Inhoud / Contents

81 Abstracts of Contributions
82 R. J. Johnston
   Party Strength, Incumbency, and Campaign Spending as Influences on Voting
88 Shmuel Shamai & Aharon Kellerman
   Conceptual and Experimental Aspects of Regional Awareness
100 Zhigang Rykier
   System of Main Cities: A Critique and Evaluation
106 Roger Hayter
   The Restructuring of Traditional Industries in a Time of Recession
121 Bert Helmsting
   Dependency or Differentiation? Regions and Industrialization in Colombia
133 Ross Robinson
   Industrial Strategies and Port Development in Developing Countries
144 Window on The Netherlands: Hans van Amersfoort
   Immigrants in The Netherlands
150 Boekbesprekingen / Book Reviews
   A. L. van Naerssen, A tale of two towns (L. Solhaar)
   M. K. White & W. L. Parish, Urban Life in Contemporary China (J. G. Berchert)
   F. A. Crompton & M. Ploix, eds., Environmental Management: British and Hungarian case studies (G. J. Ashworth)
   D. Kornhammer, Japan: Geographical Background to Urban-Industrial Development (M. de Smith)
   T. Bayliss-Smith & S. Wamrei, eds., Understanding Green Revolutions (A. Harris-Bechlois)
   P. Grenier, Chilot et les Chilenos: Marginalité et dépendance en Patagonie (J. M. G. Kiepienning)
   G. J. Wiggers, Industriepolitiek (M. de Smith)
   D. T. Herbert & R. J. Johnston, Geography and the Urban Environment (G. J. Ashworth)
   G. Demko, ed., Regional Development (G. de Rijk)
   E. Graham & J. Floeting, The Modern Plantation in the Third World (J. M. G. Kiepienning)
   B. John, Scandinavia: A New Geography (J. R. Floyd)
   M. Patrome, Rural Geography (D. de Bakker)
   D. Phillips & A. Williams, Rural Britain, A Social Geography (Ch. van Welmers)
   D. J. Walsmsky & G. J. Lewis, Human Geography, Behavioural Approaches (R. de Paeer)
   P. Jackson & S. J. Smith, Exploring Social Geography (R. de Paeer)
   A. Blackbourne & R. G. Pornam, The Industrial Geography of Canada (H. F. L. Orons)
   E. Zielez, Die Japanner in Dusseldorf (M. de Smith)
   G. Demko & R. J. Fuchs, eds., Geographical Studies on the Soviet Union (G. de Rijk)

The Netherlands in Maps (omslag / cover p. 3)
DEPENDENCY OR DIFFERENTIATION?
REGIONS AND INDUSTRIALIZATION IN COLOMBIA

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Introduction
Over the last five to ten years the framework in which processes of regional development are analyzed has considerably changed, not only in level and scope but also in terms of the kinds of variables considered. The first wave of regional theory contributions, of which the readers by Friedmann & Alonso of 1964 and 1975 are fairly representative, studied regions in their respective national contexts. These was very little regard for the international dimensions of the development process. It is the considerable contribution of the dependency perspective that the regional interregional effects of external interregional integration became directly part of regional analysis and theory. For a recent discussion see Ettema (1983). The scope of analysis changed. So did the kind of variables considered. Political economy questions came more and more to the fore, displacing conventional economic growth and employment issues. Multiplier analysis gave way to the study of ownership and control. The conceptual apparatus became very large indeed and for many reasons little weeding out took place through empirical testing. What happened was more like a 'crowding out' of theories.

In this article a partial attempt will be made to evaluate empirically some theoretical propositions on the basis of the Colombian regional industrialization process since the Second World War.

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Industrialization in Colombia went through various and different processes of industrial growth. The first stage of import substitution was more or less completed in the 1950s. The production of consumer durables and of intermediate products were the main sources of output growth in the sixties. The opening up of the economy to foreign investment and firms played an important role in this respect. At the end of the sixties and in the seventies a number of impulses were given to stimulate a drive for export so as to revive again the industrialization process, first from a sheltered home base, later after 1975 under neo-liberal policies. In the first period, industry was protected from external or foreign competition, and almost entirely undertaken by Colombian industrialists. In contrast, in the third and last period not only had foreign investment and TNCs become important, and were exports becoming a significant source of accumulation, but also imports were liberalized (after 1975), extending therefore external influences on the industrialization process. The second period is something of an intermediate period, in which the role of external factors had increased (foreign investment, TNCs), but in which the industrialization process was still inward oriented.

Our analysis of the pattern of regional industrial development takes the above features into account by the adoption of the following periodization: a) 1945-1958; b) 1958-1967; c) 1967-1980. A 'shift and share analysis' is carried out for each period (cf. Armstrong & Taylor 1978). Before presenting this analysis, some tentative propositions will be formulated for some theories of regional development. Against the back-
While dependency theory is elaborate on what happens in peripheral regions and less so regarding its national core - as the latter is an intermediate element in the international relations of dependency - domination theory poses a superior structure of the (national) center (Hilhorst 1971). The center is diversified and less dependent on exports, while the periphery depends more on its exports as a source of growth. Moreover, it has an undiversified basis. Vertical trade integration is pointed to exist where individual peripheral regions specialize in export of raw materials and imports and the center produces and exports final products.

These unequal trade structures stand in sharp contrast to the initial exponential application of neoclassical international trade theory, which points to an interregional specialization by both trading partners with mutual gains and growth from it. Since regions are, however, not self-contained, it is not comparative but absolute advantage that would rule interregional trade.

Unfortunately, only very rarely is survey data available on regional trade, which would allow to approximate such trade structures that exist and, above all, how they change over time. The only alternative, therefore, is to have recourse to estimates. One way to approximate a region's export structure and periphery import structure is by calculating the export base. The concept of export base has a wider definition as it includes not only final output for external demand, but also related production destined for export industries.

For the estimation of a region's export base a number of methods have been developed (Pleeter, ed. 1980). One of the most widely used methods in impact analysis is one based on the location coefficient (Lq) of the purpose of identifying the export base of each sector. The coefficient is a quotient of the national share and the national share of a sector (output, employment). If \( Lq > 1 \), then the sector is more than proportionally represented in the region. The region is said to be specialized in this particular sector and in view of this would be able to cater for its internal demand and export more on a proportional share of its output to other regions or abroad. The export component (OB) can in this way be taken to:

\[
OB = \frac{Lq - 1}{Lq} \text{Q}_i \quad \text{for } Lq > 1
\]  

(1)

If \( Lq < 1 \), then the sector concerned would in comparison to the national average be underrepresented. In such cases exports are expected to be absent (OB = 0). The latter result is also obtained for \( Lq = 1 \). Some industries depend a lot on exports, others very little. For the region as a whole we are now in a position to define its 'export dependence' \( E_L \) which is defined as follows:

\[
E_L = \sum_{i=1}^{n} OB_i \sum_{i=1}^{n} O_i \times 100
\]  

(2)

The index \( E_L \) - which is the inverse of the base multiplier - expresses the share of export base production in the total of regional industrial output.

Regional participation in the Colombian industrialization process

Early industrialization in Colombia effectively started after the 'War of a Thousand Days' (1899-1902). This civil war centered around the decentralization issue (federalism versus centralism) and was settled in favor of a centralized system of government. The war marked, in a way, the beginning of the process of political integration of the Colombian nation state, which was a necessary condition to bring about the economic integration of the country.

The early industrialization meant a gradual move away from the agrarian export economy which had slowly developed in the 19th century, first in tobacco and quinine and later more securely on coffee (Bejarano 1979). In the first decade of the present century, coffee came to constitute around one third of total Colombian exports. Parity due to the changing world market for coffee in favor of the fast growing post-WW I US economy, Colombian coffee exports rose rapidly to constitute around 70% of total Colombian exports in the 1920s. This share went down during the Great Depression only to rise again immediately after WW II (McGreevy 1975).

Without doubt it was the growth of coffee production and exports that in various ways enabled industrialization to take place (Urrutia 1978). First of all, the structure of production was much less concentrated than in the other agricultural sectors, generating a more favorable distribution of (monetary) income, and thus constituting an important source of demand for manufactured products. Secondly, the growing coffee exports generated the foreign exchange necessary to finance the imports of industrial machinery and raw materials. To this, one may add as a third point that coffee's export boom also stimulated the creation of transport infrastructure, which enabled the physical entry and movement of industrial equipment. Particularly during the 1920s great advances were made in the expansion of the various railway networks in the country. Finally, the emergence of the industrial bourgeoisie is related (though not exclusively) to the development of coffee production and trade (Arango 1977).

In addition to coffee, several other factors should be kept in mind which assisted the establishment and consolidation (as from 1930) of the industrial sector. First of all the temporal interconnection is the analysis of its economic impact on the First and Second World Wars, and during the Great Depression when protective measures, made necessary because of the reduced capacity to export, created a similar effect. A further factor of importance was the import of foreign loans and capital, particularly during the 1920s, with which the public works in transport were partly financed. Foreign (US) capital concentrated particularly in oil extraction (Bejarano 1979).

The main branches of manufacturing activities were food, beverages, textiles and clothing, complemented by the good production. It was estimated that these branches increased their share in industrial employment from 40% in 1925 to 56% in 1945. The development of the sector as a whole was largely based on the realization of foreign investments, particularly due to the formation of oligopolistic structures, first on a regional and later on a national scale, particularly in textiles, beer and some food products like.
for instance, chocolate and tobacco. Periods of reduction of competitive imports marked great surpluses in the process of oligopoly formation by means of absorption of competing firms, followed by periods of incorporation of new technical progress leading to larger size of plants, which in its turn led to a further consolidation of these marked structures.

Industrialization was not a generalized regional phenomenon. In the first three decades it basically developed in the Caights/Antioquia coffee region (Medellín, and to some extent in Pereira and Manizales), in the eastern coffee region, Cundinamarca (Bogotá) and in port cities like Barranquilla and Cartagena. By 1945 the four departments concerned approximately 70% of the industrial labor force and 76% of total manufacturing output.

The change from the period of early industrialization to the next was marked by a spectacular investment boom immediately after the Second World War (1945-50), during which annual growth rates were achieved on the order of 11% (Poveda 1967, 1970).

The period 1950-1968 is one in which the nature of industrialization underwent various fundamental changes. Its pattern followed very closely the import substitution model. Periods of boom and recession followed each other as a function of import capacity of exports (coffee).

Government responded to balance of payments problems with new protectionist measures, which stimulated the emergence of new sectors. It is particularly this feature of recurrent and in many respects systematic government intervention which marked an important difference from the previous period.

Whereas in the beginning of the period the traditional industries showed marked rates of growth and continued to employ the majority of the industrial workers, the growth of manufacturing industry was achieved more and more by the emergence and expansion of new sectors producing consumer durables, intermediates and capital goods, such that import substitution was extended further into new products but on a more and more narrow market of domestic demand.

1945-1958 — In the first period considered here, 1945-1958, the sectors that experienced the highest rates of growth were paper, paper products, oil refining, rubber, other manufacturing and tobacco.

Table 1 summarizes the results of the shift and share analysis carried out for this period. The first two columns give the value added generated by the manufacturing industries in 1945 and 1958, respectively. For each region the expected level of net output was calculated for 1958. This level was found by applying the national growth rate to each region. It expresses a situation in which no further regional differentiation would have occurred during that period. The difference between the actual value at the end of the period and this estimated value constitutes the "net shift" of regional output change vis-à-vis the national average. This figure is presented in column 3. In the fourth column the percentage distribution of the total negative and of the total positive net shifts are presented. In the fifth column the net shift is expressed in terms of the "expected level" of net output, so as to have an indication about its importance for each region. In the sixth and seventh columns the net shift of each region is decomposed into the industrial mix and the residual regional share effect.

The regional pattern of output growth in this period reveals some very clear changes. Whereas industry in Antioquia, the "oldest" industrial area, grows slightly below the national average, Cali (Valle) becomes firmly established as the third industrial center. The extraordinary growth of output in Cali can to a large extent be explained by the expansion of the Buena Ventura harbor at the Pacific coast which made Cali an attractive location as a transshipment point, at the cost of Barranquilla (Atlántico) which in consequence fell behind. A second important reason is found in the development of agro-processing, particularly sugar refining. Valle together with the capital city region Cundinamarca contained almost the entire positive shift.

There were significant processes of concentration going on within the central regions, but within the latter a reallocation took place away from Barranquilla (Atlántico) and towards Cali (Valle).

This regional restructuring of output growth is also clearly reflected in the decomposition of the net shift of each region. Only in the case of the Valle department are the mix and share effects positive in other words, not only had this department a favorable sectoral composition or mix (proportionally more of fast growing sectors), but these did grow faster as well.

Peripheral regions such as Narino, Norte Santander, Tolima and Magdalena have not only a relatively unfavorable industrial structure, but these performed also worse than elsewhere. The same also applies to regions that do not have a clear peripheral status such as Bolivar, and Viojo Caldas. On Atlántico we have already commented above. Of the remaining departments, perhaps the most noteworthy is Antioquia, which experienced a small negative net shift.

Given the fact that the period concerned is one of export-led growth, from foreign imports, one could interpret the relative interregional changes as a zero sum context. That is to say that there is a direct relation between the high growth of the central industrial regions and the relatively poor industrial growth performance in the periphery.

1958-1967 — Whereas early industrialization was largely undertaken and controlled by Colombian groups, in this period, particularly from 1961 onwards, foreign investment and multinational firms became more important. The basically open attitude towards foreign enterprise was related to the fact that Colombian industrial expansion was now heavily based on development of intermediate goods, consumer durables and some capital goods production, to which foreign enterprise can be clearly associated (Bejarano 1978). The fastest growing sectors were Furniture, Metal Products, Non-electrical machinery, Electrical machinery and appliances, Rubber, and Oil and oil derivatives. Basic consumer goods industry clearly fell behind in this period.

Table 2 summarizes the pattern of regional growth in this period. Within the industrial core of the country the above sectoral pattern reflected itself in a minor relative decline (-4.3) in Antioquia where the slow growth of 'first stage' sectors, most notably textiles, expressed itself in a large negative industrial mix component, and in Cundinamarca where the growth of 'second

Table 1. Regional industrial output and growth in Colombia: 1945-1958.

<table>
<thead>
<tr>
<th>Region</th>
<th>Output (VAP)* 1945</th>
<th>Output (VAP)* 1958</th>
<th>Net shift</th>
<th>Relative distribution</th>
<th>Comparative shift</th>
<th>Decomposition</th>
<th>Net shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antioquia</td>
<td>30,475</td>
<td>80,184</td>
<td>-13,508</td>
<td>5.3</td>
<td>-1.7</td>
<td>101,265</td>
<td>87,808</td>
</tr>
<tr>
<td>Atlántico</td>
<td>18,382</td>
<td>292,570</td>
<td>-129,508</td>
<td>51.2</td>
<td>-30.7</td>
<td>36,097</td>
<td>99,411</td>
</tr>
<tr>
<td>Bolívar</td>
<td>4,739</td>
<td>93,369</td>
<td>-8,811</td>
<td>5.1</td>
<td>-1.2</td>
<td>17,320</td>
<td>-4,411</td>
</tr>
<tr>
<td>Boyaca</td>
<td>3,173</td>
<td>74,124</td>
<td>-63,951</td>
<td>1.3</td>
<td>4.5</td>
<td>-2,302</td>
<td>5,699</td>
</tr>
<tr>
<td>Caldas</td>
<td>6,993</td>
<td>168,280</td>
<td>-26,638</td>
<td>10.3</td>
<td>-11.4</td>
<td>-23,245</td>
<td>7,849</td>
</tr>
<tr>
<td>Cauca</td>
<td>15,646</td>
<td>22,738</td>
<td>-7,092</td>
<td>4.8</td>
<td>3.5</td>
<td>3,216</td>
<td>-15,439</td>
</tr>
<tr>
<td>Cundinamarca</td>
<td>36,681</td>
<td>875,945</td>
<td>57,787</td>
<td>-22.8</td>
<td>7.1</td>
<td>-73,858</td>
<td>131,644</td>
</tr>
<tr>
<td>Huila</td>
<td>596</td>
<td>11,864</td>
<td>533</td>
<td>0.2</td>
<td>4.9</td>
<td>-1,914</td>
<td>2,487</td>
</tr>
<tr>
<td>Magdalena</td>
<td>1,326</td>
<td>20,051</td>
<td>-9,590</td>
<td>3.8</td>
<td>-32.4</td>
<td>-2,306</td>
<td>-7,284</td>
</tr>
<tr>
<td>Narino</td>
<td>970</td>
<td>18,202</td>
<td>-3,781</td>
<td>1.4</td>
<td>-16.1</td>
<td>-2,267</td>
<td>-1,214</td>
</tr>
<tr>
<td>Norte Santander</td>
<td>1,623</td>
<td>29,674</td>
<td>-6,606</td>
<td>2.6</td>
<td>-18.2</td>
<td>-4,461</td>
<td>-2,145</td>
</tr>
<tr>
<td>Santander</td>
<td>7,665</td>
<td>172,464</td>
<td>1,125</td>
<td>0.9</td>
<td>0.7</td>
<td>280,866</td>
<td>-239,742</td>
</tr>
<tr>
<td>Tolima</td>
<td>3,916</td>
<td>48,143</td>
<td>-19,393</td>
<td>15.6</td>
<td>-45.0</td>
<td>-715</td>
<td>-38,679</td>
</tr>
<tr>
<td>Valle</td>
<td>18,262</td>
<td>190,445</td>
<td>75.2</td>
<td>5.6</td>
<td>4.7</td>
<td>6,536</td>
<td>181,909</td>
</tr>
<tr>
<td>Total</td>
<td>144,395</td>
<td>3,227,724</td>
<td>0.0</td>
<td>100.0</td>
<td>100.0</td>
<td>-0</td>
<td>-0</td>
</tr>
</tbody>
</table>

* (CI) current Col. pesos. Sources: See appendix.

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125
more than 20% of their output, still represented a small share, whereas for large sectors such as food and textiles, which were the largest exporters, external demand still constituted no more than 10% of total gross output. Furthermore, there was an important element of transnation-
alization, in so far as firms with foreign ownership played an important role in this seemingly rapid export success.

In the 1960s foreign investment in manufactur-
ing industry had already expanded considerably. The 1968 reforms gave renewed inputs to foreign-owned industrialization. By 1974 firms with major or minor foreign participation contrib-
uted no less than 45% of total exports. For-

citizens' exports, the strongest in intermediate and capital goods sectors such as paper, chemi-
cals, rubber, glass, non-ferrous metal and trans-
port machinery (Arango 1976). The most impor-
tant change with respect to the previous period was the growth of foreign control of ownership. Whereas in 1969 only 45% of foreign participation concerned major firms (>50%); in 1974 this figure had risen to 72%.

The four major growth sectors in this period were chemicals, printing and publishing, basic metallurgical, and transport industries. In other words, the main increase in output originated most importantly in the intermediate and capital goods industries. In contrast, it can be added that the traditionally most important and con-
sumer goods industries lagged relatively behind in growth. This sectoral reorientation of the economy clearly produced a new tendency to-
wards interregional differentiation.

Table 3 summarizes these changes. First, it can be concluded that within the industrial core a 're-centralization' occurred favoring Bogotá (Cundinamarca). The Cali region in particular lagged behind (more than 20%); in contrast, it is important to note that during the period of 'export drive', the Barranquilla de-

Department (Atlántico) did not benefit. On the contrary, as in the previous periods, Atlántico continued to trail behind and was responsible for 28% of the total negative shift.

The trend already discussed in the previous period of 'differentiation within the periphery' continued very clearly in this period. Bolivar and Santander together accounted for 65% of the total positive shift. In both cases it is almost entirely due to their insertion as producers of intermediate resource based output (chemicals, oil and oil derivatives).

Only Cundinamarca had a favorable industrial structure but also experienced above average sectoral rates of growth. Five departments had opposite characteristics; Cauca, Magdalena, Tolima and also Córdoba and Meta remained behind and acquired definite peripheral status.

With regard to foreign investment, it is impor-
tant to observe that according to the data avail-
able for 1974, 80% of net output of firms with foreign participation was concentrated in the three industrial core regions. This is well in ex-

| Region     | Output (V.A) 1967 | Output (V.A) 1980 | Net shift | Net shift | Relative distribution | Compara-
tive shift | Decompo-
sition of industrial composition | Net shift |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Antioquia</td>
<td>3,590,703</td>
<td>76,276,076</td>
<td>36,483,822</td>
<td>15.1</td>
<td>-</td>
<td>-4.6</td>
<td>3,197,454</td>
<td>513,625</td>
</tr>
<tr>
<td>Atlántico</td>
<td>1,256,400</td>
<td>20,606,216</td>
<td>-6,964,680</td>
<td>28.5</td>
<td>-</td>
<td>-24.9</td>
<td>-1,952,347</td>
<td>-5,012,336</td>
</tr>
<tr>
<td>Bolivar</td>
<td>566,920</td>
<td>20,300,328</td>
<td>-3,305,675</td>
<td>34.0</td>
<td>-</td>
<td>46.8</td>
<td>-1,516,665</td>
<td>-9,824,335</td>
</tr>
<tr>
<td>Boyaca</td>
<td>833,258</td>
<td>8,630,374</td>
<td>95,661</td>
<td>0.4</td>
<td>1.1</td>
<td>2,827,111</td>
<td>-2,731,449</td>
<td>1,121,845</td>
</tr>
<tr>
<td>Cauca</td>
<td>609,519</td>
<td>16,441,399</td>
<td>1,033,152</td>
<td>4.2</td>
<td>6.7</td>
<td>-1,040,275</td>
<td>-2,073,428</td>
<td>3,458,916</td>
</tr>
<tr>
<td>Casanare</td>
<td>119,483</td>
<td>2,088,794</td>
<td>-571,954</td>
<td>23.1</td>
<td>21.5</td>
<td>258,510</td>
<td>-313,444</td>
<td>2,841,344</td>
</tr>
<tr>
<td>Cordoba</td>
<td>24,438</td>
<td>506,274</td>
<td>-379,012</td>
<td>0.2</td>
<td>-2.0</td>
<td>54,896</td>
<td>16,954</td>
<td>11,954</td>
</tr>
</tbody>
</table>
| Cundinama-
rica | 3,988,677         | 94,387,288        | 7,228,088  | 29.6      | 8.3                   | 6,604,916    | 621,078                          | 1,624,798 |
| Meta       | 57,441            | 1,230,992         | -48,153    | 0.3       | -3.8                  | 49,424       | -96,577                          | 41,906    |
| Magdalena  | 151,833           | 2,106,994         | -1,247,152 | 5.2       | -37.2                 | -140,162     | -1,133,989                       | 3,042,185 |
| Meta       | 56,198            | 1,237,901         | -28,491    | 0.1       | -2.3                  | 41,605        | -129,165                         | 87,560    |
| Norte San-
te | 135,879           | 3,564,395         | 226,507    | 1.0       | 7.9                   | 70,896       | 309,425                          | 319,952   |
| Santander  | 839,350           | 26,512,662        | -2,519,614 | 38.0      | 40.7                  | -1,369,290   | 2,606,678                       | 8,986,025 |
| Tolima     | 172,114           | 3,620,466         | -2,129,214 | 0.9       | -5.5                  | -159,385     | -16,906                          | 1,629,867 |
| Valle      | 3,076,071         | 37,670,088        | -10,830,456| 44.4      | -15.5                 | -1,149,255   | -12,249,118                     | 2,922,318 |


* (C.10) current Col. pesos. Sources: See appendix.
cess of the participation of these regions in total net exports (68% in 1975). It cannot be concluded, however, that foreign investment simply accentuated the general trend to re-centralization formulated above. In this context it is striking to observe that foreign investment became much more important for Antioquia and Valle than for Cundinamarca.

The shift and share analyses conducted over the 1945-80 period appear to support the conclusion that already in the 1945-1958 period (before the barrios were part of the industrial dominance of the Bogotá region (Cundinamarca). This position stabilized or weakened a bit during the transitional period, only to be consolidated further in the export orientation period. This in itself is an important finding and its theoretical implications call for attention. Whether the economy was growing on the basis of internal demand or was developing on external sources of growth, the tendency of further concentration in the Bogotá region continued, only to be interrupted during the transitional period.

A second major conclusion is that in the period of import substitution and development of a protected national market, regional differentiation appeared to be much more a process of generating a regional dualism of an industrializing core and a stagnating periphery. In the later periods the pattern of regional change was much less unilinear and straight-forward. The development of resource based production in intermediate goods (oil derivates, chemicals, and agro-processions) seem to have greatly contributed to differentiation within the periphery. The remarkable performance of industries in Bolivar and Santander can be largely explained in this way. Similar but definitely less spectacular cases of industrial revival in Vioja Caldas and Norte Santander may be explained in a similar fashion.

Although it would perhaps have been feasible to decentralize industrial development via foreign investment policy, quite the opposite result came about without such a policy (Jimenez & Sideri 1983).

Patterns of specialization

So far we have given a broad description of the patterns of regional industrialization. In this section, we will analyze the pattern of regional specialization and diversification with the aid of the indexes elaborated in the first part of this paper.

In Table 4 the export base dependence index is calculated for the Colombian departments.

A number of conclusions may be drawn from it. First of all, it is interesting to observe that the index for the national and (autonomous) development of a protected national market, regional differentiation appeared to be much more a process of generating a regional dualism of an industrializing core and a stagnating periphery. In the later periods the pattern of regional change was much less unilinear and straight-forward. The development of resource based production in intermediate goods (oil derivates, chemicals, and agro-processions) seem to have greatly contributed to differentiation within the periphery. The remarkable performance of industries in Bolivar and Santander can be largely explained in this way. Similar but definitely less spectacular cases of industrial revival in Vioja Caldas and Norte Santander may be explained in a similar fashion.

Although it would perhaps have been feasible to decentralize industrial development via foreign investment policy, quite the opposite result came about without such a policy (Jimenez & Sideri 1983).

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cumulative causation mechanisms only.

The analysis of the Colombian patterns of change seems to give more support to the unequal structures identified by dependency as well as domination theory. Processes of specialization in peripheral regions may induce growth or stagnation, depending on its relation to the industrial core. The latter had, and consolidated further, its industrial dominance. It is difficult, however, to explain the differentiation within the industrial core by means of either theory. Although the proposition of dependency theory that increased international exposure and integration produces further interregional differentiation cannot be disproven, it is perhaps striking to observe, as we have seen above, that the greatest interregional differences were produced in the 1945-1958 period in which domestic manufacturing production was protected from international forces of competition.

Certainly, our aggregate quantitative analysis cannot capture important qualitative changes that have taken place and that have an important bearing on regional development, e.g., economic and financial concentration, transnationalization of industry, and the industrialization of agriculture (Helming 1983a), etc. Notwithstanding these and other limitations it seems clear that the impact of national and international changes on regional development is or has become far more complicated than is assumed in current regional theory.

Appendix on empirical sources:

The 1945 census data are published by Osppina Vasquez (1974). However, only sectoral and regional breakdowns of employment and gross and net output are given (Osppina Vasquez 1974, Tablés 2 and 3), but not the regional distribution of each sector, except for gross output (ibid, Table 5). As a consequence it became necessary to estimate value added by sector and region. The problem at hand can be visualized as a matrix with socio-economic cells and a row and column of totals. The problem therefore is to generate a distribution over the individual cells such that its corresponding row and column totals completely match the row and column totals. This kind of problem is a familiar one in input-output analysis and the so-called 'input-expenditure procedure' can be utilized to solve it, using the regional distribution of gross output by sector as the initial distribution. The data for 1958 and 1969 are found in GAS 1978, 1965, and the 1980 figures are taken from the 1985 census of manufacturing industry (DANE 1982). During the period that is analyzed here, the conventions concerning classification of manufacturing activity changed. Moreover, and as a consequence of new administrative conditions, there are changes in regional breakdown. Both required a number of adjustments so as to create comparable (uniform) sets of data. The problem of sector classification is particularly real when one is made of the 1945 census which is not based on the standard industrial classification. Two sets of data were prepared. One (series A) based on the 1945 format, was used for the analysis of the 1945-1958 period. The second (series B) which is the same throughout the remainder of the period, adopts the 1958 format. These data adjustments and RAS procedure are described in detail elsewhere (Helming 1983b).

Since it was virtually impossible to obtain price indices for the entire period and discriminated by region, it was decided to use current value of output. This in itself constitutes an important restriction as it implies the assumption that the terms of trade between sectors and regions remained constant.

References:


JIMENEZ, M. & S. SIDDIQI (1983), Estado y Vinculaciones...
Regional per thousand share in national total of wages* paid to employees (Dfl. 151,465 million), and the % share of government wages in each region's wage total, in 1980

Basic source: Central Bureau of Statistics.

*excl. premiums for insurance etc. paid by employer