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Industrial clusters, firm location and productivity

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Abstract
According to the economic literature, industrial clusters are groups of firms on the same location composing a production system with spillovers that can be vertical and/or horizontal. This paper focuses on horizontal clusters by exploring the spatial distribution of industrial clusters in Denmark. The key issue in the theoretical part of the paper is whether firms located in industrial clusters are more productive than their counterparts located separately outside industrial agglomerations. Firms located in clusters are potentially more productive than other firms because of the agglomeration advantages of e.g. networks, knowledge spillovers, human capital mobility etc. In the empirical part of the paper, industrial clusters are identified using municipalities as the spatial dimension. In the first part of the analysis, clusters are identified at the NACE-2 digit industrial level. Next, using firm-level data for the 1990s the relative 'cluster-firm' productivity is estimated. The study finds evidence of a significantly higher productivity in clusters. However, the magnitude of the cluster advantages varies a lot across industries and is highest in textile.

Keywords: Industrial clusters, productivity

JEL code: D24, L6

1. Introduction

The geographic agglomeration of firms within industries is a visible fact in many countries and has been recognised many years ago. The auto industries clustered around Detroit in the USA and Turin in Italy are well-known examples. Later, the high-tech industries settled in Silicon Valley at San Francisco and around Boston in the USA whereas Dublin is known as a home for high-tech firms in Europe. However, people do not recognise that this agglomeration of firms is more the rule than the exception. In their studies of the manufacturing industries in the USA, Ellison and Glaeser (1997) compared the actual geographic concentration of firms with what one would expect to arise randomly if firms locate themselves as blinds. They found that of a total of 459 four-digit SIC industries, as many as 446 display excess concentration in some location. Of course, a lot of these industries have only a weak geographic agglomeration compared to the auto industry, but their results still show, that the tendency for firms within the same industry to locate near each other is general across different industries.

Economists have developed a lot of different theories explaining why firms may locate next to each other and which kind of competitive advantages they gain from their location. However, when it comes to the size of these location benefits there are only a limited number of empirical studies mainly due to lack of relevant data, and the studies are mainly case-based and examine the performance of a few selected clusters. The advantages of this study are that it uses a rich panel data set of Danish firms where it is possible to calculate the enhancement in firm productivity when the firm belongs to a cluster. In general, this paper found a positive effect on the competitiveness of firms located in clusters.

The paper is organized as follows: The next section presents some theoretical and empirical considerations. Section 3 discusses the definition of a cluster and presents the data used in the estimation. Section 4 presents and discusses the estimation of firm productivities in clusters and Section 5 concludes the paper.

2. Theoretical and empirical considerations

A geographic agglomeration of firms in a cluster may emerge either as a result of the firms' localization decisions or due to a higher survival rate among firms in the cluster. In both cases, the cluster may offer some economic advantages compared to other areas and in the literature it is common to distinguish between natural cost advantages and advantages from firm spillovers which could be either physical or intellectual, see Glaeser et al. (1992).

The natural cost advantages can emerge from a lot of sources such as climate, soil, minerals, electricity, costal location, infrastructure, cheap labour cost etc., and several industries are clustered around such natural sources. For verification just think of the following industries with a high agglomeration: Wine growing, shipbuilding, food processing, fishing, mining, etc. Ellison and Glaeser (1999) studied the importance of natural cost advantages for the profitability of US firms by looking at 16 variables reflecting the costs of different types of energy, labour, agricultural inputs, lumber inputs and transportation. They found, that these 16 variables could explain about 20% of the variation in profits between industries and states in the USA. As they use only a few variables and they therefore capture the natural advantages very imperfectly, they guess that at least half of the concentration in the US manufacturing industry is due to natural advantages.

The spillovers between firms are also very important in enhancing firm productivity in clusters as it may account for the other half of the profit variations between state-industry profit in the USA according to Ellison and Glaeser (1999). The spillovers could emerge in vertically (buyer/supplier) related firms or in clusters where firms are linked through a horizontal relationship within the same industry. In both cases, there could be physical spillovers that reduce the cost of transportation and other factor inputs by economies of scale in the productions among subcontractors when the demand for highly specialised factors increases in the areas where firms agglomerate. The agglomeration of firms also increases the possibilities of specialization between firms as more specialized tasks in the firms could be outsourced. This is especially true for the workforce as it is often highly specialized, and the agglomeration of firms within the

same industry creates a large labour pool of specialists for that particular industry which is an advantage for the individual member of the cluster.

Beside the physical spillovers, there also exist intellectual spillovers that may be of special importance in explaining the clustering of the high-tech industries. The diffusion of knowledge works better in short distances where the mobility of specialists between firms is high and people have better opportunities of meeting face to face. This is important as the main part of the knowledge that a specialist pursue can not be transferred by mail or in any written form but has to be communicated personally. Also public research institutions may contribute to these spillovers as they create local research environments. As a large part of research and development is financed through these public research institutions, knowledge spillovers from universities and other institutions such as science parks may be an important source for innovation and knowledge of best practices in itself.

Porter (1990) focused on the local competitive environment among the firms within the same industry as an important source to build up a highly innovative and competitive cluster on the world market. In his study, he finds that the clusters often consist of many local firms in intense competition within the same industry and he concludes that this increases the innovative capability of the cluster and the incentive to develop new products of a better quality and more efficient production facilities. However, Jacobs (1969) presents another view, where variety and diversity of industry structures promote innovation and growth. The different industries with their different technologies create an opportunity for creative thinking and new innovation, when the ideas flow between the industries. Therefore, from a theoretical point of view high-tech clusters are not necessarily industry-specific but could span over several technological unrelated industries.

The results from the empirical studies on the dynamic of clusters that have been conducted the last fifteen years are rather inconclusive. Glaeser et al. (1992) do not find any evidence for the USA that industries are growing faster in cities where these particular industries are overrepresented. However, there is some evidence for the USA

supporting Jacobs's view that city diversity promotes growth in the newer high-tech industries, but not in the traditional and matured industries, see Glaeser et al. (1992) and Henderson et al. (1995). There is also some evidence from the USA supporting the view that public research institutions create spatial externalities, see Acs (2002). On the other hand, Braunerhjelm and Johansson (2003) and Wever (1999) find that the knowledge spillover hypothesis for the high-tech industries was largely rejected for Sweden and the Netherlands, respectively.

Due to lack of appropriate data, most of the empirical studies so far have examined the growth rate of the agglomerated industries and compared with the growth outside the clusters. This has also been called dynamic externalities as opposed to static externalities, which account for differences in the level of productivities at a given point in time. However, static externalities may exist without any dynamic externalities. This may be the case in matured industries where the advantages of the externalities are incorporated in the new equilibrium industry structures, and therefore the differences in the growth rate within and outside clusters have levelled off. One of the advantages of this study is, that the data make it possible to estimate the productivity level of a given cluster; not only to identify dynamic externalities in new industries, but also to estimate the competitive advantages of externalities from more matured technologies.

3. Definition of clusters and data

Clusters are defined with a high concentration of related firms within a geographic area, and the firms can be related both vertically and horizontally. However, this study looks at high geographic concentrations of firms within a given industry, and for that reason we only examine horizontally related firms. In searching for clusters of firms, we use a general method instead of subjectively pointing out clusters within some industries. It is hoped that this method will give less biased results.

The area of a municipality is used as the basis for evaluation of firms' localization and their concentration is measured along two dimensions. First, for a concentration of firms to qualify for a cluster in this study the specialization share of workplaces within a

given industry must exceed a given threshold for the municipality. The specialization share of workplaces in industry i and municipality j is defined as follows:

$$S_{ij} = \frac{\frac{L_{ij}}{L_{.j}}}{\frac{L_{i.}}{L_{..}}} \qquad (1)$$

where L_{ij} is the number of workplaces within industry i in municipality j and $L_{.j}$ is the total number of workplaces in municipality j, $L_{i.}$ is the total number of workplaces in industry i and $L_{..}$ is all the workplaces in the country. In other words, the numerator gives the share of workplaces in industry i in municipality j, and this is divided by the share for this industry for the whole country. So if the specialization share, S_{ij}, take the value of 2, the interpretation is that the share of workplaces within this particular industry and municipality is the double of the share for this industry in the whole country. The conditions rule out cases where a lot of small firms are located in a municipality but the economic activity is still very low compared to the other regions.

The second condition for a concentration of firms to qualify for a cluster is that the number of firms within a given industry in a municipality should be above a given threshold. This condition rules out municipalities where only a single firm has a large amount of the employed within the industry and therefore there could be no relation or spillovers to other firms. In this study, it is presumed that there should be at lest 10 firms in a municipality to guarantee a high degree of spillovers in the region.

The data set for defining the clusters in the different industries is retrieved from Statistics Denmark. The data are based on public registers of firms and contain all workplaces in Denmark. However, in this study the public sector and the primary industries have been excluded.

To evaluate the productivity of firms belonging to a cluster, a data set based on public information on accounts of Danish firms over the period 1990 to 2000 is used. The data source is a private company (Købmandsstandens Oplysningsbureau A/S), who collects firm-specific information derived from each Danish firm's legal obligation to submit

account reports to the Danish authorities. In principle, all Danish firms are included in the database that takes the form of an unbalanced longitudinal data set.

4. Characteristics of clusters in Denmark

To define the clusters, data from 1995 are used as this year represents the middle of the period studied. The municipalities are used as the unit of geography as mentioned above and for a municipality to house a cluster of firms within an industry there must be at least 10 firms in the industry. Furthermore, the share of workplaces in an industry within the municipality should be at lest 2 or 3 compared to the average for the country. Table 1 lists the number of clusters in different industries in Denmark for these two different definitions of a cluster. Industries with high clustering are manufacturing of furniture, textiles etc., food products, wood products, stone and glass, and machinery.

By using the narrow definition with a specialization share of 3, only 49 clusters exist compared to 159 clusters if a share of 2 is applied. It is worth mentioning, that these figures overestimate the number of clusters as some of the clusters by this definition are placed in municipalities next to each other and therefore they belong to the same cluster. However, it is not important for the following estimation of firm productivities where only firm affiliation to a cluster is important.

Table 1 Number of clusters within the different industries in 1995.

Industries	*Number of workplaces*	*Number of municipalities where* $Sij > 3 \wedge \#>10$	*Number of municipalities where* $Sij > 2 \wedge \#>10$
15 Food, beverages and tobacco	2,607	8	20
17 Textiles, wearing apparel, leather	2,214	4	8
20 Wood products	938	3	5
21 Printing and publishing	3,659	0	1
23 Refined petroleum products	18	0	0
24 Chemicals and man-made fibres	459	2	3
25 Rubber and plastic products	730	1	4
26 Stone and glass	1,314	8	9
27 Processing of basic metals	4,204	2	23
29 Machinery and equipments	2,325	4	17
30 Electrical and optical equipment	2,138	1	11
35 Transport equipment	725	3	5
36 Furniture	2,680	11	19
45 Construction	23,251	0	2
64 Post and telecommunications	1,702	0	1
65 Financial intermediation	3,584	0	3
66 Insurance and pension funding	674	1	5
67 Activities auxiliary to finance	438	0	3
70 Real estate	14,557	0	0
71 Renting of machinery	1,616	0	3
72 Computer	3,256	0	7
73 Research and development	273	1	3
74 Consultancy and cleaning	25,961	0	1
Total	99,323	49	153

Table 2 lists the number of workplaces in 1992 and 1999 and the growth in this period for selected industries. In this period, the total number of workplaces has decreased by 5.6% but the manufacturing sector has decreased by 15% whereas the consultancy and cleaning has increased by 17% which is typical for the service sector and follows the general trend over the last two centuries. Table 2 also shows, that the industries with most clusters, textile and furniture, are decreasing industries whereas the rising industries of consultancy and cleaning only have a few clusters.

Table 2 Growth in employment within some industries from 1992 to 1999.

Industries	*1992*	*1999*	*Changes in pct*
Private business	101,321	104,448	3.1
Manufacturing	26,244	22,308	-15.0
17: Textiles, wearing apparel	2,773	1,724	-37.8
36: Furniture	2,935	2,578	-12.2
45: Construction	23,595	25,677	8.8
74: Consultancy and cleaning	24,380	28,529	17.0
All industries	314,959	297,187	-5.6

Table 3 further elaborates on this topic by listening the growth in employment within and outside clusters from 1993 to 2001. The figures show the decrease in number of workplaces in manufacturing and the increase in private services, but in general there are no differences in the growth rate for municipalities with clusters. However, focusing on those industries with most clusters, a difference emerges in the growth rate of workplaces for municipalities with a cluster. For manufacturing of furniture, wood, paper, basic metal and machineries, employment in clusters increased whereas it decreased in clusters of textile and wearing apparel compared to employment in firms outside clusters.

Table 3 Growth in numbers of workplaces within and outside clusters from 1993 to 2001.

	Within clusters		*Outside clusters*	
	2001	*Growth 1993-2001*	*2001*	*Growth 1993-2001*
Manufacturing	41,855	-3.4%	422,171	-4.0%
Private services	12,381	25.1%	405,191	25.9%
17-19: Textiles, wearing apparel	4,131	-54.2%	10,940	-41.7%
20-22: Wood and paper	1,691	36.7%	69,681	-4.9%
27-35: Metal and machineries	7,695	12.3%	183,573	0.1%
36: Furniture	4,524	18.4%	28,537	-4.2%
All industries	63,596	5.2%	992,094	11.0%

5. Efficiencies of Danish clusters

To measure the competitive advantages of the clusters, a normal Cobb-Douglas production function is used and specified as:

$$Y_{ft} = A_t \cdot D_{ij} \cdot L_{ft}^{\alpha} \cdot K_{ft}^{\beta} \quad (2)$$

where Y_{ft} is the total production in firm f, K_{ft} and L_{ft} are the amount of capital and labour used in the production in period t. A_t is the total factor productivity in period t and D_{ij} is the efficiency enhancement added to firms in the cluster belonging to industry i and municipality j.

The estimation equation for the firms' productivity is the natural logarithm of the production function in equation (1) and specified as follows:

$$y_{ft} = a_t + b_i + d_{ij} + \alpha l_{ft} + \beta k_{ft} + \varepsilon_{ft} \quad (3)$$

where a small letter denotes the log of the variables, and ϵ_{ft} is an error term. a_t picks up the effect on productivity from the general business cycle and the term b_i corrects for the heterogeneity in firm productivity across the different industries. Equation (3) is estimated with an OLS regression and Table 4 presents the results from four different models.

The panel data hold 142,475 observations of an unbalanced panel of firms for the period 1990 to 2000. There are 32,800 firms in the panel and 144 of these belong to some of the clusters defined above. The two first models in Table 4 are estimated with a general dummy for all the clusters. Surprisingly, the cluster dummy in model (1) has a negative coefficient which indicates that in general firms belonging to a cluster are less productive. However, the coefficient is not significant.

Firm productivity varies a lot across industries and Model (2) corrects for this by introducing a fixed effect for each of the 531 different industries measured by the 4-digit level of the NACE-industry code. Correcting for heterogeneity in firm productivity across the different industries increases the estimated coefficient for firm productivity in

clusters dramatically, and the coefficient becomes positive and significant at the 5% level. The reason for this dramatic increase in the estimated coefficient may be that a lot of the clusters are located in industries with productivity below the average of all the industries. So correcting for this effect, cluster- firms in general have a productivity which is 8.65% above productivity in firms not located in a cluster.

Table 4 Estimation of total factor productivities in clusters.

	Dependent variable: ln Y			
	Model (1)	Model (2)	Model (3)	Model (4)
Fixed effects	No	Industries	Industries	Industries Capital
Intercept	5.7095** (0.0126)			
Labour, ln L	0.9838** (0.0021)	0.9470** (0.0021)	0.9469** (0.0021)	0.9455** (0.0021)
Capital, ln K	0.1306** (0.0014)	0.1320** (0.0015)	0.1320** (0.0015)	0.1295** (0.0015)
Dummies for clusters:				
All clusters	-0.0762 (0.0394)	0.0865* (0.0430)		
Textiles			0.1852* (0.0857)	0.2777** (0.0904)
Wood products			0.1822 (0.1015)	0.1887 (0.1008)
Processing of basic metals			0.0234 (0.1606)	0.0458 (0.1592)
Machinery and equipments			-0.2175* (0.0953)	-0.1860 (0.0952)
Furniture			0.1697* (0.0795)	0.1912* (0.0799)
R^2 (adjusted)	0.7643	0.8188	0.8188	0,8231
Observations	144,054	142,475	142,475	142,475

Notes: Numbers in brackets are standard error of the coefficient. * denotes that the estimated coefficient is significant at the 5% level, ** at the 1% level. All the estimations include fixed effect for years.

In Models (3) and (4), it is examined whether the productivity in clusters depends on which industry it belongs to. The clusters are split up in 5 main industries, and Table 4 shows that the estimated coefficient varies a lot across the different industries. The regression in Model (3) indicates, that firms belonging to a cluster in textile, wood products or furniture manufacturing have 17-18% higher productivity whereas clusters in processing of basic metals do not add to firm productivity and firms in clusters of machinery and equipments have a lower productivity.

It is well known, that the wage level varies a lot between the different municipalities especially between the capital and the rest of the country in Denmark. In general, the wage level is about 15% higher in Copenhagen for the same type of labour, and this may reflect a higher productivity in the capital. Model (4) corrects for this difference in productivity by introducing a fixed effect for the 36% of the firms located in the capital. This further enhanced the estimated productivity advantages of a textile firm located in a cluster, as most of the textile firms are located outside the capital. The estimated productivity also increases for firms belonging to a furniture cluster and cluster of machinery and equipment manufactories.

6. Conclusions

This paper uses information from public registers on number of firms and workplaces to find clusters of firms within the same industry. By using a more general method in defining clusters than what normally has been used, it is believed that the result will be more reliable. Furthermore, the study uses a large longitudinal data set of Danish firms for the period 1990-2000 with more than 30,000 firms for estimating the enhancement in productivity for firms belonging to a cluster.

In general, the productivity advantages for a firm belonging to a cluster of horizontally related firms are about 8%. However, the productivity advantages of clusters differ a lot across different industries. The advantage is highest for firms manufacturing textile and lowest for firms manufacturing machinery and equipment.

References

Acs, Zoltan J.: Innovation and the Growth of Cities. Edward Elgar, 2002.

Braunerhjelm, Pontus and Dan Johansson: The Determinants of Spatial Concentration: The Manufacturing and Service Sectors in an international Perspective. Industry and Innovation, vol. 10, no. 1, 2003

Ellison, Glenn and Edward L. Glaeser: Geographic Concentration in U.S. Manufacturing Industries: A Dartboard Approach. Journal of Political Economy, vol. 105, no. 5, 1997.

Ellison, Glenn and Edward L. Glaeser: The Geographic Concentration of Industries: Does Natural Advantages Explain Agglomeration? The American Economic review, vol. 89, no. 2, 1999.

Glaeser, L. Edward, Hedi D. Kallal, Jose A. Scheinkman and Andrei Shleifer: Growth in Cities. Journal of Political Economy, vol. 100, no. 6, 1992.

Henderson, Vernon, Ari Kuncoro and Matt Turner: Industrial Development in Cities. Journal of Political Economy, vol. 103, no. 5, 1995.

Jacobs, Jane: The Economics of Cities. New York: Vintage, 1969.

Porter, Michael E.: The Competitive Advantages of Nations. New York, Free Press, 1990.

Statistics Denmark: *IDA – en integreret database for arbejdsmarkedsforskning, hovedrapport*. Danmarks Statistik, København, 1991.

Statistics Denmark: *Statistiske Efterretninger, Generel Erhvervsstatistik og Handel*. Danmarks Statistik, København, 1992-2000.

Wever, Egbert and Erik Stam: Clusters of High Technology SMEs: The Dutch Case. Regional Studies, vol. 33,4, 1999.

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