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European integration and the division of labour between European regions

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Abstract

European integration proceeds with steps like the South and North enlargement, the Single Market Programme, the European Monetary Union, and the envisaged East enlargement. This ongoing process of integration is likely to increase trade and factor mobility thereby affecting the division of labour between countries and regions, and the core-periphery divide of regional incomes. Theoretical reasoning, particularly on the basis of the New Economic Geography (NEG), hints to potentially rising specialization and polarization of European countries and regions via a concentration of industries with scale economies. However, NEG also allows for quite reverse solutions, according to circumstances, e.g., a dispersion of industries with scale economies mitigating the core-periphery divide. Empirical evidence on this matter is still scarce, particularly regarding regions, and we are working at improving the data base, drawing from national statistical sources. As yet, the existing empirical evidence for European countries and regions yields that any change of specialisation is slow, that the direction toward increase or decrease is almost equivocal (with a slightly elevated probability for an increase), and that the group of industries with high increasing returns to scale rather tardily seems to disperse across space.

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1. Introduction

The process of European integration is likely to influence not only the *international* division of labour, but also the *interregional*. Integration intervenes into the balance of the factors deciding on the location of industries in space and on the shaping of the economic landscape in that it leads to a decrease of transaction costs (illustrated mostly by a decrease of transportation costs), and thus puts any spatial equilibrium achieved in motion. Economic theory offers various views of what could happen during this process, rising or declining specialization and polarization of European regions, and an increasing or decreasing core-periphery-divide of regional income. According to the way industrial concentration and regional specialization takes place, integration of European states, although beneficial to overall economic welfare, at the regional level may produce winning as well as losing regions.

The paper is organised as follows: We start submitting some hypotheses on the likely effects of integration on the spatial division of labour. We will have a quick overview on the empirical evidence in this field so far. We will then look at some empirical results on specialisation of European regions that are outlet of an ongoing research project of the IfW. We will discuss these results and further research requirements, and, finally, draw some tentative conclusions as to the relevance of the submitted hypotheses.

2. Some hypotheses on regional specialisation in the course of integration

2.1. Hypotheses

For hypothesising on the relations between integration, trade, and the spatial division of labour, there are various theories at hand, and they offer quite divergent views on these relations. In this paper, we will concentrate on three major theoretical strings: neoclassical trade theory, new trade theory and new economic geography.

According to *neoclassical trade theory*, increasing integration, i.e., liberalisation of trade, should result in increasing regional specialisation, when industries relocate according to comparative advantages. This raises the overall welfare as well as the welfare of each country

Table 1 – Integration effects for regional specialisation and industrial concentration: Hypotheses from various trade theories

	Theory	Specialisation pattern	Localisation pattern	Result on regional income
	<i>Neoclassical HOS-model</i>			
H1	– usual assumptions	Specialisation of regions	Dispersion of economic activity	Equalisation of factor income
H2	– with a highly localised factor	Complete specialisation for some regions	Dispersion of economic activity	Income differentials
H3	– with factor mobility	Diversification of regions	Dispersion of economic activity	Equalisation of income
	<i>New trade theory</i>			
H4a	– level of industrial aggregates	Diversification of regions	Dispersion of economic activity	Income differentials
H4b	– level of deeply disaggregated industries	High specialisation of regions	Concentration of product varieties	Income differentials
	<i>New economic geography</i>			
H5	– usual assumptions / intermediate stage	High specialisation of regions	High concentration of IRS industries in a core	Sharp core-periphery-divide of income
	– usual assumptions / final stage			
H6a	– level of industrial aggregates	Diversification of regions	Dispersion of the IRS sector	Equalisation of income
H6b	– level of deeply disaggregated industries	High specialisation of regions	Clusters of single industries	Equalisation of income
	– without labour mobility (firm or capital mobility instead)			
H7a	– intermediate stage	Low specialisation of regions	Low concentration at the core	Moderate core-periphery-divide
H7b	– final stage	Pronounced diversification of regions	Dispersion of industrial aggregates and clusters of single industries	Equalisation of income

Source: Own compilation.

or region involved in the process, and equalises factor prices. In this analytical framework, it is taken for granted that convergence of countries and regions is to be expected, and that economic activities are dispersed rather evenly across space (table 1, hypothesis H1).¹

However, admittedly, there may exist corner solutions when one region is in such a severe lack of a certain factor that this factor becomes a bottle-neck to specialisation and the region is not able to produce at optimal factor intensities. This region will then specialise completely on industries that are less dependent on the bottle-neck factor, and it will generally produce with sub-optimal factor intensities, hence distorting the interregional equalisation of factor prices (hypothesis H2). A similar result occurs, if one region produces with inferior technologies since it lacks access to advanced technologies. This case can be interpreted in an analogous way as the case of the lacking production factor. Accordingly, in this case, too, the region will specialise completely in industries that are less technology-prone, and an interregional factor equalisation will not take place.

If the conventional HOS assumption of regionally immobile factors is released the case of complete specialisation of a region may become less likely. On the one hand, one may expect an influx of the relatively well-paid bottle-neck factor into the respective region, be it by a movement of persons or assets or by a spillover of ideas and technologies. On the other hand, relatively abundant and ill-paid factors will flow off to other regions. Accordingly, factors will tend to become more evenly dispersed across space, and this will reduce the specialisation of regions (hypothesis H3).

Since the 1980s, the emerging *new trade theory* has put the opportunities and risks associated with the integration process in a new perspective. Due to the introduction of scale economies and a consumers' love of product variety, the equalisation of factor prices does no longer turn out to be standard result. Increasing returns to scale (IRS) make it worthwhile to concentrate the production of a certain variety at one location only supplying all other locations from there. Although at the level of industrial aggregates no change of specialisation may be obvious (hypothesis H4a), regional specialisation will increase quite pronouncedly at the level of varieties when trade barriers are removed (hypothesis H4b). This kind of specialisation is reflected in increasing intra-industry trade. Due to the non-competitiveness of IRS industries, producers can retain rents and free trade would enhance welfare globally but not necessarily for all participating regions. The degree of emerging income differentials between regions depends on the degree of scale economies that are embodied in the branch portfolios of these regions.

¹ Of course, apart from integration processes, regional specialisation may decrease (increase) as its comparative advantage basis erodes (intensifies), e.g., by a change of demand preferences for products that require ubiquitary factors instead of rather localised factors (localised factors instead of ubiquitary factors).

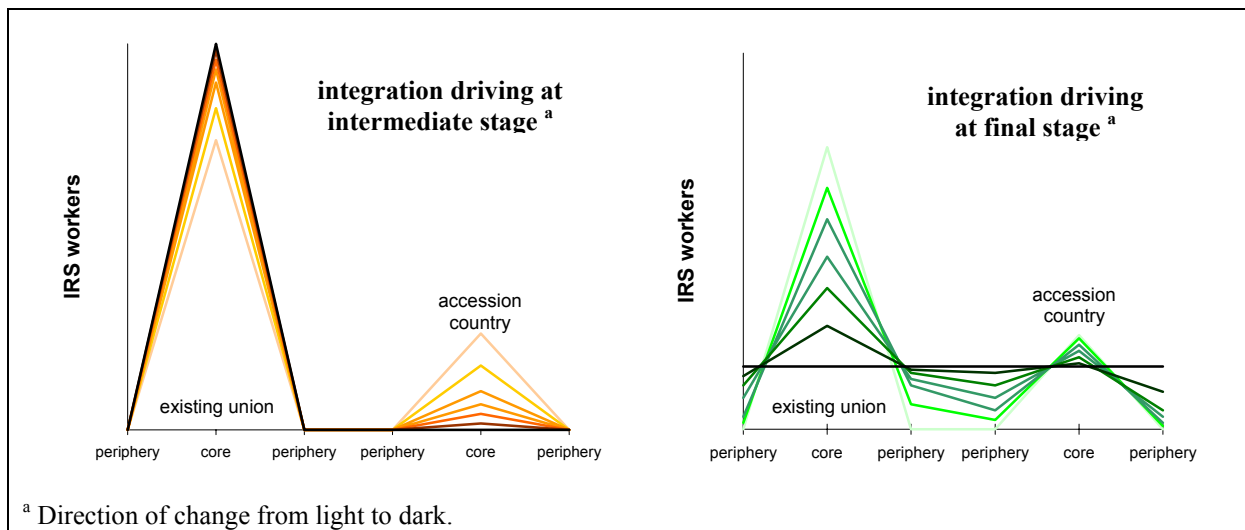
The *new economic geography*, picking up theoretical lines that go back to von Thünen, Weber, Lösch, and Isard as well as to Perroux, Myrdal, Hirschman, and Kaldor, moves one step further by considering factor mobility and thus endogenising factor endowments of regions.² Mobile factors choose their location according to existing centripetal and centrifugal forces. Being at the same time consumers, they add to the market size of this location, and by these vertical linkages become the engine of a circular cumulative process driving at agglomeration. This puts not only the equalisation of factor prices but also the even dispersion of economic activities in space at question; the emergence of an explicit and highly specialised core and periphery becomes a likely outcome of the process (hypothesis H5).

The balance between centripetal and centrifugal forces, however, is not fixed but changes as the degree of integration increases, i.e., as transaction and transportation costs decrease. In particular, it's the move from high to medium transportation costs that results in a core-periphery system where the core gets specialised in IRS industries and the periphery in what is left, industries with constant returns, perfect competition, and a low income potential. At this intermediate stage, integration may thus bring about a sharp core-periphery divide regarding income and growth. But, with transportation costs declining even further, agglomeration stops being advantageous as scale economies can be exploited from any place in space. Rather, within the agglomerated core region, a vigorous product competition dampens real wages and drives workers out of the centre towards the peripheral region. Hence, according to new economic geography, increasing integration may be characterised by an approximate U-shaped evolution path, leading from dispersion of IRS industries to concentration and back to dispersion, and accompanied by a first increasing then decreasing regional specialisation and core-periphery divide of income (hypothesis H6a).

Some special remarks apply to the situation of enlargement when one country enters a large union of several already internally integrated countries. Again, the effects of opening up the border depend on the stage of overall integration – whether it is driving at the intermediate or final stage. If integration still drives at the intermediate stage, we are likely to observe a dominance of the centripetal home market effect, and the large market potential of the union's core will attract workers from the accession country's core, and IRS activities will be concentrated in the union's core – in a way I tried to sketch out at the left side of figure 1. This tendency perhaps will not come to a complete expatriation of the IRS sector out of the accession country, since the degree of integration between countries may never be the same as within the country. Still, an increasing polarisation is probable and will occur in the union's core due to the hysteretic nature of agglomeration even if this core is no longer situated at the centre of the enlarged union.

² For a comprehensive presentation see Fujita, Krugman and Venables 1999; see also Ottaviano and Puga 1997.

Figure 1— Agglomeration / deglomeration effects in the case of integration by enlargement



Source: Own illustration.

In the case of already low transaction costs, when overall integration is driving at a final stage of integration, the opening of the border may have different effects. Again the accession country's core may lose workers in IRS industries but this time due to the dispersion of the IRS sector to the periphery. This dispersion process is likely to first favour the peripheral regions between the two cores due to the higher market potential of these regions (as I tried to sketch out at the right side of figure 1). The peripheral regions outside both cores are likely to be the latest to profit from the dispersion tendency, and, hence, to catch up.

Returning to table 1, we have to admit that the process of decreasing transaction costs from high to medium and low level, and of related increasing integration may take a long time. It cannot even be taken for sure that a degree of integration sufficient to enter the dispersion stage will be achieved. There are certain barriers to integration that will persist in spite of all institutional and technical progress in reducing them: e.g., geographic distances (relevant in particular for the movement of goods and persons), language, cultural and institutional differences. If integration comes to a standstill at an intermediate stage of integration, persisting high regional disparities remain a possibility that needs to be taken seriously (hypothesis H5).

Looking at IRS industries in more detail, at a reasonably deep sectoral break-down, there is no return toward a dispersion of all industries (hypothesis H6b). Instead, we find regions getting specialised in one branch of the IRS industries in order to take advantage of scale economies internal to the branch, while at the same time easing external diseconomies of scale such as competition for immobile factors. Put in other words, we may observe the emergence of decentralised clusters that will become the more common the lower transportation costs get. Hence, the degree of regional specialisation may increase further

while more and more regions will host at least some IRS industries and will be able to take advantage of their income potential.³

A sharp polarisation of regions even in the intermediate stage is less likely, if we assume other engines of agglomeration instead of labour mobility, e.g., migration of firms, as some NEG models do (hypothesis H7a and H7b).⁴ Such assumption seems much more appropriate for the European case. In these models, the centripetal forces are somewhat constrained as there is no comparable accumulation of consumers. Competition for workers will strongly raise wages in the central region, and this will force industries with a lower potential for scale economies to move toward the periphery, thereby easing the competitive pressure in the central region. A lack of interregional labour mobility can thus „sustain non-extreme equilibria in which all regions have industry, even if in different proportions.“ (Puga 2001:17; cf. also Braunerhjelm et al. 2000:28f).

Hence, the various trade theories supply us with various predictions of likely effects of integration on the specialisation pattern of regions and localisation pattern in space. Accordingly, the predicted results of integration on regional income and thus on regional welfare differ remarkably. Particularly, in the world of the new economic geography the outcome of integration is rather ambiguous, as it depends not only on the assumptions of the model chosen, e.g., regarding the degree of labour mobility, but as well on the starting point of the integration process due to the non-monotonic relationship between integration and specialisation.

2.2. Relevance

At the backdrop of these controversial prospects for integration, the question of the empirical relevance of the theories behind comes to the fore. I will not pretend to possess a complete overview on all literature concerned with testing the new economic geography against new trade theory and neoclassical trade theory. Amiti (1997) claims to find support for new economic geography and new trade theories, but none for HOS theories. By contrast, Ellison and Glaeser (1999) consider natural comparative advantages to play a significant role for geographic concentration and, hence, for regional specialisation, as suggested by the neoclassical trade theory. Considering the relevance of the NEG perspective, there are some

³ Ottaviano and Puga 1997, Puga 1999.

⁴ Krugman and Venables 1995, Venables 1996, Markusen and Venables 1999.

econometric tests on the relevance of NEG models.⁵ But all in all, empirical analysis is lagging behind.

There are, however, investigations on the *evolution of specialisation* in the course of the West European integration process so far. This process of European integration may be accounted for as an economic experiment without precedent in modern economic history. It offers an outstanding field for empirical research on the effects of integration. In the last two decades, three major integration steps have been taken: the south enlargement in 1981/1986, the completion of the Single Market in 1992, and the north enlargement in 1995 (the creation of the European Monetary Union in 1999/2002 still being too recent for analysis). It is thus much worthwhile to look what has happened to the division of labour between countries and regions during this period.

I think we can go rather roughly over the existing empirical evidence so far in summing up the most obvious results of the respective investigations:

- Any change of specialisation seems to occur at a very slow pace, and as the result of quite divergent processes, some acting toward concentration others toward dispersion of industries (Middelfart-Knarvig, Overman, Redding, and Venables 2000).
- Overall specialisation of *EU member states* seems to have increased in the 1970s and 1980s and for a slight majority of countries also in the 1990s (Hufbauer and Chilas 1974, Molle and Boeckhout 1995, Amiti 1999, Brülhart 1998, Walz 1999, Dohse et al 2002). Moreover, the localisation of IRS industries seems to have increased, i.e., industrial clusters seem to have emerged (Brülhart 1998).
- On a *regional level*, some studies show localisation of the manufacturing sector as a whole to have increased throughout the 1970s and 1980s (Molle 1980, Brülhart 1998, Walz 1999; no figures for the 1990s exist).
- Within the manufacturing sector, observed at a flat sectoral breakdown, the specialisation of European regions seems to have been decreasing since the 1980s (Hallet 2002, Paluzie, Pons and Tirado 2001).

What is still particularly lacking is an analysis of regional specialisation on a deep sectoral breakdown to see in how far results on increasing /decreasing specialisation really depend on

⁵ See, however, the work by Davis and Weinstein (1996, 1999) who tested the relevance of home market effects and found them to be significant in the case of (Japanese) regions, but not in the case of (OECD-) countries. See also Ellison and Glaeser (1997) who tested the relevance of agglomerative forces against random chance („dartboard approach“) in the process of concentration and found US industries to be considerably more concentrated than random chance alone would explain.

the degree of disaggregation (as suggested by hypothesis H4b /H6b). This lack is mainly due to the non-availability of sufficiently prepared regional data.

3. Empirical results for French and Spanish regions

3.1. Overall change of regional specialisation

To analyse the spatial division of labour and the location of industries in deep sectoral detail requires to take recourse to nationally available data for EU member states, since no such data set at the European regional level exists that is internationally comparable. In building such a data set, we started collecting employment figures for *France* for some selected years from 1973 to 1996 broken down into 21 regions and 35 manufacturing branches and for *Spain* for years from 1981 to 1992 broken down into 18 regions and almost 80 manufacturing branches. For these data, we provide some descriptive statistics. For convenience, the two major integration events of the observation period are signified, the south enlargement when Spain entered the EU and France got a new intra-EU neighbour, and the completion of the single market when all intra-EU borders ought to have gotten less relevant.

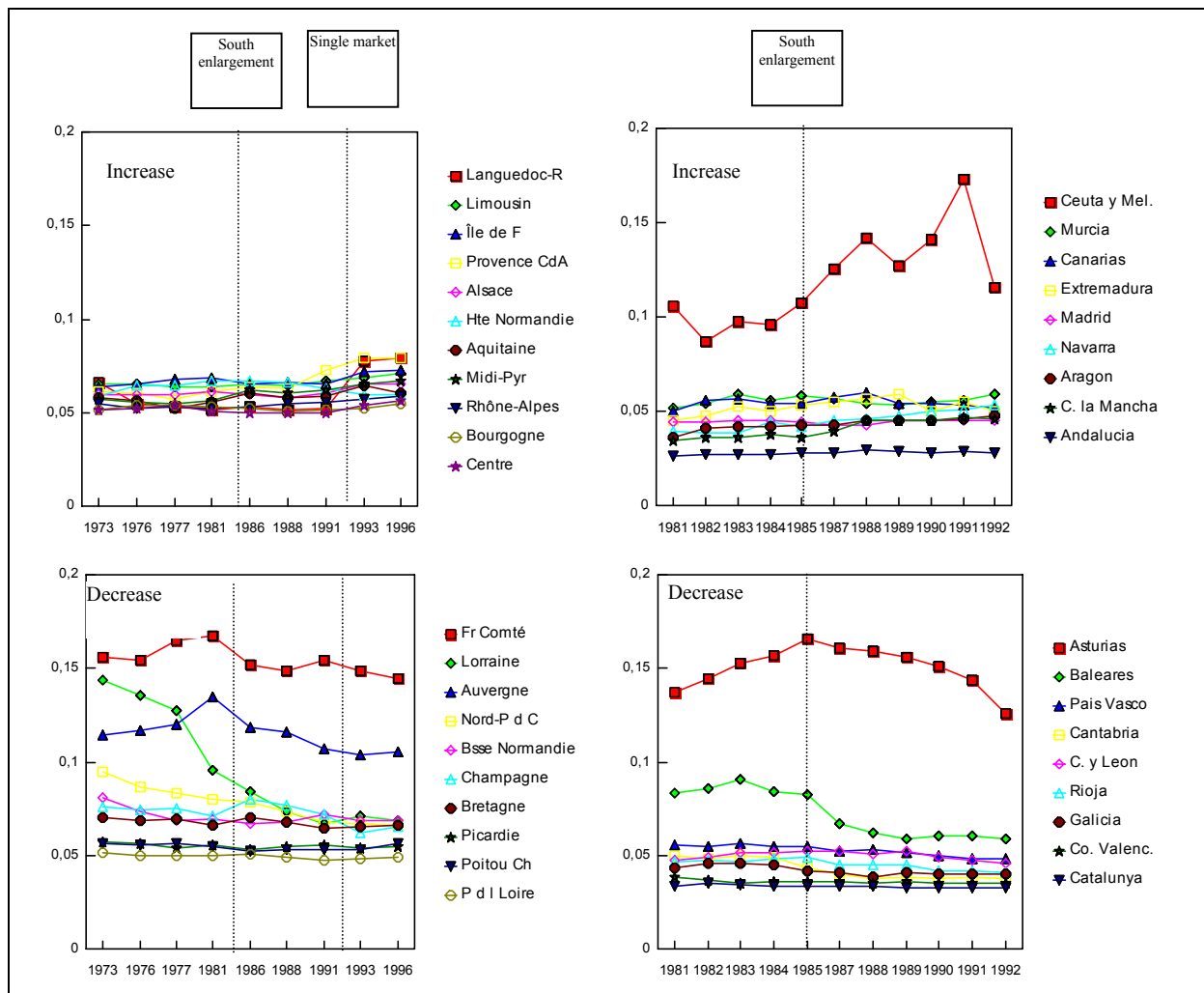
Both for French and Spanish regions, Herfindahl indices have been calculated which compare a given regional structure to a situation where all industries have equal shares (figure 2).⁶ Quite in line with other empirical studies on specialisation we find most regions, particularly such with a low degree of specialisation, to reveal only slow variation, even over a period of more than 20 years as in the case of France. A narrow majority of all regions in France and Spain experienced a moderate overall *increase* of specialisation as expected from NEG theory. For several of these regions, particularly those situated at the French South, this overall increase was the result of a first-decrease-then-increase evolution, an *U-type* evolution. Less than one half of all regions in France and Spain experienced a *decrease* of specialisation, most remarkably those that had been highly specialised in the past like the mining and steel regions (Lorraine, Nord-Pas de Calais and Asturias).⁷ No obvious influence of the south enlargement or the single market program can be detected. Accordingly, the evolution of regional specialisation does not pursue any simple and uniform path.

⁶ $h = \sum_i^n (a_i)^2$, where a_i are industrial shares of an economy under investigation, $\frac{1}{n} \leq h \leq 1$, and where a region

is the more specialised the higher the indicator is. For an overview on different measures of specialisation and their specific properties, see Amiti (1999) and Krieger-Boden (1999). The results depend to a considerable degree on the specialisation index chosen.

⁷ A few regions ended up in their overall result after a first-increase-then-decrease evolution, which may be taken as an *inverted U-curve* (e.g., Franche-Comté, Auvergne, Asturias).

Figure 2 —Regional specialisation in France and Spain, Herfindahl indices



Source:SESSI. — INE, TEMPUS Bancos de Datos. — Own calculations.

3.2. Specialisation on IRS industries

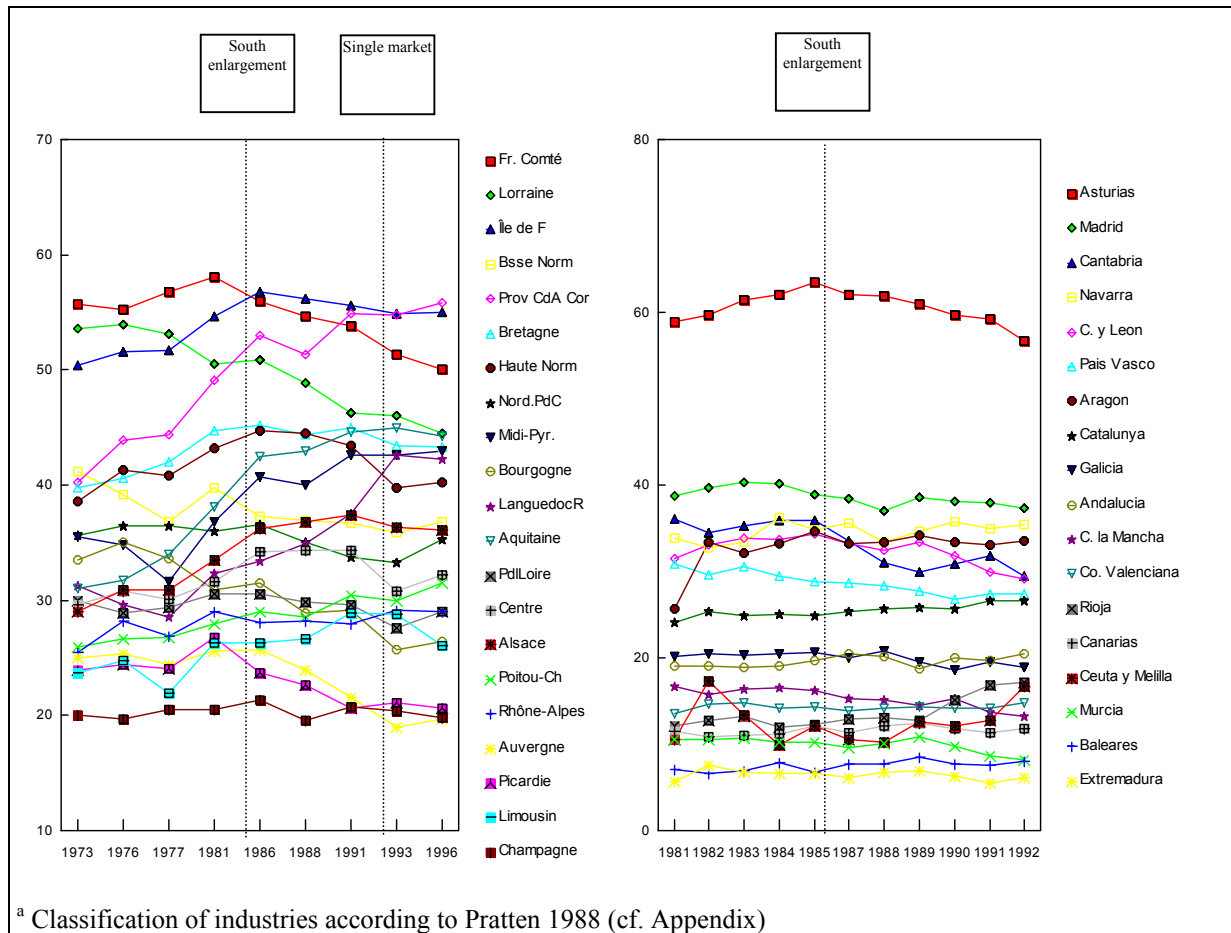
3.2.1. Overall specialisation on IRS industries

The mere observation of increasing or decreasing specialisation does not by itself answer the question of an advancing or aggravating regional cohesion. To this end, it is much useful to have a look at the location of IRS industries across regions since these industries are most relevant with respect to income perspectives of regions. We analyse the significance of IRS industries in French and Spanish regions and its evolution, applying a classification by Pratten (1988; figure 3)⁸. In this illustration, a divergence of the IRS shares between regions would

⁸ There exists a number of studies applying various methods to characterize industries according to the relevance of scale economies. We draw on a study which tries to measure scale economies (Pratten 1988, cf. annexe table A1; see also Oliveira Martins, Scarpetta and Pilat 1996) whereas other studies conclude on

signify a concentration process of these industries and a polarisation of income perspectives. By contrast, a convergence of these shares would signify a spread of IRS industries across regions, and a convergence of income perspectives of regions.

Figure 3 — Shares of all industries with high IRS in French and Spanish regions ^a



Source: SESSI. — INE; TEMPUS Bancos de Datos. — Own calculations.

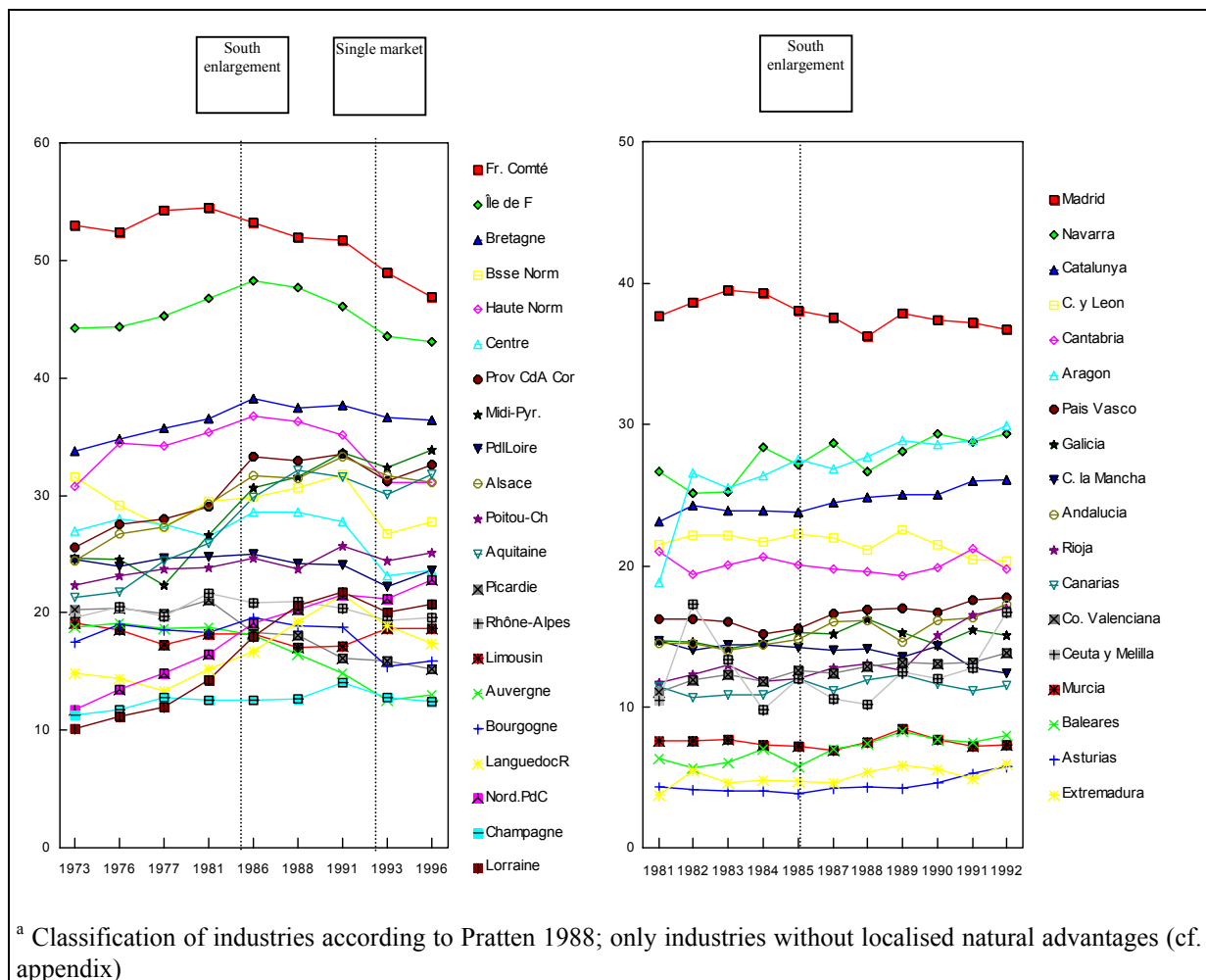
By our figures, above all, the observation is once more confirmed that any change of specialisation is slow and due to quite opposing processes: we find in most cases only slight variation over time regarding the shares of IRS industries within the regions (figure 3). Also, the overall shares of IRS industries seem not to increase significantly. Also, particularly in the case of France, the findings are rather mixed. Whereas in some regions (e.g., at the French south) the IRS sector overall increases, in others (e.g., old-industrialised regions like Franche-Comté and Lorraine) it decreases. The latter finding raises the presumption that some industries, characterised not only by increasing returns but at the same time by a linkage to

scale economies from the degree of localisation of industries (e.g., Ellison and Glaeser 1997, particularly for France see Maurel and Sédillot 1999). See also OECD (1987) distinguishing five categories of industries: scale-intensive industries, science-based industries, industries producing differentiated goods, labour-intensive industries, and resource-intensive industries. For an overview see Junius 1999.

highly localised natural advantages such as coal and iron resources, may dominate all other influences.

Therefore, in a further attempt, we consider only industries with high IRS but without a significant influence of localised natural advantages.⁹ And in fact, the influence of the industries with natural advantages is considerable, as the picture changes remarkably when leaving them out (figure 4). A comparison of figure 3 and figure 4 reveals that it is the sharp decline of these natural advantages industries that explains the decrease of the IRS sector in regions such as Lorraine and Asturias.

Figure 4 — Shares of typical IRS industries in French and Spanish regions^a



Source: SESSI. — INE; TEMPUS Bancos de Datos. — Own calculations.

The remaining industries may be looked at as being typical IRS industries in the sense of the new trade theory and the new economic geography. The results for these, illustrated in figure

⁹ That is, we eliminate all industries whose location is significantly influenced by localised natural advantages, as marked in the appendix.

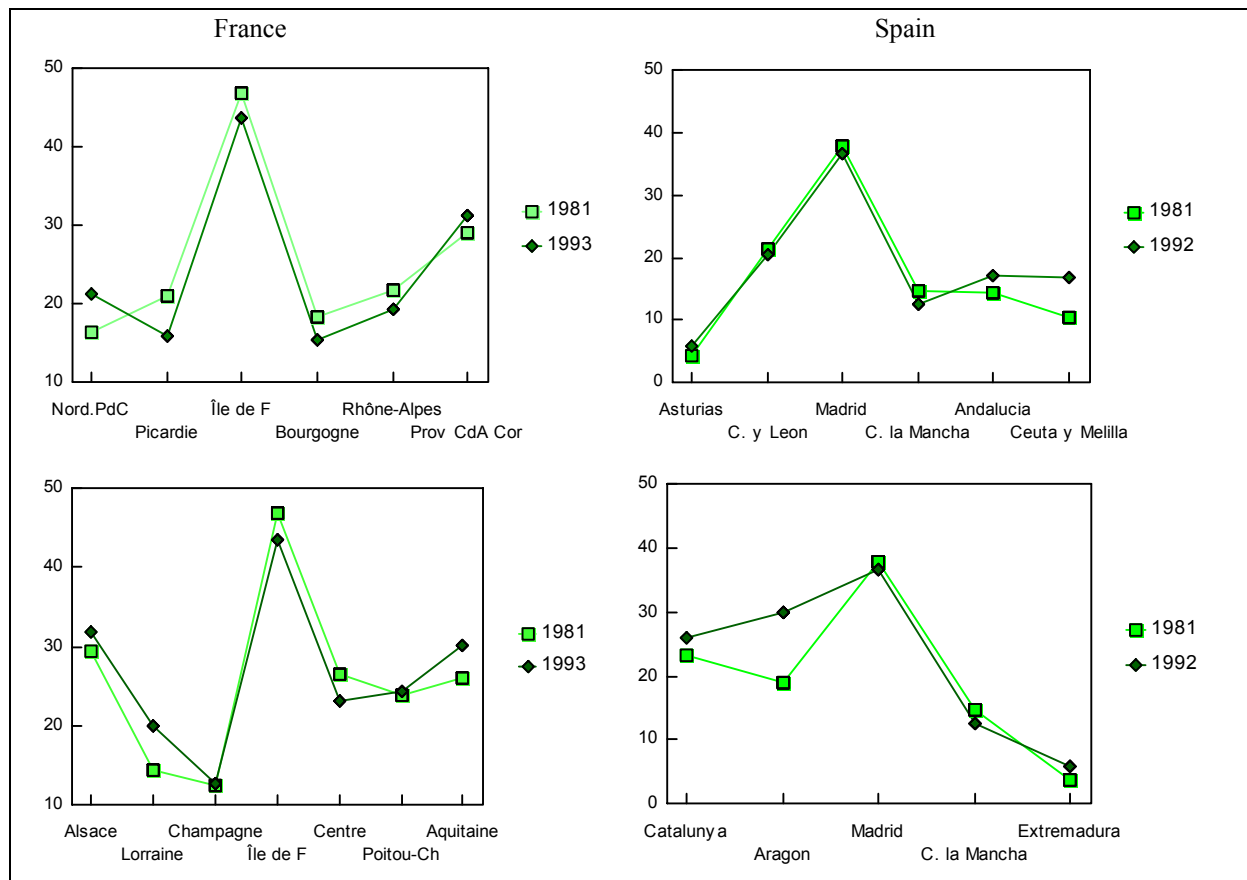
4, are much more meaningful: In the French case, we find a quite obvious tendency toward convergence of this sector's share in regional economies. Particularly, in the core region Île de France (and in Franche-Comté known for its high specialisation on precision instruments manufacturing) the relative significance of the IRS sector is decreasing. At the same time, this sector's significance is increasing in regions like Midi-Pyrénées, Provence-Côte d'Azur-Corse, Aquitaine and Languedoc-Roussillon in the French south, commonly known as having undergone a remarkable catching-up process in this very period. Also, it is increasing in regions like Nord-Pas de Calais, Lorraine and Alsace that qualify as being old industrialised, perhaps indicating a renewal of these regions.

A similar picture may be drawn for the Spanish case: here, too, we find convergence of the IRS sector's share though a bit less pronounced – of course, the observation period is also much shorter. It is due to a slight loss of significance in the Madrid region and a slight increase in most other regions. Hence we may draw the conclusion that the IRS sector taken as a whole seemingly tended to disperse over the regions during the respective periods, i.e., during major periods of the European integration process.

Dispersion of the overall IRS sector from the core regions toward the peripheries can also be observed by drawing profiles of the economic landscape regarding IRS shares. In figure 5, we find the IRS shares along a line of regions reaching from north to south of the respective country (upper row), and from north-east to south-west (lower row). These profiles quite nicely reproduce the right-hand sketch of our figure 1: During the decade of the 1980s, the period where Spain entered the EU, in both countries, IRS industries' shares decreased in the centre and increased at the peripheries, particularly at the peripheries far off from the cores,¹⁰ and particularly at the peripheries situated between the two cores. Also, we find that the decrease of IRS industries is more pronounced in the traditional EU core Île de France than in the accession country's core Madrid, which is also in line with our previous considerations. These figures may give us thus some hints that south enlargement in fact did influence the division of labour, particularly in Spain.

¹⁰ Further careful consideration should be attributed to this location pattern of the IRS industries. In particular, figure 5 reveals a remarkable accordance with theoretical considerations on urban economics within the NEG world (cf. Fujita, Krugman, Venables 1999, and for a quick survey of the literature Krieger-Boden 2000). These NEG urban economics set out how the interplay between centripetal and centrifugal forces produces a hierarchic system of IRS locations dependent on distance – a system resembling strongly the early considerations by Lösch.

Figure 5 — Profiles of IRS dispersion in France and Spain (shares of typical IRS industries)

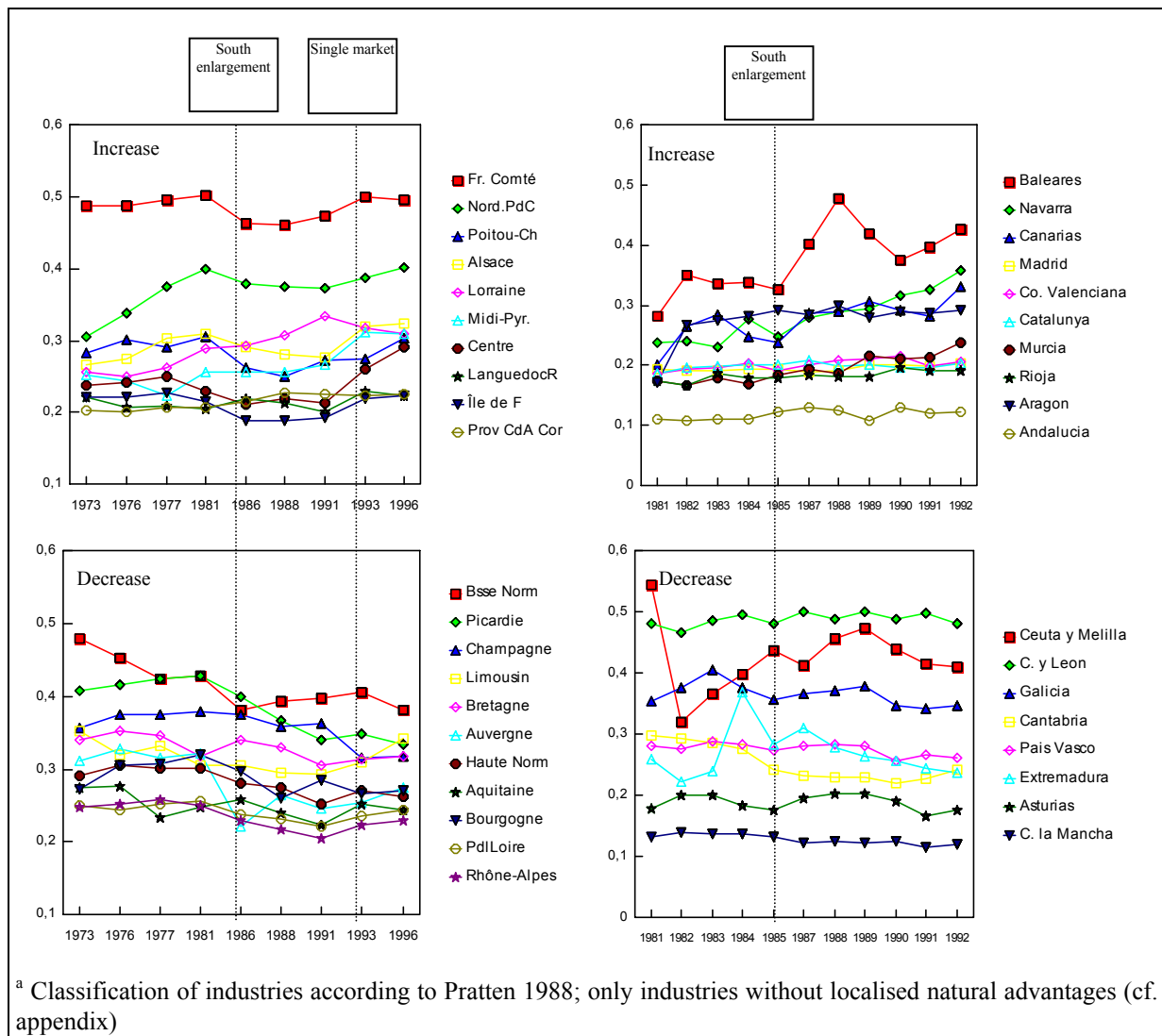


Source: SESSI. — INE; TEMPUS Bancos de Datos. — Own calculations.

3.2.2. Specialisation within the IRS sector

Recalling the hypotheses from the beginning we ought to have a look also on what happened to specialisation *within* the IRS sector – whether the overall dispersion was borne by an accordant dispersion of each IRS branch, or rather by the emergence of decentralised clusters. To this end, we may calculate Herfindahl indices, this time only for (typical) IRS branches within regions (figure 6).

Again, like in the analysis of regional specialisation regarding all industries, we find no very clear-cut results. Change is slow, and there is about as much increase as decrease of specialisation. Perhaps one may argue that particularly such regions are among those with an increased specialisation on specific IRS industries that are traditional or aspiring core regions of their respective countries (e.g., Île de France and Provence-Côte d'Azur-Corse; Madrid and Catalunya). By contrast, several of those regions that are close neighbours of these cores seem to diversify their set of IRS branches (Picardie, Champagne, Basse Normandie, Haute Normandie and Bourgogne; Castilla la Mancha and Castilla y León). But this interpretation is already highly speculative and demands for much more in-depth analysis.

Figure 6 — Specialisation within IRS industries in French and Spanish regions^a

Source: SESSI. — INE; TEMPUS Bancos de Datos. — Own calculations.

3.3. Some reservations

The last highly speculative remarks (and some others, too) may raise the suspicion this analysis to be a bit shirt-sleeve. It should, however, be minded that this is only work in progress, the beginning of a large project on regional specialisation. Thus let me quickly pass over some very reasonable reservations with respect to the above results that will be considered in forthcoming work:

- First, the data basis ought to be expanded to cover further European regions.
- Second, the above interpretations need to be counterchecked by an econometric analysis. To this respect, an appropriate variable for the degree and progress of integration should be

defined, instead of analysing merely the time trend – we may think, for instance, of a variable measuring the degree of trade entropy between regions.

- Third, in order to pay due respect to path dependencies, the nature of regional specialisation at the starting point should be investigated and regions be classified by a cluster analysis. For, as we already saw, it makes a difference for the effects of integration on a region whether this region is a traditional coal and iron location, and whether it can be labelled as being a core or peripheral region.
- Finally, a sophisticated shift-share-analysis (as proposed by Möller, Tassinopoulos 2000 and Blien, Wolf 2001) should answer the question of the relation between regional specialisation and regional income.

All this work is still ahead.

4. Conclusions

From our, still quite rudimentary analysis of regional specialisation in France and Spain, we may draw the following conclusions:

- In the course of the European integration process no obvious decrease or increase of regional specialisation can be detected. Rather, we find that change of specialisation in most cases is slow. Also, the evolution of regional specialisation does not pursue any simple and uniform path but differs between regions.
- Localised natural advantages like coal and iron resources, in accordance with the neoclassical HOS hypotheses H2 and H3, play a significant role on the specialisation of the respective regions, particularly at the beginning of the observation period. Their influence is, however, declining during the observation period. It is not clear whether this can be traced back to increasing integration or rather to structural change such as a change of demand preferences and a change of technologies.
- The typical IRS industries seen as a whole seem to disperse during the observation period; their significance decreases in the core regions and increases in peripheral regions commonly known as catching up, and, also, in regions that have been dominated by the influence of localised natural advantages. Hence, these observations are in line with the NEG hypotheses H6a and H7b, respectively.
- In Spain, this dispersion of the IRS sector as a whole seems to occur a bit retarded, perhaps Spain can be addressed as ranging still between the intermediate and final stage of integration, and hence, between hypotheses H5 and H6a.

- Within the IRS sector a clear specialisation and formation of decentralised clusters according to hypothesis H6b is still to be awaited for. Indications for such a development are as yet only weak.

What do these results mean for the theories on integration outlined above? The *neoclassical HOS theory* seems still valid for shaping regional specialisation though – at the moment – to a declining degree. This could change at any time if economic evolution came up with a new industry depending on some sort of localised natural advantage. The probability that this will happen, however, decreases as the economic development gradually dissociates from the material base and increasingly associates to the existence of non-material resources such as knowledge and human capital. The *new trade theory* appears to be incomplete and gets no obvious empirical affirmation. By contrast, the world of *NEG theories* seems more appropriate in explaining integration effects on European regions, all the more, since it offers a multitude of differing outcomes. In particular, our empirical evidence is in certain accordance with the view that integration in Europe follows an evolution path according to NEG models without labour mobility and entering into a final stage of dispersion of the IRS sector (our hypothesis H7b). This view does not exactly support the imputation of ever growing polarisation between regions resulting from integration. Rather, we may expect a though very slight tendency towards a conversion of regional income perspectives due to the dispersion of IRS industries across regions. However, much uncertainty regarding the relation between integration and regional specialisation, on the one hand, and regarding the relation between regional specialisation and regional income and growth, on the other hand, remains and requires much more empirical research.

References

- Amiti, M. (1999). Specialisation Patterns in Europe. *Weltwirtschaftliches Archiv* 135: 1-21.
- Blien, U., and K. Wolf (2001). Regional Development of Employment in Eastern Germany. An Analysis with an Econometric Analogue to Shift-Share-Techniques. Paper prepared for the “Verein für Socialpolitik”.
- Braunerhjelm, P., R. Faini, V. Norman, F. Ruane, P. Seabright (2000), Integration and the Regions of Europe: How the Right Policies Can Prevent Polarization. Centre for Economic Policy Research (CEPR), Monitoring European Integration 10. London.
- Brühlhart, M. (1998). Trading Places: Industrial Specialisation in the European Union. *Journal of Common Market Studies*. 36 (3): 319–346.
- Davis, D.R., und D.E. Weinstein (1996). Does Economic Geography Matter for International Specialisation? Working Paper 5706. National Bureau of Economic Research (NBER), Cambridge, Mass.

- Davis, D.R., und D.E. Weinstein (1999). Economic Geography and Regional Production Structure: An Empirical Investigation. *European Economic Review* 43: 379–407.
- Dluhosch, B. (2000). Industrial Location and Economic Integration. Centrifugal and Centripetal Forces in the New Europe. Cheltenham and Northampton.
- Dohse, D., C. Krieger-Boden, R. Soltwedel (2002). EMU and Regional Labor Market Disparities in Euroland. In: J. Cuadrado-Roura, M. Parellada (eds.), *The EMU and Regional Convergence*, Berlin, Heidelberg, New York.
- Ellison, G., and E. L. Glaeser (1997). Geographic Concentration in U.S. Manufacturing Industries: A Dartboard Approach. *Journal of Political Economy* 105 (5): 889-927.
- Fujita, M., P. Krugman and A.J. Venables (1999). The Spatial Economy: Cities, Regions and International Trade. Cambridge (Mass.).
- Hallet, M. (2002). Regional Specialisation and Concentration in the EU. In: J. Cuadrado-Roura, M. Parellada (eds.), *The EMU and Regional Convergence*, Berlin, Heidelberg, New York.
- Hufbauer, G.C., and J.G. Chilas (1974). Specialisation by Industrial Countries: Extent and Consequences. In H. Giersch (ed.), *The International Division of Labour*. Tübingen.
- Instituto Nacional de Estadística de España (INE), Encuesta Industrial (EIG). TEMPUS Bancos de Datos, <<http://www.ine.es>>
- Junius, K. (1999). *The Economic Geography of Production, Trade and Development*. Kieler Studie 300. Tübingen.
- Krieger-Boden, C. (1999). Nationale und regionale Spezialisierungsmuster im europäischen Vergleich. *Die Weltwirtschaft* 1999(2): 234-254.
- Krieger-Boden, C. (2000). Globalization, Integration and Regional Specialisation. Kiel Working Paper 1009. Kiel.
- Krieger-Boden, C. (2002). EMU and the Industrial Specialisation of European Regions. In: J. Cuadrado-Roura, M. Parellada (eds.), *The EMU and Regional Convergence*, Berlin, Heidelberg, New York.
- Krugman, P., and A.J. Venables (1995). Globalization and the Inequality of Nations. *Quarterly Journal of Economics* 110 (4): 857–880.
- Markusen, J., and A. Venables (1999), Foreign direct investment as a catalyst for industrial development, *European Economic Review*, 43: 335–356
- Maurel, F., and B. Sédillot (1999). A Measure of the Geographic Concentration in French Manufacturing Industries. *Regional Science and Urban Economics* 29: 575-604.
- Middelfart-Knarvig, K.H., H.G. Overman, S.J. Redding, and A.J. Venables (2000). The Location of European Industry. Report prepared to the Directorate General for Economic and Financial Affairs, European Commission. Economic Papers 142, ECFIN/318/00-EN.
- Möller, J., and A. Tassinopoulos (2000), Zunehmende Spezialisierung oder Strukturkonvergenz? Eine Analyse der sektoralen Beschäftigungsentwicklung auf regionaler Ebene. *Jahrbuch für Regionalwissenschaft* 20:1-38.
- Molle, W. (1980). *Regional Disparity and Regional Development in the European Community*. Farnborough.
- Molle, W., and S. Boeckhout (1995). Economic Disparity under Conditions of Integration — A Long Term View of the European Case. *Papers in Regional Science* 74 (2): 105–123.

- OECD (Organisation for Economic Co-operation and Development) (1987). *Structural Adjustment and Economic Performance*. Paris.
- Oliveira Martins, J., S. Scarpetta, and D. Pilat (1996). Mark-up Ratios in Manufacturing Industries. Estimates for 14 OECD Countries. OECD Working Papers - Economic Department Working Papers (IV) 24. Paris.
- Ottaviano, G. I. P., and D. Puga (1997). Agglomeration in the Global Economy: A Survey of the „New Economic Geography“. Discussion Paper 1699. Centre for Economic Policy Research (CEPR), London.
- Paluzie, E., J. Pons, A. Tirado (2001). Regional Integration and Specialization Patterns in Spain. *Regional Studies* 38 (4):285-296.
- Pratten, C. (1988). A Survey of the Economies of Scale. In Commission of the European Communities, *Research on the „Cost of Non-Europe*. Volume 2: *Studies on the Economics of Integration*. Luxemburg.
- Puga, D. (2001). European regional policy in light of recent location theories. Discussion Paper 2767. Centre for Economic Policy Research (CEPR), London.
- Puga, D. (1999). The Rise and Fall of Regional Inequalities. *European Economic Review* 43: 303–334.
- Services des Statistiques Industrielle (SESSI). Enquête Annuelle d' Entreprises. Various years, Paris.
- Venables, A.J. (1996). Equilibrium Locations of vertically linked Industries. *International Economic Review* 37: 341–359.
- Walz, U. (1999). *Dynamics of Regional Integration*. Heidelberg.

Appendix

Table 1: Internal increasing returns to scale (IRS) for 3-digit-industries ^a

High IRS	Intermediate IRS	Low IRS	
11 Solid fuels ^b	14 Refineries	17 Water supply	424 Alcohol distilling
12 Coke ovens ^b	16 Electricity & gas	223 Drawg., cold rollg.	425 Wine
13 Petroleum, natural gas ^b	224 Non-ferrous metals	231 Building materials	427 Brewing & malting
15 Nuclear fuels ^b	247 Glass	232 Potassium, phosphate	428 Soft drinks
21 Metal ores ^b	248 Ceramic products	243 Concrete	429 Tobacco prod.
221 Iron and steel ind. ^b	255 Paint, varnish & ink	244 Asbestos	431 Wool industry
222 Steel tubes ^b	257 Pharmaceuticals	245 Non-met. minerals	432 Cotton
241 Clay prod. for constr.	258 Soap & cleaning prod.	246 Grindstone	433 Silk
242 Cement	311 Foundries	259 Other. chem. prod.	434 Flax, hemp & ramie
251 Basic industr. chemic.	312 Forging	313 Transf. of steel	435 Jute
256 Ind. & agric. chem.	321 Agricult. machinery	314 Struct. metal prod.	436 Knitting industry
26 Man-made fibres	322 Machine tools	315 Boilers & tanks	437 Textile finishing
326 Transmission equipm.	323 Textiles machinery	316 Metal tools	439 Misc. textile ind.
33 Office & comp. mach.	324 Food & chem. mach.	319 Metal nec.	441 Leather tanning
342 Electrical machinery	325 Mach. f. mine, constr.	341 Wires & cables	442 Leather products
344 Communic. equipm.	327 Mach. for spec. use	347 Lamps & lightings	451 Footwear
345 Radio & Tv	328 Mach. & equipment	348 Electr. installation	453 Clothing
351 Motor vehicles	343 Electr. app. & appl.	352 Bodies f. vehicles	455 Household textiles
364 Aircraft	346 Dom. electric. appl.	374 Clocks & watches	456 Furs
371 Profess. instruments	361 Shipbuilding	411 Vegetable	461 Sawing
372 Medical equipment	362 Railway equipment	412 Meat	462 Semi-fin. wood prod.
373 Optical instruments	363 Cycles & motorcycles	413 Dairy prod.	463 Carpentry & parquet
421 Cocoa & chocolate	416 Grain milling	414 Preserving fruits	464 Wooden containers
473 Printing	438 Carpets & coverings	415 Preserving fish	465 Other wood prod.
474 Publishing	471 Pulp & paper	417 Spaghetti etc.	466 Cork, straw etc.
	481 Rubber products	418 Starch	467 Furniture
	483 Plastic products	419 Bread	482 Repair of tyres
	494 Toys, sporting goods	420 Sugar refining	491 Jewellery
	495 Misc. manufact	422 Animal foods	492 Musical instruments
		423 Other food	493 Photograph. lab.

^a Technical IRS measured by engineering cost functions on the base of estimates by managers, engineers, economists, and accountants; NACE classification. – ^b Location also influenced by localised natural advantages.

Source: Pratten (1988) Table 5.3.(a). — Own interpretation.