of the leader-follower-model. However, the empirical results are limited to one specific period – the 1980s. In the early 1990s Sweden went through a major economic crisis, which, for example, resulted in the loss of 20 per cent of the employment in the manufacturing industry. After the crisis the Swedish economy has experienced a rapid growth and in particular it seems as if it is industries related to the so-called “new economy” that grow. It seems as if much of this growth has been concentrated to the larger cities and in particular to the capital region, i.e. the Stockholm region. This of course, raises questions as regards the leader-follower-model. Have, for example, the same decentralisation forces been active in the 1990s and in the 1980s? Data is now available for a long enough period to study the leader-follower processes in the 1990s. Furthermore, since 1993 Sweden has a new system of industrial classification,

that at the finest level – the 5-digit level – identifies almost 750 different industries. The earlier studies distinguished only between about 100 different industries. With this new set of data, it is possible to study leader-follower-processes on a much more detailed scale. Another aspect of the earlier studies is that they included public sector industries as well as primary sector industries. As the location behaviour of these industries for obvious reasons are governed by some sector specific aspects it also seems motivated to make a special analysis of the remaining private sector industries to be able to analyse market driven spatial industrial dynamics.

The purpose of this paper is to present a model that can be used to analyse spatial industrial dynamics in a system of functional regions and to apply this model to illustrate at an aggregated level, the general developments of the private sector in Sweden during the period 1990-1999. By doing this we provide a basis for more disaggregated analyses of the development of both groups of industries and individual industries as well as of individual functional regions.

The paper is organised as follows: Section 2 introduces important aspects of the leader-follower model within a spatial industrial dynamics framework. In Section 3, the model to be used to analyse spatial industrial dynamics is presented. This model is then used in Section 4 to illustrate at an aggregated level, the general developments of the private sector in Sweden during the period 1990-1999. In Section 5 the main results of the analysis are summarised, and some suggestions made for future research.

## **2. The leader-follower model**

Forslund & Johansson (1995) have introduced a model of spatial industrial dynamics in the time and space hierarchy of functional urban regions. Their model combines elements of the spatial product life cycle, the “filtering-down” and the regional life cycle theories. It is characterised by the idea that a leading urban region in a country keeps its lead by initiating, imitating, and developing activities that have a high tendency to successively diffuse to other locations in a hierarchy of functional urban regions. They see the large urban regions as the fundamental nodes in the innovation, production and distribution networks in every country. Many of the large urban regions are also key nodes in the international exchange and diffusion networks, which contain a large number of interaction functions. In particular, they are import nodes, with dense import networks that provide rich information about new products, new techniques, and so on from the world market. To a large extent, it is in these nodal locations that new technologies, new activities, new occupations, and new consumption patterns are created and introduced. Hence, large urban regions in the industrialised countries are looked upon as the key forces behind both the national and the international economic evolution.

As in all product cycle models, the dynamics of standardised and non-standardised activities are focused upon in their analysis. Standardised activities are characterised by their standardised products, and by the routinised methods that are used to produce these products. As products and production techniques become standardised, activities tend to migrate and a region can only “survive” with a proper inflow of new activities. The Forslund-Johansson leader-follower-model differs from the standard version of the spatial product cycle model in

one important aspect. It does not assume that non-standardised activities generally develop to standardised activities. Also, non-standardised activities include customised deliveries of goods and services for which each delivery has new and unique individual characteristics. In these cases the authors maintain that one cannot observe any spatial product cycles at all, and, hence, these functions tend to remain in the large urban areas, where their locational advantage is the greatest (Barkley, 1988). However, at an aggregated level, they claim that it is possible to observe how parts of clusters of such activities expand or contract. Hence, in that respect it is still possible to make references to Schumpeterian waves of varying length and amplitude.

According to the new perspective presented by Forslund & Johansson, the system of functional urban regions in a country forms a time and space hierarchy for which the largest functional urban region is leading by more or less continuously introducing new products (goods or services), new activities, etc. Hence, it is assumed that most new products and industries have their early growth in the largest region, even if the activity has been initiated somewhere else. A natural explanation exists as to why new industries take off in the largest market in this way. One reason is that the regional home market is larger than in any other region in the country. A further reason is that the largest region has a larger share of R&D-resources and a larger supply of highly educated labour than any other region.

What happens then when an industry has a foothold in the largest region? For many products, as mentioned above, a certain standardisation and a routinisation of production and deliveries are achieved over time. As products are standardised they also gradually become well known and demanded in larger and growing regional markets. With standardisation and routinisation a reduction of the set up costs for new production follows, and, thus more and more regional markets become large enough to make it possible to exploit economies of scale. This means that it will be possible for this type of production to find a profitable location in other regions than the largest region. For products that develop in accordance with this pattern a gradual diffusion to other regions often takes place. This growth is often first observed in other large urban regions. For certain products the diffusion can stop here if the products need the external economies offered by large urban regions. However, in many cases the diffusion continues to medium-sized and small regions, and in some cases it continues until almost all regions have taken up the actual activity. Large, medium-sized and small functional urban regions are followers in such a way that they adopt the new products, new activities, and so on, some time after they have been introduced in the largest region.

Of course, leaders and followers can not be classified in a complete and strict sense. However, in frequency terms it is possible to order the functional urban regions in a hierarchy that remains invariant during long time periods (Forslund & Johansson, 1995). In order to keep their position in the hierarchy, the functional urban regions must adapt to small and large external shocks. Such an adaptation may demand new location patterns: some "old" activities must go and some "new" activities must come. The speed of such an adaptation process is assumed to depend upon how general (non-production specific) and how polyvalent the actual urban infrastructure is. For functional regions with a non-general (production-specific) infrastructure, such adaptation processes can be very slow or even non-existing (Johansson & Karlsson, 1990). However, leading functional urban regions are expected to have a rich endowment with general urban infrastructure.

### 3. A method for analysing spatial industrial dynamics

It is a more or less a daily phenomenon in most industrialised countries to come across descriptions and analyses of industrial structure and structural change at the national level. In almost all cases these descriptions and analyses suffer from the basic weakness, that they are strongly aggregated, and that often much valuable information is hidden in the aggregated numbers. To solve this problem, at least partly, a new analysis model and presentation format that can be used for disaggregated analyses of spatial industrial dynamics is presented here. This method was first introduced by Forslund and Johansson (1995).

This new approach, like previous methods, gives a general overview, but it also elucidates how the transformation of the structure of industries has taken place for half a decade<sup>1</sup>. Furthermore, this method can be used to make qualified statements about how the transformation of the structure of industries can be expected to continue for the next decade or so. The basic motive to develop a new prognosis method is that traditional linear prognosis methods do not give a good picture of the future industrial structure in different regions. The focus of the new method is to provide a qualitative picture of the composition and the development of the industrial structure in each region. At the same time the ambition is to draw the picture in such a way that it can be used as a basis to express the direction of the development in different regions more precisely.

To illustrate the method, regionalised employment data for the years 1990 and 1999 are used.<sup>2</sup> As a general point of departure, the total employment in the private sector<sup>3</sup> in Sweden distributed over 616 industries is classified into three groups:

1. rapid employment growth – if the employment in the industry outside the Stockholm local labour market region<sup>4</sup> increased by 48 per cent or more during the period 1990-1999,
2. slow employment growth – if the employment in the industry outside the Stockholm local labour market region increased by less than 48 per cent during the period 1990-1999,
3. slow employment decline – if the employment in the industry outside the Stockholm local labour market region decreased by less than 29 per cent during the period 1990-1999,
4. rapid employment decline – if the employment in the industry outside the Stockholm local labour market region decreased by 29 per cent or more during the period 1990-1999.

However, this division of industries based upon the development of employment between 1990 and 1999 produces a weak basis to make prognoses for enduring dynamic development traits for the future development of the industrial structure in different regions. To obtain a firmer point of departure, this division of the 616 industries is complemented by a second division of the same industries based upon whether they have a high, a medium, a low or a very low specialisation in the year 1990 in the Stockholm local labour market region. As the

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<sup>1</sup> Changes in the system of industrial classification currently limit the time period. As time goes by it will be possible to extend the time period.

<sup>2</sup> Due to changes in statistical definitions, data for earlier years cannot be used.

<sup>3</sup> This means all employment except the public sector and the agriculture, forestry and fishing sector.

<sup>4</sup> Local labour market regions are aggregates of municipalities connected by labour force commuting, and can be looked upon as functional urban regions.

measure of specialisation, the location quotient<sup>5</sup> in the Stockholm local labour market region for all the 616 industries is used. Table 3.1 shows how it is possible, based upon these two divisions, to create an analysis scheme with 16 cells.

**Table 3.1** An analysis scheme based upon a classification of industries, given their regional specialisation in the Stockholm local labour market region in 1990, and their employment growth and decline in the rest of the country during the period 1990-1999

Regional specialisation in the Stockholm local labour market region in 1990	Employment growth and decline in the rest of Sweden 1990-1999			
	Rapid growth	Slow growth	Slow decline	Rapid decline
High	H++	H+	H-	H--
Medium	M++	M+	M-	M--
Low	L++	L+	L-	L--
Very low	VL++	VL+	VL-	VL--

The Stockholm local labour market region is used as the norm for comparisons, as it is the most advanced, i.e., the leading region in the Nordic countries. It has come furthest in (i) developing new consumption goods and new consumption patterns, (ii) acting as an intermediary in new technologies, and (iii) crystallising new growth industries. The region also has a lead, when it comes to automatisisation and rationalisation of established production. Industries that have expanded and reached a strong over-representation in the Stockholm local labour market region can generally be expected to be industries that will have a strong growth potential in other regions in Sweden in the future. Industries that on the other hand have gone backwards and become strongly underrepresented in the Stockholm local labour market region are industries that with a high probability will also lose employment in other regions.

If one follows this method mechanically, one postulates that the industrial structure of the Stockholm local labour market region is a future picture of the industrial structure of an average region. However, the purpose is not to make precise forecasts for each individual region based upon the developments in the Stockholm region. Instead, the point of using the Stockholm region as a reference region is that it gives a relevant basis for comparisons. Thus this method can give an appropriate starting point for studying the specific development tracks and development patterns in different regions. It can, for example, entail services produced for consumption within a region. Furthermore, this method provides an opportunity to make explicit how each functional region's specialisation pattern diverges from a general development pattern.

To evaluate the potential of this method it could be worthwhile to discuss its limitations. In analyses within regional economics, one often starts from the idea of an export base.

<sup>5</sup> Location quotient for industry j in region i = the share of region i of the total employment in industry j in the country divided by the share of region i of all the employment in the country.

Expressed in simple words, this means that the economic growth in a small open economy is dependent upon the income creation in firms that produce for markets outside the region. These firms create the export base of the region. Other production directed towards the internal market of the region is classified as derived production. For many regions in Sweden, part of the export base consists of production based upon natural resources such as food and paper production, which is relatively region-specific. In these cases, the Stockholm local labour market region is not very well suited as a reference region. However, the main question is what additions to the export-directed production in the natural resources-based regions can be expected, when their traditional export base contracts. When trying to forecast such a structural change process, a well-chosen reference region can give important support. There are, however, good reasons to stress that the export-oriented production in smaller regions always will be more specialised and less comprehensively structured than in a large region, such as the Stockholm region.

Hence, even if there are important areas, where one should use and interpret the general comparison model cautiously, there are other areas where the model has a very strong position. In particular, it will for most industries give a precise guide about ongoing labour saving rationalisation. It also highlights the emergence of new activities in the following two areas:

- the regionally-directed production of goods and services tied to private and public consumption and income distribution,
- the production of producer services.

In the first case the argument is the following. In a long-term perspective, consumption patterns in Sweden show the same development tracks in all regions. What produces lags in time and hence causes the different time patterns in the different regions are mainly, differences in the access and diffusion of information, the development of the average income level, and the income distribution. The same observations can be made for the purchases of producer services by firms. Whether the new (increased) demand will give rise to new production within a specific region or not depends among other things upon

- whether the demand concerns production, where the region can have special comparative advantages or disadvantages (e.g., spare time, recreational or cultural activities),
- if the demand is directed towards sheltered service production (e.g. municipal services),
- if import substitution takes place (i.e., if a region gradually covers more and more of its own demand by increased intraregional production and hence decreased imports).

It is in this connection possible to argue that a strongly urbanised region like the Stockholm region, gives strong indications of the upper limit for a region's self-sufficiency, when it comes to production of the kind of goods and services discussed here.

The growth of specialised producer services is dependent upon the size of the market and the availability of the competence that the production of such services demands. The growth and the degree of differentiation of producer services such as consultancy, R&D, banking and financial services, insurance services, as well as real estate agents and managers mirror the growth and differentiation of other production activities in the region. The growth and differentiation of producer services in a region are also influenced by the status of the interregional infrastructure and its development and the possibilities to export producer



services to other regions. These are conditions, which indicate that a rapidly growing and strongly developed region with a well-developed infrastructure can be looked upon as a region that has an advantage over other regions or as being a forerunner to other regions. At the same time, it almost always holds that the more specialised a service production is, the more dependent its location upon high accessibility in the system of regions.

#### 4. The Method of Analysis Applied

In this section it is shown how the method of analysis presented in last section can be used to describe and analyse the overall industrial dynamics in Sweden in a new way. In Table 4.1, it is shown how the 616 industries are distributed over the cells of the model of analysis. The distribution pattern is strongly skewed and it is possible to observe a marked concentration along the main diagonal with 33.6 percent of all the included industries concentrated in these four cells. The  $\chi^2$ -value clearly indicates that the actual distribution in a significant way deviates from an even distribution of the 616 industries over the 16 cells.

In Table 4.1, we see that of the 154 industries with a high specialisation in the Stockholm region in 1990, 67 percent grew in the period 1990-1999 and 35 percent of them exhibited a rapid growth. At the same time, we see for the period 1990-1999, that of 152 industries with a very low specialisation in the Stockholm region in 1990, 67 percent had a decline in employment and that 43 percent of them had a rapid decline in employment.

Service industries are mainly concentrated in the cells H++, H+, M++ and M+<sup>6</sup>, i.e., to the upper left corner of the table. 121 of 297 service industries, i.e., roughly 41 percent, are found in these four cells. The different industries within the manufacturing industry are, on the other hand, with few exceptions, concentrated to the bottom right corner of the table (162 out of 210 industries within the manufacturing industry, or a little more than 77 percent, are to be found in the cells L-, L--, VL- and VL--).

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<sup>6</sup> See Table 3.1 for definitions.

**Table 4.1** 616 private sector industries in Sweden classified according to regional specialisation in the Stockholm local labour market region in 1990 and employment growth and decline in the rest of Sweden 1990-1999

Regional specialisation in the Stockholm local labour market region in 1990	Employment growth and decline in the rest of Sweden 1990-1999				
	Rapid growth	Slow growth	Slow decline	Rapid decline	Sum
<b>High</b>	54	49	24	27	154
<b>Medium</b>	20	35	64	35	154
<b>Low</b>	26	26	53	51	156
<b>Very low</b>	30	20	37	65	152
<b>Sum</b>	130	130	178	178	616

$$\chi^2 = 75.47 \text{ (9 d.f.)}$$

The total employment in private sector industries in Sweden decreased from 2,813,837 persons in 1990 to 2,492,804 persons in 1999<sup>7</sup>. Table 4.2 shows the distribution of the employment in 1990 and 1999 over the 16 cells in the analysis table developed in this paper. We see in the table that the rapid growth industries in 1999 had a share of the total employment in the private sector that was almost 2.5 times as high as in 1990. During the same period the employment share for the rapidly declining industries decreased with 40 percent. In Table 4.2A and Table 4.2B in Appendix 1 and 2, respectively, we can clearly see the distinct difference between the Stockholm local labour market region and the rest of Sweden. In 1999 almost 53 percent of the employment was concentrated to growing industries, of which rapidly growing industries accounted for 40 percent. In the rest of Sweden, growing industries only accounted for a little less than 39 percent, of which rapidly growing industries accounted for only about 33 percent.

<sup>7</sup> Total national employment in private industries as defined here 1990 and 1999

**Table 4.2** The total employment in private sector industries in Sweden in the year 1999 (1990) distributed over the cells of the model of analysis (percent)

Regional specialisation in the Stockholm local labour market region in 1990	Employment growth and decline in the rest of Sweden 1990-1999				
	Rapid growth	Slow growth	Slow decline	Rapid decline	Sum
<b>High</b>	10.13 (4.23)	13.01 (10.98)	2.45 (2.45)	3.89 (5.71)	29.48 (23.37)
<b>Medium</b>	1.81 (0.61)	8.71 (6.63)	19.12 (20.39)	8.07 (14.75)	37.71 (42.38)
<b>Low</b>	2.47 (1.08)	3.00 (2.21)	13.07 (13.33)	4.45 (6.85)	22.99 (23.47)
<b>Very low</b>	0.81 (0.23)	2.35 (1.62)	3.81 (4.14)	2.86 (4.80)	9.83 (10.79)
<b>Sum</b>	15.22 (6.15)	27.07 (21.44)	38.45 (40.31)	19.27 (32.11)	100.00 (100.00)

By consulting Table 4AA in Appendix 1 and Table 4BB in Appendix 2, we find that the Stockholm region in 1999 has a very strong specialisation in growth industries and in particular in rapidly growing industries. This specialisation has declined during the period 1990-1999, but it is still very pronounced in 1999. The rest of Sweden, on the other hand, has as a result a clear specialisation in declining industries in 1999.

In Table 4.3 the employment changes in the private sector industries in Sweden during the period 1990-1999 are analysed. During this period the total employment in private sector industries decreased by about 11.41 percent, which accounted for a net decrease of about 321,000 jobs. However, this average figure disguises a strongly divergent development, as can be seen in the table. Overall, the rapidly growing industries increased their employment with almost 120 percent during the period 1990-1999, while the rapidly declining industries lost almost 50 percent of their employment during the same period. From Table 4.3A and Table 4.3B in Appendix 1 and 2, respectively, we see that the Stockholm local labour market region during the actual period lost only 6.2 percent in the private sector, while the rest of Sweden lost 13.1 percent of the jobs. This means that the decrease in jobs in the private sector between 1990 and 1999 was more than twice as high in the rest of Sweden as in the Stockholm region.

The structural change process illustrated by Table 4.3 is a typical process in all dynamic economies.<sup>8</sup> The relevant policy response is obviously not to try to check the structural

<sup>8</sup> The disappearance of a job among the industries in the cell VL-- (or any other cell) does not necessarily mean that the tasks disappear. What is typical for the period studied here is that great changes in the division of labour between different industries took place and that new patterns of specialisation between industries developed. Many of the tasks that disappeared within the manufacturing industry showed up as new jobs within the rapidly growing service industries.

change to keep up the employment level, but instead, to concentrate on measures that can secure that the growth of new job opportunities keeps up with the losses of job opportunities.

**Table 4.3** Relative changes in employment in the different industry groups during the period 1990-1999 (percent)

<b>Regional specialisation in the Stockholm local labour market region in 1990</b>	<b>Employment growth and decline in the rest of Sweden 1990-1999</b>				
	<b>Rapid growth</b>	<b>Slow growth</b>	<b>Slow decline</b>	<b>Rapid decline</b>	<b>Average</b>
<b>High</b>	112.22	4.97	-11.39	-39.61	11.78
<b>Medium</b>	164.18	16.33	-16.93	-51.54	-21.18
<b>Low</b>	102.50	19.90	-13.13	-42.36	-13.23
<b>Very low</b>	218.18	28.33	-18.56	-47.15	-19.27
<b>Average</b>	119.55	11.79	-15.51	-46.81	-11.41

In Table 4.4 we illustrate the absolute changes in the number of employees in the different industry groups. We see in the table, for example, that during a period when the private sector industries in Sweden in total lost more than 320,000 jobs, the rapidly growing industries grew with more than 200,000 jobs. Two thirds of this job growth came from industries that also had a high specialisation in the Stockholm region in 1990.

Comparing the general development in the country as a whole, as illustrated in Figure 4.4 with the developments in the Stockholm local labour market region and in the rest of Sweden, as illustrated in Table 4.4A and Table 4.4B in Appendix 1 and 2 respectively, we observe very divergent developments. The job losses in the private sector in the Stockholm region that was just over 42,600 jobs accounted only for 13.3 percent of all the job losses in the country as a whole. This can be compared with the share of the Stockholm region of all the employment in the country that in 1999 was 25.9 percent. Of the job growth in the rapidly growing industries, the Stockholm region accounted for 32.7 percent even though the growth rate in these industries was lower in the Stockholm region than in the country as a whole.

**Table 4.4** Absolute changes in employment in the different industry groups during the period 1990-1999

	<b>Employment growth and decline in the rest of Sweden 1990-1999</b>				
<b>Regional specialisation in the Stockholm local labour market region in 1990</b>	<b>Rapid growth</b>	<b>Slow growth</b>	<b>Slow decline</b>	<b>Rapid decline</b>	<b>Sum</b>
<b>High</b>	133,524	15,356	-7,842	-63,586	77,452
<b>Medium</b>	28,046	30,475	-97,165	-213,996	-252,640
<b>Low</b>	31,106	12,395	-49,248	-81,592	-87,339
<b>Very low</b>	13,859	12,931	-21,645	-63,651	-58,506
<b>Sum</b>	206,535	71,157	-175,900	-422,825	-321,033

Much interest has in recent decades been focused on the role of small and medium sized enterprises for the creation of new job opportunities. In Table 4.5 we illustrate the change in the average size of plants in the different cells in 1990 and 1999. Industries that have a very low specialisation in the Stockholm region have on average a plant size that is four times larger than the other industries. This indicates that internal economies of scale are essential for these industries. This is what one could expect, since these industries are located mainly in peripheral regions. The general pattern is that the average plant size has declined between 1990 and 1999. However, for rapidly growing industries, except those with a high specialisation in the Stockholm region we see that the average plant size has increased.

**Table 4.5** Average plant size in the different cells in 1999 (1990)

	<b>Employment growth and decline in the rest of Sweden 1990-1999</b>				
<b>Regional specialisation in the Stockholm local labour market region in 1990</b>	<b>Rapid growth</b>	<b>Slow growth</b>	<b>Slow decline</b>	<b>Rapid decline</b>	<b>Average</b>
<b>High</b>	7.38 (7.64)	7.81 (8.45)	4.31 (5.10)	14.17 (17.20)	7.60 (8.77)
<b>Medium</b>	3.97 (3.86)	5.07 (5.31)	6.37 (7.11)	7.82 (12.06)	6.08 (7.71)
<b>Low</b>	8.18 (5.90)	6.73 (6.18)	9.46 (8.80)	8.45 (10.57)	8.66 (8.68)
<b>Very low</b>	19.55 (18.20)	57.54 (58.08)	25.10 (26.70)	28.51 (42.77)	29.39 (35.06)
<b>Average</b>	7.01 (6.78)	6.99 (7.31)	7.53 (8.04)	9.97 (13.87)	7.65 (8.95)

The changes in the average size of plants illustrated in Table 4.5 is of course the result of varying entrepreneurial behaviour in the various industry groups. In Table 4.6 we see how the relative number of plants in the different cells has changed during the period 1990-1999. We see that the number of plants in the private sector as a whole increased only with 3.7 percent during the period 1990-1999. In the rapidly growing industries the number of plants more than doubled. At the same time, the number of plants in the rapidly declining industries declined with more than 25 percent. These figures in an interesting way illustrate the dramatic structural change process that the Swedish private sector went through during the period 1990-1999.

Turning now to a comparison between the Stockholm local labour market and the rest of Sweden using Table 4.6A and Table 4.6B in Appendix 1 and 2, respectively, we see that, while the number of plants in the Stockholm region increased with 17.1 percent between 1990 and 1999, it declined with 0.2 percent in the rest of Sweden. This means that the Stockholm region accounted for the whole net increase of plants in Sweden between 1990 and 1999 and a little more. Obviously, most of the entrepreneurial efforts in Sweden during the 1990s was concentrated to the Stockholm region. In particular, we might notice that the number of plants in rapidly growing industries during the period 1990-1999 increased with 126.5 percent in the Stockholm region and only with 104.7 percent in the rest of Sweden.

**Table 4.6** Relative changes in the number of plants in the different industry groups during the period 1990-1999 (percent)

<b>Regional specialisation in the Stockholm local labour market region in 1990</b>	<b>Employment growth and decline in the rest of Sweden 1990-1999</b>				
	<b>Rapid growth</b>	<b>Slow growth</b>	<b>Slow decline</b>	<b>Rapid decline</b>	<b>Average</b>
<b>High</b>	119.61	13.57	4.83	-26.69	29.02
<b>Medium</b>	157.04	21.81	-7.26	-25.28	0.04
<b>Low</b>	46.25	10.19	-19.16	-27.95	-12.96
<b>Very low</b>	196.28	29.52	-13.35	-20.72	-3.70
<b>Average</b>	112.36	16.28	-9.88	-26.01	3.70

To complement the picture in Table 4.6 we show the absolute changes in the number of plants during the period 1990-1999 in Table 4.7. In the table we see that the growing industries showed a net increase of more than 42.000 during the period, while the declining industries had a net loss of more than 30.000 plants. At the same time as the private sector was able to provide substantial entrepreneurial efforts a large number of entrepreneurs and companies also had to go out of business.

Once again, making a simple division between the Stockholm local labour market region and the rest of the country we find in Table 4.7A and 4.7B in Appendix 1 and 2, respectively, that the Stockholm region accounted for 39.4 percent of the increase in the number of plants in

rapidly growing industries. In the cell H++ the Stockholm region even accounted for 42.7 percent of the net increase of the number of plants.

**Table 4.7** Absolute changes in the number of plants in the different industry groups during the period 1990-1999

<b>Regional specialisation in the Stockholm local labour market region in 1990</b>	<b>Employment growth and decline in the rest of Sweden 1990-1999</b>				
	<b>Rapid growth</b>	<b>Slow growth</b>	<b>Slow decline</b>	<b>Rapid decline</b>	<b>Sum</b>
<b>High</b>	18,637	4,959	653	-2,491	21,758
<b>Medium</b>	6,949	7,669	-5,856	-8,701	61
<b>Low</b>	2,377	1,026	-8,165	-5,096	-9,858
<b>Very low</b>	685	232	-583	-654	-320
<b>Sum</b>	28,648	13,886	-13,951	-16,942	11,641

One factor that varies significantly between different regions and that in different studies have been shown to be connected with variations in development, renewal and transformation in different regions is the supply of labour with tertiary education. In Table 4.8 we illustrate how the share of employees with long university education (three years or more) varies between the different cells. We see that this share for the sector as a whole has increased with almost 50 percent during the period 1990-1999. We see that the quarter of the industries in the private sector with a high specialisation in the Stockholm region on average have a knowledge intensity that is about 80 percent higher than for all private sector industries. Furthermore we see that rapidly growing industries on average have a knowledge intensity that is more than double that of the private sector as a whole. The knowledge intensity in the H++ industries is about 160 percent higher than the national average for the private sector. 25 percent of the employees in these industries have a long university education. It is obvious that these industries in their location decisions are very demanding with respect to the supply of well-educated labour in different regions.

Comparing the intensity of employees with a long university education in the Stockholm region with that in the rest of the country, using Table 4.8A and Table 4.8B in Appendix 1 and 2, respectively, we see that the average knowledge intensity in the Stockholm region is 2.2 times higher than that in the rest of Sweden. One interesting observation can be made for cell H++, where the knowledge intensity has declined between 1990 and 1999, while it has increased substantially in the Stockholm region. This indicates that the expansion of these industries in the rest of Sweden probably concerns other less knowledge intensive functions such as production and distribution, while the knowledge intensive R&D and product and process development functions become more concentrated to the Stockholm region.

**Table 4.8** Share of employees with a long university education (three years or more, including a Ph.D. training) in the sixteen industrial aggregates in 1999 (1990) (percent)

Regional specialisation in the Stockholm local labour market region in 1990	Employment growth and decline in the rest of Sweden 1990-1999				
	Rapid growth	Slow growth	Slow decline	Rapid decline	Average
<b>High</b>	25.40 (24.31)	12.98 (10.52)	10.71 (9.00)	16.78 (11.92)	17.58 (13.22)
<b>Medium</b>	15.74 (13.66)	13.22 (11.30)	5.43 (4.47)	4.75 (3.07)	7.58 (5.28)
<b>Low</b>	5.63 (3.58)	3.62 (2.44)	4.61 (3.13)	6.10 (4.01)	4.86 (3.34)
<b>Very low</b>	5.90 (13.76)	8.43 (6.53)	4.63 (2.96)	5.09 (3.36)	5.78 (3.92)
<b>Average</b>	20.17 (19.23)	11.55 (9.64)	5.41 (4.14)	7.46 (4.96)	9.72 (6.56)

Table 4.9 illustrates how the share of employees with any tertiary education<sup>9</sup> (including Ph.D. training) varies between the different cells. Overall, for the period 1990-1999 this share has increased with almost 50 percent. We see that more than one third of the employees in industries with a high specialisation in the Stockholm region has some form of tertiary education. That means that these industries have an educational intensity that is at least double that in industries with a low specialisation in the Stockholm region. In rapidly growing industries almost 40 per cent of the employees have some tertiary education. This figure is 77.5 per cent higher than the national average for all private sector industries. For the cell H++ we find that almost 50 percent have some tertiary education. This share is 120 per cent higher than the national average.

Comparing the intensity of all kinds of tertiary education in the Stockholm local labour market region and the rest of Sweden in Table 4.9A and Table 4.9B in Appendix 1 and 2, respectively, we still find a substantial difference between the two parts of Sweden. However, the difference is less pronounced than was the case with long university education. On average the knowledge intensity in the private sector is 1.75 times higher than in the rest of the country.

<sup>9</sup> Swedish statistics do not make any distinction between university education and different types of vocational education.



**Table 4.9** Share of the employees with any kind and any length of tertiary education (including a Ph.D. training) in the sixteen industrial aggregates in 1999 (1990) (percent)

Regional specialisation in the Stockholm local labour market region in 1990	Employment growth and decline in the rest of Sweden 1990-1999				
	Rapid growth	Slow growth	Slow decline	Rapid decline	Average
<b>High</b>	48.44 (41.62)	28.81 (22.58)	23.68 (18.76)	32.83 (22.01)	35.69 (25.52)
<b>Medium</b>	28.52 (24.12)	28.35 (23.65)	15.35 (11.20)	14.39 (10.19)	18.77 (13.12)
<b>Low</b>	16.14 (10.97)	11.81 (8.11)	12.85 (9.32)	16.10 (10.86)	13.68 (9.73)
<b>Very low</b>	15.34 (22.14)	17.23 (13.56)	12.90 (8.48)	13.86 (9.67)	14.40 (10.08)
<b>Average</b>	39.34 (33.77)	25.65 (20.76)	14.78 (10.76)	18.31 (12.45)	22.16 (14.93)

As the next step in the analysis, we study the relationship between specialisation in the Stockholm region, growth in the rest of Sweden and education intensity by means of regression analysis. Here we use two measures of university education:

Univ 1 = share of employees with a long university education (three years or more, including post graduate education) in the different industries in the private sector measured at the national level

Univ 2 = share of employees with any type and any length of tertiary education in the different industries in the private sector measured at the national level.

To begin with, we examine the relationship between specialisation in the Stockholm region and educational intensity in the different industries at the national level. The results of a first simple linear regression are illustrated in Table 4.10. There is a clear association between the value of the location quotient for the private sector industries in the Stockholm region and both the share of the employees with a long university education and the share of employees with any form of tertiary education. The t-values are highly significant and the R<sup>2</sup>- values are between 20 and 29 percent.

**Table 4.10** The relationship between the specialisation of private sector industries in the Stockholm region measured by means of the location quotient and the educational intensity at the national level in 1990 and 1999

	Univ 1		Univ 2	
	1990	1999	1990	1999
Constant (t-value)	0.650 (17.5)	0.572 (15.7)	0.417 (9.4)	0.326 (7.4)
Univ 1 (t-value)	3.665 (12.3)	3.647 (13.4)		
Univ 2 (t-value)			3.239 (14.8)	2.829 (15.9)
R <sup>2</sup>	0.20	0.23	0.26	0.29
N	616	616	616	616

In Table 4.11 we repeat the exercise in Table 4.10 but this time with logarithmic values. All the parameter estimates are highly significant but the R<sup>2</sup>-values are low. Overall, we get the highest elasticity for the variable ln Univ 2, i.e., for the share of employees with any form of tertiary education. An increase of that share with 10 percent increases the specialisation of an industry in the Stockholm region with almost 9 percent in 1999. One might have expected that a long university education should had had the highest elasticity, but that was not the case. This result points in the direction that all types of tertiary education migay be of importance for regional development.

**Table 4.11** The relationship between the specialisation of private sector industries in the Stockholm region measured by means of the location quotient and the educational intensity at the national level in 1990 and 1999 (logarithmic values)

	ln Univ 1		ln Univ 2	
	1990	1999	1990	1999
Constant (t-value)	0.340 (1.1)	0.201 (0.61)	-9.81E-02 (-0.36)	-0.352 (-1.19)
ln Univ 1 (t-value)	0.668 (12.0)	0.726 (9.1)		
ln Univ 2 (t-value)			0.856 (12.4)	0.897 (8.4)
R <sup>2</sup>	0.19	0.12	0.20	0.10
N	616	616	616	616

What applies to the subset of industries, which have a high specialisation in the Stockholm region and at the same time grow rapidly in the rest of Sweden, i.e., the urban growth industries? The logit analysis in Table 4.13 gives the answer. The role of the educational intensity of industries at the national level is confirmed.

**Table 4.13** The relationship between industries having a high specialisation of private sector industries in the Stockholm region and rapid growth in the rest of the country and the educational intensity of industries at the national level in 1990 and 1999 (logit model)

	Univ 1		Univ 2	
	1990	1999	1990	1999
Constant (z-statistic)	-3.112 (-15.0)	-3.121 (-14.9)	-3.817 (-13.7)	-3.879 (-13.4)
Univ 1 (z-statistic)	7.747 (6.7)	6.612 (6.6)		
Univ 2 (z-statistic)			7.165 (7.8)	5.911 (7.6)
p-value	1.71E-13	2.46E-11	0.0000000	3.11E-15
N	616	616	616	616

## 5. Summary and conclusions

In the analysis we found, as expected, that private sector industries with a high specialisation in the Stockholm region in 1990 had a much stronger tendency to grow in the rest of the country during the period 1990-1999 than industries with a medium or low specialisation. Industries with a very low specialisation in 1990 in the Stockholm region, on the other hand, had a strong tendency to decline during the period 1990-1999. A few interesting observations may also be noted. The average size of establishments in industries with a low specialisation in the Stockholm region was in 1999 three times as large as establishments in industries with a medium or high specialisation in the Stockholm region, indicating the importance of internal economies of scale in industries mainly concentrated in peripheral regions. The knowledge intensity of industries with a high specialisation in the Stockholm region was in 1999 two to three times as high as in industries with either a medium or a low specialisation in the Stockholm region, depending upon the criteria used.

The analysis also indicated interesting and very drastic differences between the development in the Stockholm region and the rest of Sweden during the period 1990-1999. The strength of the Stockholm region in terms of creating new jobs and new plants in growing industries was clearly illustrated. The strong knowledge intensity in terms of higher education in the Stockholm region was also made clear.

The results that are presented here are, of course, just tentative and mainly have the purpose to be the foundation for future research. In future research we will for the system of functional regions in Sweden study the spatial industrial dynamics of the different industrial aggregates identified more in detail. We will also for some of the growing industrial aggregates study the spatial behaviour of individual industries to see to what extent the overall model illustrated here is able to make predictions for particular regions or groups of regions. In both these cases we will try to explain what the characteristics of regions are that make them winners or losers in the race for industrial renewal and new jobs.

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## Appendix 1 The Stockholm local labour market

**Table 4.2A** The total employment in private sector industries in the Stockholm local labour market region in the year 1999 (1990) distributed over the cells of the model of analysis (percent)

Regional specialisation in the Stockholm local labour market region in 1990	Employment growth and decline in the rest of Sweden 1990-1999				
	Rapid growth	Slow growth	Slow decline	Rapid decline	Sum
<b>High</b>	18.38 (9.42)	21.44 (20.95)	4.51 (4.85)	7.33 (10.09)	51.66 (45.31)
<b>Medium</b>	1.74 (0.68)	7.86 (6.41)	17.90 (19.56)	8.03 (15.87)	35.53 (42.52)
<b>Low</b>	1.40 (0.47)	1.43 (0.96)	6.53 (7.01)	2.33 (3.08)	11.69 (11.52)
<b>Very low</b>	0.25 (0.01)	0.20 (0.05)	0.30 (0.29)	0.38 (0.29)	1.13 (0.64)
<b>Sum</b>	21.77 (10.58)	30.93 (28.37)	29.24 (31.71)	18.07 (29.33)	100 (100)

**Table 4.2AA** Location quotients for the different industrial aggregate for the Stockholm local labour market in the year 1999 (1990)

Regional specialisation in the Stockholm local labour market region in 1990	Employment growth and decline in the rest of Sweden 1990-1999				
	Rapid growth	Slow growth	Slow decline	Rapid decline	Sum
<b>High</b>	181 (223)	165 (191)	184 (198)	188 (177)	175 (194)
<b>Medium</b>	96 (111)	90 (97)	94 (96)	100 (108)	94 (100)
<b>Low</b>	57 (44)	48 (43)	50 (53)	52 (45)	51 (49)
<b>Very low</b>	30 (4)	9 (3)	8 (7)	13 (6)	11 (6)
<b>Sum</b>	143 (172)	114 (132)	76 (79)	94 (91)	100 (100)

**Table 4.3A** Relative changes in employment in the different industry groups in the Stockholm local labour market region during the period 1990-1999 (percent)

Regional specialisation in the Stockholm local labour market region in 1990	Employment growth and decline in the rest of Sweden 1990-1999				
	Rapid growth	Slow growth	Slow decline	Rapid decline	Average
High	82.92	-4.01	-12.72	-31.85	6.94
Medium	141.70	15.14	-14.17	-52.51	-21.59
Low	177.74	40.19	-12.71	-29.17	-4.92
Very low	2411.11	254.89	-4.75	20.40	62.39
Average	92.92	2.29	-13.54	-42.22	-6.20

**Table 4.4A** Absolute changes in employment in the different industry groups in the Stockholm local labour market region during the period 1990-1999

Regional specialisation in the Stockholm local labour market region in 1990	Employment growth and decline in the rest of Sweden 1990-1999				
	Rapid growth	Slow growth	Slow decline	Rapid decline	Sum
High	53,720	-5,775	-4,242	-22,083	21,620
Medium	6,579	6,670	-19,061	-57,284	-63,096
Low	5,766	2,643	-6,127	-6,184	-3,902
Very low	1,519	938	-95	410	2,772
Sum	67,584	4,476	-29,525	-85,141	-42,606

**Table 4.5A** Average plant size in the different cells in the Stockholm local labour market region in 1999 (1990)

Regional specialisation in the Stockholm local labour market region in 1990	Employment growth and decline in the rest of Sweden 1990-1999				
	Rapid growth	Slow growth	Slow decline	Rapid decline	Average
High	8.01 (9.46)	10.71 (12.24)	6.24 (9.48)	23.15 (27.44)	9.68 (12.63)
Medium	2.83 (3.78)	5.52 (5.87)	6.74 (7.96)	8.45 (14.49)	6.29 (8.81)
Low	7.13 (3.90)	6.23 (5.19)	7.47 (6.99)	6.79 (7.61)	7.12 (6.73)
Very low	7.91 (2.33)	12.80 (7.08)	4.48 (4.92)	9.27 (7.15)	7.30 (5.79)
Average	6.93 (8.14)	8.42 (9.47)	6.77 (7.87)	10.49 (15.36)	7.82 (9.77)

**Table 4.6B** Relative changes in the number of plants in the different industry groups in the Stockholm local labour market region during the period 1990-1999 (percent)

Regional specialisation in the Stockholm local labour market region in 1990	Employment growth and decline in the rest of Sweden 1990-1999				
	Rapid growth	Slow growth	Slow decline	Rapid decline	Average
High	116.10	9.71	32.60	-19.23	39.55
Medium	223.63	22.47	1.36	-18.54	9.84
Low	51.99	16.72	-18.31	-20.70	-10.15
Very low	640.74	96.15	4.67	-7.12	28.94
Average	126.49	15.01	0.48	-18.89	17.12

**Table 4.7A** Absolute changes in the number of plants in the different industry groups in the Stockholm local labour market region during the period 1990-1999

Regional specialisation in the Stockholm local labour market region in 1990	Employment growth and decline in the rest of Sweden 1990-1999				
	Rapid growth	Slow growth	Slow decline	Rapid decline	Sum
High	7,952	1,143	1,147	-486	9,756
Medium	2,744	1,686	230	-1,396	3,264
Low	432	212	-1,263	-577	-1,196
Very low	173	50	19	-20	222
Sum	11,301	3,091	133	-2,479	12,046

**Table 4.8A** Share of the employees with a long university education (three years or more, including a Ph.D. training) in the different industrial aggregates in the Stockholm local labour market region in 1999 (1990) (percent)

Regional specialisation in the Stockholm local labour market region in 1990	Employment growth and decline in the rest of Sweden 1990-1999				
	Rapid growth	Slow growth	Slow decline	Rapid decline	Average
High	28.27 (24.20)	18.01 (14.37)	15.77 (12.93)	19.82 (15.84)	21.74 (16.52)
Medium	19.23 (14.79)	18.09 (15.22)	8.09 (7.25)	9.11 (5.84)	11.11 (8.26)
Low	7.86 (3.63)	6.85 (5.43)	7.10 (5.01)	12.01 (8.13)	8.10 (5.82)
Very low	11.23 (22.09)	29.83 (7.16)	9.59 (10.19)	9.60 (8.21)	13.82 (9.34)
Average	26.01 (22.46)	17.54 (14.24)	9.06 (7.66)	13.73 (9.92)	16.38 (11.67)

**Table 4.9A** Share of the employees with any kind and any length of tertiary education (including a Ph.D. training) in the different industrial aggregates in the Stockholm local labour market region in 1999 (1990) (percent)

Regional specialisation in the Stockholm local labour market region in 1990	Employment growth and decline in the rest of Sweden 1990-1999				
	Rapid growth	Slow growth	Slow decline	Rapid decline	Average
<b>High</b>	51.80 (41.06)	36.45 (28.75)	31.30 (24.72)	37.00 (26.10)	41.57 (30.19)
<b>Medium</b>	34.68 (26.46)	34.01 (27.90)	19.48 (15.18)	20.96 (14.41)	23.82 (17.24)
<b>Low</b>	21.95 (11.37)	17.93 (13.67)	16.15 (11.94)	23.72 (16.75)	18.52 (13.36)
<b>Very low</b>	24.45 (28.37)	42.31 (17.08)	22.55 (17.27)	19.78 (16.76)	25.80 (17.47)
<b>Average</b>	48.12 (38.46)	34.92 (28.01)	20.58 (15.95)	27.64 (19.13)	32.61 (22.53)



## Appendix 2 The rest of the country

**Table 4.2B** The total employment in private sector industries in the rest of Sweden in the year 1999 (1990) distributed over the cells of the model of analysis (percent)

Regional specialisation in the Stockholm local labour market region in 1990	Employment growth and decline in the rest of Sweden 1990-1999				
	Rapid growth	Slow growth	Slow decline	Rapid decline	Sum
<b>High</b>	7.25 (2.55)	10.07 (7.75)	1.73 (1.67)	2.69 (4.29)	21.74 (16.26)
<b>Medium</b>	1.83 (0.58)	9.00 (6.70)	19.55 (20.66)	8.08 (14.39)	38.46 (42.33)
<b>Low</b>	2.84 (1.27)	3.54 (2.62)	15.35 (15.37)	5.20 (8.06)	26.93 (27.32)
<b>Very low</b>	1.01 (0.30)	3.10 (2.13)	5.04 (5.39)	3.73 (6.25)	12.88 (14.07)
<b>Sum</b>	12.93 (4.70)	25.71 (19.20)	41.67 (43.09)	19.70 (32.99)	100 (100)

**Table 4.2BB** Location quotients for the different industrial aggregate for the rest of Sweden in the year 1999 (1990)

Regional specialisation in the Stockholm local labour market region in 1990	Employment growth and decline in the rest of Sweden 1990-1999				
	Rapid growth	Slow growth	Slow decline	Rapid decline	Sum
<b>High</b>	72 (60)	77 (71)	71 (68)	69 (75)	74 (70)
<b>Medium</b>	101 (95)	103 (101)	102 (101)	100 (98)	102 (100)
<b>Low</b>	115 (118)	118 (119)	117 (115)	117 (118)	117 (116)
<b>Very low</b>	125 (130)	132 (131)	132 (130)	130 (130)	130 (130)
<b>Sum</b>	85 (76)	95 (90)	108 (107)	102 (103)	100 (100)

**Table 4.3B** Relative changes in employment in the different industry groups in the rest of Sweden during the period 1990-1999 (percent)

Regional specialisation in the Stockholm local labour market region in 1990	Employment growth and decline in the rest of Sweden 1990-1999				
	Rapid growth	Slow growth	Slow decline	Rapid decline	Average
High	147.25	12.82	-10.14	-45.50	16.15
Medium	172.58	16.70	-17.78	-51.20	-21.05
Low	93.50	17.51	-13.20	-43.99	-14.36
Very low	196.17	26.49	-18.80	-48.18	-20.48
Average	138.91	16.33	-15.98	-48.12	-13.09

**Table 4.4B** Absolute changes in employment in the different industry groups in the rest of Sweden during the period 1990-1999

Regional specialisation in the Stockholm local labour market region in 1990	Employment growth and decline in the rest of Sweden 1990-1999				
	Rapid growth	Slow growth	Slow decline	Rapid decline	Sum
High	79,804	21,131	-3,600	-41,503	55,832
Medium	21,467	23,805	-78,104	-156,712	-189,544
Low	25,340	9,752	-43,121	-75,408	-83,437
Very low	12,339	11,993	-21,550	-64,061	-61,279
Sum	138,950	66,681	-146,375	-337,684	-278,428

**Table 4.5B** Average plant size in the different cells in the rest of Sweden in 1999 (1990)

Regional specialisation in the Stockholm local labour market region in 1990	Employment growth and decline in the rest of Sweden 1990-1999				
	Rapid growth	Slow growth	Slow decline	Rapid decline	Average
High	6.90 (6.21)	6.51 (6.65)	3.36 (3.56)	10.36 (13.40)	6.45 (6.87)
Medium	4.58 (3.89)	4.94 (5.15)	6.26 (6.89)	7.63 (11.38)	6.01 (7.41)
Low	8.39 (6.29)	6.81 (6.33)	9.85 (9.15)	8.79 (11.10)	8.95 (9.04)
Very low	22.34 (19.47)	62.53 (61.69)	27.71 (28.94)	30.75 (46.25)	32.37 (37.91)
Average	7.05 (6.04)	6.53 (6.59)	7.75 (8.08)	9.70 (13.49)	7.59 (8.72)

**Table 4.6B** Relative changes in the number of plants in the different industry groups in the rest of Sweden during the period 1990-1999 (percent)

Regional specialisation in the Stockholm local labour market region in 1990	Employment growth and decline in the rest of Sweden 1990-1999				
	Rapid growth	Slow growth	Slow decline	Rapid decline	Average
High	122.35	15.40	-4.94	-29.46	23.86
Medium	131.49	21.63	-9.54	-27.17	-2.64
Low	45.14	9.25	-19.33	-29.26	-13.48
Very low	158.20	24.80	-15.20	-22.05	-6.88
Average	104.73	17.42	-12.42	-27.81	-0.17

**Table 4.7B** Absolute changes in the number of plants in the different industry groups in the rest of Sweden during the period 1990-1999

Regional specialisation in the Stockholm local labour market region in 1990	Employment growth and decline in the rest of Sweden 1990-1999				
	Rapid growth	Slow growth	Slow decline	Rapid decline	Sum
High	10,685	3,816	-494	-2,005	12,002
Medium	4,205	5,983	-6,086	-7,305	-3,203
Low	1,945	814	-6,902	-4,519	-8,662
Very low	511	182	-602	-634	-543
Sum	17,346	10,795	-14,084	-14,463	-406

**Table 4.8B** Share of the employees with a long university education (three years or more, including a Ph.D. training) in the different industrial aggregates in the rest of Sweden in 1999 (1990) (percent)

Regional specialisation in the Stockholm local labour market region in 1990	Employment growth and decline in the rest of Sweden 1990-1999				
	Rapid growth	Slow growth	Slow decline	Rapid decline	Average
High	22.90 (24.42)	9.30 (7.46)	6.19 (5.46)	13.93 (9.20)	14.18 (10.55)
Medium	14.48 (13.15)	11.76 (10.14)	4.58 (3.62)	3.29 (2.26)	6.44 (4.38)
Low	5.25 (3.57)	3.16 (2.09)	4.23 (2.86)	5.19 (3.51)	4.37 (3.01)
Very low	5.31 (13.66)	7.91 (6.52)	4.53 (2.83)	4.93 (3.29)	5.53 (3.84)
Average	16.69 (17.16)	9.09 (7.58)	4.51 (3.32)	5.49 (3.72)	7.45 (4.99)

**Table 4.9B** Share of the employees with any kind and any length of tertiary education (including a Ph.D. training) in the different industrial aggregates in the rest of Sweden in 1999 (1990) (percent)

Regional specialisation in the Stockholm local labour market region in 1990	Employment growth and decline in the rest of Sweden 1990-1999				
	Rapid growth	Slow growth	Slow decline	Rapid decline	Average
<b>High</b>	45.51 (42.17)	23.22 (17.68)	16.86 (13.38)	28.92 (19.18)	30.88 (21.73)
<b>Medium</b>	26.29 (23.05)	26.65 (22.39)	14.02 (9.99)	12.19 (8.96)	17.14 (11.88)
<b>Low</b>	15.17 (10.92)	10.93 (7.46)	12.36 (8.95)	14.94 (10.14)	12.95 (9.25)
<b>Very low</b>	14.34 (21.93)	16.63 (13.53)	12.70 (8.32)	13.65 (9.57)	14.05 (9.97)
<b>Average</b>	34.10 (30.77)	21.82 (17.51)	13.36 (9.54)	15.38 (10.77)	18.62 (12.58)