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European integration and the spatial dynamics of manufacturing employment change

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European integration and the spatial dynamics of manufacturing employment change

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Abstract

This paper examines the dynamics of manufacturing employment change in 13 EU countries between the years 1978 and 1996 mainly through the utilisation of shift-share techniques. Despite the momentum that European integration gained over this period the key finding here is that the geography of manufacturing employment has remained almost intact. Processes operating at European scale appear to have the largest impact on labour outcomes in each member state, while there is little deviation from the widespread declining trends. Spatial stability is reinforced even further through the homogeneity of several national industrial structures. In addition, the moderate increase in the industrial specialisation of the participating economies and the localisation tendencies of a few traditional sub-sectors pose little if any threat to the stability of the present map of manufacturing distribution. This evidence suggests that, contrary to some political rhetoric, the integration process has not, at least so far, adversely affected the relative competitiveness of manufacturing in either peripheral or core countries.

1 Introduction

During the past two decades the process of European integration gained significant momentum through the establishment of the Single Market and the steps taken towards the Monetary Union. Although, in principle, this evolution is expected to be highly beneficial for all the participating countries there is still much uncertainty in relation to the actual spatial outcomes. In advanced economies, such as the UK, several fears have been expressed that the abolition of trade barriers and the free movement of capital will have negative implications on their industrial activity. On the other hand, in peripheral states there is much scepticism regarding their ability to take advantage of the opportunities offered by economic integration. The main perceived danger is that the gap that separates them from their advanced counterparts may become wider, as the latter are thought to be better adjusted, in terms of economic and institutional structures, human capital or technology, to the new conditions of growth.

The evidence provided by economic geographers suggests that both scenarios are possible. Undoubtedly, there are various factors that promote the concentration of production in the European periphery. Other things being equal, lower wages and improved accessibility to the major markets, which are situated in the North, increase the attractiveness of the South as an industrial location. Moreover, the EU regional assistance has a similar effect. It represents a significant transfer of resources that has the potential to play a catalytic role in the upgrade of the physical and social infrastructure in lagging areas.

However, most analysts are rather hesitant to argue in favour of this prospect (see amongst others Hudson, 1997) although they do not entirely dismiss it. Krugman and Venables (1990) are quick to point out that lower wages and better market accessibility are not sufficient conditions to raise the relative competitiveness of southern economies. In the presence of substantial economies of scale and moderate trade barriers the northern member states stand better chances to pull additional industrial activity there. This happens because economies of scale encourage the concentration of production in a single location, while moderate barriers to trade favour core locations that offer the optimum, not just improved, market access. Furthermore, it has been suggested that although the EU regional policy in general grants a privileged position to the South, the same does not apply to the component that focuses on the support of the productive sector. Martin (1998) demonstrates that the EU expenditures per capita for this purpose are almost evenly distributed across Objective 1 and 2 regions. The

latter group includes mostly northern European areas in industrial decline. In addition, the EU initiatives are further undermined by the difficulty of peripheral states to absorb all the funding that are allocated, while national regional policies are important too. Advanced countries have the ability to allocate far more resources to their backward regions in comparison to their Mediterranean counterparts. Apart from that, Hadjimichalis (1994) states that the EU policies suffer from a clear north-central European socio-economic bias. Southern peculiarities are usually not taken into account during their design or implementation and thus the policies are less effective in triggering economic growth in that part of Europe. Finally, firms in the periphery face added difficulties in order to compete successfully in the Single Market. Smallbone et al (1999), for instance, show that UK small and medium sized enterprises in the clothing and food sectors adapt more easily to the new business environment than Portuguese firms due to their longer exposure to external competition in their domestic market.

In such a context, the present paper aims to shed some light on the spatial effects of the integration process by examining the dynamics of employment change in 13 EU states and 28 manufacturing sub-sectors during the period 1978-1996. Manufacturing has a central role in the relevant debate, since it accounts for the largest part of international trade and includes several relatively footloose industries. The geographical coverage is not ideal, however, as will become clear, interstate analysis can offer some important advantages.

In the next section some methodological issues and an outline of the available data are presented. This is followed by the decomposition of manufacturing employment decline using shift-share techniques. The exploration of the evolution of industrial specialisation and sectoral dispersion patterns is a task for section four, while the study concludes with a summary of the main findings and the discussion of the questions that arise in relation to them.

2 Methods and data

Undoubtedly, a simple and undifferentiated measure of employment is not a perfect indicator of industrial performance. The great variation among the type of jobs (full-time, part-time, seasonal, unpaid, etc.) that are aggregated together in official statistics sometimes obscures regional comparisons. Similarly, the comparability of international data is often limited due to discrepancies in the way (censuses, surveys, etc.) that they are collected. Leaving aside these

two issues, a more serious consideration is that employment does not always reflect accurately the magnitude or the dynamics of manufacturing sector. In areas where productivity is low or labour intensive industries are predominant, large numbers of workers do not necessarily indicate a sizeable manufacturing activity. Furthermore, the evolution of employment frequently deviates from the trends that other indicators, such as fixed capital stock and output, display (Melachroinos and Spence, 1997). This is more so during periods of intense industrial restructuring or new technology implementation, when job losses occur despite the expansion of the manufacturing sector.

Although the above points are well documented in the literature, employment remains a widespread measure of industrial dynamism. An important reason behind this tendency is that the generation of new jobs is an integral aspect of regional economic development, since it facilitates the mobilisation of human resources (labour, knowledge, skills, etc.) in the production process. In addition, most of the previous critique can be just as easily applied to most other indicators. A single variable, by definition, can offer only a limited view on multifaceted phenomena like industrial change. Ideally, the parallel examination of several variables may provide an answer to this problem, and indeed there are some noteworthy examples of this approach in the context of the EU regional disparities (see for instance Dunford, 1993; 1994; 1996). Nevertheless, in the case of international comparisons this research avenue is subject to arbitrary assumptions. Output and investment figures have to be converted into a common currency, something that is highly problematic considering the deficiencies of the available conversion factors.¹ To this extent, employment has a significant advantage over other manufacturing indicators, since it avoids the conversion obstacle.

The spatial coverage of the analysis is another issue that needs some discussion. Clearly, comparisons at country level conceal a great deal of geographical variance. Economic disparities in the European Union are by far sharper among regions than member states (Fagerberg and Verspagen, 1996; Cappelen et al, 1999). Even so, it could be argued that from a political perspective that inequalities between countries are still significant. The key decisions that affect the future shape and policies of the European Union cannot be taken unless a consensus is achieved among the participating national governments. The latter are as much interested in the overall performance of their entire economy as that of individual areas and act accordingly. Apart from that, it should be noted that the size of many EU countries is similar to that of US states, and hence an interstate focus can facilitate comparisons between

the two areas, since a significant amount of geographic research in the US is carried out at this level. To the extent that changes in the spatial manufacturing structure in the US provide a guide for the prospective evolutions in the European industry, such comparisons are particularly fruitful (see among others Krugman, 1991; Neven and Gouyette, 1995; Heim, 1997; Martin and Tyler, 2000). Last but not least, the amount and quality of information about industrial structure are much higher at national rather than regional levels. Consequently, research focusing on member states can unveil the importance of industry mix and other factors (competitive shift, for instance) that often cannot be examined properly in a regional framework due to the limited availability of data (Armstrong, 1995; Fagerberg and Verspagen, 1996; Martin and Tyler, 2000).

Shift-share is the main method of analysis utilised in this paper. According to this framework, the employment change (ΔE^s) in a member state between two points in time 0 and t can be viewed as the outcome of three effects (see equation 1). The first is the EU effect, which represents the expected gains or losses ($\Sigma E_{i0}^s(e)$) if total employment in the member state (Σe_{i0}^s) had followed the EU growth rate (e). The second is the structural effect, which reflects the hypothetical employment change ($\Sigma E_{i0}^s(e_i - e)$) if every manufacturing industry (i) in the member state had grown at the EU sectoral rate (e_i). It is evident that the component will be positive in countries specialising in activities expanding faster (or declining slower) than the rest manufacturing sector ($e_i > e$) at European level. Finally, the third is the competitive effect which captures the spatial variation in the growth rates of individual manufacturing sectors ($e_i^s - e_i$). The component is positive if the manufacturing sub-sectors are growing faster (or declining slower) in the state than the rest EU ($e_i^s > e_i$).

$$(1) \quad \Delta E^s = \Sigma E_{i0}^s(e) + \Sigma E_{i0}^s(e_i - e) + \Sigma E_{i0}^s(e_i^s - e_i)$$

Despite its simplicity equation (1) has been a widely used tool for the empirical decomposition of manufacturing employment change. In the British regional context, for instance, an indicative and certainly inexhaustive list of studies utilising the classic shift-share model includes the works of Fothergill and Gudgin (1982), Frost and Spence (1991), and Keil (1997). Nevertheless, it should be also mentioned that several reservations regarding various aspects of the method have been raised over time. According to Loveridge and Selting (1998) the main points of the critique can be summarised in terms of the lack of theoretical content,

data aggregation problems, weighting bias, instability of the competitive effect, and the interdependence of the industry mix and competitive effects.

The absence of an underlying theory for the model is the essence of the first, and arguably, most serious problem. Employment evolution is ascribed to the three components without much explanation (especially in the case of the competitive effect) offered about the spatial variation of growth rates. This is a valid point and numerous efforts have been made to address it, mostly through the introduction of additional variables (output, imports, exports, etc.) into the model. Thus, Massey and Meegan (1979) modified the original shift-share equation in order to account for the impact of rising output and labour productivity on manufacturing job trends. Similarly, Markusen et al (1991) included in their analysis international trade data as well, in an attempt to throw some light on the first two components of expression (1). A more elaborate framework, based on a regional input model, was provided by Casler (1989), who linked shift-share components to factor demand for labour. Finally, Graham and Spence (1998; 2000) developed further this framework by incorporating two fundamental mechanisms behind employment evolution, changes in output demand and the technological attributes of production, into the method.

In this paper, a strong preference is expressed for the classic shift-share model, although certain modifications are allowed as a response to some of the remaining criticisms. This decision can be supported on several grounds. On the one hand, in this way the previously mentioned conversion obstacle, which is associated with other manufacturing indicators in the European context is avoided. On the other hand, the impact of additional variables, such as labour productivity, is not at all clear. Labour productivity improvements do not necessarily result in job losses. Employment levels may be preserved or even new positions created as technical change enables local industries to become more competitive and increase their market shares and output (Markusen et al, 1991). Lastly, the main aim here is to depict, with clarity, the spatial dynamics of manufacturing employment change in the EU. Shift-share analysis serves this purpose satisfactorily, despite its lack of an underlying theoretical framework.

Returning to the remaining concerns about the method, it has to be admitted that data aggregation poses a significant limitation. Highly aggregated data may result in the overestimation of the competitive effect, since what is attributed to differential growth rates

may in fact be the outcome of favourable industrial mix (strong presence of sub-sectors that expand fast everywhere). Nevertheless, the degree of aggregation applied is largely an issue of information availability. From this viewpoint, it is difficult to criticise the method for the absence of relevant data at finer industrial detail. For this analysis, the level of aggregation is the lowest permitted by data availability and, as it will be demonstrated shortly, the sub-sectoral coverage is quite detailed.

The instability of the competitive effect and the interdependence of the structural and differential components are two additional themes that have caused concern in the literature. The temporal variation of the competitive effect entails that employment projections based on shift-share results are particularly precarious. While accepting this point, the advocates of the method are quick to emphasise its analytical utility if only for exposing this instability (Fothergill and Gudgin, 1979). Similarly, the interdependence of the two components is an inherent problem considering the difficulty of isolating differential performance from industrial structure. Subsequent research has shown that the classic model is by no means an inferior predecessor of more sophisticated models that were developed in relation to this issue (Loveridge and Selting, 1998).

Last, but not least, the values of the industry mix and competitive components are largely affected by the choice of employment weights (ΣE_{i0}^s). A common practice is to apply the industrial shares of the base year. However, during longer periods industrial composition may be altered dramatically (especially during recession times) and thus results will not reflect the adjustment. Barff and Knight (1988) have proposed the annual estimation of shift-share parameters, as a solution to this problem. The yearly figures are then added in order to calculate the long run structural and differential effects. This dynamic shift-share model is the version that is adopted here.

The necessary data for the calculation of the shift-share components come from the OECD (1998) STAN database for industrial analysis, which contains information on the number of people engaged in manufacturing in 13 EU states. (Ireland and Luxembourg are the two missing states, while the German data refer only to the former Federal Republic of Germany.) This number includes not only salary earners but also self-employed, owner proprietors and unpaid family workers. The level of detail is quite impressive as 49 ISIC (revision 2) manufacturing branches are covered over the period 1970-1997. However, due to gaps in the

annual time series and spatial coverage, the analysis here is based on the employment evolution in 28 3-digit ISIC sectors between the years 1978 and 1996. The omitted branches represent finer ISIC classifications (4-digit), and thus only the level of disaggregation is affected, not the total manufacturing figures. Moreover, in order to avoid the further reduction of the analytical time span, it was decided to replace some missing values by interpolation. Thus, jobs in Austria and Germany at 3-digit industry level in 1996 have been estimated by assuming that the share of sub-sectors in the employment of the 2-digit industry to which they belong (provided by the database) has remained the same as that of the previous year. Sub-sectoral employment in Belgium and Italy for the periods 1993-1996 and 1995-1996 respectively has been calculated in a similar fashion.²

3 Decomposing employment decline in European manufacturing

The results of the dynamic shift-share analysis between the years 1978 and 1996 are presented in table 1. It is useful to pay some attention to the second column of the same table before the components of employment change are examined in detail. At a first glance the geographical distribution of manufacturing in the EU appears extremely uneven. Germany and the other large economies (France, Italy, Spain, and the UK) accounted in 1978 for approximately 4/5 of the people engaged in the sector. Similarly, in the European North (Austria, Belgium, Denmark, Finland, France, Germany, Netherlands, Sweden, and the UK) was concentrated more than 70% of all manufacturing jobs. However, the enormous variation in state size should be also taken into consideration. Indeed, if an experiment similar to that of Dollar and Wolff (1993) for the OECD countries is conducted, it is evident that the spatial distribution of manufacturing jobs resembles more or less that of population (figure 1). With the notable exception of Germany (where population figures refer to the entire country, while manufacturing data cover only the western part of it), the magnitude of industrial activity in each member state seems to be in line with the likely domestic demand. In this light, the inequalities in manufacturing allocation are rather small, although of course there are countries (Greece, for instance), which are significantly less industrialised than the rest.

Leaving aside the issue of distribution, table 1 also reveals that employment declined dramatically over the examined period. At the European level more than 1/5 of the available positions in the sector were lost in just 18 years. However, it should be noted that the decrease in the number of jobs is not associated with a catholic industrial decline. As other studies have demonstrated manufacturing fixed capital stock and output continued to grow at a slow but

steady pace throughout the period (Melachroinos and Spence, 2001). It is rather the specialisation of European industry in activities where labour-saving process innovations are dominant and its parallel weaknesses in sectors where product innovation is prevailing that trigger job losses (Pianta and Vivareli, 1999). In any case, a cursory glance at the data shows that the negative trends were universal, although there was some variation in the rates. The UK (32.6%), Belgium (30%) and France (28.6%) were the states that experienced the most acute employment reduction, while the losses in Finland, Austria, Spain, Italy, Greece and Sweden ranged around the EU average. In contrast, the fall in labour figures was less striking in the Netherlands and Germany (16.4% and 15.5% respectively) and almost negligible in Denmark (1%) and Portugal (7.5%). Nonetheless, these differences are not extreme, while the two countries deviating most from the EU average are not sizeable. Moreover, small economies (Austria, Belgium, Denmark, Finland, Greece, Netherlands, Portugal, and Sweden) and the South (Greece, Italy, Portugal and Spain) performed only slightly better than large economies and the North. As a result the pattern of manufacturing allocation across Europe has remained roughly the same (compare the last two charts in figure 1).

Apart from the above, another noteworthy finding is that the EU effect accounts for the largest part of employment change. Except for Portugal, Denmark and the UK, the absolute values of the EU component are approximately two (Greece) to forty-three (Spain) times higher than that of competitive shift. The same applies to the absolute impact of industry mix, which is everywhere at least four times lower than that of proportional shift.³ Consequently, national labour outcomes are mainly determined by EU trends, something that reinforces the observed spatial inertia. It may be the case, that processes taking place at the European scale (production rationalisation, capital intensification, closure of outdated plants, etc.) are perhaps the major driving forces behind employment outcomes in each member state.

By examining the geographical variation of the remaining shift-share components it is clear that industrial structure had a substantial positive effect only in Denmark and the Netherlands, while its impact was most adverse in the lagging economies (Portugal and Greece). In addition, the industry mix was certainly more favourable in the North than the South (1.2% and -2.9% respectively), although it hardly had any influence on labour outcomes. On the other hand, the competitive component demonstrated higher values and greater spatial fluctuation. In Portugal (24.5%) and Denmark (18.3%) the performance of individual manufacturing industries was far superior compared to elsewhere and almost compensated for

the severe EU effect. However, the same did not happen in the remaining countries, where the deviation from European sectoral trends was either moderate (Greece, Germany, Italy) or negligible (Netherlands, Sweden, Austria, Spain, Finland). In the UK (-13.7%), France (-7.2%) and Belgium (-6.8%) in particular, the shift was substantially negative and this exacerbated job losses. Finally, smaller economies (5.8%) and the South (5.4%) benefited from the improved employment record of manufacturing industries present there in comparison to large economies (-1.2%) and the North (-2.1%). Nevertheless, it should be repeated that these figures represent only but a fraction of the EU effect.

Results such as the above indicate that perhaps the level of detail that is lost in regional studies due the absence of disaggregated data may be less significant than usually thought. However, this is far from a definite conclusion, since the smaller the spatial scale the larger tends to be the structural differentiation.⁴ Nonetheless, the low values of this component can be attributed to two possible reasons. They either reflect the absence of marked differences in the growth rates of individual sub-sectors or result from geographically uniform manufacturing structures across the EU. In the same vein, the spatial variation of the competitive effect is either associated with migration movements of manufacturing activities within Europe or derives from national differences in the pace of labour decline.

In respect of the first issue, the low impact of the structural component can be only partly attributed to the relatively homogeneous industrial trends prevailing at the EU level during the period 1978-1996. With the exception of printing & publishing (3420) and plastic products (3560), employment change was negative in the remaining 26 3-digit ISIC branches (table 2). Nonetheless, the sectoral variation in the proportion of jobs lost (ranging from 8.5% of the positions available in 1978 for other chemicals to 49.8% for iron & steel) was not that small to produce a near zero industry mix effect in several countries alone. Thus, a certain degree of similarity should be also prevailing among the national manufacturing bases. The extent of this spatial uniformity and its evolution over the past two decades will be explored further in the subsequent section.

In relation to the second point, the evidence presented in table 2 suggests that manufacturing migration movements within the EU have so far been minimal. In eight member states and four large groupings of economies (North, South, large and small), fewer than five out of 28 sub-sectors recorded any employment growth. Furthermore, the gains were insubstantial,

ranging from 1.3% (Austria) to 9.2% (Netherlands) of the total job loss. The situation was somewhat different in Denmark, Portugal, Sweden, Finland and Greece. However, even there no more than 10 industries generated new positions, while apart from Denmark and Portugal the increases did not even compensate for 1/5 of the employment loss. Last but not least, the job-creating sectors were not the same everywhere. Although in total 20 industries expanded in at least one country, only four (plastic products, printing & publishing, furniture & fixtures and professional goods) achieved this in more than five states. Consequently, although there are some sectors in each country that create new jobs, it is difficult to argue that their growth is either the direct outcome or the cause of industrial decline elsewhere. The gains are simply not analogous to the losses. On the contrary, it is safer to view spatial disparities in the impact of the competitive effect (which again in absolute figures is not sizeable) as the product of national differences in the pace of decline.

The findings of this section paint a picture in which it is hard to identify winners or losers in the new integrated European economy. The geography of manufacturing employment has remained almost intact, while any shift from the EU labour trends seems to stem from milder declining rates in some areas (particularly the small economies and the South). Instead of engaging in head to head competition, national industrial structures appear to strive to eliminate the negative implications of the common pressures to which they are exposed. Inevitably, some of them are inherent aspects of the integration process (improved access for other EU firms in domestic markets, for instance), and thus a limited case can be made that even the decline differentials are the result of intra-EU competition. However, many other pressures are external to the system (globalisation, reduction of trade barriers with the US and Japan, increased competition from NICs in world markets, etc.). The universal deterioration in the employment record of all but two manufacturing sub-sectors is perhaps a reminder of just how powerful these latter processes are.

Finally, firm or plant relocations hidden in the aggregated numbers of official statistics cannot be ruled out, while arguably competition may not take the form of job growth, but that of uneven fixed capital and output expansion. Nonetheless, it is rather unlikely these elements will dictate spatial labour outcomes. Job transfers cannot possibly have a significant impact in a context where the vast majority of industries shed labour virtually in every member state. Similarly, it is reassuring that, for total manufacturing, the geographical distribution of fixed capital stock and value-added among the EU countries has been altered only slightly during

the 1978-1994 period (Melachroinos and Spence, 2001). Undoubtedly, more research is necessary to check whether this conclusion applies also to individual sub-sectors as in the case of employment examined here.

4 Industrial specialisation and sectoral dispersion

The discussion in the previous section has raised a number of important issues concerning the mechanics of employment change in European manufacturing. An implicit finding that deserves to be explored further is the degree of differentiation among national industrial structures. If it is low then manufacturing bases are equally susceptible to processes occurring at European scale and thus spatial stability is a likely outcome. Moreover, it has been predicted that industrial specialisation is bound to be increased eventually, as member economies will become more integrated (Krugman, 1991). In this context, the measurement of industrial specialisation at state level can be useful in finding out the extent to which these assumptions hold. Apart from that, another related theme is that of sectoral localisation. It will be interesting to examine whether the interstate variation in the rates of labour decline signals any change in the spatial behaviour of individual industries. In other words, whether the geographical distribution of sub-sectors has become more concentrated or dispersed.

The provision of some answers to the above questions necessitates the utilisation of additional measures, namely the indices of industrial specialisation and sectoral concentration. The calculation of these indicators is not dissimilar to that of shift-share components. Instead of relying on disparities in employment growth rates, the new measures capture the differences in the contribution of every industry or country to overall aggregate employment. Consequently, the index of industrial specialisation (I_s) is estimated as the half of the sum of absolute differences between the shares s_i and s_i^* (equation 2). The former symbol denotes the contribution of each sector i to total manufacturing employment in a member state, while the latter refers to the contribution of the same sector in another country or the EU. The values of the indicator range between zero (implying that the industrial structures in question are identical) and one (in which case they are poles apart).

$$(2) \quad I_s = 1/2 \sum_i |s_i - s_i^*|$$

In the same way, the index of sectoral concentration (I_c) is given by equation (3), where q_i reflects the share of every country i in the total employment of a specific industry at the

European scale and c_i^* is the national contribution to total EU manufacturing. Again the index fluctuates between 0 and 1, however this time low values mean that the spatial distribution of the industry follows that of aggregate manufacturing. In contrast, for sectors located in a single state, which does not attract any other industry, the index is very close to one.

$$(3) \quad I_c = 1/2 \sum_i |c_i - c_i^*|$$

The national indices of industrial specialisation for the year 1978 are presented in table 3. Following Krugman (1991) the estimations have been carried out for every possible pair of member states and the total of the 13 countries (EU 13). In this way the interstate differences in industrial structure are calculated accurately without the distortion that spatial disparities in the size of manufacturing activity cause when comparisons are made solely in relation to the European average.⁵ Hence, it is possible to investigate whether neighbouring states or economies sharing common attributes are characterised by similar industry mix as well.

The first conclusion that derives from table 3 is that the presumption made earlier about the lack of heterogeneity among national manufacturing bases is to a great extent true. The levels of specialisation in 1978 were particularly low with just four countries (Greece, Portugal, Finland and Denmark) demonstrating values above 0.2 when compared with the average European industrial structure. As expected, the index is very close to zero for the large economies, especially France (0.061), the UK (0.092) and Germany (0.095). However, what is striking is that the same applies to the indices for each pair of these countries (UK-France 0.08, UK-Germany 0.114, France-Germany 0.106) meaning that their industrial composition is almost identical. It is interesting, that Sapir (1996) also reports similar findings, although his time coverage (1977-1992), data (trade) and indices (Herfindahl and Lawrence) are different to those of the present study. In contrast, the highest deviation from the rest of the EU is recorded by Greece (0.277) and Portugal (0.273), presumably due to their strong specialisation in traditional manufacturing sectors. Sweden in particular emerges as the most distant economy to them with scores 0.414 vis-à-vis Greece and 0.402 against Portugal.

In addition to the above, another important finding is that ‘geography matters’. The indices of specialisation tend to be lower between bordering states or economies of comparable magnitude. Thus, in the Mediterranean, manufacturing structures are quite homogeneous with values ranging from 0.124 (Italy-Spain) to 0.239 (Greece-Italy). The same appears to be the

case in the Nordic region where the deviation from the EU average is stronger. Finland for instance, is closer to Sweden (0.21) and Denmark (0.225) than any other member state. Equally, countries such as Austria, Belgium or the Netherlands specialise in common sectors with their neighbours. The index of specialisation between them and Germany is less than 0.17. Finally, it is evident that Italy and Spain share reasonably similar industrial structures with other large economies (the maximum score is 0.229 for Spain-UK).

A cursory glance at the data of table 4 reveals that the previous findings continue to hold in 1996 as well. Geographic proximity and size remain the factors that iron out disparities in industrial composition, while the level of spatial variation remains relatively limited. However, as Krugman (1991) predicted and several empirical studies (Sapir, 1996; Amiti, 1999; Begg et al, 1999) utilising different indicators argued, specialisation has increased. In the majority of countries (Belgium, Finland, the Netherlands, Spain and the UK are the exceptions) the index of specialisation in relation to the EU 13 is higher in 1996 than 1978. Nonetheless, most values remain below 0.2, while only Greece (0.326) and Portugal (0.289) exhibit a substantial score. Moreover, the indices for each pair of countries continue to be lower when the economies in question are of comparable magnitude or spatially proximate. Hence, Germany, France and the UK are still characterised by fairly similar manufacturing structures (the maximum score is 0.137 for France-Germany). The same can be said, although to a lesser degree (the indices are approximately double there), about the Mediterranean and Nordic regions. Even in Greece and Portugal, the most deviating states, the indicator grows slowly and in 1996 does not exceed the 0.5 mark (0.485 and 0.431 respectively in relation to Sweden).

Consequently, it could be argued that despite the rise of specialisation indices, several national industrial structures still demonstrate a remarkable level of homogeneity. This entails that processes taking place at the wider European scale will continue to have the largest impact upon labour outcomes in the near future. Nevertheless, the slow but gradual differentiation of manufacturing bases, which is also confirmed here, may eventually put an end to this situation. The precise effects that such an evolution could have on the geography of manufacturing employment are not yet clear. However, it is logical to expect that sectoral localisation will become more intense as state specialisation escalates.

The last argument is supported by the results in table 5. The index of sectoral concentration increased in 21 out of 28 industries during the period 1978-1996. Nonetheless, this evolution was not enough to alter location patterns. In 1996 no less than 20 sub-sectors displayed values below 0.2, suggesting that their spatial distribution was proximate to that of aggregate manufacturing. Among them were several key industries, including metal products (0.054), non-electrical machinery (0.09), electrical machinery (0.132) and transport equipment (0.117), which one might anticipate to be heavily concentrated in few countries. In contrast, it was traditional activities, such as footwear (0.396), petroleum & coal products⁶ (0.366), pottery & china (0.329), leather products (0.318), tobacco (0.296), textiles (0.284) and wearing apparel (0.255) that emerged as the most localised, although once more the scores were not extreme.

The inevitable question that arises from these results is whether there is a link between the higher localisation tendencies of traditional sectors and the increased industrial specialisation of southern economies. The examination of national shares in sectoral employment (not presented here) reveals that traditional activities are not only largely concentrated in the South but also this concentration has been enhanced between the years 1978 and 1996. According to the 1996 data, in the case of footwear Italy and Portugal account for 43.3% and 14.9% of total employment, while in pottery & china their contribution is only slightly lower (38.9% and 13.3% respectively). Similarly, the majority of the EU labour force in leather products is located in Italy (38.3%) and Spain (16%). The same can be suggested for textiles and wearing apparel, where the combined share of Italy and the two Iberian countries exceeds 54% and 52%. Finally, Greece (11.7%), Italy (26.3%) and Spain (10.4%) have exceptionally large shares of the tobacco industry.

Hence, the rising specialisation of southern states is associated with their better employment record in traditional industries that shed labour elsewhere more severely. The stronger resistance of these sectors in the South can be attributed to local conditions (lower wages, participation of the extended family in the production, lack of alternative employment opportunities etc.). However, the localisation trends are also intensified due to the fact that countries such as Greece or Portugal do not attract a significant amount of other manufacturing. Advanced sectors, irrespective of their low values in the relevant index, are also concentrated in only a limited number of member states. Nonetheless, these states happen to be the largest in the EU (France, Germany, the UK, plus Italy and Spain) and thus the

geographical dispersion of advanced manufacturing is bound to resemble that of total manufacturing. (Recall that these five countries account for 4/5 of the employment in total manufacturing.) In this sense, it would be a mistake to assume that the effects of European integration have been more notable in the traditional industrial segment. Similarly, the higher localisation tendencies of this segment also pose hardly any threat to the present map of manufacturing distribution in the foreseeable future.

5 Conclusions

Summarising the key findings of this paper, it can be said that despite the acceleration of the integration process over the past twenty years, the geography of manufacturing employment in Europe has remained really rather stable. In most countries the total shift from the negative EU labour trends is limited, suggesting that processes operating at European scale are perhaps the main driving forces behind employment outcomes. The impact of industrial structure is surprisingly low and the moderate interstate variation in the competitive effect stems not from the creation of new jobs in some member states but from milder rates of decline (especially in the small economies and the South). Furthermore, it is interesting that the migration movements of manufacturing activity across Europe, at least in terms of employment dynamics, appear to be insubstantial. Leaving aside the fact that few industries generate new jobs in any given country, employment gains are usually negligible in comparison to losses.

Undoubtedly, the spatially uniform labour trends are largely attributable to the homogeneity of several national industrial bases. The values of the industrial specialisation indicator are rather small among neighbouring states and large economies, while the majority of sub-sectors display a geographical distribution that is fairly close to that of aggregate manufacturing. The slow increase in the specialisation of member economies and the localisation tendencies of a few traditional sectors over the period 1978-1996, although expected, are unlikely to affect substantially the existing industrial geography in the near future.

These findings raise an interesting set of questions that deserve some discussion. The first concerns the causes of spatial inertia. The eradication of internal borders and the free movement of production factors have already radically altered the environment in which member states strive to achieve economic growth. However, their impact on the European map of manufacturing employment is not visible so far. There are several possible

explanations for this. One might argue that the integration process is not completed yet. The Monetary Union is still in an early phase. There are states that entered the EU in the mid-nineties and the Single Market has a lifetime of less than a decade. Although this is a valid argument, it should be noted that the integration process was launched almost five decades ago. Early custom agreements, initiatives to facilitate the flow of goods and people across the EEC or mutual tariff reductions have paved the way for the more decisive steps taken in the eighties and nineties. Similarly, the ties of the newer member states with the EU date back many years before their official entry. Thus, by now some of the side effects, if there are any, should be apparent.

The survival of many 'natural' trade barriers after 1992 is another likely cause of spatial stability. According to Krugman and Venables (1990; 1996) factors such as transportation costs, difficulty of communication and cultural differences will continue to prevent the EU reaching the integration levels of the US. Apart from that, economies of scale may in fact be powerless to reverse, in the short term, the geographical effects of historical accidents (national borders, protectionism, etc.). If this is true, then industrial specialisation or sectoral localisation will take a long time to become prominent features of the European manufacturing landscape. Last, but not least, the absence of radical changes can be also attributed to the dynamic interplay between factors that promote the shift of industrial activity to the periphery (lower wages for instance) and factors that reinforce the dominance of the EU core (market accessibility, etc.). In this case, it will be interesting to see when these opposite forces will begin to move out of balance.

The second question is related to the policy implications of the results. The main consequence of the preservation of the current status quo is that the disparities between advanced and lagging economies continue to hold. However, given that the distribution of manufacturing employment resembles more or less that of population, this is not so much of a problem. On the contrary, from a policy viewpoint the absence of winners and losers can be seen as a positive outcome, as it deprives the self-appointed champions of national interests of the argument that European integration harms the industrial performance of their country. A rapid elimination of inequalities at this stage could have been easily subject to political exploitation of this kind, effectively blocking the evolution of the EU into a solid economic entity. Moreover, the results implicitly provide reassurance for existing and prospective member

states that the imminent EU enlargement is unlikely to affect adversely the relative competitiveness of their manufacturing bases.

The third and final question regards the impact of industrial specialisation and sectoral localisation on the convergence process. The slow but gradual differentiation of national manufacturing structures has the potential to increase disparities in income per capita levels across Europe in the long run, since southern economies become more dependent in traditional activities. Nevertheless, divergence is not the only possible outcome. One of the main benefits of the Single Market is the opportunity offered to member states to specialise further in sectors where they have a comparative advantage. Even if these sectors, are mature there are advantages to be gained from specialising in them. The capture of the dynamic and quality-driven EU market presupposes improvements in terms of labour skills, technology, and production organisation. The implementation of such qualitative changes in mature industries can produce many positive spillovers for the entire economies of peripheral countries.

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¹ GDP purchase power parities (PPPs) are a favourite in many studies. Although PPPs are a suitable conversion factor for fixed capital stock (Van Ark, 1990) the same does not apply to manufacturing output. This happens because PPPs are measures of final expenditure prices. From this viewpoint, they are not industry specific and do not reflect relative producer prices. This is not so much a problem in sectors where a large proportion of the output is destined for final consumption, but it causes difficulties in manufacturing where many goods are sold to other industries. Unit value ratios (UVRs) are a better conversion factor since they represent producer prices and remain more stable over time (O' Mahony, 1996). However, they do also suffer from major drawbacks such as the limited sample of goods in which they are based or the inability to account for spatial differences in product quality (Van Ark, 1995; Hooper, 1996; O' Mahony, 1996).

² Although the interpolated values cannot be entirely accurate, the deviation from the actual figures is unlikely to be substantial. The estimations cover a short period, while they derive from disaggregated labour data at 2-digit ISIC level. Thus, in Austria, for instance, employment in the tobacco industry (3140) for the year 1996 has been calculated in relation to the actual number of jobs in the food, beverages & tobacco sector (31) in the same year. Furthermore, the utilisation of the dynamic shift-share model ensures that the limited use of interpolated data affects only marginally the long run structural and differential components. Their values derive from adding up 18 annual estimations and not from comparing industrial structures and growth rates between the base and end year.

³ The impact of the EU component for the entire period varies marginally among the participating countries, although annually is the same everywhere. This happens because employment levels do not remain constant over time. Thus, depending on whether national industrial bases shed significant amounts of labour earlier or later in the period, the EU effect fluctuates slightly from the weighted average of the 13 states (22.9%).

⁴ Keeble (1989) reports considerable differences in the manufacturing structure of 'inner central' and 'outer peripheral' EU regions for 1983. The relevant index (based on the ratio of employment in modern industries to that in traditional industries) tended to be three times higher in the former areas. Nevertheless, the disparities between 'intermediate' (they accounted for 62 out of 166 EU12 spatial units) and 'inner central' areas were less

than 20 percent.

⁵ By definition larger economies will be closer to this average since their contribution to aggregate figures is several times higher to that of smaller countries. Moreover, the industrial structures of states displaying similar values of specialisation in relation to the EU 13 may in fact be less homogeneous than it is evident at a first glance (see for example the Netherlands and Sweden in table 3).

⁶ The high values of the index for petroleum & coal products can be partially attributed to data deficiencies. According to the OECD (1998) STAN database for industrial analysis there was not a single person engaged in this activity in France and Portugal. Nevertheless, a closer look on labour figures confirms that the industry is to some extent localised, as Italy, Spain and the UK accounted in 1996 for 62% of the total EU employment in the sector.

References

- Amiti M, 1999, "Specialisation patterns in Europe" *Weltwirtschaftliches Archiv* **135** 573-593
- Armstrong H W, 1995, "Convergence among regions of the European Union, 1950-1990" *Papers in Regional Science* **74** 143-152
- Barff R A, Knight P L III, 1988, "Dynamic shift-share analysis" *Growth and Change* **19** 1-10
- Begg I, Dalum B, Guerrieri P, Pianta M, 1999, "The impact of specialisation in Europe", in *The Economic Challenge for Europe* Eds J Fagerberg, P Guerrieri, B Verspagen (Edward Elgar, Cheltenham Glos) pp 21-45
- Cappelen A, Fagerberg J, Verspagen B, 1999, "Lack of regional convergence", in *The Economic Challenge for Europe* Eds J Fagerberg, P Guerrieri, B Verspagen (Edward Elgar, Cheltenham, Glos) pp 130-148
- Casler S D, 1989, "A theoretical context for shift and share analysis" *Regional Studies* **23** 43-48
- Dollar D, Wolff E N, 1993 *Competitiveness, Convergence, and International Specialisation* (MIT Press, Cambridge MA).
- Dunford M, 1993, "Regional disparities in the European Community: evidence from the REGIO databank" *Regional Studies* **27** 727-743
- Dunford M, 1994, "Winners and losers: the new map of economic inequality in the European Union" *European Urban and Regional Studies* **1** 95-114
- Dunford M, 1996, "Disparities in employment, productivity and output in the EU: the roles of labour market convergence and welfare regimes" *Regional Studies* **30** 339-357
- Fagerberg J, Verspagen B, 1996 "Heading for divergence? Regional growth in Europe reconsidered" *Journal of Common Market Studies* **34**, 431-448
- Fothergill S, Gudgin G, 1979, "In defence of shift-share" *Urban Studies* **16** 309-319
- Fothergill S, Gudgin G, 1982 *Unequal Growth, Urban and Regional Employment Change in the United Kingdom* (Heinemann, London)
- Frost M, Spence N, 1991, "British employment in the eighties: the spatial, structural and compositional change in the workforce" *Progress in Planning* **35** 75-168
- Graham D J, Spence N, 1998 "A productivity growth interpretation of the labour demand shift-share model" *Regional Studies* **32** 515-525
- Graham D J, Spence N, 2000, "Manufacturing employment change, output demand, and labor productivity in the regions of Britain" *International Regional Science Review* **23** 172-200
- Hadjimichalis C, 1994 "The fringes of Europe and EU integration: a view from the South" *European Urban and Regional Studies* **1** 19-29

- Heim C E, 1997, "Dimensions of decline: industrial regions in the United States and Europe, 1970-1990" *International Regional Science Review* **20** 211-238
- Hooper P, 1996, "Comparing manufacturing output levels among the major industrial countries", in OECD: *Industry Productivity: International Comparison and Measurement Issues* (OECD, Paris) pp 263-293
- Hudson R, 1997, "Regional futures: industrial restructuring, new high volume production concepts and spatial development strategies in the new Europe" *Regional Studies* **31** 467-478
- Keeble D, 1989, "Core-periphery disparities, recession and new regional dynamisms in the European Community" *Geography* **74** 1-11
- Keil S R, 1997, "Regional trends in British manufacturing employment: tests for stationarity and co-integration, 1952-1989" *Regional Studies* **31** 13-24
- Krugman P, 1991 *Geography and Trade* (MIT Press, Cambridge Ma)
- Krugman P, Venables A, 1990, "Integration and the competitiveness of peripheral industry", in *Unity with Diversity in the European Community* Eds C Bliss, J Braga de Macedo (Cambridge University Press, Cambridge) pp 56-77
- Krugman P, Venables A J, 1996, "Integration, specialisation, and adjustment" *European Economic Review* **40** 959-967
- Loveridge S, Selting A C, 1998, "A review and comparison of shift-share identities" *International Regional Science Review* **21** 37-58
- Markusen A R, Noponen H, Driessen K, 1991, "International trade, productivity, and U.S. regional job growth: a shift-share interpretation" *International Regional Science Review* **14** 15-39
- Martin R, 1998 "Regional incentive spending for European regions" *Regional Studies* **32** 527-536
- Martin R, Tyler P, 2000, "Regional employment evolutions in the European Union: a preliminary analysis" *Regional Studies* **34** 601-616
- Massey D, Meegan R A, 1979, "Labour productivity and regional employment change" *Area* **11** 137-145
- Melachroinos K A, Spence N, 1997, "Regional productivity dynamics of manufacturing in Greece" *European Urban and Regional Studies* **4** 315-332
- Melachroinos K A, Spence N, 2001, "Manufacturing productivity growth across European Union states: 1978-1994" *Environment and Planning A* **33** 1681-1703
- Neven D, Gouyette C, 1995, "Regional convergence in the European Community" *Journal of Common Market Studies* **33** 47-65

- OECD 1998 *The OECD STAN Database for Industrial Analysis 1970-1997* (OECD, Paris)
- O' Mahony M, 1996, "Conversion factors in relative productivity calculations: theory and practice", in OECD: *Industry Productivity: International Comparison and Measurement Issues* (OECD, Paris) pp 245-262
- Pianta M, Vivarelli M, 1999, "Employment Dynamics and Structural Change in Europe" in *The Economic Challenge for Europe* Eds J Fagerberg, P Guerrieri, B Verspagen (Edward Elgar, Cheltenham Glos) pp 83-105
- Sapir A, 1996, "The effects of Europe's internal market program on production and trade: a first assessment" *Weltwirtschaftliches Archiv* **132** 457-475
- Smallbone D, Cumbers A, Syrett S, Leigh R, 1999, "The Single European Market and SMEs: a comparison of its effects in the food and clothing sectors in the UK and Portugal" *Regional Studies* **33** 51-62
- Van Ark B, 1990, "Comparative levels of manufacturing productivity in postwar Europe: measurement and comparisons" *Oxford Bulletin of Economics and Statistics* **52** 343-374
- Van Ark B, 1995 "Manufacturing prices, productivity, and labor costs in five economies" *Monthly Labor Review*, July, 56-72

Figure 1 Distribution of population (1994 figures) and manufacturing employment (1978 and 1996 figures) among the EU states

Table 1. Dynamic shift-share analysis of manufacturing employment change in the European Union, 1978-1996

States	1978 employment (000s)	As % 1978 Employment			
		Actual change	EU effect	Industrial mix	Competitive shift
Austria	899	-23.8	-23.2	-1.2	0.6
Belgium	969	-30.0	-21.5	-1.7	-6.8
Denmark	500	-1.0	-24.8	5.4	18.3
Finland	520	-24.0	-23.9	2.0	-2.1
France	5,555	-28.6	-22.2	0.8	-7.2
Germany	8,906	-15.5	-25.2	0.9	8.7
Greece	371	-19.5	-23.9	-5.5	9.8
Italy	5,793	-21.8	-23.5	-3.1	4.8
Netherlands	1,042	-16.4	-23.5	4.2	2.9
Portugal	1,119	-7.5	-25.8	-6.2	24.5
Spain	3,357	-23.3	-21.7	-1.1	-0.5
Sweden	1,000	-18.6	-22.7	2.8	1.3
United Kingdom	7,427	-32.3	-20.0	1.3	-13.7
EU 13	37,459	-22.9			
Large Economies	31,038	-23.9	-22.7	0.0	-1.2
Small Economies	6,421	-17.9	-23.6	-0.1	5.8
North	26,818	-23.7	-22.7	1.2	-2.1
South	10,641	-20.7	-23.2	-2.9	5.4

Note: Detail may not add to total due to rounding.

Table 2. Manufacturing sectors recording employment gains in the European Union, 1978-1996

States	Number of sectors	Sectors ISIC Rev.2	Job gains as percentage of total employment loss
Austria	3	3320, 3530, 3820	1.28
Belgium	2	3560, 3850	1.97
Denmark	10	3310, 3320, 3510, 3520, 3540, 3560, 3810, 3820, 3850, 3900	90.90
Finland	5	3520, 3540, 3810, 3830, 3850	14.52
France	2	3420, 3560	1.20
Germany	3	3420, 3560, 3720	7.39
Greece	7	311/2, 3140, 3320, 3420, 3530, 3690, 3720	7.06
Italy	4	3530, 3540, 3560, 3610	3.57
Netherlands	4	3420, 3520, 3560, 3900	9.24
Portugal	10	3220, 3240, 3320, 3420, 3560, 3610, 3810, 3830, 3850, 3900	49.52
Spain	2	3420, 3560	3.65
Sweden	6	3420, 3520, 3560, 3810, 3850, 3900	18.31
United Kingdom	3	3320, 3420, 3560	4.97
EU 13	2	3420, 3560	3.09
Large Economies	2	3420, 3560	3.43
Small Economies	5	3520, 3560, 3610, 3850, 3900	4.83
North	2	3420, 3560	3.57
South	3	3420, 3560, 3610	2.54

Note: The classification description of manufacturing sectors is provided in table 5.

Table 3 Indices of industrial specialisation 1978

States	Austria	Belgium	Denmark	Finland	France	Germany	Greece	Italy	Netherlands	Portugal	Spain	Sweden	UK	EU 13
Austria		0.129	0.225	0.249	0.153	0.163	0.283	0.168	0.203	0.262	0.165	0.245	0.183	0.114
Belgium			0.257	0.265	0.160	0.163	0.272	0.177	0.200	0.268	0.168	0.240	0.181	0.127
Denmark				0.225	0.231	0.242	0.296	0.254	0.161	0.300	0.200	0.249	0.222	0.213
Finland					0.234	0.273	0.315	0.265	0.238	0.309	0.238	0.210	0.251	0.222
France						0.106	0.303	0.195	0.194	0.308	0.178	0.175	0.080	0.061
Germany							0.340	0.215	0.167	0.345	0.225	0.180	0.114	0.095
Greece								0.239	0.314	0.137	0.197	0.414	0.330	0.277
Italy									0.245	0.208	0.124	0.292	0.224	0.146
Netherlands										0.342	0.247	0.229	0.206	0.182
Portugal											0.160	0.402	0.357	0.273
Spain												0.274	0.229	0.148
Sweden													0.150	0.176
UK														0.092

Table 4 Indices of industrial specialisation 1996

States	Austria	Belgium	Denmark	Finland	France	Germany	Greece	Italy	Netherlands	Portugal	Spain	Sweden	UK	EU 13
Austria		0.172	0.226	0.205	0.175	0.161	0.336	0.224	0.198	0.287	0.203	0.263	0.177	0.132
Belgium			0.256	0.248	0.156	0.197	0.316	0.230	0.187	0.291	0.146	0.272	0.186	0.121
Denmark				0.226	0.233	0.260	0.362	0.283	0.172	0.342	0.217	0.251	0.214	0.218
Finland					0.195	0.201	0.425	0.299	0.175	0.385	0.273	0.140	0.149	0.172
France						0.137	0.346	0.267	0.149	0.359	0.169	0.197	0.101	0.096
Germany							0.410	0.274	0.187	0.390	0.242	0.200	0.128	0.125
Greece								0.283	0.336	0.239	0.248	0.485	0.369	0.326
Italy									0.263	0.187	0.212	0.326	0.254	0.185
Netherlands										0.371	0.219	0.223	0.162	0.158
Portugal											0.226	0.431	0.362	0.289
Spain												0.281	0.199	0.133
Sweden													0.175	0.204
UK														0.086

Table 5 Indices of sectoral concentration

ISIC Rev.2	Sectors/Year	1978	1984	1990	1996
311/2	Food	0.084	0.090	0.105	0.103
3130	Beverages	0.124	0.131	0.137	0.140
3140	Tobacco	0.211	0.254	0.290	0.296
3210	Textiles	0.193	0.225	0.244	0.284
3220	Wearing Apparel	0.122	0.159	0.215	0.255
3230	Leather & Products	0.160	0.231	0.292	0.318
3240	Footwear	0.273	0.324	0.365	0.396
3310	Wood Products	0.182	0.164	0.163	0.139
3320	Furniture & Fixtures	0.149	0.137	0.125	0.120
3410	Paper & Products	0.120	0.133	0.118	0.108
3420	Printing & Publishing	0.146	0.173	0.179	0.182
3510	Industrial Chemicals	0.107	0.112	0.114	0.123
3520	Other Chemicals	0.054	0.084	0.075	0.084
3530	Petroleum Refineries	0.138	0.119	0.180	0.153
3540	Petroleum & Coal Products	0.404	0.381	0.379	0.366
3550	Rubber Products	0.087	0.072	0.087	0.117
3560	Plastic Products, nec	0.059	0.073	0.083	0.096
3610	Pottery, China etc	0.163	0.222	0.318	0.329
3620	Glass & Products	0.092	0.117	0.130	0.121
3690	Non-Metallic Products, nec	0.156	0.133	0.145	0.138
3710	Iron & Steel	0.136	0.139	0.170	0.159
3720	Non-Ferrous Metals	0.163	0.173	0.212	0.232
3810	Metal Products	0.062	0.069	0.055	0.054
3820	Non-Electrical Machinery	0.092	0.079	0.083	0.090
3830	Electrical Machinery	0.098	0.123	0.139	0.132
3840	Transport Equipment	0.111	0.114	0.111	0.117
3850	Professional Goods	0.167	0.184	0.177	0.170
3900	Other Manufacturing	0.139	0.173	0.189	0.195