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Regional Differentiation of Economic
Growth in Belgium, 1846 - 1977

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Abstract

This paper focuses on the regional differences in employment growth in the Belgian provinces. Since regional transformations are long-run processes, the period studied covers the years between 1846 and 1977. It starts with the spatial and sectoral diffusion of modern industrialisation, continues with the tertialisation process that went together with 20-th century urbanisation and ends with the recent crisis. In a first section, the growth figures and the changing shares of the provinces are discussed. A second section looks for an explanation of these changes. The differences of the sectoral structures and the specific regional advantages are combined in the shift share model. Finally, some effects of the differentiation of growth on the labour market are presented.

An economic crisis is a period of fast transformation of an economy. Traditional activities are restructured or broken down, and, if the transformation is successful, replaced by new activities. The present crisis once again makes it clear that the process affects regions very differently. This difference may be exemplified by the rates of unemployment. Despite the small geographical dimensions this applies also to Belgium : between 1972 and 1981 the average rate of unemployment with men was 3.5 % in Luxemburg and 7.1 % in Liège; with women the lowest figure was 7.3 % in Brabant and the highest 16.4 % in Limburg.

This paper is meant as the beginning of an attempt to explain such regional differences. Attention is paid mainly to the growth of employment in a long-term perspective. This should allow an overview of fundamental structural changes in employment. Our starting point is the unequal spatial distribution of employment (section 1). The explanation of regional shifts is based on the unequal sectoral structure, i.e. the unequal participation in the industrialisation and tertiarisation process, and on specific regional characteristics. Both dimensions are taken up in the shift and share model (section 2). In the third section, some effects of the regional changes in the labour market are discussed.

1. Size and distribution of employment.

A study of this kind naturally requires reliable data on employment. Despite recent ample attention to the subject (1), the situation is not entirely satisfactory. The points of view are varied (2) and for certain types of activity there is no reliable information at all. The latter defect especially applies to outworkers (3) in 1846. Also for agriculture rather complex corrections and/or re-estimates are necessary for the pre-world-war I period.

As our starting point is the problem of economic growth, it is self-evident to look for employment data based on economic criteria.

Therefore, the numbers of full-time equivalent workers should be approximated as closely as possible. In principle, part-time work is recalculated as much as possible in full-time units, and hidden unemployment (or 'apparent employment') is reduced to the real productive activity (4). The main defect of the resulting figures, summarized in table 1, is the lack of data about outworkers. In view of the transformation of an agrarian into an industrial economy these data play an important part. However, the inclusion of data about the domestic system in 1896 and 1910 would make impossible a comparison with the 1846 figures. Another weak point concerns the 1977 data. Because the 1981 census forms have not been processed yet, the figures from 1977 must be used. These, however, are extrapolated results of a survey among about 7.5 % of the population (5). Mainly with samples from small populations the extrapolated results may differ considerably from reality. For the small provinces and especially the subsectoral disaggregation of their totals such errors may be very important. Thus, only to a limited extent shall we be able to appeal to data about the crisis since 1970.

Considering the general evolution of employment the numbers of jobs (exclusive of outwork) between 1846 and 1977 can be seen to have increased by about 150 %. This increase, however, develops very unevenly in time. A low rate of growth occurs between 1896 and 1910 and between 1937 and 1961 (each time 0.13 to 0.19 % per year). The period 1910 - 1937 scores an average growth of 0.84 % per year. Only between 1846 and 1896 and between 1961 and 1970 a growth-rate of 1.1 % is reached. Strikingly, the period 1970 - 1977 is the only one with a decrease in the total figure, but this is obviously because the other periods are longer (6) and the decreases are therefore compensated for by increases (e.g. the rise in the twenties compensates for the fall between 1930 and 1937).

The development is very uneven regionally. Antwerp and Brabant at the height of 1970 have an employment level which is almost five times as high as in 1846. In Limburg employment has been trebled now. In spite of the growth between 1961 and 1977 Luxemburg is not far above the 1846 figure. Liège and Hainaut already attain

Table 1 The regional distribution of employment 1846-1977

	<u>1846</u>	<u>1896</u>	<u>1910</u>	<u>1937</u>	<u>1947</u>	<u>1961</u>	<u>1970</u>	<u>1977</u>
Antwerp	131,967	258,397	300,709	457,449	476,613	521,685	619,175	590,394
West Flanders	209,052	269,350	268,231	321,847	326,677	335,748	385,500	383,357
East Flanders	250,100	381,202	381,282	443,028	442,439	417,658	434,640	415,569
Limburg	66,303	93,449	80,597	131,609	145,219	157,898	206,379	215,330
Brabant	216,403	455,150	500,549	731,593	762,768	864,019	1,014,888	972,601
Hainaut	249,862	460,372	458,580	471,129	469,462	417,904	412,600	396,092
Liège	141,872	310,081	328,823	395,498	395,387	379,183	358,195	353,356
Luxemburg	63,141	94,044	70,511	72,740	69,007	61,187	62,173	63,217
Namur	82,604	142,770	123,403	123,211	120,609	111,144	120,558	120,207
Belgium	1,411,304	2,464,815	2,512,685	3,148,104	3,208,181	3,266,426	3,614,108	3,510,123

their maxima in 1937 and afterwards only decline. Such unequal growth performances of course lead to a spatial redistribution of employment. Table 2 shows that already in 1910 Hainaut had lost its leading role to Brabant. The latter province's share was steadily increasing from 1846 to 1970, just like Antwerp's share, whereas after 1896 Hainaut only had falls. In East Flanders the process of decline starts earlier and more intensely than in Hainaut, but the slow-down of the decline in the period round about world war II leads to a slightly higher share than Hainaut's. West Flanders, the second Flemish textile province, after 1947 even succeeds in a reversal of the downward trend, changing it into a slight rise. In Liège the evolution is different, with a fall from 1910 onwards (7), which is only a little reversed in the last subperiod under consideration. The 'small' provinces of Limburg, Luxemburg and Namur start from a very similar share in 1846. Initially, the shares shrink for the three of them. This process continued until 1970 for Namur and Luxemburg - the latter even gets into a marginal situation - whereas Limburg after the first world war shows an important rise, relatively speaking of course.

This entire process of growth obviously did not develop without structural changes. The general pattern is sufficiently known : a permanent fall of the agrarian sector (from 55 % in 1846 to 4 % in 1977), an increase of the share of industrial activity (circa 47 % both in 1910 and in 1947), which afterwards is changed into a decline, leaving room to an almost permanent growth of the tertiary sector. On the whole this general pattern also occurs in the individual provinces, but the sectoral shares are very different during the whole period (see figures 1 and 2). From the preceding two conclusions follow :

- (i) also for a small country like Belgium the regional dimension is essential for a good understanding of the growth process and the accompanying structural transformations;
- (ii) from a historical point of view the participation in the process of industrialisation is very important, especially because of the regional differences in the timing and the intensity of the participation, but, moreover, even in the nineteenth century the diversity in the tertiarisation plays an enormous role (8).

Table 2 Provincial shares in employment 1846-1977 (in %)

	<u>1846</u>	<u>1896</u>	<u>1910</u>	<u>1937</u>	<u>1947</u>	<u>1961</u>	<u>1970</u>	<u>1977</u>
Antwerp	9.4	10.5	12.0	14.5	14.9	16.0	17.1	16.8
West Flanders	14.8	10.9	10.7	10.2	10.2	12.3	10.7	10.9
East Flanders	17.7	15.5	15.2	14.1	13.8	12.8	12.0	11.8
Limburg	4.7	3.8	3.2	4.2	4.5	4.8	5.7	6.1
Brabant	15.3	18.5	19.9	23.2	23.8	26.5	28.1	27.7
Hainaut	17.7	18.7	18.3	15.0	14.6	12.8	11.4	11.3
Liège	10.1	12.6	13.1	12.6	12.3	11.6	9.9	10.1
Luxembourg	4.5	3.8	2.8	2.3	2.2	1.9	1.7	1.8
Namur	5.9	5.8	4.9	3.9	3.8	3.4	3.3	3.4

In this context it can be pointed out that Hainaut and Liège were the leaders of the industrialisation process at the beginning of the period. There the realisation of the typical coal-metal complex resulted in industrial growth poles which long determined the structure. After 1910, however, tertiarisation intensified distinctly and despite a short industrial revival in the reconstruction period after the second world war, coal and steel no longer dominated the industrial landscape. In East and West Flanders the specialisation in the production of textiles could not bring about real industrial poles about the end of the Industrial Revolution. At least the importance of these poles remained limited to such an extent that the regions kept their agrarian character.

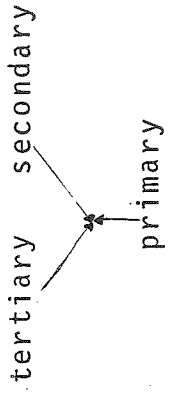
Except for Brabant, where very quickly Brussels was forming a dominating tertiary pole, this also applies to the other provinces. It should be observed that in the period of regression of the Walloon industrial pioneers the four Flemish provinces advanced quickly, with in each of the latter an increasing share of the secondary sector between 1947 and 1970, and without a fall of the tertiary sector's share.

2. Structural and locational advantages

Although the three-sector scheme presents only a preliminary exploration, the preceding discussion implies two logical dimensions in the explanation, viz. the sectoral structure and the regional spread. Both dimensions are the result of a number of underlying variables. We will explore them in a first subsection and link their relative importance to the general economic evolution. In a second subsection the shift and share method is presented and applied to the Belgian regions.

2.1 The variables

In connection with the evolution of the sectoral structure attention should be drawn to shifts in demand as well as fundamental technological innovations. For that matter, technology results in an enormous differentiation within the industry itself, whereas within each



- An Antwerp
- Br Brabant
- He Hainaut
- Lk Liège
- R Belgium

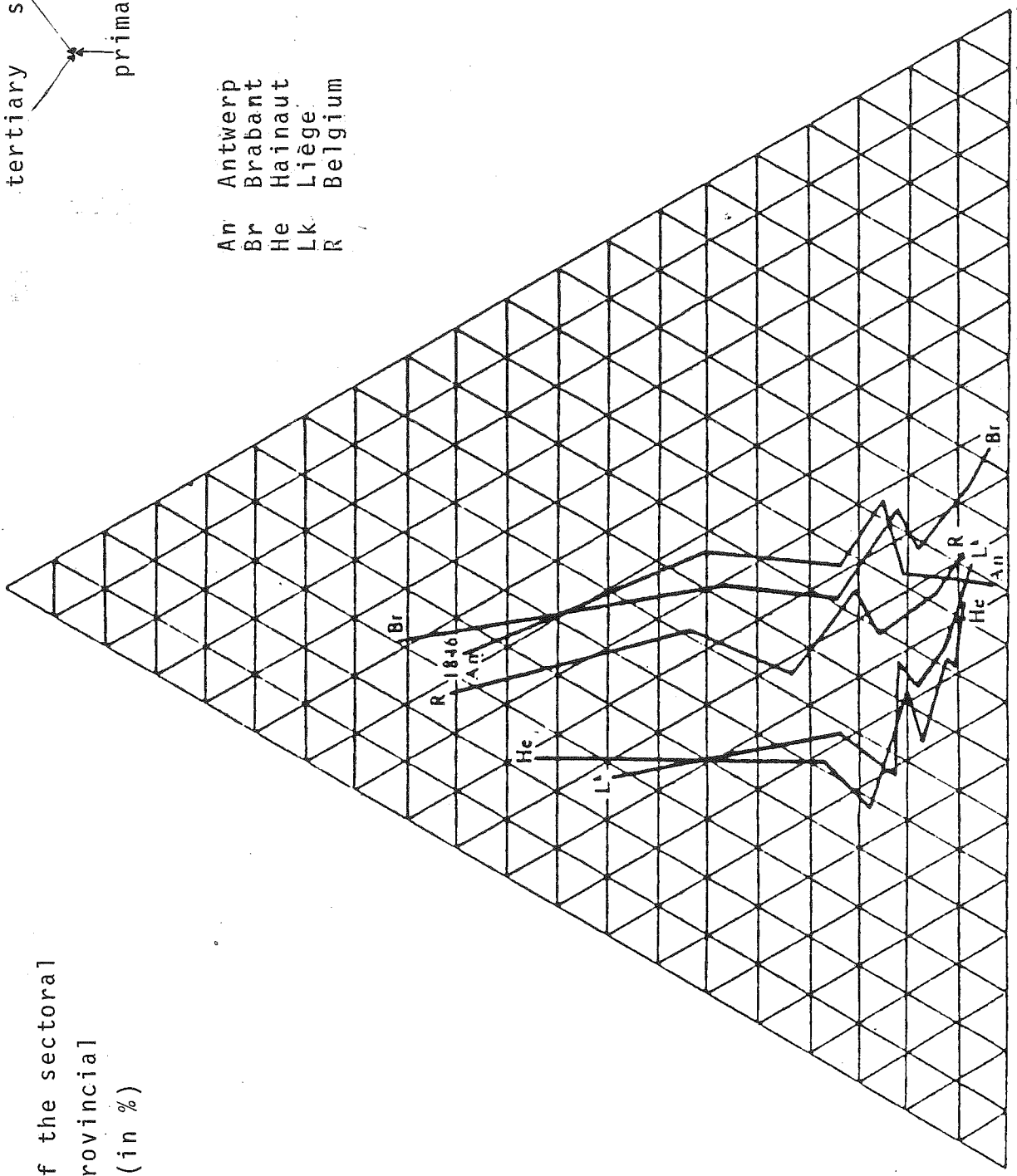
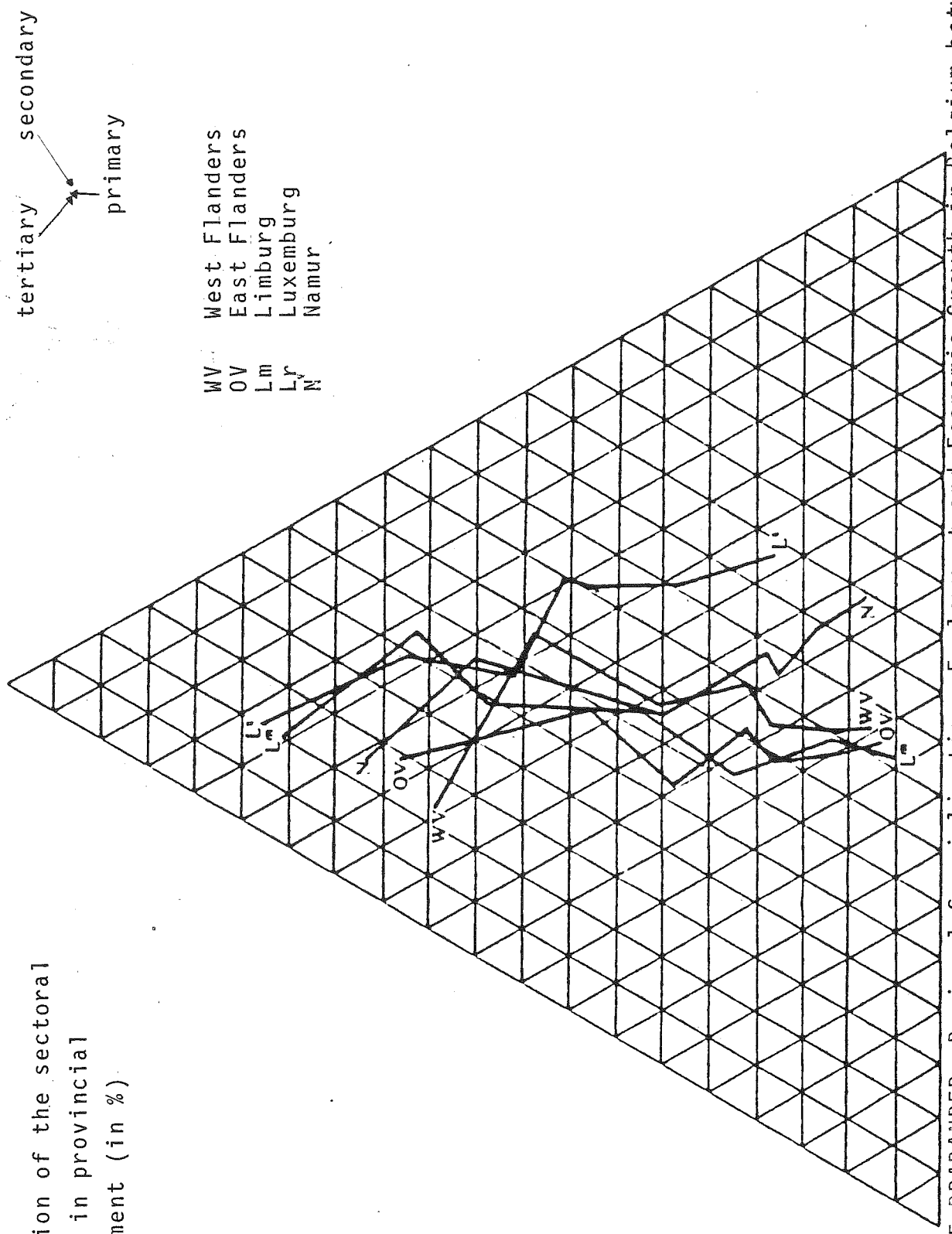


Fig. 1 Evolution of the sectoral shares in provincial employment (in %)

Source : G.L. DE BRABANDER, Regional Specialization, Employment and Economic Growth in Belgium between 1846 and 1970, New York, Arno Press, 1981, p. 257

Fig. 2 Evolution of the sectoral shares in provincial employment (in %)



Source : G. L. DE BRABANDER, *Regional Specialization, Employment and Economic Growth in Belgium between 1846 and 1970*, New York, Arno Press, 1981, p. 258

of the subsectors the traditional methods for some time co-exist with new technology. The heterogeneous development of technology and demand lead to an important part of the explanation of heterogeneous growth. Yet, obviously there is a problem here. Macro-economic data relate to both the modern and the traditional part of the subsector. A fall of employment may be due to regression of a traditional activity as well as to productivity profits in a renewed branch (9). Although the exclusion of outworkers means a step to less heterogeneity in the figures about the nineteenth century secondary sector, it certainly does not mean an achievement of homogeneity. On the other hand, without macro-economic aggregates, obviously no general pattern of an economic development process can be constructed.

The technological-sectoral dimension also involves a regional component, viz. the spatial diffusion of innovations. In the framework of the industrialisation process this spatial spread can be explained by "locational advantages, resources and, above all, preceding economic development bringing in its train a favourable structure" (10). In his 'Peaceful Conquest' S. Pollard stresses the influences of "the external economies of the industrial complex, the factors of production of entrepreneurship, capital, and labour, natural resources, and the influence of government, apart from the region's own inner development" (11) on the differentiation of the regions. Of course the factors mentioned do not represent a static 'wealth' for the regions, since their differentiating power fluctuates strongly. Geographers (12) point out for instance that in most West European countries the following elements led to a spatially concentrated Industrial Revolution :

- almost all (modern) enterprises were relying on coal as a source of energy;
- in many cases per ton of manufactured product a multiple of sources of energy were needed, in this case coal (13);
- transport facilities were limited and expensive.

The spreading movement between 1880 and 1930 would be caused by, among other elements

- increasing use and distribution of electricity, diminishing the dependence on coal considerably;

- growing opportunities for transport (railways, canals) and increasing port functions ('maritimisation');
- increasing productivity of labour in agriculture, which put a great deal of manpower at the disposal of the secondary (and tertiary) sector.

In the next phase again a concentration movement was initiated, mainly in favour of the larger towns. The stronger link of industry with urban concentrations concurred with a further increase of the scale of enterprises and, in this context, with

- growth pole effects : large enterprises, also because of the growing complexity of the production process, increasingly appeal to subcontractors, who therefore will be located near to their main customers;
- but the large enterprises also have to call more and more on external services (financing, planning, maintenance etc.) so that their dependence on urban concentrations of services is on the increase.

In the so-called post-industrial society, from the sixties onwards, a new spread of the economic activities takes place. The improvement of mobility by car (motorways), the growth of urban tertiary functions, and especially the fear of agglomeration diseconomies are all factors strengthening this spread. It would be stimulated even more by regional economic policies, giving extra opportunities to less prosperous regions.

Although this four-phase approach can be criticised in many ways, in any case it draws our attention to a number of regional factors which are important in the explanation of the diversification of growth.

From another point of view also an impact on the regional structure could be deduced. Concentration of some branches indeed implies an increasing interregional diversification, whereas deconcentration leads to greater similarity. In this perspective the proposed phasing does not correspond with the Belgian evolution. Cramer's

coefficient (zero with completely equal spread, one with maximum differentiation) indeed shows the following results :

1846	0.152
1896	0.185
1910	0.204
1937	0.190
1947	0.200
1961	0.193 (old provincial boundaries)
1961	0.192 (new provincial boundaries)
1970	0.158

It is clear that diversification first increases (until 1910), then is about stable, and decreases from 1947 onwards (14).

2.2 The shift and share model

The question we have to answer now is how the different variables explain the variations of regional growth. It is impossible, however, to comment on each of the variables for all the provinces in each of the subperiods within the limits of a short paper. Moreover, for some of them research started only recently and, especially for the twentieth century, it would be premature to draw conclusions... Therefore, we will make use of the shift and share method, one of the very few operational models that can bring us closer to a trustworthy explanation.

2.2.1 The method

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Since there is an abundant literature about this method (15) we will not go into every detail (a formal version of the model is included in appendix A). The essential contribution of the shift and share method is to divide performed growth into three components : the standard growth, the proportional and the differential shift.

The standard growth represents the national and international factors which affect growth. They are regionally or sectorally invariant, e.g. the monetary policy, the general fiscal policy, or the dimension of the market. The standard growth is equal to the growth which would result if all branches in all regions showed

the national growth rate. So, the regional score is the result of the regional share in national employment.

The proportional shift or industry-mix effect accounts for the impact of the sectoral composition of the region. It shows how the specialisation in rapidly or slowly growing activities affects regional evolutions of employment. It is calculated by comparing the national average growth with the sectoral growth at the national level.

The region-specific factors are expressed in the differential shift, sometimes called the locational growth component or the competition effect. This component is calculated using the difference between the regional growth rates of each subsector and their national growth rate. In this way, the regional advantages as regards resources, location, labour productivity, wage rates, capital etc. are taken into account.

2.2.2 The industry-mix effects

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Since standards growth reflects only the regional share in employment (see table 2), we will consider only the proportional and the differential shifts (see tables 3 and 4). The results are calculated in jobs per year to avoid that the length of the subperiods disturbs the picture. As to the sectoral structure, it must be stressed that a disaggregation of the traditional scheme is used (see appendix B), especially for the secondary sector. This disaggregation is based on the International Standard Industrial Classification (U.N.) as used in the Belgian national accounting system.

The results show a striking characteristic of Brabant. It is the only province for which in each subperiod positive industry-mix effects are scored. Before the first world war these effects were very small. This results from the very weak participation in modern industrialisation. Especially because of their Brussels market, traditional crafts and luxury industries remained the field of specialisation in Brabant's secondary sector. Since the importance of tertiary activities has grown fast during the twentieth century -

Table 3 Average contribution of the proportional shift to employment growth per year

<u>period</u>	<u>Antwerp</u>	<u>West Flanders</u>	<u>East Flanders</u>	<u>Limburg</u>	<u>Brabant</u>	<u>Hainaut</u>	<u>Liège</u>	<u>Luxemburg</u>	<u>Namur</u>
1846-1896	237	-718	-456	-306	28	798	640	-288	61
1896-1910	-202	-1,511	-496	-908	45	2,256	2,016	-920	-279
1910-1937	1,018	-440	-406	-345	1,497	-1,050	149	-259	-163
1937-1947	-74	-1,010	-1,395	-559	345	1,610	1,641	-504	-53
1947-1961	1,565	-881	-1,675	-1,551	3,292	-1,048	754	-428	-29
1961-1970	2,311	-678	-1,427	-2,346	6,346	-2,283	-1,055	-639	-229

Table 4 Average contribution of the differential shift to employment growth per year

<u>period</u>	<u>Antwerp</u>	<u>West Flanders</u>	<u>East Flanders</u>	<u>Limburg</u>	<u>Brabant</u>	<u>Hainaut</u>	<u>Liège</u>	<u>Luxemburg</u>	<u>Namur</u>
1846-1896	321	-1,197	-656	-141	1,516	-318	606	-37	-91
1896-1910	2,866	1,057	-27	-139	2,567	-3,023	-1,107	-892	-1,302
1910-1937	1,971	-87	-879	1,479	2,372	-2,780	-759	-319	-1,000
1937-1947	1,118	879	490	1,669	1,377	-2,676	-2,406	-8	-442
1947-1961	1,036	2,590	-632	2,291	2,731	-4,721	-2,270	-220	-804
1961-1970	2,352	2,235	-1,626	5,866	199	-3,249	-5,762	25	-39

and in this process public administration as well as financial services had an important part - the proportional shift has grown too. The decline between 1937 and 1947 must be attributed to the abatement of the hidden unemployment included in commercial activities in 1937 and even more to the reconstruction policy, which favoured heavy industry. Except for these ten years, one may say that Brabant has dominated the positive industry-mix effects of all provinces since 1910.

Perhaps this was not too difficult, since four out of the nine provinces have scored permanently negative industry-mix effects. The problems in the primary sector and in the textiles industry were the most important factors to explain the bad scores of West and East Flanders. The increasing participation in the industrialisation process and the slow breakdown of the agrarian activities did not result in a growth-oriented structure. The long-lasting use of traditional production methods and the slow diffusion of innovations led to a weak growth of the textiles industry. Besides, the absence of resources made it impossible to develop any heavy industry. It was only between 1962 and 1968 that a steel plant was built in Gent's port zone.

Things are quite different in Limburg. In the beginning it was a scarcely populated province, characterised by poor soil and labour-intensive agriculture. During the nineteenth century even there was even no embryo of modern production activities. The discovery of coal and the migration from Liège to the Campines of some environment damaging plants gave birth to a nucleus of modern industry after the first world war. However, it was too late then to create a new coal-metal complex. The consequence was a one-sided development until the sixties, when a major and diversified industrialisation took place. On the other hand, an industrial renewal was an absolute necessity, since the coal crisis started its destructive job at the end of the fifties.

During almost the whole period from 1846 to 1977, Luxemburg is the most agrarian province. This is expressed in negative proportional shifts. At the end of the nineteenth century a (modest) heavy industry existed, but this was marginalised quite rapidly. Except

for wood processing, which is closely linked to forestry, no positive specialisation existed in any branch of the secondary sector.

The results of the industry-mix effects in Namur show almost the same picture as in Luxemburg. The exception, viz. the subperiod 1846 - 1896, is based on the presence of a traditional metalworking industry during the beginning of the period. In the extractive sector, only quarrying remained important during the whole period. Linked to this branch is the lasting specialisation in the subsector of the construction materials. For the rest Namur remains a relatively agrarian region, with a more than average participation in tertiary activities from 1937 on.

The two Walloon pioneers of modern industry scored an important structural employment growth until 1910. Afterwards, their leading position seems to get lost, albeit more intensively in Hainaut than in Liège. The coal-metal complex remains the heart of the matter in this process. But before the first world war its effects were positive, whereas afterwards it became a disadvantage, at least in respect of employment. After 1961, when the coalpits were closed, this resulted in substantial negative industry-mix effects.

Antwerp's evolution is based on the expansion of port activities and on the progressive maritimisation of industry. At the end of the nineteenth century the non-ferro industries arose. The engineering industries came next. The development of photography, car industries and modern chemical activities all meant the presence of the most developing branches of the secondary sector. They were accompanied by a strengthening of tertiary activities.

2.2.3 The differential shifts =====

The pattern of the differential shifts is quite different from the proportional shift (see table 4). Although Brabant again scores positively in all subperiods, it is in this respect not the only one. The same holds for Antwerp. It is clear that the central

places in both provinces provide the dominant locational advantages. The specific functions of Brussels as the capital of Belgium offer extra opportunities for the tertiary sector. But at the end of the period the agglomeration disadvantages play an important part in the decrease of the differential shift. Because of the expansion of the port, together with its industrialisation, Antwerp became an important growth pole from the end of the nineteenth century onwards. The geographical conditions as well as the massive stock of cheap labour were locational advantages, which could attract a lot of foreign investors (e.g. Bell, Ford, General Motors). The development of the non-ferro industries at the beginning of the century was linked to the exploitations in the Belgian Congo, while the sharp rise in the regional component between 1961 and 1970 was due to the industrialisation induced by a ten-year plan of port development.

The traditional Walloon growth poles lost their locational advantages already in the nineteenth century. Resources, relative location, working conditions and even the social climate became drawbacks. It should be added that management and investment strategies were rather conservative. They acted in defense of the existing coal-metal complex, without major initiatives in favour of new sectors.

The locational disadvantages of Luxembourg and Namur have to be regarded as the result of

- (i) a more or less peripheral location;
- (ii) the heritage of a large traditional sector which was broken down rather slowly and without replacement by major modern industries; lack of resources, skilled labour and transport facilities are some of the negative attraction factors.

The recent reduction in the disadvantages is due to the opportunities in the tertiary sector especially by the development of tourism.

The problems of the Flemish provinces during the nineteenth century must be regarded as the result of the difficult transformation of

the traditional agrarian economy. In West and East Flanders e.g. the putting out system still was important in the textiles industry at the turn of the century. Although the coal-mining activities in Limburg suggest the opposite, it was only when the resource-orientation of industrial location was replaced by labour-orientation that these Flemish provinces got better chances. The weak relations of Gent with the other parts of the province, made the peripheral districts of East Flanders less attractive and resulted in negative differential shifts. In West Flanders and Limburg, on the other hand, the cumulative processes in and around poles as Kortrijk, Bruges, Genk-Hasselt scored positively.

3. Some implications for the labour market

The recent character of the medium-sized growth pole effects in large parts of Flanders once again stresses the transformation problems in the long run. The period between 1846 and 1950 was characterised by structural unemployment. The excess labour force had to look for opportunities elsewhere. During the nineteenth century mobility was relatively low. Although a number of the Flemish workers migrated to the Walloon industrial zones, the demand for labour in Belgium was too low to offer sufficient job opportunities. Therefore, international migration was a necessity. The geographical orientation of migration was diversified : the U.S.A., Canada, Argentina, Brazil but also Northern France were frequent destinations. The economic, social and psychological costs of emigration prevented the labour market getting into equilibrium in this way. So, the excess labour force remained important. Unemployment, cheap labour and too low incomes were the result. These factors also explain why the putting out system could remain so important in East and West Flanders. For the outworkers and their families each additional income was important to survive. And a lot of employers could avoid the risk of investments by using these cheap workers.

At the end of the nineteenth century two new factors emerged. First, the growth of the industrial centres in Northern France (Lille, Rou-

baix, Tourcoing) attracted increasing numbers of Belgian workers. Secondly, the railways offered new opportunities to commuters, especially after the introduction of cheap season tickets in 1870.

In that period, it was not only the industrial growth in France which offered jobs to the Belgian labour surplus. Although in 1896 no less than 29,000 jobs in the French secondary sector were censused, these were outnumbered by especially seasonal work in French agriculture. This sector offered about 50,000 jobs. Here too the transition to an industrial region would have some effects. In 1910 the number of frontiers workers had risen to 40,300, while agriculture provided 38,000 jobs. The first group grew until the end of the twenties, when their number was estimated at about 100,000, 75,000 of whom lived in West Flanders. But the crisis of the thirties stimulated a number of restrictions to frontier work, imposed by the French policy makers.

At that time, intra-national commuting had become rather important. Although Limburg was a reservoir of labour for the Liège industries already earlier in the nineteenth century, it was only at the end of that century that commuting became really important. In 1896 the number of commuters to Liège is estimated at about 15,000, to Charleroi 12,500, to Brussels 11,000 and to La Louvière 9,000 (16). However, it was not the Walloon industrial centers which would absorb the largest part of the Flemish labour surplus. Besides the growing employment in Flemish industries, due to the larger locational advantages in transport as well as in the labour oriented activities, it was the growth of the Brussels demand for labour that was to reduce unemployment. The number of commuters to Brussels rose to 27,000 in 1910, 65,000 in 1930, 137,000 in 1947, 190,000 in 1961, 246,000 in 1970 and 265,000 in 1977. In fact the central location of Brussels, its transport facilities towards all parts of the country and, hence, its opportunities for recruitment of employees may be the most important regional advantage of Brussels.

One of the benefits of this intensive commuting system is the spatial (re-)distribution of income and consequently of demand (17),

certainly in a period where the (local) service sector (18) offers the largest increase in employment ! A drawback is, of course, that the decline of the centres of commuting filter down interregionally. These effects were clear for the industry in Northern France, in Hainaut and in Liège, and will perhaps come true for Brussels too, if the decrease of the agglomeration advantages continues.

4. Conclusion

The last section makes clear that interregional and international interactions are important on the demand side of the labour market. In this way it is a complement to sections one and two, which focused on intra-regional demand. The employment figures showed a shift of the point of gravity from the early industrialised Walloon provinces (Liège, Hainaut) to the Flemish provinces. This shift was accompanied by a continuing growth of the Brussels economy. These changes implied an increasing diversification of the sectoral structures in the provinces until the first world war, but since 1947 the coefficient of Cramer has shown a decrease of the differentiation.

As regards growth, it is clear that locational advantages as well as regional sectoral structures had an important part in the heterogeneity of the patterns. Already in the nineteenth century the structural advantages of Hainaut's and Liège's industry were at least in part compensated by locational disadvantages. The comparison of tables 3 and 4 also points out that these disadvantages are much more important to explain Wallonia's industrial decline than the sectoral structure. At the same time the Flemish provinces, except East Flanders, succeeded in compensating their structural handicaps by increasing locational advantages. The growing importance of the labour orientation, the increasing maritimisation and the decline of the resource orientation all favoured these provinces. This did not imply a complete absorption of the large Flemish reservoir of labour. But the growth of local as well as Brussels employment made a fall in international labour mobility possible.

Notes

- (1) The most important contributions are those of J. GADISSEUR, "Contribution à l'étude de la production agricole en Belgique de 1846 à 1913" in : Revue belge d'histoire contemporaine, 1973, nos. 1-2, pp. 1 - 48; J. HANNES, De economische bedrijvigheid te Brussel 1846 - 1847, Leuven-Paris, 1975; P.M.M. KLEP, "De agrarische beroepsbevolking van de provincies Antwerpen en Brabant en het Koninkrijk België, 1846 - 1910" in : Bijdragen tot de Geschiedenis, 1976, nos. 1 - 2, pp. 25 - 69; G.L. DE BRABANDER, "De regionaal-sectoriële spreiding van de economische activiteiten in België, 1846 - 1910" in : Bijdragen tot de Geschiedenis, 1978, nos. 1 - 2, pp. 97 - 184; E. GUBIN and A. VAN NECK, "La répartition professionnelle de la population belge en 1846 : un piège statistique" in : Acta Historica Bruxellensia, vol. IV, Brussels, 1981, pp. 269 - 365; P.M.M. KLEP, Bevolking en Arbeid in Transformatie, Nijmegen, 1981; J. HANNES, "Historische kritiek en verder; een gevalstudie : Turnhout 1846" in : Bijdragen tot de Geschiedenis, 1981, nos. 1 - 2, pp. 79 - 105. All of them focus on pre-1914 data. This does not mean, however, that post-1914 data can pass without any criticism, as is shown in my Regionale structuur en werkgelegenheid, Brussels, 1983, pp. 22 - 29.
- (2) Sociological and economic points of view are clearly in conflict with each other in parts of the publications by E. Gubin, A. Van Neck and P.M.M. Klep; cf. G.L. DE BRABANDER, "De definitie en de classificatie van de werkgelegenheid in het licht van de 19de eeuwse Belgische algemene tellingen en de nationale rekeningen" in : XLV^{ième} Congrès de la Fédération des Cercles d'Archéologie et d'Histoire de Belgique, Actes, Brussels-Comines, 1982, vol. 3, pp. 279 - 291.
- (3) By outworkers is meant that part of the labour force involved in the putting out system or "domestic system". In this production system merchant-employers "put out" materials to (rural) producers who usually work in their homes. Finished products were returned to the employers for payment, mostly on a piece-

work basis, but sometimes on a wage basis. In this way the outworkers neither bought materials nor sold products.

- (4) A more profound analysis of these problems is included in my paper about Regional differences in the Belgian labour market (1846 - 1947), Antwerp 1983, pp. 1 - 7.
- (5) Cf. "Enige resultaten van het sociaal-economisch onderzoek - april 1977" in : Statistisch Tijdschrift, 1979, no. 2, pp. 95 - 121.
- (6) The delimitation of the subperiods is based on the years for which qualitatively and quantitatively sufficient data are at our disposal.
- (7) This is the more striking since after the first world war the territory of the province of Liège was expanded. This expansion implied at the same time an increase of employment by a few thousand jobs.
- (8) For a discussion of the intensity of industrialisation and the importance of the tertiary sector (at the national level) see H. KAELBLE, Was Prometheus most unbound in Europe ? Labour force in Europe during the late 19th and 20th centuries, Berlin, 1984, 44 p. (unpublished working paper).
- (9) See e.g. S. POLLARD, Peaceful Conquest : the Industrialisation of Europe 1760 - 1970, Oxford, 1981, p. 39, or J.G. LAMBOOY, Ekonomie en Ruimte, Assen, 1981³, vol. 1, pp. 205 - 206.
- (10) S. POLLARD, "Industrialisation and the European Economy" in : The Economic History Review, 1973, no. 4, p. 647.
- (11) S. POLLARD (1981) o.c., pp. 116 - 117.
- (12) See e.g. M. GOOSSENS, Energie en Industrie, Antwerp, 1981², passim.

- (13) According to the classical location theory of Weber, this implies a materials index larger than one. If the decision maker acts rationally, in this case he should choose a location near the places where sources of energy or, in general, located resources are extracted (or processed).
- (14) The decrease during the last subperiods is confirmed by application of the same coefficient to data about value added. Since no statistics about the geographic product before 1955 exist, a comparison is impossible for the earlier years.
- (15) For a critical discussion of the method see e.g. H.W. RICHARDSON, Regional and Urban Economics, Harmondsworth, 1978, pp. 202 - 206, or G.L. DE BRABANDER, Regionale structuur en werkgelegenheid, Brussels, 1983, pp. 117 - 130 and pp. 199 - 206.
- (16) See e.g. my paper Regional differences..., o.c., p. 15.
- (17) Compare e.g. the income polarisation according to the growth pole theory, or the spread effects according to the cumulative causation model.
- (18) The range of the 'central goods' is rarely larger than 20 km, even at the hierarchical level of the regional towns.

Appendix A: the shift and share model

The formal definition of the shift and share model makes use of the following symbols:

L	employment
i	branch of activity, varying from 1 to m
r	regions 1 to n
L_{ir}	employment of i in r
$L_{i.}$	$\sum_{r=1}^n L_{ir}$
$L_{.r}$	$\sum_{i=1}^m L_{ir}$
$L_{..}$	$\sum_{r=1}^n \sum_{i=1}^m L_{ir}$
t, t-1	census years

The model can be summarised as

$$\sum_i t^{L_{ir}} - \sum_i t^{-1L_{ir}} = \sum_i s_{ir} + \sum_i p_{ir} + \sum_i d_{ir} \quad (1)$$

in which

$$s_{ir} = t^{-1L_{ir}} \left(\frac{t^{L_{..}} - t^{-1L_{..}}}{t^{-1L_{..}}} \right) \quad (2)$$

$$p_{ir} = t^{-1L_{ir}} \left(\frac{t^{L_{i.}} - t^{-1L_{i.}}}{t^{-1L_{i.}}} - \frac{t^{L_{..}} - t^{-1L_{..}}}{t^{-1L_{..}}} \right) \quad (3)$$

$$d_{ir} = t^{-1L_{ir}} \left(\frac{t^{L_{ir}} - t^{-1L_{ir}}}{t^{-1L_{ir}}} - \frac{t^{L_{i.}} - t^{-1L_{i.}}}{t^{-1L_{..}}} \right) \quad (4)$$

Given these definitions, one can deduce that :

$$\sum_i \sum_r s_{ir} = t^{L_{..}} - t^{-1L_{..}}$$

$$\sum_i \sum_r p_{ir} = 0$$

$$\sum_r \sum_i d_{ir} = 0$$

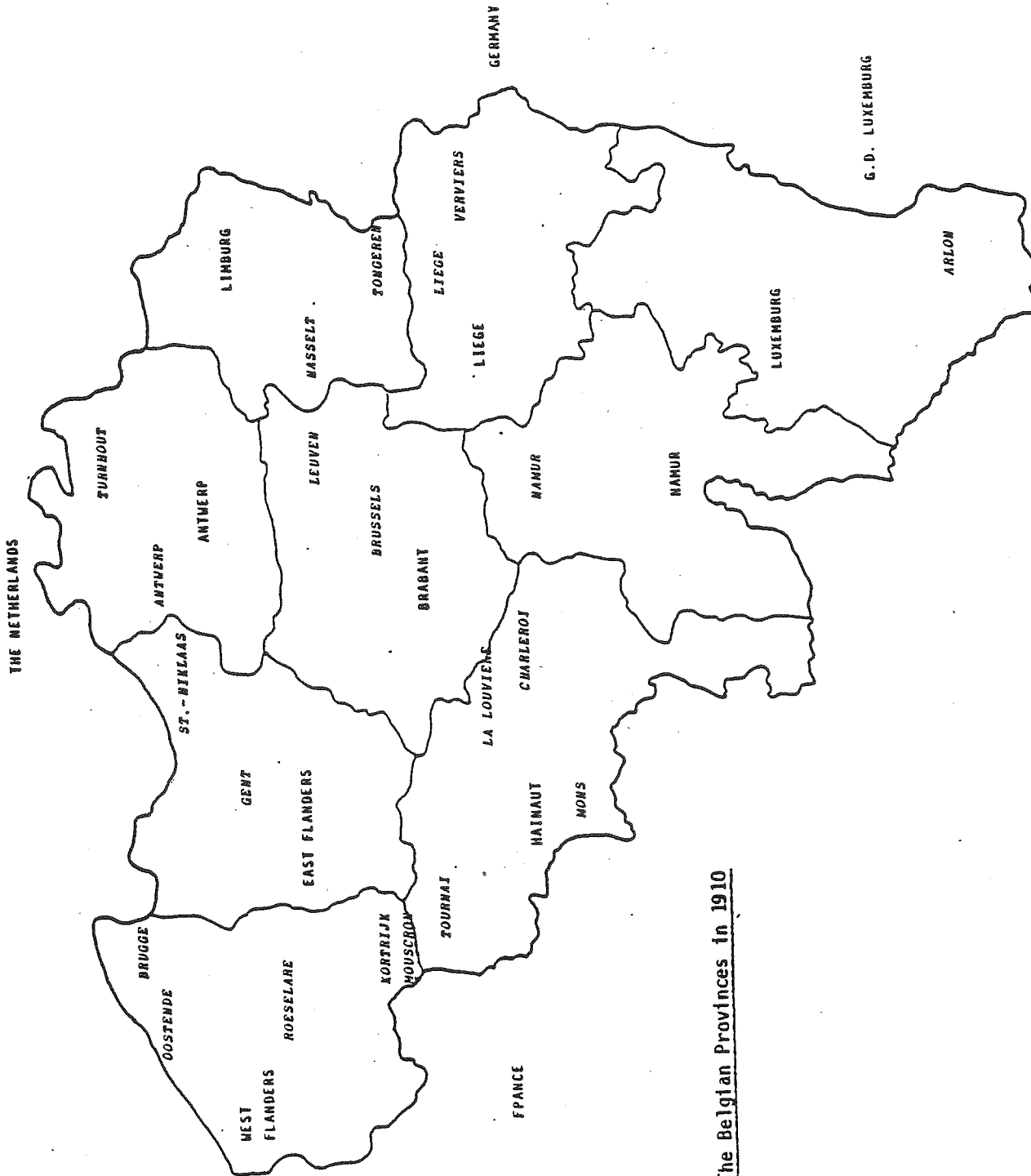
$$\sum_i \sum_r d_{ir} = 0$$

Appendix B : the sectoral disaggregation

The three sector scheme used in section 2 is disaggregated to compute the shift and share results as follows :

- primary sector :
 1. agriculture (including fishing)
- secondary sector :
 2. mining and quarrying
 3. food, beverage, tobacco
 4. textiles
 5. clothing and footwear
 6. wood and furniture
 7. paper, printing, publishing
 8. chemicals
 9. bricks, pottery, cement and glass
 10. iron, steel and non ferro metals
 11. engineering
 12. other manufacturing
 13. construction
- tertiary sector
 14. electricity, gas, water
 15. trade, banking etc.
 16. transport
 - 17 services

Because of lack of data for earlier subperiods, the disaggregation of the tertiary sector could only be applied to the years 1961 - 1970.



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