TECHNOLOGY AND INDUSTRIAL RESTRUCTURING IN LATIN AMERICA: THE 1990s

Jorge Katz
José Miguel Benavente

TECHNOLOGY AND INDUSTRIAL RESTRUCTURING IN LATIN AMERICA: THE 1990's. ([1])

1. Introduction

The need for selective government interventions aimed at attaining a satisfactory long term rate of economic expansion and an adequate pattern of insertion into the international economy is once again becoming a fashionable topic for discussion among academic economists and policy makers throughout Latin America.

One of the main reasons for this to be so is the growing realization that macroeconomic stability, the de-regulation of markets and an open trade regime might not be sufficient conditions for countries to attain a self-sustained process of economic growth and an optimal pattern of integration into a globalizing world economy in the years ahead. The East Asian Miracle study recently presented by the World Bank has strongly contributed in developing such prise de conscience. Scholars and policy makers examining the experience of countries such as Japan, Korea or Taiwan have come to the conclusion that the 'visible hand' of governments has played a major rol in all of these cases creating markets, developing institutions, distributing technical information, inducing cooperative actions among firms, etc. which succeeded in dramatically changing the structure and performance of each one of these societies in the course of the last three to four decades.

Moreover, the fragile nature of the recent Mexican or Argentine laissez faire experiment also seems to point out that the free functioning of markets might not be enough to bring about an increase in the rate of savings and investment and a sufficiently strong process of technological upgrading and modernization, both of which seem to be needed at this point in history if these countries are to a return to a satisfactory equilibrium long term growth path.

Questions of increasing returns to scale, externalities, imperfect information, coordination costs, 'public goods' etc. appear as major sources of market malfunctioning demanding

---

[1]/ Jorge M. Katz. Regional Advisor on Industrial and Technical Development, DPPM, ECLAC, Santiago de Chile and Professor of Industrial Economics, Universities of Buenos Aires and Chile. José Miguel Benavente. Associate Economic Affairs Officer, DPPM, ECLAC, Santiago de Chile and Professor at the Department of Economics, Universidad de Chile. The present paper has been prepared for the Netherlands Economic Institute (NEI) Conference: "Globalization of labour markets; challenges, adjusments and policy response in the European Union and the less developed countries", to be held at Rotterdam on May 1995. The usual disclaim applies.

different forms of selective interventions capable of improving the long term performance of the economy.

It is worth noticing at this point that this revival of 'old' development theory questions and debates takes place at a time in which a new generation of growth theorists - represented, for example, by, P.Krugman or P.Romer, - is extensively writing on these same topics legitimizing some of the old thinking of A.Hirschman, Rosenstein-Rodan or other early pioneers of Development Economics.

The purpose of this paper is to revisit this broad set of issues in the context of the Latin American industrialization process. We intend, first, to present a non orthodox description of the main 'stylized facts' characterizing such process and, second, to proceed therein with the examination of various different industrial policy questions emerging from our general diagnosis. Both, Latin American countries and the world economy have experienced dramatic changes throughout the 1980's and in recent years and it seems quite clear today that many new institutions and economic coordination mechanisms and strategies are presently needed if Latin American countries are to attain the rate of productivity growth and technological modernization that seem to be now required for a successful integration into the world's new economic order.

The orthodox critique concerning the negative impact of excessive protectionism in Latin America in the past is now widely accepted. In our opinion, however, such critique does not provide a prima facie case against selective interventions in general but rather against the careless way in which policy making was conducted in the region up until the mid and late 70's. Chilean economic policy making in the 1980's and 1990's can be regarded as a successful mix of laissez faire and selective interventionism largely confirming the fact that 'market economies' could take many different forms in the real world and that each society has a some degrees of freedom in deciding which way to go as long as it does not seriously violates some basic principles of public administration. There does not seem to be any reason on account of which other Latin American countries would not follow this lesson in the years ahead and search for a successful combination of markets and intervention adapted to their particular circumstances.

The critical diagnosis of the Latin American experience contained in the Washington Consensus-type literature (Williamson, 1990) has led main-stream economists into a rather derogative view of the import substitution process and of the role of public intervention during the post-war years.

We shall argue here that such literature presents an ideological and partially misleading account of the Latin American industrialization story. A more balanced picture can probably be attained if we accept that the expansion of industry also brought about a massive technological and engineering learning process

which has gradually diffused throughout society upgrading domestic technological capabilities and the degree of maturity of the local production fabric. Countless firms and industries have attained an important degree of modernization and have been able to accumulate managerial and engineering skills expanding both their productivity and their international competitiveness. A qualified labour force and a modern industrial culture have emerged and constitute a major asset for the future. The process might not have been of the magnitude and dynamism observed in some - certainly not in all - of the South-East Asian countries but it has nevertheless had many more positive features and consequences than those normally recognized in the orthodox accounting of the facts. Manufacturing exports increased at a fairly rapid pace during the last couple of decades, and the rate of external protection has gradually fallen through time, much before - and quite independently - of recent trade liberalization efforts carried out under the influence of neoliberal thinking.

Major inter-country and inter-industry differences can be identified when we look at the region as a whole, particularly when we compare industrially more mature societies - such as Brazil or Argentina - with others in which the development of domestic technological capabilities started somewhat later or proceeded at a slower pace. Differences can also be found when we examine sectors producing capital goods and consumer durables - which were erected during the early stages of the ISI process and were initially ment for domestic consumption - and raw material processing industries producing industrial commodities, such as petrochemicals, pulp and paper, aluminum, fishmeal or vegetable oil, which grew rather rapidly in the late 1970s and throughout the 1980's. These last sectors - much more capital intensive and of a continuous flow nature - confront us with very different production organization and industrial policy questions than the former ones. In both territories, however, the need for an explicit industrial policy is presently felt with increasing urgency, as we will have the opportunity to show throughout this paper.

2. 'Old' and 'new' theoretical questions.

Recent writings by authors such as P.Krugman, P.Romer or J.Stiglitz have once again brought attention to almost forgotten concepts such as increasing returns to scale, externalities, endogenous technological learning, asymmetric information, transaction costs, the 'public good' nature of information, its incomplete specification and imperfect accessibility, etc.

Some of these concepts had been used in the past by development economists (Lewis, 1954; Myrdal, 1957; R.Rodan, 1943; Nurkse, 1952; Hirschman, 1958; Prebisch, 1950;) but were afterwards relegated to a back sit position with the strengthening of competitive equilibrium thinking and the discrediting of ideas concerning government intervention and central planning.

In his paper for the 1992 World's Bank Annual Conference on Development Economics, Krugman (1993) highlights the fact that some of these issues were quite central to 'old' economic development theory. Krugman himself puts strong emphasis upon the concept of increasing returns to scale, both as a major source of growth and as an yet unresolved problem for competitive equilibrium models . Its existence at the individual firm level generates strategic complementarities up stream and down stream in the production structure that call for coordination efforts from the part of the state. Market forces turn up to be incapable of providing correct price signals under such circumstances. Increasing returns to scale and complementarities are by no means unusual in manufacturing production and, as Krugman himself (1986) states, " ... If there are important rents in certain sectors, trade policy can raise national income by securing for a country a larger share of the rent-yielding industries." While his argument is framed in terms of trade policy it is quite obvious that a similar one can be made for industrial policy. This seems to us to be a strong enough justification of the role of the state as an inducer of the industrialization process and as coordinator of private decisions, capable of managing a package of selective policies inducing technological modernization and innovation in different sectors of the economy.

The recognition of the existence of increasing returns to scale at the firm level leads into models of imperfect competition. Such models are in sharp contrasts with competitive equilibrium models in which the rol of the state managing an adequate industrial property rights regime - patents - as well as antitrust legislation, antidumping control, etc. does not even appear as an issue for consideration.

Yet another important contributor to contemporary growth theory is P. Romer (1987,1990), who stresses the importance of endogenous technological change as an explanatory force of individual firm performance. Endogenous technical progress derives from 'in house' R&D and engineering efforts carried out for the 'adaptation' or improvement of product designs, production processes and organizational technologies. As with the case of increasing returns to scale and of strategic complementarities, endogenous technological change also implies that markets do not necessarily provide correct signals. Technical knowledge and information are characterized by imperfect appropiability and by what Romer calls non-rivalry features in consumption.(Romer, 1988). Excluding someone from consumption may not be feasible even if an adequate industrial property legal framework exists. Exclusion is still more complicated if such a legal framework is absent - like in many LDCs - or is purely nominal when challenged in court.

Market structure is not independent of appropiability and excludability. Again, the role of public regulation and coordination arises. In a first best world, the optimal decision would be to create knowledge just once and to allow all individual agents to have access to it costless and timeless. Obviously this

is incompatible with private appropriation of the benefits of R&D expenditure and with the right kind of incentives for its performance, both in magnitude and structure . Imperfect appropiability discourages investing in R&D and this can be partially mitigated by the creation of institutions such as patent laws, copyrights protection mechanisms, inventor's certificates, etc. We can intuitively perceive the 'second best' nature of the emerging institutions. As once pointed out by J.Robinson they block the diffusion of existing knowledge in order to induce the creation of new knowledge.

It is interesting to notice that many of the above mentioned topics were in fact central to ECLAC's thinking in the early fifties. The 'infant industry' argument used by ECLAC in those years strongly depends on an underlying notion of endogenous technological change as well as on the idea of non-convexities in the production function, that is, of increasing returns to scale and 'learning by doing'. Additionally, it is quite clear in Prebisch's writings that technical change, strategic complementarities and increasing returns to scale are greater in manufacturing than in agricultural production, so the former should be given priority from the part of public policy making. Moreover, we can also find in his writings the idea that differences in market structure account for the fact that the benefits of technical change in primary production are transferred to the consumers while this tends not to be the case with technical change in manufacturing production, thus the need for further strengthening the pace of industrialization.

There are, to be sure, significant differences between ECLAC's thinking and development economists such as Rosenstein-Rodan or Hirschman. The notions of state ownership and of central planning as a strategy of governance do not come up in the writings of the above mentioned authors with the strength that they do in the ECLAC's literature of the 1950's. The strong disarray that prevailed in world markets and the increasing world-wide degree of protectionism that followed the collapse of the Economic and Monetary World Conference of 1933, as well as the aurea of prestige that Soviet-type planning carried out in those days in the region contributed to the development of the ideological climate in which Latin American countries moved into the creation of a whole new set of institutions strengthening the role of governments in society, both as an 'engine' of growth and as a producer and provider of 'public goods' such as health, educational services or social security coverage. Tariff protection, foreign exchange controls, active monetary policies following the creation of Central Banks, etc. were some of the features of the newly emerging economic and institutional landscape. Many of these new institutions were firstly introduced as 'transitory measures' but later on remained as permanent, and took an ideological character, in the hands of highly nationalistic local governments. (Gonzalez and Pollock (1991) and Jayawardena (1993).

Summarizing, the case for public intervention on the face of market malfunctioning seems clear enough. Although market failure does not provide prima facie support for public ownership or for central planning of economic activities it seems to us understandable why in the economic and political atmosphere of the immediate post-war years ECLAC took such a strong stand in defence of these institutions.The world has changed quite dramatically since then and so has ECLAC's thinking, as we can gather from its current output.[2]

The industrial structure that developed during the ISI period certainly had pros and cons which need to be evaluated in detail. To such evaluation we now turn.

3. A non-orthodox account of the Latin American industrialization process..

The industrial expansion of Latin America can be described in a stylized fashion as having gone through three quite different 'moments' throughout the post war period. The first such 'moment' starts in the late forties and lasts until the early seventies.[3] The most dynamic sectors within manufacturing production were at that time textiles, consumer durables, agricultural equipment and capital goods of a relatively low degree of technological sophistication. Countries such as Argentina, Brazil or Mexico had an early start in the 1940's and 1950's along those lines, only to be followed by Colombia, Chile or Peru with a lag of around one decade.

The second period starts in the early seventies and proceeds until the late eighties. The more dynamic sectors throughout these years were those related to raw material processing industries such as pulp and paper, petrochemicals, steel,aluminum,fishmeal, minerals, vegetal oil, etc. The re-structuring against capital goods and the engineering industries and in favor of resource-based processing sectors has been particularly strong in all of the above mentioned countries . The expansion of the natural resource frontier has been quite significant over the last two decades favoring the rapid

---

[2]/See, for example: América Latina y el Caribe : Políticas para mejorar la inserción en la economía mundial. ECLAC, March, 1994. Also: El Regionalismo abierto en América Latina y el Caribe. ECLAC, Marzo de 1994.

[3] This does not mean that previous industrialization efforts were non existent. In particular, we can observe significant developments in sectors such as textiles or foodstuffs but they were undertaken in the context of a free trade regime and therefore subject to the challenge of external competition. From this perspective such efforts were not the result of deliberate government policies but the consequence of market signals.

development and internationalization of the respective industrial processing sectors.

In more recent times - late 80's and early 90's - the structure and behavior of the industrial sector has been strongly affected by the opening up of the economy to external competition, the de-regulation of markets and the privatization of public assets. Such policy actions have had an 'indirect' industrial policy effect quite different in substance from direct interventions of the sort applied during the previous three decades. As a consequence of the above major structural changes have been taking place affecting both the structure of industry as well as the organization of work at the individual firm level and the degree of vertical integration and inwards-orientedness of manufacturing production. Such changes describe what we will characterize as a third 'moment' in the long term process of industrialization of the region and will be examined further down in this paper with particular reference being made to their long term impact upon employment, foreign trade, domestic R&D and engineering efforts, etc.

Let us now look at the main 'stylized' features of the three previously identified 'moments' of the long term process of industrialization.

3.1 The first 'stage' of the ISI process.

Latin American countries emerged from World War II with strong unsatisfied demand for consumer durables and for capital goods which could not be imported for well over a decade. In the late 40's and early 1950's new industrial policies developed throughout the region inducing the erection of many new firms and industries.

Such policy gave high priority to the so called industries of 'national interest' which were basically those related to the defense sector and to the production of household durables. In some countries, notably Argentina or Brazil, the Armed Forces played a major role in shaping up the direction of the industrialization process and introduced a highly corporatist imprint to the whole import substitution strategy.

Such an institutional environment, plus the lack of markets -for technology, long term finance and qualified human resources - and the weakness of the preexisting local industrial fabric, induced the creation of a highly idiosyncratic industrial sector scarcely comparable in structure and performance to the one that characterized more mature societies. Local firms were smaller in size and highly primitive as far as plant lay out and production organization were concerned. They normally started production on the basis of product designs which were one or even two decades behind the international technological frontier.Let us briefly review some of the micro features of the emerging production structure:

a) Small size of plant.

b) High degree of vertical integration;
c) Outmoded product designs as well as production and organization technologies.
d) An excessively wide product 'mix' coupled with small individual production batches.
e) Old and self-produced machinery and equipment.
f) 'In house' technological efforts mostly carried out with the purpose of upgrading old product designs, production processes or organizational techniques.

The above mentioned features explain why the results of the ISI process were quite different from those a priori expected by early development writers. The benefits of externalities, strategic complementarites and endogenous technical change were certainly much smaller than those they hoped for. Local policy makers could not at that point correctly identify the pre-existing micro weaknesses of the domestic production structure and did not consequently act in order to resolve some of the pre-existing problems as they certainly seem to have done it in the more successful East Asian societies.

The lack of independent subcontractors and markets for intermediate parts and components forced many firms to operate with a much higher degree of vertical integration than otherwise advisable, selfsupplying themselves of many items and services which would have been purchased under 'arm-length' relations from specialized suppliers in more developed industrial societies. This had a strong negative impact upon static and dynamic efficiency as it led to an excessive diversification of activities within the firm and to a learning process which was less deeper than otherwise possible. Externalities and synergic effects were therefore much smaller than what they could have been.

Another source of static and dynamic inefficiency arose from the fact that plants were no more than 5-10% of the size of comparable production facilities in more developed industrial countries. A small size of plant, a poor factory lay-out and a rather primitive production organization technology, led to a high incidence of downtime and low initial total factor productivity. Capital turn over was quite low and so was the initial competitiveness of local production facilities even if domestic wages were just a fraction of wages in developed countries.

The previously described circumstances induced many companies to develop 'in house' engineering departments and technical assistance to production groups whose main purpose was that of producing incremental units of technical knowledge on the basis of which to adapt and upgrade product designs, production processes and work organization technologies. Such activities had a steady and important effect upon productivity growth and international competitiveness. Even if received theory does not lead us to expect knowledge generation efforts to have any significant rol in explaining productivity growth and manufacturing exports in less developed societies our empirical studies show that such efforts

actually accounted for as much as two thirds of the observed rate of productivity growth at the individual plant level [3] . It is important to notice that in many industries such rate was higher than the one the world's technological frontier was actually experimenting throughout those years, and that this permitted a gradual 'catch-up' process to take place, followed by competitive exports to foreign markets. As a result of this process exports of an increasing degree of technological sophistication could be gradually attempted by countries such as Brazil, Argentina, Mexico or Colombia during the 1970's. At the same time, tariff protection gradually contracted reflecting the fact that many firms and industries were experimenting less needs for trade barriers as their relative productivity moved upwards through time.

It is quite clear to us that a story of this kind can be told of the Latin American industrialization process and that in such story the gradual accumulation of domestic technological capabilities plays a major rol in explaining company and industry performance. Such story is quite different in nature from the one neoclassical authors advanced in the 1970's and 1980's. in which the core of the explanation of what happened runs in terms of rent-seeking entrepreneurs and captured and corrupted public agencies.

In spite of the above, however, we have to accept that once the pressure of excess domestic demand for consumer durables and capital goods diminished —in the 1970's— industrial growth slowed down and became much less spectacular. The manufacturing sector entered into a *plateau* in the mid-seventies thus showing the limits of an inwards oriented strategy and the needs for a stronger outwards commitment. In actual facts some of the countries -notably Brazil- proceeded in this direction quite early in the 1970s, being followed later on by Argentina or Mexico. It is important to notice that concomitantly with these events - but quite independently of them - the world's technological frontier began to experiment a rapid outwards expansion in the late 1970's due to the discovery and rapid diffusion of microprocessors and flexible manufacturing organizational technologies. The combination of a domestic slow down and of a more rapid outwards movement of the world's technological frontier account for the rapidly expanding gap that developed in the late 1970's and early 1980's between the region's and world's productivity levels.Such gap was particularly important in consumer durables and capital goods were a new generation of product designs introduced numerical control and digitalization features which Latin American companies could not replicate. Many markets previously supplied by mechanical engineering and capital goods firms from, say, Brazil or Argentina, were lost at the hands of new entrants from Korea or Taiwan. Concomitantly to the above

[3] Our research at the individual firm level shows that the lion share of productivity growth came from process optimization efforts, production planning and organization activities and other such 'disembodied' forms of technical progress. A significant amount of 'in house' engineering efforts were also made in the adaptation and upgrading of existing machines, before actually replacing them by new equipment. See, Katz 1985.

the industrial structure of the major Latin American countries was already experimenting a major change towards raw material processing industries. Such change we explore in our next section.

3.2 Mid-1970's to late 1980's: The re-structuring of manufacturing production towards raw material processing industries.

In the second half of the seventies, and even more so during the eighties, a new generation of manufacturing plants was erected in the region, this time much bigger in scale, highly capital intensive and closer to the world's technological frontier as far as process technology is concerned. These plants were mostly addressed to the production of commodities such as petrochemicals, iron and steel, pulp and paper, aluminum, vegetal oil, mineral products, fishmeal, etc.were the production function is of a continuous flow type, 'machine-paced' and less subject to production organization difficulties than in the mechanical engineering and capital goods sectors.

Some of these new production facilities were erected with the purpose of supplying developed country markets right from the beginning. This appears to be particularly true in the case of Chile and less so in the case of Argentina or Brazil where many of the new plants in the process industries were originally intended for domestic consumption but ended up being re-oriented towards exports as a result of the deep and longlasting recession which affected local absorption during the early 1980's. Domestic macroeconomic conditions deriving from the debt crises induced many of the newly erected companies to reformulate their long term strategy putting more emphasis on the export side of their operation.

Other important 'stylized' facts of the emerging new industrial organization scenario of the 1980's should also be noticed at this point. Firstly, manufacturing production became much more concentrated, with a small number of large domestic conglomerates now controlling a significant - and increasing - share of industrial production. Secondly, the above mentioned vintage of new plants erected for the production of industrial commodities enjoyed significant support from the State, particularly in the cases of Argentina or Brazil and less so in Chile or Colombia. As much as 60-70% of the original investment came in many cases from tax deductions and other indirect subsidies. Thirdly, direct foreign investment, and the share of MNCs in manufacturing output, came down in many countries of the region, and major multinational groups left the contracting markets of Argentina, Chile and even Brazil. Fourthly, the degree of structural heterogeneity increased quite considerably as small and medium size enterprises rapidly lost participation within manufacturing production. The success of capital intensive sectors - in particular raw material processing industries - was accompanied by a marked contraction in the metalworking and textile industries engaged in the production of machinery, agricultural equipment, consumer durables, garments,

etc. Fifthly, the natural resource frontier of many of the Latin American countries expanded significantly throughout these years with the discovery and exploitation of new sources of petroleum, gas, fisheries, forestry, minerals, etc. Exports have grown quite significantly in the raw-material based industries but the value added content of such exports is significantly lower than the one previously attained in the metalworking and capital goods industries which have now lost share in total manufacturing exports.

A third, and dramatically different stage, in the region's long term industrialization process obtained in the late eighties and early nineties. Induced by macroeconomic difficulties most countries in the region have moved into policies of trade liberalization, the de-regulation of markets and the privatization of public assets. Though not ment as industrial policies per se such efforts have had - and continue to do so - a dramatic impact upon the structure and performance of manufacturing industry. A process of 'creative destruction' has now been set in motion through which firms, markets and institutions are gradually modifying their long term behaviour adapting themselves to a new more competitive scenario and to a significantly different model of production organization and market functioning. Let us briefly examine some of the more outstanding micro and macro aspects of this new phase.

3.3. The 'indirect' industrial policy of the 1990s:

As said before, since the mid eighties, and particularly so during the course of the 1990's, most countries in the region have moved towards trade liberalization, the de-regulation of markets and the privatization of public assets in an attempt of stabilizing, first, and revitalizing, afterwards, their badly shaken economies . Although the starting point in time of such policy actions, their sequence and deepness, and the political support governments have managed to attain - both domestically and abroad - for their liberalization efforts, vary a great deal among nations, it is quite clear that such actions have had - and will continue to do so in the future - a major impact upon the structure and performance of industry. In so far as the real exchange rate, the level and composition of investment, relative prices between tradables and non-tradables, regulatory institutions, etc, have all changed quite significantly in response to the above mentioned macro policies, it seems clear that they will end up having a major - though 'indirect' - industrial policy effect in their own right. Let us briefly consider in some detail the impact such actions are having upon firms, markets and institutions.

3.3.1. Privatization of Public Sector Assets

Even if the privatization debate dates back in the region to the mid-seventies when it became one of the guidelines for the deregulation and opening up of the Chilean economy, it is worth recognizing that the issue has grown in importance in recent years

as Mexico, Argentina, Peru and Colombia, among others, decided to go deeper into their own privatization efforts.

In some of these countries the transferring of public assets to the private sector became a major source of government finance. In the absence of external financing it rapidly became a key element in the search for fiscal equilibrium, which itself played a crucial role within macroeconomic stabilization programs.

Although from this point of view privatization efforts belong in the sphere of short term policy actions intended at stabilizing the economy, there can scarcely be any doubt concerning the fact that they have also had a major long term impact upon the structure and performance of the industrial sector. A new analytical literature is presently emerging exploring such impact in detail [4]. From such literature we learn that privatization efforts have strongly affected both the level and composition of private investment. Firms taking over public enterprises have been required to upgrade and modernize received production facilities [5]. As a counterpart for that they have in many cases been assured monopoly rents. This has had a 'crowding out' effect upon investment in preexisting industries in as much as investment projects related to such industries could not compete in terms of expected rate of return with those belonging to the privatization sphere.

3.3.2. Trade liberalization and domestic technological capabilities.

Together with the privatization of public assets the opening up of the economy to foreign competition is also inducing important changes in the structure and performance of industry. Beginning at the shop-floor level we notice that the organization of work and the degree of vertical integration are undergoing major changes pari pasu with the transition towards a higher level of external 'contestability'. It is becoming increasingly evident that the high degree of vertical integration with which many firms were accustomed to operate in the past is no longer sustainable to day. Many firms producing durables and capital goods have in recent years increased the import component of their production, substituting foreign parts and subassemblies for locally produced equivalents and have moved into the de-verticalization of production developing external subcontractors for services, ancillary activities, etc. Simultaneously, they have also reduced

---

[4] A pioneering work in this direction is that edited by P.Gerchunoff, Las privatizaciones en la Argentina. Instituto Torcuato DiTella, Buenos Aires, 1992.

[5] Excluding the investments in crude oil, sea and air transport, mail and national defense, Gerschunoff estimate that investment for the period 1990/1992 reach near USD 22 billion, that is, USD 2.4 million yearly or 1.6% of the GNP.

their engineering and R&D efforts directed towards product design activities, prototype construction, etc. Moreover, they have also increased their utilization of foreign licenses in substitution for domestically-originated product designs and production processes.

In other words, a more open trade regime seems to be inducing deep changes in production functions bringing about a shift towards assembly-like operations, closer to the 'maquila' industrial organization model and moving away from the domestic fabrication model. A similar phenomena seems to be occurring in relation to domestic technical knowledge generation. The same firms that previously catered for domestic needs on the basis of local production, today tend to do so more on the basis of imports: i.e. acting as commercial distributors of foreign brands and firms and lowering their commitment towards local fabrication and engineering design.

An important case at point is that of the automobile sector which is experimenting both a rapid expansion and a major process of reorganization at the individual firm level in Mexico, Brazil, Argentina and Colombia. After a decade long in which the industry suffered the consequences of macroeconomic stabilization programs and of the contraction of domestic demand, its rate of growth has dramatically expanded in all of the above mentioned countries since the early 1990's. In the Mexican case an outward orientation towards the US market appears to be the main explanation of the observed trend, whereas in the case of Argentina and Brazil plants seem to be restructuring with an eye at their integration on the Mercosur.A much higher import content, more updated vehicles, and a new pattern of insertion into the global strategy of their respective headquarters appear as major features of the ongoing micro restructuring process.

Having so far examined three quite different stages in the process of industrialization of the Latin American region we now move on to the discussion of policy issues towards the future.

4. Industrial strategy and public policy in the nineties

A careful examination of the current industrial performance of the major Latin American countries highlights various rather worrying features of the present industrial scenario. Firstly, there is little evidence suggesting a long term convergence to international productivity levels , even in spite of the fact that labor productivity has increased over recent years at rates significantly higher than those prevailing at the beginning of the seventies. As a result of the acceleration of the world's rate of technical progress associated to the rapid difussion of informatics and flexible manufacturing production principles the somewhat better performance of many Latin American countries in the late 1980's and early 1990's does not seem to be enough to allow them to close the prevailing productivity gap. Secondly, the newly emerging industrial structure seems much less capable of generating employment than the pre-existing one in which labour intensive

industries had a larger relative participation in total manufacturing production. The recent trend towards capital deepening industrialization in raw material processing plants clearly involves a labour-saving bias of major significance. Thirdly, the change in industrial organization which is presently taking place is associated to an increasing degree of economic concentration in the hands of a small group of domestically-owned conglomerates which in recent years has aquired control over nearly one third of manufacturing production in countries such as Chile, Argentina, Brazil or Mexico.Such a dramatic increase in business concentration clearly points out towards a much higher degree of structural heterogeneity, and a worsening income distribution situation than the one that prevalied during the ISI period. Forthly,a negative external balance of trade in manufacturing production and a significant apreciation of the exchange rate also seem to be endogenous to the model, adding further sources of doubt as to the future substainability of the emerging new production structure.

Do the above mentioned 'stylized' features of the present industrial organization model involve structural distortions which the market mechanism would eventually overcome by itself ? Do they justify government intervention and, if so, of what kind ? What is the nature of the institutions and policy-implementing capabilities countries need to develop at this point in order to act on this front ?.

Consider first the question of whether or not the above mentioned structural features constitute distortions which demand new forms of government intervention in the economy.

It might be thought, for example, that the increasingly negative manufacturing trade deficit is not in itself a problem. On the one hand, it can well be of a temporary nature and could correct itself in the future without any need of government intervention. On the other hand, it could perfectly well be the consequence of natural comparative advantages and therefore be compensated with surpluses elsewhere in the production structure, for example, in the service sector. There are, however, two well-founded theoretical reasons to justify government intervention as a result of trade deficit in manufacturing production. The first one refers to cases in which such deficit originates in distortions emerging from third country's disloyal practices based on subsidies to exports, artificial entry barriers, etc. In this case, active trade policies of a countervailing nature, such as anti-dumping duties, tariff surcharges or subsidies to exports, could be justified. The second reason refers to industries with potential economies of scale, which - owing to incomplete learning processes - have been unable to close the productivity gap with the international technological

frontier.[6]. Examples of both such situations can be found in the present Latin American industrial scenario, both demanding new industrial policy actions.

Consider now the case for intervention as a result of increased business concentration. From the point of view of its negative impact upon income distribution, a first-best policy in this field would be to give the tax system greater progressiveness. No industrial policy can be theoreticaly justified on this account. Different, however, is the case if we consider the extent to which an increase in business concentration allows for collusive behavior and anti-competitive activities from the part of industrial firms. In this case the regulatory mechanism should be strengthened and anti-trust policies should be implemnented. Recent privatizations of public utilities, airlines, port facilities, etc.in countries such as Argentina, Mexico or Peru could well be approached as from this perspective. Again, new industrial policy actions seem to be needed on this front.

The existence of a long term productivity gap in manufacturing production justifies industrial policy actions if such a gap is the result of persistent market failures which ultimately block the process of convergence with the international technological frontier.

Various different sources of market failure can be identified which would bring about the need for public action in this field. In the first place, technological learning crucially depends upon the training of labor and, more in particular, upon the skills acquired through on-the-job-training at the work-place. Due to imperfect appropiability of the benefits of training firms normally underinvest in the creation of human capital. There is then an externality to investment in this area and a sufficiently strong reason for governments to act inducing firms to spend more on skills creation.

It is not just in the labor market that we can find different forms of market failure. Also in the capital market - where informational asymmetries generate credit rationing to innovators - we can identify such failures. The outcome is that innovative firms become dependent upon their own funds to finance their search activities. This leads to an insufficient market entrance of innovative entrepreneurs.

There also exist failures in the product markets; for instance, when firms develop a new product, enter a new market or introduce

---

[6] Recall, for instance, the 'infant industry' argument, according to which there is the need to promote a decreasing protection as domestic costs converge with international ones as an outcome of learning. However, it is to be borne in mind that the argument for decreasing protection in this case is only a second-best tool.

a new productive technology, they provide information to all other economic agents that could follow them thus facilitating their own entrance to the market.

From the foregoing discusion we conclude that the prevailing market distortions seem to be pervasive enough to justify industrial policies of various types. Yet, against common wisdom, our reasoning leads us towards selectivity rather than neutrality. This is due to the fact that distortions are not distributed uniformly across sectors and markets. Then, if externalities and/or economies of scale can be identified in a precise manner, they should give rise to a highly differentiated structure of subsidies, taxes and regulations.

Consider now the question of governmental capabilities to implement first-best policies of the sort our previous discussed. The fact that many of such distortions are difficult to identify and measure is just one of the problems here, but certainly not the only one. In addition, most States in the region have serious administrative limitations to handle a flexible and heterogeneous system of subsidies and taxes with differences across industries. There is the obvious risk that many theoreticaly sound propositions would end up generating rent-seeking practices and corruption from the part of entrepreneurs and public officials . Moreover, to the extent that many of these policies demand resources, they can eventually bring about fiscal difficulties and thus affect macroeconomic stability. These serious limitations in designing and administering first-best policies generally lead public officials to implement second-best interventions (for instance, to use trade policies to promote sectors that have externalities, to induce the creation of small and medium-size firms with the purpose of improving employment or income distribution, etc.) leading to distortions in other markets and hence generating costs in terms of forgone consumption.

To sum up, both the fact that market failures can not be adequately identified measured and that intervention instruments are normally second-best in nature, imply that industrial policies frequently end up subsidizing wrong sectors (in addition to some right ones) and generating high social costs.

This leads us to conclude that an adequate industrial policy for the nineties should probably be one of a neutral type, relatively 'soft' in interventions so as to avoid waste, rent-seeking and corruption. It is preferable that the intervention package should be small in terms of the number of instruments employed and relatively simple to implement.This would preclude making serious mistakes by using tools that are too specific, selective and expensive and would also imply the possibility of pragmatically monitoring the attained results introducing correction when needed.

On the other hand, to the extent that many interventions are designed with the purpose of fostering the learning process, they should involve a well defined time period and a decreasing rate of

support in time. In addition, as capital markets become deeper and more sophisticated it is also likely that the needs for specific support to R&D activities will become less important as time goes by. Similarly, the subsidy to exports should be limited to the opening up of specific new markets. Possibly, the only interventions that could justify permanence in time would be those related to the generation of human capital and certain types of 'generic' R&D activities difficult to be supported by private sources of finance.

The above mentioned actions will have to be designed and implemented in the context of a more complex and hostile international institutional and regulatory environment as it is now developing in the aftermath of the Uruguay Round of the CATT. Recent developments concerning the International Regulation of Trade (GAIT), Services (GATS), Investment (TRIMS) and Intellectual Property Rights (TRIPS) originating in the Uruguay Round of the GATT will provide the framework in which domestic industrial policies will have to be pursued and implemented in the years ahead if they are to be accepted by the international community. Although the scope for intervention is certainly narrower than in the past it nontheless provides sufficient scope for governments to act in support of industrialization, if they so wish to do it, even within the new institutional and regulatory atmosphere now prevailing in the world.

References

Amsdem, A. Asia's next giant. South Korea and late industrialization. Oxford University Press, 1989.

Basu, K. "Comment", (comentarios al trabajo de P. Romer) (Op.Cit.) Banco Mundial, 1993.

Berlinski J. Una planta argentina de equipamiento agrícola. En J.Katz (Ed.) Desarrollo y crisis.... Op. Cit.Buenos aires, 1986.

Canitrot A. y Frenkel R. Estabilización y largo plazo. La experiencia argentina 1976-1979. CEDES, Buenos Aires, 1979.

Castaño A. Katz J. y Navajas F. Una empresa Argentina productora de máquinas- herramienta. En J.Katz (Ed.) Op.Cit. Buenos Aires, 1986.

Caves, R. International diferences in industrial organization. En: (Ed.R.Schmalensee y R.D.Willig) Handbook of Industrial Organization. North Holland, 1989.

Dahlman C. y Frischtak C. National systems supporting technical advance in industry: the brazilian experience. In: (Ed.R.Nelson) National Innovation Systems. Oxford University Press, 1993.

Fanelli J.M., Frenkel R.y G.Rozenwurcel. Growth and structural reform in Latin America:Where do we stand.CEDES, Buenos Aires,1990

Fleury A.y Humphrey J. Human resources and the diffusion and adaptation of new quality methods in Brazilian manufacturing. Research report Nº24, IDS, Universidad de Sussex, Gran Bretaña, 1993.

Frisch W. y Franco G.H. The quest for efficient industrialization in a technologically dependent economy: the current brazilian debate. Trabajo presentado en la conferencia sobre Competition and Economic Development, OECD, Paris, Octubre 1989. También, de los mismos autores: Foreign direct investment and patterns of industrialization and trade in developing countries: the Brazilian experience. En :(Ed.)Helleiner G. Trade policy, industrialization and development.

Gerchunoff P. (Ed.), Las privatizaciones en la Argentina. Primera Etapa.Editorial del Instituto T. DiTella, Buenos Aires, 1992. También, del mismo autor: Privatizaciones: la experiencia argentina, Mimeo, Bs.As. ITDT, Diciembre de 1992.

González, N. y D.Pollock. Del ortodoxo al conservador ilustrado. Raúl Prebisch en la Argentina, 1923-1943. Desarrollo Económico Enero-Marzo 1991, pag.455.

Helm D. The economic borders of the state. Oxford University Press, 1989.

Hirschman, A. The strategy of Economic development. Yale University Press, New Haven,1958.

Jayawardena, L. Comment,Comentario al trabajo de P.Krugman (Op.Cit.), Banco Mundial,1993.

Katz, J. y Colaboradores. Desarrollo y crisis de la capacidad tecnológica latinoamericana.El caso de la industria metalmecánica. IDES/Programa BID/CEPAL/UNDP, Buenos Aires, 1986.

Katz, J. (Ed.). Technology generation in Latin American manufacturing industries. MacMillan Press, Londres, 1987.

Katz J., Burachik G.y R.Bisang: Cambios estructurales en la industria manufacturera Argentina.Estudios comparativos entre la etapa sustitutiva y el escenario industrial contemporáneo. (Trabajo en preparación, Mimeo, Buenos Aires, 1994.)

Kim, L. Korea's national system for industrial innovation. Mimeo, mayo de 1990. In: (Ed.R.Nelson), Op.Cit. Oxford University Press, 1993.

Krugman, P. y Helpman E., Market Structure and Foreign Trade. The MIT Press,Cambridge, Massachussets, Londres, 1986.

Krugman, P., Toward a counter-counterrevolution in Development theory. En: Proceedings of the World Bank annual Conference on Development Economics. Washington, 1993

Lall, S., Goverments and Industrialization: The role of Interventions in the 1990s. Proceedings of the ECLAC-IDRC/UNU-INTECH Conference "Productivity, Technical Change and National Innovation Systems in Latin America in the 1990s". Marbella, Chile 28-30 August 1995.

Lin, L., Technology policy and export development: The case of the electronics industry in Singapore and Malaysia. Trabajo presentado a la conferencia UNU/INTECH sobre el Impacto de las Nuevas Tecnologías en el desarrollo Económico. Maastricht, Holanda, Junio 1993

Lewis, W.A., Economic Development with unlimited supply of labour Manchester School of Economics and Social Studies, 22, 1954

Myrdal, G., Economic theory and Under-developmed Regions-Duckworth, London, 1957

Nurkse, R., Some international aspects of the problem of economic development, American Economic Review, May 1952

Prebisch, R., The economic Development of Latin America and its principal problems, New York, United Nations, 1950

Romer, P., Are non-convexities important for understanding growth? American Economic Review, Papers and Proceedings, 1989. pag.97.

Romer, P., Strategies for Economic development: Using Ideas and Producing Ideas. En:Proceeding of the World Bank annual Conference on development economics. Washington, 1993.

Rosenstein-Rodan, P. Problems of industrialization of Eastern and South Eastern Europe,Economic Journal, June-September 1943

Rosenberg, N., The direction of Technological Change. Inducement mechanisms and focusing devices, Economic Development and Cultural Change, October 1969

Schmalensee, R. y R.D. Willig (comps). Handbook of Industrial Organization. North Holland Publishing Co. Amsterdam, 1989.

Stiglitz, J., On the microeconomics of Technical progress. En (Ed.J.Katz): Technology generation in Latin American Manufacturing Industries. MacMillan Press, 1987.

Stiglitz, J., Comment, Comentarios al trabajo de P.Krugman (Op.Cit.) Banco Mundial, 1993.

Tirole, J.: The theory of Industrial Organization. MIT Press, Cambridge, 1988.

Westphal, L., Industrial incentives in the Republic of China. Mimeo, Banco Mundial,Marzo 1978. También: L. Westphal, Y.W. Rhee y G. Pursell: Korean industrial competence. Where it came from?. Mimeo, Banco Mundial 1980.

World Bank, The East Asian Miracle. World Bank Policy Research Report. Oxford University Press. 1993.