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# CONTENTS

# Changes in the *industrial development* of Latin America

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Trade liberalization, deregulation of economic activity, the privatization of public-sector production units and much more careful management of the main macroeconomic aggregates are causing profound changes in the behaviour of the Latin American economies. A more competitive climate is gradually spreading through the countries of the region as companies, markets and institutions adapt to a new micro- and macroeconomic scene. This article analyses the various types of modifications in the production structure of the industrial firms of Latin America, the variations in productivity, the systems of incentives and industrial organization, as well as the organization of labour and the trends of the changes connected with the factors of production. Among other conclusions, it is noted that the weight of industry in the GDP is steadily going down, especially since the 1980s, in the context of a reorientation of the region's production structure towards natural resources and services. It is also noted that during the last quarter-century there has been a process of convergence between the region's productivity and that of the United States in the industrial commodities sectors, especially in the transport equipment sector but also, albeit to a lesser degree, in the metal products and machinery sector; in contrast, the productivity gap has widened in the most traditional sectors (textiles, clothing, footwear, etc.), while in the foodstuffs, beverages and tobacco sector it has remained unchanged.

# I

# Introduction

Trade liberalization, deregulation of economic activity, the privatization of public-sector production units and much more careful management of the main macroeconomic aggregates are causing profound changes in the behaviour of the Latin American economies. A more competitive climate is gradually spreading through the countries of the region as companies, markets and institutions adapt to a new micro- and macroeconomic scene.

A relatively long period of efforts at import substitution, in which firms basically responded to signals from the domestic market, now seems to be coming to an end.

Neoclassical economists have described the achievements of the Latin American countries during the substitution process, as well as the role played by industrial policies in the postwar decades, in pretty pejorative terms. In their view, the active intervention of governments in the field of manufacturing production only served to secure the installation of inefficient industrial plants and to subsidize rent-seeking businessmen incapable of competing on increasingly competitive international markets.

We feel, however, that the results obtained during the import substitution industrialization years were not quite as negative as the orthodox literature suggests. In our opinion, the substitution process led to the establishment and spread of a large number of institutions of crucial importance for the development of capitalism. The expansion of industry brought about the gradual appearance and consolidation of a sophisticated industrial culture (chemical, electrical, mechanical and other industries), as well as the building-up of a vast arsenal of domestic technological capacity. In addition to expanding manufacturing production, many industrial firms and whole branches of activities were generating an important stock of their own technology and know-how which enabled them to raise their labour productivity and international competitiveness, thus closing the gap separating them from the international technological frontier and winning shares in various world markets.

It must be admitted, however, that this maturity process has not been as extensive or thorough as that observed in some Southeast Asian countries, although it undoubtedly has many more positive features than the most orthodox authors have been willing to admit so far.

Whatever our judgment of the import substitution stage, it must be admitted that many of its institutions and much of the public policy agenda associated with them –such as for example the use of customs tariffs to stimulate the construction of factories or even the development of whole branches of industry– have now been abandoned by the Latin American governments, which have been turning instead to the new doctrines of economic liberalization and the deregulation and privatization of production activities, in the expectation that the "invisible hand" of the market will be able to secure a faster rate of modernization and technological change than those attained during import substitution under the direction of the State.

Industrial firms have gradually begun to react to these changes in their operational environment. "Old" forms of organization of production –involving, for example, extensive stocks of parts and components or a high degree of vertical integration– have begun to be abandoned by manufacturers as they learn to use –and adapt to their own needs and circumstances– the organizational principles of "flexible manufacturing" and "just in time" and "zero defect" methods. Greater subcontracting of intermediate inputs and production services, as well as a higher unit content of imports in the respective work programmes, are now routine strategies in manufacturing.

The turbulent conditions of the 1980s are now a thing of the past, and the region is gradually learning to live with trade liberalization and the deregulation of production activities. This transition undoubtedly raises many new questions, such as the following: Is the current production structure of the region different in some way from that observed, say, ten or fifteen years ago, and if so, how? Can the new model

of social organization of production be expected to behave better or worse, in terms of factor productivity, than the import substitution model? What will be the probable impact of the changes in the global scheme of incentives on the various countries of Latin America? What are the new systems of industrial organization that are taking shape in the various countries, and how are the various agents of production (transnational corporations, small and medium-sized firms, family firms, large domestic-owned conglomerates, etc.) adapting to them? What changes are to be observed in the organization of labour and production planning at the individual company level? Are these changes neutral with respect to the various factors, or are there grounds for suspecting that they are skewed towards relative savings of capital or labour? What lessons can be drawn from current trends in the region that could be useful for other countries that are going through similar processes of deregulation and technological change, such as the former socialist countries?

Some of these and other related topics will be analysed in this article. We must begin, however, by recognizing that as yet there is no economic growth theory that provides the conceptual bases for such an analysis. The conventional neoclassical model is based on a number of simplifying assumptions concerning the behaviour of "typical agents" and the typical features of growth in equilibrium which make it difficult or impossible to integrate micro and macro aspects in a really useful manner in any given study of national evolution.

When the production structure, markets and the institutional fabric of a given society pass through a long period of turbulence and thousands of companies close their doors (7,000 in Chile in the 1980s and over 20,000 in Argentina), while many markets partially or completely disappear and institutions undergo dramatic changes in their ends and means, we cannot simply assume that once the dust has settled the same production structure will continue to operate and the economy will return to a situation of long-term equilibrium growth in which the main lines of the model will be only marginally different from those that prevailed before the episode in question.

In such circumstances, many new firms, industries and institutions spring up, whereas others decline or disappear altogether. The capital and labour markets change in terms of their structure, behaviour and characteristic institutions. Companies begin to use different forms of production organization, and a new public/private mix emerges as regards saving and investment and the financing and provision of public goods such as health services, education, etc. This process involves a change in what French economists have called the "mode of regulation" of society. It seems obvious that in a transition of this type between "systems of regulation" we simply do not have adequate information on what is taking place and we do not have a full understanding of the final nature of the process and the new forms of microeconomic behaviour which are emerging, so that it is not only necessary but even urgent to set about new micro- and mesoeconomic studies to shed light on the problems and opportunities that the new situation is revealing. The aim of the present paper is precisely to set afoot research of this type, taking it for granted that much more basic research will be needed in the future if we are to gain a proper understanding of the new scheme of social organization of production that is currently taking shape in Latin America.

As far as the region is concerned, one thing seems clear. Even though the efforts to secure greater openness, deregulation and privatization of production activity are in some respects similar from one country to another, the changes have been taking place in them in very different ways and speeds. Their results also vary widely, because the dates, sequences and extent of the trade liberalization and economic deregulation measures have been very diverse, as also has been the domestic political support and external financial backing that each country has obtained for its structural reform programme. Furthermore, the macroeconomic stabilization and structural reform measures are being applied by societies that differ greatly from each other in their degree of economic maturity, their institutions and their system of social organization of production. The diversity of the results obtained is therefore hardly surprising.

There is as yet no model or set of models capable of adequately illustrating some of the micro/macro links involved in questions of this type, and much less the complex interdependences that exist between the behaviour of individual economic agents and major changes in public policies in countries at different levels of economic and social maturity. The

whole question becomes even more complicated when we admit the existence of imperfect information among those agents, or incomplete markets. We simply do not know how the various branches of industry should react to changes in interest or exchange rates, or what attitude the various types of companies –with different degrees of access to factor markets and different perceptions of what changes in the regulatory system mean– will take to the new rules. Likewise, we do not know much either about how the various degrees of economic maturity affect the long-term sustainability of the economic liberalization and production deregulation measures.

In all these respects, we really are without any solid theory to back us up in our assertions. Consequently, in this paper we shall try to work with an inductive approach rather than theorizing *a priori* about what is happening. We shall provide the reader with what Nelson (1995) called an evaluative approach to economic theory from the empirical standpoint: it seems useful to us to know a little more about what we need to posit on the formal level, in order to put future efforts at more formal modelling on the right track. We shall therefore begin by describing some of the main basic features of the new situation which is taking shape.

# II

## Main basic features of the production structure which is taking shape

To a greater or lesser extent, the main basic features of the production structure which we shall analyse in this section are to be found in all the Latin American countries. However, the highly idiosyncratic nature of each national case must not be forgotten when discussing the long-term behaviour of each economy. Among the most salient features of the new production structure are the following:

i) Manufacturing has ceased to be the drivng force behind economic growth, as it was during the import substitution stage. Nor is it an important source of generation of new jobs, and it is not likely to become so again in the future. Natural resources, industries which process raw materials, and non-tradeable activities have now become very important fields for economic expansion and the absorption of labour.

ii) Countries are now much more exposed to international competition than before, both on the import and export sides, and the external sector of each economy plays a much more important role than it did a few years ago. Exports of the industries processing natural resources, foodstuffs and primary commodities are growing fast, but imports of capital goods and labour-intensive products are increasing still faster, thus making the manufacturing trade balance increasingly negative.

iii) The degree of economic concentration has increased considerably in the 1990s as a small number of big national conglomerates and local subsidiaries of transnational corporations have taken better advantage of the operating conditions opened up by the new public policies and the new regulatory framework now prevailing in the countries of the region. Small and medium-sized enterprises and public enterprises have been losing their share of manufacturing production and trade as a result of privatization programmes, market flaws, and failure to understand the changes needed in the production organization model in order to survive in the present circumstances. These factors have affected the small and medium-sized firms in particular.

iv) Only a small number of countries in the region seem to have returned to a stable growth path after the macroeconomic upsets of the 1980s. The increases in rates of saving and investment and the creation of new installed capacity seem to have been the decisive factors in the economic growth achieved in such cases. Chile is the clearest example of this type of situation. Some other countries which have also left behind these macroeconomic upsets are still facing various types of uncertainty, however, and their rapid growth in the 1990s was due more to fuller use of their installed capacity and labour-saving

technological changes than to new investments, unlike Chile. Argentina and Brazil are the two most significant examples of this situation.

v) Average labour productivity in the region is still well below international standards, and the available data suggest that the distance between the two levels of productivity –the relative gap– is not being significantly reduced with time.

If, instead of looking at the economy as a whole, we pay more attention to the manufacturing sector, we see the following:

i) Industries that process raw materials –i.e., those producing pulp and paper, petrochemicals, iron and steel, vegetable oils, aluminium, fishmeal, mineral products, etc.– register significantly faster growth than the branches of industry which make intensive use of technological know-how and engineering services (industries producing capital goods, electronic equipment, fine chemicals, etc.).

ii) The 1980s witnessed the entry into operation of a new generation of capital-intensive industrial plants, using continuous processes for the treatment of raw materials and natural resources, which have won a major share of both the overall manufacturing output and the industrial exports of the various countries of the region.

iii) In contrast, there are signs of contraction and decline, along with a high rate of mortality among enterprises, in branches that make intensive use of labour (such as textiles, footwear and clothing) and also in those that make relatively intensive use of engineering services (such as those manufacturing machine tools, heavy engineering products, instruments, agricultural equipment, etc.). In these sectors, firms are having great difficulty in adapting to more open, unregulated conditions of competition and to the use of new technologies based on computerization, typical of flexible manufacturing.

iv) Although the inflow of foreign direct investment declined significantly during the 1980s, such factors as macroeconomic stability and the recent changes in the industrial property regulations prevailing in the countries of the region have set off a new wave of foreign direct investment in manufacturing in various Latin American countries. Strategic alliances between big domestic conglomerates, transnational corporations, world-scale banks and transnational consultants and contractors have been growing rapidly in such activities as the processing of natural resources, food production, energy generation and distribution, telecommunications, transport and port operation. The privatization of State assets has opened up a wide range of opportunities for such alliances and for the entry of fresh foreign direct investment.

v) The organization of labour at the individual plant level and the degree of vertical integration adopted by enterprises in organizing their production programmes have undergone big changes as a result of the shift towards production systems which are more open to external competition and greater flexibility of labour markets. The high level of vertical integration used in the 1970s is clearly not profitable now that the importation of parts, components and sub-components has become cheaper and simpler. In recent years, many firms producing capital goods or consumer items have significantly increased the unit content of imports in their products, replacing locally-produced parts and components, or even those produced inside the firm itself, with the equivalent imported products. This is dramatically affecting their former suppliers, many of them small and medium-sized family firms in the metal products and machinery sector, among whom the business death rate is currently abnormally high. The big firms have moved towards the "de-verticalization" of their production processes, using external suppliers to obtain services such as computation, maintenance, etc., while at the same time they have reduced their commitments with local product design, production and research and development, resorting instead to greater use of international licences.

vi) A significant difference is to be observed between the results obtained, on the one hand, by those firms which have adopted an active strategy of adaptation to the new circumstances and have consequently invested in new equipment, upgraded the skills of their staff and changed the composition of the goods they sell, and, on the other, firms which have taken a defensive stance and, while making organizational changes with a view to saving labour, have not committed themselves significantly in terms of expanding their installed capacity.

The foregoing is a brief summary description of some of the most salient features of the current situation. In the following two sections, we will analyse the empirical information on which our earlier assertions were based.

# III

# The global economy and the manufacturing sector as a whole

## 1. Main features of the restructuring of the production system after the debt crisis of the 1980s

The early post-war years marked a period of rapid expansion of the Latin American economy. Both the level of economic activity and that of gross investment recovered after the long period of restricted access to capital goods and finance caused by the war. The two decades between the early 1950s and the early 1970s may be considered as the golden age of the import substitution-based development model.

Already by the mid-1970s, however, various countries of the region were suffering from a serious slackening in the growth rate of their overall and industrial GDP or their labour productivity, so that they were faced with the need to intensify or reformulate their strategies.

In addition to the loss of dynamism caused by the exhaustion of the import substitution model, they were subjected to serious adverse external shocks. Thus, the two oil crises of the 1970s marked the beginning of serious macroeconomic disturbances in the region which were further aggravated in the 1980s by the debt crisis, the drop in the terms of trade, and the rise in international interest rates.

These changes in the macroeconomic context had varying effects on the different countries, both because of their differing capacities to absorb external shocks and because of the differing policies applied in each case. Generally speaking, however, for the region as a whole one of the main features of the 1980s was the resurgence of inflation, accompanied first of all by stabilization policies and subsequently by structural reform measures, which undoubtedly had a significant effect both on the rate and the nature of the growth process. In the second half of the decade, various countries of the region began to show signs of a gradual (and as yet quite feeble) reversal of these negative trends, but it was only from the 1990s onward that the aggregate indicators –total and per capita GDP, gross fixed capital formation, exports and imports– reflected a clearer process of recovery (table 1).

TABLE 1

**Latin America (12 countries): Average growth rates, 1950-1994**

*(Percentages)*

| | 1950-1974 | 1974-1980 | 1980-1990 | 1990-1994 |
|---|---|---|---|---|
| Per capita GDP | 2.4 | 2.6 | -0.8 | 1.9 |
| Exports | 3.9 | 3.5 | 5.4 | 6.6 |
| Imports | 6.0 | 5.7 | -0.8 | 14.4 |
| Gross capital formation | 6.2 | 6.3 | -2.8 | 8.3 |

*Source:* Prepared by the authors on the basis of ECLAC data.

In general terms, despite the differences from one country to another, in the 1990s the economies of the region have displayed a noteworthy reorientation towards the exterior and towards more intensive exploitation of their natural resources, which have significantly increased in both quantity and quality. Exports, which had already grown by an average of 5.4% per year in real terms between 1980 and 1990, have attained average real growth rates very close to 7% per year in the 1990s. The region's imports have registered even faster growth, rising from negative annual average growth rates some years ago to values close to 15% per year in 1990-1994.

Notwithstanding the foregoing, however, it should be noted that so far the recovery has been only partial, since the growth rates of total and per capita GDP are still well below those of the 1970s. In 1993, gross fixed capital formation came to 18.1% of GDP, which is not only less than in 1980 but is even below the 1970 figure.

The 1950-1994 period was marked by major structural changes in the composition of the regional GDP (table 2). The tertiary sector (commerce, transport, finance and social services) increased its share, while the other sectors lost relative importance. The performance of the "transport equipment" branch was particularly outstanding, as it grew much more than the average GDP, whereas financial activities and commerce grew rapidly only up to the mid-1980s.

TABLE 2
**Latin America: Evolution of GDP, by sectors, 1950-1994**
*(Percentages)*

| | 1950-1974 | 1974-1980 | 1980-1990 | 1990-1994 |
|---|---|---|---|---|
| Agriculture | 3.5 | 3.7 | 2.2 | 2.4 |
| Mining | 4.3 | 0.9 | 2.7 | 3.3 |
| Industry | 6.7 | 4.3 | 0.4 | 3.2 |
| Energy | 9.1 | 8.8 | 5.1 | 4.5 |
| Construction | 5.1 | 5.9 | -2.4 | 5.6 |
| Commerce | 5.9 | 6.0 | 0.2 | 3.7 |
| Transport | 6.0 | 7.6 | 3.3 | 6.3 |
| Financial establishments | 6.4 | 5.8 | 2.2 | 3.2 |
| Social services | 6.2 | 5.8 | 2.2 | 1.5 |
| **Total GDP** | **5.5** | **5.1** | **1.2** | **3.6** |

*Source:* Prepared by the authors on the basis of ECLAC data.

The remaining sectors lost relative importance, although their behaviour varied from one sector to another. Outstanding among those that increased their weight in the GDP was the energy sector, which doubled its share between 1970 and 1994.

In contrast, the share of industry in the GDP went down steadily, and its decline became still faster in the 1980s. Although this process speeded up still further in the 1990s, industry had already ceased to be the main driving force behind the region's growth ever since the 1970s, in spite of its high growth rate of 4.3% per year in the period 1974-1980, and it actually suffered a slight decline in its relative weight in GDP.

In the first half of the 1980s, the industrial sector sank into a profound crisis and subsequently stagnated for almost ten years. Its recovery in the first half of the 1990s was less marked than that of the economy as a whole, thus confirming its tendency to lose weight in the regional economic structure.

In the case of the primary sector (agriculture and mining), after having gone through a period in which its share of GDP went down steadily, from 1980 onwards it began to grow faster than the economy as a whole and increased its relative share. This situation tended to undergo a turnaround in the period 1990-1994, however, when the primary sector once again grew more slowly than the economy as a whole.

This behaviour gives an idea of the importance that the drop in domestic aggregate demand due to the stabilization programmes has had as a decisive factor in the crisis of the manufacturing sector. In fact, this drop was much greater in the sectors (industry, construction, commerce) where the income-elasticity of production is greatest. In contrast, during the 1980s the primary sector as a whole grew faster than the other sectors (even the tertiary sector). In this respect, it may be asserted that between 1980 and 1990 there was a clear reorientation of the regional production structure towards natural resources and services.

The sectors connected with natural resources, including both agriculture and mining and the production of industrial commodities, played a particularly important role in the region's new scheme of international economic linkages which took shape from the 1970s onwards (table 3). The expansion of these natural-resource-linked sectors has depended both on the development of "new" products (timber, fresh fruit and fishery products in Chile) and on increases in the physical output of products already exported for decades past: soya beans, sunflower seed and wheat in Argentina; coffee, sugar cane and soya beans in Brazil; coal and petroleum in Colombia; copper in Chile; petroleum in Ecuador; bauxite, tin, iron ore and petroleum in Brazil, and coal and iron ore in Venezuela.

Natural resources have also been a key element in the development of other sectors which have been of great importance in the restructuring of the Latin American economies in the 1980s. These sectors are those producing industrial commodities and some associated services sectors. The subject of industrial commodities will be discussed later. With regard to the associated services, it may be said that, at least to some extent, the great demands for road, port and communications infrastructure associated with the production of primary goods and industrial commodities have been an important factor in causing the "Transport, storage and communications" sector to keep up, after the strong growth registered in the 1970s, growth rates which have been more than double those of overall GDP ever since 1980.

Likewise, the "Electricity, gas and water" sector, which had already grown strongly between 1970 and 1980, has continued to be one of the most dynamic elements in the regional economy, thanks to the energy needs of the new natural-resource-based activities and the discovery of new energy sources.

In short, analysis of the evolution of the Latin American economy since 1970 shows that the first half of the 1970s marked the end of a long phase of growth; in the 1980s there was a severe process of contraction, and it was only in the 1990s that some signs of a recovery of growth began to appear.

TABLE 3

**Latin America: Production of selected agricultural and mining goods, 1970-1993**
*(Thousands of tons)*

| | 1970 | 1980 | 1985 | 1990 | 1993 |
|---|---|---|---|---|---|
| Bananas | 20 564 | 21 671 | 22 270 | 26 939 | 27 637 |
| Coffee beans | 2 170 | 2 970 | 3 839 | 3 883 | 3 629 |
| Sugar cane | 277 943 | 356 626 | 457 703 | 490 370 | 454 234 |
| Sunflower seed | 1 220 | 1 756 | 3 522 | 4 035 | 3 432 |
| Maize | 38 095 | 45 280 | 55 771 | 50 067 | 67 999 |
| Soya beans | 1 927 | 19 814 | 27 167 | 34 325 | 36 463 |
| Wheat | 11 509 | 14 874 | 20 215 | 20 922 | 17 295 |
| Livestock products[a] | 76 | 100 | 107 | 123 | 132 |
| Bauxite | 24 045 | 24 596 | 18 029 | 29 071 | 33 739 |
| Coal | 10 015 | 17 626 | 28 283 | 34 730 | 34 064 |
| Copper | 987 | 1 654 | 1 961 | 2 237 | 2 785 |
| Tin | 35 588 | 36 167 | 47 307 | 61 900 | 55 600 |
| Iron ore | 88 355 | 137 647 | 149 952 | 187 254 | 187 934 |
| Petroleum | 305 603 | 334 219 | 367 265 | 395 506 | 428 855 |

*Source:* ECLAC.
[a] Livestock products: index, base 1980=100.

In the course of this process of decline and partial reactivation of the level of activity, the economic structure underwent some important changes. Industry ceased to play a leading role in the growth process, whereas the primary sector and services displayed greater dynamism, the first-named from the 1980s onward and the latter from the 1970s.

As well as placing a new emphasis on natural resources, the change in the economic structure sharply reoriented production towards the external market, as reflected in a constant and significant increase in the ratio of exports to GDP from 1980 onwards.

This new picture now presented by the region also includes some other elements which are not so positive, however, and which raise challenges that must be faced if we wish to ensure the sustainability of the process of greater openness to the exterior and deregulation of the economy. Firstly, after having fallen sharply between 1980 and 1985 in both volume and value, imports thereafter rose considerably faster than exports. Consequently, after having been notably positive in 1985 and 1990, the trade balance became negative again (at current prices) in 1993. Mexico is a particularly clear example of this, but Argentina and Colombia are also noteworthy examples.[1]

[1] From this point of view, the 1994 results were even worse for these countries and indeed for the region in general. Furthermore, as from the last quarter of 1994 there was a notable deterioration in the situation of Brazil, a country which had registered substantial surpluses since the mid-1980s.

Secondly, the expansion of the natural resources frontier involves an increase in the pressure on the environment. The growth model based on more intensive use of natural resources will undoubtedly call for greater care of the environmental equilibrium and, ultimately, faster dissemination of international standards relating to the environment (ISO 14000, the use of eco labels, etc.) as well as new forms of institutional behaviour for handling these issues.

Thirdly, despite export growth rates of almost 7% per year in terms of physical volume, per capita GDP is growing by only 1.9% per year, which raises certain doubts about the ultimate significance of export-led strategies like many of those which have won uncritical acceptance in recent years in the regional economic debate.

## 2. Structure and behaviour of the industrial sector

### *a) The different stages in the restructuring process*

Over the period 1974-1994, Latin American industry passed through various stages in the course of which it registered profound changes as regards its growth rate, its structure and its linkages with the international economy.

As we saw earlier, in the second half of the 1970s the industrial growth rate of the region as a whole went down significantly (table 4), sinking to lower levels than in the 1950s and 1960s. However, the global average conceals very considerable differences between the countries. Thus, manufacturing

TABLE 4

**Latin America (12 countries): Average annual growth rates of industrial added value, 1950-1994**

| | 1950-1974 | 1974-1980 | 1980-1990 | 1990-1994 |
|---|---|---|---|---|
| Argentina | 4.9 | -0.6 | -1.4 | 6.9 |
| Bolivia | 3.7 | 3.4 | -0.6 | 3.3 |
| Brazil | 8.7 | 6.7 | -0.2 | 2.8 |
| Chile | 4.4 | 1.2 | 2.6 | 6.3 |
| Colombia | 6.7 | 4.0 | 2.9 | 3.9 |
| Costa Rica | 8.7 | 5.5 | 3.8 | 5.7 |
| Ecuador | 6.2 | 10.2 | -0.8 | 5.7 |
| Guatemala | 6.1 | 6.1 | -0.1 | 2.8 |
| Mexico | 7.4 | 6.2 | 2.0 | 2.3 |
| Peru | 7.0 | 1.8 | -1.9 | 5.6 |
| Uruguay | 2.4 | 4.9 | -1.0 | -1.3 |
| Venezuela | 7.8 | 5.0 | 1.9 | 1.8 |
| **Total** | **6.8** | **4.6** | **0.4** | **3.4** |

*Source:* Industrial Growth Analysis Programme (PADI) and data prepared by the authors. The PADI is a computer programme prepared by the ECLAC Division of Production, Productivity and Management to describe and analyse the behaviour of the main industrial variables of the region.

in Argentina, Chile and Peru was already showing the first signs of stagnation in the 1970s, whereas industry continued to expand throughout that decade in Brazil, Ecuador, Guatemala and Mexico.

Faced with ever-greater trade deficits and increasingly sluggish domestic demand, many countries of the region began to employ export promotion policies in the second half of the 1970s, which caused local firms to display increasing interest in external markets.

Industrial exports rose from US$ 19,262 million to US$ 41,894 million between 1974 and 1980. Imports increased even faster, however, leading to the deterioration of the region's trade balance (table 5).

As from 1980, and throughout the rest of the decade, industrial production entered a phase of clear stagnation throughout the region, while it contracted sharply in some countries, such as Argentina, Uruguay and Peru. In many cases, the 1990 level of production was below that of 1980.

With the decline in domestic demand, the external sector became the most dynamic demand component. As a reaction to this, many firms reoriented their production towards international markets, and industrial exports grew rapidly from US$ 41,894 million in 1980 to US$ 70,407 million in 1990. This time, however, imports did not behave as they had

TABLE 5

**Latin America: Industrial exports and imports, 1974-1994**

*(Values in millions of dollars at current prices)*

| | 1974 | 1980 | 1990 | 1994 |
|---|---|---|---|---|
| Exports | 19 262 | 41 894 | 70 407 | 123 442 |
| Imports | 28 476 | 67 284 | 70 758 | 163 315 |
| Trade balance | -9 214 | -25 390 | -351 | -39 873 |

*Source:* Industrial Growth Analysis Programme (PADI) and data prepared by the authors.

done in the 1970s. As the economic growth rates were much smaller, imports increased only slightly and the trade deficit went down steadily.

However, this improved external situation took place in a context of big internal and external changes which prevented it from lasting very long. Three aspects stand out in these new circumstances: i) the macroeconomic stabilization policies led to sharp falls in domestic demand; ii) the external debt crisis (heightened by the consequent rise in interest rates and the big reduction in the supply of external finance) seriously affected the macroeconomic situation of the region, and iii) the major shifts in the international technological frontier (due to the discovery and rapid spread of new products and production processes based on the use of microprocessors and numeric control) greatly widened the technological gap between the production practices used in the region and the best international practices.

In this context, the industrial sector suffered a profound structural crisis. Domestic demand contracted, and the international competitiveness of many firms and branches rapidly deteriorated. Growth rates in the sector were negative in the first half of the 1980s. Thousands of firms ceased to exist in these years, and unemployment in the region reached unprecedented levels. Only towards the end of the decade did this situation begin to turn around and industry began to grow again. This time, however, the expansion took place within a profoundly changed production structure and a production organization model very different from that which had prevailed in the 1950s and 1960s (we shall return to this subject later).

The first half of the 1990s brought a partial recovery in the growth rate of industrial production, which averaged 3.4% per year for the region as a whole between 1990 and 1994. Although this value was clearly higher than that of the previous decade, it

was still below the rate of 4.6% registered in the 1974-1980 period. In fact, with the notable exceptions of Argentina, Chile, Peru and, to a lesser extent, Costa Rica, the great majority of the countries of the region grew much less than in the second half of the 1970s.

Exports continued to grow, but this time expansion of domestic demand and revaluations of the national currency in various countries of the region led to appreciable increases in imports and a heavy deficit on the industrial sector's trade balance. The partial recovery in production was accompanied by considerable increases in labour productivity (8.0% per year for the region as a whole between 1990 and 1993, compared with figures of 1.6% in 1974-1980 and only 1.0% in 1980-1990).

It is important to note, however, that this improvement in labour productivity was achieved without major new investments (except in Chile) in most sectors of industry. Generally speaking, it was due to drastic cuts in employment made possible by growing technological and organizational changes of a "disincorporated" nature.[2] In other words, except in the case of Chile the increased labour productivity attained in the first half of the 1990s has been associated with a high level of elimination of labour from the industrial sector. Whereas industrial employment had increased up to 1980 and had gone down only slightly in the 1980s, it fell at the rate of 4.7% per year between 1990 and 1993.

In absolute terms, the level of employment in 1993 was slightly below that of 1974, but over the intervening period production increased by 50%.

All in all, the situation of the industrial sector in the mid-1990s, after the impact of the macroeconomic stabilization and trade liberalization policies of the late 1970s and early 1980s had been overcome, is marked by a renewed capacity for growth in an increasing number of countries and big increases in labour productivity and export capacity.

At the same time, however, industrial imports continue to expand rapidly and to generate a growing trade deficit for the manufacturing sector, especially in the metal products and machinery, electronics and capital goods sectors, whose imports have increased at a spectacular rate since the onset of trade liberalization.

[2] I.e., not associated with new physical investments.

Finally, another significant aspect is the very limited capacity of the industrial sector to absorb labour.

*b) The restructuring of manufacturing activities and the relative increase in the importance of industries processing natural resources*

Analysis of the industrial development of the main countries of the region over the period 1974-1994 reveals the relative advance of industries processing natural resources, accompanied by a decline in the branches producing capital goods and consumer durables (table 6). The structure of industrial added value in 1974 reflected a pattern of specialization based on the various branches of the metal products and machinery sector (this includes various branches producing motor vehicles, capital goods, consumer durables, agricultural equipment, etc.). These are industries that make intensive use of engineering design as well as skilled labour for the production and assembly of parts and components.

In the two most technologically advanced countries of the region (Argentina and Brazil), these sectors accounted for around 30% of the total value of industrial production in 1974, while in various other countries (Chile, Mexico and Peru), where the industrial system was not yet as complex, they accounted for between 17% and 21% of total manufacturing added value.

It is important to note the highly special way that the metal products and machinery sector developed in the early stages of the import substitution process.

Starting from quite meagre levels of technological capacity, many small family-type firms gradually managed to expand by copying the designs of outdated foreign products, engaging in "reverse engineering" and supplying their needs with parts and components manufactured by themselves. At the same time, they were building up engineering skills and technological know-how of a "disincorporated" nature which complemented the gradual evolution of their machinery and equipment.

At the most general level, this process meant the gradual development in the region of an industrial "culture" which had not previously existed, and it called for the absorption and spread of practices, quality standards, limits of precision, subcontracting standards, etc. which local firms were not used to employing.

TABLE 6

**Latin America (6 countries): Composition of industrial added value, 1974-1994**
*(Percentages)*

| Sectors [a] | Argentina | | | Brazil | | | Chile | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1974 | 1990 | 1993 | 1974 | 1990 | 1994 | 1974 | 1990 | 1994 |
| I | 17.1 | 14.3 | 17.6 | 23.3 | 22.9 | 23.6 | 14.0 | 10.2 | 10.2 |
| II | 10.5 | 8.5 | 13.5 | 7.7 | 7.0 | 8.7 | 6.9 | 2.3 | 2.3 |
| I+II | 27.5 | 22.8 | 31.0 | 31.0 | 29.9 | 32.3 | 20.9 | 12.5 | 12.5 |
| III | 20.3 | 24.3 | 21.0 | 14.6 | 15.2 | 14.9 | 26.0 | 33.8 | 36.6 |
| IV [b] | 16.1 | 22.4 | 16.6 | 22.3 | 24.4 | 25.8 | 24.9 | 21.5 | 19.3 |
| III+IV | 36.5 | 46.7 | 37.6 | 36.9 | 39.7 | 40.7 | 50.9 | 55.3 | 56.0 |
| V | 36.0 | 30.5 | 31.4 | 32.1 | 30.5 | 27.0 | 28.2 | 32.2 | 31.5 |
| **Total** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** |
| ISC [c] | | 0.33 | | | 0.27 | | | 0.6 | |

| Sectors [a] | Colombia | | | Mexico | | | Peru | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1974 | 1990 | 1994 | 1974 | 1990 | 1994 | 1974 | 1990 | 1994 |
| I | 9.6 | 9.6 | 10.6 | 13.3 | 12.3 | 13.9 | 9.2 | 6.2 | 5.2 |
| II | 4.5 | 4.3 | 6.9 | 6.0 | 9.5 | 10.8 | 8.3 | 5.3 | 3.6 |
| I+II | 14.0 | 13.9 | 17.5 | 19.3 | 21.8 | 24.7 | 17.5 | 11.5 | 8.8 |
| III | 29.2 | 31.1 | 29.0 | 29.9 | 25.8 | 25.7 | 27.6 | 31.7 | 32.6 |
| IV [b] | 19.5 | 20.0 | 20.8 | 18.3 | 21.0 | 20.8 | 11.8 | 13.5 | 12.6 |
| III+IV | 48.7 | 51.2 | 49.8 | 48.2 | 46.8 | 46.5 | 39.4 | 45.2 | 45.2 |
| V | 37.3 | 34.9 | 32.7 | 32.5 | 31.4 | 28.8 | 43.1 | 43.4 | 46.0 |
| **Total** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** |
| ISC [c] | | 0.33 | | | 0.27 | | | 0.62 | |

*Source:* Industrial Growth Analysis Programme (PADI) and data prepared by the authors.
[a] I = Metal products and machinery in general (ISIC 381, 382, 383, 385).
II = Transport equipment (ISIC 384).
III = Foodstuffs, beverages and tobacco (ISIC 311, 313, 314).
IV = Industrial commodities (ISIC 341, 351, 354, 355, 356, 371, 372).
V = Traditional industries (ISIC 321, 322, 323, 352, 361, 362, 369, 390).
[b] The figures for Chile do not include the basic copper industry (ISIC 372).
[c] Index of Structural Change.

However, this industrial organization model also had many weaknesses which later greatly compromised its long-term capacity to compete in a context of economic openness: these included unsuitable plant sizes, a high degree of vertical integration, the improvised and often artisanal nature of the production plant or workshops, and the imperfect technological information possessed by local businessmen. This became particularly noticeable towards the end of the 1970s, when a new generation of products and production processes associated with numeric control, informatics and the principles of flexible manufacturing began to spread rapidly throughout the world but arrived on the Latin American scene with several years' delay.

The technological lag of the Latin American metal products and machinery firms increased markedly in only a few years, making it more difficult for them to remain competitive. Trade liberalization aggravated this situation still further.

All the foregoing suggests that although many firms and sectors achieved substantial improvements in productivity and built up appreciable stores of technological know-how in the import substitution industrialization phase, it nonetheless remains true that the Latin American countries have not managed to close the gap separating them from the international technological frontier.

This gap did narrow a little in the most successful period of industrialization (the 1960s and the first half of the 1970s), but it began to widen again when the technological frontier shifted towards numerically controlled products and processes. This was particularly so in the metal products and machinery sector, with the worldwide spread of a new generation of more sophisticated products and processes from the late 1970s onwards.

In this context, some countries such as Argentina, Brazil, Mexico or Colombia decided to further the industrialization process by introducing State subsidies for the expansion and fuller development of sectors specializing in the processing of natural resources, some of which had been established in the 1950s and 1960s but needed significant modernization and expansion by the late 1970s or the 1980s. These State subsidies gave rise to a new generation of industrial plants characterized by their capital-intensive nature and their use of technologies similar to the most advanced ones used elsewhere, in such branches as petrochemicals and the production of aluminium, pulp and paper, steel, vegetable oils, and other goods. This marked the entry into what has been called the "second phase" of import substitution, which included a process of making fuller use of capital, both in terms of the sectors chosen for expansion and the production technologies used.

In Chile, in contrast, the expansion of these branches of production was not due to stimuli of an orthodox nature, although it cannot be denied that some subsidies were indeed made available, as for example in the case of the subsidies for expansion of the forestry base, which made possible the subsequent development of export pulp and paper plants. In this case, the transition to industries processing natural resources was a response to the policy of greater external openness and liberalization of the economy applied by the government from the mid-1970s on.

As a result of these trends in industrial growth, the weight of the foodstuffs and industrial commodities sectors in total manufacturing production rose between 1974 and 1990 from 36.5% to 46.7% in Argentina, from 36.9% to 39.7% in Brazil, from 39.4% to 45.2% in Peru, from 48.7% to 51.2% in Colombia, and from 50.9% to 55.3% in Chile. Even in Mexico, where the weight of the foodstuffs, beverages and tobacco sector is not so great, the share of industrial commodities rose from 18.3% to 21.0%.

In contrast, the relative weight of the metal products and machinery sector went down. In some cases (Chile, for example) the contraction reached dramatic proportions, but in Brazil it was much gentler.

The new plants processing natural resources gave rise to a rapid increase in exports, in which the share of the foodstuffs, beverages and tobacco and industrial commodities sectors grew very markedly: in Argentina, the share of the last-named sector rose from 12.8% to 25.3% between 1974 and 1990, in Brazil from 7.1% to 35.4%, and in Mexico from 23.8% to 27.8%. In Chile, however, it was the processed foodstuffs industries which increased their share: from 13.8% to 38.0%.

The data also show that in spite of the clear success of exports of industrial commodities and foodstuffs, beverages and tobacco, there was an increase in the trade deficit, especially because of the inability of the metal products and machinery sector to compete with imports on the domestic market. In actual fact, only Brazil managed to improve its trade balance after 1974 and maintain a surplus up to 1994. The big increase in the import coefficients of the other countries bears out this process (table 7).

As from 1990, a further interesting event has been observed: the clear resurgence of the motor vehicle industry (except in Chile).

Thus, many plants in this industry have recently been completely restructured in line with a significant change in the market strategies of the companies involved. After having used in the past a model involving a high degree of vertical integration and self-supply of parts and components, with a considerable effort of adaptative engineering in each plant, the companies are now changing over to a system that uses less vertical integration, more outsourcing of parts and sub-assemblies, and less engineering effort at the plant level. In other words, the industry is moving towards an organizational model closer to the assembly of imported components than to integrated local production.

Together with this phenomenon, another noteworthy development in the cases of Chile, Argentina and Mexico is the contraction in the other activities of the metal products and machinery sector (capital goods, agricultural machinery, machine tools, etc.), which involve a good deal of domestic added value and in-plant engineering and have a strong impact on local technological capacity. Research and development on new products and production processes has declined, and local firms in these branches of industry now seem more disposed to operate as representatives and licensees of international brands than they were a few decades ago.

In Brazil, the destruction of local engineering capacity seems to have been less serious than in the other countries mentioned, but in this case too the general direction of the restructuring process shows various similarities.

TABLE 7

**Latin America (6 countries): Import coefficients, 1974-1994**

| Sectors [a] | Argentina | | | Brazil | | | Chile | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1974 | 1990 | 1993 | 1974 | 1990 | 1994 | 1974 | 1990 | 1994 |
| I | 10.8 | 13.7 | 48.9 | 22.8 | 17.0 | 22.6 | 119.9 | 239.2 | 233.2 |
| II | 2.4 | 4.8 | 22.8 | 8.9 | 6.5 | 17.9 | 100.5 | 231.3 | 259.8 |
| I+II | 7.8 | 10.3 | 36.4 | 18.1 | 13.8 | 21.2 | 114.1 | 237.5 | 239.4 |
| III | 0.5 | 0.2 | 2.8 | 2.3 | 3.0 | 5.7 | 37.2 | 5.6 | 7.4 |
| IV [b] | 26.7 | 8.9 | 24.1 | 27.3 | 7.2 | 10.7 | 50.9 | 60.8 | 63.8 |
| III+IV | 10.5 | 3.3 | 10.6 | 15.9 | 5.4 | 8.8 | 43.5 | 25.5 | 26.3 |
| V | 2.7 | 1.9 | 8.3 | 3.1 | 2.8 | 5.2 | 15.8 | 23.3 | 37.4 |
| **Total** | **7.2** | **4.1** | **16.6** | **13.1** | **6.7** | **11.5** | **48.3** | **54.4** | **60.4** |

| Sectors [a] | Colombia | | | Mexico | | | Peru | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1974 | 1990 | 1994 | 1974 | 1990 | 1994 | 1974 | 1990 | 1994 |
| I | 59.9 | 97.9 | 113.4 | 33.7 | 71.8 | ... | 93.3 | 95.9 | 216.1 |
| II | 55.8 | 44.2 | 118.8 | 29.5 | 30.2 | ... | 29.3 | 36.9 | 187.0 |
| I+II | 58.5 | 76.9 | 115.6 | 32.0 | 50.6 | ... | 71.8 | 71.4 | 206.1 |
| III | 3.4 | 2.2 | 5.6 | 2.5 | 6.4 | ... | 4.7 | 5.1 | 6.1 |
| IV [b] | 48.2 | 45.2 | 47.1 | 17.8 | 20.3 | ... | 29.3 | 19.7 | 36.6 |
| III+IV | 20.3 | 18.8 | 22.9 | 7.9 | 12.0 | ... | 13.5 | 8.9 | 13.7 |
| V | 6.1 | 6.5 | 13.1 | 3.6 | 8.6 | ... | 3.6 | 2.3 | 6.2 |
| **Total** | **20.9** | **23.9** | **35.9** | **11.0** | **19.1** | **...** | **15.8** | **10.3** | **19.9** |

*Source:* Industrial Growth Analysis Programme (PADI) and data prepared by the authors.

[a] I = Metal products and machinery in general (ISIC 381, 382, 383, 385).
II = Transport equipment (ISIC 384).
III = Foodstuffs, beverages and tobacco (ISIC 311, 313, 314).
IV = Industrial commodities (ISIC 341, 351, 354, 356, 371, 372).
V = Traditional industries (ISIC 321, 322, 323, 324, 331, 332).

[b] The figures for Chile do not include the basic copper industry (ISIC 372).

*c) The differences among countries in terms of performance and results obtained*

Although this move towards industries specializing in the processing of natural resources has been fairly widespread in the region, it should be noted that the form assumed by this process of structural change has displayed differences from one country to another which are important to bear in mind when appraising the long-term sustainability of the process. Thus, the index of structural change (ISC) [3] registers a higher value for Chile than for Mexico or Brazil, thereby indicating that the changes in the production structure were a good deal more radical in the first-named country. Argentina and Colombia register intermediate values (table 6).

Brazil has been successful, to a greater extent than the other countries of the region, in preserving the metal products and machinery and capital goods sectors that make the most intensive use of domestic engineering and are very important sources for the development of local technological capacity (table 6). In Chile, in contrast, these sectors suffered a clear setback, and a similar setback –rather less marked, but nevertheless significant– was observed in Argentina (the only country which had a metal products and machinery sector at the beginning of the 1974-1994 period that was at a comparable level of development to that of Brazil). In this sense it would appear that, even within a restructuring process with many common features linked with greater exploitation of natural resources and a return to static comparative advantages, the differences between the various national production systems have been growing, and Brazil has maintained, to a greater extent

[3] The ISC is an indicator developed by the United Nations Industrial Development Organization (UNIDO) to measure the intensity of changes in industrial structures. It is calculated on the basis of the variations in the relative weight of each sector, between a base year and a final year, in the total industrial added value of a country. Consequently, it does not measure the direction of a given change (i.e., it does not indicate whether a structure has evolved towards industrial commodities or towards metal products and machinery, for example, but only the size of the changes which have taken place).

than other countries of the region, its historical stock of industries with a high engineering content and its accumulated technological capacity.

The external sector indicators also bring out significant differences between countries. Analysis of the import coefficients, for example, reveals some important points (table 7). On the one hand, in Chile and Mexico both the export and import coefficients registered a big increase over the period in question.[4] On the other hand, Argentina, Brazil and Colombia present us with three different situations. In Argentina, the most important increase was in the import coefficient, whereas Brazil achieved a significant increase in its export coefficient without any major increase in its imports. Colombia, for its part, registered a somewhat smaller increase in its export capacity, accompanied by a rise in its import coefficient, which was already relatively high at the beginning of the period in question. As a result, the manufacturing trade balance of each country behaved differently in each case: it went from positive to negative in Argentina and Chile, registered a notable surplus in Brazil, and suffered a deterioration in Colombia and even more so in Mexico.

In order to explain these different results, we must take into account a whole set of structural, macroeconomic and institutional factors (see Bielschowsky and Stumpo, 1996). It is very likely that the high level of complexity reached by the metal products and machinery sectors, the scale of the domestic market and the higher level of protection maintained up to the early 1990s strongly influenced the fact that Brazil maintained an industrial structure more oriented towards dynamic and technologically advanced sectors than the other countries of the region.

Likewise, in Chile –a completely opposite case– the combination of greater trade liberalization with growing appreciation of the currency, a relatively small domestic market, the absence of nearby regional markets of any substantial size, the lack of industrial policies designed to aid capital goods producers, and the availability of abundant natural resources that could be exploited in the short and medium term led to a process of de-industrialization and the orientation of production towards natural-resource-based industrial commodities.

# IV

## Mesoeconomic and microeconomic features of the new industrial organization scene

So far, we have looked at the process of Latin American industrial restructuring in the 1980s at a relatively high level of aggregation, showing that there has been a marked change in the composition of the manufacturing product as a result of the macroeconomic stabilization and structural reform policies applied. Industries which process raw materials have had more success than those that make intensive use of labour or engineering services, and have consequently gained a relatively larger share of the industrial product. The textile, footwear and metal products and machinery branches have been hardest hit by trade liberalization and deregulation of the economy, and their volume of production and level of employment have fallen sharply. The death rate of businesses in these sectors has been unusually high, especially among family-type small and medium-sized firms, as we shall see later in this section.

As noted in the opening paragraphs of this article, while the economic and social restructuring process of the 1980s may be analysed at the macroeconomic level, it can also be examined at a much more disaggregated level, taking account of the changes which have occurred in the structure and behaviour of whole branches of activity, or in the approaches and organization of work of individual firms. At these different levels, a wide variety of stories can be recounted on successes and failures and successful or unsuccessful adaptation to the new

[4] In reality, differences are also to be observed between these two countries in the following respect: while Chile directed its export effort towards foodstuffs and industrial commodities, Mexico placed more emphasis on automobiles and electronic products. In both countries, however, the main increases in imports are in metal products and machinery.

"regulatory model" for production activity. There is therefore a need for coherence between the macro, meso and microeconomic interpretations of what happened during the process of transition to the new public policy system of the 1990s. In this section we will deal with the meso- and microeconomic interpretations of the events which have been observed.

In order to proceed to these more disaggregated levels of economic analysis, we have selected two special issues on which to centre our arguments. Firstly, the macroeconomic stabilization and structural reform programmes have been far from neutral as regards their effects on firms of different types, as may be seen if we compare their impact on small and medium-sized family-type firms with their effect on domestic-capital conglomerates and local subsidiaries of transnational corporations. Because of the bias of these programmes against public enterprises and their differential impact with regard to companies' access to factor markets (especially capital), the changes in global public policies have in fact acted as a powerful non-neutral selection mechanism which has favoured economic concentration in the countries of the region. Secondly, recent changes in the organization of labour at the individual plant level are displaying a strong labour-saving bias which is affecting both the size and the composition of the employed labour force. In other words, the macroeconomic stabilization and structural reform programmes have favoured economic concentration and adversely affected the capacity of the economies of the region to absorb labour in manufacturing. We shall now consider these two issues in greater detail.

## 1. The changing roles of small and medium-sized firms, transnational corporations and big local-capital conglomerates in manufacturing

Industrial enterprises normally belong to one of four well-defined groups: i) small and medium-sized enterprises (SMEs), many of them family-owned; ii) large local-capital firms and conglomerates; iii) local subsidiaries of transnational corporations, and iv) public enterprises. Among these groups, there are big differences as regards labour organization models, capital density, access to factor markets (especially long-term capital), and technological capacity, to name only a few aspects. Recent changes in global public policies have been far from neutral in terms of their impact on these groups, and this has led to significant economic concentration in the sphere of manufacturing.

Let us begin with the first group: the vast universe of SMEs, many of them still family owned and run, which are heavily represented in the production of such goods as footwear, machine tools, furniture or clothing. In all these sectors there was a heavy business deathrate in the 1980s, first as a result of the sharp contraction in domestic demand following the application of the macroeconomic stabilization programmes, and subsequently because of the difficulties these firms have experienced in adapting to a more open economy and a much more competitive climate, subject to the discipline of foreign competition. The SMEs have found it harder to gain access to capital markets because of their lack of acceptable bank guarantees, while they have remained on the sidelines of the technology markets because of their proverbial lack of information. Their perception of the nature of the changes in global public policies has been very imperfect, as also have their efforts to adapt to the new industrial organization model (Mizala, 1992; Boscherini and Yogel, 1996). As they have started off with outmoded production processes and product designs, as well as plants which still retain much of the organization of work used before the recent "flexible manufacturing" revolution and a family-style business and management structure which has found it hard to cope with the complexities of "just in time" and "total quality" organizational principles, many of the SMEs have not been able to survive in the far more competitive atmosphere of the 1990s (Castillo, Dini and Maggi, 1996; Kosacoff, 1993). The sales and purchases of enterprises, forced mergers and a high rate of bankruptcies reveal that among these industries often as many as half of the firms have been forced out of the market.

Of the survivors, many survived simply because they significantly changed the nature of their operations, giving priority to financial and speculative transactions and partly abandoning engineering and production activities (Mizala, 1992). Others, in contrast, managed to survive by becoming subcontractors for big transnational firms (Posthuma, 1995) or retreating into small market niches. Only a few kept going by making substantial investments and significantly improving their plant and technological capacity, retraining their labour force, and profoundly changing their business management principles. In

the 1990s, the most dynamic firms have increased their purchases of foreign equipment and international licences for new products and production processes, gradually adopting various forms of leasing or obtaining franchises from big transnational chains.

The second group –the big domestic-capital conglomerates operating industries that process natural resources such as pulp and paper, vegetable oils, iron and steel or petrochemicals– were able, unlike the SMEs, to make spectacular advances on the regional production scene (Bisang, 1996). In recent years, a large number of new plants –many of them belonging to such conglomerates– have been built which are highly capital-intensive and use technologies very close to the most advanced international practice. These plants have enjoyed generous fiscal subsidies and other forms of public support, especially in Argentina and Brazil (Bisang, Burachik and Katz, 1995). As explained in the previous section, many of these plants were originally intended to satisfy the domestic demand of the countries in question, although not in the Chilean case (Díaz, 1996; Stumpo, 1995); subsequently they had to reprogramme their operating strategies and turn to exports when the domestic market contracted as a result of the macroeconomic stabilization programmes and the installed capacity proved excessive for a domestic market that in some cases shrank to half that originally foreseen. More recently, many of these big domestic-capital conglomerates have entered into agreements and strategic alliances with transnational banks and foreign subcontractors or engineering firms in order to take part in the privatization programmes undertaken as part of the global development strategies of various countries of the region, and their market power has increased still further on the local production scene as a result of these association agreements.

The third group of enterprises to be considered is that of the local subsidiaries of transnational corporations, mainly engaged in the production of foodstuffs, motor vehicles, petrochemicals and pharmaceuticals. The flow of foreign direct investment to the Latin American industrial sector went down significantly in the 1980, when various transnational corporations decided to leave the markets of Argentina, Chile and Colombia (and, to a lesser extent, that of Brazil) because of the contraction of domestic demand and the turbulent economic and social climate. At the end of that decade and the beginning of the 1990s, however, some of those corporations sought to return to those countries, but this return has often formed part of a globalized transnational operating strategy and has no longer had anything to do with the idea of supplying almost exclusively the domestic markets of the host countries. In view of the progress made by regional integration programmes such as MERCOSUR or the North American Free Trade Agreement (NAFTA), these corporations have given their globalized operating strategies a more permanent nature, and their managements have sought new forms of organization to adapt to those strategies. The privatization of public sector assets and the purchase of debt paper at knockdown prices in the secondary markets for such securities have given old and new transnational corporations ample opportunities to expand their interests in the region and thus increase their relative share in GDP.

The fourth and last group is that of the big State enterprises which have played a leading role over the years in such fields as the oil industry, iron and steel, mining, etc. Many of these enterprises have formed the backbone of the privatization processes carried out in recent years in the region. In many cases, such privatization operations were carried out primarily for short-term fiscal reasons, with the aim of bringing resources into the government coffers. In others –perhaps the fewest– the aim was rather to improve the microeconomic efficiency of the production apparatus by doing away with monopoly situations and trying, through the splitting-up of these enterprises, to give rise to new forms of competition designed to favour the end-users of the services in question. Examples of this are to be found, *inter alia,* in the fields of energy generation and distribution and telecommunications. Chile is perhaps the country which has gone farthest in this direction. It is hard to draw up a final balance on whether this process has been a success or a failure, but what is beyond doubt is that the big State firms have lost considerable weight in the region and their relative share in the global and manufacturing GDP has gone down significantly.

In the 1990s, each of these four major groups of firms has had to face different types of challenges and new opportunities in the light of the changes in global public policies. They have displayed very diverse capacities to adapt to the new set of rules, so that the results obtained have also been very different. Small and medium-sized firms, many of them family owned and run, and the big public enterprises

have lost considerable ground in the region, resulting in a big increase in economic concentration both at the sectoral level and within the global economic activity of each country. Thus, in the mid-1990s 30% or more of the industrial product of each of the countries of the region is controlled by something like a score of big firms which are either domestic-capital conglomerates or subsidiaries of transnational corporations (Paredes and Sánchez, 1996; Bisang, 1996; Obstchatko, 1996).

## 2. The factor-saving slant of recent changes in the structure of production and the organization of production at the enterprise level

The industrial restructuring process considered so far has taken place in extremely unstable macroeconomic contexts, in the midst of great social upheavals. One of the main features of this process has been the sharp contraction in gross investment, both private and public. The rate of investment in some particular sectors of industry –in branches that process natural resources, for example– has remained significantly high, however, even when global investment has gone down. It may therefore be assumed that the relative weight of the capital-intensive branches of production has grown considerably in each economy, whereas that of the branches that make relatively intensive use of labour or of technological know-how and engineering services has gone down significantly.

The new plants for processing natural resources need few workers. Generally speaking, they are highly automated, their pace of work is set by the basic sub-processes used rather than by the organization of factory labour, they produce a highly standardized set of goods, they do not need much engineering work on product design, and they use practically no unskilled labour (Obstchatko, 1996).

In contrast, the restructuring of production patterns in the industrial branches which make intensive use of labour or of engineering or organization and methods services, such as footwear, clothing, textiles, machine tools and agricultural equipment, has resulted in big cuts in both administrative personnel and factory workers and technicians. The labour-saving effect has become more and more visible as firms have advanced towards less vertical integration in their production processes, greater subcontracting of parts, components and services from third parties, and the incorporation of a greater unit content of imports in their end-products. These processes have led to the introduction of a multitude of "disincorporated" labour-saving changes in technology. Many firms have found that they can produce the same amount of goods, or even more, with half or a third of the previous labour force. Labour productivity has grown significantly, while structural unemployment has begun to be a leading concern in various countries of the region, including Argentina and Brazil (Katz (ed.), 1996). In many countries, this has occurred side by side with a serious weakening of the trade union structure, in the context of a radical change in labour relations and in the behaviour of the archetypal institutions of the labour market. Simplified arrangements for dismissal and flexible forms of hiring have spread considerably compared with one or two decades back.

In general terms, entrepreneurs can be placed in three major categories, depending on their reaction to the restructuring of their plants and their long-term strategies (Kosacoff, 1993). First, there are the "proactive" firms, where adaptation to the new set of rules has meant, among other things, new physical investments, expansion of installed capacity, changes in the range and nature of products manufactured, retraining of staff, and changes in relations with the trade unions. In addition to the industries processing natural resources, to which we already referred earlier, this group also includes the motor vehicle industry, especially in Mexico but also, to a lesser extent, in Brazil and Argentina (Shaiken and Mankita, 1995).

A second quite important category covers firms which have taken a defensive attitude to the changes and have concentrated their response on relative savings of labour through the introduction of a host of "disincorporated" technological changes in the organization of work (Kosacoff, 1996). In both this and the first-named category, the capital/labour ratio has risen significantly (though much more in the first category), as also has labour productivity. The replacement of labour with capital and labour-saving technological changes have played an important role in both types of situations (Katz (ed.), 1996).

However, there is a third –and very numerous– category of firms which have adapted to the new circumstances only minimally or which have not even tried to adapt: in this category, the business death-rate has been and will continue to be extremely high. Inertia, faulty information, and difficulty in

gaining access to factor markets (especially long-term credit) and to technology are the main reasons for these situations. In view of the large number of firms in this category, it can readily be understood why structural heterogeneity has been on the rise in many countries and why substantial sectors of the community feel that the new macroeconomic policies are threatening their survival.

To sum up, there has been an incomplete and imperfect transition to a new model of social organization of production in the region, and this has led to greater economic concentration than in the immediate past, with few new job opportunities. Labour productivity has made very significant advances in various branches of industry, but the prevailing structural heterogeneity means that the improvements achieved are neither generalized in the sector, nor do they involve the whole of the labour force. All this is taking place in an industrial structure which was very far behind international standards of labour productivity to start with. It can only be hoped that the dynamics referred to will continue to operate and that in time the relative gap between the Latin American countries and the international technological frontier will be closed. However, if this takes place in aggregate terms, what differences are likely to appear between industries? We will consider this question in the following section.

# V

## The relative productivity gap

In this section, we will explore the question of the relative productivity gap separating the region from the international technological frontier.

One way of studying these convergence processes is to formulate a structural growth model and, on the basis of it, estimate a reduced version for the exogenous variables. This procedure, which has typically been used in empirical studies on what are known as the new exogenous growth theories, assumes that the researcher knows the "true model" and does not fall into specification skews.

Another alternative is to examine the problem on the basis of the study of the stochastic properties of the time series involved, subsequently establishing an interpretative framework for the findings thus obtained; this approach has the advantage that it frees the researcher from the need to formulate an *a priori* causal model, and it has also shown a capacity of prediction superior to more conventional approximations (Dickey and Fuller, 1979; Doornik and Hendry, 1994).

If we take this latter path, then after studying the degree of integration of the series and identifying their stochastic generation process we must seek a stationary presentation of them and, through the corresponding estimates by recurrent least squares, together with sequential Chow tests, we must proceed to identify the structural breakpoints in both the levels and the trends of each series.

This was the method applied here to the labour productivity of Latin America and of the United States in the following fields: total manufacturing sector; foodstuffs, beverages and tobacco; industrial commodities; machinery and equipment, and traditional industries. The tests of the order of integration of the series were based on Dickey-Fuller tests increased with variable lags for each series and a deterministic trend. In no case was it possible to reject the null hypothesis that the series are first-order integrates. Studies were then made in terms of growth rates of labour productivity. The results obtained for the estimation of model 1 are presented in the following paragraphs.

*Model 1*

$$D\ln(Q/L)_{ijt} = \alpha+\beta Trend+\Sigma^{K}_{h=1}[\gamma_h D_{ijh}+\delta_h(D_{ijh}*Trend)]+e_{ijt}$$

where:

$i$ = sector
$j$ = region (Latin America or United States)
$D_{ijh}$ = dumb variable which has a value of 0 or 1 depending on whether or not there is evidence of structural change in period $h$
$K$ = number of possible structural changes identified
$e_{ijt}$ = $N(0,\sigma^2)$.

## 1. Closing the gap or losing ground? The experience of the 1970s, 1980s and 1990s

Figure 1 shows the results obtained for manufacturing as a whole when comparing the labour productivity of Latin America with that of the United States between 1975 and 1995. The top left segment of the figure shows the logarithms of labour productivity in the two regions, while the top right segment shows the same series, but superimposed so as to adjust the measurements of the series to simulate identical starting conditions. Finally, the lower segment shows the evolution of the productivity growth rates and identifies the discontinuities in each series.

In general terms, around 1970 Latin America had a level of industrial labour productivity which was only 26.5% of that of the United States. Subsequently, a process of convergence began which coincided with the oil crisis and with an absolute drop in United States productivity which lasted until 1983. Meanwhile, the region continued to grow at close to 2% per year, without showing any signs of the adverse effects of the oil crisis: this is typical of closed economies in which the State, through its control of the currency, takes action to cushion the volatility of external prices, often financing this action with the inflation tax.

The convergence process then came to an end when the United States recovered a higher growth rate in the mid-1980s. Although the region also recovered a little with the loosening of external constraints (due to the debt crisis) and the structural changes of the early 1990s, this has had only transitory rather than permanent effects on the growth rate of Latin American productivity: there was really just a one-time leap forward which brought the region closer to the international frontier but was not sustained over time. As a result, by the end of the 1974-1994 period the convergence was virtually insignificant and Latin American productivity was still only 27.2% of that of the United States.

## 2. The productivity differential, by major sectoral groups

This section will analyse the sectoral differences in labour productivity between Latin America and the United States. Figure 2 shows the behaviour of the foodstuffs, beverages and tobacco industries. It will be noted that in Latin America this sector displays great stability (its productivity grew by less than 2% per year during the period 1970-1994). In the United States, in contrast, the sector shows the heavy impact of the mid-1970s crisis, when productivity growth slackened by six percentage points; this situation was reversed as from 1983, but the rates became smaller and smaller, reaching a level of around 3% per year by 1994. This pattern reflects a convergence process similar to that of industry as a whole, with a gap that closes somewhat from 1974 onwards, but grows steadily wider as from the second half of the 1980s. The net result is that Latin American productivity in this sector has remained at about 22% of the United States level.

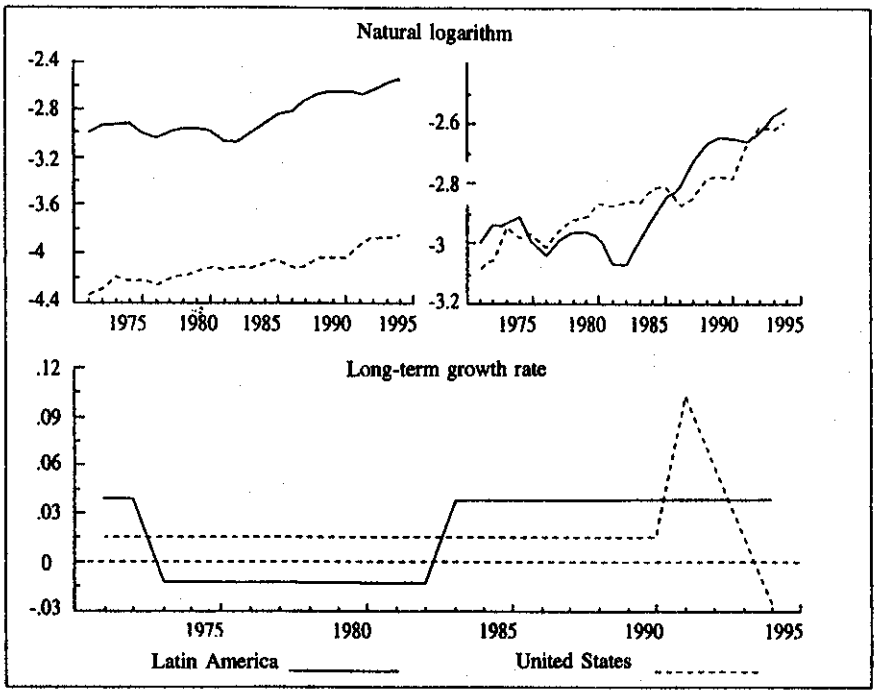
In the case of the traditional industries (textiles, clothing and footwear), productivity grew over the period 1970-1994 at a rate of a little under 2% per year. Unlike the preceding case, however, productivity in these industries took an upturn at the beginning of the 1990s, but this could not be maintained, and the period under analysis ended with a downward trend. In contrast, the United States reacted to the 1970s recession with a slump of six percentage points in the growth rate (accompanied by a drop in productivity), but its traditional sector recovered much more rapidly than the foodstuffs, beverages and tobacco sector, which stagnated for a longer time. This means that the convergence was much less marked and the Latin American traditional sector suffered a setback in relation to the United States, declining from a relative efficiency level[5] of 27.5% to one of 22.5% (figure 3).

The Latin American industrial commodities sector, for its part, behaved in a stable manner throughout the period, with a growth rate of around 3% per year. This rate is clearly superior to that of the United States (1.5%), thereby making possible a consistent convergence process which was heightened by the crisis of the sector in the United States from the late 1970s until the early 1980s. In the latter country, the sector showed a vigorous recovery, but this could not be maintained (perhaps it merely reflected the recovery of under-utilized installed capacity), and it has stagnated up to the mid-1990s. In net terms, the region consistently narrowed the gap, with its relative efficiency rising from 33.3% in 1970 to 45% in 1994 (figure 4).

[5] This is the ratio between the labour productivity of Latin America and that of the United States.

FIGURE 1

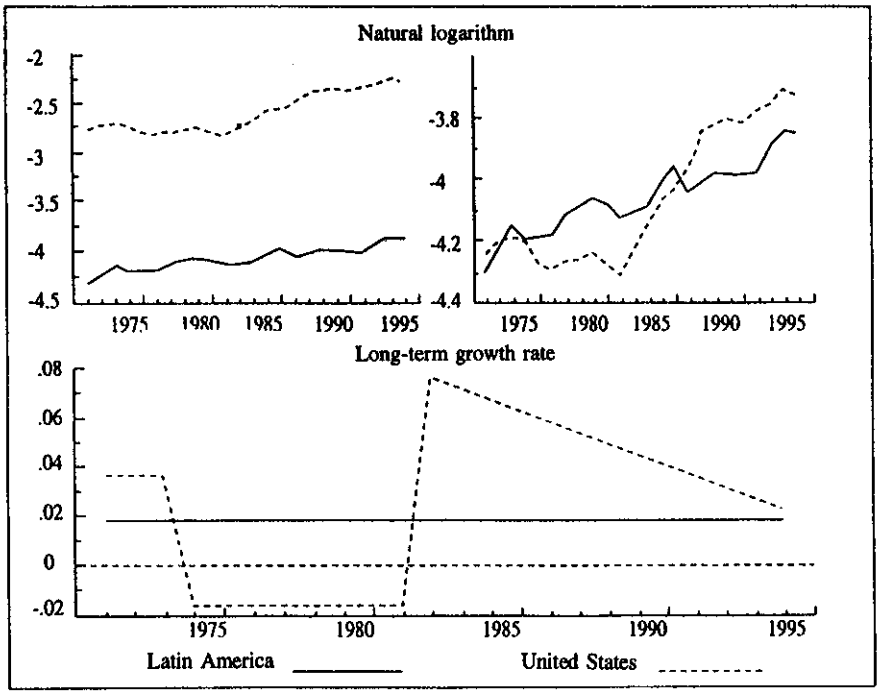
**Latin America and United States: Labour productivity in the manufacturing sector as a whole, 1970 -1994**




*Source:* Prepared by the authors.

FIGURE 2

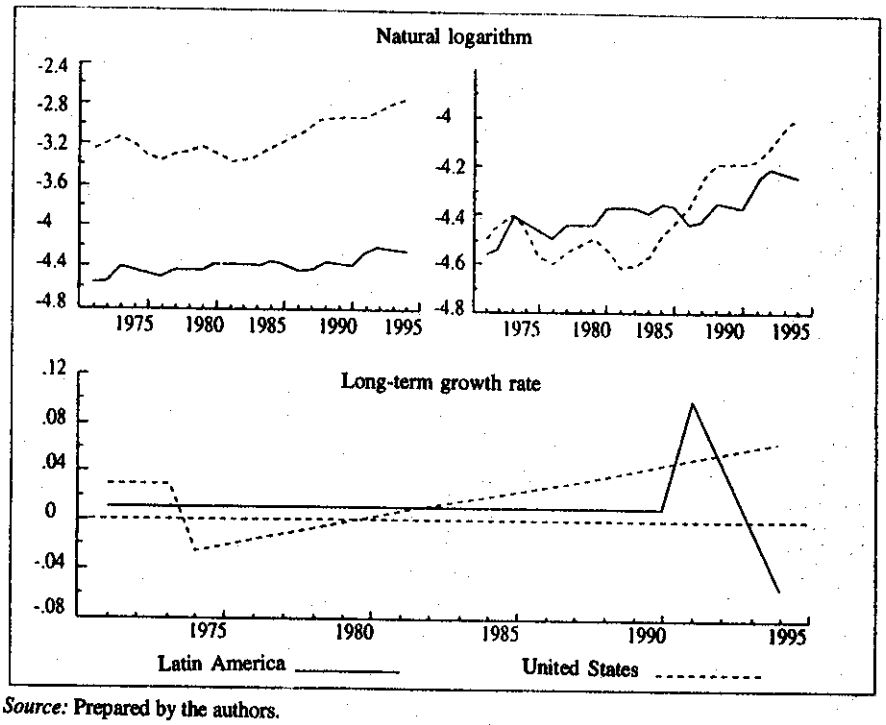
**Latin America and United States: Labour productivity in the foodstuffs, beverages and tobacco sector, 1970 -1994**




*Source:* Prepared by the authors.

FIGURE 3

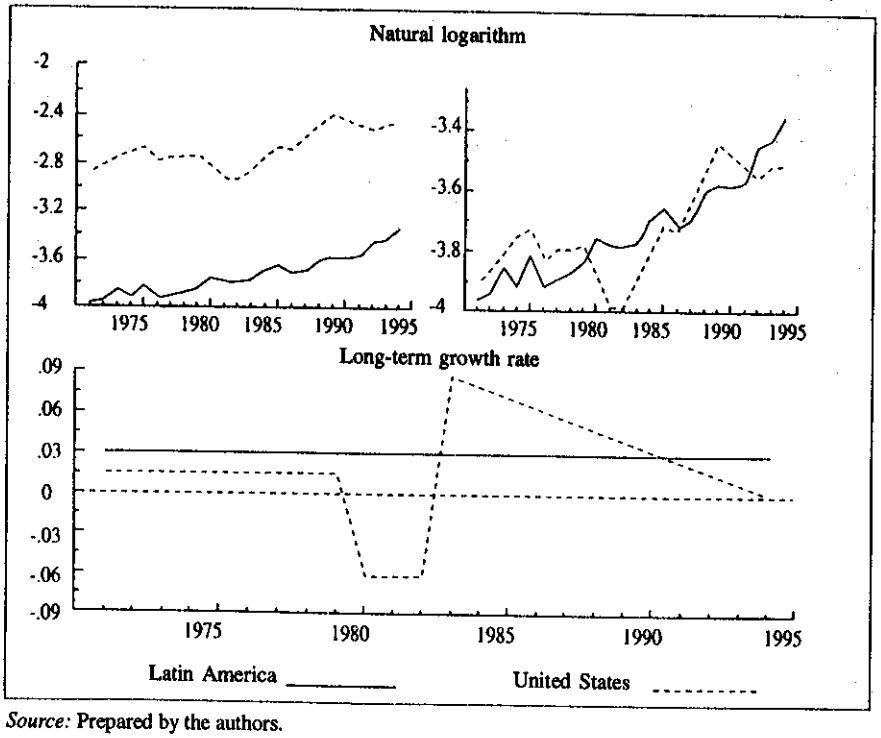
**Latin America and United States: Labour productivity in the traditional industries sector, 1970 -1994**




*Source:* Prepared by the authors.

FIGURE 4

**Latin America and United States: Labour productivity in the industrial commodities sector, 1970 -1994**




*Source:* Prepared by the authors.

Finally, in the metal products and machinery and transport equipment sectors Latin American and United States productivity levels have tended to converge (figures 5 and 6), but as the initial gap was bigger in the case of transport equipment, the rate of convergence is higher in the motor industry than in the metal products and machinery sector. Among the factors contributing to the narrowing of the gap, the 1970s crisis once again played a significant role, as it caused United States productivity growth to slacken by eight percentage points in both sectors, whereas Latin American productivity has continued to grow at its historical rate of 3% per year for the transport equipment industry and 1.7% for the metal products and machinery sector. In the case of the latter sector, however, there was a "permanent" change in its productivity in the first half of the 1990s, so that it rose above the United States trajectory and thus narrowed the sectoral gap more markedly.

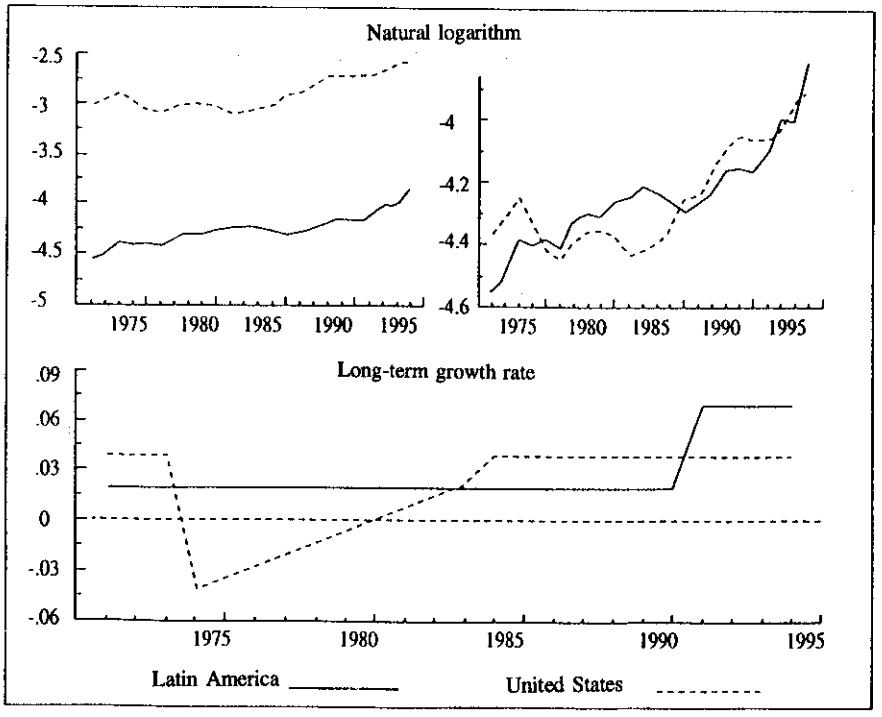
To sum up, if we look at the variations in the labour productivity of various industrial activities in Latin America and the United States, we see that between 1970 and 1994 there has been a process of convergence in the industrial commodities sector and in that of transport equipment (especially in the motor industry). Less striking, but none the less important, progress was made by the metal products and machinery sector, which has narrowed its relative gap by around 28% (table 8).

In contrast with these "successes", there has been a significant relative loss of productivity –widening of the gap– in the so-called traditional sector. The foodstuffs, beverages and tobacco sector shows no change over the period as a whole.

(Original: Spanish)

FIGURE 5

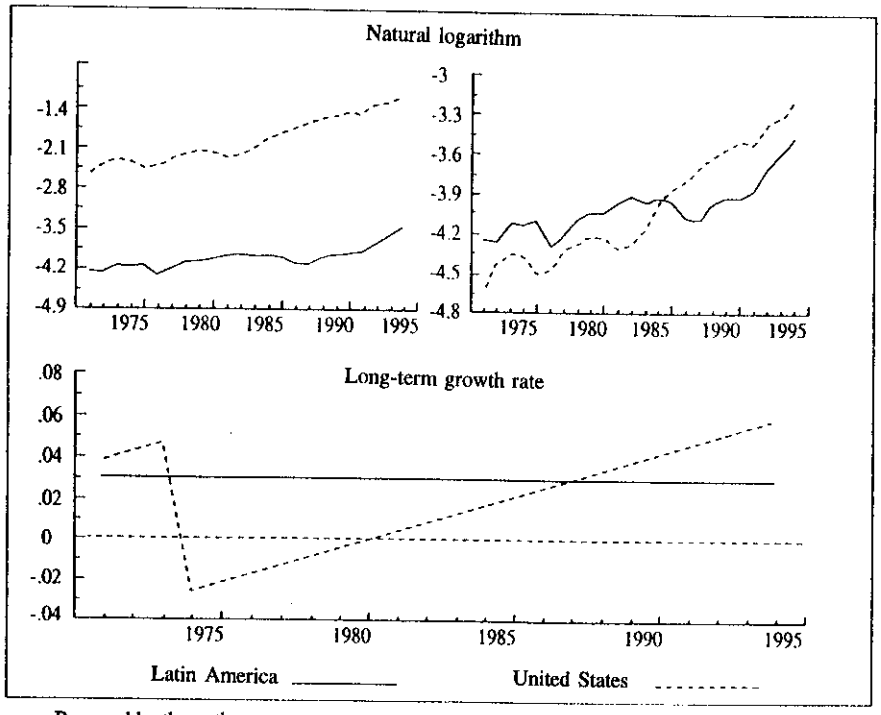
**Latin America and United States: Labour productivity in the metal products and machinery sector, 1970 -1994**




*Source:* Prepared by the authors.

FIGURE 6

**Latin America and United States: Labour productivity in the transport equipment sector, 1970 -1994**




*Source:* Prepared by the authors.

TABLE 8

**Latin America and the United States: Relative labour productivity of the two regions in selected sectors, 1970 and 1994**
*(Percentages)*

| Sectors | Initial efficiency (1970) | Final efficiency (1994) | Percentage variation between 1970 and 1994 |
|---|---|---|---|
| Foodstuffs, beverages and tobacco | 22.3 | 22.3 | ... |
| Traditional industries | 27.5 | 22.5 | -18 |
| Industrial commodities | 33.3 | 45.0 | 35 |
| Metal products and machinery | 22.3 | 28.6 | 28 |
| Transport equipment | 16.5 | 23.4 | 42 |

*Source:* Prepared by the authors.

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