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Review

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UNITED NATIONS
ECONOMIC COMMISSION FOR LATIN AMERICA AND THE CARIBBEAN

SANTIAGO, CHILE, AUGUST 1990

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LC/G.1631-P

August 1990

Notes and explanation of symbols

The following symbols are used in tables in the *Review*:

Three dots (...) indicate that data are not available or are not separately reported.

A dash (—) indicates that the amount is nil or negligible.

A blank space in a table means that the item in question is not applicable.

A minus sign (-) indicates a deficit or decrease, unless otherwise specified.

A point (.) is used to indicate decimals.

A slash (/) indicates a crop year or fiscal year, e.g., 1970/1971.

Use of a hyphen (-) between years, e.g., 1971-1973, indicates reference to the complete number of calendar years involved, including the beginning and end years.

Reference to "tons" mean metric tons, and to "dollars", United States dollars, unless otherwise stated.

Unless otherwise stated, references to annual rates of growth or variation signify compound annual rates.

Individual figures and percentages in tables do not necessarily add up to corresponding totals, because of rounding.

UNITED NATIONS PUBLICATION

ISSN 0251-2 920

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CEPAL

Review

Santiago, Chile

Number 41

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Latin America's place in world trade

Mattia Barbera*

This article analyses the role played in world trade by the main countries of Latin America during the period 1965-1987. The analysis is based on a reclassification of commercial trends which shows both the intensity of use of the factors concerned and the technological content of these trends. Also, by constructing an indicator showing the contribution to the trade balance, we can compare the patterns of international specialization of the region as a whole and of each country in particular, as well as the changes made in those patterns as a result of the trade and exchange policies applied during the last two decades.

With the data produced and assembled for this analysis, we can describe in detail the principal phenomena at the root of the current crisis. These phenomena include the technology gap in Latin America's specialization in relation to the developed countries and the newly industrialized countries, the bias against exporting on the part of the primary sectors and manufacturers who use natural resources intensively, the loss of dynamism towards the end of the 1970s by the sectors initially more successful, and the inefficiency of the mechanisms for allocating scarce resources.

The data obtained also reveal that these countries have been able to specialize and achieve major technological advances during recent decades. However, these trends could be reversed if they adopt policies of indiscriminate openness solely in order to improve the relative performance of the primary sectors and if they neglect the potential for regional integration, the generation of dynamic comparative advantages, and the experience acquired during the long period of inward-looking development.

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The author is grateful to Juan José Pereira for his invaluable collaboration, and to Oscar Altimir, Eugenio Lahera and L.K. Johnson for their comments.

Introduction

The *neo-Schumpeterian* view of technological, organizational and entrepreneurial innovation as the most dynamic element in economic growth has become established in economic policy and entrepreneurial strategy in the immense majority of the countries of the world. It no longer applies only to the West. This new *dominant paradigm* could be summarized, from the viewpoint of the developed countries, as the functional relationship between the growth rate of income and the rate of introducing new products and technologies or new organizational techniques.

On the other hand, especially in the Latin American countries, the growth rate of the product has been related historically to the constraint on the balance of payments, the two main components of which—the trade balance and the capital account—have evolved in a highly asymmetrical fashion because of the region's external indebtedness. The *lost decade* of the 1980s has clearly shown the harmful effects of efforts to export accompanied by a decline in imports of capital goods and investment. It has also shown that, if the problem of the external debt is to be finally solved, the debt must be radically redefined.¹ Nevertheless, in view of the structural nature of this crisis, it would be wrong, in the medium and long term, to concentrate exclusively on the financial imbalances of the economic relations between Latin America and the developed countries. The main impediment to the reactivation of the Latin American economies continues to be the limit imposed on growth by the *real* component of external relations. Understanding and redefining that component is one of the high-priority tasks for public and private authorities in these economies.

Most interpretative theories of international trade have centred on the differences between countries with commercial relations. Thus, the

¹See ECLAC, *Latin America and the Caribbean: options to reduce the debt burden* (LC/G.1605 (SES.23/5)), Santiago, Chile, 1990, where it is stated that, in the absence of significant measures on the part of the creditor countries, the only solution would be for the debtors to declare a unilateral moratorium.

neo-classical tradition has emphasized the initial factor endowment of the different countries; the neo-Ricardian tradition has emphasized the differences in production costs and technology; the neo-Marxians and structuralists have emphasized the institutional differences that determine the specific structures of the labour and goods markets and the specific ways in which they operate and seek to achieve a *balance* (as well as their effects on income distribution); the neo-Keynesians have emphasized the differences in the income elasticities of the goods in which the different countries specialize.²

On the basis of this diagnosis and conceptual framework, the principal aim of this study is to examine, from a technological viewpoint the more important trends in the international trade of the main countries of Latin America, over a period of more than two decades. This examination will be systematic and integral; it will constitute a synthesis but will be rich in detail.

With the help of these new empirical elements, as well as their elaboration resulting from our analysis, we aim to examine a series of trends of crucial interest for qualitative evalua-

tion of economic progress in the Latin American countries. In particular, we shall consider the differences in factors and their costs, the technology gap and the different income elasticities of the products traded. The developing countries are exporting their technology—the values of which are *weighted* in the study with those of imports—mainly because of the following advantages:³

—Cost advantages implied by producing with the same process the same kind of product or service as the developed countries (for example, lower wages for equally skilled workers);

—Advantages based on the production of an adapted or obsolete good or of a technical service more appropriate for the needs of the user (for example, smaller scale and/or greater knowledge of a similar market);

—Advantages of experience derived from lower costs or greater knowledge, generally from a natural advantage, as, for example, the availability of a specific raw material;

—Advantages resulting from the introduction of technological innovations.

I

Methodology

Our study is based on a reclassification of trade flows in which different categories are introduced. Thus, besides the analytical categories that distinguish between trade in primary products and trade in manufactures, we use technological categories, which allow us to *combine* some of the different approaches to international trade.

The result, which can be seen in detail in table 1, was a classification⁴ which, in the first place, divides manufactures into two main categories: those based on natural resources and those that are not. This division reveals the existence of an intermediate stage between primary products and manufactures. It defines a border area between the two that would have

²Income elasticity is also one of the main elements of structural analysis, particularly the analyses of Prebisch and ECLAC.

³An excellent summary and bibliography of the principal theoretical contributions to this discussion can be found in Martin Fransman, "Conceptualising technical change in the Third World in the 1980s: an interpretative survey", *The Journal of Development Studies*, vol. 71, No. 4, London, July 1985. Also see Carl Dahlman and Francisco Sercovitch, "Exports of technology from

semi-industrialized economies and local technological development", *Journal of Development Economics*, vol. 16, No. 1-2, September-October 1984.

⁴For a detailed list of the breakdown by sectors and products of each category, see the study done by the author of this article, "América Latina: especialización y sector externo. Un análisis de las tendencias tecnológicas del comercio", which will be published soon by ECLAC.

otherwise remained unnoticed and that conceals the presence of crucial interdependencies in developing economies.

Second, for manufactures based on natural resources, we defined three subcategories that reproduce the structure of the classification of primary products; for the subcategory of agricultural products, we also indicated the use intensity of the factors of capital and labour.

In the category of manufactures not based on natural resources, we opted to apply classification criteria that take into account the criticism of the concept of the homogeneity of the productive factors, namely, the criticism arising from neo-factorial theories.⁵ By dividing the labour factor into two categories—skilled and unskilled—we introduced a new subdivision between established and new industries, which also incorporates a qualification that can be related to the product cycle theory.⁶ On the basis

of this subdivision, we divided each group of industries into two subgroups according to the degree of use intensity of capital and unskilled labour.

Finally, in an attempt to make a new distinction dealing more directly with the capital factor (in a broad sense) and the labour factor in its more skilled component, we divided each subgroup into three categories, according to research and development expenditures incurred by the different industries.⁷

Table 1 gives the final classification we are proposing. As can be observed, the 17 final categories represent a rather high degree of disaggregation we must therefore use indicators that summarize trade performance and make it possible to define the lines of specialization. At the same time we must be able to make a rapid comparison between different countries. This need was met by using a fixed scheme for elaborating and analysing the data, which in this paper was reduced to the indicator of the contribution to the trade balance.⁸

Obviously, this classification has selective elements because we are trying to make compatible and put into practice different theoretical frameworks. Nevertheless, it has the advantage of eliminating several of the limitations that affect each of the categories in itself, i.e., it does not constitute a simple algebraic sum of its parts. However, both for technical reasons (with reference, for example, to the type of trade classification, the disaggregation of the data base used, or to the empirical studies of Latin American technology and production), as well as for reasons dealing basically with levels of aggregation used

⁵On the basis of the famous paradox of Wassily W. Leontief, "Factor proportions and the structure of American trade: further theoretical and empirical analysis", *Review of Economics and Statistics*, vol. 38, No. 4, November 1956, research has been developed that tends to distinguish the different qualities of the labour factor. Its main representative has been Donald B. Kessing, "Labour skills and comparative advantage", *American Economic Review*, vol. 56, No. 2, May 1966.

Investment in human capital as a determinant of growth has been incorporated by several models that postulate the existence of a sector specialized in producing that resource. See Patricio Mujica and Jorge Marshall (consultants), *Conocimiento y crecimiento económico. Un marco alternativo para el análisis de los determinantes del desarrollo económico*. (Knowledge and economic growth. An alternative framework for analysing the determinants of economic development) (LC/R.826), Santiago, Chile, ECLAC, 1989.

⁶The literature on this question is ample and well known. Therefore we will limit ourselves to the more important representatives of this international trade theory. M.V. Rosner, "International trade and technical change", *Oxford Economic Papers*, vol. 13, No. 3, London, Oxford University Press, October 1961; Raymond Vernon, "International investment and international trade in the product cycle", *Quarterly Journal of Economics*, vol. 80, No. 2, Cambridge, Harvard University Press, May 1966, and Raymond Vernon, *The Technology Factor in International Trade*, New York, National Bureau of Economic Research, 1970.

In the context of our classification, we should mention above all the work of Seev Hirsch, *Location of Industry and International Competitiveness*, 1967.

The sectoral groupings were elaborated on the basis of United Nations Industrial Development Organization (UNIDO), *International Comparative Advantage in Manufacturing. Changing Profiles of Resources and Trade*, Vienna, 1986, United Nations publication, sales No. E.85.II.B9. See also UNIDO, *Changing Patterns of Trade in World Industry: an Empirical Study on Revealed Comparative Advantage*, New York, 1982, United Nations publication, sales No. E.82.II.B.1.

⁷For this purpose we used a classification of the Organization for Economic Cooperation and Development (OECD) which divides industrial activities into three groups (low, medium, and high) according to their technological content, which depends in turn on the effort they put into research and development (R&D).

Studies of the role of R&D in international trade began with the work of William Gruber, Dileep Menhta and Raymond Vernon, "The R&D factor in international trade and international investment of United States industries", *Journal of Political Economy*, vol. 75, Part 1, Chicago, Illinois, University of Chicago Press, 1967.

⁸For an analytic discussion of this indicator, see Barbera (1990), *op. cit.* However, the field of variation of this indicator for each sector is between 100 (total specialization) and -100 (total external dependence).

Table 1

LATIN AMERICA: RECLASSIFICATION OF TRADE FLOWS

Variables Categories	Natural resources	Skilled labour	Capital unskilled labour	Research and development
Manufactures →	Industries not based on natural resources → Industries based on natural resources →	Established New	Labour-intensive Capital-intensive Labour-intensive Capital-intensive	— low technological content — medium technological content — low technological content — medium technological content — high technological content — low technological content — medium technological content — high technological content
Primary products →	Agriculture Non-combustible minerals Fuels	Agriculture Mining Petroleum derivatives	Labour-intensive Capital-intensive	

Source: Elaborated by the author.

(between three and four digits), this proposal⁹ is based on the assumption that, within each category, given the degree of disaggregation with which we worked, the products that belong

to each sector and the different sectors between themselves have homogeneous and stable technological characteristics throughout the period analysed.

II

Overall view of the region¹⁰

The external constraint on growth in the Latin American countries first became clear from the amount of freedom given to industrial-development policies by the foreign-exchange flows generated by exports of primary products.

Throughout the period studied, these products continued to comprise the largest share of exports from Latin America, while the manufacturing sector, the internal driving force of the substitution strategy, failed to generate an equivalent impetus on the external front, i.e., an export flow that would allow it to pay for its imports of inputs and capital goods. The manufacturing sector was also unable to reduce its technological dependence on the exterior nor the consequent outflows of capital (as payment for production services, royalties, patents and profits). The external quantitative dimension of this process can be represented by the trend between 1965 and 1983 in both the average annual nominal growth rate (in current values) and of the real growth rate (in constant values at 1980 prices) of the region's exports and imports.

The nominal values (figure 1a) indicate that the region's positive performance throughout the 1965-1983 period was the result of a *deficit-*

*based*¹¹ trend in the first two five-year periods considered, and of a *surplus-based* trend between 1975 and 1983. However, from 1982 onward, the trend is recessive; it is characterized by a sharp drop in both imports and exports. Consequently, it cannot be interpreted as a lasting modification of a historical trend but rather as a drastic short-term response of the trade balance to the need to make prompt factor payments on current account.

Considered in real values, the situation is quite different (figure 1b) and is explained to a large extent by the positive trend in the region's terms of trade as a net oil exporter.

In the 1965-1970 period, the average annual real growth rate of imports of the Latin American countries as a whole was almost treble the corresponding rate of exports. This structural imbalance acquired alarming dimensions between 1970 and 1975, a period in which imports reached an annual growth rate—in real terms—of 6.2%, while exports fell sharply by an annual rate of 8.7%. This situation began to change in 1975. That year saw the beginning of the reversal of the relationship between the growth rate of exports and that of imports (3.1% and -7.0% respectively), which accompanied the profound and lasting crisis of the 1980s.¹²

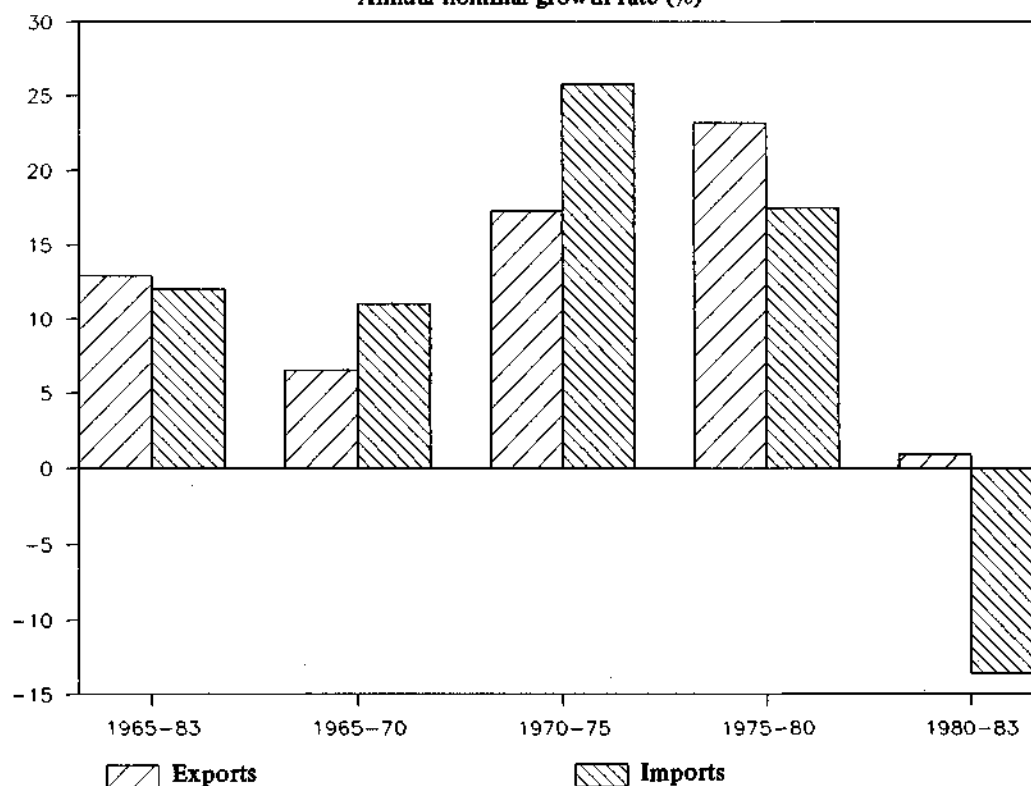
⁹Other taxonomy proposals for typologies were also used and attempts were made to render them compatible—particularly Keith Pravitt, "Sectoral patterns of technical change: towards a taxonomy and theory", *Research Policy*, vol. 13, No. 6, Amsterdam, December 1984. But, given the particular characteristics of the Latin American economic systems—which generate practically no technology—we concluded that they cannot be analysed with schemes elaborated on the basis of observations of developed economies and their technological circuits.

¹⁰All the statistics used in this study were elaborated by the author on the basis of data in current and constant 1980 values from the United Nations Statistical Information System (UNSIIS). The countries considered are Argentina, Bolivia, Colombia, Chile, Ecuador, Mexico, Paraguay, Peru, Uruguay, Venezuela. Data from 1965-1970 do not include Uruguay.

¹¹The term *deficit-based* (when in italics) refers to growth rates and does not necessarily imply a negative trade balance, but only a growth rate of imports higher than that of exports. The same is true, although in the opposite sense, for the use made in this paper of the term *surplus-based*.

¹²The data base used here does not allow us to aggregate data from the last years of any of the countries under consideration. Nevertheless, this trend has grown stronger, so that the data from 1980-1983 can be considered to represent an underestimation of the reversal of trade flows that took place in the region beginning with the external debt crisis.

Figure 1a
LATIN AMERICA: EXPORTS-IMPORTS, 1965-1983
 Annual nominal growth rate (%)



Source: Prepared by the author, on the basis of data provided by the United Nations Statistical Information System (UNSIIS).

As the comparison between the growth rates in real and nominal terms shown by the first two figures makes clear, during the period 1980-1983 the terms of trade, positive up till then, also declined. Thus, despite the tremendous effort to export made in order to confront the crisis, the growth in the value of exports was quite small. Later this increased the burden of the adjustment.¹³

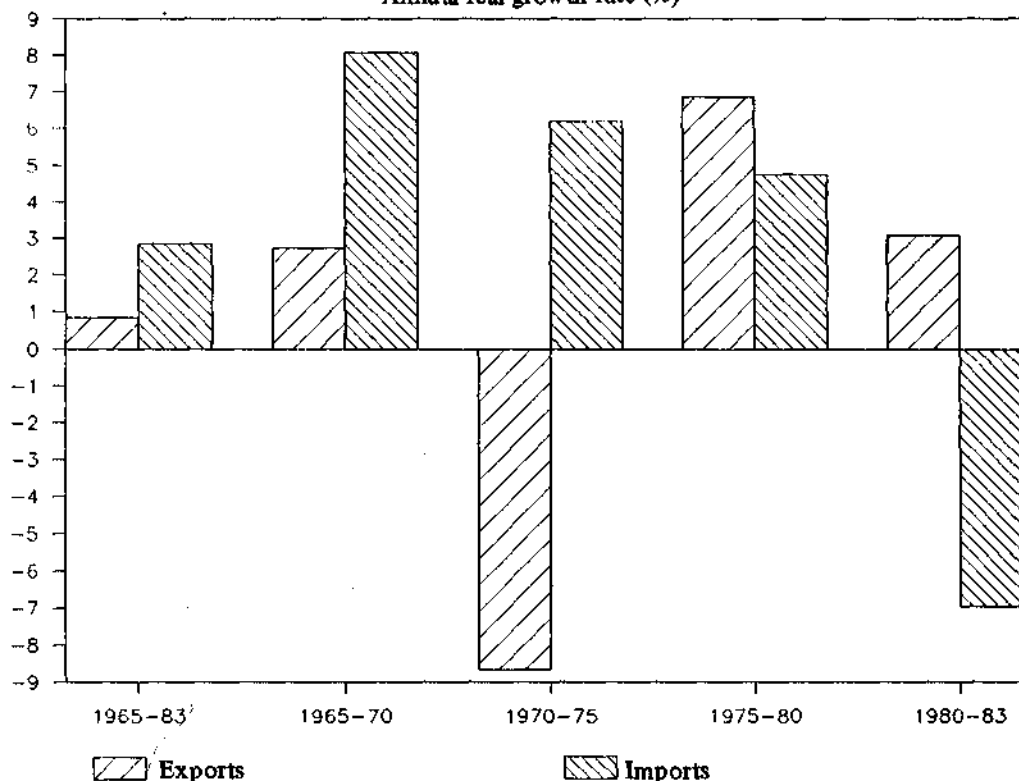
In short, it can be stated that between 1965 and 1980 —i.e., throughout the period that preceded the crisis— the development process of the Latin American economy generated a serious structural imbalance in the external accounts.

¹³It should be remembered that the drop in the price of oil on international markets also contributed to the burden of the adjustment.

Figures 2a and 2b illustrate this same result in more detail. In figure 2a the average rates of nominal growth of the main technological categories are compared; in figure 2b, the same relations are given on the basis of constant values. A comparison of the two figures allows us to make some comments about the effect that the changes in the terms of trade have had on the balances of payments in the region.

Between 1965 and 1980, Latin American exports and imports, calculated in current values, evolved on the average in an almost identical fashion: exports grew at an average annual rate of 17.5%, while imports increased at an average annual rate of 18% (figure 2a). This equilibrium was the result of a positive trend in manufactures not based on natural resources and of a deficit-based trend on the part of primary products and manufactures based on natural resources.

Figure 1b
 LATIN AMERICA: EXPORTS-IMPORTS, 1965-1983
 Annual real growth rate (%)



Source: Prepared by the author, on the basis of data provided by the United Nations Statistical Information System (UNSIIS).

Figure 2b, in turn, shows that for primary products imports constantly tended to increase and exports decrease, while for manufactures imports grew more rapidly than exports. From this viewpoint, then, the trade performance of Latin America was markedly *deficit-based*.

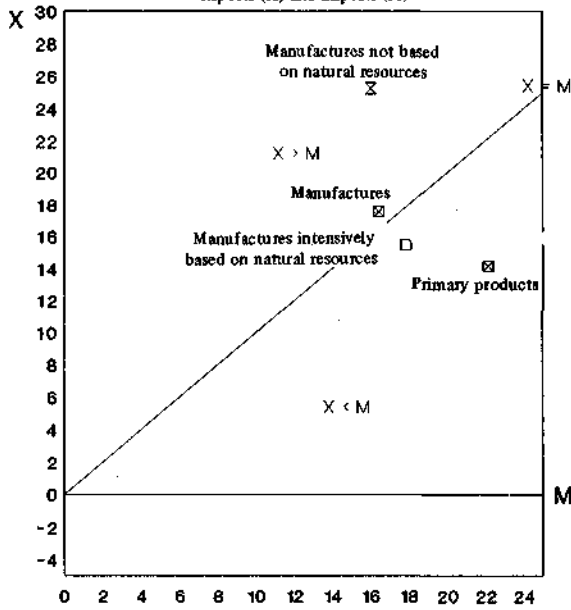
The terms of trade, which can be roughly deduced by comparing figures 2a and 2b, seem to have been favourable for all sectors of the region (with the exception of manufactures that use natural resources more intensively) and, in particular, for manufactures not based on natural resources.

Regional aggregate data represent the sum of different trends, and consequently conceal the marked disparities between the performances of the different countries. However, these differences can be seen diagrammatically in figures 3a and 3b, which were constructed according to the same logic used in figures 2a and 2b.

The average annual rate of growth calculated in nominal values (figure 3a) makes it possible to evaluate the *deficit-based* trade performance between 1965 and 1980 of the non-oil-exporting countries, plus Venezuela (a country which in any case was close to the line of external equilibrium). In this period, the countries with the most critical performance were Brazil (in spite of a strong growth in exports, equal to 18.3%), Paraguay and Argentina.

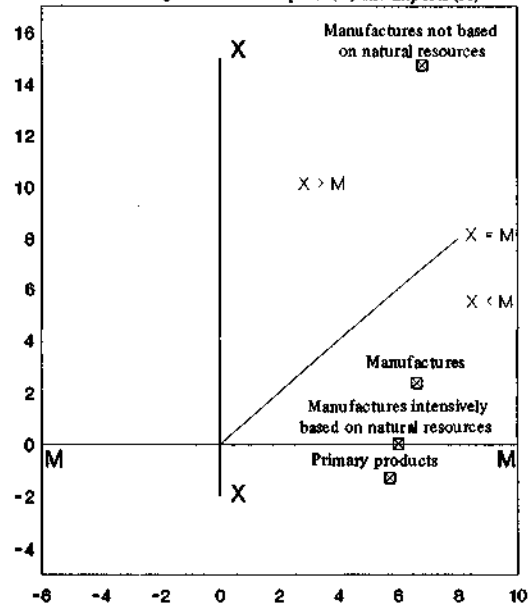
The real growth rates (figure 3b) show a situation very different from the previous one. A perusal of them leads to the conclusion that in most of the countries trade relations were not in critical areas (i.e., those on the right of the line $X = M$). This difference is explained by the evolution of the terms of trade, particularly because of the rises in the price of petroleum between 1973 and 1979.

Figure 2a
LATIN AMERICA: 1965-1980
Average annual nominal growth rate of exports (X) and imports (M)



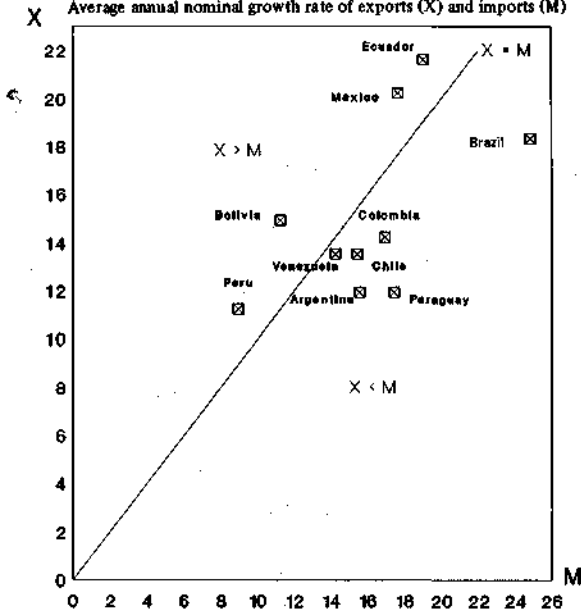
Source: Prepared by the author, on the basis of the series in current values of the United Nations Statistical Information System (UNSIIS).

Figure 2b
LATIN AMERICA: 1965-1980
Annual real growth rate of exports (X) and imports (M)



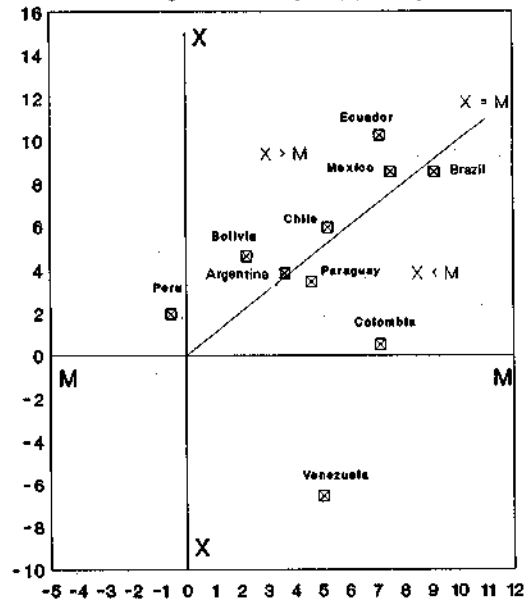
Source: Prepared by the author, on the basis of the series in constant values of the United Nations Statistical Information System (UNSIIS).

Figure 3a
LATIN AMERICA: 1965-1980
Average annual nominal growth rate of exports (X) and imports (M)



Source: Prepared by the author, on the basis of the series in current values of the United Nations Statistical Information System (UNSIIS).

Figure 3b
LATIN AMERICA: 1965-1980
Annual real growth rate of exports (X) and imports (M)



Source: Prepared by the author, on the basis of the series in current values of the United Nations Statistical Information System (UNSIIS).

III

The structure of Latin American trade

1. Imports

This section gives an overall picture of the commercial exchanges of 11 Latin American countries from 1965 onward. We will first consider the behaviour of imports.

Imports of manufactures (table 2) represented in 1965 85% of total imports, with the remaining 15% of imports of primary products.

Imported manufactures were concentrated in industries not based on natural resources (66%), and among these, in new labour-intensive (31%) and capital-intensive (19%) industries, and particularly in industries of medium technological content of each one of these subgroups (21% in labour-intensive and 13% in capital-intensive).

Industries based on natural resources, agricultural industries —labour- and capital-intensive— absorbed 8.8% of those imports.

Among primary products, agricultural products, with 8.6%, and fuels, with 4.7%, were the two largest items in that same year.

On the other hand, the growth of imports was accompanied by a change in their breakdown, so that in 1980, almost at the height of the substitution process, while the percentage of imports of primary products had increased, that of imports of manufactures had fallen by 11 points in relation to 1965, representing 74% of total imports. This decline affected almost exclusively the imports of the industries not based on natural resources, which declined from 66% in 1965 to 54% in 1980. Within this subgroup, the biggest drop was registered in new labour-intensive industries with medium technological content, whose imports fell from 21% to 15%. The decline in the other subgroups of low and medium technological content was quite homogeneous and widespread (except in capital-intensive established industries), while the imports of new industries of high technological content increased their share to 15% of total imports.

Imports of industries based on natural resources, to the contrary, increased their share

by one percentage point, as a result of an increase of mining and petroleum derivative imports, and of a drop in imports of labour-intensive agricultural industries.

During those same years, imports of primary products almost doubled their share (from 15% to 26%), exclusively because of the trebling of the weight of fuels, a change that derived both from the intensive process of industrialization undertaken by Brazil and the increases in the price of oil.

The external debt crisis and the adverse trend in transfers of financial resources from the developed countries towards the countries of the region inaugurated the period we are now experiencing, which is characterized by adjustment processes.

These processes centred initially on the imports variable, the primary means of establishing immediate equilibrium in the current account. Consequently, imports fell off abruptly, especially in the years immediately after the crisis, as was clearly shown by the drop in imports of manufactures of more than 40% in current values (table 2).

This reduction modified the breakdown of Latin American imports in relation to imports of primary products, which came to represent in 1983 a third of total imports, as opposed to much smaller percentages during the preceding period.

Among imports of manufactures not based on natural resources, the largest decline took place among capital-intensive industries, both established and new. The breakdown of new labour-intensive industries changed significantly due to a persistently strong decline of the component with medium technological content, which dropped to 13% in 1983, and to the increase of the component with high technological content, which reached 11% that same year, a modification all the more notable as the former was more than double the latter during the 1970s.

Table 2
**LATIN AMERICA: SPECIALIZATION AND EXTERNAL SECTOR IMPORTS
 BY CATEGORY OF GOODS AND TECHNOLOGICAL INTENSITY**

		Millions of current dollars					Percentages				
		1965	1970	1975	1980	1983	1965	1970	1975	1980	1983
I	Manufactures	6 056	10 017	29 138	59 461	34 234	84.6	85.8	78.5	73.7	68.1
A	Industries based on natural resources	1 361	2 282	6 873	15 992	9 215	19.0	19.5	18.5	19.8	18.3
a1	Labour-intensive agricultural industries	385	516	1 312	3 329	2 032	5.4	4.4	3.5	4.1	4.0
a2	Capital-intensive agricultural industries	245	426	981	2 858	1 562	3.4	3.7	2.6	3.5	3.1
a3	Mining	608	1 172	3 927	8 219	4 527	8.5	10.0	10.6	10.2	9.0
a4	Petroleum derivatives	123	169	653	1 587	1 094	1.7	1.4	1.8	2.0	2.2
B	Industries not based on natural resources	4 694	7 734	22 266	43 469	25 020	65.6	66.3	60.0	53.9	49.8
b1	Established labour-intensive industries	349	437	929	3 001	1 473	4.9	3.7	2.5	3.7	2.9
b1.1	Low technological content	336	417	881	2 907	1 409	4.7	3.6	2.4	3.6	2.8
b1.2	Medium technological content	13	20	48	94	64	0.2	0.2	0.1	0.1	0.1
b2	Established capital-intensive industries	804	1 300	4 958	7 634	3 476	11.2	11.1	13.4	9.5	6.9
b2.1	Low technological content	637	979	3 964	5 296	1 942	8.9	8.4	10.7	6.6	3.9
b2.2	Medium technological content	167	321	994	2 338	1 534	2.3	2.7	2.7	2.9	3.1
b3	New labour-intensive industries	2 199	3 922	11 300	21 005	13 551	30.7	33.6	30.4	26.0	27.0
b3.1	Low technological content	138	258	625	1 546	1 363	1.9	2.2	1.7	1.9	2.7
b3.2	Medium technological content	1 507	2 491	7 670	11 939	6 745	21.1	21.3	20.7	14.8	13.4
b3.3	high technological content	554	1 173	3 005	7 521	5 443	7.7	10.0	8.1	9.3	10.8
b4	New capital-intensive industries	1 342	2 076	5 079	11 828	6 519	18.7	17.8	13.7	14.7	13.0
b4.1	Low technological content	104	157	402	818	717	1.5	1.3	1.1	1.0	1.4
b4.2	Medium technological content	949	1 358	3 475	8 223	4 213	13.3	11.6	9.4	10.2	8.4
b4.3	High technological content	289	561	1 203	2 788	1 589	4.0	4.8	3.2	3.5	3.2
II	Primary products	1 049	1 586	7 907	20 851	15 844	14.7	13.6	21.3	25.8	31.5
1	Agricultural	617	959	2 738	6 760	4 210	8.6	8.2	7.4	8.4	8.4
2	Non-combustible mineral	93	119	506	1 033	709	1.3	1.0	1.4	1.3	1.4
3	Fuels	339	509	4 663	13 059	10 925	4.7	4.4	12.6	16.2	21.7
III	Other	53	71	78	380	198	0.7	0.6	0.2	0.5	0.4
	Total	7 157	11 674	37 123	80 692	50 275	100	100	100	100	100

Source: Elaborated by the author on the basis of figures from the United Nations Statistical Information System (UNSI) and from the condensed data bank on foreign trade (COMTRADE).

Table 3

**LATIN AMERICA: SPECIALIZATION AND EXTERNAL SECTOR EXPORTS
BY CATEGORIES OF GOODS AND TECHNOLOGICAL INTENSITY**

	Millions of current dollars					Percentages				
	1965	1970	1975	1980	1983	1965	1970	1975	1980	1983
I Manufactures	3 107	5 294	12 450	34 911	37 482	34.0	42.3	44.7	44.2	46.2
A Industries based on natural resources	2 703	4 265	8 390	23 172	22 451	29.6	34.1	30.2	29.4	27.7
a1 Labour-intensive agricultural industries	753	1 260	2 358	7 374	7 105	8.2	10.1	8.5	9.3	8.8
a2 Capital-intensive agricultural industries	242	443	2 186	2 927	1 982	2.7	3.5	7.9	3.7	2.4
a3 Mining	898	1 585	1 163	5 812	4 997	9.8	12.7	4.2	7.4	6.2
a4 Petroleum derivatives	811	976	2 683	7 058	8 366	8.9	7.8	9.6	8.9	10.3
B Industries not based on natural resources	403	1 029	4 060	11 739	15 031	4.4	8.2	14.6	14.9	18.5
b1 Established labour-intensive industries	90	266	1 264	3 362	3 434	1.0	2.1	4.5	4.3	4.2
b1.1 Low technological content	89	266	1 257	3 349	3 424	1.0	2.1	4.5	4.2	4.2
b1.2 Medium technological content	1	1	7	13	10	-	-	-	-	-
b2 Established capital-intensive industries	121	225	521	1 873	3 558	1.3	1.8	1.9	2.4	4.4
b2.1 Low technological content	109	206	427	1 566	2 953	1.2	1.6	1.5	2.0	3.6
b2.2 Medium technological content	12	19	95	307	605	0.1	0.2	0.3	0.4	0.7
b3 New labour-intensive industries	95	353	1 360	3 780	5 430	1.0	2.8	4.9	4.8	6.7
b3.1 Low technological content	28	64	195	631	733	0.3	0.5	0.7	0.8	0.9
b3.2 Medium technological content	43	148	697	2 010	2 015	0.5	1.2	2.5	2.5	2.5
b3.3 High technological content	24	140	469	1 139	2 681	0.3	1.1	1.7	1.4	3.3
b4 New capital-intensive industries	97	185	915	2 724	2 610	1.1	1.5	3.3	3.5	3.2
b4.1 Low technological content	9	25	82	193	246	0.1	0.2	0.3	0.2	0.3
b4.2 Medium technological content	54	100	683	2 259	2 017	0.6	0.8	2.5	2.9	2.5
b4.3 High technological content	34	60	149	272	346	0.4	0.5	0.5	0.3	0.4
II Primary products	6 004	7 156	15 116	43 541	43 235	65.7	57.2	54.3	55.2	53.3
1 Agricultural	3 328	4 141	5 729	14 669	14 058	36.4	33.1	20.6	18.6	17.3
2 Non-combustible minerals	651	938	1 997	4 184	3 310	7.1	7.5	7.2	5.3	4.1
3 Fuels	2 024	2 078	7 390	24 688	25 867	22.2	16.6	26.6	31.3	31.9
III Other	23	58	257	476	53	0.3	0.5	0.9	0.6	0.1
Total	9 133	12 508	27 823	78 928	81 185	100	100	100	100	100

Source: Elaborated by the author on the basis of figures from the United Nations Statistical Information System (UNISIS) and from the condensed data bank on foreign trade (COMTRADE).

2. Exports

Table 3 shows the evolution of Latin American exports during the period 1965-1983. A particularly striking change in their breakdown is the increase of exports of manufactures, which rose from 34% in 1965 to 46% in 1983.

At the same time, exports of primary products dropped from 66% to 53%, due to a reduction by half of the share of agricultural exports (from 36.4% to 17.3%), the sharp decline of mineral exports (from 7% to 4%), and the strong increase of the export quota for fuels (from 22% to 32%), especially due to the influence of Mexico's exports.

The increase in exports of manufactures was not prompted by an important change in the contribution of industries based on natural resources. This remained practically stable at

around 28%. It came rather from industries not based on natural resources which were the special concern of development policies. Their contribution grew more than four times, rising from 4% to 18% during the period. Among these industries, the biggest increases were in exports of the established industries with low technological content, both capital-intensive and labour-intensive (these latter developed very rapidly during the 1970s and stabilized around 4% the following decade), and to exports in all the branches of new labour-intensive industries.

The percentage of exports of new capital-intensive industries also rose in the branches with lower technological content, although with some symptoms of stagnation during the 1980s. On the contrary, exports of industries with higher technological content remained stable throughout the period studied.

IV

Trade balances and sectoral contributions

1. Regional breakdown

Figure 2a shows that the growth rates of exports and imports for the two main sectors of the Latin American economy —primary products and manufactures— tended to be *deficit-based* during the period 1965-1980.

First, while exports of primary products (traditionally the backbone of the balance of payments in the region) declined by an average annual real rate of 1.3%, imports of those products grew at a high annual real rate of 5.7%.

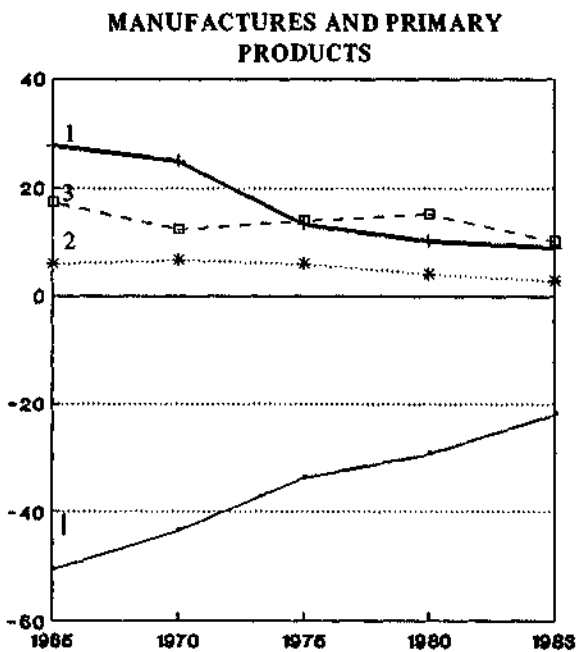
Second, manufactures, which begin with a deficit, grew much less than imports. This was the combined effect of an overwhelming real growth of exports of manufactures not based on natural resources, which reached an average annual rate of 14.7% as opposed to a growth of imports of 6.8%, and of a markedly *deficit-based* performance by manufactures based on natural resources, the imports of which grew at an average annual rate of 6%, while exports remained constant in real terms throughout those 15 years.

Figure 4 provides an overview of the contribution to the trade balance of the different sectors of the Latin American economies between 1965 and 1980. Some rough conclusions can be drawn from observing its four quadrants.

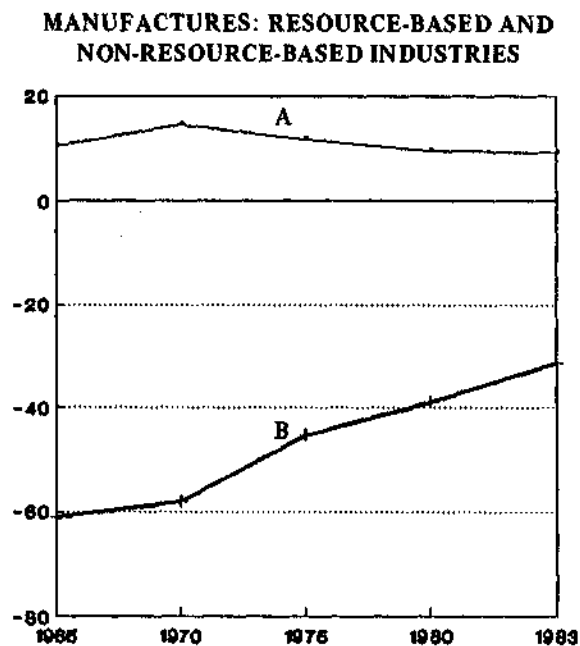
The first quadrant shows that the trade balance of the Latin American countries continued to be sustained by primary products, among which agricultural products (the most important at the beginning) and fuels came to have equal importance. Mineral products tended to decline slightly. If the contribution index is interpreted as the measure of the continent's external specialization, two clearly defined trends become immediately apparent: the noticeable decline in primary products and the evident and large increase in the contribution of manufactures.

The second quadrant reveals that throughout the period the negative balances are concentrated in the sector of manufactures not based on natural resources, to such a degree that they determine an extremely negative index of sectoral contribution to global balance.

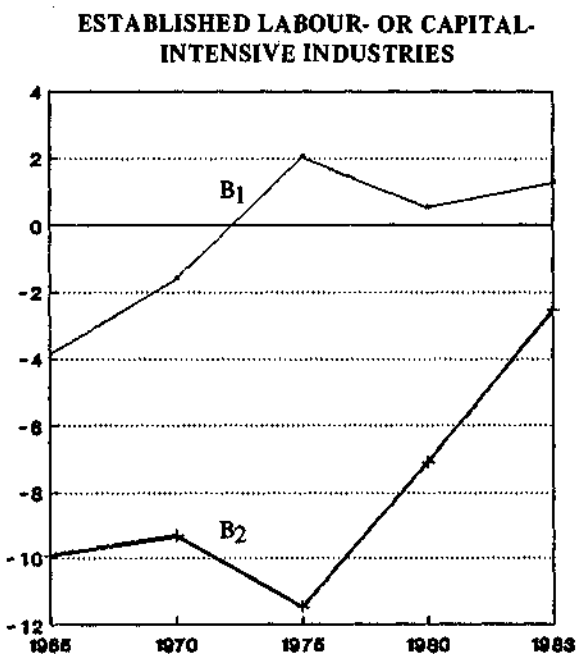
Figure 4
 LATIN AMERICA: SPECIALIZATION AND EXTERNAL SECTOR, 1965-1983



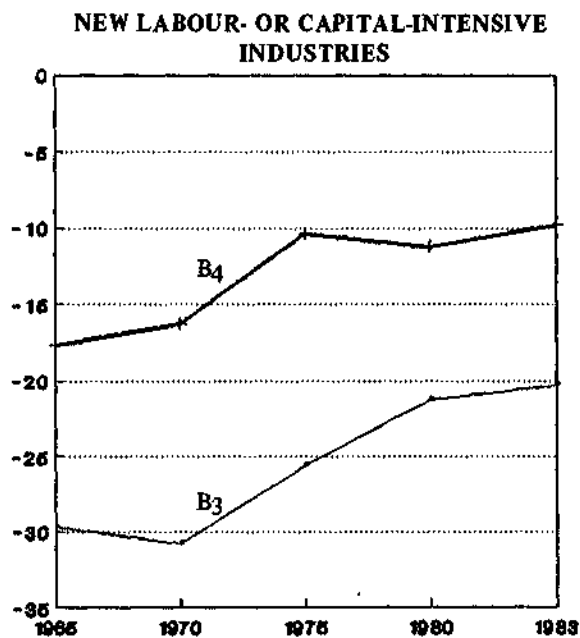
- | Manufactures
- 1 Primary products (agricultural)
- 2 Primary products (mineral)
- 3 Primary products (energy)



- A Manufactures based on natural resources
- B Manufactures not based on natural resources



- B1 Established labour-intensive manufactures
- B2 Established capital-intensive manufactures



- B3 New labour-intensive manufactures
- B4 New capital-intensive manufactures

Source: Prepared by the author, on the basis of data provided by the United Nations Statistical Information System (UNSIIS).

However, the magnitude of this index diminished noticeably with the years, explaining to a large extent the variation in the performance of the manufacturing sector as a whole.

Manufactures using natural resources intensively made a positive and stable contribution throughout the whole period.

The third quadrant, which concentrates on the contribution of established industries, reveals some important changes. On the one hand, there was a surge in labour-intensive industries, which became the one group with a positive balance and a positive contribution among manufactures not based on natural resources. On the other hand, in capital-intensive industries impressive growth marked the last two years, a fact which in 1983 was explained as a short-term result of the drop in imports following the crisis.

Nevertheless, the increase in the contribution of established industries did not come from the branches with higher technological content, whether labour- or capital-intensive.

New industries (fourth quadrant), despite their recovery during the 1970s, represented the weakest point of Latin America's external role and had most of the negative balances with the world market, especially in the labour-intensive branches with higher technological content (table 4).

2. Country breakdown

Figures 5 to 15¹⁴ show separately the specialization of each one of the 11 countries under consideration, in the 10 main technological categories proposed (three primary and seven manufacturing) during the period 1965-1987.

In the first quadrant of the figures, the contribution of the three primary sectors (agricultural, mining and energy) is compared with that of the manufacturing sectors taken together. The comparison brings out the disappointing technological and industrial role of trade in most Latin American countries, as

well as their persistent specialization as providers of primary products for the world economy. Only three countries (Brazil, Chile and Uruguay) achieved a positive contribution index in manufacturing during the period under study.

Brazil is the only country in which the manufacturing specialization became steadily positive and even far superior to that of the primary sectors during the 1980s, taking first place over agricultural products.

In Chile, in turn, manufactures achieved levels of positive contribution already during the 1970s (obviously due to the influence of the variations in the price of copper), which were maintained, although irregularly, up to the beginning of the following decade. At that point they were surpassed by agricultural products, which thus reached the top of the ascending curve they had followed from the beginning of the period and which led them to attain levels of contribution close to those of mining.

In the case of Uruguay, there is a clear rising trend of manufacturing specialization, which, however, reaches levels of positive contribution only in the years immediately after the crisis. Agricultural specialization, in turn, though showing signs of decline, continued to be the most stable structural element in the external trade of that country.

In two other countries (Argentina and Colombia), the contribution of the manufacturing sector, although constantly negative, tended to improve rapidly during the 1970s, but displayed clear symptoms of stagnation during the 1980s.

In some countries (Mexico up to 1985, Paraguay and Peru), the contribution of manufacturing grew during the 1970s only to fall during the next decade. In others it fell constantly (Bolivia), remained steadily negative (Ecuador), or barely improved (Venezuela) during the 1980s.

In the second quadrant of the corresponding figures, the contribution trend of industries based on natural resources is compared with that of industries not based on them.

First, if specialization in industries based on natural resources is examined, three main groups of countries can be distinguished:

¹⁴See the figures at the end of this article.

Table 4

**LATIN AMERICA: TRADE BALANCE AND CONTRIBUTION TO THE BALANCE
BY CATEGORIES OF GOODS AND TECHNOLOGICAL INTENSITY**

		Trade balance					Contribution to the balance				
		Millions of current dollars					Percentages				
		1965	1970	1975	1980	1983	1965	1970	1975	1980	1983
I	Manufactures	-3 006	-5 187	-17 465	-27 201	823	-50.6	-43.5	-33.7	-29.5	-21.9
A	Industries based on natural resources	1 213	1 845	1 358	6 262	12 597	10.6	14.5	11.6	9.5	9.3
a1	Labour-intensive agricultural industries	288	711	1 000	3 929	4 962	2.9	5.7	4.9	5.2	4.7
a2	Capital-intensive agricultural industries	-23	-22	1 184	10	415	-0.8	-0.1	5.2	0.2	-0.7
a3	Mining	257	354	-2 880	-2 810	247	1.3	2.6	-6.4	-2.8	-2.8
a4	Petroleum derivatives	691	801	2 053	5 134	6 974	7.2	6.4	7.9	7.0	8.1
B	Industries not based on natural resources	-4 218	-7 031	-18 823	-33 463	-11 774	-61.2	-58.0	-45.4	-39.0	-31.3
b1	Established labour-intensive industries	-243	-180	290	161	1 753	-3.9	-1.6	2.0	0.5	1.3
b1.1	Low technological content	-235	-165	323	240	1 807	-3.7	-1.4	2.1	0.6	1.4
b1.2	Medium technological content	-8	-15	-33	-79	-54	-0.2	-0.2	-0.1	-0.1	-0.1
b2	Established capital-intensive industries	-710	-1 163	-4 406	-6 127	-402	-9.9	-9.3	-11.5	-7.1	-2.5
b2.1	Low technological content	-561	-856	-3 512	-4 028	684	-7.7	-6.7	-9.1	-4.6	-0.2
b2.2	Medium technological content	-149	-307	-894	-2 099	-1 085	-2.2	-2.6	-2.3	-2.5	-2.3
b3	New labour-intensive industries	-2 114	-3 727	-10 231	-17 976	-8 899	-29.7	-30.8	-25.6	-21.2	-20.3
b3.1	Low technological content	-125	-210	-417	-1 016	-633	-1.6	-1.7	-1.0	-1.1	-1.8
b3.2	Medium technological content	-1 461	-2 449	-7 166	-10 351	-5 204	-20.6	-20.2	-18.2	-12.2	-10.9
b3.3	High technological content	-528	-1 068	-2 594	-6 609	-3 063	-7.5	-8.9	-6.4	-7.9	-7.5
b4	New capital-intensive industries	-1 152	-1 962	-4 476	-9 521	-4 226	-17.7	-16.3	-10.4	-11.2	-9.8
b4.1	Low technological content	-92	-137	-362	-684	-542	-1.4	-1.1	-0.8	-0.8	-1.1
b4.2	Medium technological content	-814	-1 314	-3 043	-6 142	-2 349	-12.7	-10.8	-6.9	-7.3	-5.9
b4.3	High technological content	-246	-511	-1 071	-2 696	-1 335	-3.7	-4.3	-2.7	-3.1	-2.7
II	Primary products	4 908	5 461	6 684	20 552	25 478	51.1	43.6	33.0	29.3	21.7
1	Agricultural	2 735	3 203	3 014	7 844	9 778	27.8	24.9	13.2	10.2	8.9
2	Non-combustible minerals	557	813	1 478	3 031	2 581	5.8	6.5	5.8	4.0	2.7
3	Fuels	1 616	1 445	2 192	9 676	13 119	17.4	12.3	14.0	15.1	10.1
III	Other	-43	-17	-29	-821	-863	-0.5	-0.1	0.7	0.1	-0.3
	Total	1 860	257	-10 810	-7 471	25 437	-	-	-	-	-

Source: Elaborated by the author on the basis of figures from the United Nations Statistical Information System (UNSD) and from the condensed data bank on foreign trade (COMTRADE).

Note: Contribution = $100 \cdot \left\{ \frac{(xi-mi)/[(X+M)/2]}{(X-M)/[(X+M)/2]} \cdot \frac{[(xi+mi)/(X+M)]}{[X/(X+M)]} \cdot [1 - [(X-M)/(X+M)]] \right\}$
 X, M = Export, Import totals, xi, mi = Export, Import of sector "i".

—Those that present stable degrees or positive growth of specialization (Argentina, Bolivia,¹⁵ Brazil, Chile, Peru, Uruguay and Venezuela);

—Those that did not achieve positive contributions, despite improving their relative performance (Colombia and Ecuador);

—Those that have shown a trend opposite to that of the region as a whole, i.e., have gone from significantly positive indicators to others markedly negative (Mexico and Paraguay).

Second, for manufactures not based on natural resources, Brazil was the only Latin American country that successfully specialized internationally in this field during the 1980s.

All the other countries —with the exception of Bolivia, which worsened its relative performance, and Ecuador, which maintained it practically stable— reduced their almost absolute lack of specialization in this field, especially Argentina. This progress took place, however, within the framework of a severe stagnation during the 1980s, which particularly affected Chile, Paraguay, Peru and Uruguay.

The third quadrant compares the performance of the contributions of established labour-intensive manufacturing industries with that of the corresponding capital-intensive industries.

As mentioned above, the trend shown in figure 4, covering the whole region, conceals substantial differences between the countries studied. In fact, toward the end of the period, the positive contributions were concentrated, in descending order of size, in Uruguay, Brazil, Argentina,¹⁶ Peru and Colombia. Except for Peru, which joined this group later, the specialization process had in this case its most dynamic period during the 1960s and 1970s, clearly stagnating in the 1980s.

All the other countries, on the contrary, present negative indicators. Some do so, however, within a trend towards growth, such as Bolivia, Ecuador, Paraguay and Venezuela. Mexico, in turn, moves from a positive to a slightly negative contribution, especially due to the oil boom, while in Chile the indicators that

improve up to the 1970s begin to decline until they become negative, owing to an indiscriminate opening of its market together with an overvalued exchange rate.

Also, in the case of established capital-intensive industries, most of the results attained by the region as a whole may be attributed to the performance of Brazil. Brazil showed an impressive dynamism between the end of the 1970s and the beginning of the 1980s, but this appears to have quickly stagnated. However, Chile, owing to exports of mineral surpluses, had also reached, even before Brazil, a positive contribution in these branches, which was even able to recover after the sharp drop between 1975 and 1980.

Argentina, although its contribution was negative, showed a rising trend, with results very similar to those of the region as a whole. Ecuador and Bolivia —a country that followed a trend similar to that of Chile, but in the opposite direction— saw their specialization in these sectors plummet, while Colombia, Peru, Paraguay and Uruguay were unable to maintain the trend toward growth they had shown up to the debt crisis. Finally, Mexico, even in the midst of large fluctuations, was able to maintain and even slightly improve its initial level.

The fourth quadrant of figures 5 to 15 shows what has already been pointed out in the analysis of figure 4, which represents the whole region: the new industries, both labour- and capital-intensive, are the area of least specialization in the Latin American economies. Moreover, both on the regional and national level, the contribution indicators of capital-intensive industries are much less negative than those of labour-intensive industries. If we remember also the relative structural scarcity of skilled labour in relation to unskilled labour, so characteristic of Latin America, we may detect in the fourth quadrant of the figures a trend that is decisive for the style of development and its effect on the region's international role. We are referring specifically to the desire to allocate scarce resources precisely to the sectors that use them intensively. They are highly inefficient in the international sphere and are dominated by highly protectionist policies with strong transnational participation. This trend, although it helped to reduce the imports of these

¹⁵Bolivia always presents a positive indicator but, however, with a marked relative decline.

¹⁶With a significant turnaround in 1987.

sectors (a reduction which explains that the indicator for them was better than that for labour-intensive industries), displayed no capacity to generate a sustainable movement in terms of domestic equilibria (unemployment) nor in terms of external equilibrium (as seen from the greater dynamism of labour-intensive sectors).

Brazil represents in this respect an exception only insofar as it was able to cross—in 1980—the threshold of positive contribution in capital-intensive industries. This result was achieved, however, at the cost of serious fiscal

pressures, both direct—related mostly to the promotion of industry and to export subsidies—and indirect. It displayed moreover an early stagnation, especially as compared with the dynamism shown by those same sectors in world trade during the 1980s. These considerations are applicable to all the countries of the region which, even in a framework of emphatically negative contributions, have shown an initially positive trend in the performance of these sectors, as is the case of Argentina, Bolivia, Colombia, Chile, Mexico, Peru, Uruguay and Venezuela.

V

Evaluation and conclusions

This article concentrates on the period 1965-1987, which includes very diverse trends in both Latin American and world economic history, and ends on the threshold of a period which seems to presage important political and economic changes. Consequently, the region's trade performance during this time reflects to some extent the tremendous instability and enormous variations—of a magnitude perhaps still unknown—to which both economic agents and political planners have been submitted.

Without a doubt, the most dynamic element of this period was technological and organizational change. There is also no doubt, from the viewpoint of economic theory, that the speed with which these changes were disseminated disrupted the explanatory capacity of those theoretical models whose fundamental concepts were still based on the perfectly competitive market, homogeneity of factors, perfect and free access to technology and, in the final analysis on the incorporation of technology as an exogenous parameter.¹⁷

Despite industrial progress, the main obstacle to growth in Latin America during the

period under consideration was the external constraint, which is increasingly identified with the technology gap (seen in trade flows) that separates this continent from the developed countries, and to a lesser extent, from some newly industrialized countries (NICs).

It would be superficial to try to explain external performance, whose character seems to be more structural than short term, with reference exclusively to exogenous variables. This is so because in the medium term an open economic system¹⁸ should have the internal capacity to adapt to external changes, a capacity which supposedly would have to operate that much more quickly to the extent that the degree of openness was greater. Now the degree of openness is measured correctly not so much by the relative importance of trade in relation to production (which in most of the Latin American countries is not much), as by the decisive character of imports for the normal performance of all the activities of an economy, which is precisely what happens in the case of the Latin American economies.

Indeed, the decline in imports due to the debt crisis, particularly of capital goods, increased and prolonged indefinitely the imbalances generated

¹⁷ See Nathan Rosenberg, *Inside the Black Box: Technology and Economics*, Cambridge, Harvard University Press, 1982; Patricio Mujica and Jorge Marshall, *op. cit.*, and Martin Fransman (1985), *op. cit.*

¹⁸ This very characterization—openness—already represents an implicit acceptance of making the exogenous endogenous.

by the financial variables. This laid bare the vulnerability of the Latin American economic systems and the tremendous difficulties they have in trying to catch up with the vigorous technological progress of the last two decades in the world economy. The countries of the region, which had begun to consolidate their own industrial position within the world economy, saw their original objectives of developing their production become increasingly unattainable, since they were incapable of keeping in step with those changes.

The main effects of the extraordinary surge in the conception and application of technological and organizational innovations can be summarized very roughly on two principal levels. First, in the context of the *vertical* perspective of development, these innovations have broken down Rostow's sequential strategy of the stages of development. In terms of the hierarchy among countries, the rise of the NICs took place in a context of incorporation that extended the tendency of the terms of trade to deteriorate to certain products and industrial sectors and raised protectionist barriers in the developed countries.

On the other level, in a *horizontal* perspective, the more important one in our judgement, the magnitude and impact of the new technological development produced a profound qualitative modification of both the economic systems and their rules of the game as well as the behaviour that was predominant in those systems. Given their characteristics, the dissemination of the new technologies left nothing intact. They not only created new products and sectors, but also had widespread effects on all economic sectors (from the primary sector to services), on the sphere of production and its organization (the move from the enterprise system to a network system), on distribution (management of commercial networks, new warehousing techniques, etc.), and on reproduction. And above all, with regard to the education and training of human resources, labour was no longer considered as a cost component and came to be considered as an asset both from the microeconomic and macroeconomic viewpoint.¹⁹

There is a growing consensus that the main cause of Latin America's incapacity to handle

these changes is the fact that the region was for the last 40 years the most fertile ground for experimenting with import-substitution policies,²⁰ and also, that after a long and successful phase of growth, the costs of these policies began to outweigh their benefits.

In this regard, the most criticized aspects of import-substitution policies are the systems of multiple exchange rates; the levels and dispersion of the tariff and non-tariff barriers (which in fact gave most of the industrial sectors a good deal of protection during almost indefinite periods, while the primary sectors chronically faced negative effective rates of protection); the *systems* of exemptions constructed in such a way that in fact they institutionalized different treatment for distinct economic agents, thus lending themselves to strong manipulation, and finally, the incapacity of the public sectors to administer such complex systems.²¹

To sum up, these policies²² generated tremendous rents,²³ pressure groups and enormous possibilities for speculation. Consequently the economies suffered a premature sclerosis, since the development process was unable to stimulate technological

¹⁹For the concept of the network-enterprise, see Cristiano Antonelli, *L'impresa-rete*, CESPE Papers, No. 7, Padua, Italy, 1987, and by the same author, *Cambiamento tecnologico e teoria dell'impresa*, Turin, 1982. For a summary of the presentation and a brilliant historical analysis of the evolution of production systems (market-system, enterprise-system, network-system) and of the concept of economies of scale, see B. Di Bernardo, *Economie di scala, economie di scopo, economie di varietà. Il valore economico della complessità*, Economia e Politica Industriale, No. 61, Milan, 1989. In this regard, we should mention the growing criticism of the conceptual division between production and organization which the penetration of the new information technologies is introducing into present-day industry.

²⁰On the origin of this process, see Andrés Bianchi and Toboshi Nohara, *A Comparative Study on Economic Development Between Asia and Latin America*, Tokyo, Institute of Developing Economies, 1988.

²¹See ECLAC, *Estado y desarrollo: la necesaria reconversión del sector público de América Latina y el Caribe* (LC/R.824), Santiago, Chile, 1989.

²²For a lucid and penetrating exposition that also reconstitutes the basic stages of structuralist thinking, see Osvaldo Rosales, "An assessment of the structuralist paradigm for Latin American development and the prospects for its renovation", *CEPAL Review*, No. 34 (LC/G.1521-P), Santiago, Chile, April 1988.

²³See Anne Krueger, "The Political Economy of Rent-Seeking Society", *American Economic Review*, vol. 64, No. 3, June 1974.

innovation and dissemination among these productive systems. They were characterized by a high degree of concentration and accustomed to operating according to a static oligopolistic logic of defending acquired positions, which were moreover passed on almost by inheritance.²⁴

In time, the joint action of these elements created an entrenched economic system, i.e., a system that is defined both by barriers and by the immense complementary areas which remain outside of it. It is following the wrong path in the external pursuit of the fetish of development.²⁵

²⁴From a viewpoint of North-South international economic relations, this is problematic for a neo-Schumpeterian view of large oligopolistic enterprises as the main sources of research and innovation. Because in fact, even though transnational corporations have been the main source of modernization in developing countries, there is a clear asymmetry in the rate of dissemination of new technologies with the different subsidiaries of the same enterprises. In the context of the stagnation of many Latin American countries, this asymmetry has been accentuated, creating thereby a barrier to international markets, owing to the obsolescence of installed productive apparatuses. Also in some cases, the transnationals' capacity to appropriate more skilled human resources and innovations resulting from autonomous research has made it possible for them to reap the economic advantages, thus nullifying local efforts (and investments).

For the mechanisms of appropriating the economic advantages of technological innovations, see David J. Teece, "Capturing Value from Technological Innovation: Integration, Strategic Partnering, and Licensing Decisions", Berkeley, University of California, March 1986, *mimeo*. Teece shows how in introducing a determinate technological innovation different relations are established, relations which can be classified in three different categories: assets that are *cospecialized*, *specialized* and *generic*. The more or less decisive character of such assets depends on the phase of the *life cycle* in which the innovation is found. Since rents are generated especially in the second phase (*paradigmatic*), the availability of specialized assets (which have a relation of unilateral dependence with respect to the innovation), will determine to a large extent the possibility of appropriating the economic advantages of an innovation—in such a way that an imitator who disposes of the necessary complementary specialized assets can easily appropriate the rents, if the innovator disposes only of the cospecialized assets (which depend bilaterally on the innovation) and cannot then compete in that phase of development. In this context, the most important consequence of Teece's analysis is that both for promoting technological innovations and for attracting to a country a flow of such innovations, it is not necessary to concentrate efforts on only one research and development activity (which generates cospecialized assets), but especially on the complementary assets and their infrastructures, given that the presence of protective barriers in a country which offers no other complementary asset than access to its market, will in no way promote the innovation, but rather will only generate in the domestic market rents higher than those that would be generated in the world market (moreover prolonging them unnecessarily in time).

²⁵See Osvaldo Sunkel, "Capitalismo transnacional y desintegración nacional en América Latina", *El Trimestre Económico*, vol. 38, No. 150, April-June 1971.

This system was also one of the main obstacles to the establishment in Latin America of multilateral free-trade agreements. These have never gone beyond the experimental phase or bilateral negotiations by product. In the same way, the attempt to modify Latin America's international role by granting subsidies to production and exports²⁶ of non-traditional manufactured products, ended by increasing the burden of a public sector that already tended to incur deficits. It remained distorted after having made this effort in the midst of a blockade represented by high protectionist barriers and conspiratorial agreements to divide the rents generated by sales in domestic markets.

Within the perspective of our analysis, it is particularly important to emphasize that, owing to these rules of the game, technological development was incorporated only as an absolutely secondary variable in the strategies of the leaders of the Latin American economies. Thus, in several cases, the progress made in sectors of higher technological intensity turned out to be simply decorative, and not the result of technological research and development.

The previous model was seriously questioned for the first time in the 1970s, and since that time the notable uniformity that had characterized Latin America's trade and exchange policies began to break down. Several countries then attempted to apply *the monetary focus of the balance of payments*, which could well be compared to an 180 degree turn in relation to import substitution. One of the key themes of this focus was the emphasis it placed

²⁶For a description of the instruments of these policies in different countries, see ECLAC, *Políticas de promoción de exportaciones en algunos países de América Latina* (LC/G.1370), Estudios e Informes de la CEPAL series, No. 55, Santiago, Chile, 1985.

The models of export-led growth were developed especially in the 1960s. Among the more important representatives of this view of development are Beckerman, Caves, Cornwall and Kaldor. A very interesting model in this regard is that of Anthony Thirwall and R.J. Dixon, *A Model of Export-Led Growth with a Balance of Payments Constraint*, 1979. In its more simplified version, this theory holds that the growth rate of the product is equal to the ratio between the growth rate of exports and the income elasticity of the demand for imports. This analysis, within the framework of export-led growth, has the advantage of also incorporating the peripheral characterization of an economy—a kind of exogenous linkage—whose basic feature is expressed in the divergence between the high income elasticity of its demand for imports and the low elasticity of its demand for exports.

on the supposed direct relationship between export performance and economic growth and on the dependence of the former on government policies.²⁷ These techniques were initially applied by an extreme liberalization of trade policy along with a highly controlled exchange policy, which resulted in external crises and serious industrial deterioration, mostly because of freezing the exchange rate with a consequent overvaluation. Such errors obliged the governments to abandon this attempt to liberalize,²⁸ and to reintroduce mechanisms of controlled fluctuations of the exchange rate.

Finally, with the tremendous debt crisis, most Latin American countries were forced by both external and domestic pressures to abandon inward-looking development strategies. Indeed, once the *brief* parenthesis of artificially favourable external variables created by the rapid and excessive process of indebtedness²⁹ was over and the bill was presented, the Latin American countries faced the paradoxical need to become net exporters of financial resources.

The consequent pressure that this need exercised on the result of the trade balance was added to the difficulties the countries had in increasing and diversifying their exports to the developed countries, owing both to the trade barriers they met there³⁰ and the clear technological gap between their productive apparatuses and their managerial capacities. All this affected the validity of economic-policy

plans and their influence on the external sector.³¹

On the other hand, technological progress in the industrialized countries led to an unprecedented rate of depreciation of the physical and human capital of the countries that did not participate in this process. Consequently, they faced a severe loss of competitiveness, aggravated by their incapacity to carry out the structural modifications of an institutional character that would have enabled them to develop sources from which they could create and disseminate new technologies.³²

The preference given by the Latin American countries to a closed domestic market as the driving force of their economic development and the consequent mercantilistic logic of their international role had been consolidated as strategic elements in the decisions of their economic leaders, and particularly those of transnational corporations. They were thus excluded from the process of internationalizing integrated production, which boosted the development of the world economy throughout almost the whole post-war period.³³

²⁷See for example, Bela Balassa, "Exports and economic growth: further evidence", *Journal of Development Economics*, vol. 5, No. 2, June 1978. Anne Krueger, "Trade Policies as an Input to Development", *American Economic Review*, vol. 70, No. 2, May 1980.

²⁸Except for Chile.

²⁹In addition, some countries benefitted from a considerable recovery in their raw material export process, leading to a substantial improvement in their external terms of trade.

³⁰See Sam Laird and Julio Noguez, *Trade Policies and the Debt Crisis*, Washington, D.C., World Bank, September 1988; and Sam Laird and Alexander Yeats, *Trends in Nontariff Barriers of Developed Countries 1966-1986*, Washington, D.C., World Bank, December 1988. Both studies show how openness and the export efforts of developing countries before and after the debt crisis were accompanied by more protection of the developed countries' markets. The studies make clear, in particular, that the non-tariff barriers of those countries have almost doubled in the last two decades, thus making it difficult for exports to those countries to grow, especially agricultural and labour-intensive products (textiles, footwear).

³¹See ECLAC, *Economic Survey of Latin America and the Caribbean, 1988* (LC/G.1577-P), Santiago, Chile, 1989, particularly section X, which analyses the relationship between the transfer of resources, the absorption of private debt by part of the public sector, devaluations, inflation and fiscal deficit.

³²The experience of both public and private managers of operating within frameworks of economic policy imposed by dictatorial régimes made institutional asymmetries worse, particularly those corresponding to the labour market and organizational forms. By promoting authoritarian mental structures and limiting the freedom of most economic actors, this experience contributed to the frustration of development dynamics and the disposition to innovate and incorporate productive and organizational technologies that could have existed in those societies.

³³In saying this, we by no means wish to take away importance from the role —which is moreover fundamental— of the domestic market as an initial motor of development. We want to highlight the insufficiency and deficiency of a logical scheme that begins with a correct consideration but arrives at conceptions of autarkic policies, transforming a necessary condition into a sufficient condition. This limitation was also presented in liberal orthodoxy concerning export-led growth, with respect to the evaluation of free trade as a necessary and sufficient condition of development, as was clear, for example, in the first comparisons between the countries of Southeast Asia and Latin America. See, for example, Anne Krueger, "Export-led industrial growth reconsidered", *Trade and Growth of the Advanced Developing Countries in the Pacific Basin: Papers and Proceedings of the Eleventh Pacific Trade and Development Conference*, W. Hong and C.B. Krause, Korea Development Institute, 1981.

From these premises and the recession of the domestic markets (the main attraction for foreign investors), the Latin American countries were forced to compete with other developing countries for their own place in the world economy.

After the *shortcuts* taken as a result of the compression of real wages and the severe fiscal crises of the States, other possible roads to integrated development still have to be conceived, this time really viable, since in terms of dynamism, the technological revolution has also meant opening up new ways of participating in the world economy, increasing possibilities through greater market diversification and segmentation. Such possibilities are much more extensive than can be imagined on the basis of the sole aspiration —legitimate but limited— of returning to the primary sectors their previous importance by eliminating the distortions that had so powerfully blocked their development. This is true because a strategy of international participation based solely on the intensive exploitation of static comparative advantages (the vast majority of which are dependent on absolutely natural advantages and on a strong compression of real wages) can be viable in the short term —however, at what social and environmental cost?— but does eliminate the need to generate dynamic comparative advantages, the only ones which, given the current state of the world economy, can support a process of sustained and stable growth over time.³⁴

At the beginning of the 1990s, exchange and trade policies are once again among the top priorities of all the countries in Latin America. Similarly, most of the countries of the area have clearly modified —or are in the process of modifying— the basic principles that guide their policies, moving from protection to free trade.³⁵

As they strive to attain their two major objectives, democracy and modernization, which

symbolize their aspirations towards both social justice and sustained and stable economic growth, the Latin American countries uniformly accept the need to open up their economic systems. In the face of this unanimity, which may lead some countries to resolve all their uncertainty by adopting a new fatalistic dogmatism,³⁶ it is important to observe closely and remember what has happened to their trade over the last 20 years from the viewpoint of their external technological relations. Thus, we can understand that in reality there is no single answer (as is evident if, for example, we compare the performance of Brazil with that of Chile), and that each country has to find its own technological path and not follow the latest fashion.

In seeking to redefine these external relations, governments must have the real will and capacity to modify at least one of the more notable characteristics of their trade and exchange policies. This is their excessive complexity. Instead of achieving a superior rationality, this complexity is simply chaotic. This state of affairs, rather than the logical deficiencies of the import-substitution model, constitutes at this particular time the best reason for undertaking the urgent task of drastically revising the economic policies of the Latin American countries. Their policies can only be modified by respecting the basic principle of having economic-policy instruments that are manageable, known, and as transparent as possible. These features coincide moreover with the desire for democratization on the continent, since with an unintelligible system, the only ones who win are those who have a particular kind of knowledge that allows them to increase their rate of profit by damaging the efficiency of the economic system in general.

Nevertheless, even though clarity is needed to eliminate the recognized defects of previous policies, it is also necessary not to confuse simplicity with a vacuum, and to let this vacuum take the place of previous policies, thus leaving the function of guiding and planning the use of social resources to the State. Only by modifying, but also by capitalizing on existing resources and

³⁴See Fernando Fajnzylber, "International competitiveness: agreed goal, hard task", *CEPAL Review*, No. 36 (LC/G.1537-P), Santiago, Chile, 1988, and Ricardo Ffrench-Davis, *Generación de ventajas comparativas y dinamismo industrial* (LC/R.559), Santiago, Chile, 1988.

³⁵We should mention in this regard the parallel process of deregulating foreign investment and the growing use of debt-conversion mechanisms.

³⁶Read *laissez-faire*.

investing more in them, can the dangerous (and socially non-viable) temptation be avoided of beginning from zero.

In this regard, the developing countries can adopt two main technological strategies³⁷ for trying to close the gap that separates them from the developed countries, with respect not only to growth but also to well-being. The first aim is to try to reach the frontiers of technological development; the second is to use available technological advances without trying to generate them, except over the long term.³⁸

Even though the dissemination of innovations is indispensable for achieving any of these objectives, we must not only take full advantage of the national differences that facilitate a better international role, but we must also reduce the most characteristic asymmetries of the peripheral economic systems. These include particularly the internal duplications and the institutional framework of the labour and

goods markets in which there is direct competition with developed countries. Finally, we must ensure that productive structures (and not only demand) converge towards a better income elasticity.

Likewise, it will be of fundamental importance to condition the renegotiation of the external debt on a greater openness of the developed countries' markets.

Given the current situation in Latin America, it would seem advisable to adopt the second strategy. This would take advantage of existing innovations, accompanied by institutional measures —general and sectoral— and investment measures which would facilitate and increase the dissemination and adaptation of innovations.³⁹

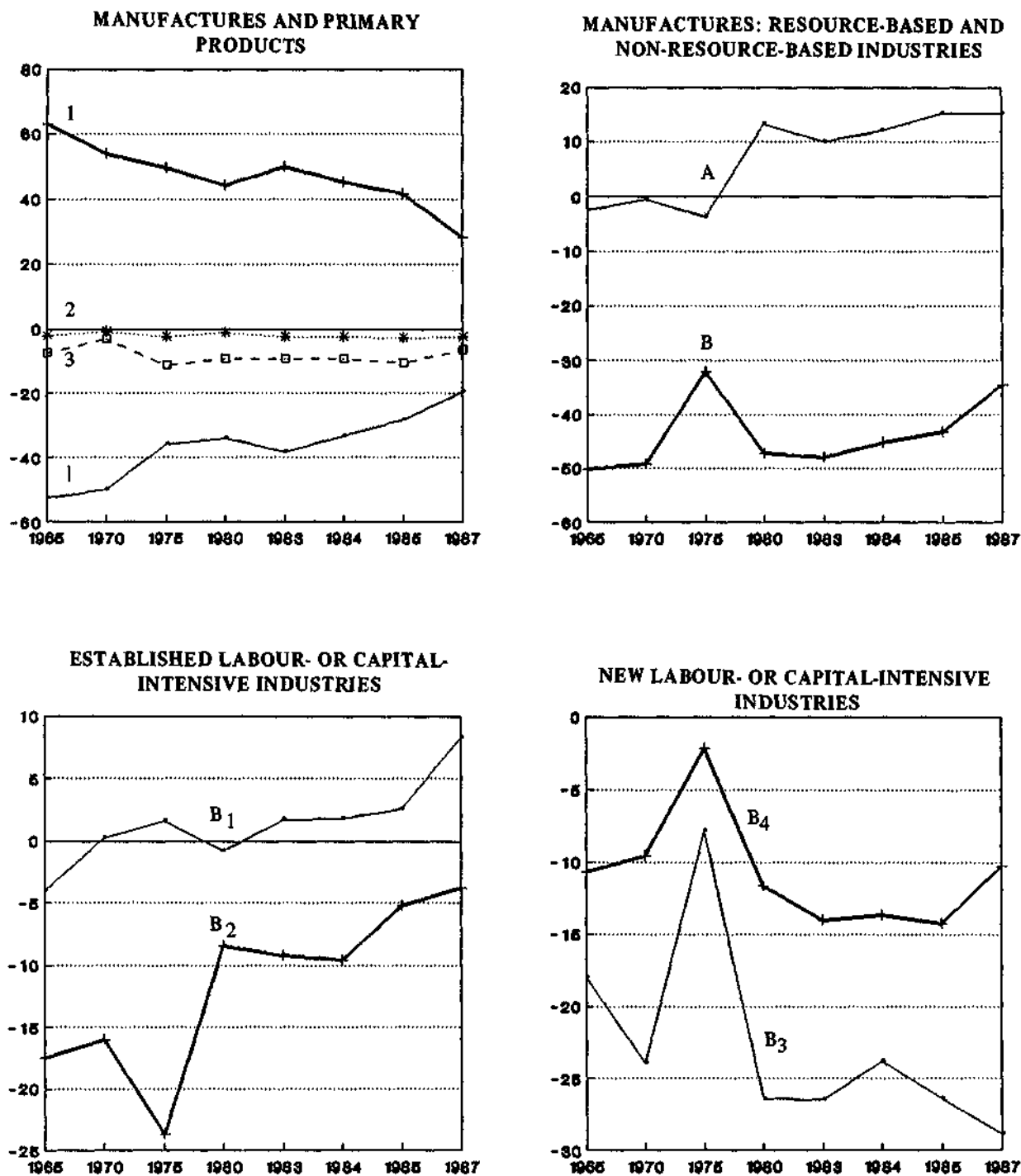
Even though the Latin American economic crisis will surely continue to be exceptional, both for its magnitude and duration, it is no less certain that Latin America has been able to elaborate over several decades of development its own learning curve, the fruit of a long process of accumulating knowledge. We can advance much more easily from this knowledge than from the depths of false dogmas.

³⁷ See J.S. Metcalfe and Luc Soete, "Notes on the Evolution of Technology and International Competition", Manchester University, *mimeo*, 1983, and David Teece (editor), *The Competitive Challenge. Strategies for Industrial Innovation and Renewal*, Cambridge, 1987, and the interesting model of M. Cimoli, G. Dosi and L. Soete, "Innovation diffusion, institutional differences and patterns of trade: a North-South model", *mimeo*, a document presented at the Conference on Innovation Diffusion, Venice, 17-22 March 1986.

³⁸ See also Dieter Ernst and David O'Connor, *Technology and Global Competition. The Challenge for Newly Industrialising Economies*, Paris, OECD, 1989.

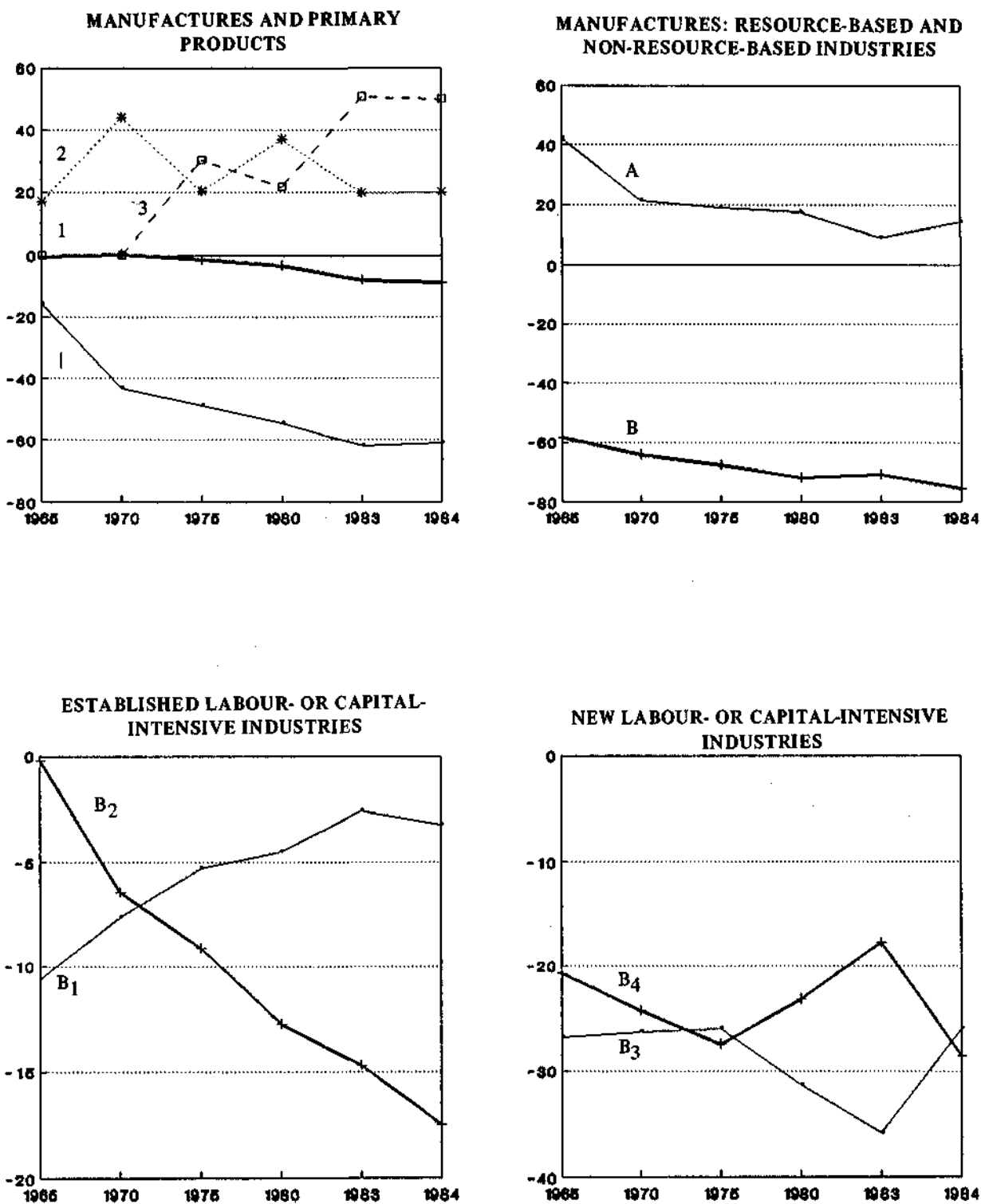
³⁹ For a more detailed discussion of the policies, see ECLAC, *Changing Production Patterns with Social Equity. The Prime Task of Latin American and Caribbean Development in the 1990s* (LC/G.1601-P), Santiago, Chile, 1990, United Nations publication, sales No. E.90.II.G.6.

Figure 5
ARGENTINA: SPECIALIZATION AND EXTERNAL SECTOR, 1965-1987



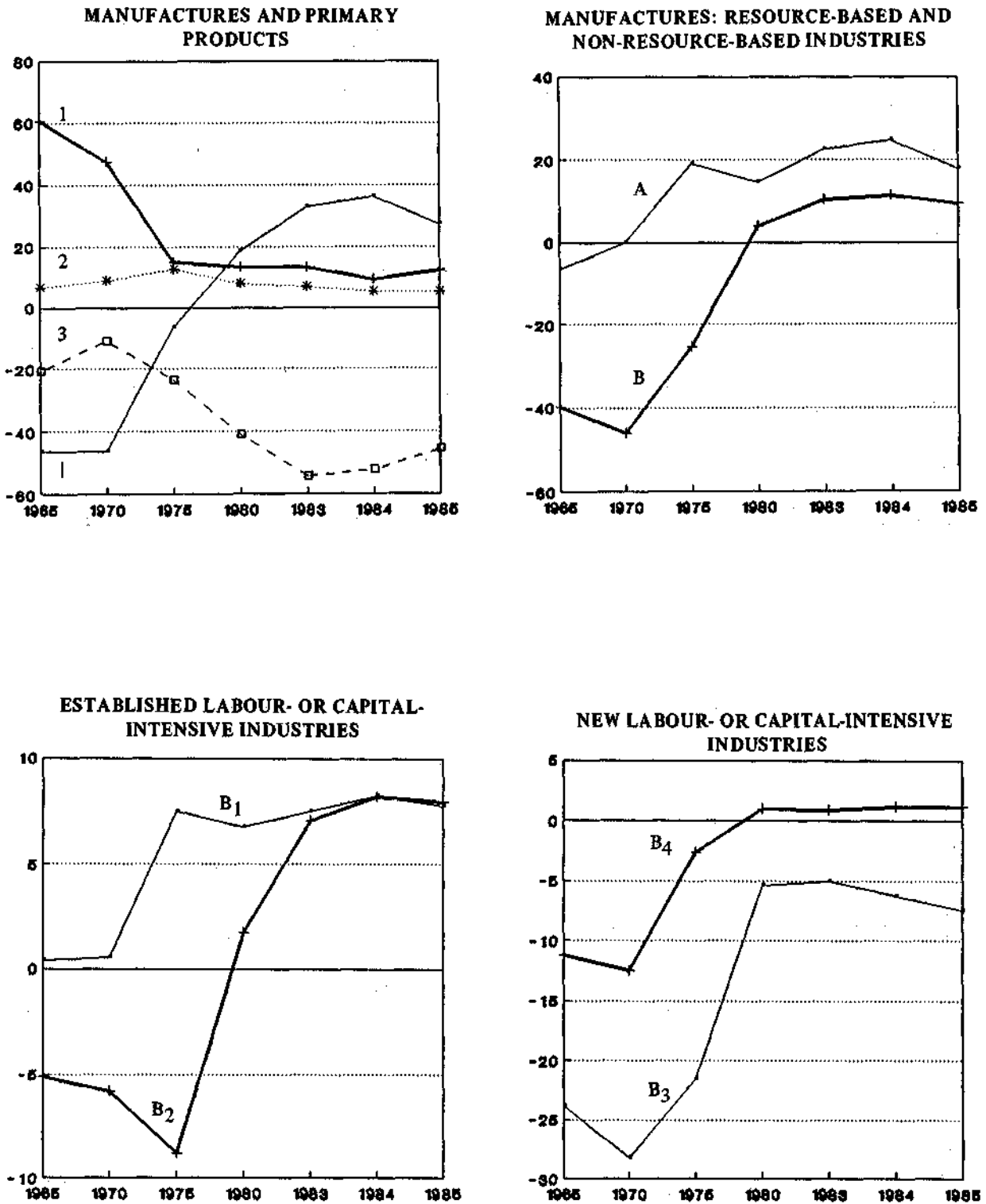
Source: Prepared by the author, on the basis of data provided by the United Nations Statistical Information System (UNSI).

Figure 6
BOLIVIA: SPECIALIZATION AND EXTERNAL SECTOR, 1965-1984



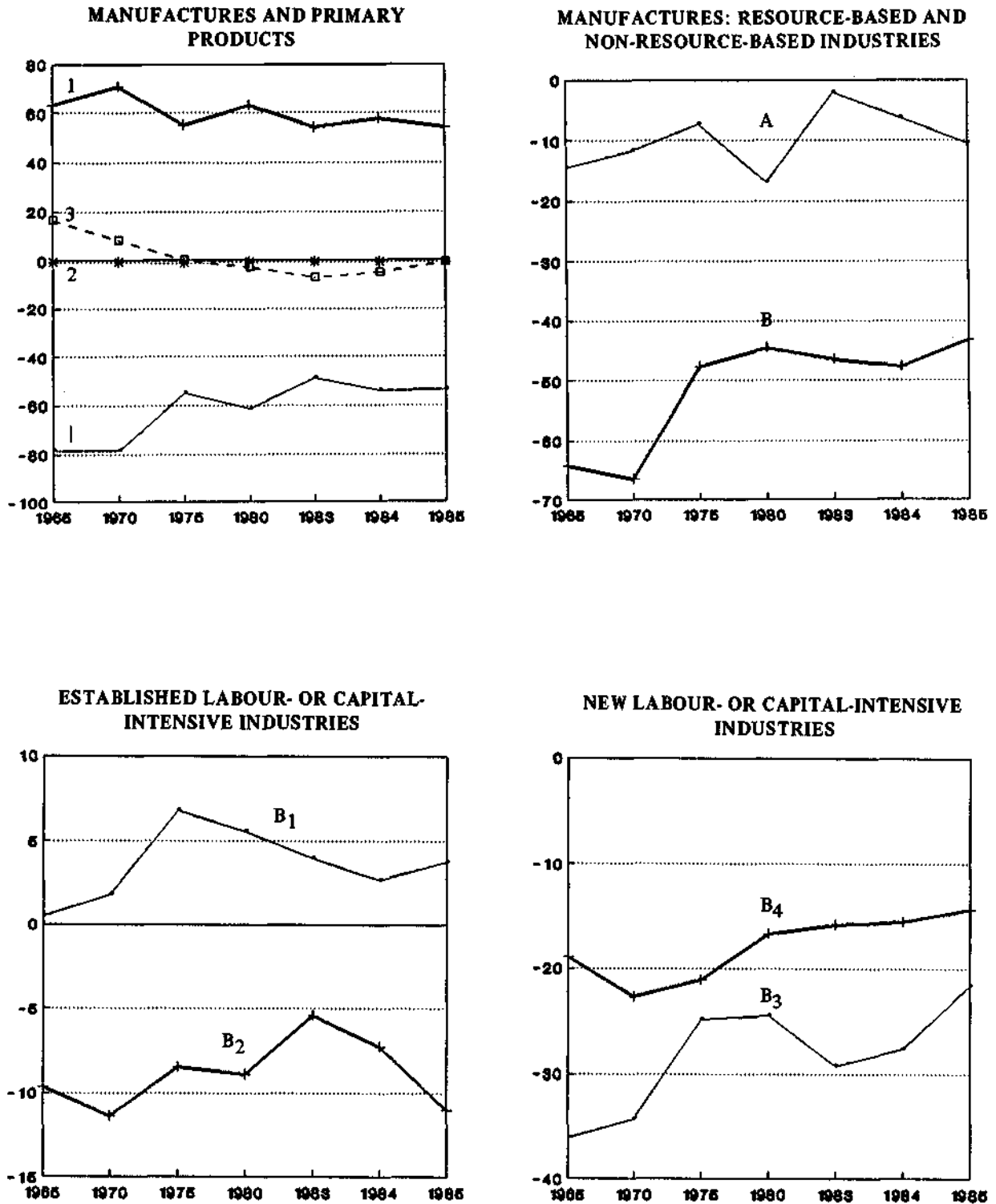
Source: Prepared by the author, on the basis of data provided by the United Nations Statistical Information System (UNSIIS).

Figure 7
 BRAZIL: SPECIALIZATION AND EXTERNAL SECTOR, 1965-1985



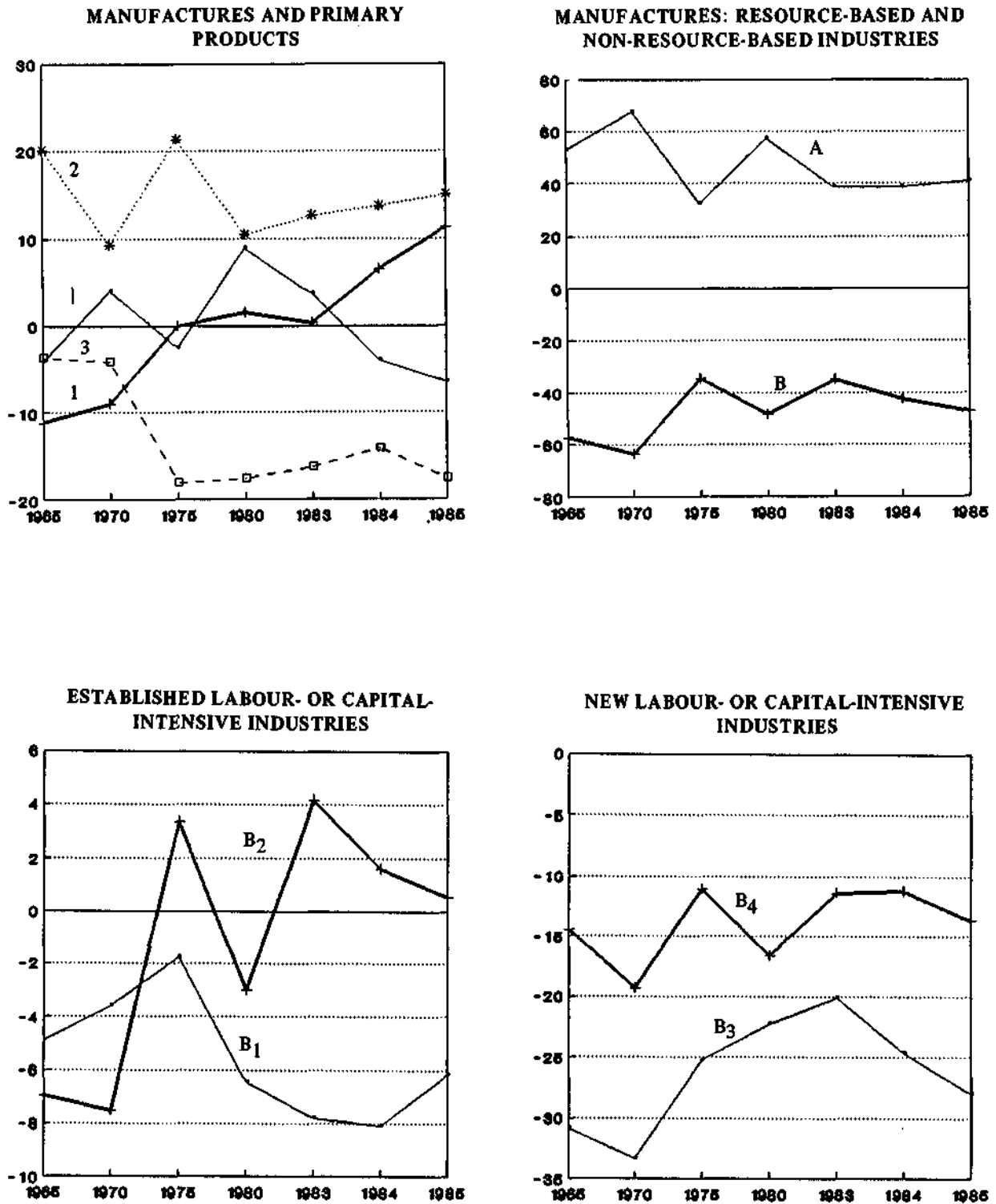
Source: Prepared by the author, on the basis of data provided by the United Nations Statistical Information System (UNSI).

Figure 8
COLOMBIA: SPECIALIZATION AND EXTERNAL SECTOR, 1965-1985



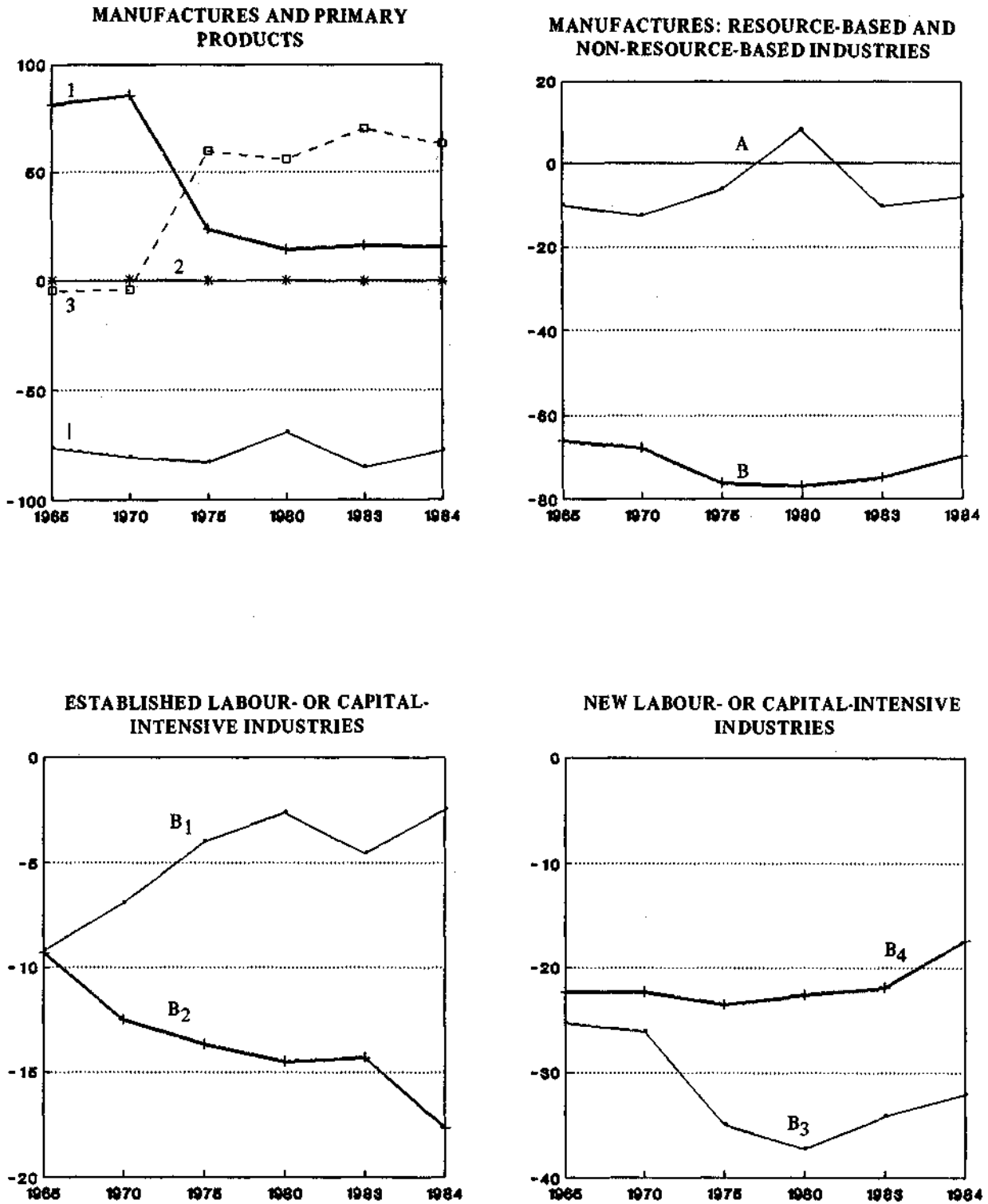
Source: Prepared by the author, on the basis of data provided by the United Nations Statistical Information System (UNSI).

Figure 9
CHILE: SPECIALIZATION AND EXTERNAL SECTOR, 1965-1985



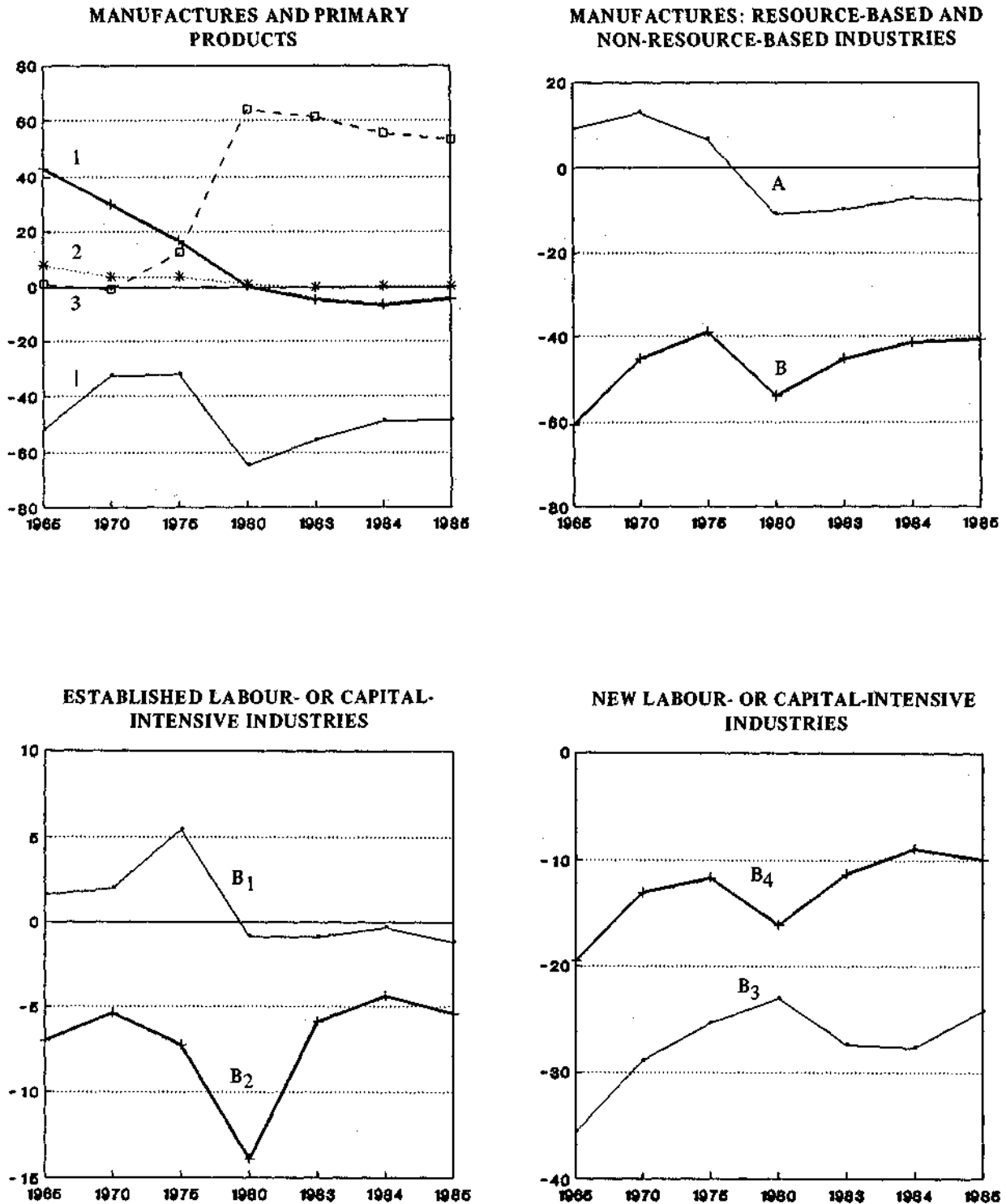
Source: Prepared by the author, on the basis of data provided by the United Nations Statistical Information System (UNSIIS).

Figure 10
 ECUADOR: SPECIALIZATION AND EXTERNAL SECTOR, 1965-1984



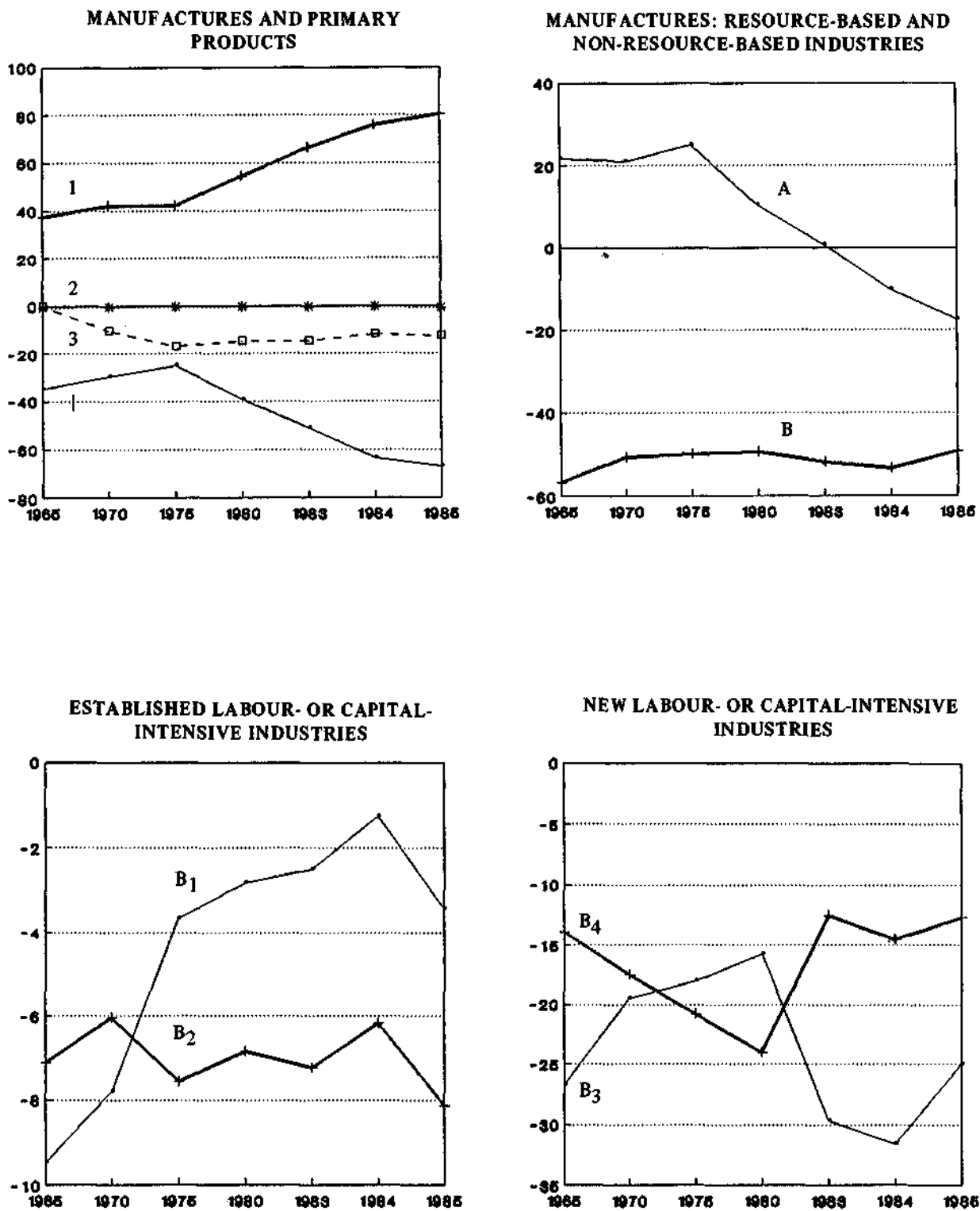
Source: Prepared by the author, on the basis of data provided by the United Nations Statistical Information System (UNSI).

Figure 11
MEXICO: SPECIALIZATION AND EXTERNAL SECTOR, 1965-1985



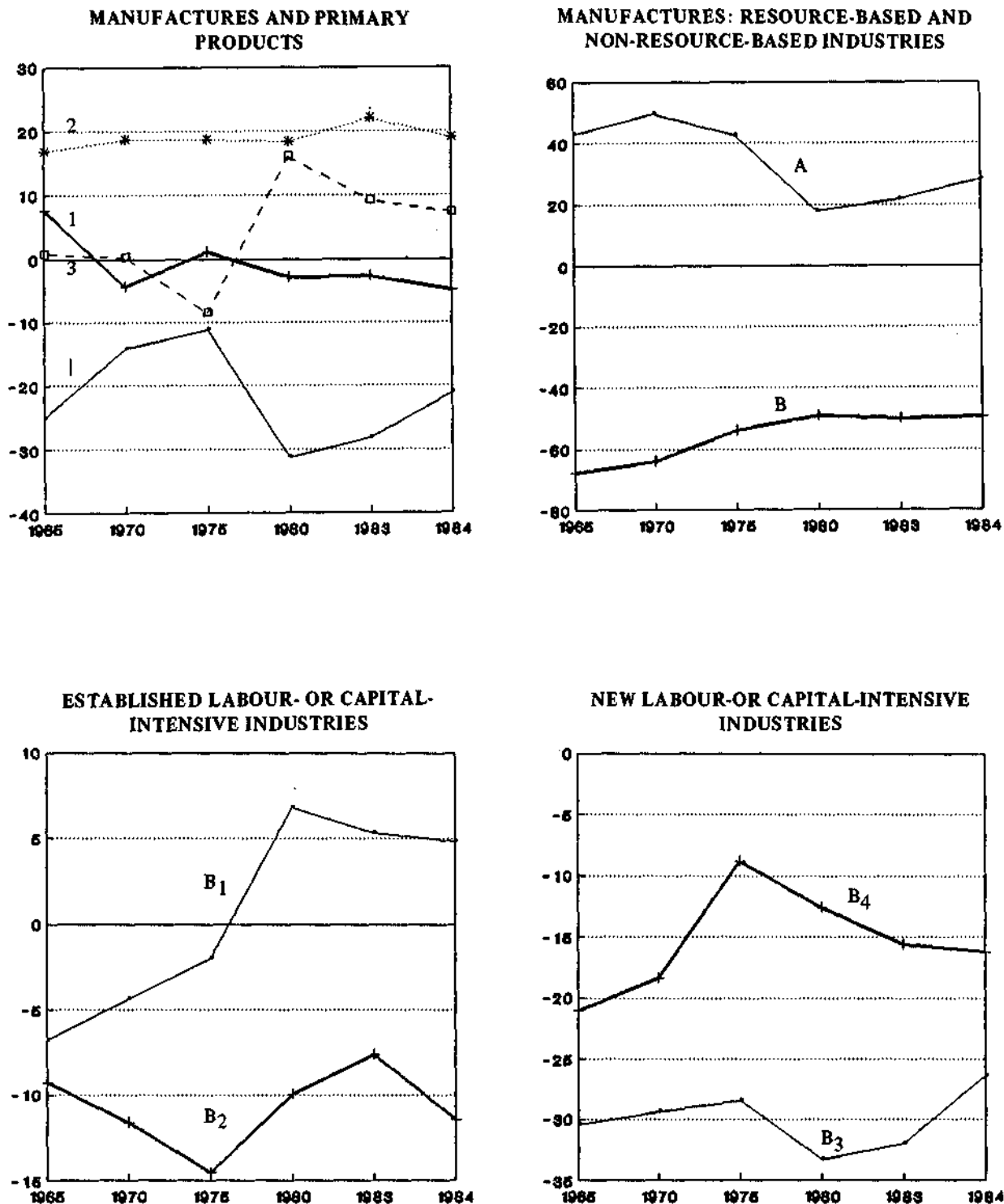
Source: Prepared by the author, on the basis of data provided by the United Nations Statistical Information System (UNSI).

Figure 12
PARAGUAY: SPECIALIZATION AND EXTERNAL SECTOR, 1965-1985



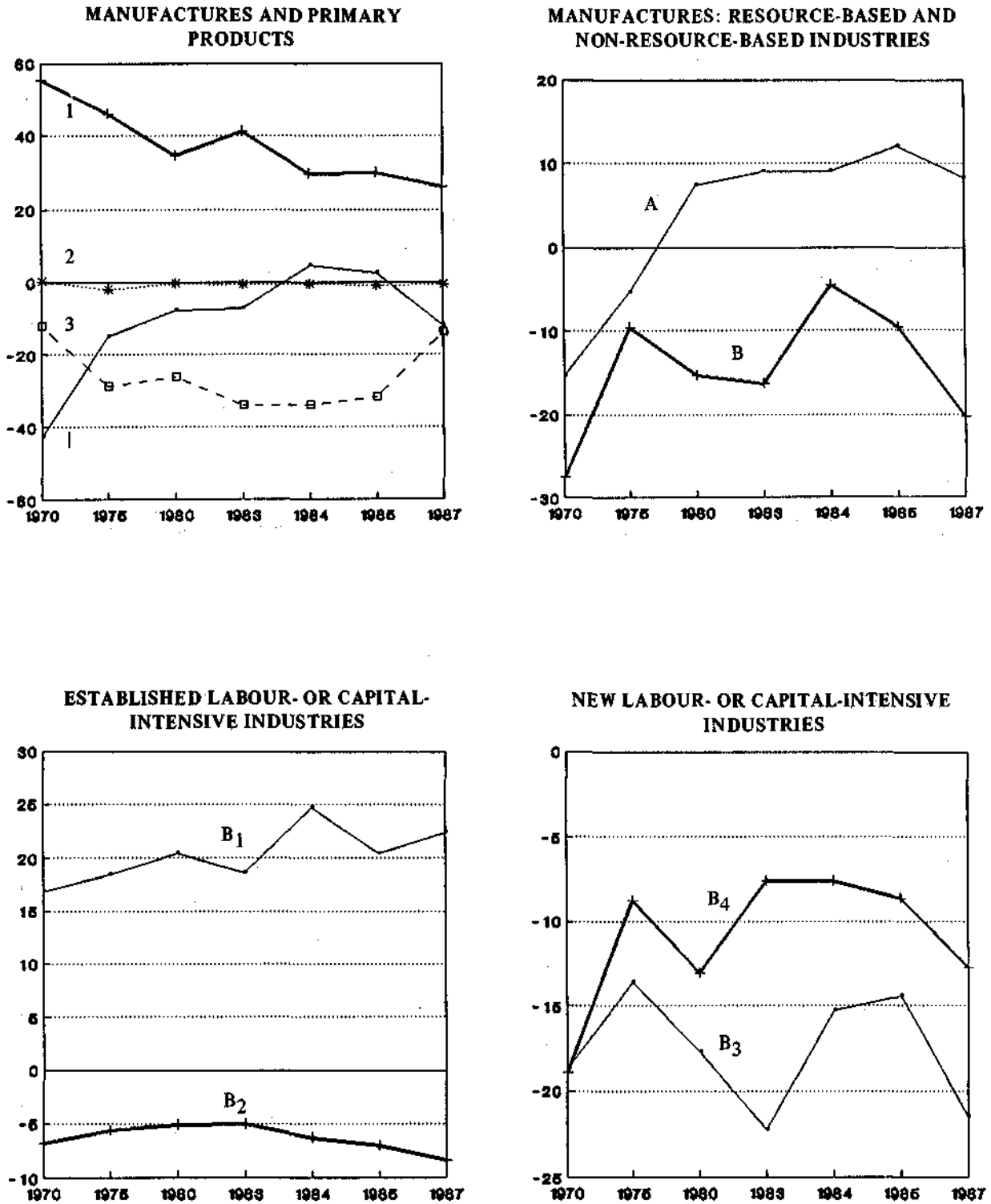
Source: Prepared by the author, on the basis of data provided by the United Nations Statistical Information System (UNSI).

Figure 13
PERU: SPECIALIZATION AND EXTERNAL SECTOR, 1965-1984



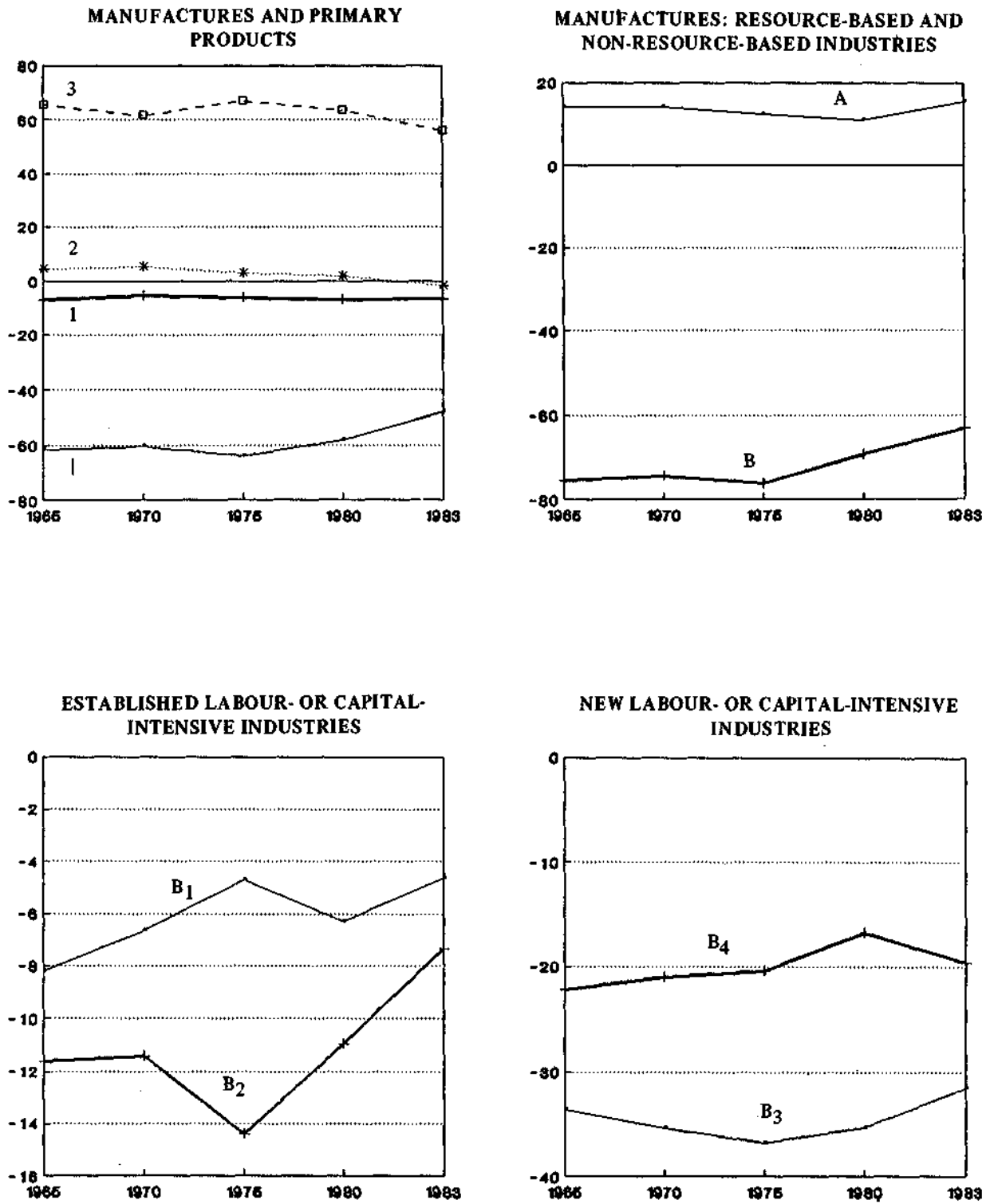
Source: Prepared by the author, on the basis of data provided by the United Nations Statistical Information System (UNSI).

Figure 14
 URUGUAY: SPECIALIZATION AND EXTERNAL SECTOR, 1970-1987



Source: Prepared by the author, on the basis of data provided by the United Nations Statistical Information System (UNSI).

Figure 15
VENEZUELA: SPECIALIZATION AND EXTERNAL SECTOR, 1965-1983



Source: Prepared by the author, on the basis of data provided by the United Nations Statistical Information System (UNSI).