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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

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INDUSTRIAL POLICIES AND TECHNOLOGICAL CHANGE IN LATIN AMERICA

By

Peter O'Brien

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Technological Change and Industrial Strategies and Policies in Latin America

I. Introduction

The rapidity and scope of technological change in recent years has coincided with a period of severe economic crisis and profound re-examination of industrial strategies in Latin America. In most countries of the region both governments and enterprises are groping towards new ways of meeting fresh technical challenges and of retaining competitiveness in domestic as well as external markets. Considerable uncertainty prevails as to the most appropriate policies to use and in regard to their possible effects; this uncertainty is coupled with at best a hazy picture of what is happening in the main OECD countries. The present notes are intended as a contribution to the ongoing debate and are organized as follows. To begin an attempt is made to focus on the principal ideas which, up to now, have tended to colour thinking in the region on the key subjects of industrial policy, technological change, and international competition. This sketch is followed by a statement of the nature and impact of technological change as it now seems to be occurring and the following section tries to place technological change in the overall environment of political economy in which the bulk of the Latin American countries are operating. In the light of those observations the final section of the notes tries to indicate some of the main areas where policy decisions will have to be taken and to suggest some possible lines which might orient those decisions.

II. The Approaches Employed

II.A. Industrial Strategies and Policy

During the past three decades or so industrial policy in Latin America has, with various twists and turns along the way, generally been guided by a series of more or less explicit premises. In the period following 1945, and in particular following the commodity boom of the early 1950s, it was argued that industry could become the motor of economic progress in many, if not all, countries of the region. The industrial structures set up were meant to replicate those in the OECD region and indeed to fulfill fairly similar objectives to those in Europe and North America, especially with regard to employment. The internal policies to encourage new industries were those of protection against imports of final products along with relatively cheap credit and fiscal concessions to encourage local production. Externally, the promotion of industry was seen in terms of attracting new funds for investment rather than selling domestically manufacturing goods. At the beginning of the period a major part of foreign money came through external assistance of the aid type; later, this was replaced by direct foreign investment and eventually with the huge bank loans characteristic of the 1970s. Subsequently more attention was paid to clamping down on outflows of funds but the overall focus continued to be on foreign capital as a significant contributor to new investment and technological inputs. It was supposed furthermore that an adequate balance could be reached between domestic and private sectors. Specifically, in several countries in Latin America empirical examination suggested that industrial branches could be classified into groups according to ownership and technology, with foreign control and high technology dominating in certain areas, domestic private control and relatively simple

technology the norm in other branches, and a third group of industries involving an admixture of public and foreign capital. Within that context of ownership and technological level, the assumption appeared to be that domestic policies could and should promote technological learning and would lead to a gradual reduction in the gap between best practice technology in use in the OECD countries and the best technologies employed in production in Latin America.

The relationship between best practice technology internationally and the production methods actually employed in the region did not receive much attention until the late 1970s by which time several awkward points were becoming apparent. First, the major countries of the region certainly were interested in best practice methods both because of the demand for high quality consumer goods stemming from the upper income groups and the constant pressure for imports (despite the stiff trade barriers). Second, the equipment and technical processes actually imported were in many cases of older vintage and ensured that locally produced items would have great difficulty in competing on international markets. Third, the absorption of imported technologies was found to be, in many instances, a slow and uncertain business in which government policies often failed to play a positive enough role. Fourth, the institutional setting for use of technologies (whatever their vintage) was found to matter a great deal, with much depending on ownership structure and size of the firm. Fifth, the obvious point that the 'technological gap' was a function, among other things, of the rate of change in best practice methods did not appear with full force until very recently. In part this was due to a relatively smooth technological evolution in the OECD countries, in part to the clear association of Latin America with the USA and the tendency to depend on that country as the source for technological standards, and in part to a tendency to focus on handling individual technologies rather than industrial structures. This last point meant that the influence of organizational factors, within firms and (more importantly perhaps) among firms, on technical command, productivity and competitiveness was seriously underestimated during a long period. It is only in the present decade that this factor has come to the forefront in the context of a broader interpretation of 'best practice'. Industrial policy in the region has now to look increasingly towards best practice organization, including but not confined to technology.

These comments, while a substantial simplification of the complex reality, nevertheless do capture the essence of industrial strategies. Governments have acted on the belief that industry could provide surpluses for promoting overall economic growth and that foreign technologies could be absorbed on a substantial scale; both premises themselves were subordinate to a fundamentally harmonious view of the international system. This last statement may appear surprising in the light of the protagonism exercised by various groups in Latin America, particularly during the last quarter of a century, in favour of changes in the international framework. However, cool assessment of the thrust of most proposals suggests that the real objective has nearly always been to obtain an improvement in the mechanisms of the system rather than to alter it in a radical fashion. What is at stake now is the relevance of such premises as a guide for industrial policy.

II.B. Technology and Industry

On the relation between industry and technology another inter-related set of assumptions seems to have governed policy actions. Despite the earlier emphasis of much economic economic theory on technological change ocurring in discrete and abrupt fashion, the practice of policy-making focussed more on incremental and industry specific changes. It was felt that in most cases a relatively smooth linkage existed from invention in the research laboratory to innovation in the factory and that Latin American countries could gradually develop such linkages in the same fashion as prevailed in the OECD centres. It was recognized that fairly significant time lags occurred in the introduction of best practice technology into industrial plants in the region but the belief underlying policy was that those time lags would steadily be eliminated through systematic actions both at government and enterprise levels. This overall framework was, of course, a reflection of the way in which post-war industrial resurgence seemed to be taking place in Europe and Japan and in which international industrial expansion of US firms was occurring. Despite the necessary adaptation of corporate structures to handle the internationalization of business, it was generally felt that technological advances did not of themselves usually necessitate major reorganization of business units. In other words, while technology was recognized as a key factor in industrial advance, it did seem that most technologies could be handled within existing corporate contexts.

The technological shifts of the past few years have cast considerable doubt on most of the preceding assumptions. It no longer seems plausible to focus on incremental technological changes; the interaction between research laboratories and industrial innovation is far less clear than before; where, when and how new technologies are brought into industrial plants in developing countries is a much more open question than it used to be, and the ferocity of the struggle between major OECD based corporations strongly hints that corporate organization is becoming subordinate to the technologies rather than vice versa. What was conventional wisdom in relation to technological change is therefore no longer a sturdy branch on which to hang policy. This, in turn, is related to a reassessment of the prevailing conditions of international industrial competition.

II.C. International Industrial Competition

It used to be held that developing countries would industrialize in, as it were, successive waves with each group of countries gradually moving up a predefined ladder. The conditions for movement would be governed from below by the arrival of a new cohort offering still cheaper wages and from above by sufficient mastery of a given technology as to permit a transition to more complex techniques. This process would be encouraged, from the OECD side, by the persistence of two conditions. .First, steady growth in their markets and the maintenance of relatively low protection, thereby reinforcing demand for industrial exports from developing countries. Second, by the progressive redeployment of industrial facilities to developing countries. The behaviour of the international system in the past decade or so has given the lie to such assumptions. OECD economies have not grown rapidly, trade conditions have not been kept open, and the alleged process of redeployment has occurred only on a limited scale. In fact, the core of the competitive struggle in industry has switched dramatically towards the OECD countries themselves and it is within this struggle that the arrival of new technologies has been playing such a

powerful role. Those new technologies, above all in microelectronics and informatics, have dramatically altered the conditions of competition and in various branches of industry have rendered the availability of cheap labour a matter of minor significance only. In short, developing countries have become of far lesser significance to OECD firms, and this whether developing areas are looked on as suppliers of assets or as potential markets.

The foregoing observations suggest, as has in fact been the case, that both new investment funds and new technologies have been in relatively short supply for developing countries. Whereas in the past these items were available in a reasonably fluid flow, they are now only going to appear in highly selective and specific locations. Trade in manufactures has not offered anything like the stimulus which it was supposed to and in the second half of the 1980s any discussion of newly industrialized countries (NICs) has to be viewed in a quite different way from the shallow yet noisy otpimism of a decade ago. Indeed, it now appears that to avoid an even greater breach on the technological dimension, many developing countries must encourage still greater integration of the foreign affiliates located on their territory with the headquarters of those firms. This type of perspective is diametrically opposed to that which was behind much of industrial policy in Latin America in earlier years.

There is thus little doubt that many if not most of the underpinnings of government policy in Latin America in relation to industry, technological change and international competitiveness have now to be seriously reexamined. The problem, as noted at the beginning, is that it is still hard to state with confidence exactly where various changes are leading and consequently difficult to pinpoint with precision exactly which types of policies would be best suited to the probable conditions of the rest of this decade. What follows in the next sections is an endeavour to highlight some of the points emerging from recent practice.

III. Nature and Impacts of Contemporary Technological Changes

III.A. Characteristics of Recent Changes

The current phase of technological change has as its hallmark the transformation of information systems. Whether attention is focused on microelectronics or on genetics, the common element is a new understanding of extremely powerful ways in which information can be collected, stored, analysed, and distributed. The fact that information control is crucial to numerous industrial processes implies that the current advances are umbrella in character, i.e., they can be and are being applied across a wide range of industrial branches. This, in its turn, has the further and important implication that numerous processes and products are being rendered obsolete at the same time as many new ones are being created. This is one of the reasons why the present period of industrial change is so intense - new industries are being created at the same time as old ones are being destroyed. A period of crisis in the international economy, as measured by growth performance, unemployment, inflation and severe international payments imbalances, has thus also been a period of technological advance. One thesis of these notes is that the difficulty of coping with technological change is precisely because it has been occuring in the overall economic conditions just mentioned.

The spread of the new technologies and their effects on products and systems/costs of manufacture has been both faster and slower than anticipated. The speed has come in relation to various elements of electronics and in particular to the introduction and disappearance of new electronic products; their half life is nowadays very short, so much so that the President of Phillips has recently remarked that of the products the company is expected to sell in 1990, more than half are not yet on the market. On the genetic side, however, the introduction and widespread adoption of fresh products and processes is a much slower affair; to some extent this is due to the inherent problems of understanding the construction of matter, but it also stems from prevailing industrial structures in branches using such advances as well as the necessary government controls on their introduction for the sake of consumer safety. Without entering into further details, the message as far as the Latin American countries are concerned is quite clear. On the electronics side, they are confronted with the difficulty of assessing which products and processes are likely to be of lasting value and thus of selecting those enterprises with whom medium to long-term investment and production arrangements could be made; and on the genetic side the countries of the region are compelled to judge the possible impact of longer-term research programmes in which all of their investments could easily yield few results and yet the cost in investment terms could be detrimental to other activities. The problems of assessment and choice are not made any easier by the mixture of ways in which invention and innovation seem to be taking place in the OECD. To begin with, it appears that smaller enterprises have had a [illegible]rgence as creators of technology, and this both in the electronics and genetics fields. Now it is generally quite difficult for Latin American countries to come quickly into contact with such enterprises; instead, the foreign links tend to arrive when the larger OECD firms take on a more active role. Among those firms, however, there are contrasting technological and industrial strategies at the present time. Some firms are deliberately seeking to be leaders in innovation, while others (IBM is a good example) make use of their powerful market position to remain effective suppliers of products and systems which are not quite the best practice. The problem of who to deal with in the OECD area is complicated still further by the various kinds of co-operation which have flourished in recent years and which cover research and development, innovation and corporate organization. Thus, some of the transnational firms in the automotive industry have got together in joint ventures which embrace plan organization, use of new technologies, retraining of the work force, and division of markets. There are likewise collaborative ventures between transnationals operating in different sectors; e.g., automotive and informatics, while still other types of schemes embrace both national governments and enterprises as is the case in the EUREKA venture. All of this implies that not only are the characteristics of recent technological change quite different but also the institutional framework for them presents a sharply different panorama as compared to the past. Both considerations impel Latin American countries to seek an understanding precisely because the changes do not and will not leave them unaffected.

III.B. Effects of Technology on Industrial Structure

The impacts of the emerging situation are not difficult to enumerate. The essence of the technological developments is to enhance the value of information and organization command relative to such assets as cheap labour. This means that the international division of labour in manufacturing is

undergoing important changes where the quality of both inputs and outputs is much more closely correlated with conditions in OECD markets than was the case in earlier years. Concretely, it means that the new technologies are probably being introduced into Latin America much more through major affiliates of transnational companies than through independent technology transfer arrangements, and that the products made in these firms are probably destined to export markets in a much higher proportion than previously was the case. The same argument implies that fresh investments from OECD firms in new activities and/or new locations are not too probable but rather that most such investments are likely to be directed at changing processes and organization within existing networks. In short, though the new technologies, especially in microelectronics, open vast horizons the OECD firms using them still do not wish to loosen their control over either the technologies or the products made.

All of this has implications for industrial structure in the countries of the region. It may be expected that there will be progressively greater splits between foreign controlled and domestic controlled firms in relation to labour productivity, product mix and the destination of output. To the extent that trade barriers are weakened within the Latin American countries it may be expected that there will be still greater pressures for survival on domestic firms competing with imports (since those imports reflect more and more the influence of technologically new processes and products). Moreover, we may anticipate greater concentration of market control in several industrial branches as those few firms capable of handling the new technologies extend their market power. To the degree that the technological shifts affect wide segments of output, it might be anticipated that, in at least the rest of this decade, the range of industrial production as a whole may tend to diminish. These commentaries on the production side are underlined if brief reference is made to consumption patterns in the region. The notorious differentials in household income imply that the middle to upper income brackets are likely to be significant purchasers of a wide range of consumer electronics. Recent studies in other countries, e.g., Spain, confirm the rapid diffusion of such items in countries where the average income per capita is not particularly high. It follows that at the level of non-industrial as well as industrial consumers the propensity to import is basically high and that the pressures to open domestic markets are likely to increase rather than diminish. At exactly the time when firms in the region may need most encouragement for coping with an inherently complex and rapidly shifting technological setting, they are least likely to have any shelter from the force of external changes.

The preceding remarks, sketchy though they are, do imply a period of quick and extremely risky change in industrial structure in the region. It would, however, be a serious mistake to confine observations to technological changes alone. As noted at the beginning of these remarks, the technological shifts have been and continue to take place within an overall environment which is not only radically different in the OECD from what it was a few years ago but is also very different in Latin America itself; the next section makes some brief comments about that environment.

IV. Technological change in the context of Latin American economies

Table 1 summarizes the decline in major macroeconomic magnitudes in Latin America during the first half of this decade. The figures relate to the region as a whole as well as to the six leading countries which together account for 85 per cent of regional GDP. In absolute terms GDP at the middle

of the decade was barely above the 1980 level while in per capita terms the fall was more than 7 per cent (Colombia being the only country to register a small increase). Manufacturing performed slightly worse than the economy as a whole; by 1985 value added was just about back to its level of the beginning of the decade. The cutbacks in investment were still sharper, suggesting that future growth has been affected quite badly by the crisis. Domestic investment (even before allowance for disinvestment) fell by more than one quarter in the 5-year period while foreign direct investment contracted by about 45 per cent; resources devoted to accumulation of productive assets were thus well below their earlier levels, reinforcing the earlier observations concerning the need for careful choices regarding investments in new technologies. Funding from abroad via long-term loans fell far more sharply and had turned to an outflow of more than $5 billion per annum by the middle of the decade (in all of these dimensions, Colombia was the only country registering some upturns). The severe reductions in aggregate investment along with the provision of foreign finance were reflected in a much diminished capacity to import, down by over 30 per cent in the five-year period.

While in the main OECD countries strong arguments can be made regarding the association between the crisis starting in the 1970s and the sweeping technological innovation of the past 10 years, the situation in Latin America appears to have been quite distinct. Although the technological factor is now a central element in economic and social reorganization, the chronic regress in economic performance described in Table 1 has its causes elsewhere. What continues to be a common feature of the present and recent past is the influence of changes abroad on Latin America's fortunes. That major industrial change has taken place and will continue to do so is clear: whereas in the recent past much of that change took the form of plant closures, severe falls in employment (Table 2 indicates the reductions in the six leading countries of the region since 1980) and idle capacity, along with growing pressures to sell off public sector holdings and provide greater freedom for foreign investors, the future decisions are likely to revolve around technological choices. Since the macroeconomic upheavals have largely shattered the fragile infrastructures for technological change which existed before (Brazil seems to be the exception, with the institutional support for technical upgrading still basically in place), the steps taken in the near future will largely be piecemeal and only slowly grope towards a general context. Yet those steps are themselves conditioned by the general environment.

Table 1: Macroeconomic Indicators for Latin America, 1980 and 1985

Country[a] and Continent	GDP ($bn, 1984 prices)		GDP per head ($bn, 1984 prices)		Gross Domestic Investment ($bn, 1984 prices)	
	1980	1985	1980	1985	1980	1985
Brazil	229	249	1923	1852	63	50
Mexico	165	178	2402	2248	56	33
Argentina	67	60	2387	1971	15	7
Venezuela	46	43	3041	2451	13	9
Colombia	30	33	1195	1243	6	7
Peru	21	21	1232	1055	4	3
Total Latin America	660	685	1933	1782	168	123

Source: BID, Progreso Social y Económica en América Latina, Washington 1986

Notes:

a: The six countries mentioned account for just over 3/4 of the regions population and about 85 per cent of regional GDP. All of them have populations of 20 million or more; apart from Chile, all other countries have populations below 10 million. As column 1 shows, all have GDP over $20 bn; again with the exception of Chile, all other countries have GDP less than $10 bn.

b: 1984 figures.
c: 1983 figures.

Table continued:

Country[a] and Continent	Private Foreign Direct Investm. ($bn)		Net Receipt of Private Foreign Long-term Capital ($bn)		Imports of Goods and Services ($bn, 1984 prices)		Value-Added in Manufact.	
	1980	1985	1980	1985[b]	1980	1985	1980	1985
Brazil	1.5	0.8	3.5	-1.7	17	12	68.3	68.9
Mexico	2.2	0.4[b]	3.8	-1.1	24	15	41.0	43.8
Argentina	0.8	0.9	3.3	-1.9	10	5	16.8	13.9
Venezuela	0.01	0.01	2.1	-0.1	14	9[b]	8.2	8.9
Colombia	0.01	0.8	0.3	0.9[c]	6	5[b]	6.7	7.0
Peru	0	-0.1	0.1	-0.1	3	2	5.2	4.5
TOTAL Latin America	5.7	3.1	13.6	-5.2	104	71[b]	165.1	164.4

Table 2: Employment in Manufacturing Industry in Leading Latin American Countries, 1985

Country	Employment Index (1980=100)
Brazil	88.1
Mexico	94.5
Argentina	88.7
Venezuela	98.0[a]
Colombia	82.4
Peru	83.3

Source: Cuadernos de la CEPAL No54, Crisis Económica y Políticas de Ajuste, Estabilización y Crecimiento, Santiago 1986

a: 1984 figures.

Since the start of the present decade, the perspectives for industrial expansion in Latin America have undergone a sea change. Investment financing for industrial purposes is now under constraints, both direct and indirect, of a far more severe character than at any time in the past thirty years. None of the foreign economic agents who occupied a leading role at various times in the past are now ready to continue on anything like the same scale. Multilateral financing agencies, international banks, and foreign firms are all unwilling to be major lenders to Latin American countries. Venture capital stemming from abroad therefore has not played a locomotive role in any process of industrial financing in Latin America in the present decade. This constraint significantly complicates the already severe problem of the burden of existing debt in most countries of the region, above all the more industrialized ones. Under existing schedules, a high proportion of the foreign exchange which is generated by Latin American economies goes directly towards the repayment of the debt and therefore cannot be used as a source of industrial financing. Moreover, the availability of foreign exchange for industrial purposes is still more circumscribed due to the enormous outflows of capital from the region. While at the beginning of the 1970s a great deal of attention was given to controlling repatriation of funds by foreign affiliates established in the region, emphasis in the mid-1980s has switched to the huge transfer of capital effected by domestic economic agents. The point is that under either process the availability of funds for local investment has been severely curtailed. To these problems on the foreign exchange side must be added the almost certainly adverse effects on domestic savings and industrial investment of the low and often negative growth rates recorded in the past few years. Adding together all of these considerations means that very little is available for any fresh industrial investment.

The debt servicing problem has, as is well known, a further important negative impact on the industrial situation. It is that any attempts to obtain supplementary funding from abroad are nowadays strictly conditional on reaching agreement with the IMF on domestic economic policy. In practice the main elements of such agreements involve sharp cut-backs in most areas of domestic demand as well as powerful pressures to diminish the size of the public deficit. These measures imply not only a squeeze on domestic savings but also a contraction of local purchasing power; neither of these is particularly conducive to industrial investment. The pressures on the State sector generate further problems, especially bearing in mind the focal position that State firms have occupied in the actual process of industrial growth in the region. At the moment, governments are trying to sell off appreciable numbers of State-owned industrial enterprises and are finding that the attempt has structural consequences of its own. Those companies which have been less profitable on a commercial basis are difficult to sell off while the firms which have been doing well have no lack of would-be buyers, particularly from abroad. The public sector is thus faced with a situation in which the short-run need for liquidity brings about a privatization and denationalization of the industrial economy on the one hand and yet leaves the State with even bigger current deficits on the other. This in turn weakens any possibilities the State may have had for encouraging industrial expansion elsewhere through subsidy systems or other methods; behaviour of the public deficit is, after all, closely monitored and the government can only go beyond specific limits at the risk of jeopoardizing agreements with external agencies designed to cope with the debt servicing problems.

Through the last three decades countries of the region have tried, on larger or smaller scales, to make co-operation arrangements which would extend markets, harmonize policies towards foreign investments and seek better conditions from external trading and financing partners. All of these arrangements, however, have run into fairly severe limits and at the present time there are few grounds for optimism regarding the route of intra-regional co-operation. This means that neither the international market as a whole nor the regional market seem to offer major opportunities for extending industrial production and thereby compensating to some extent the constraints stemming from the present condition of national markets. The overall picture is therefore bleak. The new technologies have not been developed in the region; their use in the region is closely tied to the corporate decisions of major OECD firms; the state of the national economies in the region renders it most problematic for local firms to employ these technologies on a large scale, let alone develop them; and the parlous condition of international payments has powerful negative repurcussions on the capacity of the State, directly or indirectly, to stimulate domestic producers.

It is scarcely surprising that, in such conditions, governments are driven to an agonizing rethinking of not only the instruments of industrial policy but also of the very objectives towards which policies should be directed. To begin with, it is nowadays difficult to sustain the notion that industry is a motor of overall economic growth. Along with this, it is also difficult to continue promoting the idea that integrated industrial structures should be built up (can be built up) in the countries of the region. Moreover, the newtechnologies are forcing a dramatic reconsideration of the relationship between industrial production and employment. Even if, as is regularly repeated in OECD circles, the new technologies do offer significant employment potential, albeit in new types of jobs, the medium-term impact in Latin America is firmly in the direction of reducing industrial employment. Governments can no longer seek to justify industrial investments through appeals to their employment creating effects. If the weakness of the employment impact is added to the other difficulties on the industrial side, it is scarcely surprising that the advocacy of industry becomes a tougher task. In the OECD economies the clear direction of change is towards far greater linkages between the service and industry sectors, so much so that the lines of distinction between them are now quite blurred. Latin American countries are therefore also compelled to ask themselves what degree of co-ordination between these two sectors can be achieved. Is it possible for them to move away from the idea of NICs towards that of becoming what might be called developing industrial service countries (DISCs)? What direction could industrial policy take to cope with this hazardous situation?

V. Policy Options

The preceding comments have uhnderlined the numerous uncertainties which surround policymaking at present, yet have also stressed that there is now escaping the task. What is being done and what can be done? Four interrelated sets of policy issues stand out, viz. macro-economic questions, industrial development, technology matters proper, and the nature of international co-operation particularly collaboration schemes within the region. Before discussing these four areas, however, a few broader comments on the approach to policy making in the region are in order.

There are no universal forumlae or recipes setting out the 'ideal' relations between government and industry - it is all to easy to glorify the relations observed in some Asian countries, notably Japan and Republic of Korea, without taking account of the crucial influence of culture on those relationships. That much said, however, there are genuine grounds for supposing that a distinct improvement in government/business linkages in Latin America is necessary. In a sense, Latin American governments have tended to be both too distant from industry yet also too close to it. The distance is seen in the marked tendency to treat policy formulation as an arcane art capable of being practiced only by economists and lawyers versed in the intricacies of manipulating theories and legal documents. The direct and permanent involvement of industrialists in the policy process is as yet gravely insufficient and leads to situations both of unrealism of policies and of their irrelevance in that the actual path of industrial change turns out to be quite different. Unless a thorough dialogue process is established in which administrators openly recognize that they have much to learn rather than to teach, the prospects of reaching sensible decisions in a phase of great uncertainty will be slim. At another, and less savory, level the distance between govenment and industry is much too short. Since the possession of government posts is regarded as a location from which favors can be dispensed, there is a natural tendency for industrial groups to try and coax administrators into decisions which will favor them rather than their competitors. Obviously this is a phenomenon to be found in most countries and most times; however, its effects are more serious when the overall setting does not encourage sufficiently a full dialogue between government and industry. Putting the point somewhat crudely, the role of government officials will have to be seen from a different perspective if the role of government is to be strengthened.

The problems of the government-industry relationship tie up with an additional and quantifiable difficulty in the present period. Faced with a grave crisis and the need for severe economies in the public sector, the evidence is alas all too strong to show that government officials have been ready to utilize their access to key matters, particularly decision taking ad foreign exchange, to insure that they themselves are well protected financially. Capital flight from major countries of the region during the present decade has reached alarming amounts and has undoubtedly contributed significantly to the debt problem. At root this behavior, along with that of industrial and commercial groups who have been doing the same thing, is indicative of a fundamental lack of confidence not only in their own economies but also, and still more importantly, in the willingness and capacity of their own people to work together and overcome the crisis. Despite the constant statements on the need for a collective effort, the chastening reality has been that of partial and individualistic behavior by those in a position to exercise influence. There are no short-term remedies for this problem of perspectives, for the perspectives involved relate to societies as a whole and not just the economies. Yet ways to inculcate mutual confidence must be explored for without them there will remain the persistent danger of policy statements being nothing other than echo chambers.

Just as earlier sections of these notes have emphasized the importance of fresh approaches to industrial organization as a key to better absorption of new technologies along with greater competitveness of domestic production, so the message here is for tighter organization within the government structure and in its relations with industry. Time and again the results of utilizing

various economic policy instruments have been shown to vary greatly depending on the context in which they are applied. So at this delicate moment of contemporary Latin American history the argument is that the context must be thoroughly understood lest the mechanical introduction of schemes go badly astray. The experiences, many of them harsh, in recent years may at least have the positive effect of encouraging greater pragmatism and greater tolerance. These are valuable assets, not only in themselves but also as a protection against the more strident and often misleading advice being thrown at the region from elsewhere. Though these notes have underlined the uncertainties in present international shifts, the striking feature of policy discussions in most of the main OECD countries has been the simplicity of the message put forward. In essence the crisis of economies has been swept under the table by a return to simple economic themes. The advantage of current debate in Latin America is that such simplification is, in most instances, absent. It is that type of positive thinking which has to be drawn on in devising policies.

(i) Macro-economic policies

During the post-1980 period most countries of the region, especially the three largest, have experienced very similar and severe difficulties: a collapse of prices for primary product exports, rapid accumulation of foreign debt to a point at which the maintenance of original payment schedules has been beyond possibility, severe inflation, sharp cutbacks in industrial production and employment, and strong pressures for reduction of the public deficit. These macro-economic difficulties have had major impacts on the extent and nature of industrial performance. Not only have many enterprises been forced to reduce their activities (and in quite a few cases stop them altogether) but also industrial planning has become a task of inordinate complexity.

The main countries of Latin America have made very determined attempts to resolve these problems. Mexico followed IMF prescriptions to the maximum extent and for a couple of years held its foreign payments problems in check at the expense of a severe contraction in domestic economic activity. With time, however, it has become clear that although the lid could be kept down for some time, the pot is still boiling. Argentina and Brazil launched, respectively, the Plan Austral and the Plan Cruzado as original attempts to break inflationary spirals in their economies. While it is true that these plans, especially the latter, have also run into heavy weather, it cannot be said that these economies have failed to tackle head-on one of their main problems. The question now, as far as the impact of macro-economic conditions on industrial change is concerned, seems to comprise the following elements. First, to what extent are industrialists and labor groups convinced that governments are determined to keep the foreign exchange price and domestic prices within fairly predictable ranges of movement? Second, to what degree can fresh macro-economic policies actually be devised? This second issue is critically dependent on tackling the problems which have been at the forefront of both the Mexican policies and those of Brazil and Argentina, i.e. industrialization under foreign exchange scarcity, and the breaking of a set of price expectations which, in the medium- to long-term, forces constant devaluation of national currencies and ever greater pressure on the foreign exchange side.

At the moment easy-sounding proposals are insistently being put forward in relation to these matters. Export expansion of manufactures is the usual recipe to alleviate the foreign exchange constraint while strong control over domestic money supply along with sharp reductions in the public deficit is normally propsed in relation to the inflation problem. Yet neither of these seems to promising on its own although both of them can make a positive contribution. Put another way these notes are arguing that even if steps are taken in the direction of "getting macro-economic variables right" there is still everything to do as regards developing an industrial policy. In one sense, it could be argued that this is the first period in the last thirty years in which this problem has faced virtually all countries of the region at the same time. It is surprising that, given the accent on regional collaboration so often heard, no obvious ways have been used to exchange experience on this matter, apart from the organization of seminars. There may well be scope for industrial groups and government officials, along with thoseresearching industrial policy problems, to set up a strong dialogue on these questions. The provision in the 1986 Argentina-Brazil agreement to set up a group examining economic issues in the two countries could well represent a start in this direction.

(ii) Industrial policy

In the situation of macro-economic upheaval which has prevailed in the present decade it has become much more difficult to detect any sharp profile of industrial strategies and policies. The accent has been firmly on short-run measures aimed at saving foreign exchange through sharp cutbacks in imports along with attempts to sell off enterprises to foreign buyers. The notion of industrial planning has received scant attention and instead many studies and recommendations have been related to the trade aspects of industry. In particular, the use of protection policies has come in for strong criticism and it has been suggested to many countries of the region that they reduce levels of protection, even up effective rated of protection as between industrial branches, and try to give full support to activities that appear to be export-oriented (one implication of this last point has been the renewed drive for liberalization of foreign investment regulations in the expectation that fresh investments would aim mainly at export - as Table 1 above shows, there has in fact been a dramatic fall in net investment receipts).

The less conspicuous nature of policy making has not meant, of course, that this period has seen few changes in industrial structure - quite the contrary, the upheavals have been enormous. At the risk of simplification, the following points, all closely related to technology, can be cited. First, in heavy industries, especially the automotive branch, tie-ups with foreign firms have increased substantially and the nature of production has moved firmly towards the provision of major components for intra-firm cross-border trade. On one side this has meant that the larger countries have in effect given up or at least appreciably curtailed their ambitions towards full-scale production of a wide range of vehicles and on the other it has led to the introduction of fresh production technologies and organizational methods necessary to insure that the quality of the components produced in Latin America meshes exactly with the requirements of the production system abroad (in this case essentially U.S.A. and to a lesser extent Japan). Second, the pressure to sell off public sector firms has increased enormously and many countries of the region have made quite extensive lists of enterprises to be offered for private purchase although the number of such sales continues to be

fairly small. This pressure itself has effects on industrial structure since public sector firms have tended to be concentrated in fairly heavy industries; insofar as sales of such firms prove difficult, the role of these industrial branches in overall production is reduced or even eliminated. Given that the activities under discussion are the provision of important intermediate inputs the consequence of this pressure is clearly to reduce the degree of internal industrial integration. This will have sharper effects in some countries than in others since not all are in the same position regarding domestic capital goods production. Mexico, for example, imports over 90 per cent of the machine tools on the domestic market whereas the comparable figures for Argentina and Brazil are around 60 per cent and 30 per cent respectively. Similarly, taking capital goods as a whole, the domestic procurement ratio in Brazil is near 80 per cent while in Mexico the figure is only somewhat more than one-half. Third, the scarcity of foreign exchange coupled with the introduction of new and costly technologies means that local firms have been finding it extremely difficult to upgrade production if they rely on their own capital resources only. Once more the tendency is towards greater collaboration with foreign suppliers so as to obtain from them not only the technology but also the wherewithall to purchase it.

The stress on earning and saving foreign exchange has had a more general impact in relation to industry's place in Latin American economies. Though the policy advice from abroad has been couched in much more cautious terms for Latin America than for Africa, the general thrust has been the same, i.e. that production should be shifted away from more complex branches towards those where Latin American countries are held to have a competitive advantage. Explicitly this includes (according to the country) food processing activities, mineral processing, certain branches of engineering and metal working where some countries have acquired long experience and where (following major currency devaluations) labor costs of production are fairly low, and the tie-ins with TNC activities mentioned above. Certainly exceptions to this broad pattern are recognized but on the whole the emphasis is against the extension of the range and depth of industrial production formerly envisaged. In overall terms the implication is that industry will occupy a somewhat more limited role in the economies of the region than was previously the case. Yet there does not appear to be a corresponding expansion of industrial service activities, e.g. computer software production, which could take up the slack. Since the transformation of the agricultural sector towards ever more capital intensive and land extensive output is continuing apace, the ways in which any slack in employment could be taken up are correspondingly confined. It is in this context that attention is being given more and more to the activities in the so-called informal sector. Just as in the southern European economies, above all Italy and Spain, the growth of this sector has been a vital component of meeting the crisis (in Italy recent estimates put the proportion of national output coming from such activities at about 30 per cent of national income, while in Spain their share of manufacturing output is probably of the order of one-fifth to one-quarter), so in Latin America governments are virtually compelled to see informal sector growth as an escape valve. In Peru and Colombia, in particular, major changes have taken place in this regard and, at least in the former case, very sizeable towns on the outskirts of the capital are now expanding production with the government having to provide more and more services.

The ingenuity of responses to a crisis can certainly contribute to the formation of new industrial structures; what is missing now is a clear conception of what those structures might look like. Once more the necessity

of dialogue seems evident since otherwise the splits between those groups actually expanding despite the crisis and the ideas put forward in policy discussions will become totally unmanageable. The key questions, nevertheless, will continue to revolve around familiar points. To what extent can import subsitution in the capital goods field be increased? The Argentina-Brazil arrangements of 1986 put strong emphasis on this point and has developed mechanisms to expand, in balanced fashion, capital goods trade between the two countries. In which branches should the public sector continue to play an important role as producer? A central tenet of policy advice from North America has been that the public sector should concentrate on the provision of welfare services, where it is supposed to have performed well, and to progressively eliminate its participation in major industrial branches. As noted above, this may be tantamount to giving up the aim of greater domestic industrial integration. What should be the role of foreign capital in the industrialization process? Nowadays the theme of much discussion is to argue that this capital should play an ever greater part in industrialization. Yet it has been seen that TNC are not particularly willing to expand investments in developing countries, save for a few locations and industrial branches. The increase of incentives to them is unlikely to produce significant results for any one country, i.e. the incentive elasticity of foreign direct investment is, in most cases, very low. Fresh ways of seeking collaboration are certainly necessary but the extent of participation already existing in Latin American economies along with their fairly row rates of growth does not auger well for expansion through this route. What should be the nature of trade policy? Currently the prevailing orthodoxy is very much in favor of reducing import barriers and expanding export incentives both through the macro-economics of devaluation as well as through branch-specific measures. Yet the structural effects of these proposed changes are not at all self-evident. It is not clear that large expansion of net foreign exchange earnings can be achieved through this route; the effects on public revenue of the proposed reductions of trade barrie s are by no means clear; and the consequences of altering protective structures for the composition of domestic-based industry are also not evident. In particular, it must be remembered that as technologies continue to shift in OECD countries, even the promotion of export-oriented manufacturing may require an ever greater input of foreign technology.

The upshot of these observations is that the linkage between a general approach to industrial change and the ways of developing a greater command over industrial processes and their evolution is still to be clarified. Measures to alter incentive structures in the direction of what are held to be the yardsticks of international prices still offer no recommendations as to improving domestic absorptive and innovative capacity. It is for this reason that technology policy as such has to be a key focus for coping with the uncertainties.

(iii) Technology policy

For the past two decades at least this subject has received a great deal of attention in Latin America yet in some respects the issues seem at least as complicated as when some of the earlier practical work was undertaken. The ways of obtaining information about available technologies are generally known yet the secrecy surrounding current developments is so great that countries in the region find it very difficult to stay abreast of changes. Evaluation of such information as can be obtained is also a tough proposition due to uncertainties about the profitable economic life of any set of available

processes. The selection of areas in which domestic R & D could be undertaken is, for the same reasons, very difficult and especially so in a time of severe financial constraints. Innovation itself, always an arduous task, is now more onorous due to the important shifts of industrial organization described earlier in these notes. In other words, to reap the full benefits from any innovative steps, it is increasingly necessary for larger scale alternations in industrial structure to take place. While such shifts have been effected within the industrial cultures of some of the Asian countries, and have also proved reasonably manageable in the quite different setting of U.S.A., the traditions of industrial behavior in Latin America do not facilitate the alterations required. As if these complexities were not enough, the whole set of issues connected with the transfer of technology from abroad also requires re-examination. This is because the choices of partners need to be seen in a much more dynamic sense than when technological change is relatively slow or at least very predictable; because the expected benefits may be much more difficult to quantify when employment, tax receipts and other such variables play a lesser role in overall decisions than that of shifting towards the 'correct' systems; and because the problems of absorption may now have to be posed in different terms than before.

It is scarcely surprising that countries of the region are still groping with ways of handling this situation. At the basic level of collecting and analysing information, along with assessing which areas might be suitable for R & D within the region, present developments cover a few aspects. In certain cases, especially where Argentina and Brazil are concerned the presence of scientists and technicians from those countries in major OECD locations has given some point of contact. It has made somewhat easier the process of establishing agreements on provision of information and has encouraged the development of some collaborative programs. There have also been an example or two of explicit government to government agreements which allow for the conclusion of collaboration of this type. But the range of alternatives is still not great. There is, after all, great suspicion on the part of OECD innovators regarding the risks of losing their information grip. It is certainly no accident that the present international economic environment is characterized, among other things, by persistent and powerful pressures for developing countries to increase to the fullest extent the protection which they give to industrial property. This means not only incorporation in their national legislation and practice of the norms set out in prevailing international conventions but also extension of protection to cope with the fresh problems posed by recent and expected technical advances. Consequently as the actual technological gap appears to grow, Latin American countries are constantly cajoled to reduce the legislative and institutional gap; if these two things continue to happen together, their combination may produce a distinctly unfavorable situation.

In the face of the picture described, new ways of approaching negotiation for transfer of technology seem necessary. In a sense the guiding principles remain as before, i.e. the crucial importance of identifying key elements in technological packages and developing ways of absorbing those elements as quickly and fully as possible, but at the practical level the issue is to discover what those key elements really are. For areas such as computer software some advances are being made, e.g. through information sharing between Argentina and Mexico, but in general the panorama is patchy. More seriously, perhaps, the assessment of existing technological arrangements is also difficult since it is by no means clear just how useful they are likely to be say five years from now. Government offices that were set up more than

a decade ago in many countries of the region to tackle registration of technology arrangements are generally not well-equipped to deal with this type of situation. Indeed, it is not obvious that legislation for it can easily be prepared. The relevant knowledge, if it exists, is most likely to be found in local firms and it may be best to leave them with their own ways of handling negotiations. Put another way, the point being made is this. Although a key strand in the thinking which led to the development of general technology policies in the region towards the end of the 1960s and in the early 1970s related to the need to conserve foreign exchange, and for this reason government policy sought detailed information on outflows related to use of foreign technology, the present position is one where the foreign exchange scarcity is at least as great yet the technological uncertainties are probably much greater. In these conditions the most useful approach might not be the legislative one employed earlier but rather to operate with much greater freedom for the individual firms.

(iv) International cooperation

Notwithstanding the constant preoccupation internationally with the debt problems of Latin American countries, the prevailing mood inthe 1980s has certainly been one where Latin America has been more marginalized from international discussions than before. The Asian countries, for the most part, have been regarded favorably and there has been considerable support for the policies they are thought to adopt. Sub-Saharan Africa is constantly in the forefront, even though for the quite different reason that its condition is regarded as requiring constant injections of external funds and technical assistance. But now that flows of direct investment and long-term capital have fallen so precipitously for Latin America, and its countries have not been closely linked to favored arrangements with particular OECD countries, the problems of the region are being largely ignored by those outside it. Bluntly put, if Latin American countries could repay foreign debt rapidly, the chances that OECD countries would pay serious attention to the grave structural problems facing the region would not be great. If correct, this assessment implies that the need for collaboration within the region is probably greater now than it has ever been - yet this is precisely the time at which a mood of deep disillusion about the prospects for collaboration prevails. The Argentina-Brazil arrangements may provide a way forward, particularly since they focus on the key industrial area of capital goods and are specifically oriented towards a longer-run common market arrag=ngements. Moreover, though it would be premature to suggest that the arrangements herald an end to direct competition between the countries, nevertheless, their willingness to collaborate does provide an important pivot for regional cooperation.

From what has been said in these notes, the elements of cooperation are fairly easy to identify. First, there must be much greater interaction on questions regarding macro-economic management as it effects the industrial sector. In the earlier part of this decade much discussion took place regarding the possibility of a debtors' cartel but these debates appear to have died down. However, the notion of close contact on this and other macro-economic matters needs to be pursued and formalized. Second, a serious attempt to create alternative ways of developing industrial strategies has to be made. It is not difficult analytically to show the limitations of prevailing quantitative measures, e.g. domestic resource costs and effective rates of protection, as guides to resource allocation decisions and therefore to policies. The tough problem is to devise alternative useable indicators

and a focus on these through joint work could yield major results. Third, an assessment of technological changes should probably be conducted ina much more cooperative way than has so far been attempted. Just as the diffusion of ideas of technology policy in the region was quite rapid some fifteen years ago, so it may be possible to have the same type of spread in the complex conditions now existing. Fourth, a further appeal for regional collaboration in tackling these matters needs to be made. All of these points should be seen against the backcloth of a radical reduction of the distance in dialogue between industry and government. They must see each other as partners and not opponents - for to the extent that internal disharmony exists, so it will be more difficult to establish necessary linkages abroad.

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