

# **ECONOMIC PAPERS**

Number 141

March 2000

## **Regional Specialisation and Concentration in the EU**

by

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\* Views expressed in the paper are exclusively those of the author and do not necessarily correspond to those of the European Commission, for whose Directorate-General for Economic and Financial Affairs the author is working. Comments and suggestions are very welcome and should be sent to [martin.hallet@cec.eu.int](mailto:martin.hallet@cec.eu.int).



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# REGIONAL SPECIALISATION AND CONCENTRATION IN THE EU

## 1. Introduction

Spatial issues have received renewed interest in economics following the development of the new economic geography. At the same time, there is a general concern that the process of European integration would lead to higher regional specialisation making regions more prone to adverse shocks and increasing adjustment costs in the case of a relocation of firms. In particular, the warning by Krugman (1993) to EMU participants to learn the “lessons of Massachusetts”, i.e. the need for a highly specialised region to have efficient adjustment mechanisms as a reaction to a shock to its leading sector when the nominal exchange rate is not available in a monetary union, has received major attention. He predicted that Europe, once it has completed a single market with a single currency, would soon have the same degree of regional specialisation as the US. While trade and specialisation is a basic theoretical concept in economics, which already Adam Smith identified as the main source of the wealth of nations, it is all the more surprising that the empirical evidence on spatial patterns of specialisation following the integration of economies is very scarce and inconclusive. Due to problems of data availability, this holds in particular for the regional, sub-national level in Europe. The objective of this paper is to provide some new empirical results on these issues.

The paper is organised as follows. Section 2 gives a short overview of the theoretical and empirical literature on the subject. After describing the problems of data and methodology in section 3, the main results are presented in section 4 before summarising and drawing conclusions in section 5.

## 2. The literature

Traditional economic theory is rather clear on how economies specialise when they become more integrated. Trade theory suggests that economies specialise according to their comparative advantage due to technology (Ricardo) or factor endowment (Heckscher-Ohlin). In the long run, however, growth theory predicts less specialisation due to a tendency of income convergence through an equalisation of factor productivities. Predictions from economic theory became more complicated in the 1980s when the Dixit-Stiglitz model of monopolistic competition was applied to trade theory and economic geography. The empirical observation that the major part of world trade is in similar products (“intra-industry trade”) - rather than in different products (“inter-industry trade”) as could be expected from traditional trade theories - was modelled on the basis of product differentiation and economies of scale. Empirically, regional specialisation then depends on how disaggregated the statistics are to identify different products. New economic geography is similarly ambiguous in predicting the location of production which depends on the relative strength of deglomeration forces (such as trade costs and factor price differences) and agglomeration forces (such as economies of scale and forward/backward linkages)

(Fujita et al. 1999). When reducing trade costs, production initially concentrates in locations with good market access (“core”) and spreads into more distant markets (“periphery”) at lower levels of trade costs. New growth theory, in modelling externalities from technology or human capital, would in general suggest more specialisation due to the self-reinforcing effects of externalities. In these models, trade integration may, however, also lead to spill-overs in knowledge and thus bring about less specialisation through learning and imitation. Taken together, economic theory gives little guidance on the exact spatial pattern of specialisation so that answers have to be provided by empirical studies.

The empirical literature has recently been reviewed elsewhere (Amiti 1998 and 1999, Aiginger 1999, Ilzkovitz/Dierx 1999, Krieger-Boden 1999). The main features of studies on the EU can be briefly summarised as follows:

- Most studies use national data, i.e. data at Member States level;
- Time periods taken into account are 10 to 25 years due to the limited availability of comparable earlier data;
- Variables analysed are mostly on production, employment or trade in the manufacturing sector;
- Indicators used vary considerably, although all of them take either a sectoral perspective (“concentration”) or a geographic perspective (“specialisation”);
- Most authors add a statistical analysis to explain the results by specific industry characteristics (factor, scale and R&D intensities etc.) or country characteristics (centrality, income etc.).

Most of the results for the EU are of rather low significance as regards the magnitude of changes which is mostly due to the – in historical terms – rather short period of time taken into account. If anything, there is a weak tendency towards less specialisation and concentration in manufacturing in the 1970s and a slight reversal of this tendency since the 1980s.<sup>1</sup> More significant results of structural change are for smaller peripheral countries that have undergone a rather fast process of catching-up, in particular Ireland and Portugal.

The only more extensive study known to the author which analysed regional data for EU15 and is therefore comparable to this study is the one by Molle (1996). He finds for employment in 17 branches (including services) from 1950 to 1990 a general trend for less concentration and less specialisation of EU regions. In 1990, north-western European regions had a low specialisation, many peripheral regions had a high specialisation while some capital-city and peripheral regions were medium-specialised.

Although mainly analysing national data, Brülhart (1997) showed that manufacturing in EU regions had a lower centrality in the 1980s than in the 1970s. More recently, the OECD (1999, p.108f.) has calculated a regional specialisation index for euro area

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<sup>1</sup> Cf. the results of studies by WIFO 1999 and Midelfart-Knarvik et al. 1999, both carried out recently for the Commission services. Amiti 1999 has similar results.

NUTS 1 regions based on employment in three sectors (agriculture, manufacturing, services). The results show a tendency towards less specialisation, the index value declining from 0.19 in 1986 to 0.14 in 1996.

### 3. Data and methodology

For this paper, data have been taken from Eurostat's REGIO database which is the only source providing comparable EU-wide regional data based on a standardised classification of regions ("NUTS"). The deepest sectoral classification for which regional data are available has 17 branches and includes 5 groups of services ("NACE 17", see Table 2 in the Annex). For most of the categories the data situation is extremely patchy, except for gross value added (GVA) between 1980 and 1995 if the difference between GVA at market prices and GVA at factor costs is ignored.<sup>2</sup> But even for GVA many gaps exist which can however be completed with data from national accounts (see Table 3 in the Annex). For some of the smaller Member States (DK, GR, IRL, L, AT, S, SF) this is less of a problem, since they have - economically speaking - the size of "regions". However, missing regional data for Germany was a major problem since the data for this Member State are crucial for most branches.

The few gaps in national accounts data have been filled by linear interpolation or – if at the beginning or end of the series - by applying the growth rates of the EU aggregate GVA of the branch. The same applies for the regional data of a Member State where interpolation or the national growth rates of the branch have been applied to estimate missing data. For the specific case of Germany, NACE 17 data have been estimated from national and NACE 6 data for the west German Länder (excluding Berlin) by applying data from social security employment statistics which have a fairly similar branch classification. Thus, including the 10 west German regions, the total number of regions is 119. The overall reliability of the data has been checked by comparing for each branch the EU15 aggregate from national accounts with the sum of the regional data. This suggests that there are only major differences for fuel and power products (around 20 %) and food/beverages/tobacco (around 10 %), probably due to the difference between GVA at factor costs and GVA at market prices, while for the remaining branches there are hardly any deviations of more than 5 %.

For reasons of simplicity and due to the lack of data for other explanatory variables, we apply rather simple indicators as measures for specialisation, concentration, clustering, centrality and income.<sup>3</sup> These measures capture different aspects of location: the specialisation index indicates if a region's production is concentrated in fewer branches than the EU average; the concentration measure indicates if a branch is located in few regions; the clustering measure indicates if locations of a branch are close to each other; the centrality measure indicates the degree by which a branch is located in central regions rather than in peripheral regions; the income measure indicates whether a branch is located in high-income regions or in low-income regions. Some of the measures required some additional data input: regional GDP for all of them, distance for the clustering measure and market potential for the centrality

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<sup>2</sup> The difference between GVA at market prices and GVA at factor costs is that the latter do not include indirect taxes and subsidies.

<sup>3</sup> Most of these measures are inspired by those used in the intermediate and final reports of Midelfart-Knarvik et al. 1999.

measure. Data on GDP has been taken from the REGIO database. For the clustering measure, Eurostat data on geographic distance has been used, ie. distances between the administrative capitals of the regions or countries.<sup>4</sup> Peripherality data are taken from a study of Copus (1999) which follows the methodology of Keeble et al. (1988).

## 4. Results

In WIFO (1999) specialisation is defined as “the extent to which a given country specialises its activities in a small number of industries or sectors” and concentration as “the extent to which EU activity in a given industry is concentrated in a few countries”. For illustration, they suggest to imagine for a given year a matrix with the countries in columns and the sectors in rows; then specialisation is observed by reading down each column and concentration by reading along each row. This terminology is used below.

### 4.1 Specialisation

In order to find out about the sectoral specialisation of regions and its trends, the data have been arranged in a way as to show for each of the 119 regions the shares of the 17 branches in GVA. A well-known index of regional specialisation is the absolute difference between the sectoral share  $y_i^k$  of branch  $k$  in region  $i$  and the respective EU15 average  $\overline{y^k}$ , summed over all branches  $k$ :

$$S_i = \frac{1}{2} \sum_k |y_i^k - \overline{y^k}|$$

This specialisation index takes the value zero if a region has a production structure which is identical to the EU15 average and takes the value one (or 100 %) if a region’s structure is completely different. The index – illustrated in Graph 1 as the GDP-weighted average of all 119 regions – shows a very moderate decline from a value of about 14 % in 1980 to a value of below 13 % in 1995. This trend is mainly due to a reduction in specialisation between 1981 and 1984 (–0.3 %) and between 1989 and 1993 (–0.8 %). Specialisation in 1995, illustrated in Map 1 (in the Annex), was somewhat higher in southern peripheral regions due to their smaller economic base. Finland as well as several core regions along the “blue banana” also tend to be highly specialised. For the change in specialisation between 1980 and 1985, illustrated in Map 2 (in the Annex), it is more difficult to identify any clear pattern. The regions that have become more specialised are either among the poorest regions (e.g. Andalusia, Sicily) and have developed a few services, in particular tourism and non-market services, or are among the richer ones that have undergone a major structural change from manufacturing into services (Finland, Denmark, some west German, Belgian and Dutch regions, South East England, some parts of France, Cataluña)

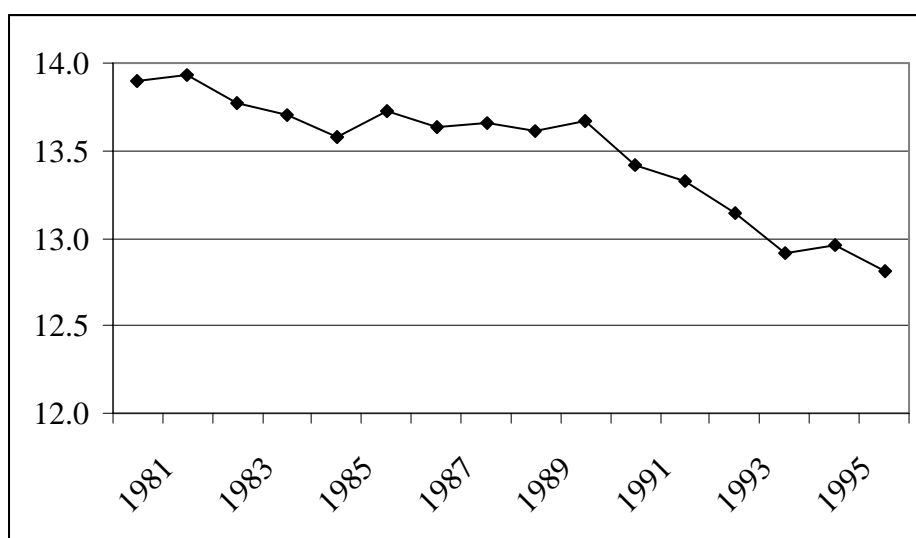
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<sup>4</sup> In the few cases where there are no administrative capitals at NUTS II level (in particular in the UK), a centrally located city has been chosen.



Between the years 1980 and 1995, only 34 regions have become more specialised while 85 regions have become less specialised.

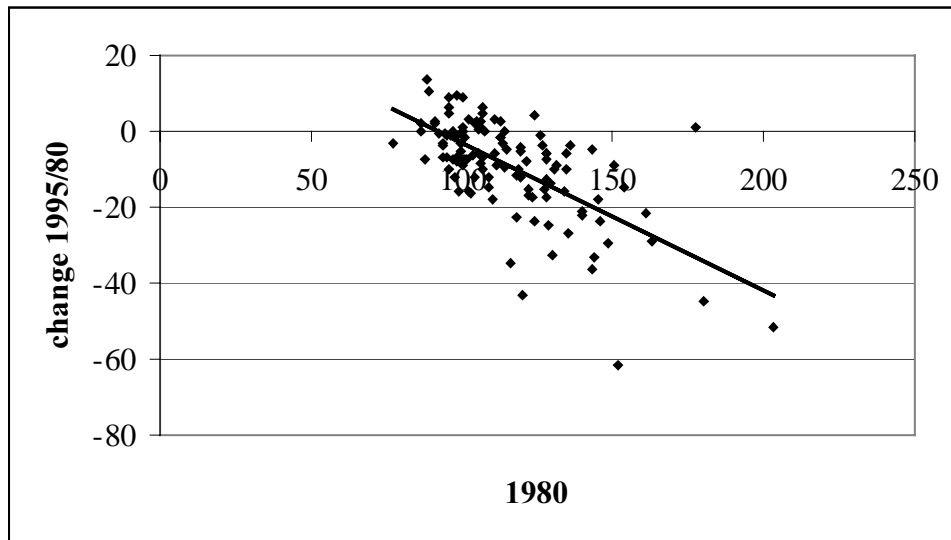
*Graph 1: Specialisation index in %, 1980-95*



As a further summarising measure of regional specialisation, the coefficient of variation of the sectoral composition of GVA within each region and its changes between 1995 and 1980 can be calculated; assuming that the higher the coefficient of variation, the higher the specialisation. However, due to the fact, that the NACE17 classification of branches is much more detailed on manufacturing than on services, the overall structural change from several manufacturing branches into few service branches implies almost automatically a higher specialisation for all regions. This is reflected in the strongly increased importance of “other market services” (b74) and “non-market services” (b86) in almost all regions. If these service branches were statistically more disaggregated, the coefficient of variation would not necessarily increase. In order to reduce this statistical problem, the regional coefficients have been calculated in relation to (i.e. in % of) the total coefficient for EU15.<sup>5</sup> Specialisation is highest (more than 125%) in regions where services tend to be important. These are, in general, the richest regions (i.a. Paris, Brussels, London, Hamburg) and some poorer regions (i.a. Ceuta y Melilla, Canarias, Corse, French DOM, Algarve). During time, comparing the differences between 1980 and 1995, there seems to be a strong convergence towards the average sectoral composition (see Graph 2). However, this might again be partly due to the statistical bias of structural change from manufacturing to services.

<sup>5</sup> This is an application of the concentration measure used below, the only “difference” being that the indices *i* and *k* have been switched.

Graph 2: Regional specialisation in 1980 (in %) and change between 1980 and 1995 (in percentage points)



Note: Regional specialisation is measured as the coefficient of variation of sectoral GVA composition in a region in % of the coefficient of variation of sectoral composition of total GVA of EU15. The trendline is a linear regression with  $\beta=-0.3869$  and  $R^2=0.4307$ . The extreme case of Groningen has been excluded.

## 4.2 Concentration

We take four indicators to measure the spatial dispersion of production regarding concentration, clustering, centrality and income. The respective branch value is always set in relation to the GDP value in order to standardise the results and to eliminate business cycle effects.

The *concentration measure* captures the spatial dispersion of production measured by the coefficient of variation:

$$V^k = \frac{\frac{1}{y_i^k} \sqrt{\frac{\sum_i (y_i^k - \bar{y}_i^k)^2}{N}}}{\frac{1}{y_i} \sqrt{\frac{\sum_i (y_i - \bar{y}_i)^2}{N}}}$$

The *clustering measure* is based on the gravity model by summing up the distance-weighted production of all pairs of regions:

$$C^k = \frac{\sum_i \sum_j \left( \frac{y_i^k y_j^k}{\delta_{ij}} \right)}{\sum_i \sum_j \left( \frac{y_i y_j}{\delta_{ij}} \right)} \quad \text{with } i \neq j$$

The *centrality measure* expresses if the production is located in the centre or in the periphery of the EU:

$$M^k = \frac{\sum_i \left( \frac{y_i^k}{p_i} \right)}{\sum_i \left( \frac{y_i}{p_i} \right)}$$

The *income measure* indicates if the production is located in regions with high or low GDP per capita:

$$W^k = \frac{\sum_i (y_i^k w_i)}{\sum_i (y_i w_i)}$$

where:

- $k$                     branch ( $k = 1, \dots, 17$ )
- $i, j$                     regions  $i$  and  $j$  ( $i, j = 1, \dots, 119$ )
- $y_i^k$                     production (GVA) of branch  $k$  in region  $i$  relative to EU15 production (GVA) of branch  $k$
- $y_i$                     total production (GDP) in region  $i$  relative to total production (GDP) in EU15
- $\delta_{ij}$                     geographic distance between capitals of regions  $i$  and  $j$
- $p_i$                     peripherality index value of region  $i$  in 1995

$w_i$	GDP per capita of region $i$ relative to EU15
$N$	total number of regions ( $N = 119$ )

For the description of the results, two perspectives are of particular interest: (1) the results by measures, and (2) the results by branches.

*(1) Results by measures*

When interpreting the results, the common features of the four measures have to be borne in mind: First, production variables are always expressed as shares in EU 15 production of a branch and, second, the sectoral tendencies are always expressed in relation to (i.e. in % of) the results for total GDP production. For example, a result of 100 % for a certain measure means that the branch followed the spatial pattern of GDP in EU15. Table 1 presents the results for the year 1995 for each of the measures which we will discuss subsequently.

*Table 1: Sectoral results in % of GDP results, 1995*

	<b>concentration</b>	<b>clustering</b>	<b>centrality</b>	<b>income</b>
<b>b01</b>	76.1	79.0	69.9	87.1
<b>b06</b>	114.2	99.6	104.2	99.9
<b>b13</b>	126.2	118.3	93.4	98.1
<b>b15</b>	100.6	100.1	88.8	96.2
<b>b17</b>	117.0	117.5	104.7	102.2
<b>b24</b>	122.8	110.1	100.6	102.3
<b>b28</b>	136.3	110.5	103.2	101.3
<b>b36</b>	85.9	98.9	89.3	95.7
<b>b42</b>	125.5	96.1	83.6	96.3
<b>b47</b>	133.9	98.4	106.7	102.0
<b>b50</b>	110.4	97.3	89.6	98.7
<b>b53</b>	94.7	93.8	93.7	97.2
<b>b58</b>	89.4	95.8	97.2	98.0
<b>b60</b>	99.5	98.7	100.8	100.8
<b>b69</b>	126.8	102.0	113.3	104.9
<b>b74</b>	115.8	107.9	108.5	102.1
<b>b86</b>	95.1	92.7	95.2	97.1

Note: The NACE codes in the left-hand column are explained in Table 2 in the Annex

In 1995, spatial *concentration* of gross value added relative to overall GDP was at 76 % in agriculture (b01) and less than 90 % in food/beverages/tobacco (b36) as well as in trade and tourism. (b58). Concentration was higher than 130 % only in transport equipment (b28) and in paper and printing products (b47). These results at the

extremes are rather intuitive in that agriculture and the processing of its products as well as day-to-day services are spatially dispersed following patterns of arable land and of settlement whereas manufacturing industries with high economies of scale are concentrated in fewer locations.

High results for the *clustering* measure indicate that production of similar products takes place in regions having geographically low distance to each other. Again, as can be expected, agriculture (b01) has by far the lowest result of less than 80 %. At the other extreme, only two branches have results of about 118 %, which are ores and metals (b13) and chemical products (b17). Except for three branches with about 110 % – metal products (b24), transport equipment (b28) and other market services (b74) – the remaining branches are more or less close to GDP clustering. Taken together, clustering seems to prevail in traditional manufacturing branches that are – or used to be – depending on raw materials which are (or were) only available in specific locations. Even when this has ceased to be an important factor, the location of production might already be sufficiently well established and difficult to change because of sunk costs or various externalities of the location for some historical reasons.

The *centrality* measure indicates whether production takes place in the centre or in the periphery of the EU. As before, agriculture (b01) is at the lower margin with a result of about 70 % while the second lowest result of 84 % is for textiles and clothing (b42). A high degree of centrality of 113 % is only achieved by credit and insurance services (b74) whereas the remaining branches are close to or in a band of between 90 % and 110 %. Overall, it is a rather surprising result that – with only few exceptions – most branches tend to follow the centre-periphery pattern of GDP. Although it is obvious that banking and insurance is rather centralised – considering their most important locations London, Frankfurt and Paris – the result that this branch is the most centralised of all branches was hardly to be expected.

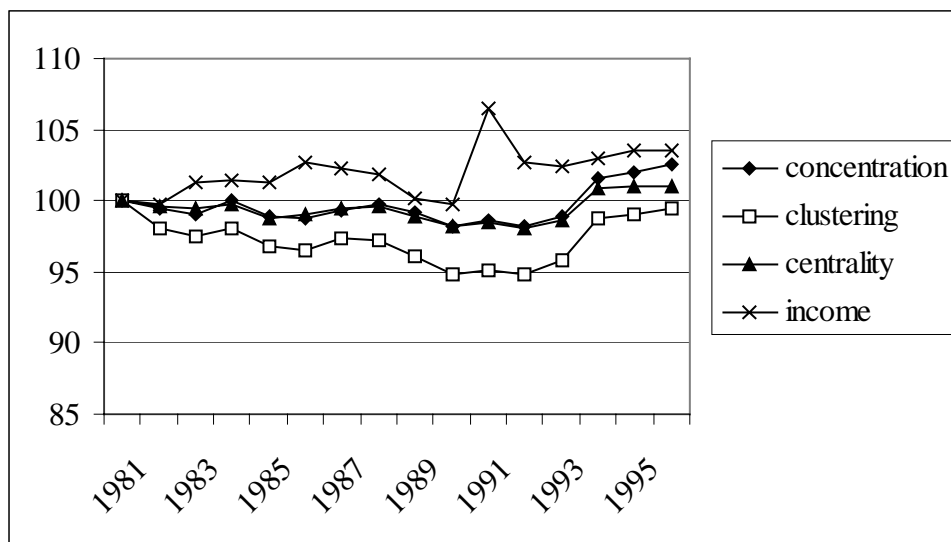
The *income* measure is to indicate whether production is located in wealthier or in poorer regions. With the exception of the agricultural sector (b01), which shows a result of 87%, the results for all other branches tend to follow the GDP pattern within a rather narrow band of between 95 % and 105 %. Similar to the centrality measure, banking and insurance services (b69) have the highest result (105 %) while the lowest results (96 %) are for food/beverages/tobacco (b36), mineral products (b15) and textiles and clothing (b42). Thus, the income measure shows overall consistency with the other measures, with banking and insurance services being concentrated in wealthier central regions whereas the more traditional labour-intensive branches also tend to be located in peripheral regions of lower income.

## (2) Results by branches

Since developments in total GDP production serve as a reference for the sectoral results, it is of interest to first look at the development of GDP results during time (i.e. the denominator of the measures). Taking into account the small scale of Graph 3, there is a relative stability during time for all measures, in particular during the 1980s. If anything, one might identify a decreasing tendency during the 1980s which reverses into an increase during the 1990s. It remains to be seen in the light of more recent data

whether this tendency actually continued in the second half of the 1990s. A striking feature is the parallel movement of concentration, centrality and clustering which might be the outcome of both the similarity of the measures used and the simultaneous change of these phenomena. An exceptional movement for the income measure can be identified for the year 1990. This is mainly due to an extraordinary GDP growth in the west German Länder which - as far as statistical problems can be excluded - might reflect the temporary boost in demand following German economic and monetary union in July 1990. It might also have contributed to the upward trend of all four measures in the subsequent years.

Graph 3: Changes in results for the four measures for GDP (1980=100), 1980-95



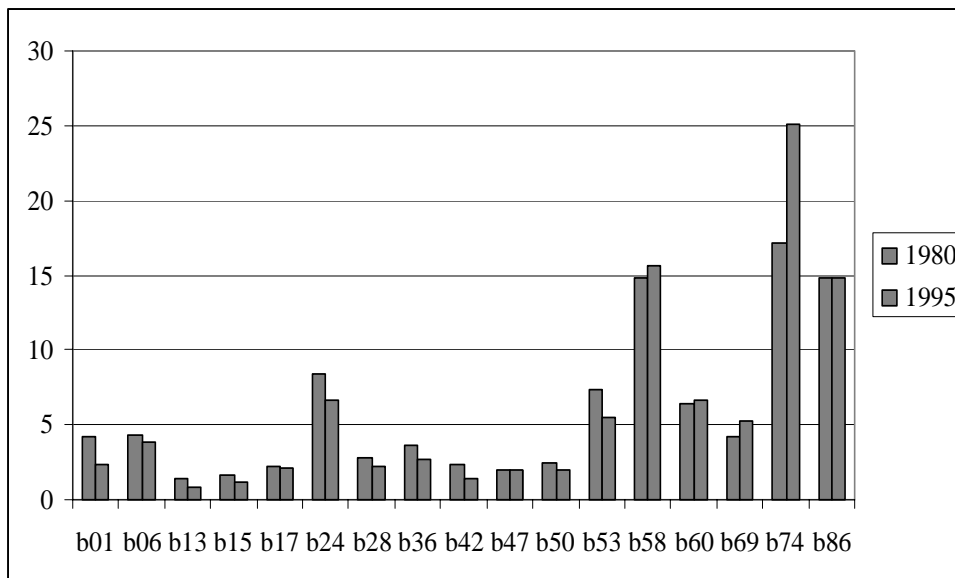
The results for the 17 branches (see Graphs 5 to 21 in the Annex) allow to broadly distinguish three groups:

1. The first group is the rather specific production of *agricultural, forestry and fishery products* (b01) which tends to be much less concentrated, clustered and centralised than overall production. The results for the income measure confirms the finding that per capita income in peripheral, rural regions is lower than elsewhere. A tendency for less concentration can be seen after 1985 which might result from the declining relative importance of agriculture in many regions. Declining values for concentration, clustering and centrality in the 1990s point to the fact that the agricultural sector has not followed the overall spatial economic tendencies.
2. The second group could be called "*traded goods*" which includes fuel and power products (b06), almost all manufacturing branches (b13, b17, b24, b28, b42, b47, b50) as well as credit and insurance services (b69) and other market services (b74). They are characterised by spatial concentration which is much higher than GDP concentration, i.e. a production that takes place in fewer locations than other activities. However, in some of these branches there is a trend of de-concentration during the 1990s which is strongest for chemical products (b17) and metal products (b24). Most branches of this second group have values above 100 % for

the clustering measure, although there is a declining trend in the 1990s. Surprisingly, the results for the centrality and income measures do not deviate much from 100%, except for textiles and clothing (b42) and products of various industries (b50 which includes rubber and plastic) that are more peripherally located, and the two services branches (b69 and b74) which are more centrally located. The only two exceptions from these general trends in the manufacturing sector are mineral products (b15) and food/beverages/tobacco (b36) which are more located in peripheral regions with a somewhat lower income. For both of these branches the clustering measure is around 100% while only for food/beverages/tobacco is the concentration measure lower than 100%. A further interesting aspect of many of the traded goods branches is that the measures show some cyclical effects, implying that their production is varying more than the overall cycle.

3. The third group could be called “*non-traded goods*” although this is certainly somewhat simplifying in view of the diversity of activities which include building and construction (b53), trade and tourism (b58), transport and communication services (b60) as well as non-market services (b86). The results for all four measures tend to vary only little around 100% with very few exceptions, such as trade and tourism (b58) being less concentrated and non-market services (b86) being somewhat below 100% for all measures, although concentration used to be higher than 100% in the early 1980s. The spatially rather homogenous pattern of this group is likely to be due to the nature of these activities which mainly follow the spatial pattern of purchasing power (i.e. GDP).

Graph 4: Shares of branches in total GVA in %, 1980 and 1995



The relative weight in terms of GVA in 1995 was 2.3% for the first group, 55.1% for the second group and 42.6% for the third group. This is not very different from what it used to be in 1980: the first group was 2 percentage points higher and the second group was 3 percentage points lower. However, this rather stable share of the traded goods sector conceals a major structural change during the period when most of the manufacturing sectors have lost and most services have gained in relative importance, in particular “other market services” (b74) whose share has increased from 17% to

25% (see Graph 4). One of the reasons for this change might be the increasing recourse to outsourcing of business services.

## 5. Summary and conclusions

In spite of considerable problems of data availability, the analysis of specialisation, concentration, clustering, centralisation and income measures for sectoral production at regional level provides some interesting results which - interpreted cautiously by taking into account the mixed quality of data – can be summarised as follows:

- *Regional specialisation*, calculated by the specialisation index and the relative coefficient of variation between 1980 and 1995 for each region across the 17 branches, has an increasingly similar pattern for most regions which reflects the general structural change from manufacturing into services. This is rather good news in that it reduces the probability of region-specific shocks and does not confirm the expectations of increased probability following European integration. However, this result might also be partly due to a statistical bias arising from the classification of branches which is much more detailed on manufacturing than on services, so that the overall structural change from several manufacturing branches into few service branches implies automatically a higher structural similarity of regions.
- The *results on the four measures for concentration* showed that agriculture and the processing of its products as well as day-to-day services are spatially dispersed following patterns of arable land and of settlement whereas manufacturing industries with high economies of scale are concentrated in fewer locations. Clustering seems to prevail in traditional manufacturing branches that are (or used to be) depending on raw materials which are (or were) only available in specific locations. As regards centrality, most branches tend to follow the centre-periphery pattern of GDP with few exceptions among which the banking and insurance sector as the most centralised of all branches. The results for the income measure show consistency with the results for the other measures, with banking and insurance services being located in wealthier central regions whereas the more traditional labour-intensive branches also tend to be located in peripheral regions of lower income.
- For the *results on concentration for the 17 branches*, the most striking observation is a high degree of stability during time, indicating that the time period of data availability (1980 to 1995) might be too short to identify any major trends. The results allowed to distinguish three groups of branches: (1) agriculture which has a low degree of concentration, clustering, centrality and income; (2) traded goods (including fuel and power products, almost all manufacturing goods, credit and insurance services and other market services) which have a high degree of concentration and clustering, although centrality and income are similar to the overall development; (3) non-traded goods (including building and construction, trade and tourism, transport and communication services as well as non-market services) which tend to follow the spatial pattern of purchasing power (i.e. GDP) for all measures, due to the nature of these activities.



Many of these results are within the range of what one might have expected and therefore allow for some confidence in the reliability of data and methodology. The few changes during the time period considered, which includes events such as the completion of the Single Market, several EU enlargements, the opening up of Eastern Europe and a general trend towards globalisation, is probably the most surprising result that makes the availability of more detailed and longer time series data as desirable as unrealistic. Altogether, taking into account the caveats due to data problems, the results suggest a less dramatic view of the spatial effects of European integration for mainly two reasons:

1. Location and relocation of production involve high investment and are therefore long-term processes with a high sluggishness, possibly due to Marshallian externalities (or “lock-in” effects), once a certain pattern of specialisation and concentration has developed. Significant changes are therefore difficult to identify in a time period of 16 years although several important location factors in the EU have changed considerably. Historic data, such as those used by Kim (1997) for the US from 1840 to 1987, provide much clearer results, but are hardly available for European regions.
2. The general process of structural change from manufacturing into services tends to make regions more similar regarding their specialisation. While further concentration in some traded goods sectors cannot be excluded in the medium to long run, the overall effect will always be limited by the importance of non-traded goods whose production follows the spatial pattern of purchasing power and thus – given the absence of significant geographic labour mobility in the EU - counteracts possible agglomeration forces. These tendencies cast some doubt on the relevance of empirical evidence which is limited to the manufacturing sector.<sup>6</sup>

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<sup>6</sup> Bayoumi/Prasad (1995, p.7) come to a similar conclusion when comparing the specialisation of 8 US regions and 8 EU countries for the whole economy from 1970 to 1989: “Our measure of specialization indicates that, in all industries except manufacturing and primary goods, the EU is more diverse than the United States, at least at the 1-digit SITC level. Manufacturing may, therefore, not necessarily provide an adequate basis for comparing the structure of the United States and EU economies.”

## ANNEX

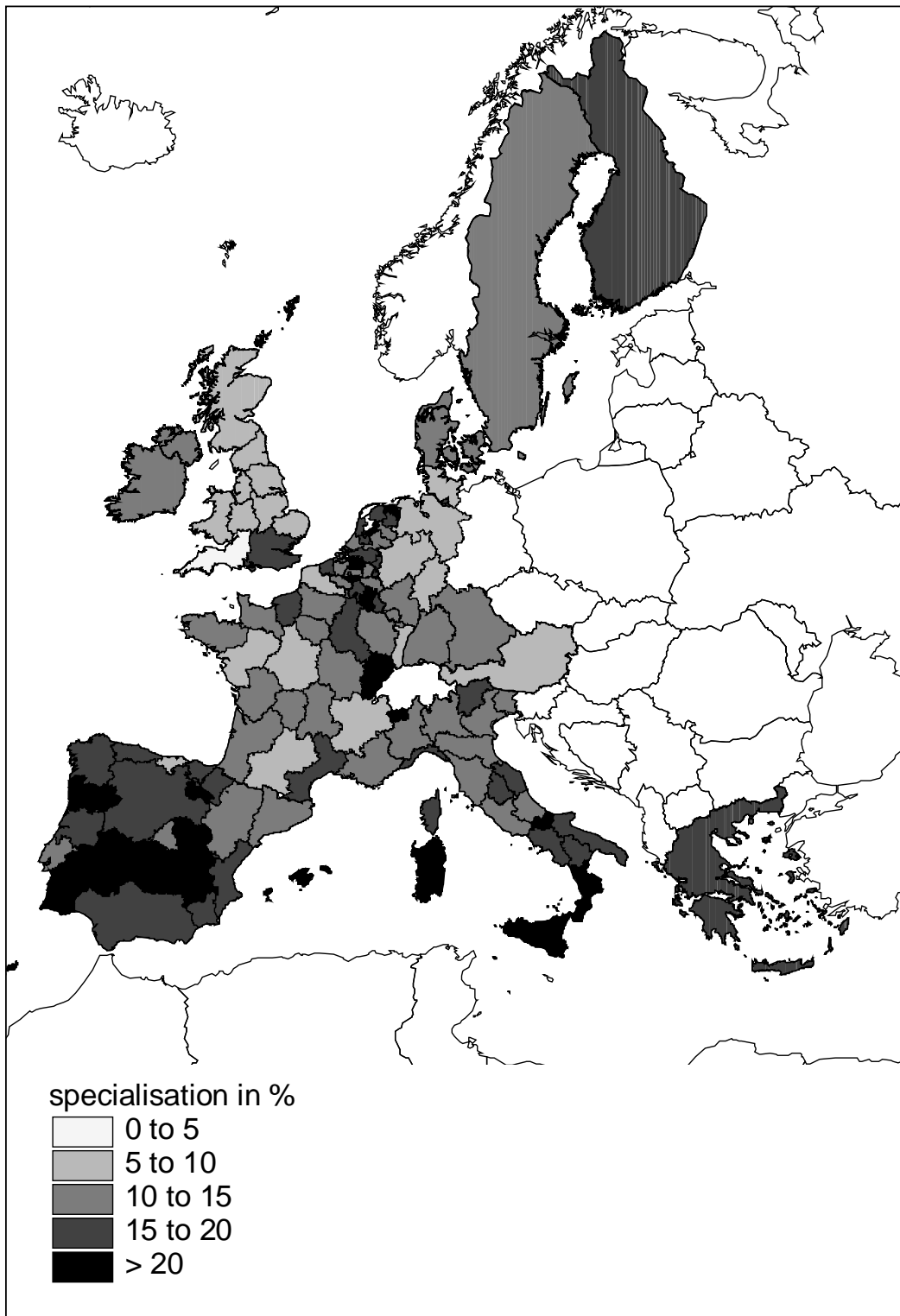
*Table 2: NACE-CLIO RR 17 branches for GVA in the REGIO database*

B01	Agricultural, forestry and fishery products
B06	Fuel and power products
B13	Ferrous and non-ferrous ores and metals, other than radioactive
B15	Non-metallic minerals and mineral products
B17	Chemical products
B24	Metal products, machinery, equipment and electrical goods
B28	Transport equipment
B36	Food, beverages, tobacco
B42	Textiles and clothing, leather and footwear
B47	Paper and printing products
B50	Products of various industries (including rubber and plastic)
B53	Building and construction
B58	Recovery, repair, trade, lodging and catering services
B60	Transport and communication services
B69	Services of credit and insurance institutions
B74	Other market services
B86	Non-market services

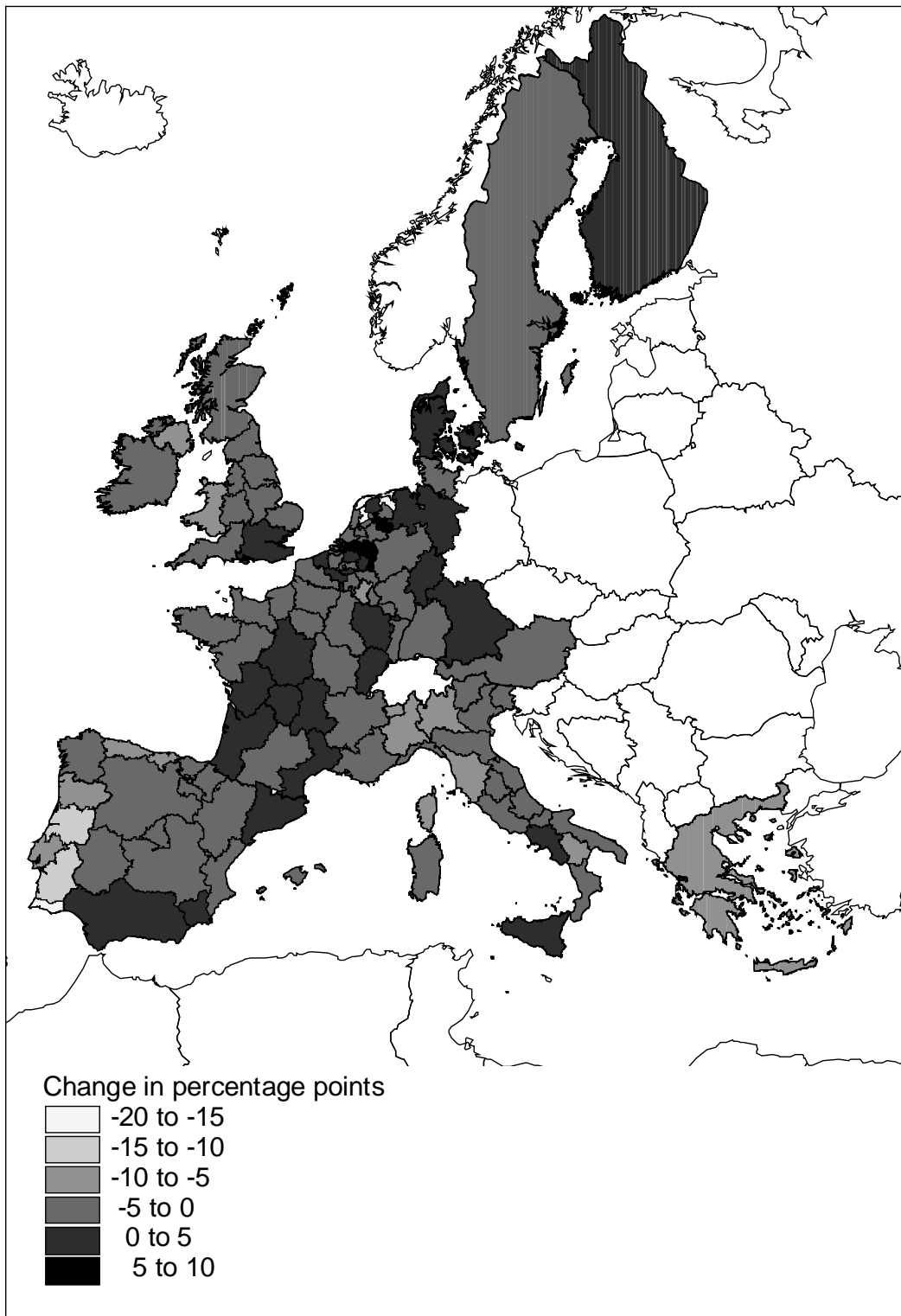
Table 3: Availability of sectoral EUROSTAT data (NACE-CLIO RR17) for gross value added at market prices (GVA mp) or at factor costs (GVA fc), 1980-1995

<b>Member State</b>	<b>Geographical level</b>	<b>Number of regions</b>	<b>GVA</b>	<b>Comments</b>
<b>B</b>	NUTS 2	11	mp	
<b>DK</b>	National	1	mp	1995 missing
<b>D (west, excl. Berlin)</b>	NUTS 1	10	mp	NACE 6 for NUTS 1 (Länder) available until 1994
<b>D (east)</b>	-	-	-	-
<b>GR</b>	National	1	mp	Some years in the 1980s for few branches missing
<b>E</b>	NUTS 2	18	mp	1995 missing
<b>F</b>	NUTS 2	23	mp	1995 missing; several years for DOM and Corse missing
<b>IRL</b>	National	1	mp	Some years for some branches missing
<b>I</b>	NUTS 2	20	fc	
<b>L</b>	National	1	mp	Some years for some branches missing
<b>NL</b>	NUTS 2	12	fc	1994 and 1995 missing; some years in the 1980s for some regions missing
<b>AT</b>	National	1	mp	
<b>P</b>	NUTS 2	7	mp	Açores and Madeira before 1990 missing
<b>SF</b>	National	1	mp	
<b>S</b>	National	1	mp	
<b>UK</b>	NUTS 1	11	mp: 1980-83, fc: 1984-95	1982 and 1983 for some services missing
<b>Total</b>		<b>119</b>		

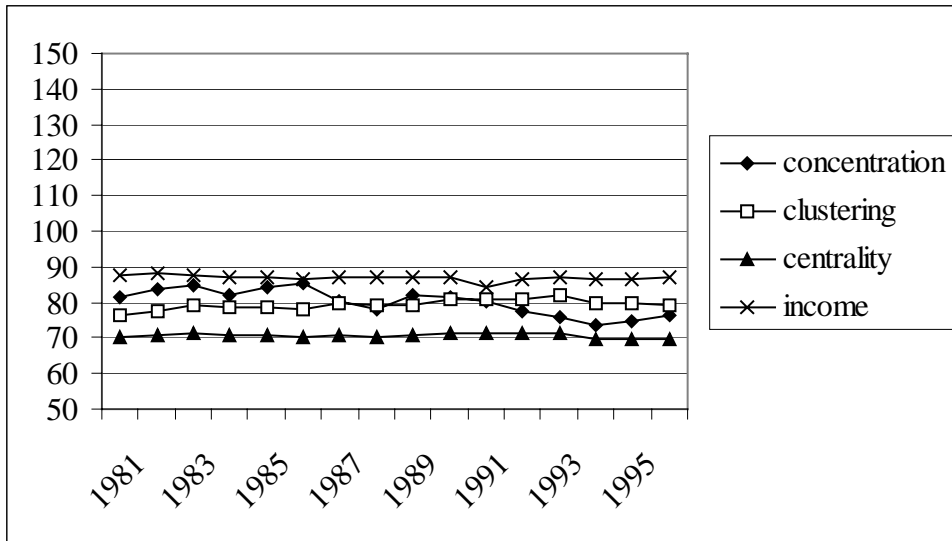
Map 1: Specialisation index in %, 1995



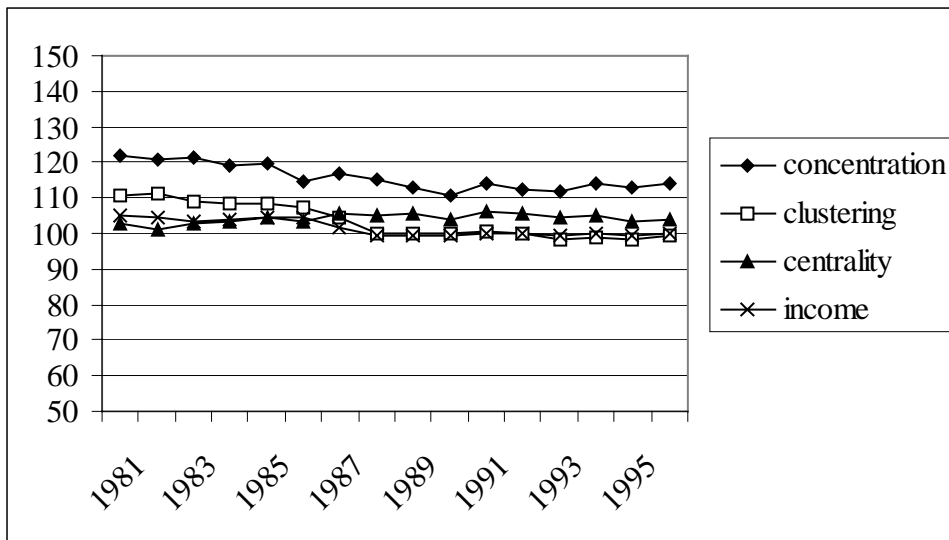
Map 2: Change in specialisation index between 1980 and 1995



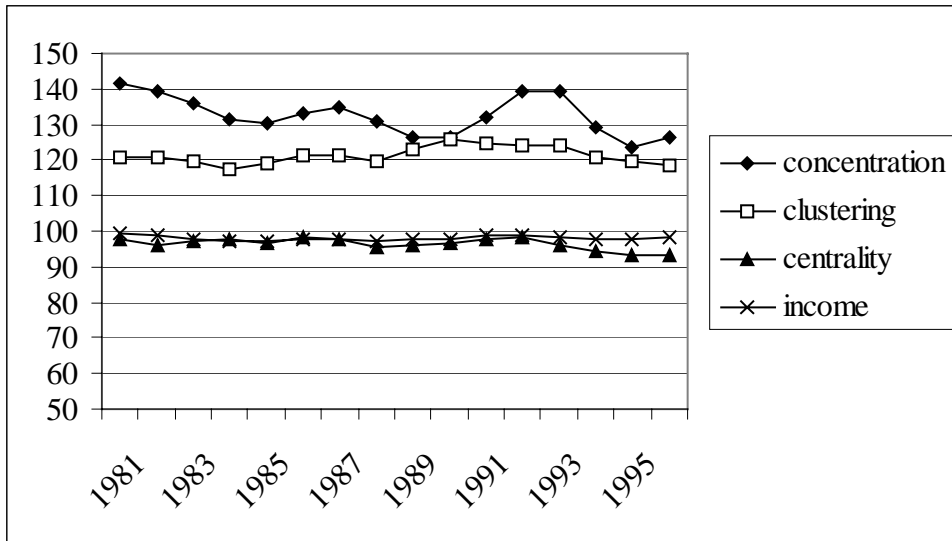
Graph 5: Agricultural, forestry and fishery products (NACE-CLIO b01) in % of GDP results, 1980-95



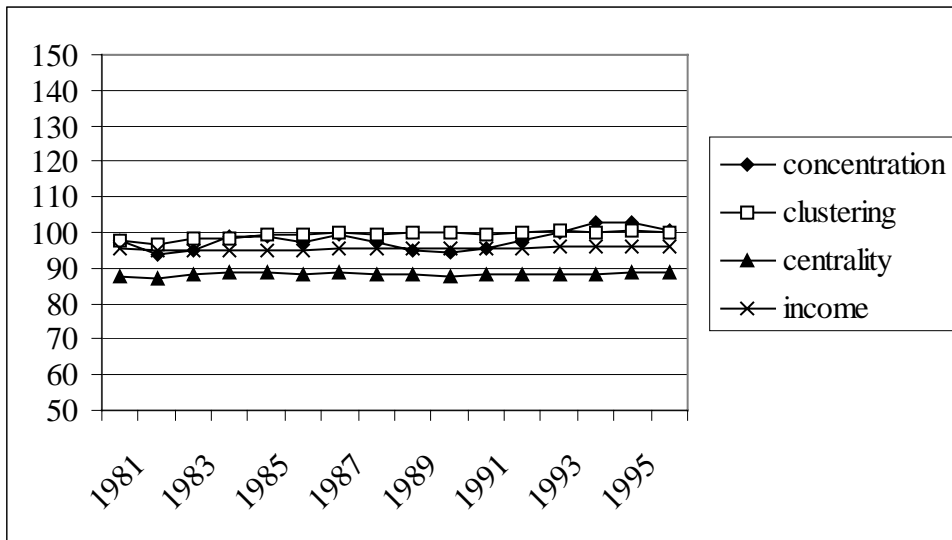
Graph 6: Fuel and power products (NACE-CLIO b06) in % of GDP results, 1980-95



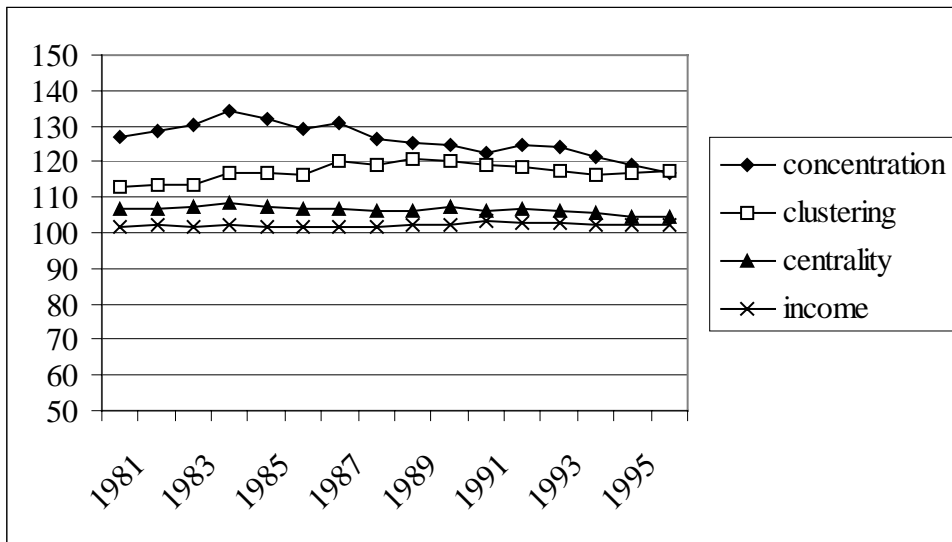
Graph 7: Ferrous and non-ferrous ores and metals, other than radioactive (NACE-CLIO b13) in % of GDP results, 1980-95



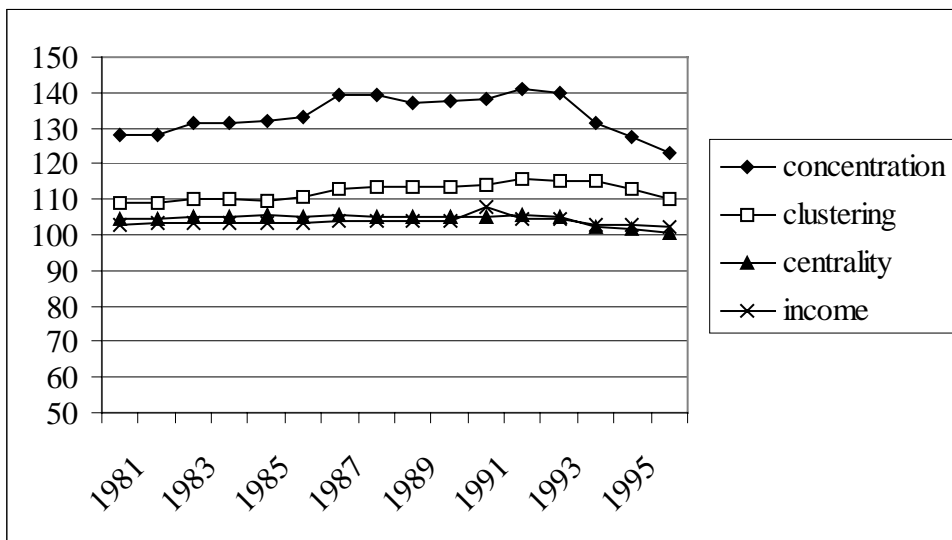
Graph 8: Non-metallic minerals and mineral products (NACE-CLIO b15) in % of GDP results, 1980-95



Graph 9: Chemical products (NACE-CLIO b17) in % of GDP results, 1980-95

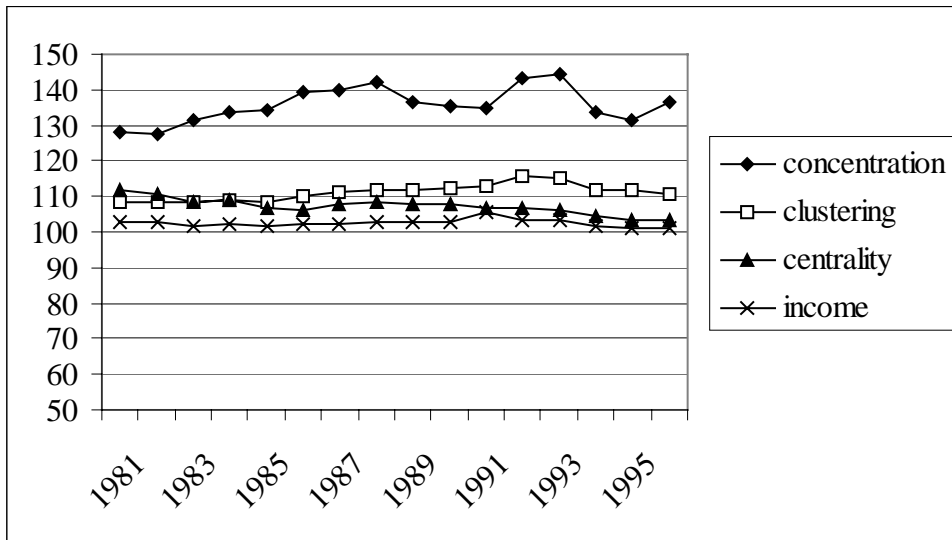


Graph 10: Metal products, machinery, equipment and electrical goods (NACE-CLIO b24) in % of GDP results, 1980-95

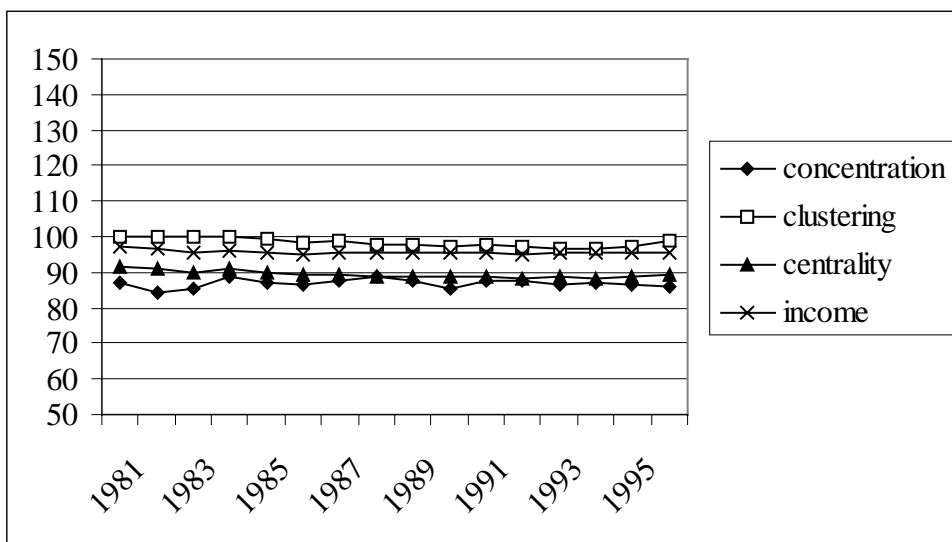




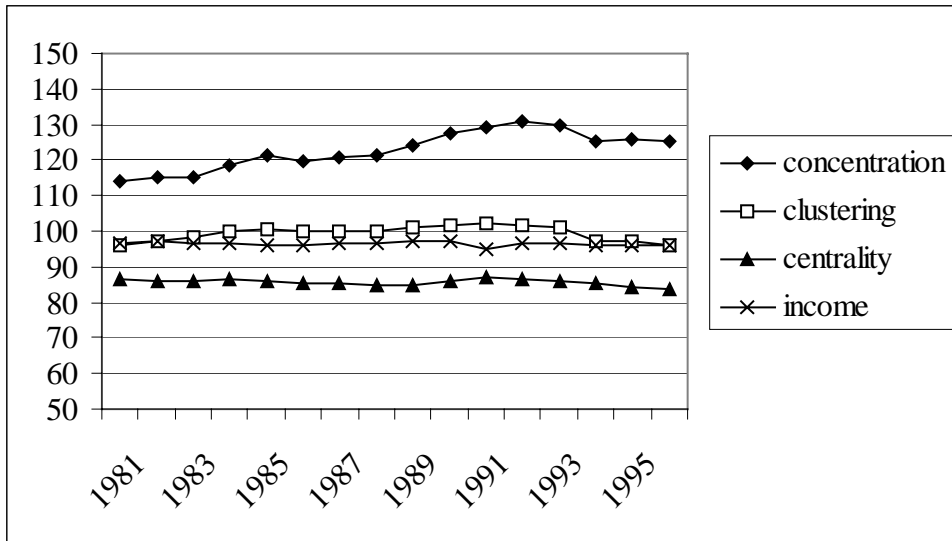
Graph 11: Transport equipment (NACE-CLIO b28) in % of GDP results, 1980-95



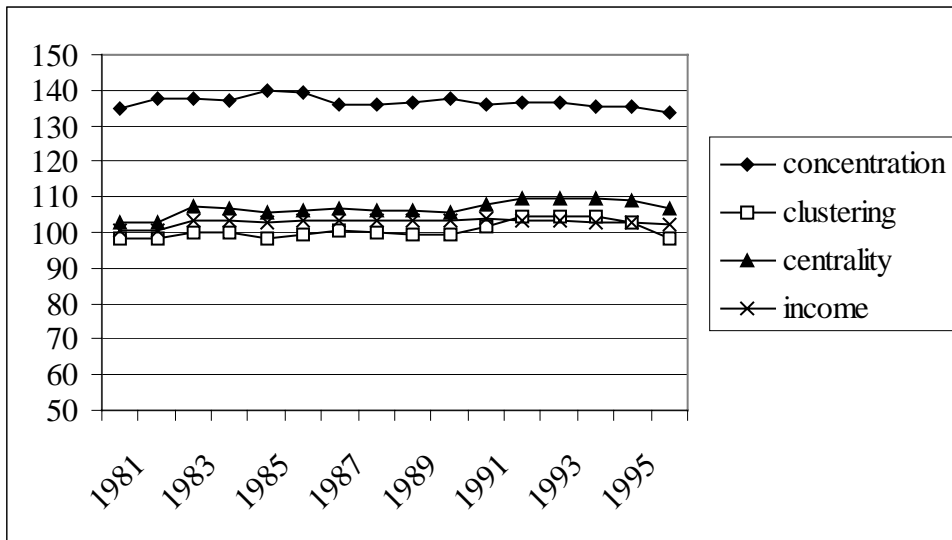
Graph 12: Food, beverages, tobacco (NACE-CLIO b36) in % of GDP results, 1980-95



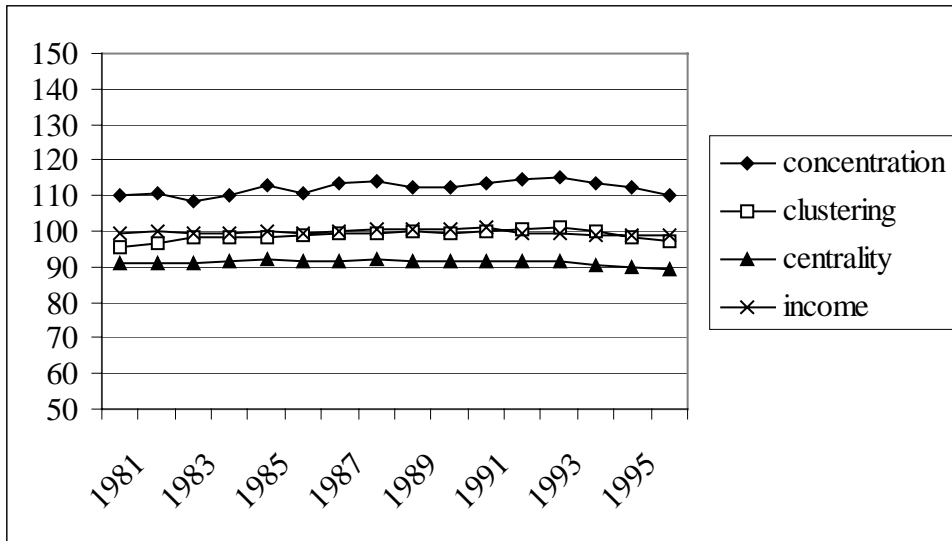
Graph 13: Textiles and clothing, leather and footwear (NACE-CLIO b42) in % of GDP results, 1980-95



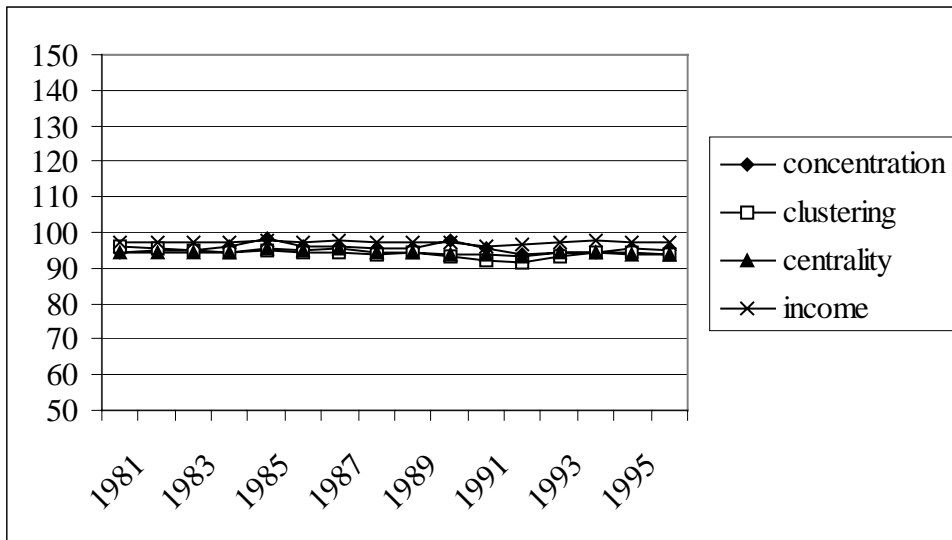
Graph 14: Paper and printing products (NACE-CLIO b47) in % of GDP results, 1980-95



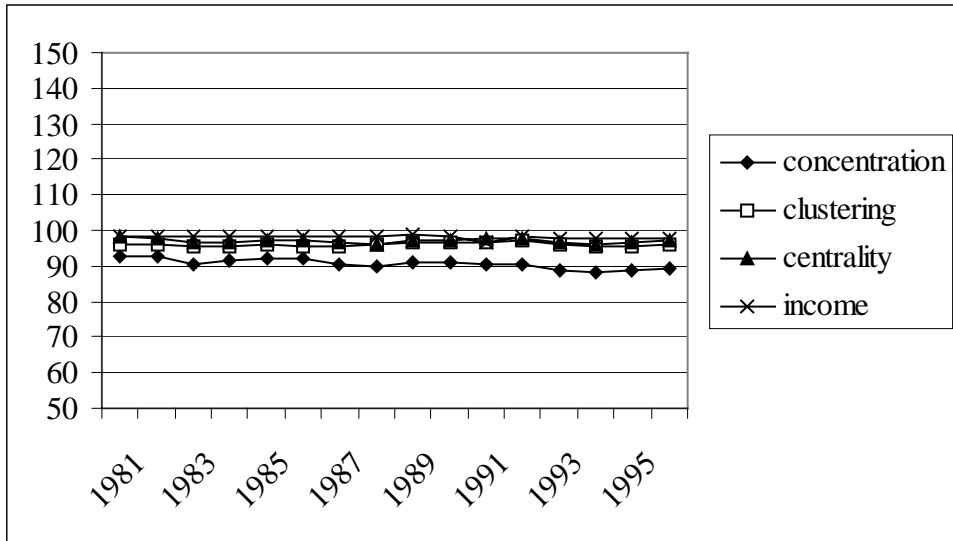
Graph 15: Products of various industries (NACE-CLIO b50) in % of GDP results, 1980-95



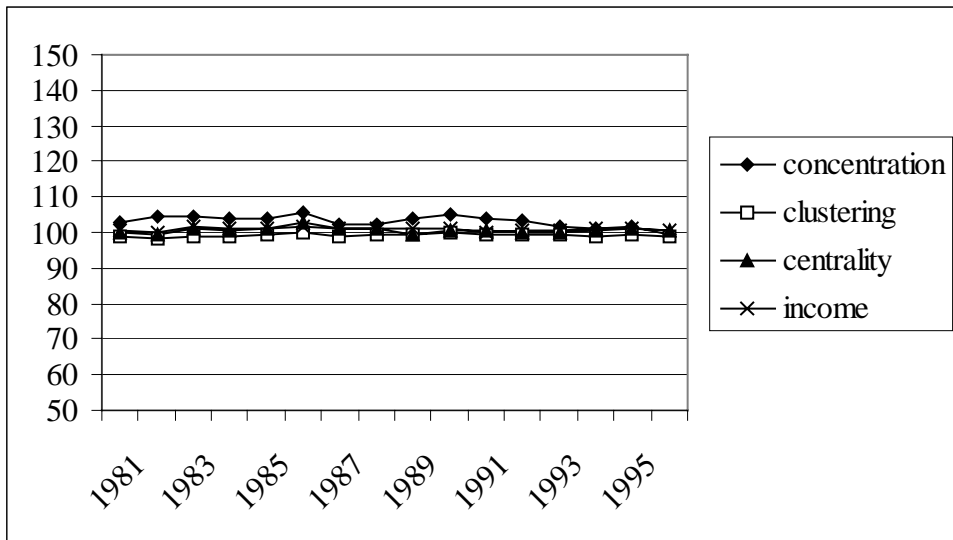
Graph 16: Building and construction (NACE-CLIO b53) in % of GDP results, 1980-95



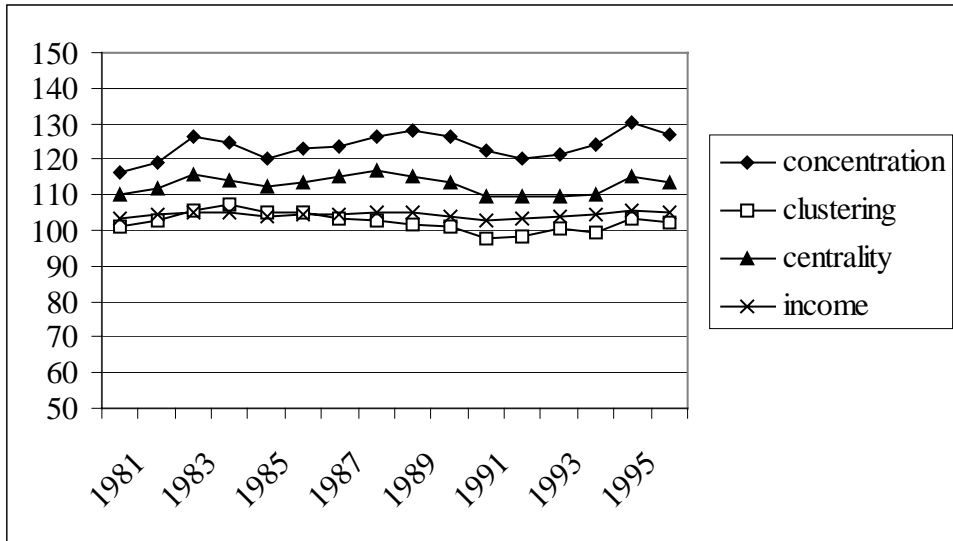
Graph 17: Recovery, repair, trade, lodging and catering services (NACE-CLIO b58) in % of GDP results, 1980-95



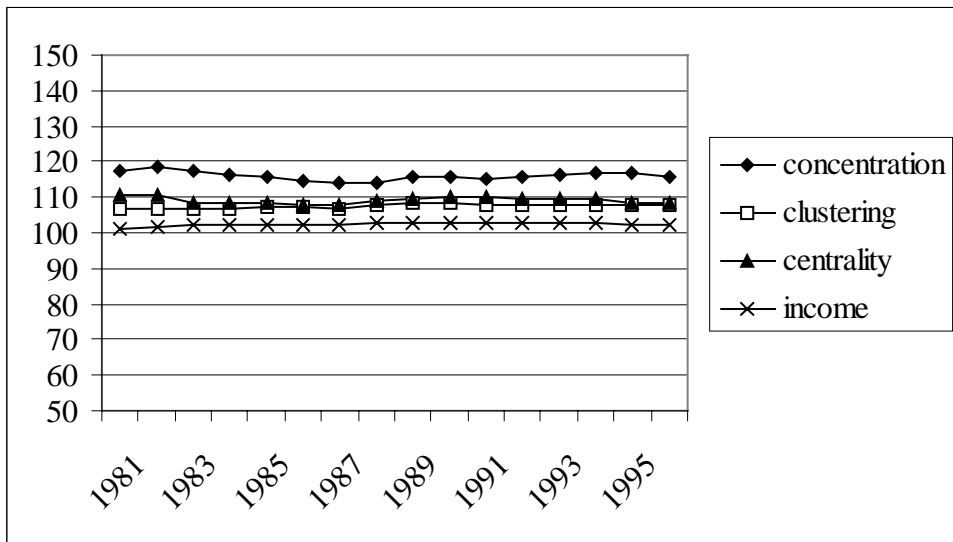
Graph 18: Transport and communication services (NACE-CLIO b60) in % of GDP results, 1980-95



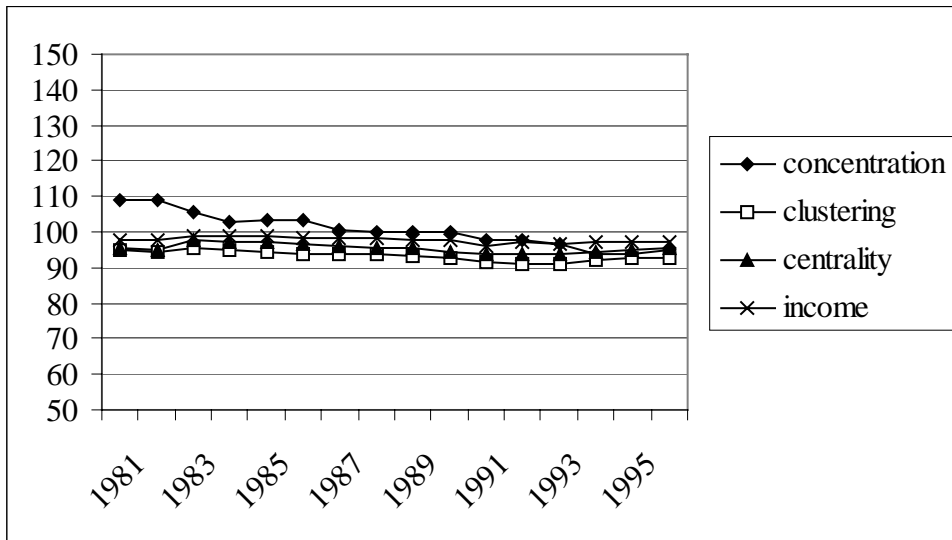
Graph 19: Services of credit and insurance institutions (NACE-CLIO b69) in % of GDP results, 1980-95



Graph 20: Other market services (NACE-CLIO b74) in % of GDP results, 1980-95



Graph 21: Non- market services (NACE-CLIO b86) in % of GDP results, 1980-95



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