UNITED NATIONS

E C L A C

ECONOMIC COMMISSION
FOR LATIN AMERICA AND
THE CARIBBEAN

JOSE ANTONIO OCAMPO
Executive Secretary

REYNALDO BAJRAJ
Deputy Executive Secretary

CEPAL

REVIEW

NUMBER 67
APRIL 1999
SANTIAGO, CHILE

OSCAR ALTIMIR
Director of the Review

EUGENIO LAHERA
Technical Secretary

UNITED NATIONS

LC/G.2055-P — April 1999

United Nations Publication

ISSN 0251 - 2920 / ISBN 92-1-121248-0

CEPAL Review is published in Spanish and English versions three times a year.
Annual subscription costs for 1999 are US$ 30 for the Spanish version and US$ 35 for the English version. The price of single issues is US$ 15 in both cases.
The cost of a two-year subscription (1999-2000) is US$ 50 for the Spanish-language version and US$ 60 for English.
A subscription application form may be found just before the section "Recent ECLAC Publications".

CONTENTS

First World *and Third World* after the Cold War

Eric Hobsbawm

Emeritus Professor of Social and Economic History, Birkbeck College, University of London.

This exposition is about the United States and the Third World after the Cold War. However, this matter can only be understood in the light of the long history of the relations between the Western countries –the centre of the world system– and the periphery. This history began at the end of the 15th century, when the Europeans, after a thousand years of defending themselves against invaders from Asia and Africa, embarked on their own era of world conquest.

In essence (at least for several centuries) this conquest was not based on greater wealth or overwhelming technical superiority, although scientific and technical progress in the most important regions of Western Europe was already more rapid and in some aspects more advanced than in any other part of the world. It was only in the 19th century, however, that the enormous gap between the per capita gross national product of the West and that of at least some of the non-Western countries became evident.

To begin with, the superiority of the conquerors lay in their maritime and military power, although the latter was still relatively limited. The only really large region conquered by the Europeans outside their own continent was America, where, for reasons that do not concern us here, the local empires were incapable of resisting the invasion. In Asia and Africa, in contrast, up to the 18th century the Europeans were only able to establish control over some ports, and even then only in areas where they were not confronting fairly large and effective States such as China and Japan. In short, in the first two and a half centuries European expansion was successful largely because local conditions did not prevent it. The relative weakness of the European empires was shown by their incapacity to control the independence movements which arose in America: neither in North America nor in Latin America were the European States able to resist these movements for long.[1]

□ This is an edited version of Professor Eric Hobsbawm's exposition at the seminar "El Mundo frente al Milenio", held on 25 November 1998, jointly organized by CENDA, ARCIS University, Revista Encuentro XXI and Editorial Grijalbo Mondadori and sponsored by ECLAC, among other institutions.

[1] The British quickly recognized these limitations. Thus, they did not make any serious attempt to reconquer the United States, even though they won a war in 1812-1813, and very soon after the Spanish colonies won their independence the British decided to refrain from direct military interventions, even in the River Plate region.

However, the clear technical, economic and hence also military superiority of the centre over the periphery grew enormously in the 19th century, thanks to the so-called "tools of power" –gunboats, machine guns, artillery– and the construction of a worldwide support infrastructure for maritime supremacy. In the 19th century this infrastructure was almost entirely in the hands of the British, who were then the leading economic and world power.

Let us now take a brief look at the political implications of this situation. First, the States of the centre could easily and quickly reach the world of the periphery, but not the other way round. Great Britain could use gunboat diplomacy against China, but Chine could not do the same against Great Britain. In modern terms: the United States can reach Iraq, but Iraq cannot reach the United States. Second, in almost all armed conflicts between the First and Third Worlds, the former won the battles, generally with little difficulty.[2]

Third, the result was the political inferiority of the Third World States, large or small, compared with those of the First World, as is shown by the relations between the United States and Mexico and between Great Britain and China up to 1949. Up to the mid-20th century, only one Third World State –Japan, which had successfully imitated the West– was able to escape from this inferiority and thus become part of the global power system.

Fourth, Third World States, or the Third World as a whole, could only offset this permanent inferiority with the support of one of the world powers. This was the function of the Soviet Union during the Cold War. The most extreme case is that of Cuba, which has survived as a Communist regime only 170 miles from Key West, thanks to the direct support of the Soviets. The end of the Cold War did away with this counterweight to the power of the developed world in general and the United States in particular.

This raises the question: why did the First World have to make so much use of its military and political superiority? Could it not have simply relied on the overwhelming advantages of its greater wealth and economic development, which increased spectacularly, especially during the Cold War? Well, it did indeed do this during the 19th century and much of the 20th century. We know that after the end, or withdrawal, of the old empires of the 16th to 18th centuries the sway of the First World increased, but the incentives to turn areas of the under-developed world into colonies went down during the 19th century, with a few notable exceptions.[3] The example of Great Britain shows that the purely economic exploitation of the Third World did not require direct occupation, at any rate in the absence of another Western competitor. This was the "free trade colonialism" about which so much has been written. However, Great Britain naturally maintained a network of bases which were of strategic importance or were necessary in order to allow it to keep on controlling the international sea routes. At first sight, the present situation of the United States might seem similar, but I hope to show later that there are fundamental differences.

The resurgence of colonialism at the end of the 19th century –the so-called "new imperialism"– was due mainly to competition between rival Western States. It is worth recalling, however, that this was a period when, for economic and technical reasons, a number of raw materials and commodities which are mainly found in the Third World became vitally important and continue to be so: oil, non-ferrous metals, rubber, and various tropical foodstuffs. These goods caught the attention of Western businessmen and also, as some of them were of strategic importance, of governments too. As the history of the oil industry

[2] This did not necessarily mean that the powers of the First World could win the whole war, however, unless it was a war against local governments. It was always hard and sometimes impossible to permanently defeat guerrilla movements in areas which favoured them, such as the Atlas Mountains in North Africa, Kurdistan or Afghanistan. The most intelligent of the imperial powers, Great Britain, gave up trying to occupy and administer such areas as the Northwest Frontier in India, and after the First World War it contented itself with controlling this area by periodically bombing it from the air, as in Kurdistan today.

[3] The main exceptions were the United States, France, the Netherlands and British India. The United States was committed almost by definition to territorial expansion, which explains its conflict with its poor and backward neighbour to the south (the war with Mexico). Border disputes with the other developed country present in North America, Great Britain (in Canada), were settled peacefully by diplomatic means. For domestic policy reasons, France was committed to the conquest of Algeria, in the Southern Mediterranean, which was an area also used for European migration. The Netherlands and Great Britain (or rather the Dutch and British East India Companies) found, for reasons that do not concern us here, that after setting up territorial bases in India and Indonesia they had to expand those bases until they became great colonies.

shows, however, the exploitation of this product did not necessarily call for colonial occupation.[4]

If we take a historical view, we can see that the new era of colonialism (of empires which insisted on direct occupation and administration) proved to be relatively short. Direct colonialism was a temporary fashion which only lasted a short time. Indeed, it can be contained within the lifetime of a single person: for example, that of Winston Churchill, who lived from 1874 to 1965. Since the industrial revolution, capitalism has needed to create a world economy dominated by the capital accumulation centres, but this does not necessarily require a formal colonial system.

A recent development has brought in a new element in this respect, however. In the last quarter of the twentieth century, the centre of gravity of the increasingly globalized world economy has begun to shift to some extent from the original capitalist countries to the Third World, especially in manufacturing. Moreover, since the rise of the Japanese economy and the oil crisis of the 1970s, native capital accumulation outside Europe and North America has become much more important than before.[5] This change was hastened by the enormous and growing difference in income between the First and Third World, which furthered the transfer of labour-intensive forms of production from high-wage areas to those of low wage levels (a well-known phenomenon in the case of Mexico). Likewise, this heightened the de-industrialization of the oldest industrial regions of the First World.

Thus, economically speaking, the international economy can no longer be considered as being divided simply between a First World concentrating most of the production and marketing of industrial goods and a Third World linked with the former as a producer of raw materials, although possessing an industrial sector based on the domestic market, as for example through import substitution (I will not refer to the more tightly closed economies of the socialist Second World which have now ceased to exist (like the former Soviet Union) or have changed their policies (like China). Today, the Third World includes the fastest-growing industrial economies and the most export-oriented industry. As long ago as the late 1980s, over 37% of United States exports already came from the Third World, while almost 36% of its exports went to the latter.

For this reason, the economic superiority of the First World is no longer due to the fact that it is the most highly industrialized region or that it has the most "advanced" economy, except in one respect: that up to now it continues to almost monopolize scientific and technological research and development.[6] Leaving aside this field, the First World's superiority lies in operating as an economic-financial conglomerate rather than a mere production plant. It houses the head offices of most of the great transnational corporations, which, with all their local branches and subsidiaries, account for a large part of the world economy. It has the faculty of laying down the framework for the world economy and its institutions, such as the World Bank and the International Monetary Fund, which it controls, and its immense wealth allows it to manage the greater part of world investment capital flows.

At the same time, however, this superiority makes the First World more dependent on what happens in the Third World. From the economic point of view, it is now much more important than before to have some degree of political control, especially in the case of the United States, which is the leading power in present-day capitalism. Until after the end of the Second World War, that country's economic development was based on its domestic market, and protecting its industry from foreign competition was traditionally much more important for it than free trade and export promotion. Although some specific branches of United States business and finance were deeply committed in one or another part of the Third World economy (the United Fruit Company, for example), the United States economy as a whole did not depend on its links with the Third World, unlike Great Britain, which had been the leading power in the nineteenth century.

This brings us to the specific matter that we will deal with here, which is the international position and policies of the United States after the Cold War.

[4] The division of the world into colonies was confined to Africa and the Pacific. The Americas were hardly affected, nor were those parts of continental Asia which had not already been conquered, except for those which became the area of territorial expansion of Japan in East Asia.

[5] Before the 1970s, even Japan -although a major military power since the beginning of the twentieth century- generated no more than 5% of the world industrial product.

[6] Even now, at the end of the present century, only a few Asians or Latin Americans have won a Nobel Prize in the sciences, and a number of those who have done so have worked or are working in Europe or the United States.

The United States now occupies a position which has no precedent in history. It is the only real world power. In the nineteenth century, Great Britain occupied a position which was similar in many respects, as the only power with global interests, since the other countries, including the United States and Japan, only had regional interests. In politico-military terms, however, Great Britain was only one of several powers, although in one respect it outstripped them all until the twentieth century: the British Navy was bigger than all the others put together, although this only lasted until other powers, especially the United States and Japan, began to build up powerful naval forces themselves. But the present position of the United States is very much stronger, in both relative and absolute terms. There is no foreseeable possibility of any other power competing with its nuclear and aerial might. Since the collapse and disintegration of the Soviet Union, there is no other State or combination of States which could even dream of challenging it militarily.

For this reason, I think it is important to compare these two positions of dominance. It seems to me that there are three main differences between them, which are not unconnected with each other. Unlike Great Britain in the nineteenth century, the United States is an ideological empire (as Revolutionary France and the Soviet Union were in their day). Perhaps for this reason, the United States empire (unlike the British Empire) seeks to transform the world into its own image and likeness. In practice, this aspiration is superimposed on that of world political and military domination. The lust for control is political, not just economic: although in the present world situation free trade is in line with the United States's interests, that country's basic attitude has been to protect and foster United States capitalism through political action. Unlike Great Britain in the nineteenth century, the United States has a long history of military intervention abroad.

In the days of the *Pax Britannica*, things were different. As it was only a relatively small country, Great Britain could not allow itself the luxury of megalomania. Its European policy, for example, was based on the "balance of power". It did not aim to become the mightiest European power, but it did take care to ensure that the stronger powers were always at daggers drawn with each other, while Britain remained on the sidelines of the disputes. As successful pioneers in world industrialization, the British had enormous confidence in their economic system.[7] They were also convinced that their political system was superior to all others, but they did not promote it as a general model.[8] When nineteenth-century Britain did become a model for others, this was by example and not by design, as in the case of men's fashions and internationally popular sports, almost all of which were of British origin.

The *Pax Britannica* was thus very different from the *Pax Americana*, except that the British Navy, in the days when it ruled the waves, took the main responsibility for international maritime vigilance against such activities as piracy and (after its prohibition) the slave trade. Great Britain recognized its limitations. No British Foreign Secretary, not even Palmerston, would have referred to any part of the world whatever in the terms that Secretary of State Olney used with regard to the Western Hemisphere in 1895, when he declared that the United States was now practically all-powerful in that continent and that when it took up a matter its decisions had the force of law, because apart from all the other considerations, its unlimited resources and its position of isolation meant that it was in total control of the situation and was practically invulnerable to any or all other powers.

United States policy has therefore consistently been one of interventionism, first within the Western Hemisphere and subsequently all over the world. Great Britain had many colonies but no satellite States, except for what has been called "Britain's heyday in the Middle East", between 1918 and 1958. The United States has had very few colonies, but its aim has been to build up a system of satellite States. We may recall that the typical *modus operandi* of the United States intelligence service, the CIA, is to combine intelligence work proper with covert political actions.

Furthermore, as we have already seen, first within the Western Hemisphere and then worldwide, United States policy has been based on the acknow-

[7] So much so that they unilaterally adopted free trade and kept it up for almost a century, although no other State joined them in this: a highly beneficial policy for an economy based on trade with the Third World.

[8] They considered that, regrettably but inevitably, the French and Americans would never be like them, while although the Russians would be better with stable laws and civil liberties they would still be quite un-British. As for the Third World, the British were convinced -mainly on the basis of their experience in governing India- that most of its inhabitants were permanently unfitted for the exercise of freedom.

ledgement of its overwhelming power –both economic and technico-military– in its area of influence: a power that it has always been ready to use when necessary and which demands some degree of public acceptance and consideration on the part of other States. The older powers, accustomed to the conventions and practices of diplomacy, had not generally made such demands. The assumption –clearly implicit in the Helms-Burton Act– is that the United States is so indispensable to the rest of the world that it can use its national power to oblige other States to comply with United States policies even within the jurisdiction of their own territory.

During the Cold War, all this was justified on the grounds of the Soviet menace and accepted by the United States's allies and satellites as the price that had to be paid to keep Washington happy.[9] But what is the situation today? The list of interventions since the end of the Cold War, when the Soviet threat no longer exists, is surprisingly long. It includes Panama in 1989, the Gulf War in 1991, Haiti in 1994, and various operations which had humanitarian or peacekeeping objectives but nevertheless involved the direct participation of United States forces, from Liberia and Somalia up to the Iraqui sector of Kurdistan and Bosnia. The most recent examples are the bombing raids on the Sudan and Afghanistan.

Indeed, as one United States author has noted, there is an ongoing conviction that military intervention is always likely to be the final response of the United States (Down, 1997, p. 202). Why is this so? Because other methods of asserting United States influence have come to be less effective, and because the real need for that country to continually assert its supremacy has increased. United States economic aid has drastically diminished, especially since the adoption of the Graham-Rudman-Hollings Act in the mid-1980s, and this has weakened a traditional means of influencing other States. The success of economic sanctions, to which the United States has been strongly addicted, has gone down since the early 1970s, perhaps because the United States economy has lost relative weight or because such sanctions are no longer suitable for achieving particular objectives such as respect for human rights or controlling drug trafficking. Para-military and covert actions have had dubious results, although they have undoubtedly been very effective for harassing governments that the United States disapproves of and upsetting their functioning (Angola is a lamentable example of such cases). Furthermore, such actions are no longer so effective for overthrowing hostile governments as they were in the 1950s. In any case, they are not a weapon that can be used unilaterally, since they require the aid of a local ally (Schraeder, 1992, p. 149).

At the same time, the globalization of the economy has meant that the activities of transnational corporations (regardless of their country of origin) are now more dependent on the goodwill of the authorities of the country where they operate. The Helms-Burton Act seeks to bar from United States territory all foreigners whose economic activities in other parts of the world are not to the taste of the U.S. government. But this principle is applicable to all States.[10] A country with such a long protectionist tradition as the United States has always been keenly aware of this political element in its foreign trade, which is very evident, for example, in the almost constant pressure by Washington on Japan for the latter to allow more United States imports to enter its territory. Naturally, the United States refrains from openly threatening States which it does not consider as adversaries or which are so weak as to be insignificant. It does consider it to be desirable, however, that everyone should be well aware that it can use what President Theodore Roosevelt called "the big stick".

Consequently, since the end of the 1980s the United States has worked out a systematic doctrine of what it calls "low-intensity conflict" suitable for the post-Cold War era. This is no longer based on the idea of preparation for a major war, but it does provide for the direct and if necessary armed intervention of Washington's allies or of the United States itself. Indeed, the end of the Cold War –that is to say,

[9] Intervention in the internal affairs of other States, which has been officially acknowledged, albeit only indirectly, became normal practice (in Central America, Africa since the 1960s, West Asia, etc.), although it violates the legal principle of non-intervention which has been formally recognized since the First World War. This probably explains why the United States justifies most of its interventions, even in the unconvincng case of Grenada, on the grounds of "self-defence".

[10] Without national authorization for aircraft to land there can be no international air traffic. The proposed merger between American Airlines and British Airways depends on a political decision between Washington and the European Union on the number of flights of these two airlines that are to be allowed to land at Heathrow Airport.

the end of the danger of a world war– has loosened the brakes on the war machine. The Gulf War would not have been possible before this. President Bush himself proclaimed the new doctrine, declaring that the United States and its allies must build a common strategy to ensure stability in the developing world. And what are the threats to that stability? They are insurgency, terrorism and drug trafficking, he said. This means –in the words of Defense Secretary Cheney– that greater reliance must be placed on highly mobile forces prepared for immediate action and, in the jargon of the Pentagon, *"with solid power-projecting capabilities"*, that is to say, with capacity for massive long-distance military intervention. As a result, in recent years we have witnessed a number of highly visible examples of the United States capacity to intervene at a moment's notice anywhere in the world, no matter how far it may be from military bases on United States territory. We may recall in this respect the Gulf War, Somalia, Bosnia and, a couple of months ago, an exercise involving parachutists in one of the former Soviet republics of Central Asia.

At this point in our analysis we must ask ourselves: what is the capacity and what are the limits of this global military leadership? We will now make a few comments in this respect.

First of all, there is a growing gulf between the size and resources of the United States and those of the world dominated by it. I do not mean to say that the United States is in danger of what Professor Paul Kennedy of Yale has called "imperial overstretch": that is to say, imperial ambitions out of proportion to the available resources. Since the end of the Soviet Union there is no other military power that can compete with it, and as there is no danger of a major war at present, the United States can probably maintain its military supremacy without too much of an economic effort. However, although the United States currently accounts for no more than 5% of the world population yet generates 10 to 20% of world industrial output, the latter proportion is tending gradually to diminish.

Consequently, the United States is not really any more capable of "controlling" the world in the twenty-first century than the British were in the nineteenth century. Trying to maintain the political stability of the world is a reasonable objective for the United States, but imposing this through its military or economic power is beyond its possibilities. The most dangerous aspect is that despite its present predominant position this country lacks both a diplomatic tradition and an objective awareness of its limitations.

Secondly, in spite of all its might, when acting alone the United States can only exert a relatively modest and limited amount of power. It needs allies abroad, because many of its military bases and much of its world infrastructure are on foreign territory. This is where there is a difference with the British hegemony in the nineteenth century, because the bases of the British maritime control system were British property: Gibraltar, the Falklands, Malta, Singapore, Hong Kong, and so forth. In 1973, even though it dominated the North Atlantic Treaty Organization (NATO), the United States did not have free use of its allies' air bases in peacetime. Moreover, United States domestic policy now places limits on military intervention, especially in most of the "low-intensity conflicts" envisaged in its late-twentieth century world strategy, because these conflicts often cannot be fought by remote control but involve ground troops. Bosnia and Chechenia are good examples of this. It is well known that United States public opinion always wants military victories, but only if they do not involve the loss of American lives. In order to overcome this problem it would be necessary to change both the structure of the United States military forces and American public opinion, and while this is not impossible, it has not yet occurred.

Thirdly, there are vast areas of the world –Africa, much of Asia, and even Eastern Europe– where we are currently witnessing the effective disintegration of States or a whole system of States. It is by no means clear how useful the new United States doctrine will be for dealing with "low-intensity conflicts" in such situations of instability. Clearly, in the event of war the First World would undoubtedly win all its battles against the Third World. But what about afterwards? Who would ensure stability? And where, in these unstable regions, would it be possible to find governments that were sympathetic to the West, docile, yet also capable of staying in power? When they look at what is happening in vast regions of Africa, some deeply discouraged observers wonder whether it would not be better to re-colonize those territories. This is no longer possible, however. The secret of the imperialism of the past -i.e., the passivity of the great majority of colonized peoples under their conquerors- has been lost. In any case, there is now such an abundance of highly effective and easily

portable arms and explosives in the world that huge outlays of men and resources are needed to deal with quite small groups of armed activists: an outstanding case is that of Northern Ireland, where there are no more than 500 or so active guerrillas. In these circumstances, the cost-benefit calculations become highly unfavourable, and governments tend to be acutely aware of this in almost all cases where the territorial integrity of their countries is not directly threatened. It may be noted that in Africa the non-African armies –even that of France, after forty years of interventionism– are withdrawing from the continent.

So, what does the military supremacy of the United States really count for? How far will it condition the behaviour of other countries?

I believe that the most effective use of the "big stick" is through the maintenance of the United States' virtual monopoly in the field of high-technology weapons. That country has a dual politico-military strategy: on the one hand it seeks to make its allies' military forces dependent on United States technology and supplies, without which they cannot operate, and on the other hand it seeks to prevent current or potential adversaries from producing high-technology weapons or obtaining them elsewhere. It may be assumed in this respect that the United States' relations with Iraq since the Gulf War mark the future pattern of its policy with regard to small and medium-sized States which refuse to submit to it. However, they also show the limits of Washington's strategy.

There remains another problem which is extremely serious both for the United States and for the First World as a whole: how to protect their economic superiority against the migration of the production centres of the global economy to the Third World. Although this problem is not yet a matter of immediate urgency for the First World, since China has not yet become a great world economic power, the politico-military hegemony of the United States is not capable of stopping this process. America does have two powerful weapons, however: its wealth, and the fact that it is indispensable for the functioning of the world economy. The aim of the old centres of economic power in general and of the United States in particular is none other than to keep the world economy under their control. Universal free trade has always been the favoured programme of the economies that dominate world trade, as it now is of the United States.

However, we must always bear in mind that the rise of the newly industrialized countries, and especially the economic miracles of the "Asian Tigers", have been based on rejection of the neoliberal free-market theology. As these newly industrialized economies, which are relatively weak and almost always heavily indebted, become incorporated into the global economy they become vulnerable to the pressures of the International Monetary Fund and other centres of international credit, in which the political weight of the United States is predominant. In South Korea –under the pressure and with the aid of the United States– the Fund wants to impose neoliberalism (including the right of foreign firms to purchase control of Korean enterprises) on an economy which has achieved in thirty years the most rapid transformation ever known from a poor and backward agricultural country into one of the most important industrial economies in the world, with an almost unprecedented rise in the standard of living and political progress from a developmentalist military dictatorship to something close to democracy. The aim behind this pressure is no doubt to break any economic models which run counter to global neoliberalism and any States or groups which stand in the way of such global restructuring.

Is the economic strength of the United States sufficient to maintain this control? The situation cannot last for ever: in the long run the predominance of the United States cannot survive the future growth of the global economy, that is to say, the relative decline in the weight of the United States economy. Up to just a short while ago, I would have said that we are still solidly in the era of free trade, and moreover we are not confronting only the politico-economic power of the United States, but also a powerful orthodox ideology. The most dangerous legacy of the 1970s and 1980s has been the conversion of most economists to the theology of absolute neoliberalism.[11] The consequences of economic programmes of this nature have already proved to be fatal in the regions where "real socialism" previously prevailed, and they have had results which can be described at the very least as dubious in the case of Mexico. The developing countries, including those of Latin America, are living under

[11] This is clear from the nominations for the Nobel Prizes in economics since 1975.

both the politico-economic pressure of Washington and the ideological pressure of an intellectual consensus devoid of both historical and social realism.

In the last few months, however, there have been significant changes even in the preferences of those responsible for awarding the Nobel Prize. The heyday of consensus among economists, of the utopia of capitalism without any problems, of neoliberal fundamentalism, is coming to an end, and it has been discovered that the future of the world does not necessarily lie in the universalization of the model based on United States capitalism.

It is therefore much clearer now than it was before that there are limits to the United States' hegemony over the world economy, just as there are limits to its military and political hegemony.

Bibliography

Down, R. (1997): The impact of the end of the cold war on interamerican relations: The search for paradigm and principle, *Journal of Interamerican Studies and World Affairs*, vol. 39, No. 2, Beverly Hills, California, University of Miami Center for Advanced International Studies.

Schraeder, W. P. (1992): *Intervention in the 1990s: US Foreign Policy in the Third World*, 2nd. edition.

Urban dimensions
in rural development

Alexander Schejtman

United Nations Food and Agriculture Organization (FAO), Santiago, Chile.

This article deals with the need to make some changes in the focus of policies for rural development and the relief of poverty. After noting the limitations of the traditional approaches taken by such policies, it is suggested (among other things) that the territorial dimension should be incorporated in their design, and the macroeconomic context and sectoral environment which condition those policies in the case of agriculture are reviewed, with emphasis on the structural heterogeneity of the sector and the existence of imperfect markets (section I). The article then deals with the limitations of traditional rural development approaches and the need to reconsider the role of rural-urban migrations (section II), after which it goes on to examine the links between urban issues and rural development, highlighting the need to take advantage of the potential for the establishment of suitable linkages between small urban communities and the surrounding agricultural areas (section III). Finally, it addresses some aspects relating to institutions and stresses the need for institutional innovations to make possible public-private participation and consensus-building at the local level (section IV).

I

The global and sectoral context

We are currently witnessing a process of significant changes in the way the economies of the region operate. Deregulation of markets, liberalization of the external sector, privatization of public enterprises and fiscal adjustment have been accompanied in many countries by processes of decentralization of public management, the election of mayors and governors by popular vote and the delegation of areas of authority to municipalities, provinces or federal states, with growing transfers of resources and responsibilities to the local economies in the fields of education, health and even development. This therefore raises the need to review traditional rural development strategies in order to progress towards an approach of a more spatial nature in which the policy context takes into account the links between small and medium-sized urban communities and their surrounding agricultural and rural areas.

1. The macroeconomic context

At the domestic level, the structural adjustment policies applied with varying levels of intensity in all the countries are resulting in the redefinition of the rules which had governed the economies of the region for a number of decades in the past and to which the economic agents had become accustomed. The abandonment of protectionist practices and growing openness to external trade; the reduction of the relative weight of the public sector and the privatization of State-owned enterprises; the subordination of sectoral policies to the macroeconomic balances, and the bias towards the production of exportable goods, among other factors, are phenomena whose effects on economic growth, equity in income distribution and long-term sustainability are still hard to predict.

In the agricultural sector, the immediate result has been that the new conditions have been exploited mainly by the agricultural enterprises with the most suitable land for the production of exportable goods and the capacity to gain access to credit, technology and information on domestic and external market conditions, giving rise in a number of countries to a significant increase in exports, especially in non-traditional categories. While not denying the positive elements in these developments, this nevertheless represents a potential risk which should be avoided through suitable measures: the risk of accentuating the exclusive and polarizing nature characterizing the agricultural modernization process in the region in recent decades, which has been concentrated in certain products, certain regions, and medium-sized and large producers.

The changes in the international environment and in the domestic rules of the economies of the region mean that a sustained increase in competitiveness[1] and its corollary, the broad dissemination of technical progress, have become a necessary condition for growth and indeed for the very viability of production units. In the case of the agricultural sector of the countries of the region, these challenges have arisen in a special context with regard to agrarian structures and the operation of rural markets.

2. The sectoral context: heterogeneity, imperfect markets and transaction costs

There are two main structural factors which determine the functioning of the agricultural sector in the great majority of the countries of the region: the heterogeneity of their structure of production and the presence of flaws in the credit, insurance, technology, information, labour and other markets, or even the absence of such markets.

One of the features which is shared by the great majority of the countries and which derives from the period of transition from the hacienda to capitalist agricultural enterprises is the coexistence of business or capitalist agriculture alongside peasant agriculture. Because of the characteristics to which we shall refer later, this raises complex problems for the design of policies to provide incentives and promote the dissemination of technical progress, which is a necessary condition for competitiveness. Whereas in

[1] In simple terms, and in the case of small producers and rural workers with little or no land, being "competitive" means improving to some extent the levels of net income derived from the sum total of their activities.

homogeneous structures a given incentive or a valid technological option (that is to say, in keeping with the relative resource endowments of producers) is effective for the great majority of the production units, in bimodal structures an incentive or technological option which is considered appropriate for large-scale modern business agriculture will probably not be suitable for the family agriculture sector in the context of a given set of relative prices.

a) *Contrasts in the internal operating rationale*

Even at the risk of repeating well-known facts, it is important to note that both the empirical evidence and a considerable theoretical base give grounds for maintaining that there are marked differences between what we have called the internal operating rationales or criteria used by the two types of agriculture to make decisions on what, how much, how and why to produce goods, and these are very important for the design of strategies or policies that aim to influence the behaviour and development of the sector.

The differences between the behaviour of the two types of organization are summarized in table 1,[2] and although this is not the place to embark on an analysis of each of them, it is worth noting the contrasts in the nature of the labour force and in the way of internalizing risks, because they directly affect the multiactivity patterns typical of peasant family units.

The fact that there is a non-transferable margin of labour in family agriculture (work by the children, the wife, or other unpaid family members, or "free" time of the head of household) means that this margin is only capable of creating value within that structure –that is to say, there is no other space in which this available working time can be profitably used– whereas business agriculture, in contrast, depends on paid labour hired in the market.[3]

Risk considerations are also incorporated differently in the operating criteria, since whereas for an entrepreneur it is reasonable to adopt a higher-risk option if it is offset by higher profits, small producers tend to avoid options with a higher element of risk, no matter how much greater the income from a favourable outcome might be, because of the threat to their sustainability as families and producers that an adverse result would entail.[4]

These contrasts in operating rationales mean that policies designed to bring about given forms of behaviour on the part of the two types of producers cannot be identical and, hence, specific differentiated designs are required for each sector. Thus, for example, to take a simple example, a predictable set of the main macroeconomic prices (interest rate, exchange rate, wage levels), together with measures to moderate possible undesired effects of them, may be sufficient to determine the behaviour of modern business agriculture, but in order to bring about given changes in small-scale agriculture a more complex set of measures will be required which go beyond mere adjustments to the effects of macro prices.

As a result of the changes which have taken place in the rules governing the functioning of the economies of the region and the foregoing considerations regarding sectoral heterogeneity, two types of challenges arise for the two types of agriculture, involving different strategies and policies. Firstly, there is the challenge facing business agriculture, which runs the risk of suffering the erosion of its competitiveness if it is not capable of incorporating technical progress into the most critical links of its production chains, since the advantages deriving from labour costs and the natural resources endowment are losing part of their importance as sources of competitiveness. Secondly, there is the challenge of formulating options for the heterogeneous peasant sector (small farmers and rural families with little or no land), some of whose members run the risk of losing their status of producers, while others (the majority) are in danger of further increasing the extent and seriousness of rural and urban poverty unless they can incorporate processes that improve the employment options of their labour force; this must be achieved through policies which are differentiated according to

[2] For a description of the theoretical basis for our assertions, see Schejtman (1980) and Figueroa (1981).

[3] In another study, we noted that this situation makes it possible, under certain conditions and with respect to certain products which are labour-intensive and do not involve economies of scale, for these units to be potentially competitive with those that depend exclusively or mainly on paid labour (Schejtman, 1998).

[4] Lipton (1968, p. 335) asserts that while a prosperous American farmer may prefer a 50% chance of earning either US$ 5,000 or US$ 10,000 to the certainty of earning US$ 7,000, an Indian peasant faced with the probability of earning 1,000 rupees as against the certainty of earning 700 rupees that barely allow him to feed his family nevertheless cannot put x much below 700.

TABLE 1

Differences between the features of peasant and business agriculture

Aspect	Peasant agriculture	Business agriculture
Objective of production	Reproduction of the family and of the production unit	Maximization of profits and capital accumulation
Origin of labour force	Basically the family, with occasional mutual exchanges with other units; exceptionally, wage labour in marginal amounts	Wage labour
Employment commitment of the head with the labour force	Absolute	Non-existent, except when legally obliged
Technology	Intensive use of labour, low density of "capital" and purchased inputs per day of work	Higher capital density per asset and higher proportion of purchased inputs in the value of the final product
Destination of product and origin of inputs	Partly the market	The market
Criterion regarding increase in labour	Maximum total product, even at the cost of a lower average product. Limit: zero marginal product	Marginal productivity higher than wage paid
Risk and uncertainty	Non-probabilistic avoidance: survival algorithm	Probabilistic internalization, seeking profit rates proportional to the risk
Nature of the labour force	Non-transferable or marginal value of labour	Uses only transferable labour, in the light of their skills
Components of net income or product	Indivisible family product or income, partly in kind	Wages, rents and profits, exclusively monetary

Source: Schejtman, 1980.

the type of units concerned, on the basis of classifications of producers (or family units) which not only take account of this heterogeneity but are also functional to policy design and implementation. This functionality means that the classification criteria must include elements concerning the way these units fit into the economy, while the total number of categories must not exceed the management capacity of the public authorities.[5]

b) *Rural markets*

Agricultural activity in general and that of small producers in particular takes place in an environment in which the behaviour of the credit, insurance, technology, information and labour markets –as noted by Sadoulet and de Janvry (1995, p. 254)– is far from that of a "standard Walrasian economy" which assumes that all markets do exist, including the credit and risk markets, and that the equilibrium prices determined by these markets apply equally to all participants. In the less developed countries there are many market flaws, either because the markets do not exist or because the transaction costs[6] associated with access to them are so high that it is more advantageous to the agents to effect transactions through institutional arrangements other than those of the market. This characteristic gives rise to forms of institutions and inter-agent relations with special features which distinguish them from the more formal institutional mechanisms in the markets in question. As noted later in this article, the generation of different forms of linkages between small producers and other agents is often a response to the absence or inefficiency of one or more markets.

An example of this is the obstacles faced by small producers who have potential resources for growing crops of higher value.

[5] For some ideas on the design and implementation of differentiated rural development policies, which we do not have the space to analyse in detail in this article, see ECLAC (1982), de Janvry, Gordillo and Sadoulet (1997) and FAO (1997).

[6] We will deal with the concept of transaction costs later.

i) *Credit.* While basic grains can be cultivated with amounts of inputs which are in keeping with the financial resources of peasant families, commercial crops almost always demand outlays on inputs and even on additional labour which are far beyond the possibilities of the units and represent a formidable barrier to progressing to products of higher value,[7] even though the activity in question may amply justify the credit needed.

ii) *Insurance.* As already noted, small producers internalize risks in a manner which is different from that typical of medium-sized and large enterprises. They need formulas which reduce the risks involved in embarking on the production of non-traditional crops, since these involve higher direct costs, are more susceptible to factors that affect quality or yields and to greater price fluctuations, and are also of no direct use for family consumption. As they do not have the capacity to insure against them, small producers often result to various mechanisms to face the risks involved, such as the sale of assets (livestock), the renting out of their land, diversification of crops, the cultivation of crops which are less subject to fluctuations although they give less income, work away from the farm, emigration, and agreements with buyers.

iii) *Information.* Access to information on technological options, the types of products for which there is a demand and the corresponding quality requirements and prices, alternative intermediation channels, restrictions on the use of certain inputs, etc., is increasingly important for determining the success of an activity. Normally, only the segment made up of modern producers possesses this information, which is in the hands of the agroindustrial enterprises. The segmented nature of the information markets means that this information only reaches small producers through buyers or intermediaries, since the cost of acquiring it is beyond their possibilities and is even beyond those of their cooperatives.

iv) *Specialized technology and inputs.* The market for a number of the inputs or services used in the production of non-traditional crops is generally too narrow, so that, for small producers, access to it can only be gained through some form of agreement or association with agroindustry or agro-trade. This is so, for example, in the case of new seed or plant varieties, changing requirements with regard to agricultural chemicals, or new storage and packaging techniques.

v) *Land.* The land market continues to be too rigid to adjust supply and demand; for a long time it was subject to legal restrictions, even in countries which did not carry out major agrarian reform processes. In recent years, these restrictions have tended to be relaxed with the explicit intention of promoting the development of that market, but its dynamism has been influenced more by speculative considerations than by the value of land as a production resource. In the case of small farms which their owners are reluctant to sell or rent, mechanisms which take the place of sale or rental have arisen in order to make possible the initiation or expansion of some particular form of activity, such as the various types of contract agriculture.[8]

vi) *Labour.* The labour market in rural areas has special features deriving from the multi-active nature of small producers, which permits the payment of lower wages for similar activities than those paid in urban areas; the isolation or dispersion of rural workers with respect to means of transport, which limits their mobility; the seasonal nature of agricultural activities, which, because of the need for flexibility, impedes the expansion of permanent jobs; certain forms of intermediation (advances) which reduce the transparency of the remuneration received, and the lack of information on available opportunities, among other factors.[9]

With regard to market flaws, a recent document by the FAO (1997), as well as examining the implications for agriculture of the changes in the macroeconomic environment, proposes some sectoral policy options compatible with the market and transitional mechanisms for bringing them into effect, such as price bands, export promotion, transfers of income to small producers (instead of production subsidies), or the promotion of contract agriculture, as responses to one or more of the market problems described.

c) *Transaction costs*

Transaction costs are those which an agent has to pay, over and above the price of the good or service he is acquiring, in order to try to ensure that it corre-

[7] The costs per hectare of many non-traditional crops may be 10 or more times greater than those of basic grains.

[8] See, in this respect, Schejtman, 1998. Another of the consequences of the rigidities observed in this market is that they limit the scope of processes of market-based redistribution in favor of small producers, such as those initiated in Brazil and Colombia.

[9] For a more detailed analysis of these markets, see Figueroa, 1998, pp. 96-104.

sponds to his expectations; thus, they include the costs of searching, information and supervision, and ensuring fulfilment. According to Sadoulet and de Janvry (1995, pp. 255-256), if trade exchanges involve incentives for opportunistic behaviour by the parties which may result in adverse selection or moral hazard, avoiding them entails high costs. The first of these involves *ex ante* costs of preselecting candidates, while the second involves *ex post* costs for follow-up, legal action and measures to secure fulfilment.

On the one hand, market flaws and their effects on transaction costs are phenomena exogenous to the family unit, which may be seen as structural barriers to their access to certain markets; on the other hand, they become endogenous determinants of choices between sale and home consumption or between outside employment and self-employment when there is a gap –generated by transaction costs– which means that the cost of buying something exceeds its sale price or that net productivity exceeds the remuneration plus transaction costs of seeking employment away from the farm.[10] Likewise, it may be that a farmer opts for informal credit instead of a bank loan, even though the latter may be available at a lower rate of interest, if the transaction costs of obtaining credit from a bank, plus the interest rate, exceed the cost of informal credit.

According to Benedicty,[11] the price gap can be narrowed by reducing the specific transaction costs facing the unit. If this assumption is true, we must immediately acknowledge that we know very little about the structure of transaction costs. We must also acknowledge that the conventional approach –that is, models positing a structure of effective interest rates, land rents and wages that only vary as a function of the size of the farm– is based at best on purely abstract approximations. An urgent effort is needed to collect information at the level of the family unit on the structure and determinants of transaction costs: undoubtedly quite a challenge.

Market flaws or transaction costs give rise to "linked transactions" which make it possible to get round these problems through exchanges in which access to a product, a service, employment or some form of insurance becomes part of a single broader operation,[12] in clear contrast with the anonymous and systemic interdependence of economic activity (in the respective competitive markets) posited by general equilibrium theory (Bardhan, 1991, p. 237).

Although there may be a clear awareness, in very generic terms, of the existence of market and government failures which result in transaction costs for family farms, when they actually occur they have special local features, so that their detection and possible solution must be approached at this level. General formulas are just guidelines for focussing the areas of observation: in contrast, only the local-level analysis of the nature and specific magnitude of their effects can serve as a reliable guide for action.

II

Traditional rural development approaches

1. The main limitations

If we understand rural development policies or strategies as being a set of actions designed to improve the living and working conditions of the rural population, and especially of small producers and labourers with little or no land of their own, we can see that the traditional approaches taken by such strategies suffer from a number of limitations, as noted below.

i) They take no account of the high degree of heterogeneity which is characteristic of small-scale

[10] This is not the place to analyse in detail the theoretical bases for these assertions. See, in this respect, Sadoulet and de Janvry, 1995, pp. 149-159.

[11] In a comment by M. de Benedicty on an earlier version of this paper.

[12] The absence or imperfect nature of certain markets for small producers is often "solved" through complex arrangements between agents, as in tomato production in the Ica Valley of Peru, where agroindustries rent land from the peasants, who then work it on behalf of the enterprise. For the peasants, the wages paid make up for the lack of credit for growing crops, which, together with the lack of access to technology and insurance, prevents them from growing tomatoes on their own account, while for the enterprises this conditional form of rental makes it possible to overcome the rigidities of the land and labour markets (ECLAC, 1996b).

agriculture and, hence, of the need for policies differentiated according to the type of producer, which have only recently, and in a very partial manner, begun to be adopted explicitly by some countries of the region.

ii) They are centered on agricultural activity, without taking account of the multi-active nature of the family units, despite the importance of work away from the farm for the functioning of the agricultural activity itself, as an important source of supplementary income and a part of the mechanisms for coping with the risks inherent in agricultural production,[13] and in particular they fail to take account of the importance that non-agricultural rural employment has been assuming (a matter which we will deal with later).

iii) They do not take action, or do so only in a fragmentary or sporadic manner, to correct (or rather to make up for, not always successfully) the market flaws or total absence of markets which are frequent among small producers (with regard to information, technology, inputs and products, and secure credit).

iv) Except in a few cases, they do not consider agricultural production in the context of its linkages with other agents in the primary production-agroindustrial processing-marketing chain, thus wasting (among other things) the opportunity to induce agroindustry to play the role of an agent for the spread of technology to particular segments of the small farming sector.[14]

v) At the local government level, they are unable to adapt the centrally formulated strategic proposals or policies to the specific potential and limitations of each local area.

vi) In a broader sense, they do not take account of the potential effects on changing agricultural production patterns and the living and working conditions of the rural population that can be achieved through the development of particular forms of linkages with the urban communities with which small producers and rural dwellers interact.[15] Exceptions to this are the recent studies by Paniagua (1994 and 1997) on Bolivia and Peru, respectively, and by Riordan (1997) on Peru, which bring out the potential of an approach of this type for rural development and the relief of poverty.

2. Migration and rural development

One of the explicit or implicit objectives of rural development has often been "to avoid rural-urban migration" on grounds that, in the most highly ideologized versions, idealize the rural environment in contrast to the satanic urban world, while the other objectives are based on social cost and benefit considerations.

The processes of hyper-urbanization which have marked most of the countries of the region since the 1950s may perhaps have justified the anti-migration bias of many rural development proposals, but this has not prevented the changes in spatial population distribution –with a decrease in the relative weight of the rural and agricultural population– from continuing to follow a "natural" tendency which only coercive measures or costly conservative policies can prevent.[16] If we admit that rural-urban migration is going to continue, then the central question is: what type of incentives need to be generated in order to redirect these migratory flows along a course which is more favourable to rural development?

[13] In a study on Ecuador it was estimated that income from sources other than agricultural production accounted for between 80% of total income, in the case of peasants with less than one hectare of land, and 30% in the case of those with between 5 and 20 hectares (de Janvry and Glikman, 1991), while in another study, on Mexico, it was estimated that off-farm income accounted for an average of 36% of the total, ranging from 58% for peasants with less than 2 hectares to 24% for those with over 18 hectares (de Janvry, Gordillo and Sadoulet, 1997).

[14] See, in this respect, the series of studies on Agroindustry and Changing Production Patterns in Small-scale Agriculture which were prepared under the ECLAC/FAO/GTZ agreement for a number of countries of the region and which are summarized in Schejtman (1998) and ECLAC (1996a).

[15] Even the so-called integral rural development strategies have been restricted to the activities of small producers as agricultural workers and to the linkages they have with their environment in that limited capacity; although the studies on "survival strategies" do take some account of urban activities when analysing employment and income options, their examination of the potential of such linkages is confined to that restricted field.

[16] Generally speaking, a significant part of the "agrarian" movement, in both its most populist or peasant-oriented versions and those of a more developmentalist nature, implicitly or explicitly justified its proposals (at least in part) as being designed to check rural-urban migration, refusing to acknowledge that "migration from rural areas is one of the basic elements of economic development: it is necessary, obligatory and positive. If the surplus population did not emigrate from rural areas it would be impossible to embark on the modernization process…" (Vergara, 1992, p. 184).

In this connection, it is worth mentioning –albeit very briefly– some of the positive effects that such migration can have on rural development, because of its potential direct or indirect contribution to family income, changing production patterns in small-scale agriculture, and the solution of problems of poverty and environmental deterioration:

i) With regard to income, those who migrate generally do so in search of better income opportunities than those offered by agricultural activities: in this sense, the frequent assertion that migrants end up by swelling the mass of urban unemployed does not appear to be empirically justified, as details regarding a number of Latin American cities show.[17]

ii) With regard to changing production patterns, migration aids the agricultural modernization process in various ways. Firstly, because (other things being equal) it raises the productivity of those who remain by improving the ratio of land area per active person (provided that those who migrate do not consist of the most productive elements, leaving behind only children and old people), and in some circumstances it can improve resource allocation. Secondly, because –as shown by many examples of changes in small-scale agriculture– it is often the migrants who induce such changes by bringing information and ideas that can only be acquired in the urban environment. Thirdly, because –especially in areas where the holdings are very small and the possibilities of making more intensive use of labour are very limited– migration may be a necessary condition for continued survival and may help to subsidize agricultural activities with income earned away from the farm. Fourthly, off-farm income may help to solve (or at least reduce) the difficulties that small producers have in adopting the innovations that are open to them because of the lack of a surplus to cover the cost and the impossibility of taking the risks that all innovation involves.

iii) With regard to poverty, it may be noted that in almost all the countries of the region there is usually a close correlation between the degree of rurality of a given administrative area or locality and the level of poverty in it; moreover, family sizes and rates of dependency are higher in rural than in urban areas, and there is also a bigger gap between actual and desired fertility, as the relevant studies show.[18]

iv) With regard to environmental problems, it is a well known fact that the higher the ratio of inhabitants to land area, the greater the tendency to make intensive use of steeply sloping land, to deforest marginal areas, and to intensify the cultivation of rain-fed areas, resulting in various types of environmental deterioration. On the other hand, migrations to the big cities also give rise to environmental problems. Estimates by Jeffrey and others (1989) indicate that 80% of the Latin American poor live in urban or rural areas of high ecological vulnerability, and 24% live in urban areas.[19]

In the light of these considerations with regard to migration, rural development and poverty, it is clear that the latter two aspects need to be dealt with in a broader context than that provided by a strictly agricultural or purely rural framework.

[17] Estimates made in the late 1960s indicate that in Lima and various cities of Colombia the unemployment rate among migrants was quite low: lower, in fact, than among non-migrants. In Santiago, Chile, the rate of unemployment among male migrants was 4.6%, while it was 7.2% among the established urban population. In Mexico City, even though few migrants had arranged employment before migrating, 46% found work within a week, a further 30% found jobs within a month, and two-thirds of the total gained substantially in terms of income.

[18] A number of population and health surveys made in various countries show that: "the level of fertility desired by families is almost 40% lower than their effective fertility…"; the lower the economic and social level of the family, the greater the gap between their effective and desired levels of fertility, which indicates, on the one hand, that there is a by no means negligible margin for reducing the further growth of poverty and, on the other, there is a need to design more efficient methods of information than those currently used, in order to bring effective fertility closer to the desired level. Furthermore, 80% of adolescent mothers in urban areas and 70% in rural areas belong to the poorest 50% of households (ECLAC, 1998, pp. 114-125).

[19] For a critical view of the effects of migration, which stresses its effects on the inter-family income distribution in an area and is in opposition to the views presented here, see Lipton, 1980, pp. 1-24.

III

The urban dimension and rural development

The classic paradigm on the role of agriculture in development processes (as set forth by Johnston and Mellor, for example) centered on the expected contribution of agriculture to development in general and urban-industrial development in particular, stressing that this included the transfer from rural to urban areas of savings, labour force, food, foreign exchange, etc. However, the opposite question has rarely been asked: what contribution could or should urban development make to agricultural development? At this point in time, it seems desirable to note that on the one hand the disparity between the development of the big cities and rural areas, no matter how it is defined, is extremely serious and shows no signs of diminishing, while on the other hand the rapid increase in urban-rural linkages is beginning to blur the limits between them (Da Silva, 1998).

This prolonged failure to take any account, in policy formulation, of the role that urban areas could play in the development of rural areas occurred even though studies on economic or agrarian history, when dealing with the links between the formation and development of urban-industrial areas and agricultural development, highlighted the fact that in countries of early or late industrialization which had relatively homogeneous agricultural structures there were virtuous circles of reciprocal demand between agriculture and industry in the initial phases of industrialization. At the beginning, there was a demand for simple consumer and producer goods on the part of a relatively homogeneous mass of small and medium-sized agricultural producers, which led to the appearance of domestic manufacturing enterprises to satisfy that need, but the development of the latter enterprises generated, in turn, a growing demand for food and agricultural inputs, giving rise to increasingly sophisticated consumption patterns and production techniques and, last but not least, the emergence of an extensive range of entrepreneurs (Jones and Woolf, 1969).

This growth pattern contrasts, in every one of its aspects, with that displayed by societies where, at the beginning of their industrialization processes, the countryside was dominated by the hacienda or plantation system, because of the effects of the latter on the distribution of power, accumulation patterns, the bias in their paths of technological change, and the limitations faced in the generation of a critical mass of entrepreneurial capacity (Schejtman, 1997, p. 127).

The studies by Hirschman (1961) on forward and backward linkages and by Myrdal (1962) on circular causalities are essential sources for analysing the links between urban development and its surrounding rural environment, while the proposal by Evans (1992) of a model for a "virtuous circle" of urban-rural development is a micro-level replica of the process in question. Despite its qualities, however, the main weakness of this proposal is that it does not take into account the fact that this process does not start from zero or in a context of homogeneous agrarian structures but, on the contrary, takes place in a context of highly differentiated production and social structures.

Another neglected aspect, linked with the foregoing, has been that of the space or territory in which economic activity is carried on. As Krugman (1997, p. viii) notes, although this is a matter of obvious practical importance it has been completely absent from the standard corpus of economic theory and, we may add, from our own studies too.[20] The same author (*ibid.*, p. 41) notes that spatial models of economic activity (which had their origin in Von Thünen's studies at the beginning of the last century aimed at explaining the formation of land rents as a function of distance from an urban area) , as well as Christaller's studies at the beginning of the present century on "central places", aimed at analysing the location of manufacturing activities and markets with respect to a given homogeneous agricultural population, went unnoticed in the mainstream economic literature until well into the 1950s. Their influence on economic geography and "regional science" is undeniable, however, and was rescued by Krugman in what has come to be called the "new economic geography" (Renkow, 1998).

[20] Carlos Franco reproached researchers on rural problems for the small number of studies designed to link the agrarian question with migration, urbanization, micro-regions and the urban informal sector (Franco, 1992, p. 395).

1. Urban development and rural change

In recent years, a debate has been growing up in "regional science" circles on the functional integration proposal, versus the location-allocation proposal, centered basically on the development of methods for determining the location of services and infrastructure in urban areas that can serve as inductors of rural development. Although this is not the place to go into these proposals in detail,[21] we may note that while the latter proposal takes actual or potential demand as its main criterion and does not take account of the problems deriving from unequal distribution of income, the first of these proposals seeks to generate linkages from the urban area to its surrounding rural environment through the supply of services and infrastructure, starting from the assumption that in most developing countries the problems of polarized spatial development were the result of skews in the distribution of national investment, so that their solution would call for corresponding skews in favour of secondary urban areas (Rondinelli, quoted by Hansen, 1990).

The functional integration approach comes closer to tackling the problem of strengthening the positive linkages between small urban communities and the surrounding rural areas, but unless it takes account of the heterogeneity of the agricultural production structure this approach does not ensure that its benefits will be accessible to small producers, unless the characteristics of the services and infrastructure are defined in the light of the restrictions or needs that affect those producers. This is noted, for example, by Johnston and Kilby (1975) in their excellent study on agriculture and structural change, which explores the contrasts between the forms of development based on bimodal and unimodal agricultural structures.

There is broad agreement among different analysts, however, that the strengthening of urban-industrial areas benefits agricultural development. They note that the cities have been an important source of generation and dissemination of agricultural technology (Jacobs, 1970); that the capital, inputs, labour and product markets tend to be less imperfect in the urban-industrial environment, and that, as a spillover effect, neighbouring agricultural areas can enjoy greater mechanization, less surplus labour, better prices for their products and, ultimately, better remuneration for their work (Schultz, 1953; Katzman, 1974).

According to Schultz, i) economic development (usually) takes place in a specific location matrix, and there can be one or more such matrices in a particular economy; ii) those location matrices are primarily of an urban-industrial nature, as centres where economic development originates, and not normally of a rural or agricultural nature, even though some agricultural areas are better placed than others with respect to those centres; and iii) the existing economic organization works better at the centre of the development matrix or close to it, or in those agricultural areas more favourably located with respect to that centre; it does not work as well in areas located on the periphery of the matrix (cited by Bhadra and Salazar Brandao, 1993).

In an estimate made for the state of São Paulo of the correlation between per capita added value in manufacturing and certain changes in the agricultural structure, it was found in two periods that there was a positive correlation with the percentage of arable land used, the number of tractors and pickup trucks, the use of fertilizers and pesticides per hectare, the density of machinery per worker, and the output per hectare and per worker; in contrast, the correlation with the amount of land per worker was negative or neutral (i.e., this does not appear to affect the degree of concentration).

For his part, Vergara (1992, p. 190) demonstrates the link between rurality and agricultural modernization for Peru, in a classification of communes into different strata (see table 2).

2. Non-agricultural rural employment

a) *Its size and importance*

To the best of our knowledge, the first study seeking to explore the size and characteristics of non-agricultural rural employment (NARE)[22] in Latin America is that prepared by Klein (1992) for the Regional Employment Programme for Latin America and the Caribbean (PREALC) of the International Labour Organisation (ILO). This study shows that in

[21] See, in this respect, the series of articles that appeared in *International Regional Science Review* (1992a and b) and also Belsky and Karaska, 1990, pp. 225-240.

[22] Non-agricultural rural employment is that involving rural residents who work in activities other than agriculture (commerce, construction, industry, services, etc.), while urban agricultural employment is that involving urban residents working in agricultural activities in the surrounding rural area.

TABLE 2

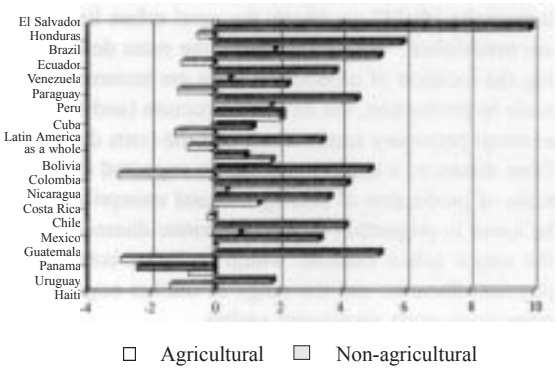
Peru: Urbanization and agricultural modernization, 1972

	Hectares per capita	Mechanization %	Fertilizer use %	Agricultural EAP, %	Rural population, %
Stratum I	0.52	1	11	77	80
Stratum II	0.77	4	16	64	65
Stratum III	1.13	21	36	35	29
Stratum IV	1.83	46	32	6	4

Source: Vergara, 1992.

FIGURE 1

Growth rates of rural employment in Latin America in the mid-1980s



Source: Klein, 1992.

the 1980s, in almost all the countries, NARE grew significantly faster (3.4% per year) than agricultural employment (0.8% per year), that is to say, even faster than the growth rate of the economically active population of the region. Klein also notes (*ibid.*, p. 2) that in 12 of the 18 countries for which information is available NARE increased more rapidly than total employment, and in eight countries it even grew faster than urban employment[23] (figure 1). As regards the structure of NARE, Klein notes that it is similar to that of the urban non-agricultural labour market in terms of the relative shares of each sector of activity (*ibid.*, p. 7).

More recent data on various countries confirm these trends in the region: Da Silva (1998, p. 19) notes that in the period from 1992 to 1995 the rural economically active population in Brazil grew by almost 200,000 persons, whereas the agricultural population proper went down by nearly 250,000, which means that over that period NARE absorbed nearly 450,000 persons. This author also notes that whereas NARE grew by 1.2% per year in the 1980s, in the first half of the 1990s its annual growth rate was almost three times as much (3.5%). In contrast, the agricultural economically active population, which grew in the 1980s by nearly 1% per year, went down at the rate of 4.5% annually in the 1990s (*ibid.*, p. 23). As regards the occupational structure of NARE, Da Silva's results coincide with those of Klein.

In tabulations made on the basis of the 1994 household survey, Escobal (1996) shows that in the rural sector of Peru almost one-third of the days worked on primary and secondary activities are devoted to non-agricultural activities: a proportion which tends to go down in proportion to the land area available to families with less than 5 hectares and to go up as the average levels of education of the household members rise. Moreover, two-thirds of the days worked by the 8% of rural households headed by non-farmers –which undoubtedly consist of a heterogeneous mix of labourers and employees– are devoted to non-agricultural activities.

In a study based on samples of households in the reformed (ejido) sector in Mexico, de Janvry, Gordillo and Sadoulet (1997) estimated that in the case of the smallest units (less than 2 hectares), income from off-farm activities accounted for 82% of the total, with almost 48% coming from wage labour and micro-enterprises. In the bigger units, such income came to almost 45% of the total. Migration was vital for the smallest producers, since it accounted for almost a third of their total income. Comparison of the results obtained from the samples in 1994 and 1997 (i.e., with only three years' difference) showed a tendency towards an increase in the relative weight

[23] Except in Bolivia (where agricultural employment grew at the rate of 1.8% and NARE at 1%) and Uruguay, where both went down but NARE did so faster.

of non-agricultural income, especially from own-account work and micro-enterprises. On the basis of this information, Lanjouw (1998, p. 20) considers that, for a given size of family unit, the higher the proportion of its members engaged in non-agricultural work, the lower is the likelihood that the family will find itself in a situation of poverty.

In the case of El Salvador, the World Bank (1997) has estimated that approximately 36% of the rural economically active population is engaged in non-agricultural activities: almost double the proportion registered in the mid-1970s. In the case of women, the proportion engaged in NARE is nearly 72% (World Bank, 1997, p. 9, viii). Once again, the structure of NARE confirms the findings of Klein, since almost 30% are engaged in various manufacturing activities, 20% in construction, 23% in trade and transport, 22% in relatively unskilled services, and 5% in services of a higher level of skill. The World Bank study concludes that the least poor families in rural areas are those that have substantial access to non-agricultural employment, that access to better jobs is strongly linked with educational levels, and that the availability of infrastructural services significantly influences the supply of NARE.

For Ecuador, Lanjouw (1998) estimates that in the mid-1990s over 40% of the income of rural households came from non-agricultural activities, in which micro-enterprises played an important role, generating almost 900,000 jobs, or nearly 60% of the total rural labour force of that country. Moreover, there was a clear correlation between family income levels and the proportion of them that came from NARE, in which micro-enterprises accounted for the major part: such enterprises employed an average of 1.8 persons, and over 60% of them were located in the homes of the producers themselves (*ibid.*, p. 16). As in the preceding cases, educational levels were a key determinant of the likelihood of operating a micro-enterprise, and access to electricity and telephone services were also important factors in determining the establishment of such units.

To sum up, then, NARE plays an important and growing role in absorbing the rural labour force; it is a means of relieving poverty that agriculture alone cannot offer; it makes it possible to stabilize income, making up for the seasonal nature of agricultural production and employment; and it makes it possible to diversify sources of income, thus reducing the effects of the risks which are inherent in agriculture. Access to better NARE options is strongly dependent on levels of education, infrastructural development (energy, roads, telephones), and sex,[24] since men have access to better-paid activities than women.

b) *Determinants of the development of NARE*

The markets which must be taken into account when considering urban-rural linkages in general and those determining the structure and characteristics of NARE in particular are the markets for: labour, capital, products, and inputs, including the aspects relating to information and the risks involved in participating in them.

As Renkow (1998) points out, these markets delineate the "field" on which the rural-urban linkages are established. Within this field, the rules determining the location of production units are economies of scale in production, the demand structure (and related external pecuniary economies), and the costs deriving from distance; it could therefore be expected that the scale of production of non-agricultural enterprises will be lower in proportion to their economic distance from the major urban centres, which includes both their physical distance and the range of market-negotiated transaction costs mentioned earlier.

A recent study by Reardon (1998) analyses the determinants of the level and composition of NARE through a series of stylized factors which correspond, broadly speaking, to the conditions existing in a number of developing countries and which are represented very schematically in figure 2, although a detailed analysis of this approach is outside the scope of the present study.

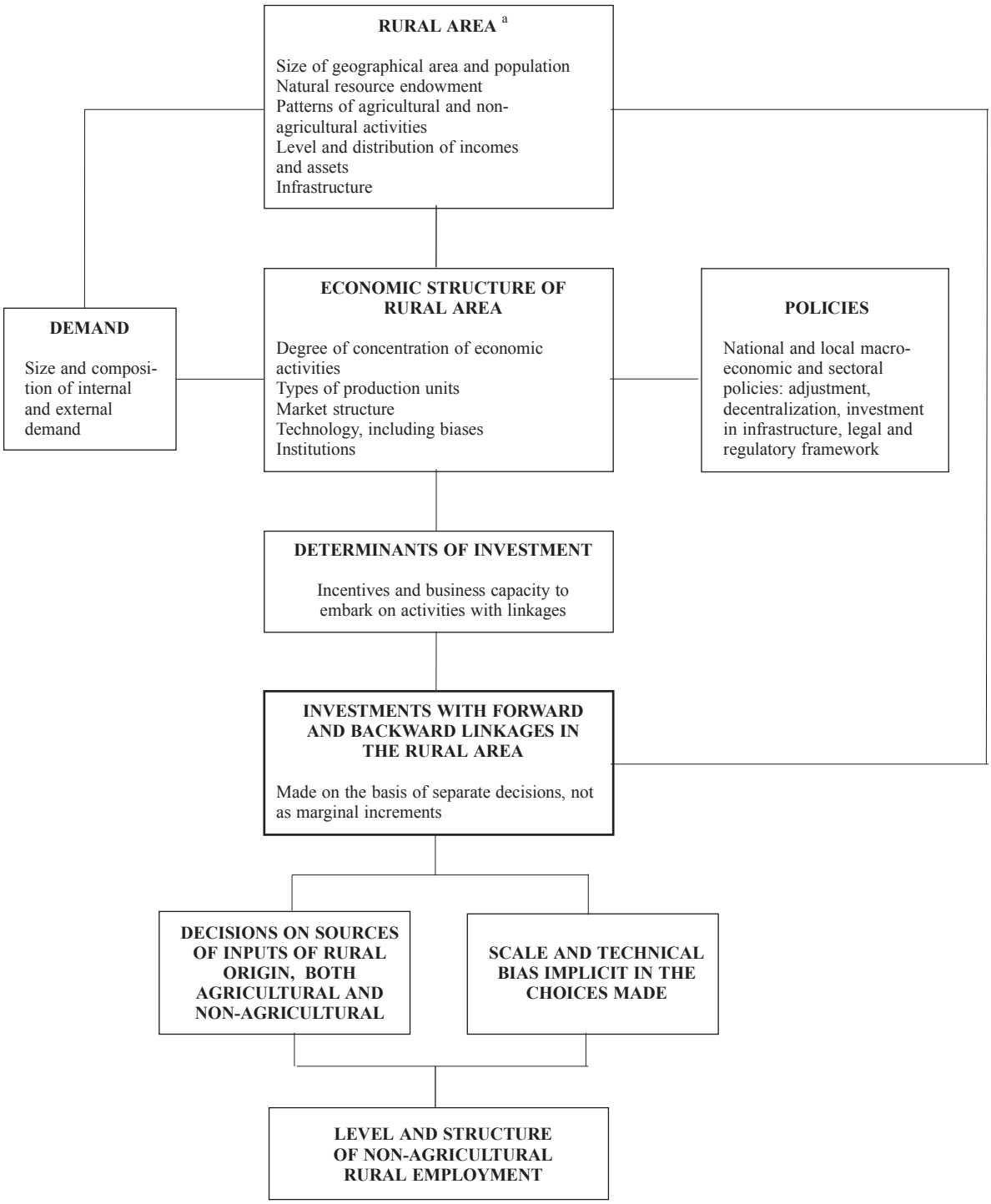
3. The urban-rural linkage approach

No-one questions the fact that hyper-urbanization has undesirable implications and that it is right to further the application of strategies to reduce it or at least slow down its growth. If we accept the hypothesis that urban development stimulates rural development, or can do so in certain circumstances, however, what we should do is make a critical appraisal of whether the present urban settlement pattern does indeed help

[24] In connection with the question of poverty, it may also be noted that better education for women and their access to possibilities of NARE reduce fertility levels, thus bringing actual fertility closer to the desired levels.

FIGURE 2

Determinants of investments with rural linkages



[a] Excluding only the big cities.

to promote such development[25] or, in a positive sense, what measures should be promoted in order to make the potential beneficial effects materialize.

Rethinking the problems of rural development means putting them in the context of the development situation of the local economies, that is to say, placing emphasis on the economic linkages between the urban communities and their agricultural hinterland and analysing the way the different markets, fragmentary or not, fit in with each other at that level. Only in this way is it possible to tackle the questions of changing production patterns, poverty and the environment with the degree of detail needed to ensure the efficacy and participation within a given institutional framework referred to later in this article.

This type of approach may be expected to achieve: i) an understanding that the local economy operates as a set of interlinked markets and an awareness of its flaws, missing elements, and the formal and informal means of filling those gaps; ii) the formulation, on the basis of that understanding, of policies that will foster virtuous circles of reciprocal demand between the urban areas and their agricultural hinterland in a broad range of activities; iii) the identification and correction of the bottlenecks that exist in the production-distribution chains, or the absence of vital links that could be made good through specific incentives, and iv) the promotion of local-level chains of institutions which are functional to the development of those virtuous circles, breaking away from the compartmentalization typical of public sector organization in order to take advantage of synergies in the fields of infrastructure, transfer of technology, health, education, housing and micro-enterprises.

IV

Institutional innovation, decentralization and participation

The structural heterogeneity of agriculture, the nature of rural markets, the differences between the different rural areas in terms of potential and constraints, and the special features of their links with different types of urban areas call for the application of a territorial approach to rural development. This means furthering institutional changes that will increase the efficacy of public action in this connection and taking measures designed to take account more precisely of the differences in potential, demands and constraints that can only be perceived at the local level.[26]

The processes of decentralization and deconcentration of resources, which have become part of the policies of most of the countries in the region,[27] represent a first step towards the necessary institutional changes, but in many cases the compartmentalized nature of public functions at the central level tends to be reproduced also at the municipal level, with the aggravating feature that the levels of training of the technical teams are not usually high enough to ensure that they can increase the efficiency and efficacy with which the greater public resources placed at their disposal are used.[28]

[25] Referring to Peru, Vergara (1992, p. 186) notes in this respect: "in reality, the most disastrous feature of migration in the region was that the peasants of the Sierra did not migrate to cities in their own region, but migrated instead to the coastal cities. As a result, the modernizing effect of urbanization was monopolized by the coastal areas. Location rents favoured the peasants of the coast and not those of the Sierra; services were provided for coastal dwellers and not those living in the Sierra, and the modernization of mentalities, of the social relations of production and of technology by-passed the Andean areas. Without cities, the Andean area vegetated in the past."

[26] By "institutions" we mean not only those connected with the public sector but the whole set of rules of behaviour that mould and shape social interaction. This concept includes both formal rules (laws, regulations, contracts) and those of an informal nature (customs, shared values, tacit conventions). The common feature of all these is that "they involve rules that delimit behaviour in a given field, giving rise to regular patterns of behaviour of the agents" (Yifu and Nugent, 1995, p. 2307). In the rest of this article, however, we will concentrate on efforts to bring about changes in the public institutions that can also give rise to changes in public-private interactions.

[27] Mention may be made in this respect of Chile, Colombia, Mexico, Peru and Venezuela, which have embarked on quite extensive processes of this type, as well as of Bolivia, which adopted the People's Participation Act in 1994 and the Decentralization Act the following year.

[28] Von Haldenwang (1997) has made an interesting analysis of the links between the decentralization process in Latin America and the structural adjustment phase, with emphasis on the elements of efficacy and legitimation.

Such compartmentalization and the insufficient technical level are both obstacles to fully exploiting the potential offered by the establishment of stronger links between medium-sized cities and their agricultural hinterland.

1. Development of local institutions

Strengthening the management capacity of the local authorities in order to further a policy of greater participation at the level of the local economy is the main task to be carried out in the field of the development of institutions, because at the local level: i) the special nature of the development needs, constraints and potential of the area can be seen much more clearly; ii) the possibilities of turning the organized participation of the population in question into a "resource" or "social capital" requires "small territorial areas and institutional interlocutors who are very close" (Borja, 1987, p. 56), and iii) it is much more feasible to make possible social control (for sustaining or redirecting policies) by those at whom public actions are aimed.

The creation of suitable conditions for participative management depends on three interrelated components: changes in the organization of the public machinery in order to strengthen urban-rural links; stimulation of the development and strengthening of the organization of the inhabitants of the urban area and its hinterland who are to be benefitted by such policies; and the need to provide the new form of organization with the means to permit the interaction of the different levels of public agents, both with each other and with the organizations representing the local population.

Within the population, the establishment and strengthening of homogeneous and representative local-level organizations should be promoted. The organizations should be homogeneous in the sense that the interests behind them and the problems they tackle are reasonably similar, in order to avoid spurious forms of representation.

With regard to the public machinery, efforts should be made to ensure sustained advances in the processes of decentralization of public management, deconcentration of human, material and financial resources, local-level integration of functions (usually dispersed and fragmented) offering potential synergies, and training of local public officials.

With regard to equipment, once the organizational bases have been laid,[29] it is necessary to progress in the provision of the resources needed to establish an interactive information/communication network to link each locality with the municipality, to link the latter with the region, and to link the region with the administrative centre. This will make it possible to take advantage of information technology –a term referring to the integration of microelectronics with telecommunications and computers–, whose cost has gone down dramatically in recent decades.[30] It may be noted that a number of countries have already begun to use the Internet as a rural development tool (see FAO, 1997).

2. The new institutional structure and the local economy

Understanding the potential and constraints of the local economy and the demands and capabilities of its population in an institutional context like the one in question will make it possible, among other things:

i) to tackle the problems of poverty, food insecurity and local environmental deterioration with a more exact knowledge of the nature of the most pressing needs and the most critical constraints;

ii) to generate and mobilize local saving in order to channel it towards local projects;[31]

iii) to generate projects for investment in production and social infrastructure to break bottlenecks that are hindering the formation of virtuous urban-rural circles;

iv) to integrate fragmented markets, by strengthening the regional market networks, especially wholesale markets, and thus simplifying the process of bringing together buyers and sellers in the same place and reducing transaction costs (UNDP/UNCHS, 1995);

[29] Even though these bases may be of an embryonic nature, they should be made sufficiently flexible to permit their subsequent modification in the light of experience.

[30] The cost of information processing and computing capacity has gone down by a steady 30% per year in real terms during the last three decades. In contrast, the cost of one of the goods most affected by technical progress in the first industrial revolution –cotton textiles– went down by approximately 3.4% per year from the late 18th century to the early 19th century (OECD, 1988, p. 37).

[31] In many countries of the region, remittances from former local residents who have gone to work elsewhere or even abroad are a by no means insignificant source of resources which could be channeled into local saving systems.

v) to take more specific account of the nature of the needs in respect of training and technological progress both in agriculture and among local small-scale industry, which is often only at an incipient stage;

vi) to give access to information, especially that which helps to improve strategies for obtaining employment and income, since the absence of information, or shortcomings in it, increase the danger of faulty resource allocation or of missing or overlooking existing opportunities. This aspect is particularly important in view of the considerable weight of work away from the farm in the family economy;

vii) to satisfy specific demands regarding environmental problems affecting the locality; and

viii) to form a suitable space for the participation of society at large and for the public agents to render accounts to the population they serve.

Although it is generally considered that the above advantages are perfectly reasonable, there are no generally applicable proposals on how to generate processes of institutional change which will secure the desired effects in each particular case. There does seem to be general agreement among the various authors regarding some of the basic conditions that need to be met if the decentralization process is to live up to expectations. Among these conditions are the existence of democratically elected authorities, a society with representative organizations, and transparency in public management which obviates clientage, corruption and rent-seeking. Although the whole set of these conditions is unlikely to be satisfied in absolute terms, there is nevertheless no doubt that the further the actual conditions of each country are from them, the less likely it is that decentralization –if adopted– will fulfil the objectives of rural development.

In general, paradoxical though this may seem, in the present phase of the democratic development of many Latin American countries the central government plays a key role in decentralization. This is not only because in order to achieve this objective the government must naturally delegate some of its authority to subnational bodies and grass-roots organizations, but also because it must, in addition, obviate the misuse of funds, avoid the fixing of priorities by a handful of powerful interests, and prevent funds from being squandered on pointless initiatives by inexpert or corrupt local officials.[32] Sometimes, the central government must pressure the local levels of government through its subnational bodies to set in motion processes of real participative decentralization, as noted in the case studies analysed by Tendler: "In so far as the Ceará cases involved decentralization, they revealed something very different from the processes of the unidirectional transfer of authority from the central to the local level depicted in the typical stylized versions of decentralization. Surprisingly, the central government took away authority from the local level even though, ultimately, its actions helped to strengthen local authority" (Tendler, 1997, pp. 146-147).

3. Absence of pre-established ways of decentralization

Finally, we will refer to the difficulty of laying down general rules that will make it more or less feasible to generate decentralized and participative structures. De Benedicty[33] rightly noted that in spite of the growing recognition in the economic literature of the importance of institutions, the results of the studies made in this respect have not progressed beyond the analytical level –how certain institutions arose and their economic and social impact– to the normative level of determining, for a given situation, the specific forms of the institutional matrix which will ensure the achievement of given economic and social objectives.

In other words, it is not possible to determine *a priori* the mechanism whereby a satisfactory decentralization process can be generated and developed, or the extent to which authority should be delegated or not in such areas as the imposition and collection of taxes, autonomy in expenditure, locally decided investments and projects, regulations regarding the

[32] Hommes (1995, p. 337) notes that the Colombian Constitution lays down that a portion of current revenue must be allocated to the departments and that the latter must share a percentage of these resources with the municipalities. The use of these funds is regulated by law, with fixed percentages being assigned to the different functions. Some critics hold that the controls under this system are excessive in that they limit decentralization, but the rigidity of the controls can, however, obviate misuse of funds and prevent them from being squandered on pointless initiatives by inexpert or corrupt local officials.

[33] In a manuscript comment on a preliminary version of this paper.

environment, trade and transport, etc.[34] It comes as no surprise that, among the conclusions of a recent Consultatory Meeting on Decentralization it was noted that in so far as decentralization depends on many national and local factors, such as the legal framework, the political system, the density of civil society, the degree of national cohesiveness, etc., there is no single way to decentralization, so that it is necessary to be on one's guard against simplistic models and excessively categorical predictions on the ways to decentralization and its subsequent effects.[35]

Notwithstanding the foregoing, the greater or lesser feasibility of a participative decentralization process for a given area or region would appear to depend on the degree of concentration of the habitat, the degree of homogeneity of the social groups, their levels of organization, and the quality and coverage of the infrastructure. Generally speaking, this process will be more viable in concentrated habitats with a relatively homogeneous and organized population and a reasonable level of local infrastructure, while it will run into serious difficulties –if indeed it manages to function at all– in dispersed habitats with a heterogeneous population, lacking both organization and infrastructure.

(Original: Spanish)

Bibliography

Belsky, E. and G. Karaska (1990): Approaches in locating urban functions in developing rural areas, *International Regional Science Review,* No. 13, Morgantown, West Virginia, West Virginia University, Regional Research Institute.

Bardhan, P. (ed.) (1991): *The Economic Theory of Agrarian Institutions,* Clarendon Paperbacks, Oxford University Press.

Bhadra, D. and A. Salazar Brandao (1993): *Urbanization, Agricultural Development and Land Allocation*, World Bank discussion papers, No. 201, Washington, D.C., World Bank.

Borja, J. (1987): *Descentralización del Estado, movimientos sociales y gestión local*, Santiago, Chile, Ibero-American Co-operation Institute (ICI)/Latin American Faculty of Social Sciences (FLACSO).

Cruz, M. E. (1997): *Llay Llay: Una ciudad intermedia del Chile Central.* (consultant's report), Santiago, Chile, Food and Agriculture Organization of the United Nations (FAO), *mimeo.*

Da Silva, J. G. (1998): *Novo rural brasileiro*, São Paulo, Brazil, State University at Campinas, Instituto de Economía, *mimeo*.

de Janvry, A. and P. Glikman (1991): *Encadenamientos de producción en la economía campesina en el Ecuador*, San José, Costa Rica, International Fund for Agricultural Development (IFAD)/Instituto Interamericano de Cooperación para la Agricultura (IICA), September.

de Janvry, A., G. Gordillo and E. Sadoulet (1997): *Mexico's Second Agrarian Reform*, La Jolla, San Diego, University of California, Center for U.S.-Mexican Studies.

ECLAC (Economic Commission for Latin America and the Caribbean) (1982): *Economía campesina y agricultura empresarial (tipología de productores del agro mexicano)*, Mexico City, Siglo Veintiuno Editores, S.A.

——(1990): *Changing Production Patterns with Social Equity*, LC/G.1601-P, Santiago, Chile. United Nations publication, Sales No. E.90.II.G.6.

——(1992): *Social Equity and Changing Production Patterns: An Integrated Approach*, LC/G.1701 (SES.23/3), Santiago, Chile, 6 February. United Nations publication, Sales No. E.92.II.G.5.

——(1996a): *Agroindustria y pequeña agricultura: síntesis comparativa de distintas experiencias*, Santiago, Chile.

——(1996b): *Pequeña agricultura y agroindustria en el Perú*, Santiago, Chile.

——(1998): *Social Panorama of Latin America 1997,* LC/G.1982-P, Santiago, Chile.

Escobal, J. (1996): *Diferenciación campesina y políticas diferenciadas*, paper presented at the Taller Latinoamericano de Políticas Diferenciadas y Tipologías Agrarias, Santiago, Chile, 20-24 May.

Evans, H. E. (1992): A virtuous circle model of rural-urban development: Evidence from Kenya, *The Journal of Development Studies,* vol. 28, No. 4, London, Frank Cass & Co. Ltd.

[34] See, in this respect, the critical analysis of fiscal decentralization by Prud'homme and the respective articles by Prud'homme, Tanzi, Oates and Hommes in World Bank, 1995.

[35] The case studies analysed by Tendler (1997) show the limitations of simplistic approaches which assume that decentralization and participation are mutually and necessarily reciprocal and clearly reveal the need to question some assumptions about the central government, society at large and non-governmental organizations, while at the same time suggesting the need for a three-way approach (local, central and civic) instead of the one-way approach of conventional proposals.

Fajnzylber, F. (1991): International insertion and institutional renewal, *CEPAL Review*, No. 44, LC/G.1667-P, Santiago, Chile, ECLAC.

Fajnzylber, F. and A. Schejtman (1995): *Agricultura, industria y transformación productiva. América Latina a fines de siglo*, Mexico City, Fondo de Cultura Económica (FCE).

FAO (United Nations Food and Agriculture Organization) (1997): *Internet y el desarrollo rural y agrícola: un enfoque integrado,* Rome, Sustainable Development Department, *mimeo.*

Figueroa, A. (1981): *La economía campesina de la Sierra del Perú*, Lima, Pontificia Universidad Católica del Perú.

——(1998): Pobreza rural en los países andinos, in L. Reca and R. Echeverría (eds.), *Agricultura, medio ambiente y pobreza rural en América Latina,* Washington, D. C., International Food Policy Research Institute (IFPRI)/Inter-American Development Bank (IDB).

Franco, C. (1992): La investigación agraria: argumentando un reproche, *Debate agrario,* No. 13, Lima, Centro Peruano de Estudios Sociales (CEPES).

Hansen, N. (1990): Impacts of small and intermediate-sized cities on population distribution: Issues and responses, *Regional Development Dialogue*, vol. 11, No. 1, Nagoya, Japan, United Nations Centre for Regional Development.

Hirshman, A. O. (1961): *La estrategia del desarrollo económico*, Mexico City, Fondo de Cultura Económica (FCE).

Hommes, R. (1995): Conflicts and dilemmas of decentralization, *Annual World Bank Conference on Development Economics 1995*, Washington, D. C., World Bank.

International Regional Science Review (1992a): vol. 14, Morgantown, West Virginia, West Virginia University, Regional Research Institute.

——*(*1992b): vol. 15, Morgantown, West Virginia, West Virginia University, Regional Research Institute.

Jacobs, J. (1970): *The Economy of Cities*, London, Random House.

Jeffrey, H. and others (1989): Environment and the poor: Development strategies for a common agenda, *U.S.-Third World Policy Perspectives,* No. 11, Washington, D. C., Overseas Development Council (ODC).

Jones, E. L. and S. J. Wolf (1969): *Agrarian Change and Economic Development,* London, Methuen & Co. Ltd.

Johnston, B. and P. Kilby (1975): *Agriculture and Structural Transformation: Economic Strategies in Late Developed Countries*, London, Oxford University Press.

Katzman, M. (1974): The Von Thünen paradigm, the industrial-urban hypothesis and the spatial structure of agriculture, *American Journal of Agricultural Economics,* vol. 56, pp. 663-696, San Francisco, California, American Agriculture Economic Association (AAEA).

Klein, E. (1992): El empleo rural no agrícola en América Latina, *Investigaciones sobre empleo,* No. 364, Santiago, Chile, Regional Employment Programme for Latin America and the Caribbean (PREALC).

Krugman, P. (1997): *Development, Geography and Economic Theory,* Cambridge, Massachusetts, The MIT Press.

Lanjouw, P. (1998): *Rural non-farm employment and poverty: Evidence from household survey data in Latin America,* paper presented at the IFPRI Workshop on Strategies for Stimulating Growth of the Rural Non-Farm Economy, Washington, D. C., International Food Policy Research Institute.

Lipton, M. (1968): The theory of the optimizing peasant, *The Journal of Development Studies,* vol. 4, No. 3, London, Frank Cass & Co. Ltd.

——(1980): Migration from rural areas of poor countries: the impact on rural productivity and income distribution, *World Development*, vol. 18, pp. 1-24.

Mertins, G. (1995): La diferenciación socio-espacial y funcional de las ciudades intermedias latinoamericanas: ejemplos del noroeste argentino, *Revista interamericana de planificación*, vol. 28, No. 112, Cuenca, Ecuador.

Myrdal, G. (1962): *Teoría económica y regiones subdesarrolladas*, Mexico City, Fondo de Cultura Económica.

Oates, W.E. (1995): Comments on "Conflicts and dilemmas of decentralization" by Rudolph Hommes, *Annual World Bank Conference on Development Economics 1995,* Washington, D. C., World Bank.

OECD (Organization for Economic Co-operation and Development) (1988): *New Technologies in the 1990's. A Socio-Economic Strategy,* Paris.

Ortega,L. (1998): *Desarrollo rural articulado a ciudades intermedias* (consultant's report) El Salvador, UNDP, *mimeo.*

Paniagua, A. (1994): *Desarrollo agrícola asociado a ciudades intermedias en agroindustria y pequeña agricultura*, La Paz, FAO/Latin American Institute for Social Research (ILDIS).

——(1997): *Análisis complementario del proyecto de desarrollo del corredor Puno–Cusco,* (consultant's report), Lima, Corporación Financiera de Desarrollo, *mimeo.*

Pearse, A. (1984): *Seeds of Plenty, Seeds of Want*, Geneva, United Nations Research Institute for Social Development (UNRISD).

Prud'homme, R. (1995): Comments on "Conflicts and dilemmas of decentralization" by Rudolph Hommes, *Annual World Bank Conference on Development Economics 1995,* Washington, D. C., World Bank.

Reardon, T. (1998): *Agroindustrialization in intermediate cities in Latin America: hypotheses regarding employment effects on the rural poor,* paper presented at the IFPRI Workshop on Strategies for Stimulating Growth of the Rural Non-Farm Economy, Washington, D. C., International Food Policy Research Institute (IFPRI).

Renkow, M. (1998): *Cities, Towns and the Rural Non-Farm Economy,* paper presented at the IFPRI Workshop on Strategies for Stimulating Growth of the Rural Non-Farm Economy, Washington, D. C., International Food Policy Research Institute (IFPRI).

Riordan, J. (1997): *Elementos para el desarrollo de las ciudades intermedias en apoyo a la lucha contra la pobreza extrema,* Lima, Peru, Ministerio de la Presidencia, *mimeo.*

Rondinelli, D. (1990): Locational planning and regional economic development: Appropriate methods in developing countries, *International Regional Science Review,* No. 13, Morgantown, West Virginia, West Virginia University, Regional Research Institute.

Sadoulet, E. and A. de Janvry (1995): *Quantitative Development Policy Analysis,* Baltimore, Maryland, Johns Hopkins University Press.

Schejtman, A. (1980): The peasant economy: internal logic, articulation and persistence, *CEPAL Review*, No. 11, Santiago, Chile, ECLAC. United Nations publication, Sales No. E.80.II.G.3.

——(1997): Peasants and structural adjustment in Latin America, in S. Lindberg and A. Sverrisson (eds.), *Social Movements in Development: The Challenge of Globalization and Democratization,* London, Macmillan Press Ltd.

——(1998): Agroindustria y pequeña agricultura. Experiencias y opciones de transformación, in ECLAC/German Agency for Technical Cooperation (GTZ)/FAO, *Agroindustria y pequeña agricultura: vínculos, potencialidades y oportunidades comerciales*, Santiago, Chile.

Schultz, T. (1953): *The Economic Organization of Agriculture,* New York, McGraw Hill.

Tanzi, V. (1995): Fiscal federalism and decentralization: A review of some efficiency and macroeconomic aspects, *Annual World Bank Conference on Development Economics 1995,* Washington, D. C., World Bank.

Tendler, J. (1997): *Good Government in the Tropics*, Baltimore, Maryland, Johns Hopkins University Press.

UNDP/UNCHS (United Nations Development Programme/United Nations Conference on Human Settlements - Habitat) (1995): *Rural-urban linkages: Policy guidelines for rural development,* Rome, *mimeo.*

Vergara, R. (1992): La ciudad y el campo ¿una danza eterna?, *Debate agrario*, No. 13, Lima, CEPES.

Von Haldenwang, C. (1997): Descentralización, fases de ajuste y legitimación, *Diálogo científico,* vol. 6, No. 2, Tübingen, Germany, Instituto de Colaboración Científica.

World Bank (1995): *Annual World Bank Conference on Development Economics 1995,* Washington, D. C.

——(1997): *El Salvador Rural Development Study. Main Report,* vol. 2, Washington, D. C.

Yifu, J. and J. Nugent (1995): Institutions and economic development, in J. Behrman y T. N. Srivanasan (eds.), *Handbook of Development Economics*, vol. 3, Amsterdam, Elsevier Science Publishers B. V.

Training and the *small enterprises* of Latin America

Guillermo Labarca

Human Resources Expert, ECLAC Division of Production, Productivity and Management.

The allocation of expenditure on training for the small enterprises of Latin America is a matter which requires clear guidelines. Increasing resources for this purpose is a necessary but not of itself sufficient strategy. The shortage of resources, their faulty allocation and the inefficiency in the use of those currently assigned to this class of enterprises are factors which make it necessary above all to take measures to ensure better use of the available resources, especially those of public origin. Likewise, it is necessary to find new sources of financing for training and upgrading the labour force, making use of suitable incentives. At the same time, it will be necessary to develop training techniques in keeping with the conditions of the countries of the region, to reform the existing institutions, and to establish new forms of relations among the actors concerned.

I

Introduction

Training is an important issue in small enterprises, considering the extent to which the labour factor can help to raise productivity in the smaller industries of the region. Training plays an important role both in situations of technological change –which involve investments in machinery and equipment– and in processes of restructuring, reorganization and the application of new management techniques, which do not necessarily require substantial acquisitions of assets. Increasing the productivity of labour is an attractive possibility, especially for enterprises which have difficulty in gaining access to credit: that is to say, almost all the small enterprises of the region. Technological change, or the lack of it, has largely determined changes in productivity: indeed, it may be said that in the case of small enterprises this type of change has raised the productivity of labour more than that of capital. Innovations marked by increases in fixed capital have created fewer jobs per unit of investment than the previous practices, however.

If we take the approach of seeking to improve the productivity of small enterprises when analysing training and suggesting training policies, we are opting for the creation of more product per unit of capital. In other words, by preferring to improve the output per unit of investment rather than the employment per unit of investment, we are opting to create productive employment rather than non-productive employment but leaving aside the contribution that human resources training policies and initiatives can make to this process.

Small enterprises in general, especially in the industrial sector, tend to create more jobs per unit of capital than large enterprises, because of the link between technology and scale of production. The most efficient small enterprises occupy production and market niches where technologies making more intensive use of labour are currently more appropriate. Thus, for example, in a narrow market it is more efficient to produce made-to-measure clothing on a small scale than on a large scale, which means using labour-intensive technologies. The same is true in metalworking industries producing one-off parts or components, or spare parts not available from the regular spare parts suppliers. At the same time, however, the new technologies allow these enterprises to generate more product per unit of capital.

Lack of credit has probably been the greatest hindrance to the development of small enterprises in the region, for unlike Italy, Germany, Japan, the Netherlands, the Scandinavian countries, etc., in Latin America there are no regional banks or finance agencies to take care of the needs of the smaller industrial establishments, or even State policies designed to address these shortcomings in a systematic manner.

Training policies cannot correct shortcomings in the area of credit, but they can improve the profitability of the existing capital, increase the yield on new investments and create a favourable environment for endogenous innovation. They can do all this at a lower cost than investments in conventional capital, and with the advantage that the cost of investment in human capital can be shared out among the different actors involved: entrepreneurs, the State and the workers themselves. Finally, not only can the scale of the investments be smaller, but the total amounts of the investment can also be broken down into separate elements, so that investment plans for training can be tailored to the needs of an enterprise or group of enterprises.

Investments in human capital and the policies guiding them have a special nature: although, like any other investment, they are regulated by a market, this is influenced by exogenous factors such as:

i) the internal criteria of the training system (for example, prior performance and the certification that the system itself can provide);

ii) the fact that training is an ongoing process which is not completed once and for all within a predetermined period;

iii) the prestige accompanying training, which helps to create a demand for certain professions or trades rather than others;

iv) the fact that "wrong decisions" only become obvious in the long term, which makes it difficult to alter them promptly or correct them as a function of market trends, even though there may be drastic changes in the market.

The most decisive consideration, however, is that connected with the imperfections in the training market, i.e., the characteristics of training from the point of view of the market value of the skills and know-how acquired by workers. If there were only two types of skills, as Becker assumes, or if all skills had only two aspects –i.e., either general or specific– there would be a better regulated market and probably more effective incentives. If it is assumed that general training, or the general part of specific training, is required by all enterprises and can be used in all jobs, while specialized training is specific to a single enterprise, this would solve the problem of the distribution of resources for training. If the know-how and skills imparted by general training can be appropriated by all productive and social activities, the cost of the investments in such training should be paid by the trainees themselves, if wages are determined by the marginal productivity of labour, or else by society as a whole, while the cost of training which can only be appropriated by a single enterprise should be paid by the enterprise benefiting from such know-how.

The weakness in this argument is that there is almost no training which is completely specific. Almost all specific training is useful to a greater or smaller number of enterprises, but almost always to more than one, and this tends to discourage investment in training. The direct relation which exists between the degree of specificity of training and the investments made by enterprises in that field is well known, since the smaller the number of enterprises able to make use of certain skills, the greater is the marginal product of labour that they can appropriate. This relation between the possibility of appropriation of the marginal product and the employment possibilities of workers according to their know-how and skills determines the investments that enterprises are willing to make in human resources.

At the same time, the degree of specificity is closely related with the technologies used, and the these in turn are related with the minimum amounts of investment needed to apply them. This is why enterprises with low capital density (the great majority of small and medium-sized enterprises fall within this group) tend to use less specific technologies. This phenomenon is further strengthened by the complementarity between capital and labour: when investments in human capital are insufficient, this reduces the productivity of physical capital, leading to a reduction in investments in more sophisticated machinery and technology and a failure to create new demands for human capital.

The close relation between training and formal education means that both in the formation of the supply and demand of skilled labour and in the identification of problems and the development of policies to overcome them there are considerations which affect the educational system. In fact, no really effective training policy can neglect this variable. Moreover, in the experience of the region and in international comparisons, especially with regard to small industrial enterprises, the general or special training of workers prior to their activities in the labour force is seen to be a conditioning factor, an element of facilitation, or the worst bottleneck in production performance and training for work.

The question of training in and for the small enterprises of the region also calls for some contextual clarifications and definitions and the consideration of certain data.

First of all, there is the actual concept of the small enterprise. This is usually decided by the number of employees and the income generated or the value added by the firm. This approach is probably less precise than that proposed by Ramos (1979), who suggests classifying enterprises in two main categories: those quoted on the stock exchange, which are the enterprises with access to financial capital, and those not quoted, which normally have chronic financing problems. The question of access to finance comes up repeatedly when analysing or formulating survival strategies and expansion policies for such firms, because it determines much of their economic behaviour and even affects their size.

Classifying firms by the number of employees and the volume of output has some practical use, since it makes it possible to establish some common specific features of a set of enterprises usually associated with the labour training processes.

Moreover, as we shall see below, when making a micro-analysis of labour training in a firm, the number of workers is a factor in defining the forms of training that can be most effectively applied and their cost/benefit ratio.

II

The cost of training for small enterprises

A conservative estimate of the needs for specific training in industrial enterprises with fewer than 50 workers is that around 30% of the industrial labour force requires such training.[1]

The efficacy, cost and impact of labour training are associated with the prior educational level of the workers. In most cases, this is more decisive than the specific training itself for improving the workers' productivity. Lynch (1994), using data from studies on the member countries of the Organization for Economic Cooperation and Development (OECD), concludes that the training expenditure that enterprises have to make depends on the initial educational level of the labour force. In this respect, he notes that in the United States the performance of the labour force is below that of Germany and Japan (even in sectors where the expenditure by companies on training is not smaller), because the basic training of United States workers is deficient. This causes investment on training to have a low yield.

When considering the problem in all its complexity, it is necessary to take account not only of the present but also of the future needs of small enterprises, since human capital formation processes are slow and require more than just short-term measures. A full analysis of the situation must take into account the aspects conditioning the success of specific training. This means that human resources formation policies for small enterprises tend to blend with general training policies when analysing or embarking on the actions which form the basic foundation for training. At this level of policies and strategies it is very difficult to discriminate between and single out those which will specifically affect the sector of interest to us in this article.

The problem of basic skills is of vital importance and cannot be solved through targeting strategies. It is not possible to "target" an action affecting between 30% and 70% of the school-age population. Global policies are still needed in the region to ensure that all persons of appropriate age have access to certain benefits which they need in order to allow them to take their place in society, both for economic considerations and for reasons of equity. These policies are so general that it is not possible to formulate suitable strategies for a separate economic sector like that of small industrial enterprises without taking them into account.

This is important for the present study because an effective training policy must begin by solving some problems in respect of prior education. Many of the workers in the small enterprises of the region have a low level of education, which is in keeping with the fact that a substantial proportion of young Latin Americans do not receive secondary education. Only Argentina, Chile, Uruguay and some English-speaking Caribbean countries have net rates of secondary school enrollment[2] which come close to or slightly exceed 50% (UNESCO, 1998). Those who do not attend secondary school are divided up into the following categories: i) those engaged in formal sector employment, ii) those engaged in informal-sector activities, and iii) those who are unemployed. Most of those in the first of these categories are in fact apprentices. Those in the other two categories could greatly benefit from a well-designed system of apprenticeship.

A problem of a more general nature which affects small enterprises is that of persons (adults or schoolchildren) who are not yet in the labour market. Some efforts in the area of technico-professional school education, especially those involving alternating studies such as sandwich courses, aim to give such training mainly to persons of school age, while at the same time improving school education, in order to deal in this way with the shortcomings in terms of basic skills. There is a close relation between the characteristics of technico-professional school education and the needs of the smaller industrial enterprises. These forms of education are organized by the

[1] Approximately 25,000 workers in Chile, between 80,000 and 90,000 in Argentina, 240,000 in Brazil and 120,000 in Mexico.

[2] The net rate of secondary school enrollment is the ratio of the number of secondary school students of the corresponding age (which varies in the different countries from a minimum of 12 to 14 years of age to a maximum of 17 to 18) to the total population in that age group.

formal school education system for periods of at least three to four years, coinciding with the period of compulsory school attendance. They do not coincide with the time spans and strategies of the enterprises, however, which means that the latter tend to have little interest in participating in such training processes. This raises the difficult problem of turning schoolchildren into apprentices. Indeed, one may wonder if this is really possible on a large scale: perhaps a more realistic approach would be to start with apprentices and give them training in basic skills. This problem also arises in the integral training (basic skills and specific training) of adults and, in general, of all those who are not in a position to acquire the basic skills within the formal educational system.

The average educational level[3] of a country is an approximate indicator of the educational level of the workers in small enterprises. For example, in the late 1980s the average number of school grades completed by the labour force as a whole was 3.3 in Brazil, 4.8 in Paraguay and Peru, 4.9 in Mexico, and 6 in the countries with the best average levels (Chile, Argentina, Uruguay and some former British possessions in the Caribbean). The latter may be considered as the minimum acceptable level for organizing effective training for work and incorporation into productive employment with outputs close to those of the best prevailing technological practices. Shortcomings in this field affect technological innovation and also labour performance. Typical difficulties include the inability of workers to convert centimetres into inches, to estimate curved surfaces and to calculate the pressure of liquids and gases, leading to inaccurate measurements and erroneous decisions that lead to waste.

III

The cost of training and expenditure on education

One way of gauging how far basic education facilitates more specific training is to estimate how much the cost of specific training is reduced when investments are made in improving school education (table 1).

The columns in section A of table 1 show the average cost of initial training of workers in sectors made up mainly of small enterprises in the region. The columns in section B show the saving for those same enterprises when the workers have approximately three years more of schooling.[4] In countries where the coverage of basic education is close to 100%, such as Argentina and Chile, the reduction in the training costs of enterprises achieved through extra investment in education tends to be close to zero. In countries with lower rates of primary educational coverage, however, the savings may be considerable, amounting in some cases to half the initial training costs. The cost of giving workers the necessary training in countries with the levels of schooling of Brazil, Mexico, Paraguay or Peru is high, but as we shall see below, if such training is provided at the school level the cost is less than if it is provided through compensatory programmes for adults. The main benefits for these countries are of a different nature: they provide suitable conditions for increasing productivity and achieving greater receptiveness for technological innovation.

The industrial sectors covered by table 1 are generally of low productivity in the region, but they currently employ a very high percentage of the total industrial labour force (between 40% and 70%, depending on the country). Their low productivity is due above all to their low technological level: in order to achieve substantial increases in productivity major investments in machinery, equipment and organization are required. When such investments are made, however, persons with a low level of schooling are excluded because they do not have the necessary basic skills and, as we shall see below, because it is very costly to develop in adults the capacities needed to enable them to attain the cultural level demanded by the new technologies.

Enterprises, and especially the smaller ones, are almost exclusively interested in the provision of spe-

[3] The number of years of schooling completed by the population on average.
[4] Based on inter-firm comparisons of domestic and international firms.

TABLE 1

Latin America: Estimated cost of initial training, and saving on training expenditure through additional expenditure on school education [a]
(1997 dollars)

Sectors:	Estimated cost of initial training needed to secure a yield equal to the average for the enterprise [b] A			Approximate percentage saving on training expenditure achieved through additional expenditure on school education + B		
	Foodstuffs, beverages and tobacco	Footwear, wood and furniture	Pottery, china and porcelain	Foodstuffs, beverages and tobacco	Footwear, wood and furniture	Pottery, china and porcelain
Argentina	200	600	300	-	-	-
Brazil	188	450	225	48	37	41
Chile	130	390	260	-	-	-
Colombia	120	320	160	31	25	25
Costa Rica	192	516	256	27	26	24
Guatemala	103	246	123	49	40	87
Honduras	136	318	159	50	42	39
Jamaica	100	500	250	50	40	40
Panama	392	980	490	52	37	53
Peru	110	290	160	32	21	80
Dominican Republic	152	363	182	47	27	42

Source: ECLAC Industrial Dynamics Analysis Programme (PADI), and surveys.
[a] Prepared on the basis of minimum wages, information from surveys of enterprises, and projections.
[b] The average yield was estimated on the basis of information obtained from the enterprises: it includes the costs in respect of induction and training of new workers and the difference in their output during the period they need to reach the average for the enterprise.
[c] The additional expenditure is equivalent to three years' coverage per individual. It is based on public expenditure per student on primary education in 1990. Average productivity of 50% of the enterprise average is assumed during the period. Only wage costs are included. Costs on material and equipment, loss of raw materials, supervisors' salaries, etc. are not included.

cialized training: they have no incentive to invest in the formation of basic skills. The biggest hindrance to investments of this type is the rotation of the skilled labour force, and important factors in such rotation are the level of training of a worker and his work experience, which increase the market value of the individual. There is a systematic drain of workers from small enterprises to medium-sized and large firms in the region, and this is the biggest hindrance to the promotion of training activities. The big firms reduce the amount of training that they have to provide because, as they are in a position to pay better wages, they hire workers who have already acquired working experience in smaller firms. For their part, the small firms have no incentive to upgrade the skills of their labour force more extensively, because they do not always obtain any benefits from such investment.

In order for enterprises to become interested in training in basic skills it would be necessary to establish incentives which must necessarily be higher than the cost to them of the rotation of the labour force and the risks involved in the investment. Such a policy is hard to implement. A more efficient approach would appear to be the proposal made by Ramos (1994), who, inspired by Becker, suggests a private loan market for investments in human capital. According to Ramos, the lack of loans explains why there is faulty resource allocation in the economy, which adversely affects efficiency and equity. He suggests that a system of loans should be established which uses pension rights as a guarantee. This proposal takes account of the fact that the worker is the first person to be benefited by training and it is he who obtains the know-how and skills, thus justifying the notion that he should absorb the costs of the process. This strategy would also make it possible to establish more efficient quality controls: since it is the worker himself who pays for his training, he will be more demanding in terms of the yield on his investment, thus eliminating the less profitable offers from the training market.

Comparisons with Southeast Asia and with certain sectors of some European countries indicate that the improvements in organization and processes gen-

TABLE 2

Latin America: Additional cost of increasing schooling by three years, and hypothetical effects on the employment status [a] of the population aged 15 or more
(1997 dollars)

Countries	Additional cost of increasing first-level schooling by three years[b] (US$ '000)	% wage increase due to improvement in employment status thanks to increased expenditure on first-level schooling (simulation)	Additional cost of increasing second-level schooling by three years [c] (US$ '000)	% wage increase due to improvement in employment status thanks to increased expenditure on second-level schooling (simulation)
Brazil	105 542	18.3	670 928	2.3
Bolivia	2 162	6.9	173 377	5.8
Chile	16 731	7.1	56 027	23.0
Colombia	58 013	9.8	219 871	-
Costa Rica	6 435	14.5	56 037	25.2
Guatemala	14 935	24.3	66 750	26.0
Mexico	49 878	19.7	1 439 123	20.4
Panama	12 600	17.5	40 242	31.9
Paraguay	2 070	12.2	34 907	34.7
Uruguay	13 740	13.8	21 325	18.3
Venezuela	22 134	17.3	58 163	21.2

Source: ECLAC, special tabulations of household surveys of the respective countries; UNESCO, 1998.
[a] Employment in more productive activities.
[b] From first to sixth grade.
[c] From sixth to tenth grade.

erated within the production units can become a very important source of higher productivity. The factors which act most negatively in inhibiting the generation and application of endogenous innovations in the enterprises of the region are educational shortcomings and the forms of management used. The style of development prevailing in Southeast Asia and Japan stimulates such innovations because, among other reasons, in those areas of the world the educational levels of the labour force are functional to forms of management which encourage the creativeness of each worker.

Increased expenditure on school education also has effects on the distribution of costs. By reducing the cost of later training and increasing productivity through the improvement and expansion of primary education, the government is assuming costs which would otherwise have to be paid by entrepreneurs and/or workers. Furthermore, the expansion of educational services produces other benefits, such as greater flexibility and adaptability of the labour force, better preparation for coping with technological innovation or the reconversion of production, and greater capacity to contribute to the development of new technologies. In-house innovation is not a normal practice in the region, because of a number of organizational and cultural factors, and it would seem unlikely that this practice can be developed when there are shortcomings in the basic skills.

In all the countries of the region, the saving on initial training thanks to better school education is particularly visible in industries such as footwear, wood and wood products (excluding wood pulp), furniture and non-metallic fittings. These industries employ techniques which are of an almost artisanal nature and are labour-intensive, and the skilled labour they use is trained mainly on the job; they therefore depend to a large extent on the levels of initial training that workers have when they join the firm. The saving thanks to better school education in the foodstuffs and beverages sector is smaller in absolute terms, but it is high as a proportion of the cost of initial training. The techniques used by the enterprises in this category tend to involve less skilled labour.

Even though a good general training is profitable, and entrepreneurs know this, they are reluctant to invest in this area because it only gives returns in the medium or long term. Moreover, the final benefit for them may be zero, because training in basic skills

stimulates labour rotation. The conclusion with regard to policy formulation is fairly obvious: it is necessary to create incentives which operate in the short term for workers to take part in training, and to apply educational policies which facilitate the access to (formal and informal) education by those under 17, rather than to continue to concentrate on incentives to entrepreneurs (through tax deductions, for example).

Assuming that the relation between primary and secondary education and occupational status is maintained, table 2 shows the effect of investments designed to improve the educational level of the segments of the population with the lowest levels of schooling. The figures show that their occupational status would be improved if there was an improvement in primary and secondary education, with an increase in the coverage of the latter producing more significant effects than an increase in primary education. The effects would be reflected both in the type of employment and in wage levels.

IV

Compensatory training

The alternative of employing persons with a low level of schooling and making up for their educational shortcomings through training involves very high investments –just as high as or higher than the training itself– and it is less efficient than the option of employing persons with at least ten years' schooling.

The available information gives grounds for concluding that the processes of the technical substitution of capital for labour are accompanied by greater demand for workers with an educational base equivalent to secondary education. When they do not have this educational base, it is necessary to consider programmes for bringing their education up to the necessary level. In the best of cases, the compensatory training to make up for the main shortcomings caused by lack of secondary schooling at the age of 18 or more would take some 20 months, with approximately 25 hours of study per week.[5] After this period, the persons in question would be in a position to start initial training proper, which, in the leading industries of the region, lasts from 2 to 4 months before full incorporation into the production line.

The estimated cost of programmes like these in various countries of the region is shown in table 3. This cost is the opportunity cost for the workers, if they pay for the compensatory programme directly; for the enterprises using more advanced technologies which find workers with schooling or experience in the labour market; or for the State, if it decides to assume these costs. This does not depend on the educational model applied, but on the role assigned to the government with regard to human resources training. Although compensatory programmes may be designed to bring persons with shortcomings in terms of secondary school education up to the desired level, they are treated as training programmes, so that they will be determined by the policy instruments governing the latter and the emphasis they place on the supply or demand side.

When their emphasis is on supply, it will be the State which has to defray a major part of the costs, as well as establishing mechanisms of evaluation, con-

TABLE 3
Latin America: Cost of compensatory programmes, compared with cost of secondary education [a]
(1997 dollars per person)

Country	Compensatory programme (20 months)	Four years of secondary education
Argentina	2 285	412
Brazil	1 220	669
Chile	1 714	677
Colombia	1 372	270
Ecuador	1 437	317
Guatemala	641	185
Honduras	916	317
Jamaica	1 118	795
Dominican Republic	1 029	191

Source: UNESCO, 1998, and ECLAC data.
[a] The present cost of education was estimated at a 10% annual discount rate over the 1990 expenditure. The present opportunity cost is based on the 1994 minimum wages, with an 0.8% monthly discount rate.

[5] Examples of such programmes are those provided by the Fundación DUOC in Chile.

trol and certification for such programmes which will bring them closer to school education. When the emphasis is on demand and there is a close link between the training and the formation of basic skills, the costs will tend to be assumed by the workers, and/or the enterprises, and/or the State (through subsidies for demand by individuals or by enterprises). The biggest difficulties in implementing these programmes, however, do not lie in their cost but in factors of an institutional nature such as certification, the formulation of curricula, coordination with the demands of production activities, etc.

The compensatory training costs shown in table 3 have been estimated on the basis of the average cost of the existing programmes in the region, after eliminating extreme cases. All of them also assume an opportunity cost for the workers equivalent to the minimum wage: a very conservative hypothesis in the case of persons working in enterprises using more advanced technology, or even many own-account workers. A level of productivity of 50% is assumed during the period of compensatory training. These values are compared with the present cost of four years of conventional secondary education, according to the educational expenditure of each country, that is to say, on the hypothesis that the current levels of quality are maintained.[6]

The present cost and externalities of the two alternatives would naturally make it advisable to opt for school education, whose cost is between 0.5 and 8 times less than that of compensatory programmes after the age of 18. The adoption of this alternative as the only and exclusive form of training, however, would mean overlooking the fact that there is a very considerable contingent of workers in the region who are over that age yet lack the basic skills demanded by modern industry and could therefore benefit from compensatory programmes.

The sectors shown in table 1 above are of a low level of technological development, and in the region they operate with production functions and labour densities that would presumably require an educational level equivalent to at least six years' primary schooling.

With regard to persons who are already working, it may be wondered whether training at this stage can really make up for their shortcomings in terms of general education, to what extent, and under what conditions. The experience of several countries of the region shows that such training cannot take the place of basic education, which has special features and develops skills that workers are assumed to possess already when their training is begun.

Training schemes which include elements of general education may be attractive to enterprises whose conventional capital component is very high, but such schemes would not have the same effect on the composition of the total investments of enterprises whose production functions are more labour-intensive and whose fixed capital is smaller, even though their labour force might be the same size. Trying to apply them in firms which have not replaced labour with capital and are not in a position to do so would force them to devote a larger proportion of their investment to human capital formation.

This raises two questions. First, whether capital/labour mixes which involve relatively greater use of labour need, or can benefit from, such intensive training processes. Second, whether an investment with an unusually large component relating to human resources formation is cost-efficient. These questions affect decisions on the advisability of investing directly in training, more or less independently of the investment in physical capital.

Although it is not possible to give categorical answers, there are some indications which can guide these kinds of decisions. With regard to the first question, the benefit that industries with high capital density achieve through the organization of general training schemes is that these schemes provide training in general basic skills while at the same time developing specific skills for use in the sector to which the industry belongs. This is necessary in order to bring workers up to a level of physical output similar to that of comparable industries in the industrialized countries, by improving both their general and specific training: that is to say, bringing them up to a level comparable with that of the workers in many German or Japanese firms who have completed their initial training.

In the industrialized countries, it is not only the leading-edge firms which have workers of this educational level, nor are these firms the only ones that give their workers intensive training in specific tech-

[6] The compensatory programmes and the four years of secondary education are not strictly equivalent: they are therefore not substitutable goods. The comparison is useful, however, because it provides background information for policy formulation.

niques. Much of the productivity of the firms in those countries, be they old or new, large or small, is due to the level of training of their workers. In Japan, for example, the length of training does not necessarily depend on the production function of the firms. In Germany, it is generally acknowledged that the level of education and skills in the production units is very high, regardless of their size or the sector in which they operate, as is the productivity of labour.

It is not only productivity which is associated with training in the industrialized countries, however, but also the capacity of the industrial sector to make technological innovations. The possibility of constantly incorporating new technologies into production is subject, among other things, to the availability of staff with the skills described above.

Transferring the experience of those countries to the region, it may be concluded that training of this nature can also benefit enterprises whose production functions are less capital-intensive. The question is to determine what conditions are needed for the application of these schemes in firms less committed to the accumulation of human capital.

First of all, there is the question of cost. In addition to the initial expenditure per worker on training there are further costs in respect of materials, instructors and training premises, as well as the opportunity cost involved in bringing the workers up to average productivity levels after their training period is completed. It is hard for enterprises making intensive use of labour to decide to engage in such expenditure, and even if they were willing and able to do so it is doubtful whether they would be able to achieve a level of productivity that would make them competitive enough to make up for the investment.

Furthermore, such investment is not very attractive to entrepreneurs because it usually means greater labour force rotation. The mobility of workers is often a result of the training they have received, which leads them to seek better-paid or own-account jobs in the same sector.

One of the chronic problems for industries in the region is the mobility of their employees. Giving workers greater skills will not help to solve this problem unless complementary measures of a social nature are adopted, as some enterprises have done (day nurseries, production bonuses, bonuses for long service in the enterprise, skills incentives, etc.).[7] These measures involve additional costs and undoubtedly call for substantial changes in management practices.

Finally, raising the basic educational level of workers may be dysfunctional to the enterprise in as much as it creates expectations about the type of employment they can hope to obtain. Fleury and Humphrey (1993) report, on the basis of a sample of enterprises in São Paulo and Rio Grande do Sul, that in Brazil a worker who improves his educational level and receives a certificate to prove it expects to "rise" to an administrative post. According to these authors, in order to have production workers with high levels of schooling it would be necessary to increase the total coverage of the educational system; if this is not done and only the education of some workers is improved, the latter will look for work away from the field of production.

This observation is confirmed by the relation which exists between the educational level of production workers and the average schooling of the population. The tendency described above is more frequent in countries like Brazil, which have a low level of schooling, than in Chile or Argentina, where the school enrollment rate of the population between 7 and 14 years of age is close to 90%, and it is even rarer in the industrialized countries, which have 100% educational coverage.

These differences are parameters that must be taken into account when designing policies. In training, as in other areas of economic activity, there are economies of scale which affect the relative efficiency of the various options. The technical and institutional instruments of a policy designed to raise the skills of over a hundred thousand workers are different from those of a policy designed for twenty thousand. In the first case, distance education techniques will be more efficient, while in the second it may be preferable to establish local training centres, which would not be effective, however, for serving a large contingent of workers.

[7] Among the enterprises which have done this are Fantuzzi in Chile and Hofab in Jamaica.

V

Appropriateness of training

Another matter is the arguments questioning the appropriateness of the training currently provided for small and medium-sized enterprises. In all the studies made, the entrepreneurs have expressed unfavourable opinions on the training available outside the firm itself. The most usual criticism is that the courses do not take account of technical progress and the tools, machinery and practical exercises used in them are far removed from the real work of the students. For their part, the workers interviewed often report that rather than helping them develop skills and capacities that will be useful to them in their daily work, the training courses provide them with certificates and diplomas which may improve their market value. These views are most frequently expressed in sectors such as mechanical engineering, gasfitting, carpentry and various activities connected with the production of metal goods. Many school and out-of-school activities for training human resources in the region have been organized by the educational or training systems, that is to say, it has been the educational sector which has taken the initiative, giving rise to the concept of the "student apprentice".

VI

Apprenticeship

In almost all the countries of the region, efforts are being made to implement forms of training which replace both in-school technical training and job training with systems of apprenticeship or sandwich courses, inspired by the dual system used in Germany, which has also been successfully applied in Switzerland and Austria. This system seeks to establish a permanent relationship between the enterprises and training, not only in the management of the training activities, as some vocational training institutes have been doing at least since the 1950s, but also and above all in the teaching practice itself. The most important workshops and training areas are the industries themselves.

Although the relation between the enterprise and the educational institution lies at the heart of the concept of sandwich courses, the problem is broader than that of the organization of a dual educational system. Other sectors of vocational training, such as in-school technical and professional education and training for production activities, also need to establish ongoing collaborative relations with the production sector. None of them has achieved this yet in the region, although all analyses and policy proposals link the shortcomings in training systems with the their lack of connection with the production units. The various efforts made so far have had varying results, but none of them has provided solutions suitable for large-scale application or for use in dual education. It would appear that such linkages as do exist have occurred in exceptional conditions. The challenge that this represents is of enormous importance today for any form of training, especially systems of sandwich courses.

There are currently no effective incentives for enterprises to take part in the planning, execution and evaluation of training programmes. How can the enterprises of the region be expected to take an interest in training if no Latin American country has the tradition of training or social consensus-building that exists in Germany? This question brings us to a problem of incentives. It is a challenge to find the right incentives, but one of them is connected with the financing of this form of training, since the costs that it involves for the enterprises are always a deterrent to taking part in the system.

It would be premature at present to express a final judgment on the efforts which are under way.

They have been successful in their current experimental stage, but they are receiving heavy international support, especially from Germany.

The experiments made along the lines of sandwich courses are particularly interesting for small enterprises, because they are associated with certain forms of organization of production and certain types of production functions. Dual training links up better with artisanal-type enterprises, where there are strong relations between the master and the apprentice, and medium-sized or large enterprises that have a flexible form of organization.

The forms referred to here –sandwich courses, vocational training institutes, technical education– are those that can be developed or modified by a training market and by State policies, whose coverage is currently limited, since only some enterprises and an even smaller proportion of small enterprises and their workers benefit from them. This does not mean that the enterprises and workers outside this system do not provide or receive training. It is necessary to see how they do this and evaluate the efficiency of their actions, however. There are large enterprises which train their staff even though they run the risk of losing skilled workers and try to make the workers help to pay for the training costs by deductions from their wages. There is no systematic information available on the forms of training used in small enterprises outside the training market. There is scattered evidence that they do provide training, but the available information is not sufficient to formulate more general views.

The details of the on-the-job training provided by these enterprises (duration, cost, number of apprentices, implicit forms of certification, appropriateness, recurrence, etc.) vary according to the branch they operate in, their size, and their technological level. The supervisors play a central role in these processes, especially when dealing with new workers.

A detailed knowledge of what takes place in the small enterprises of the region, and the dissemination of such knowledge, could be useful for preparing more general strategies. There can be no doubt that detailed research needs to be carried out on this matter.

VII

Considerations with regard to policy formulation

1. Merely increasing expenditure is not enough

The main reason why this strategy would not be enough is that the increase in training expenditure that the countries of the region would be in a position to finance would not be sufficient to satisfy the real demand of small enterprises, even if it were allocated entirely to enterprises with less than 50 workers.

If public and private training resources are not sufficient to serve the whole population and all the enterprises that need these services, then a way of sharing them out must be sought. The market would not appear to be the most efficient mechanism for this purpose, for the reasons set forth below.

The demand for any type of training is highly elastic and tends to increase more rapidly than the supply of training, thus immediately affecting the quality of the services provided. Furthermore, because of the characteristics of training viewed as a good –since it is at once a consumer product and an investment– the demand for it is not regulated by the market mechanisms. Training as a good is so complex that we could really speak of a number of different goods, with demand elasticities associated with the different levels and products offered. Even within each of these products, there are different goods that affect the elasticity of demand. Vocational training institutes, for example, offer a main product (training proper), plus a series of sub-products (know-how, prestige, access to other levels of education, access to certain types of employment, etc.) which are often seen as just as desirable as the training itself, if not more so.

In contrast, the supply of training is much more inelastic, and attempts to regulate supply and demand through the market mechanisms have not had the expected results.

Public expenditure on training does not seem to be efficient, for various reasons. Among those of a

general nature are the fact that training systems rarely guarantee access to the employment market, that they are relatively costly, and that they often fail to take account of the heterogeneity of industry and are in many cases not in keeping with the needs of the most modern sectors. Among the factors that particularly affect small enterprises are: i) cost; ii) the study requirements, which mean overwork or the absence of trainees from productive work, which is hard for small enterprises to accept, and iii) the fact that the recruitment criteria of such enterprises do not attach much importance to the qualifications provided by vocational training bodies. However, no-one opposes an increase in such expenditure. In all countries, there are declarations and promises of such increases, which are not questioned because there is general agreement on the virtues of vocational training and it is recognized that there are market failures in this field. This latter fact hinders greater private intervention and places greater demands on the public sector.

The inappropriateness of public training programmes is a phenomenon that is also to be observed in the OECD countries (*The Economist*, 1996). A number of studies reveal that hardly any of the training programmes financed by governments comply with the objectives of improving productivity and creating more and better employment.

Priorities need to be set for public expenditure on training. They could be set by the institutions responsible for the distribution of the corresponding resources, by the users of those services, or by a combination of the two. If it is decided to give users the leading role in this respect, it would be desirable at the same time to provide incentives and suitable conditions for expenditure by individuals on their training, both with respect to the generation of resources and the management of the State contribution. Both individual expenditure and better management of State resources could be more effective than the present systems of expenditure and management.

It would therefore be desirable to seek other definitions which would help to guide private resources, when there are other alternative uses for them, and which determine where public investment should be made. Mixed solutions such as the tax exemptions established in a number of countries of the region (which make expenditure by enterprises on training tax-deductible, up to a total equivalent to 1% or 2% of their payroll) have not been very satisfactory, especially in the case of small enterprises. Entrepreneurs who are reluctant to make use of these arrangements usually complain that the benefits provided are not sufficient to pay for the courses offered by training agencies, so that they have to make a supplementary contribution which they consider to be expensive, and that the training programmes do not satisfy the current needs of workers and enterprises: that is to say, they are not appropriate.

At all events, if what is considered important is productivity, then this should be made the main criterion. From this point of view, there are three types of small enterprises which warrant priority attention:

i) Enterprises which have shown themselves to be more productive (than small enterprises in less productive branches or sectors, or medium-sized or large enterprises in the same branches or sectors).[8]

ii) Enterprises in danger of losing productivity. These are enterprises which were productive in the past but are in danger of losing this quality because they are beginning to lag behind in the technological innovation process. For these enterprises, training should form part of a general strategy designed to keep them ahead in terms of technology, complemented with investment plans that involve technological innovation. This group of enterprises have already shown that they can be productive, and they have accumulated technical know-how and management capacity which represent a store of social capital worth preserving.

iii) Enterprises located in potentially productive sectors. Small enterprises which have horizontal and vertical linkages are particularly worthy of attention, especially when they form part of production clusters, since natural resource-based production clusters appear to be an interesting development option.

2. Appropriate training technologies

The different scales and forms of problems in the different countries mean that the strategies needed must be different too. The scale of training needs in

[8] In order to identify these enterprises, Ramos (1979) suggests a methodology based on inter-firm comparisons for constructing an index of the economic efficiency of the main factors (capital and labour). He concludes that the yield on capital provides the best approximation for estimating the sectoral yield. In operational terms, this means the value added, less wages, divided by the total assets. This manner of estimating productivity has the advantage of maximizing the yield of a factor which is very scarce among small enterprises, namely, capital.

Brazil or Mexico, for example, is very different from the needs in Chile or Bolivia. In the first two countries, small industrial enterprises are relatively more developed, the degree of geographical dispersion is greater, and the population is much larger, so that they need solutions which are different from those appropriate to smaller countries. However, the strategies followed in, for example, Argentina, Brazil, Colombia and Venezuela have all been centered on vocational training institutes, although the small industry sectors of those countries are all of different sizes. The main feature of these institutes is that they offer training organized on the basis of trades and job descriptions. This method may be effective when two conditions are fulfilled: that the training agency maintains constant contact with the beneficiary firms with regard to the selection of the workers to be trained and the formulation of the study programmes, and that there is an ongoing follow-up of the evolution of the persons trained. In the region, this is only possible when the beneficiary firms are few in number and easily accessible. In addition, however, the training agencies must also display flexibility in adapting their supply to changing conditions, and this is not so in the case of such agencies as the National Industrial Training Service (Brazil), the National Industrial Training and Labour Service (Peru), the National Council for Technical Education (Argentina), etc.

Not every enterprise is fitted to participate in every form of training. Dual training, for example, can be introduced in enterprises at the two technological extremes, that is to say, enterprises which use non-capital-intensive technologies and a skilled labour force, or enterprises which are highly capital-intensive but have a flexible form of organization. For this reason, sandwich courses give better results in artisanal-type enterprises, where there is a strong master-apprentice relationship, and in medium-sized and large enterprises with a wide range of functions and a system of working in teams which calls for adaptability. Enterprises of medium and high capital-intensiveness, using technologies involving great specialization of tasks and rather inflexible forms of organization, are not suitable for dual training. Examples of such enterprises are those in the non-automated textile and clothing industries, some food industries, and engineering firms with continuous production lines: that is to say, the types of industries set up and the technologies adopted during the import substitution period. Much of the industrial sector (especially in the case of medium-sized and large firms) still uses such technologies.

The production system in the region is very heterogeneous. Medium-sized and small enterprises with an artisanal production structure, medium-sized and large enterprises which are technologically backward and have a rigid form of organization, and flexibly organized modern enterprises of all sizes coexist with each other. Some enterprises are also internally heterogeneous, however, with technologically advanced departments operating side by side with very backward ones. Generally speaking, in medium-sized and large enterprises technological modernization begins in the area of management (especially financial management), subsequently extends to administration, and finally reaches the field of production. The reasons for this sequence are complex and will not be analysed here, but it is worth bearing them in mind when planning vocational training activities. It is by no means rare to find enterprises that are capable of training excellent management personnel yet are unable to give proper training to production workers.

At all events, collaboration between the production and educational sectors means that the enterprises themselves, or entrepreneurs' associations, should take initiatives in these matters or participate from the beginning in the formulation and implementation of training policies through coordination bodies. The ministries of the economy or labour should also be directly involved in policy formulation.

One of the most important elements of the new training technologies is that they are organized on industrial lines for the large-scale production of training material for direct use by the trainees.

In view of the financial situation of the region, the tendencies in terms of restructuring and the experience of other sectors, it seems both possible and necessary to consider radical solutions for the problem of financing training: just as radical as those now being applied in some health or pension systems. There are at least three financial and accounting items which are of decisive importance in this respect: the salaries of the instructors, the wages of the trainees, and the infrastructural costs. It might be desirable to develop strategies which begin within the production units, based on the idea of "student apprentices". In other words, the training process would be considered as beginning on the job, and training would be seen as a response to the demands of production activities.

3. The incorporation of graduates of training courses into employment

In general, the problem of incorporating training graduates into employment arises in respect of those graduating from training systems with characteristics similar to those of school education: that is to say, systems structured in the light of their own supply rather than outside demand. The problem is not so serious in the case of apprenticeship-based (i.e., production-based) training for young people and young adults who are already employed. In this case, what is needed is to find incentives to persuade these persons to go through this period of apprenticeship.

The innovations in human resources formation and the training of young people made in technical schools, in dual training systems, and in a large part of the vocational training institutes will not affect workers already engaged in industrial production activities, who will be left on the sidelines of any improvements in these areas. It is highly probable that over 80% of those currently working will still be working ten years from now, that at least 60% of them will still be working in another 20 years, and that over half of the current labour force will continue working for a further 30 years. In addition to this contingent, there are all those young people who are currently entering the labour force, and those who will do so in the years to come, without having received the benefit of the possible progress in vocational training inside and outside schools. Any reform in the system of pre-employment vocational training will only show tangible effects in at least five years' time. The question of on-the-job training is therefore of crucial importance if it is really desired to improve levels of productivity.

4. Dispersion or concentration

The cost and efficacy of vocational training are linked with locational variables. Economies of scale can be achieved through proper geographical distribution of training institutes.

5. Sectoral and structural heterogeneity of small and medium-sized enterprises

This is another factor that must be taken into account when designing training strategies for small and medium-sized enterprises, although this phenomenon is not restricted to them. The heterogeneity of economies is nothing new: it has been recognized and analysed at least since the beginning of the industrialization process. The economies of the region have always been described as displaying "duality", "unequal development", etc. When considering the question of human resources in relation with the technological differentiation between sectors and within each sector and subsector of the economy it is necessary to take into account the increasingly divergent trends in technological development and the fact that there are many enterprises that use heterodox technological mixes. Both of these factors have helped to accentuate technological diversity.

Thus, as well as being related with a number of factors that were already well-known, diversification is now also seen to be linked with the fragmentation of production processes. This type of diversification is to be seen in printing and furniture manufacture, among many other possible examples: in plants that are on the leading edge of technology, flexible processes associated with digital control and computation are carried on side by side with processes organized on the basis of highly traditional trades and structures of work. In both cases, this is because technologies impose certain types of behaviour and because of the type of inter-firm relations that have been growing up. Differences are also often due to factors which are more widely known and studied, such as distance behind the technological frontier, size of the firm, etc., which are observed in all the societies studied. Although the differences in question are not completely new, they are now being observed to an unprecedented extent. These aspects of technological evolution are often not taken into account when designing policies or strategies regarding the supply of qualified personnel, as may be seen from the analyses and justifications of educational and human resources formation policies.

Small and medium-sized enterprises are the weakest points in the industrial fabric of the region. They have displayed a chronic inability to close the technological gap separating them not only from the most advanced international practices but also from those of big firms oriented towards the domestic market. The two most important means of satisfying their human resources requirements are technical schools and, above all, on-the-job training. All the governments of the region have applied policies to improve the supply of skilled personnel of all levels, but the

results have not always been very satisfactory. Nor have policies of subsidies or direct attention to the demand for such personnel by small and medium-sized enterprises been satisfactory either. There are a number of obstacles which make it difficult on the one hand to define that demand, and on the other, to implement such policies. Among these obstacles are the size of the enterprises, the feebleness of their efforts to form associations to make up to some extent for the shortcomings connected with their size, and the imperfections in the information available to them. For these same reasons, these enterprises do not benefit either from the progress made by the big firms in the adaptation of technology and the training of human resources. Small and medium-sized enterprises that manage to occupy positions in the first line of the production chain of a technologically advanced industry do manage to improve their levels of technology and human resources training, but they are only a minor fraction of the overall universe of firms. All this points to the need to develop effective information and training strategies for that universe.

(Original: Spanish)

Bibliography

Dirven, M. (1995): *Propuesta para inclusión en el* paper *sobre innovación tecnológica en el agro*, Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), *mimeo*.

Fleury, A. and J. Humphrey (1993): Human resources and the diffusion and adaptation of new quality methods in Brazilian manufacturing, *Research Report*, No. 24, Brighton, U. K., University of Sussex, Institute of Development Studies.

Gitahy, L. and F. Rabello (1991): *Educação e desenvolvimento tecnológico: o caso da indústria de autopeças*, Textos para discussão, No. 11, São Paulo, Brazil, State University at Campinas.

Lynch, L. (1994): *Training and the Private Sector: International Comparisons*, Chicago, Illinois, University of Chicago Press.

Moock, P. and R. Bellew (1988): *Vocational and Technical Education in Peru*, Washington, D. C., World Bank.

Ramos, J. (1979): Tecnología, capacitación y empleo, in PREALC (Regional Employment Programme for Latin America and the Caribbean), *México: la pequeña industria en una estrategia de empleo productivo*, "Investigaciones sobre empleo" series, No. 17, Santiago, Chile, International Labour Organisation (ILO).

——(1994): *Síntesis del planteamiento de la CEPAL sobre equidad y transformación productiva*, "Desarrollo Productivo" series, No. 17, LC/G.1841, Santiago, Chile, ECLAC, December.

Schiefelbein, E. and J. Farrel (1982): *Eight Years of their Lives: Through Schooling to Labor Market in Chile*, Ottawa, Canada, International Development Research Centre (IDRC).

The Economist (1996): London, 6 April.

UNESCO (United Nations Educational, Scientific and Cultural Organization) (1998): *Statistical Yearbook 1998*, Paris.

Neoliberal reforms *and macroeconomic* policy in Peru

Oscar Dancourt

Professor,
Department of Economics,
Catholic University of Peru.

This article describes the neoliberal experiment of the 1990s in Peru, placing it in its historical context. The central hypothesis is that in that decade the Peruvian economy has lacked an operational system of monetary and fiscal policies capable of functioning without giving rise to serious disturbances in the level of economic activity. The monetary authorities do not possess the basic instruments which have been used in the past to handle adverse external shocks affecting the Peruvian economy, because of two structural reforms carried out in the financial field: the dollarization of the banking system and the opening-up of the capital account. The article consists of seven sections. It begins with a brief introduction (section I). It then describes the neoliberal experiment of the 1990s, placing it in its immediate historical context (section II); analyses the role which has been played by the growth strategy, the international economic situation and macroeconomic policy in the long-term performance of the Peruvian economy (section III); describes the way in which adverse external shocks were handled in the period from 1950 to 1975 (section IV); examines the evolution of macroeconomic policy in the 1990s, analysing its limitations (section V); illustrates these limitations in the light of recent macroeconomic experience (section VI), and ends with some conclusions (section VII).

I

Introduction

The expansion of the Peruvian economy during the 1950s and part of the 1960s, on the basis of an almost pure primary-export growth strategy and a State ideology based on the Manchester School, was an anachronism compared with the Southern Cone countries of Latin America, which favoured import substitution and the original economic thinking of ECLAC.

It was only in the 1970s that the country embarked on a real import substitution strategy, once again in the most uncompromising version of the entire continent. Naturally, it only began to export manufactures at quite a late date, at the end of the decade. With the external debt crisis, the whole story went into suspended animation, and then came hyperinflation.

The neoliberal reforms of the 1990s, carried out by the Fujimori administration, seek to put the clock back to the 1950s in economic terms, returning to the primary-export model. The control of hyperinflation and the defeat of Sendero Luminoso are the main positive elements in this venture. Some also suggest that a third and by no means negligible positive feature is the authoritarian nature of the political regime.

There are also two negative elements in this venture. One is the tendency to adopt extreme approaches, which is almost a tradition in Peru. The history of the last few years is marked by too many radical economic experiments, too many irreversible structural reforms. Its radicalism may be one of the negative features of this neoliberal reform process of the 1990s, among other reasons because it impedes adaptation to outside circumstances, which are always changing for an economy like that of Peru, and generally speaking the outside situation in the first half of the present decade was excessively favourable.

The second important negative aspect of the neoliberal reforms is connected with macroeconomic policy. In the past, the Peruvian economy has rarely qualified as a candidate for the select club of the best-run economies of Latin America, as Chile did after 1983 or as Colombia has also done, but on the other hand it did not display permanent or structural defects in its macroeconomic policy system, that is to say, in its fiscal and monetary policy system.

Today, however, the situation is different. As we shall see below, the present macroeconomic policy system suffers from severe limitations due to the financial liberalization process of the 1990s: i.e., the dollarization of the banking system and the opening of the capital account.

II

The significance of the structural reforms of the 1990s

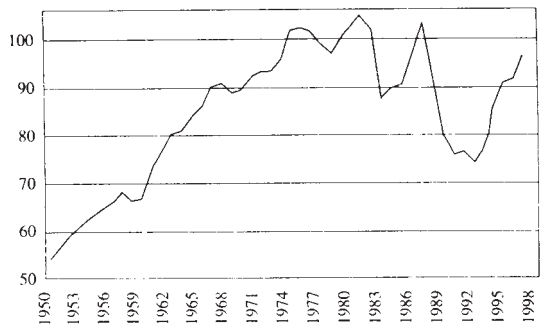
The structural reforms applied by the Fujimori government have reintroduced a primary-export growth strategy similar to that which has prevailed in the Peruvian economy during most of its economic history. This seems to be the distinctive feature of the Peruvian version of neoliberalism, as compared with other similar experiments carried out in Latin America.[1]

In order to understand the logic behind this return to the past, we will briefly review the economic growth of Peru from 1950 up to the present, set forth on the basis of two elements: first, identification of the periods through which the macroeconomic evolu-

□ The author wishes to express his gratitude for the comments made by Waldo Mendoza, the assistance provided by Alejandro Olivares, and the financial support of the International Development Centre and the Canadian International Development Agency.

[1] See Seminario (1995) and Schuldt (1994).

FIGURE 1
Peru: Per capita gross domestic product, 1950-1997
(Indexes, 1979=100)



Source: Banco Central de Reserva del Perú.

tion of the country has passed in these 45 years and, second, a description of the main changes which have taken place in the growth strategy and the rate of investment in each of those periods.

As we may see from figure 1, three main stages may be distinguished in the long-term evolution of the per capita GDP.[2] The **first stage** (1950-1975) was a period of rapid growth, interrupted by some brief recessions (in 1958-1959 and 1967-1969), with the per capita product growing at an average annual rate of 2.5%. This first stage was also one of low inflation by Peruvian standards, with an average rate of 10% per year.

The **second stage** (1976-1990) may be described as a long-lasting crisis with violent cycles of booms and recessions;[3] as may be seen from figure 1, by the beginning of the 1990s the per capita product had dropped back to the level it had attained 30 years before. This was also a period of high inflation, culminating in the hyperinflation of 1988-1990, at the end of the Alan García administration (1985-1990); leaving out these last three years, average inflation stood at 83% per year. During the period of hyperinflation, price levels rose by a factor of 39 per year (4049% per year), while the per capita product dropped by the unprecedented amount of almost one-third.

The **third and final stage** (1991-1997) represented a new period of stabilization and expansion in which the per capita product grew by over 3% per year, although without exceeding the maximum levels registered in the past. Inflation showed a clear downward tendency, standing at less than 10% per year at the end of this phase.

It may be emphasized that the development model or growth strategy which prevailed during much of the first stage and was marked by a combination of rapid growth and low inflation was an almost pure primary-export strategy.

This primary-export model, with a small State sector and the application of a policy of free trade, lasted in Peru until well into the 1960s. According to Thorp and Bertram (1978, part IV, Introduction), the Peruvian economy between 1948 and the late 1960s was the prime example in Latin America of that dream of orthodox developmentalists: an export-led system in which the entry of foreign capital and the repatriation of profits were virtually unrestricted and government intervention was kept to the minimum.

This Peruvian system was an anachronism in the Southern Cone of Latin America,[4] where the prevailing model was based on import substitution industrialization, with protected domestic markets and relatively high rates of inflation, and the primary-export sector was one of the least dynamic in the economy.[5]

The downfall of this primary-export model came in spite of its good macroeconomic performance. The crisis of the oligarchic State[6] began quite late in Peru, during the first Belaúnde administration (1963-1968), which partly modified that model by embarking on a moderate policy of import substitution industrialization which attracted a certain amount of foreign investment.[7]

[2] For a division into more detailed periods, see Vega-Centeno (1989).

[3] Two important studies on the cycles and trends in the Peruvian economy during these 45 years (those by Seminario and Boullon (1992) and Robles (1996)) identify a structural turning point in the mid-1970s, after which the volatility of the macroeconomic aggregates substantially increased.

[4] According to Borricaud (1989), the Peruvian oligarchy had learned how to maintain their dominant position in a world and a region where their foreign counterparts had already lost much of their former power.

[5] See Hofman, 1993.

[6] Cotler (1994) states that this crisis took place when political participation was spreading throughout the country to all levels of society, leading to the questioning of the structure of land ownership and the role of foreign capital, which were the pillars of the system of domination.

[7] Schydlowsky (1995) explains this by the fact that this industrialization began under a rather special combination of heavy tariff protection and weak "exchange-rate protection".

Subsequently, under the military regime of General Velasco Alvarado (1968-1975), the primary-export model[8] really was replaced by import substitution industrialization. The industrialization strategy became more radical, both in terms of the degree of protection of the domestic market and the degree of State intervention in the economy.[9] Through the nationalization of a considerable part of the foreign-owned interests and the transfer to the State of part of the assets of the oligarchy, a strong public-enterprise sector was built up which came to control over 30% of GDP. According to Fitzgerald (1985), the State was responsible for three-quarters of exports, half of imports, more than half of fixed investment, two-thirds of bank credit and one-third of all employment in the entrepreneurial sector.

The other point that should be stressed, then, is that there were notable changes in the growth strategy during the first stage, which was marked by rapid growth and low inflation. This good macroeconomic performance was compatible both with the primary-export model and with the import substitution model.

In the second stage, marked by persistent stagnation and high and growing inflation, no decisive changes were made in the development model imposed by the structural reforms of Velasco Alvarado. Two key features of this growth strategy persisted throughout these 15 years: the major role played by public enterprises and the heavy protection given to manufacturing.

There were two major attempts to change this development model, but both of them finally failed. The first was connected with the programme for the promotion of exports of manufactures applied in 1977-1980, while the main feature of the second was the trade openness of 1979-1982.

According to Schydlowsky (1986), the boom in non-traditional exports in 1977-1980 was attributable to the combination of substantial support for exports (an average of 27% of their FOB value), a devaluation of 28% in real terms between 1976 and 1978, and a shrinking domestic market (which contracted by 20% or more between 1976 and 1978). In 1979, a new system of incentives for non-traditional products was introduced, with the undertaking that it would be kept unchanged for the next ten years. It was believed that the great moment for non-traditional exports had finally arrived. Nobody suspected at that time that the new civil government that would take office in mid-1980 would reverse that policy before six months were out.

As well as doing away with this successful programme for the promotion of non-traditional exports, the second Belaúnde administration (1980-1985) further increased the trade openness[10] begun in 1979 under the military regime of Morales Bermúdez (1976-1980) and generated a significant exchange-rate lag. The 1982-1983 balance of payments crisis, associated with the onset of the external debt crisis, put an end to this first experiment in the liberalization of imports, which was the most direct forerunner of the neoliberal reforms of the 1990s.

In the third and last phase, under the Fujimori government, the growth strategy was once again radically altered. The structural reforms of the 1990s may be seen as the almost perfect antithesis to the reforms made under the Velasco Alvarado government (1968-1975), or alternatively as a new version of those made under the Odría government (1948-1956).

With the privatization of public enterprises and an extremely radical unilateral trade openness process,[11] Peru returned in effect to the primary-export model of the 1950s. There was a marked decline in the importance of manufacturing, and whole branches of the industrial structure disappeared. An indicator of this process of de-industrialization was that while in 1995 the GDP finally recovered the absolute level that it had achieved in 1987, Peruvian manufacturing output[12] was almost 20% smaller.

[8] As noted by R. Thorp (1995, chapter IV) and Fitzgerald (1985), this new growth strategy did not, however, neglect the expansion of commodity exports.

[9] See Thorp (1995), Fitzgerald (1985) and Schydlowsky and Wicht (1979).

[10] See Ferrari (1992) and Rojas (1996).

[11] The para-tariff protection system for manufacturing was totally dismantled and the system of cascading or stepped tariffs, so typical of import substitution industrialization, was replaced by a flat tariff along the lines of the Chilean system. Between 1990 and 1993, the average level of tariffs went down from 66% to 16%, and in 1993, 98% of the total value of imports was subject to a tariff of 15% (see Rojas, 1996; Ferrari, 1992; Rossini, 1991). Furthermore, Peru suspended its participation in the Andean Pact because of the stepped common tariff applied by that integration agreement (see Vega, 1997 and Fairlie, 1996).

[12] Defined as the output of non-primary-commodity-based manufacturing industry, thus excluding the branches directly linked with the export of commodities (metal refining, production of fish meal, etc.). See, in this respect, Banco Central de Reserva del Perú (1996). With regard to de-industrialization, see Jiménez, 1996.

Foreign capital, which went mainly to the export mining sector and public utilities, once again occupied a leading place in the economy, through the acquisition of many of the privatized State enterprises.[13] The closure of almost the entire State development banking system, which played an important part in the loan and deposit markets, should also be included among the main reforms made in this period.[14]

It is interesting to compare the model imposed by Odría with that applied four decades later by Fujimori. Among their common features, González (1994) mentions the openness of the trade and capital accounts and a State which plays only a minimum part in the economy and encourages foreign investment, especially in the commodity export sector and public utilities, through very favourable legislation, while among the differences he notes that the public external debt now has significant weight in the fiscal and external sector accounts, unlike the earlier period.

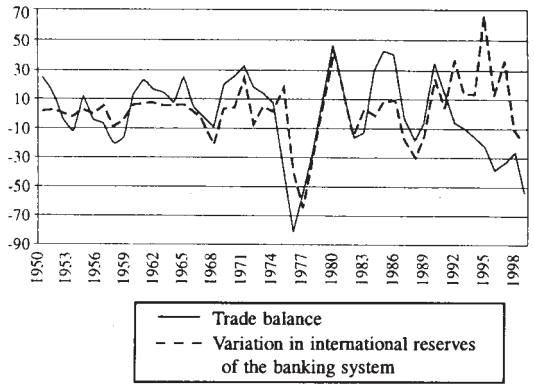
In reality, the big difference is that real exports have not yet expanded by the required amount. The promise of a big expansion in mining exports in the second half of the 1990s had been made the theoretical base for the Fujimori growth model, but so far the real factor which has made economic growth possible between 1993 and 1995 has been the enormous inflow of capital (mostly short-term capital and inflows in respect of privatization operations), for which there is no precedent in the last 45 years.

One way of appreciating this difference is shown in figure 2, which highlights two facts. Firstly, that there was an alternation of deficits and surpluses in the trade balance during the Odría government, thus giving a balanced level on average, whereas during the Fujimori government the trade deficit is increasingly large: equivalent to 20% of annual exports on average. Secondly, that the trade balance and the foreign exchange reserves of the banking system (both measured as a percentage of exports) have almost always moved in the same direction over the 45 years in question.[15] The period from 1991 to 1997 represents the only lengthy exception to this rule. The magnitude of the inflow of capital was particularly marked in the first half of the 1990s, thus making possible a notable increase in the foreign exchange reserves, in spite of a growing trade deficit and greater external debt service commitments.

FIGURE 2

Peru: Trade balance and variation in international reserves, 1950-1998 [a]

(As a percentage of exports of goods)



Source: Banco Central

[a] Up to September 1998.

How did investment behave in each of these three main stages? Figure 3 shows total gross investment as a percentage of GDP between 1950 and 1997. If we simplify the division into periods made by Seminario and Boullon (1992), we can identify five main cycles in the course of those 45 years. A first investment cycle (in mining and export agriculture) occurred in 1950-1960 in connection with the structural reforms made by Odría.

The second investment cycle, which covered the period from 1960 to the early 1970s, was marked by a clear decline in the rate of capital accumulation, probably due to the uncertainty caused by the political crisis of the oligarchic State.[16]

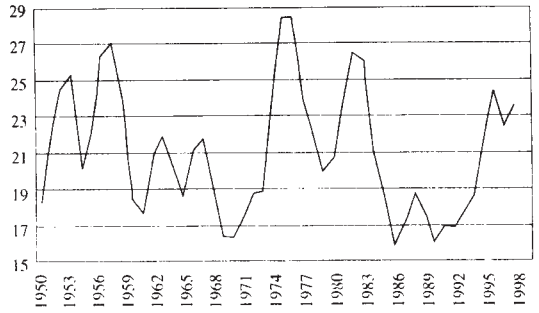
[13] Between 1991 and 1993, the government obtained very little from the sale of public enterprises. Income from privatization operations became significant as from 1994, with the sale of 29 enterprises for an amount equivalent to 35% of annual central government tax revenue. In 1995, the sale of a further 28 enterprises and various other assets generated income equal to 12% of tax revenue. In 1996, the income from 28 privatization operations increased once again to the equivalent of 25% of tax revenue. In 1997, income from privatization operations went down by over 70% compared with the previous year, amounting to the equivalent of only 6% of tax revenue, and it was expected to go down still further in 1998. Only exceptionally has public external debt paper been accepted as a means of payment in the privatization process.

[14] See Rojas and Vilcapoma, 1996.

[15] This suggests that it was the real sector of the economy which governed the rate at which the banking system accumulated external assets.

[16] See Cotler, 1994.

FIGURE 3
Peru: Gross fixed capital formation, 1950-1997
(As a percentage of GDP)



Source: Banco Central de Reserva del Perú.

The third investment cycle, which began with the Velasco Alvarado government and ended with the onset of the external debt crisis in 1982, was marked by the basic role played in it by public investment financed with external indebtedness. This process of State accumulation was interrupted in 1976-1977 by an early external debt crisis associated with the end of the "golden age" of the world economy;[17] the solution of this crisis through a marked increase in exports[18] made possible a recovery in public investment at the beginning of the second term of Belaúnde. The 1982-1983 balance of payments problems, connected with another external shock, finally put an end to this cycle.

The fourth cycle (1983-1993) was accompanied by the total collapse of the rate of investment. The burden of the external debt on the fiscal accounts, the growing macroeconomic instability, and the hyperinflation unleashed by the economic policy of the García administration (1985-1990), after the abortive attempt to nationalize the banking system, were the main causes of this decline in investment. It must be emphasized, however, that the internal armed hostilities which began in 1980 also seem to have been a basic factor which gradually destroyed the confidence of the private sector and increased the non-economic uncertainty, or political risk, to extreme levels. This led to a persistent contraction in private investment, while the expatriation of capital increased.[19]

The fifth and final investment cycle began in 1993, supported by a massive inflow of capital in connection with the privatization of public enterprises and the repatriation of domestic capital. One hypothesis holds that the capture of Abimael Guzmán, the leader of Sendero Luminoso, was the event that permitted the initiation of this cycle by sharply reducing the political risk. An alternative hypothesis, however, attributes this new investment to the stabilization and structural reform programme carried out by the Fujimori administration.

III

Interpretations of the Peruvian growth process

There are three basic interpretations of this evolution of the Peruvian economy between 1950 and 1995. The first of them attributes this performance, whether good or bad, to the growth strategy applied in each period. For example, those who note that much of the good macroeconomic performance in the first stage took place under a primary-export model, or that almost the whole of the disastrous macroeconomic performance in the second stage took place under an import substitution model with heavy State intervention, are tempted to convert this association into a relation of causality, assuming that the development model, that is to say, the structural reforms in one or

[17] See Maddison, 1991.

[18] In the late 1970s, two big investment projects, in the areas of copper and petroleum, which had been initiated early in the Velasco Alvarado government, came on stream, there was a rise in the terms of trade, and there was a boom in non-traditional exports.

[19] See Figueroa, 1993.

the other direction, explain the long-term macroeconomic performance.[20]

The second interpretation attributes this past behaviour of the Peruvian economy to the recurrent fluctuations in the international economy, which have been particularly pronounced since the mid-1970s.[21] Thus, those who note that the good macroeconomic performance in the first stage coincides almost exactly with the extremely favourable external context created by the "golden age" of Western capitalism described by Maddison (1992) could equally well conclude that it was this international economic situation which explains this performance.[22]

From this point of view, it could also be argued that the stagnation and high inflation of the 1980s were the result of another adverse external shock, similar to that which marked the end of the "golden age" and set off the external debt crisis. Or it could also be asserted that the inflow of capital in the first half of the 1990s, associated with historically low external interest rates,[23] was decisive for the initiation of the new period of price stability and expansion of the aggregate product which marked the first half of the 1990s throughout Latin America.

The third interpretation of this past experience assigns a leading role to macroeconomic policy,[24] holding that success or failure depend on the macroeconomic policies adopted during the period. As Marfán and Bosworth (1994) assert in their evaluation of the Chilean experience, whose success normally tends to be associated with structural reforms, what stands out –particularly when appraising the economic events of the last ten years– is the clear benefit of conventional macroeconomic policies emphasizing stable prices and stable growth of demand.

A classic example is the role played by macroeconomic policy in Europe during the "golden age". According to Maddison (1991), the main achievement of government policy was not "fine-tuning" but the success in feeding a demand boom which kept the economies in a situation of high employment. The pro-growth and pro-employment bias, and the absence of deflationary policies with their crudely perverse effects, were the features which most differentiated post-war domestic policy from pre-war policy. The achievements were greater than could reasonably have been expected. The absence of risks of recession in terms of production and the persistence of satisfactory profits gave rise to an unprecedented investment boom.

Particular emphasis should be placed on the importance of the macroeconomic policies adopted as a reaction to the recurrent external shocks suffered by an economy like that of Peru. It is this interaction between macroeconomic policy and external shocks which gives rise to either balance of payments crises or successful adjustments: particular events which often determine the subsequent performance of the economy in terms of growth and inflation.

As noted by Krugman (1988), a country which suffers severe external shocks can consider itself lucky if it only has to put up with a temporary recession and a spell of inflation rather than a persistent decline in its growth expectations and a permanent shift towards higher rates of inflation. He adds that the macroeconomic policy response is the key to successfully facing up to an adverse external shock.

Thus, for example, an observer who notes that the turning-point in the macroeconomic performance of Peru (the year 1975) coincides not only with an external shock but also with a significant change in the macroeconomic policy applied[25] might be tempted to extend the conclusions of Marfán and Bosworth to the case of Peru. It might therefore be

[20] From a pro-industrialization perspective, Schydlowsky and Wicht (1979) and Jiménez (1991) emphasize the intrinsic limitations on a form of industrialization depending on imported inputs and capital goods and aimed exclusively at the domestic market. Paredes and Sachs (1990) and Hunt (1996), in contrast, take an anti-industrialization approach.

[21] See Krugman (1988).

[22] Iguíñiz (1986), Frenkel, Fanelli and Rosenwurcel (1993) and Taylor (1991) have stressed the importance of the external context as the determining factor of macroeconomic performance. Hofman (1993) shows that per capita GDP growth under the import substitution industrialization model was high in Latin America during the "golden age".

[23] See Calvo, Leiderman and Reinhart (1993).

[24] See Thorp (1995), who emphasizes the role of macroeconomic management.

[25] In the mid-1970s, the system of a fixed exchange rate was replaced with a movable rate with a target real exchange rate, and public prices were made a key instrument in fiscal policy. See Thorp (1995) and Fitzgerald (1985).

argued that the inflation and stagnation marking the second stage (from 1975 to 1990) are explained by the interaction of adverse external shocks and this change in macroeconomic policy.[26]

To sum up, then, a prudent conclusion would be that the long-term macroeconomic results do not only depend on the growth strategy followed, but also the international context and macroeconomic policy.

IV

Economic fluctuations and external shocks

Both historical[27] and econometric[28] studies suggest that an essential component in the form of macroeconomic regulation prevailing during the period from 1950 to 1990 was the particular blend of fiscal, credit and exchange-rate policies applied in response to an adverse or destabilizing external shock (such as a fall in the terms of trade or a rise in international interest rates). This policy mix normally included a devaluation, credit restrictions and a contractionary fiscal policy.

This way of handling adverse external shocks, together with certain structural features of the Peruvian economy, has given rise to set of empirical regularities or stylized events in the short-term dynamics of the economy. These facts are connected with the relations that exist between the short-term cycle of the level of economic activity, the rate of inflation, and the evolution of the external sector (exchange rate, trade balance and foreign currency reserves).

The main point is that the periods of recession are at the same time periods of rising inflation[29] and of balance of payments crises. It is worth emphasizing that the basic features of these short-term dynamics, especially the balance of payments crisis-rising inflation-recession chain, are common to the three stages in which we divided these 45 years.

This chain has various links. The first link connects devaluations[30] with an appreciable decline in the foreign exchange reserves of the banking system. The regularity of this fact reflects a policy rule which prevailed during these 45 years because of the unvarying reaction of the monetary authorities, since the exchange rate has always been managed, one way or another, by the Central Bank.

The second link arises from the observation that the beginning of all the major recessions during these 45 years (namely, in 1953,1957,1967, 1975, 1982 and 1987) coincided with or was preceded by a drop in the reserves due to a deficit on the trade balance;[31] none of the declines in the international reserves were due exclusively to outflows of capital. Of the six recessions mentioned above, the first five coincide with adverse external shocks.[32] Two of them (those in 1975 and 1982) were associated with external public debt crises (lower disbursements and rises in international interest rates).[33]

[26] In order to close the external and fiscal gaps generated by the increase in the external debt burden, the instruments used were the exchange rate and public prices. First of all their real values rose sharply, and subsequently their nominal values were indexed to past inflation.

[27] For a detailed analysis of all the Peruvian stabilization attempts since the 1950s, see Thorp (1996).

[28] See Seminario and Boullon (1992), Robles (1996), Terrones and Calderón (1993) and Vilcapoma (1996).

[29] A noteworthy empirical regularity of the Peruvian economy is that the rises in inflation coincide with recessions. Three recent studies on the Peruvian experience −Seminario and Boullon (1992), Terrones and Calderón (1993) and Robles (1996), which use different methods for separating the cycle from the trend levels– find that inflation is anticyclical with respect to the level of economic activity.

[30] That is to say, devaluations during the period 1950-1975, or increases in the rate of devaluation during the period 1976-1995.

[31] See Vilcapoma (1996). The trade balance may deteriorate due to external shocks and/or domestic factors. What we wish to emphasize is that if the trade deficit –whatever its origin– means that the foreign exchange reserves go down, this marks the beginning of a recessionary cycle. During the 1990s, thanks to the inflow of capital, it has been possible for a growing trade deficit to exist at the same time as reactivation of the level of economic activity and an increase in the foreign exchange reserves.

[32] See Dancourt, Mendoza and Vilcapoma (1997).

[33] See Ugarteche (1996) and Cline (1981).

TABLE 1

Correlation between growth rates of GDP and of other macroeconomic variables, 1950-1996

Growth rate	Relative standard deviation[a]	Standard deviation	Auto-correlations	Coefficients of correlation				
				Lags			Advances	
				-2	-1	0	1	2
G [b]	3.0	15.7	0.44*	0.08	0.48**	0.62**	0.45**	0.11
T [c]	2.7	13.8	0.33*	-0.30	0.11	0.64**	0.50**	0.42**
L [d]	4.0	20.9	0.41**	-0.24	0.15	0.58**	0.30	0.23
P [e]	234.1	1 217.1	0.36	-0.28	0.53**	-0.44**	-0.20	-0.21
E [f]	139.1	723.2	0.15	-0.20	-0.35*	-0.47**	-0.34*	-0.27
E/P [g]	4.2	21.7	-0.42*	0.12	0.42**	-0.03	-0.32*	0.05
X [h]	1.8	9.6	0.00	-0.01	0.01	0.23	0.12	0.46**
M [i]	3.0	15.7	0.27	-0.18	0.41**	0.65**	0.12	-0.21
CM [j]	6.0	31.2	-0.30*	-0.31*	0.09	0.43**	0.00	0.08
Levels								
T-G[k]			0.24	-0.35*	-0.05	0.24	0.36*	0.38
X-M[l]			0.56*	-0.23	-0.53**	-0.30*	0.15	0.24
A-RIN[m]			0.32*	-0.14**	-0.19	0.14	0.19	0.44**

Source: Dancourt, Mendoza and Vilcapoma (1997).

* Significant at 95%.
** Significant at 99%.
[a] Ratio of standard deviation of variable to that of GDP.
[b] Real expenditure of central government.
[c] Real tax revenue of central government.
[d] Total real credit of banking system to private sector.
[e] Consumer Price Index.
[f] Nominal exchange rate at end of period.
[g] Real exchange rate at end of period.
[h] Real exports.
[i] Real imports.
[j] Index of import capacity.
[k] Saving on current account without capital inflows.
[l] Trade balance.
[m] Flow of international reserves of the banking system.

The third link in the chain is the observation that during these 45 years there was practically no important episode of rising inflation which was not associated with a devaluation or an increase in the rate of devaluation.

To sum up this short-term dynamic, we can say that during the period when there was a fixed nominal exchange rate (1950-1975), the recessions were associated with declines in the reserves and individual devaluation measures which caused a transitory rise in the rate of inflation. Once the balance of payments crisis was over, inflation slackened once again.[34]

There are various factors which would appear to have governed this short-term dynamic. The first is that unvarying policy rule which causes the authorities to devalue the exchange rate only when the foreign exchange reserves go down. The second is that a rise in the real exchange rate may be recessionary and inflationary in the short term, in line with the Taylor-Krugman model (see Krugman and Taylor, 1978). The third is that a rise in the real exchange rate has normally formed part of a package of measures for dealing with a balance of payments crisis; such a package generally includes restrictive fiscal and credit policies.[35]

Table 1 shows the correlations between the growth rates of aggregate GDP, with different lags and advances, and the growth rates of a set of macroeconomic variables (prices, the exchange rate, public expenditure, credit, the trade balance, etc.). This table makes it possible to classify the various macroeconomic variables as procyclical or anticyclical with respect to GDP, ac-

[34] In contrast, when an attempt was made to fix the real exchange rate and real public prices (roughly speaking, in the period 1976-1990) inflation did not slacken as soon as the balance of payments crisis was over.

[35] The studies by Seminario and Boullon (1992), Robles (1996), Terrones and Calderón (1993) and Vilcapoma (1996) find that the real exchange rate is anticyclical, that real wages are procyclical, and that credit for the private sector is procyclical and much more volatile than GDP. Vilcapoma (1996) also shows that some components of public expenditure are procyclical.

cording to whether the coefficient of correlation is positive or negative. As it would not be appropriate to try to represent the structure of lags and advances of the different macroeconomic variables with respect to GDP on the basis of annual data, we shall refer only to the current correlations.

These coefficients of correlation between the GDP growth rates and the various macroeconomic variables cover the whole period 1950-1996, without drawing any distinction between phases of boom or recession, and they sum up in a single number the type and degree of association of the fluctuations in the level of activity with those variables.

In general terms, table 1 confirms the main stylized facts described earlier. A first result is that inflation and devaluation are clearly anticyclical (they rise in times of recession and go down in boom periods). A second result is that public expenditure and real credit are highly procyclical (they go up in boom periods and go down in recessions). A third result is that imports and import capacity are clearly procyclical, whereas the trade balance is anticyclical[36] (it deteriorates in boom periods and improves in recessions). Finally, we see that taxes are procyclical and that the primary central government fiscal surplus is acyclical.[37]

Among the anomalous results (anomalous with respect to the pattern of booms and recessions we described) is, firstly, the fact that the real exchange rate is acyclical in current terms.[38] Secondly, there is the fact that the variations in the foreign exchange reserves of the banking system are acyclical in current terms. This may be because booms do not display such a systematic or regular pattern as recessions.

V

Stabilization and dollarization

Although it is possible today to apply a faithful replica of the growth strategy of 40 years ago, it is not possible to do the same in the field of macroeconomic policy. The basic idea in this section is that the policy mix used in the first stage (from 1950 to 1975) to deal successfully with adverse external shocks cannot be applied in the 1990s.

As we shall see, the financial liberalization measures of the 1990s have blocked the mechanisms traditionally used in the Peruvian economy to deal with external shocks, by notably reducing the power of monetary policy: today, the Central Bank is no longer capable of imposing credit restrictions, nor is it easy for it to devalue the currency.

Two main macroeconomic policy systems may be identified during the Fujimori administration. In the first period (1990-1992), the macroeconomic policy mix used consisted of a monetary target (the Central Bank regulated the amount of domestic money in circulation by buying or selling dollars) and active fixing of public prices, which was the key fiscal policy instrument.

In this system, there was a clear division of labour between monetary policy and fiscal policy. Monetary policy was indirectly responsible for controlling inflation, by fixing decreasing rates of growth of the amount of money in circulation. Fiscal policy, for its part, generated a primary surplus designed to cover payments on the external debt by raising the real prices of fuels for the public.[39]

The restrictive monetary policy caused exchange-rate appreciation which, in turn, checked the rise in price levels, but the increase in public prices acted in the opposite direction. These dual effects explain why the disinflation in 1990-1992 was slow and displayed pronounced setbacks associated with marked fluctuations in the rate of devaluation and frequent shocks caused by public prices. Even so, this experi-

[36] The anticyclical nature of the trade balance is observed with a certain amount of lag (first the GDP rises and then the trade balance deteriorates, and vice versa).

[37] We were expecting it to be procyclical, i.e., that it would have a destabilizing effect. See Gavin, Hausmann, Perotti and Talvi (1997).

[38] We believe this is connected in part with the definition of the real exchange rate used, which does not incorporate international inflation. It is clear, however, that all the recessions that took place between 1950 and 1996 began with a rise in the real exchange rate.

[39] There was an intermediate period, in the second half of 1990, in which the anti-inflationary policy consisted of fixing the nominal exchange rate and public prices, after the style of the heterodox plans of the 1980s, the Bolivian experience of 1985, or the Argentine experience with Cavallo. See Dancourt, 1996.

TABLE 2

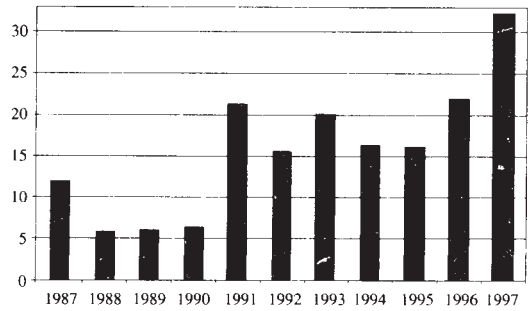
Peru: Macroeconomic indicators, 1991-1997
(Annual variation)

	1991	1992	1993	1994	1995	1996	1997
Non-primary sector [a]	3.6	-1.7	6.2	14.1	9.5	1.7	9.7
Primary sector [b]	1.85	-5.1	8.0	11.6	2.3	4.6	4.7
GDP	2.9	-2.8	6.5	13.1	7.0	2.6	7.4
Domestic demand less imports	2.0	-3.1	7.5	11.7	7.0	-0.3	4.6
Public investment	6.4	13.9	12.8	21.9	14.5	-8.5	9.0
Exports	6.0	2.5	3.3	17.5	7.0	11.4	16.3
Trade deficit [c]	-8.3	-9.7	-17.0	-21.3	-38.8	-33.9	-30.5
Index of GDP (1987=100)	79.8	78.4	83.3	94.3	100.8	103.0	111.2
Inflation	139.2	56.7	39.5	15.4	10.2	11.8	6.5
Devaluation	85.9	69.8	31.9	1.4	6.5	12.1	4.7
Price of fuels	114.1	42.5	41.7	4.4	6.3	32.2	23.4
Total credit to private sector	284.8	96.4	74.0	65.0	43.6	49.6	30.1

Source: Banco Central de Reserva del Perú (1995 and 1998).
[a] Comprises non-primary commodity-based industry, construction, government, commerce, etc.
[b] Comprises agriculture, fisheries, mining and primary commodity-based manufacturing.
[c] As a percentage of exports.

FIGURE 4

Peru: Service paid on the public debt, 1987-1997
(As a percentage of exports of goods)



Source: Banco Central de Reserva del Perú (various issues).

ence serves to confirm once more the effectiveness of overvaluation of the exchange-rate as a means of controlling inflation, in the case of Peru.

The process of controlling hyperinflation in Peru has been notably slow compared with similar processes in economies that were also dollarized, such as those of Bolivia (1985) or Argentina (1991). From the beginning of the stabilization programme until the point at which a rate of inflation (in terms of the consumer price index) of less than 2% per month was registered for three consecutive months, the Peruvian stabilization process took 37 months (from August 1990 to September 1993), the Argentine process took four months (from April to August 1991) and that of Bolivia took 13 months (from August 1985 to September 1986).

Such a policy mix did serve, however, to reconcile the disinflation process with the increase in the external debt service, which it had not been possible to do in the 1980s. The two immediate objectives of the economic programme of the Fujimori administration were to end hyperinflation and normalize the country's relations with the international financial community. This latter objective meant resuming the servicing of the external public debt (figure 4), first to the multilateral agencies, then to the member governments of the Paris Club, and finally to the international commercial banking system within the context of the Brady Plan.

The period of application of this policy mix, as may be seen from table 2, was marked by slow disinflation, stagnation of the level of economic activity at its lowest level, and enormous over-valuation of the real exchange rate.

The mechanism behind this appreciation of the real exchange rate may be summed up as follows. On the one hand, through the purchase of dollars, monetary policy fixes a certain rate of increase of the domestic money supply. On the other hand, fiscal policy pushes the rate of inflation above the growth of the money supply through periodic readjustments in public prices, thus reducing the real amount of money.

In view of the level of activity, this means that the public lacks national currency (means of ex-

change) for carrying out its transactions. In order to obtain this money, the public can immediately sell dollars (the value reserve par excellence in a dollarized economy like that of Peru) or, in the medium-term, change its habits as regards the use of money, becoming accustomed to carry out more and more transactions directly in dollars.[40]

The hypothesis put forward in this article is that it was the first of these reactions which was the main force behind the exchange rate over-valuation. As may be seen from figure 5, most of the exchange lag which marks the Fujimori administration took place at the beginning of the stabilization programme; in August 1990 the general price level rose by a factor of five because the government raised fuel prices by a factor of 30, the real monetary base shrank by two-thirds, and the real free exchange rate sank to half the level of the previous month.

Subsequently, in addition to these factors there was the more gradual impact of the inflow of foreign capital, which put downward pressure on the exchange rate, altering the relative supply of soles and dollars.[41]

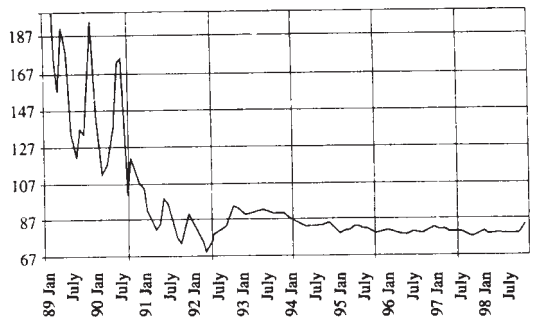
Under the second macroeconomic policy system (1993-1995), the policy mix was changed. In order to explain the change from the previous system to this one, it must be borne in mind firstly that public income from privatization operations became a significant factor as from 1993-1994 and, secondly, that Fujimori was seeking re-election in the 1995 elections.

The real price of fuels gradually went down, and public expenditure came to be the preferred fiscal policy instrument. The monetary targets were replaced with exchange-rate targets which appreciably reduced the permissible range of fluctuation of the exchange rate until it came close to a fixed exchange rate. One indicator of this transition is the relative volatility[42] of the exchange rate with respect to the amount of money in circulation, which went down from 2.34 in 1991-1992 to 0.21 in 1993-1995.

FIGURE 5

Peru: Real exchange rate, January 1989-July 1998

(August 1990=100)



Source: Banco Central de Reserva del Perú (various issues).

As may be seen from table 2, the period in which this second policy mix was applied was marked by a rapid decline in inflation –associated with the virtual fixing of the exchange rate and of nominal public prices–, a notable reactivation of economic activity, connected with the expansionary fiscal policy, and a much smaller degree of appreciation of the real exchange rate. This marked the close of the inflationary cycle which had begun in the mid-1970s.

In both periods, the inflow of capital made it possible for the foreign exchange reserves to increase in spite of the growing trade deficit, thus providing a way out from the conflict between price stability and external equilibrium which has marked the Peruvian economy over these 45 years. (If the exchange rate is used to check price rises, the trade balance deteriorates, and vice versa). Clearly, this exchange rate over-valuation –and its anti-inflationary impact– could not have lasted without the inflow of foreign capital.

It might be concluded from this brief description that the macroeconomic policies applied and the rate of inflation in the period from 1993 to 1997 came quite close to the system of a fixed exchange rate and 10% annual inflation observed at the height of the primary-export model.

This similarity is more apparent than real, however. As already noted, the credit and exchange policy mix which was used in the 1950s and 1960s to cope with external shocks cannot be used in the 1990s, basically because two structural reforms associated with financial liberalization –the dollarization of the banking system and the opening up of the capital account– prevent monetary policy from operating properly.

[40] They can, of course, also seek more bank credit or sell off their stocks of goods. The first of these actions does not represent a serious objection for the argument put forward here, while the second has not been observed in the Peruvian economy.

[41] Ruiz (1995) compares the two hypotheses econometrically (monetary policy versus inflow of capital) and reaches a conclusion in line with the view that the exchange rate appreciation was generated directly by the monetary policy.

[42] That is to say, the standard deviation of the monthly devaluation, divided by the standard deviation of the monthly growth of the monetary base.

TABLE 3

Peru: Monetary indicators, 1990-1997[a]

Year	Monetary base (1989 = 100)	Commercial banks									International reserves of the banking system (Millions of dollars)
		Foreign currency deposits		Foreign currency loans		International liabilities (% of foreign currency loans)	Real annual interest rates				
							Foreign currency		Local currency		
		Billions of US$	% of total deposits	Billions of US$	% of total loans		Loans	Deposits	Loans	Deposits	
1990	69	0.756	63	0.451	64	15	...	...	...	...	531
1991	56	2.163	75	1.242	68	7	-10.0	-19.4	43.9	-29.6	1 304
1992	58	2.627	75	1.755	76	13	26.3	13.7	72.0	-24.2	2 174
1993	56	3.875	82	2.732	79	14	9.0	-0.07	23.6	-18.2	2 793
1994	72	5.280	77	3.308	74	15	1.0	-8.0	20.5	-7.0	4 737
1995	89	6.090	74	5.426	71	19	13.2	2.5	21.1	-0.3	6 693
1996	79	8.007	75	7.268	74	23	17.1	6.0	16.8	-1.2	8 862
1997	85	8.976	73	8.537	77	28	13.7	3.5	22.5	3.2	7 963

Source: Banco Central de Reserva del Perú (various issues).
[a] Data at end of each period.

In order to understand this result, it is worth describing the institutional framework in which monetary policy operates. In the Peruvian financial system there is no market for debt paper or public bonds, and the stock exchange has little macroeconomic importance. Instead, it is the banking system and an extensive and well-organized market for exchanging dollars which are the two central institutions in the financial system.

These two basic institutions have been combined in various ways from 1980 to the present. During the Belaúnde administration (1980-1985), the banking system accepted deposits and granted loans in both national currency and foreign currency, a system of mini-devaluations was applied, and the free exchange rate closely followed the official rate.

In the first years of the García administration (1985-1987) the banking system was de-dollarized, a system of multiple fixed exchange rates was applied, and there was a stable differential between the free exchange rate and the highest official exchange rate. Subsequently, between 1988 and 1990, hyperinflation led to the dollarization of the private sector's financial holdings, but now outside the banking system; the official exchange rate gradually lost all significance, and the foreign exchange market expanded considerably, with the dollar consolidating its position as the main reserve asset of the Peruvian economy.

Finally, with the Fujimori administration, the development banking system was closed down, the private commercial banks were once again authorized to accept deposits and grant loans in foreign currency, and a flexible exchange-rate system was introduced. At the present time, three-quarters of all loans and deposits are dollarized, and the exchange-rate system, as already mentioned, is increasingly close to a fixed exchange-rate system, although without any explicit commitment on the part of the monetary authority.[43]

This latter dollarization of the banking system is the combined result of this authorization and the exchange-rate float. With this float, the Central Bank gained the capacity to control the amount of domestic money in circulation. This control also prevented the private sector from automatically remonetizing itself by ceasing to hoard the foreign currency accumulated during the period of hyperinflation once that period was over, as usually occurs with a fixed exchange-rate system.

Consequently, the dollar bills went to the banks instead of being changed into soles. Introducing the dollar into the banking system meant associating the foreign currency with the saving of transaction costs characteristic of a system of bank payments, as well as converting it into an interest-bearing asset.

There was thus a massive increase in deposits in dollars, as may be seen from table 3. This increase

[43] Exchange-rate floating still occupies a leading place in the official discourse of the Peruvian economic authorities.

came from three sources. First, there was the entry into the domestic banking system of the dollar bills saved up during the period of hyperinflation. Second, there was the repatriation of capital and the inflow of short-term capital by non-residents. Third, there were the loans obtained abroad by the local commercial banking system as from late 1994. It should be noted that the inflow of foreign exchange generated by the privatization of public enterprises (whose counterpart mainly takes the form of foreign direct investment) does not represent a fourth source, since this money remained outside the country and outside the domestic banking system;[44] it would only represent such a source if the government financed its expenditure by selling these dollars to the public.

The consequences of this process of dollarization of deposits for the relations of the commercial banking system with its debtors and with the Central Bank have been very far-reaching.

First, the increase in deposits in dollars made possible a significant expansion in bank credit to the private sector. Second, apparently because of the desire of the banks to tie their assets and liabilities by currencies in order to avoid exchange risk, this expansion in credit has led to the dollarization of the indebtedness of non-financial enterprises (table 3).

Third, the increase in bank deposits in foreign currency has also represented a considerable increase in the net international reserves of the Central Bank, through the high compulsory reserve rate applicable to these deposits; at the end of 1996, these compulsory reserves represented 40% of the total foreign exchange reserves of the monetary authority. This arrangement can also have the opposite effect, however, since a run on bank deposits in dollars is automatically also a run on the Central Bank reserves.

Fourth, this process has radically altered the terms in which the Central Bank must fulfill its role of lender of last resort in the event of a run by domestic or foreign depositors; thus, the foreign exchange reserves of the Central Bank now not only fulfill the traditional function of providing international liquidity to cushion the impact of the various external shocks to which the Peruvian economy is exposed, but also represent the ultimate guarantee of the stability of the national banking system.[45]

Within this institutional framework, monetary policy operates both through the dollar market and through the banking system. The main monetary policy instruments are now intervention in the exchange market (purchase or sale of dollars to regulate the amount of money or fix the exchange rate), compulsory reserve requirements on bank deposits, the rate of interest or remuneration paid by the Central Bank on the compulsory reserves deposited by the commercial banks, and the financial assets (previously deposits, but now securities issued by the Central Bank itself) which the monetary authority can offer the commercial banks.

In view of this institutional context, the exchange rate and the supply of bank credit are the two main transmission belts linking monetary policy with the level of economic activity, the trade balance and inflation.[46]

However, the dollarization of the banking system and the free movement of capital have markedly reduced the power of monetary policy, by inhibiting these two main channels of transmission. Firstly, the monetary authorities cannot regulate the aggregate supply of credit, whatever the exchange-rate regime in force.

If the Central Bank is willing to allow a clean float of the exchange rate, the monetary authorities could take action (through the purchase or sale of dollars and/or Central Bank paper) to regulate the monetary base and the supply of bank credit in domestic currency: that is to say, only a quarter of the total supply of credit, even in the best of cases. The problem is that, because of the dollarization of the economy, the Central Bank has no way of regulating the volume of credit in dollars, which represents three-quarters of the total supply, without limiting the free movement of capital in some way.[47]

[44] At the end of 1996, these funds represented 37% of the total foreign exchange reserves of the Central Reserve Bank of Peru.

[45] According to Seminario (1995), dollarization has given rise to a monetary system which combines the systems based on free and fixed exchange rates. In reality, the Central Bank issues two currencies. The first of them (bank deposits in dollars) has a fixed parity with the dollar and is 100% backed by international assets. The second currency is the Peruvian sol, which has a free parity with the dollar.

[46] Seminario (1995) and Dancourt and Mendoza (1996) both present models with these features. Ruiz (1995), using the autoregressive vectors technique, concludes that the main channel for the transmission of changes in money issue appears to be the exchange rate, not interest rates.

[47] Of course, if the banking system were de-dollarized, the Central Bank could regulate the aggregate supply of credit by adopting an exchange-rate float, without any need to interfere with the free movement of capital.

Secondly, the dollarization of the banking system also blocks the other channel for the transmission of monetary policy, which operates through the exchange rate. In these circumstances, enterprises and families who receive their income in soles have their indebtedness denominated in dollars. If it is accepted that the Central Bank can bring about an appreciation in the real exchange rate by raising the nominal price of the dollar, then a devaluation means raising real interest rates and the real debt burden.

Because of inflation, the real average cost of credit or the real debt burden depend directly on the interest rates in dollars (which follow the international levels, taking into account compulsory reserve requirements and country risk), the rate of devaluation, the interest rate in soles, and the relative proportions of the credit granted in soles and dollars. The stylized fact is that the real average rate on loans closely follows the rate of devaluation, as shown in figure 6.

Thus, a midi- or maxi-devaluation can abruptly increase the overdue debt portfolio of the banks, with the risk of bringing on a banking crisis. This effect of a possible maxi-devaluation has considerably strengthened the coalition of interests opposing such a measure, by including among its members both the banks and their debtors. The strength of this coalition, and the fear of further aggravating an external imbalance with a banking crisis, prevent the Central Bank from using the exchange rate as it did in 1950-1975.

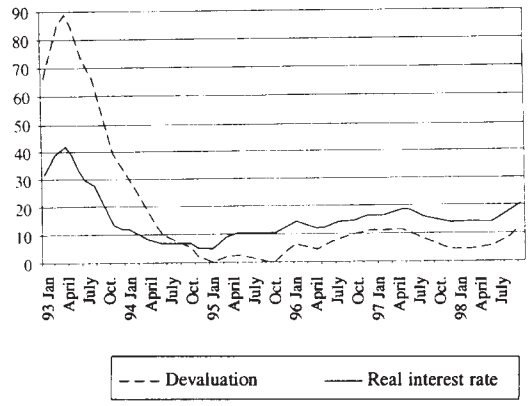
In short, the monetary authorities of the 1990s cannot restrict credit, nor can they easily carry out significant devaluations.

In reality, the problem is even more complex, because Peruvian fiscal policy in the 1990s has little flexibility, on account of the size of the external public debt commitments. Let us assume that the net payments in respect of the external debt (debt service less fresh disbursements) are positive, that tax revenue depends on the level of activity, and that the policy rule is that the primary fiscal surplus is equal to the net payments on the external public debt. In these conditions, in which the government does not receive any loans from the domestic banking system, fiscal expenditure ceases to be a policy tool and becomes an adjustment or endogenous variable. In other words, public expenditure will depend directly on the level of economic activity and inversely on the real debt burden, while the latter, for its part, will depend directly both on international interest rates and on the real exchange rate.

FIGURE 6

Peru: Real interest rate on loans and rate of devaluation, January 1993-July 1998

(Annual rates; mobile quarterly averages)



Source: Banco Central de Reserva del Perú (various issues).

In view of the rates of taxation, this fiscal system not only represents a powerful channel for the transmission of external shocks (for example, if international interest rates rise, public expenditure falls) but also functions as an automatic destabilizer. When the level of activity goes down for any reason and tax revenue diminishes, public expenditure also goes down, thus further strengthening the initial recessionary impulse. It is no longer possible to raise public expenditure in order to prevent the onset of a recessionary cycle. Nor is it possible to do this in order to offset the impact of a devaluation (if this is of a recessionary nature, because it causes real wages to go down and/or raises real interest rates) or of a restrictive credit policy.

If public expenditure includes, for example, an unemployment insurance scheme, then the system acts as an automatic stabilizer. Expenditure goes up when the level of activity goes down, and vice versa. This system assumes that the primary fiscal deficit (or surplus) is a freely adjustable variable, i.e., a variable whose value is not fixed exogenously by the debt payment requirements.

Of course in the short term the use of the resources obtained from privatization operations[48] –or greater external indebtedness– could prevent the operation of this automatic destabilizer, leaving open the possibil-

[48] At the end of 1996, such resources were equivalent to 40% of annual fiscal income.

ity of increasing public expenditure when the level of activity goes down. However, the future trajectory of the public external debt service commitments suggests that the problem will not easily be solved.[49]

Thus, the feasible set of macroeconomic policy mixes is severely restricted. This is a structural defect of the present macroeconomic policy system, if it is acknowledged that the normal handling of the current economic situation –and not just the management of adverse external shocks– should be the responsibility of monetary policy rather than fiscal policy, because of its greater flexibility and smaller relative power.

VI

The tequila effect (1995) and the Russian crisis (1998)

A description of these two macroeconomic situations marked by a financial crisis will make it possible to identify more clearly the nature of the connections that the Peruvian economy currently has with the international financial markets, as well as illustrating how some nerve centres of the prevailing macroeconomic policy system operate and what their limitations are.

In mid-1995, the expansionary cycle that the Peruvian economy had been experiencing since 1993 was abruptly interrupted. The growth rate of the non-primary sector of the economy,[50] which is the sector that responds to fiscal and monetary policies, fell abruptly to 1.7% in 1996, after having stood at 9.5% in 1995 (table 2). In contrast, the primary sector, which comprises agriculture and commodity export activities, and whose level of production is determined basically by supply-side factors, increased its growth rate between 1995 and 1996 from 2.3% to 4.6% per year.

The interruption in this growth cycle was not caused by an adverse external shock –the tequila effect– as occurred in Argentina. It is true that in the first quarter of 1995 there were all the symptoms of an outflow of short-term capital, but this phenomenon did not display the virulence observed in other parts of Latin America. Foreign currency deposits went down, there was a fall in the foreign exchange reserves of the banking system, dollar interest rates rose, the stock exchange slumped, and the Central Bank had to assume its role of lender of last resort to the commercial banking system and intervene in the exchange market.

However, this outflow of short-term capital did not have a great deal of effect on the economy, basically because it did not give rise to an appreciable increase in the real exchange rate or a reduction in the supply of bank credit. As we saw earlier, these are the two transmission belts linking monetary policy and financial crises with the real sector of the economy.

This relative feebleness of the tequila effect may be explained first of all by the nature of the Peruvian financial system. As there is no public securities market and the stock exchange is only small, Lima was not an international financial centre capable of attracting a significant portion of the short-term non-resident capital that went to the Latin American markets in the first half of the 1990s. It was presumably this capital which was sensitive to United States interest rates or to events such as the Mexican crisis in late 1994.

Secondly, most of the short-term capital inflows into the Peruvian economy which took place up to 1994 should probably be classified as repatriation of capital. Such capital is not really volatile short-term capital. The fact is that long-term political considerations –such as the defeat of subversive movements– may carry a lot of weight in deciding whether or not to repatriate capital.

In other words, a financial system based mainly on the banks and an inflow of capital which was not very sensitive to external interest rates caused the Peruvian economy to be relatively disconnected from

[49] See Ugarteche, 1996.

[50] The non-primary sector comprises manufacturing (other than that based on the processing of primary resources), construction, commerce, etc.

the United States financial markets, even though the Peruvian neoliberal programme radically opened up the capital account in the early 1990s. This explains why there was no tequila effect in Peru. Unlike Chile, where this was the result of deliberate policy decisions, in Peru this relative disconnection from the international financial markets was merely the result of circumstances.[51]

As may be seen from figure 7, the 1990s has been marked by a big inflow of capital, which was especially marked during the three-year period 1994-1996. Thus, the cooling down of the economy in 1996 coincided with an enormous inflow of capital equivalent to some 80% of exports. This inflow of short- and long-term capital only went down appreciably quite recently, in 1997. Likewise, figure 8 shows that the international reserves of the banking system grew rapidly from 1994 to the beginning of 1997, when they stabilized at around US$8.5 billion.

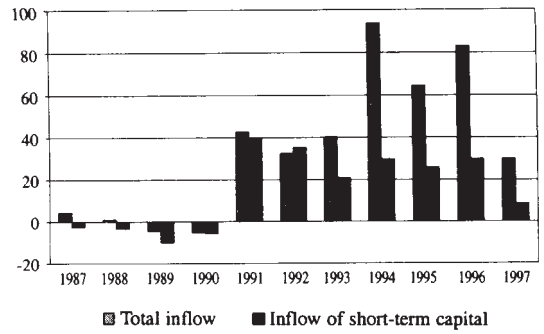
The interruption in the economic reactivation was entirely due to a violent turnaround in fiscal policy which began in mid-1995 and became still more marked in 1996. The origin of this turnaround is to be found in the Letter of Intent which the Government signed with the International Monetary Fund (IMF) in 1995, undertaking to take active measures to cool down the economy.

It may be seen from table 2 that the slump in the growth rate of the Peruvian economy in 1996 was due to the contraction in absolute terms in domestic demand less imports. Of the various components of domestic demand, that which displays the most volatile behaviour is, paradoxically, public investment, which went down by 8.5% during 1996 after having grown by 15% the year before. The other indicator of the severity of the budget adjustment is that the public sector primary fiscal surplus significantly increased in spite of the cooling-down of the economy (table 4).

FIGURE 7

Peru: Net inflow of capital (total and short-term), 1987-1997

(As a percentage of exports of goods)

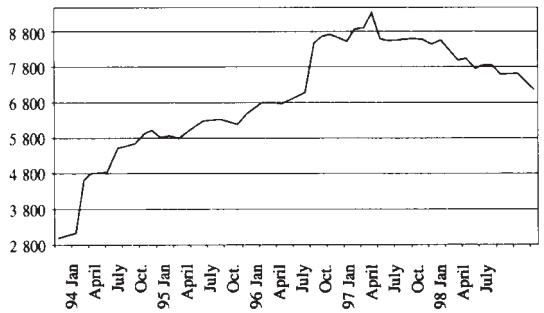


Source: Banco Central de Reserva del Perú (various issues).

FIGURE 8

Peru: Net international reserves of the banking system, January 1994-July 1998

(Millions of dollars)



Source: Banco Central de Reserva del Perú (various issues).

There are three factors which can explain this turnaround. Firstly, the Mexican crisis convinced the IMF that a persistent trade deficit could be dangerous if it was financed with capital that could suddenly leave the country, and the policy conclusion was that it was necessary to cool down the economy in order to reduce the trade imbalance. The second factor was connected with the political cycle of public expenditure: after the re-election of Fujimori at the beginning of 1995 there was no longer much government resistance to a cut in such expenditure. Moreover –and this was no less important– the fiscal accounts had to adapt to the increase in external debt service due to the agreements made in 1995-1996 with the creditor

[51] These circumstances have been changing rapidly since 1995, however, with the growing short-term external indebtedness of the local commercial banking system. This process, which is described later in this article, strengthens the links between external interest rates and the cost and availability of domestic credit, on the one hand, and the exchange rate, on the other. For an analysis of the different effects of the rise in external interest rates on a dollarized banking system, see Dancourt and Mendoza, 1996.

TABLE 4

Peru: Fiscal indicators of operations of the non-financial public sector (NFPS), 1991-1998
(As a percentage of GDP)

Year	Saving on current account					Capital expenditure		Primary result of NFPS[a]	Capital income of NFPS	Primary result of NFPS[b]	Central government non-financial expenditure
	Of central government			Of NFPS	Without interest of NFPS	Public investment	Total NFPS				
	Income	Expenditure	Saving								
1991	9.5	9.6	-0.1	1.0	4.4	2.7	3.8	0.7	0.1	0.8	10.0
1992	11.4	11.6	-0.3	1.1	5.1	3.1	4.2	0.9	0.4	1.3	10.0
1993	11.3	11.1	0.2	1.9	5.5	3.4	4.4	1.1	0.4	1.5	10.7
1994	12.9	12.2	0.7	2.7	6.1	3.9	5.1	1.0	4.5	5.5	12.7
1995	13.6	13.2	0.4	2.1	5.3	4.0	5.0	0.3	1.6	1.9	13.8
1996	14.2	12.7	1.6	3.4	5.7	3.8	4.5	1.2	0.1	1.3	13.7
1997	14.1	11.8	2.2	4.4	6.1	3.8	4.5	1.6	0.1	1.7	13.4
1998[c]	14.0	11.4	2.7	4.4	6.0	3.5	4.0	2.0	0.1	2.1	12.5

Source: Banco Central de Reserva del Perú (various issues).
[a] Without capital income.
[b] With capital income.
[c] Up to third quarter.

governments grouped together in the Paris Club and with the international private banks within the context of the Brady Plan.[52]

The plan was that the cooling down of the economy would be achieved through a strong fiscal adjustment, aided by a restrictive monetary policy. As may be seen from table 2, however, what really happened was that the recessionary fiscal policy, whose main instrument was a cut in public investment in infrastructure, was accompanied by a big expansion in credit, which took place against the explicit wishes of the monetary authority.

The monetary policy applied in 1995-1996 could only be termed restrictive if we guide ourselves exclusively by the performance of the national-currency monetary aggregates; the main fact was that the rate of increase of the monetary base went down from 28% in 1995 to 7% in 1996. In a dollarized economy where three-quarters of the credit and of deposits in the banking system are in foreign currency, however, this fact is only of relative importance. Thus, the total supply of credit to the private sector expanded increasingly fast, rising from 43.6% in 1995 to 49.6% in 1996, because of the larger amount of loans in foreign currency.

The commercial banks markedly increased their domestic loans in dollars with funds obtained abroad, just when the monetary authority was trying to impose credit restrictions through a sterilization policy.[53] The evidence showing that the commercial banks resorted to the international capital market in order to satisfy the domestic demand for loans is conclusive. It may be seen from table 3 (the column headed "international liabilities as a percentage of foreign currency loans") that the short-term external indebtedness of the commercial banks has grown rapidly since the Mexican crisis.

The commercial banks have an incentive to carry out this kind of operations because there is an appreciable difference between the cost of these external funds and the domestic interest rate on foreign currency loans. Furthermore, domestic deposits in dollars are subject to a high compulsory reserve requirement (45%), but external funds are exempt from this. Thus the compulsory reserve policy of the monetary authorities encourages the short-term external indebtedness of the commercial banks.

Consequently, if the local bankers believe that it is reasonable to increase their loans at a rapid rate, and if the international markets provide them with the funds to do this, this can easily set off a credit boom, since the monetary authorities do not have the means

[52] See Ugarteche, 1996 and 1997.

[53] I.e., by selling short-term securities to the banks and other financial institutions in order to sterilize or counteract the money issue resulting from the purchase of dollars.

to moderate this excessive expansion in bank credit.[54] This explains why the severe fiscal adjustment was accompanied in 1995-1996 with a substantial increase in credit, thus cooling down the economy without doing much to correct the trade deficit.[55]

The opposite phenomenon –a contraction which is not desired by the monetary authorities– is also possible, however. If the international markets suddenly cut off the funds with which they have been supplying the domestic banking system, this could give rise to a sharp contraction which would represent an enormous recessionary impulse while, at the same time, improving the trade balance through a reduction in imports.[56] This is what happened in the third quarter of 1998 as a result of the Russian balance of payments crisis.

Since the outbreak of the Asian crisis in mid-1997, the overall inflow of capital into the Peruvian economy has gone down markedly. However, the foreign-currency bank credit market has continued to work smoothly thanks to the continual increase in the funds obtained by the banks abroad.

In June 1998, the total short-term external debt came to US$ 7323 million: equivalent to 70% of the foreign exchange reserves of the monetary authority or 110% if the compulsory reserves in respect of domestic foreign currency deposits are excluded. About half of this short-term external debt corresponded to the commercial banking system, while the rest basically comprised the short-term debt of large non-financial enterprises, which may nevertheless be guaranteed in one way or another by the local banks.

In September, however, the Peruvian economy was severely shaken by a heavy outflow of capital due to the cancellation or non-renewal of the short-term credit lines that the local commercial banks had been obtaining abroad. This kind of stampede by the external creditors of local banks, which occurred for the first time during the 1990s, took place during the financial panic caused by the Russian balance of payments crisis.

This abrupt reversal in the short-term capital flows intermediated by the local commercial banks caused a heavy speculative attack on the national currency. As on previous occasions when there were strong upward pressures in the exchange market, this time also the national-currency price of the dollar shot up, together with the inter-bank local currency interest rate. The strange thing is that on this occasion there was also an appreciable rise in the inter-bank foreign-currency rate.

The Central Bank reacted to this upward pressure on the exchange rate by taking measures which had no precedent in recent years. Its first reaction was to intervene in the foreign exchange market through the sale of dollars, which it had not done since the auto-coup in April 1992. Its second reaction was to grant "liquidity credits" (short-term loans) in foreign currency to the commercial banks so that the latter could pay their short-term debts with the exterior, thus acting in practice as lender of last resort. It also reduced the average compulsory reserve rate on the dollar deposits of the commercial banks three times in succession, likewise so that the banks could pay their short-term debts.

Finally, the Central Bank, the Superintendency of Banks and Insurance Companies and the government itself took two more much less orthodox measures to check the rise in the exchange rate. On the one hand, they ordered the conversion of the public sector's foreign currency bank deposits into local currency: a kind of forced de-dollarization of the public sector. These deposits represented about a quarter of total deposits. On the other hand, the "overbuying" of dollars by the banks and other financial institutions was restricted to an amount equivalent to their effective net worth.

The September 1998 panic seems to have ushered in a new period of scarcity of domestic credit in foreign currency. According to the President of the Bankers' Association, the lower availability and higher cost of external credit lines will affect mortgages,

[54] Compulsory reserve requirements could be applied to the funds that the commercial banks obtain abroad, similar to the requirements in respect of domestic deposits in dollars, which would make it possible to cut down the supply of foreign-currency credit and make it more expensive. It could reasonably be argued that such a restrictive credit policy would raise the interest rates on loans in both soles and dollars, as well as the exchange rate (see Dancourt and Mendoza, 1996). Until a short while ago, the Central Bank was reluctant to impose compulsory reserve requirements of this nature, claiming that they would interfere with the free movement of capital and affect investors' confidence. In July 1998, however, the Superintendency of Banks and Insurance Companies introduced minimum liquidity requirements which carry out a function similar to these reserve requirements.

[55] As a percentage of exports, the trade deficit went down from 39% in 1995 to 34% in 1996, while the real exchange rate remained constant.

[56] An important example of this direct link between credit and imports is expenditure on durable goods such as automobiles and electrical household appliances which are not produced in the country.

loans for the acquisition of motor vehicles, credit cards and consumer credits (*Gestión*, 1998). And everything seems to indicate that this severe restriction of foreign currency credit could have a heavy negative impact on sales of consumer durables, imports, the construction industry and the prices of houses and land, as well as threatening the stability of the local banking system. If anything is clear at all, it is that the constant expansion of credit was the elixir that kept the Peruvian economy going in recent years.

VII

By way of conclusion

In Peru, the neoliberal strategy consists of returning to the development model based on primary commodity exports. This venture, which seeks to reinvent the 1950s in the late 1990s, is naturally faced with various obstacles.

The first obstacle is of what we might call a socio-political nature. Even if it is accepted that the structural reforms made by Fujimori can successfully restore the primary export model that prevailed during the period from 1950 to 1960, it is necessary to take account of the conflict that the high degree of urbanization has introduced between the present social structure and the primary-export strategy.

Seminario (1995) stressed this contradiction, noting that the starting point for this last liberal attempt is a novel feature of this economic experiment: i.e., the fact that Peru is now an essentially urban economy. In the past, export economies were constructed on the basis of a mainly rural population, a great abundance of natural resources compared with the population, and a scanty level of industrial development. According to the population censuses, however, the share of the urban population in the population as a whole has risen from 35% in 1940 to 70% in 1993.

It is hard for an economy based on the export of minerals to generate sufficient jobs in an urbanized society, as the Peruvian experience shows. This means that unemployment, whether disguised or not, will be one of the crucial economic and social problems. Consequently, there will be political pressure to develop economic activities to solve this problem. As Schydlowsky (1995) has argued, this was one of the factors that led to industrialization and protectionism.

In order to obtain a more diversified production apparatus, it would be necessary to strengthen the situation of domestic industry exposed to international competition and to promote non-traditional exports (including tourism). This involves reversing the trade openness process to some extent and also correcting the exchange-rate over-valuation. It also probably means that the Peruvian economy should be firmly integrated into the Andean Community in order to thus obtain preferential access to a large market.

The exchange-rate appreciation already mentioned would appear to represent an incoherent element, because the neoliberal reforms advocate a strategy of pro-export growth. However, a low real exchange rate is only incompatible with the development of industrial exports or, perhaps, of Chilean-style agroindustrial exports, or large-scale tourism. It is not necessarily incompatible with the commodity exports which have marked the whole of Peru's economic history. It all depends on the quality of the existing natural resources and the available technology.

In reality, the problem could be posed in exactly opposite terms. If we rule out major changes in the level of economic activity or the propensity to import, the only means of securing the medium-term sustainability of this real exchange rate, which is associated with a trade deficit equal to over 30% of the values exported in the last three years, is a big expansion in these traditional exports. The question, then, is first to determine if sufficient investment projects have been put into effect in this traditional export area (especially in the mining sector) and second, if those projects will come on stream in a timely manner: that is to say, before there is a decline in the inflow of external capital, which finances the trade deficit and the net payments in respect of the public external debt and which supports this overvalued real exchange rate.

This is obviously a fragile or vulnerable situation. Adverse external shocks which reduce the inflow of foreign capital or lead to a drop in commodity prices and put back the maturity of the

investment projects underway could give rise to a balance of payments crisis if macroeconomic policy does not respond appropriately. (An essential component in the crisis which occurred in 1975 under the Velasco Alvarado military government was the delay in the entry into operation of two big mining and petroleum projects).

Since mid-1997, as on so many other occasions in its history, the Peruvian economy has been suffering the impact of an appreciable adverse external shock which simultaneously affects both the current account and the capital account of the balance of payments. Export commodity prices have gone down markedly since the onset of the Asian crisis in mid-1997, causing a sharp drop in the terms of trade, even though the dollar price index of imports has also gone down.

At the same time, the overall inflow of capital has gone down markedly since 1997. This paralyzation of the inflow of external capital has extended not only to long-term capital (direct investment connected with privatization operations or mega-projects in the mining sector, which were to significantly expand the production capacity of the export sector) but also to short-term capital inflows (external indebtedness of the commercial banks) since mid-1998.

What are the most suitable macroeconomic policies for dealing with an unfavourable international economic situation? This question brings us to the other important obstacle facing the neoliberal strategy, which we might call the macroeconomic obstacle. The central hypothesis of this article is that the Peruvian economy of the 1990s lacks an operative form of macroeconomic regulation which could act without giving rise to serious disturbances in the level of economic activity.

In particular, it has become clear that the monetary authorities do not possess the basic instruments that have normally been used for coping relatively successfully with the adverse external shocks to which a small open economy is inevitably exposed. Monetary policy has lost its effectiveness as a result of two structural reforms which have been made in the financial field: the dollarization of the banking system and the opening up of the capital account.

Overcoming the first obstacle amounts to changing the primary export model, perhaps so much as to make it unrecognizable. Overcoming the second obstacle is an urgent task, but perhaps somewhat less complicated.

(Original: Spanish)

Bibliography

Banco Central de Reserva del Perú (BCRP) (various issues): *Nota semanal*, Lima.

——(1995): *Memoria 1994*, Lima.

——(1996): *Perú: compendio de estadísticas monetarias 1959-1995*, Lima.

——(1998): *Memoria 1997*, Lima.

Borricaud, F. (1989): *Poder y sociedad en el Perú*, Lima, Instituto de Estudios Peruanos.

Calvo, G., L. Leiderman and C. Reinhart (1993): Capital inflows and real exchange rate appreciation in Latin America, *Staff Papers*, vol. 40, No. 1, Washington, D.C., International Monetary Fund (IMF).

Cline, W. (1981): Economic stabilization in Peru, 1975-1978, in W. Cline and S. Weintraub (eds.), *Economic Stabilization in Developing Countries*, Washington, D. C., The Brookings Institution.

Cotler, J. (1994): Política y sociedad en el Perú: cambio y continuidades, *Perú problema*, No. 3, Lima, Instituto de Estudios Peruanos.

Dancourt, O. (1996): Estabilización y deuda externa en el Perú: experiencia y perspectivas, in G. Portocarrero and M. Valcarcel (eds.), *El Perú frente al siglo XXI*, Lima, Pontificia Universidad Católica del Perú (PUCP).

Dancourt, O. and W. Mendoza (1996): *Flujos de capital, política monetaria y equilibrio externo*, Documento de trabajo, No. 126, Lima, PUCP, Departamento de Economía.

Dancourt, O., W. Mendoza and L. Vilcapoma (1997): *Fluctuaciones económicas y shocks externos, Perú 1950-1996*, Documento de trabajo, No. 135, Lima, PUCP, Departamento de Economía.

Fairlie, A. (1996): Comunidad Andina, regionalismo abierto y comercio intraindustrial, in El Protocolo de Trujillo y la Comunidad Andina, *Política internacional,* No. 43, Lima, Academia Diplomática del Perú.

Ferrari, C. (1992): *Industrialización y desarrollo: políticas y efectos económicos en el Perú*, Lima, Friedrich Ebert Foundation.

Figueroa, A. (1993): *Crisis distributiva en el Perú*, Lima, PUCP.

Fitzgerald, E. V. K. (1985): Capitalismo de Estado en el Perú: limitaciones de un modelo de desarrollo

económico, *El gobierno militar: una experiencia peruana 1968-1980*, Lima, Instituto de Estudios Peruanos.

Frenkel, R., J.M. Fanelli and G. Rozenwurcel (1993): *Growth and Structural Reform in Latin America. Where We Stand*, Discussion Papers, No. 62, Geneva, United Nations Conference on Trade and Development (UNCTAD).

Gavin, M., R. Hausmann, R. Perotti and E. Talvi (1996): *Managing Fiscal Policy in Latin America and the Caribbean. Volatility, Procyclicality, and Limited Creditworthiness*, Working Paper series, No. 326, Washington, D. C., Inter-American Development Bank (IDB).

Gestión (1998): Issue dated 12 October 1998, Lima.

González, E. (1994): *Ajuste estructural y reforma de la economía fiscal en el Perú*, Documentos de Trabajo series, No. 64, Lima, Instituto de Estudios Peruanos.

Hofman, A. (1993): Economic development in Latin America in the 20th century. A comparative perspective, in A. Szirmai, B. Van Ark and D. Pilat (eds.), *Explaining Economic Growth. Essays in Honour of Angus Maddison*, Amsterdam, The Netherlands, North-Holland.

Hunt, S. (1996): Peru: The current economic situation in long-term perspective, in E. Gonzales de Olarte (ed.), *The Peruvian Economy and Structural Adjustment: Past, Present, and Future*, Miami, Florida, University of Miami, North-South Center Press.

Iguíñiz, J. (1986): La crisis peruana actual: un esquema para una interpretación, in H. Bonilla (ed.), *Las crisis económicas en la historia del Perú*, Lima, Centro Latinoamericano de Historia Económica y Social/ Friedrich Ebert Foundation.

Jiménez, F. (1991): *Acumulación y ciclos en la economía peruana: crisis de paradigmas y estrategia de desarrollo neoliberal*, Lima, Centro de Estudios para el Desarrollo y la Participación (CEDEP).

——(1996): Notas sobre la desindustrialización reciente y la necesidad de una nueva política industrial, *Socialismo y participación*, No. 74, Lima, CEDEP.

Krugman, P. (1988): External shocks and domestic policy responses, in R. Dornbusch and F.I. Helmers (eds.), *Open Economy. Tools for Policymakers in Developing Countries*, Washington, D.C., Oxford University Press.

Krugman, P. and L. Taylor (1978): Contractionary effects of devaluation, *Journal of International Economics*, vol. 8, No. 3, Amsterdam, The Netherlands, North-Holland Publishing Company.

Maddison, A. (1991): *Dynamic Forces in Capitalist Development: A Long Run Comparative View*, Oxford, U.K., Oxford University Press.

——(1992): *La economía mundial en el siglo XX. Rendimiento y política en Asía, América Latina, la URSS y los países de la OCDE*, Mexico City, Fondo de Cultura Económica (FCE).

Marfán, M. and B. Bosworth (1994): Saving, investment, and economic growth, in B. Bosworth, R. Dornbusch and R. Labán (eds.), *The Chilean Economy. Policy Lessons and Challenges*, Washington, D.C., The Brookings Institution.

Paredes, C. and J. Sachs (eds.)(1990): *Estabilización y crecimiento en el Perú*, Lima, Grupo de Análisis para el Desarrollo (GRADE).

Robles, M. (1996): *Los ciclos económicos en el Perú: 1950-1995*, Lima, Instituto Nacional de Estadística e Informática.

Rojas, J. (1996): *Políticas comerciales y cambiarias en el Perú, 1960-1995*, Lima, PUCP.

Rojas, J. and L. Vilcapoma (1996): *Algunas características importantes de la nueva Banca Peruana: un estudio preliminar*, Documento de trabajo, No. 124, Lima, PUCP, Departamento de Economía.

Rossini, R. (1991): Liberalización comercial y estabilización económica, *Foro económico liberalización del comercio exterior*, Lima, Friedrich Ebert Foundation.

Ruiz, G. (1995): Apreciación cambiaria, política monetaria y afluencia de capitales: Perú 1990-1994, *Economía*, vol. XVIII, Nos. 35-36, Lima, PUCP, Departamento de Economía.

Schuldt, J. (1994): *La enfermedad holandesa y otros virus de la economía peruana*, Documento de trabajo, No. 20, Lima, Universidad del Pacífico, Centro de Investigación.

Schydlowsky, D. (1986): The macroeconomic effect of nontraditional exports in Peru, *Economic Development and Cultural Change,* vol. 34, No. 3, Chicago, Illinois, The University of Chicago Press.

——(1995): La recuperación económica peruana en contexto histórico, Lima, *mimeo*.

Schydlowsky, D. and J. Wicht (1979): *Anatomía de un fracaso económico: Perú 1968-1978*, Lima, Universidad del Pacífico, Centro de Investigación.

Seminario, B. (1995): *Reformas estructurales y políticas de estabilización*, Documento de trabajo, No. 22, Lima, Universidad del Pacífico, Centro de Investigación.

Seminario, B. and C. Boullon (1992): *Ciclos y tendencias en la economía peruana: 1950-1989*, Cuadernos de investigación, No. 15, Lima, Universidad del Pacífico, Centro de Investigación.

Taylor, L. (1991): Economic openness: Problem to the century's end, in T. Banori (ed.), *Economic Liberalization: No Panacea*, Oxford, U. K., Oxford University Press.

Terrones, M. and C. Calderón (1993): *El ciclo económico en el Perú*, Documentos de trabajo, No. 20, Lima, GRADE.

Thorp, R. (1995): *Gestión económica y desarrollo en Perú y Colombia*, Lima, Universidad del Pacífico.

——(1996): A Long-Run Perspective on Short-Run Stabilization, in E. Gonzales de Olarte (ed.), *The Peruvian Economy and Structural Adjustment: Past, Present, and Future*, Miami, Florida, University of Miami, North-South Center Press.

Thorp, R. and G. Bertram (1978): *Peru 1890-1977: Growth and Policy in an Open Economy*, New York, Columbia University Press.

Ugarteche, O. (1996): *La deuda peruana a fines de siglo*, Lima, CEDEP.

——(1997): Deuda externa: el fin de la historia, *Revista actualidad económica*, No. 175, Lima, Centro de Asesoría Laboral del Perú (CEDAL).

Vega, J. (1997): Foreign trade policy and economic integration policy in Peru: Analysis of a dilemma, in A.J. Jatar and S. Weintraub (eds.), *Integrating the Hemisphere*, Washington, D.C., Inter-American Dialogue Conference.

Vega-Centeno, M. (1989): Inversiones y cambio técnico en el crecimiento de la economía peruana, *Economía,* vol. XII, No. 24, Lima, PUCP, Departamento de Economía.

Vilcapoma, L. (1996): *Fluctuaciones macroeconómicas en la economía peruana: 1950-1990*, Documento de trabajo, No. 130, Lima, PUCP, Departamento de Economía.

The impact of public *investment on private* investment in Brazil, *1947-1990*

Bruno de Oliveira Cruz

Research Fellow, Department of Regional and Urban Policy, Institute of Applied Economic Research (IPEA).

Joanílio R. Teixeira

Professor of Economics, University of Brasilia.

This article analyses the impact of public investment on private investment. Apart from purely ideological aspects, two opposing interpretations may be distinguished with regard to the relationship between these variables. The first is that there is competition between public and private investment, so that the former "crowds out" the latter. The second is that public investment is complementary to private investment in so far that, by generating positive externalities, it creates favourable conditions for the latter. In view of the relative scarcity of empirical studies on this matter, this study deals with the case of the Brazilian economy in the period from 1947 to 1990. Its main conclusions are that private investment is indeed crowded out by public investment in the short term, but in the long term the cointegration vector coefficients indicate that these two variables complement each other.

I

Introduction

Many economists maintain that reducing the size of the State would be a good thing for society as a whole, since they consider that public investment is less efficient than private investment. They also assert that the State should not compete with the private sector for the use of productive resources. In view of the scarcity of physical and financial resources, they say, if the government appropriates these resources this would, at least in the short term, have a negative effect on private investment. Furthermore, public intervention can raise prices and interest rates in the economy, thus reducing the private sector's disposition to invest (Buiter, 1977; Sundararajan and Thakur, 1980; Ram, 1986). The crowding-out of private investment is shown in the IS-LM model.[1] It should be noted that because it limits itself to short-term impacts, this model omits the long-term effects (Buiter, 1977 and 1980).

However, there are also those who maintain that public investment can have a complementary effect (crowding-in) with respect to private investment, especially when it is made in the areas of infrastructure and the provision of public goods. Barro (1990) shows that public investment has a strong impact on the marginal productivity of private capital and labour.

Another argument in favour of public investment is that the State is more willing to make higher-risk investments than the private sector. In the developing economies, sectors which require large volumes of initial capital and long lead times are considered to be of high risk (Dixit and Pindyck, 1994). It would be hard for the private sector to make such investments, not only because of the risk but also because of the limited size of the secondary securities market. It would be difficult for the incipient financial sector of those countries to finance long-term projects that require a large volume of resources.

Through its investment, the government can act in an anti-cyclical manner to reduce fluctuations in aggregate demand and uncertainty in the economy. Another effect which is noted in the economic literature is that the government increases the aggregate demand of the economy by creating a market for goods produced by the private sector. By increasing aggregate demand, public investment can have a positive impact on society's expectations with regard to the behaviour of that variable. An increase in those expectations will lead to a rise in private investment. Thus, the government investment would have two positive impacts: firstly, it would generate demand for the private sector, and secondly, it would raise future expectations with regard to aggregate demand, giving rise to an increase in private investment (Sundararajan and Thakur, 1980).

In the economic literature, four methodologies are identified for approaching the question of crowding-out versus crowding-in: computable general equilibrium models, IS-LM model estimates, models of the impact on the supply side, and estimates of the investment function. The appendix to this article gives a summary of the published studies using these methodologies.

Computable general equilibrium models not only make it possible to estimate the effect of public investment on private investment but also permit the study of its effect on the other macroeconomic variables and income distribution. This methodology also makes it possible to estimate the result of the impact of public investment on private investment on the basis of various sources of financing, such as increased taxes, money issue, an increase in the public debt, etc. Pardahan, Ratha and Sarma (1990) use this working methodology, but note that the computable general equilibrium model leaves out possible long-term impacts.

Another interesting methodology in the literature on this subject is the estimation of an IS-LM type model: the studies using this methodology suffer, however, from the fact that they use econometric techniques which can give rise to skewed results.

□ The authors wish to thank Carlos Henrique Rocha, Bernardo Mueller, Adolfo Sachsida and Tancredo Almada Cruz for their valuable observations in the course of this study, and the National Research Council for its support. The views expressed in this article are of course entirely the responsibility of the authors.

[1] There are two types of effects: direct crowding-out, which is the reduction of the physical resources available to the private sector, and indirect crowding-out, which takes place through the increase in interest rates and prices. See Buiter, 1977 and 1980.

The so-called supply-side impact estimates the effect of public investment on total factor productivity. One of the first studies in this area was that of Ram (1986), followed by Aschauer (1989). It may be noted that Barro (1990) has developed a model in line with the "new growth theory", thus consolidating this line of research which has given rise to a number of empirical studies.

Finally, the impact of public investment on private investment can be estimated on the basis of investment theories. In the present article it was decided to estimate the investment function, for which purpose an attempt has been made to compare Jorgenson's neoclassical theory with the theory of irreversible investment in conditions of uncertainty. It may be noted that there are few empirical studies which seek to identify a relation between irreversible investment in conditions of uncertainty and the impact of public investment on private investment.

More specifically, the present article seeks to estimate the behaviour of private investment as a function of the aggregate product, of the interest rate and of public investment for the Brazilian economy in the period 1947-1990. It analyses not only the short-term impacts but also the long-term ones, estimating an autoregressive model with distributive lags (ADL). The long-term equilibrium for this type of estimate gives the static solution. The results indicate that in the short term (error correction model) there is substitution between public and private investment, whereas in the long term the relation expressed in the cointegration vector indicates that the impact of public investment on private investment is positive.

The article is divided into four sections. After the introduction (section I), the empirical formulation and the theoretical bases used are described in section II, the econometric results are presented in section III, and section IV contains the conclusions.

II

Theoretical structure

First of all, a brief review will be made of the economic theory on investment, after which the empirical formulation used in this article will be set forth. Jorgenson (1963) developed a model in the neoclassical tradition in which enterprises seeking to maximize their gains equate the marginal productivity of capital with its utilization cost. Adding together the capital needs of each enterprise, this gives the total amount of capital desired by society. A theoretical framework with microeconomic bases is thus constructed for determining the desired capital. In this context, an enterprise has optimum accumulation when the marginal productivity of its capital equals its utilization cost. The notion of the utilization cost of the capital comes from the idea that most of the capital belongs to the enterprise, which therefore does not pay rent for using it. However, the use of this capital nevertheless has a cost for the enterprise, measured by the opportunity cost of maintaining it. The depreciation and variation in the value of the capital goods belonging to the enterprise must be included as part of the utilization cost. This cost will determine the optimum accumulation of capital. The interest rate plus the variation in the value of the capital stock (variations in price and depreciation) must be equal to the marginal contribution of the capital to the enterprise. This is the main conclusion of Jorgenson's model. It assumes the existence of adjustment costs, so that current investment would not be immediately in line with the desired level. It generally postulates a symmetrical adjustment cost, that is to say, the enterprise would incur the same costs for investing and disinvesting.

Among the components which determine investment, there are two components, namely expectations and the uncertainty of the economy, which are not incorporated in Jorgenson's formulation. Moreover, the assumption of symmetrical adjustment costs would appear to have little empirical backing, since disinvestment is seen to have a higher cost for an enterprise than investment. The notion of irreversibility arises from such criticisms. Once an enterprise has made an investment, that capital is not reversible without major difficulties.

The reasons for this are as follows: i) poorly developed secondary markets for capital goods; ii) adverse selection in the quality of capital goods, and iii) specific types of capital for specific enterprises.

As the secondary market for capital goods is limited, especially in the developing countries, the enterprise will have to bear heavy costs if it wishes to disinvest the capital it possesses.

Adverse selection is connected with the question known in the literature as the "lemons problem".[2] As the owner of the capital good has more information on it than the possible buyer and there are capital goods of different qualities, the cost of disinvestment for the enterprise will also be high. Moreover, as the market price is determined by the average quality of goods, suppliers of capital would be reluctant to offer a good of higher quality than the average. Thus, when selling a capital good on the secondary market an enterprise could incur heavy costs.

With regard to specific capital, it is assumed that the enterprise uses capital goods specifically adapted to its production line. If it wishes to dispose of such goods, the purchasers will have to make modifications in order to adapt the equipment to another type of production line. A common example in the literature is that of the iron and steel industry. Consequently, the assumption of asymmetrical adjustment costs would appear to be the most appropriate for modelling private investment (Dixit and Pindyck, 1994; Pindyck, 1993).

Thus, if we assume the extreme case of an irreversible investment in conditions of uncertainty, it is reasonable that enterprises will become more cautious when making investments, even in a favourable environment, because in an adverse future they could find themselves with an excess of capital which they cannot reduce. Ultimately, the enterprise must include in its strategic planning the possibility of postponing investment in the present period in order to make it in a later period. This analytical methodology explains why, even in a favourable economic environment, some enterprises prefer not to invest. Dixit and Pindyck (1994) cite the case of the drop in interest rates in the United States in 1991 and 1992 as a good example of this situation. In spite of that drop, there was practically no change in the level of investment. These authors suggest that the drop in interest rates also meant a reduction in the opportunity cost of postponing the investment and awaiting more favourable economic conditions. They also maintain that the liquid effect (of a reduction in interest rates) is weak and often ambiguous.[3]

The main contribution of the studies by Dixit and Pindyck (1994) is the notion that if, in conditions of uncertainty and irreversible investment, there are possibilities of postponing a project, then this information should be incorporated in the calculation of the investment decision. If this is done, the response of investment to changes in the economic environment displays a smoother trajectory, with fewer fluctuations than that based on the traditional theory.[4] Thus, the reasons for situations in which the economic environment is favourable but the rate of investment shows little variation are to be found in the theory of Dixit and Pindyck (1994). The example of the drop in interest rates in the United States appears to be one of these cases.

In the present study, as in the study by Rocha and Teixeira (1996),[5] private investment is considered a dependent variable whose behaviour is explained by the short-term interest rate, the aggregate product and public investment. Thus, the functional formulation used is as follows:

$$I_{private} = f(Y,r,I_{public})$$

The aggregate product, Y, includes the investment function as the demand expectations of entrepreneurs. A positive relation between the aggregate product and private investment is expected. The nominal interest rate, r, measures the utilization cost of capital. If it has a negative coefficient, this provides empirical evidence in favour of the neoclassical theory of Jorgenson. Likewise, a very small value for the interest rate coefficient, or a statistically insignificant coefficient, would provide empirical evidence in favour of the theory of irreversible investment in conditions of uncertainty. Public investment can have

[2] The idea of adverse selection was proposed by Akerlof (1970). That author analysed the used car market in the United States and showed that imperfect information and automobiles of dubious quality have a strong effect on used car prices. In that country, automobiles of dubious quality are known as "lemons", so that the problem of adverse selection also came to be known as the lemons problem.

[3] Dixit and Pindyck (1994), p. 14. These authors also maintain that the stability of interest rates is more important than their actual level. If the aim is to stimulate investment, a policy of eliminating undesirable and unnecessary fluctuations in interest rates should be pursued.

[4] In this respect, see Caballero (1993).

[5] The data were obtained from the GDP, the information on private and public investment was taken from the historical series of the Brazilian Institute of Geography and Statistics (IBGE), and the data on investment by State enterprises were provided by the Getúlio Vargas Foundation. Interest rates were taken from Ronci, 1991.

either a negative or a positive effect. Depending on the sign of the coefficient, this determines the impact of the public sector on private investment. If the coefficient is positive it indicates a relation of complementarity, while if it is negative it reflects a relation of substitution.

III

Econometric results

The results of the Dickey-Fuller test to determine whether the series are stationary are given in table 1.[6] The first column in this table shows the variables analysed. The second gives the values of the expanded Dickey-Fuller test (t-adf), and the third column shows the number of lags in the first difference. The last two columns give the values of the observed t statistic for the coefficients of these lags and the respective levels of significance (t-prob). The criterion for the selection of the lags for this test was the level of significance of the coefficient for each of them, in line with the methodology suggested by Doornik and Hendry (1994).

As may be seen, the only statistically significant lag was that of the GDP with one period of lag, since t-prob was 0.003. It was therefore necessary to analyse the expanded Dickey-Fuller test (t-adf), which in this case did not provide any evidence that the GDP series was stationary (t-adf = -1.6718 > $t\text{-adf}_{critical}$ = 3.957). For the other variables, the Dickey-Fuller test without lags is sufficient to reject the hypothesis that the series are stationary.

The same test was then used to analyse whether or not the differences in the series whose results are given in table 2 are stationary or not. These statistical procedures rejected the hypothesis that the difference series are not stationary. It is therefore concluded that GDP, private investment, public investment and the nominal interest rate are first-order integrals, since the primary differences are stationary. This procedure for determining the nature of the integral series is suggested in Enders (1995).[7]

TABLE 1
Dickey-Fuller test for the series logarithm [a]

Variables	t-adf	Lag	t-lag	t-prob
Log GDP	-1.5330	2	0.9458	0.3504
Log GDP	-1.6718	1	3.142	0.0033
Log GDP	-2.2860	0	-	-
Log private investment	-1.1477	2	0.77385	0.4439
Log private investment	-1.1070	1	-1.2818	0.2077
Log private investment	-1.406	0	-	-
Log public investment	-1.4655	2	0.6244	0.5362
Log public investment	-1.5323	1	0.10748	0.9150
Log public investment	-1.5588	0	-	-
Log Tx interest	0.41525	2	-1.5847	0.1216
Log Tx interest	-0.36457	1	-0.91304	0.3670
Log Tx interest	-1.0046	0	-	-

[a] The critical values of the distribution calculated by Mackinnon (1991), expanded Dickey-Fuller with constant included, are -2.934 at the 5% confidence level and -3.597 at the 1% level.

TABLE 2
Dickey-Fuller test for the first difference of the series logarithm [a]

Variables	t-adf	Lag	t-lag	t-prob
ΔLog GDP	-2.1228	2	0.78225	0.4392
ΔLog GDP	-1.9917	1	-1.1311	0.2653
ΔLog GDP	-2.9672[b]	0	-	-
ΔLog private investment	-3.0506[c]	2	0.36210	0.7193
ΔLog private investment	3.3158[c]	1	-1.0961	0.2799
ΔLog private investment	-6.3339[c]	0		
ΔLog public investment	-3.1563[c]	2	0.36210	0.7193
ΔLog public investment	-3.4211[c]	1	-1.0961	0.2799
ΔLog public investment	-5.6931[c]	0	-	-
ΔLog Tx interest	-5.8007[c]	2	2.2279	0.0321
ΔLog Tx interest	-5.8508[c]	1	1.3803	0.1756
ΔLog Tx interest	-7.4870[c]	0	-	-

[a] The critical values of the distribution calculated by Mackinnon (1991), expanded Dickey-Fuller with constant included, are -1.949 at the 5% confidence level and -2.621 at the 1% level.
[b] Significant at the 5% level.
[c] Significant at the 1% level.

[6] The logarithm of the series was used; this transform has advantages because the estimated coefficients can be interpreted as elasticities. Various empirical studies have made the same change, as for example Aschauer (1989), Rocha and Teixeira (1996) and Ferreira (1994). The logarithmic transform of the data also makes possible greater stability of the variance, which favours the empirical estimation.

[7] Analysis of the autocorrelation of the series by level and differences was also used, and it was likewise concluded that there was first-order integration.

TABLE 3

Best estimate of private investment, 1948-1990 [a]
(Dependent variable: private investment)

Variables	Coefficient	Standard deviation	t-statistic	t-prob
Log private investment (1) [b]	0.70489	0.092524	7.618	0.0000
Log GDP	2.6629	0.47158	5.647	0.0000
Log GDP (1) [b]	-2.5166	0.48354	-5.205	0.0000
Log public investment	-0.38131	0.087515	-4.357	0.0001
Log public investment (1) [b]	0.45212	0.084599	5.344	0.0000
Trend	0.0069648	0.0033298	2.092	0.0436

[a] $R^2 = 0.999818$ DW = 2.16 Harvey's R^2 = 0.87870
[b] (1) indicates that the variable is shifted by one period.

Lagrange multiplier for autocorrelation:	F (2.34) =	0.41762	[0.6619]
ARCH 1	F (1.34) =	0.043591	[0.8359]
Normality	χ^2 (2) =	4.5611	[0.1022]
White's heterocedasticity test	F (12.23) =	0.75517	[0.6870]
Ramsey's specification test (RESET)	F (1.35) =	1.9639	[0.1699]

The values in parentheses indicate the *p-value* of the test.

In the present study, it was decided to estimate an ADL.[8] We began with linear regression, using a more global dynamic specification (lags of three periods) in order to identify the dynamics of the relation between the variables. The main conclusions were that only the one-period lag was significant for the analysis; the others were statistically insignificant according to the F test provided by the Pc-Give econometric programme.

The interest rate proved to be insignificant with all the lags, which is evidence in favour of the theory on investment in conditions of uncertainty. This result is also compatible with those found by Rodrigues (1988), Ronci (1991) and Studart (1992). In all these studies, the interest rate has a coefficient with very low or statistically insignificant value. Rodrigues (1988) and Studart (1992) maintain that the availability of credit would be a more important variable for private investment in Brazil. The regression with the best statistical result may be seen in table 3.

The current GDP coefficient is that which showed the greatest impact on private investment. As was to be expected, the sign was positive, which indicates that demand expectations are a relevant variable. The lagged GDP coefficient was negative. However, the liquid effect of demand on private investment is positive.

Lagged private investment had a positive sign, which reflects the irreversibility of investment: in other words, investment made in the preceding period has a positive effect on investment in the present period.[9] It may be noted that this variable was quite significant, with a Student-T value of 7.6. The idea of the irreversibility of investment decisions was strengthened by the trend variable which, although having a very low coefficient, was nevertheless significant at 5%. The value of this coefficient would also appear to indicate private investment aimed at covering the depreciation of the capital stock.

Public investment in the current period has a negative effect on private investment, possibly reflecting competition for the use of the available resources (substitution), whereas public investment in the preceding period has a positive impact on private investment, which suggests the existence of complementarity.

The static equilibrium will determine whether the series are cointegrated, that is to say, whether there is a long-term relation between them. The Pc-Give econometric programme indicates such a relation on the basis of a steady-state dynamic equilibrium condition. It gives the value of the coefficients, as well as a joint test for their significance. The results of the long-term static solution for the regression in question are as follows:

[8] In order to use the model with only one equation, it is assumed that the product and public investment are only weakly exogenous and that there is a cointegration vector.

[9] See Gujarati (1995). This author suggests that the dependent variable, lagged as exogenous in the regression, indicates some friction in this aggregate.

TABLE 4

Result of applying the error correction model, 1949-1990

Variables	Coefficient	Standard deviation	t-statistic	t-prob
	A. *Without dummy variable*[a]			
ΔLog GDP	2.7176	0.30047	9.045	0.0000
ΔLog public investment	-0.38753	0.074176	-5.224	0.0000
ECM (1) [b]	-0.28437	0.061806	-4.601	0.0000
	B. *With dummy variable*[c]			
ΔLog GDP	2.7866	0.27501	10.133	0.0000
ΔLog public investment	-0.42329	0.068706	-6.161	0.0000
i 1954 (dummy variable)	-0.25452	0.085380	-2.981	0.0050
ECM (1) [b]	-0.26179	0.056875	-4.603	0.0000

[a] R^2 = 0.702479; DW = 2.19; Harvey's R^2 = 0.85033
Data criteria: SC = -4.61857; HQ = -4.69719
[b] (1) indicates that the model is de-phased by one period.
[c] R^2 = 0.758869; DW = 1.86; Harvey's R^2 = 0.87870
Data criteria: SC = -4.73972; HQ = -4.84455

Lagrange multiplier for autocorrelation: F (2.36)	=	0.4181	[0.6614]
ARCH 1 F (1.36)	=	0.70956	[0.4052]
Normality χ^2 (2)	=	3.1013	[0.2121]
White's heterocedasticity test F (7.30)	=	0.21539	[0.9790]
Ramsey's specification test (RESET) F (1.37)	=	0.20456	[0.6537]

$$\begin{aligned}\text{Log private investment} &= +\,0.4956\ \text{Log GDP} \\ &\quad +\,0.2399\ \text{Log public investment} \\ &\quad +\,0.0236\ \text{Trend}\end{aligned}$$

Wald test χ^2 (3) = 2921.1 [0.0000] [10]

The long-term equilibrium solution for the Brazilian economy for the period 1948-1990 indicates that the GDP has a positive impact on private investment of the order of 0.5, while public investment has a positive impact of 0.24 in the long term. In spite of the negative value of the current public investment coefficient, when the long-term effect of such investment is analysed it is noted that the effect is positive. There are two factors which may explain this fact: the impact of public investment on GDP may have a longer lead time, and the complementary effects (crowding-in) may also have longer lead times. A typical example would be the construction of a hydroelectric station or an iron and steel plant which takes several years to give results. These impacts confirm the long-term analysis made by Sundararajan and Takhur (1980) for India, where in the short term government investment has a negative impact on private investment, but in the long term public investment has a positive effect on private sector investment decisions. It may be noted that this long-term effect is omitted in the studies on the Brazilian economy. After noting the cointegration of the variables, it is necessary to estimate the model once again in an abbreviated form, that is to say, to adjust the model for differences, including the lagged error correction mechanism. The abbreviated coefficients showed the adjustment of the economy towards a long-term trajectory. Consequently, these coefficients reflect the short-term impact and not the long-term equilibrium relation (Enders, 1995; Doornik and Hendry, 1994). The adjustment of the error correction model gave the results shown in table 4.[11]

[10] Significant at the 1% level. The value between parentheses indicates the *p-value* of the test.

[11] The unit root tests suggested in Harris (1995) rejected the hypothesis of non-cointegration, while the estimated value for the test was -3.43 and the critical value at 10% is -3.4, which suggests that there is convergence of the model for the long-term solution. When the ECM coefficient is analysed, the unit root tests for this variable confirm the cointegration hypothesis. This fact suggests to us that the economy should converge towards this equilibrium solution, that is to say, it confirms that the variables are cointegrated.

In the error correction model, no lag of the variables was significant except that in the error correction mechanism (ECM). The estimation of the ECM with the current differences has the great advantage that these differences are not correlated with the ECM, in other words, the tests of the significance of the coefficients can be carried out individually without losing efficiency. Furthermore, the coefficients of the current differences represent the short-term impacts with a good empirical adjustment (Hendry, 1995).

As was to be expected, the coefficient of the lagged ECM is negative. This sign of the coefficient represents the adjustment of the model towards the long-term equilibrium, with a value of 0.28.

The above result is in accordance with the results obtained by Rocha and Teixeira (1996); the coefficient of public investment has a negative impact on private investment when the error correction model is adjusted. However, the authors did not analyse the long-term impacts expressed by the cointegration vector, so that their conclusion that there is substitution between public and private investment in Brazil is only correct for the short term. It should be recalled that in the long term private investment responds positively to public investment.

Analysis of the residues standardized by the standard deviation gave an atypical value for 1954, possibly reflecting the situation of relative uncertainty that the Brazilian economy was experiencing during that period. A dummy variable was included for that year, thus improving the adjustment of the data. The dummy variable was significant at the 1% confidence level; the information criteria of Schwarz and Hannan-Quinn gave higher values in the module, as did the R^2 and also Harvey's R^2. The normality tests also improved, while the correlation diagram of the residues points to the conclusion that the residues are "white noise".

The results with the inclusion of the dummy variable (table 4, section B) were as follows: the heterocedasticity tests (ARCH and White) did not reject the null hypothesis for the homocedasticity of the residues, and neither was evidence found in favour of the hypothesis of the autocorrelation of the residues, so that the regression residues would appear to be "white noise"; this fact indicates good adjustment of the data, so that the model seems to be well specified, as reflected in the Ramsey test (RESET).

IV

Conclusions

In short, the results give grounds for concluding that in the case of Brazil:

i) Demand expectations, represented here by the GDP, are the main factor in determining private investment.

ii) The irreversibility of investment decisions was confirmed by the significance of the lagged private investment coefficient.

iii) The theory of investment in conditions of uncertainty was backed up by the fact that the model showed the statistical insignificance of the interest rate coefficient.

iv) Substitution of private investment by public investment was only noted in the short term.

v) The complementarity between private and public investment was brought out by the sign of the coefficient of that variable in the long-term adjustment.

It would be interesting to carry out complementary studies investigating the causal relation between the variables involved in the model, in order to clarify the possible indirect impacts which may exist. It would also be important to make a sectoral disaggregation of public investment in order to identify the mutual impact of the different sectors of the economy.

Nevertheless, the present study does make some useful contributions through its estimation of an investment function based on the theory of irreversible investment in conditions of uncertainty and its analysis of the long-term impact, which is omitted by most empirical studies dealing with Brazil. Private investment in Brazil does not seem to be very sensitive to interest rates, but it does react strongly to demand expectations, represented in this study by the effec-

tive product and public investment. Other possible future projects could involve an analysis of the effect of the financing of public investment and the preparation of a more specific model for the expectations of private agents. The subject is of considerable importance, and there is a great deal of scope for future research.

(Original: Portuguese)

APPENDIX

Summary of studies on private and public investment

Author	Date	Methodology [a]	Country	Impact[b]
Sundararajan and Thakur	(1980)	IF	India	Negative
Sundararajan and Thakur	(1980)	IF	South Korea	Positive
Blejer and Khan	(1984)	IF	Group of countries	Negative
Ram	(1986)	SS	Group of countries	Positive
Rodrigues	(1988)	IF	Brazil	Negative
Aschauer	(1989)	IF	United States	Positive
Musalém	(1989)	IF	Mexico	Positive
Pardahan, Ratha and Sarma	(1990)	CGEM	India	Negative
Greene and Vilanueva	(1991)	SS	Group of countries	Positive
Ronci	(1991)	IF	Brazil	Negative
Ramirez	(1991)	IS-LM	Mexico	Positive
Barro	(1991)	SS	Group of countries	Positive
Sanchez and Lora	(1992)	IF	Colombia	Negative
Shafik	(1992)	IF	Egypt	Positive
Studart	(1992)	IF	Brazil	Negative
Sant'Ana, Rocha and Teixeira	(1994)	IS-LM	Brazil	Positive
Ferreira	(1994)	SS	United States	Positive
Dalamagas	(1995)	SS	Group of countries	Positive
Cashin	(1995)	SS	Group of countries	Positive
Rocha and Teixeira	(1996)	IF	Brazil	Negative
Nazmi and Ramirez	(1997)	IF	Mexico	Negative

[a] The four methodologies identified were:
CGEM: Computable general equilibrium model.
IS-LM: IS-LM type model.
SS: Supply-side impact (through factor productivity).
IF: Estimation of investment function.
[b] Estimated effect of public investment on private investment and/or the product.

Bibliography

Akerlof, G. (1970): The market for "lemons": Qualitative uncertainty and the market mechanism, *Quarterly Journal of Economics*, vol. 84, No. 3, Cambridge, Massachusetts, Harvard University.

Aschauer, D. (1989): Is public expenditure productive?, *Journal of Monetary Economics*, vol. 23, No. 2, Amsterdam, Netherlands, North-Holland Publishing Company.

Barro, R. (1990): Government spending in a simple model of endogenous growth, *Journal of Political Economy*, vol. 98, No. 5, Chicago, Illinois, The University of Chicago Press.

Buiter, W. (1977): Crowding-out and the effectiveness of fiscal policy, *Journal of Public Economics*, vol. 7, No. 3, Amsterdam, Netherlands, Elsevier, June.

——(1980): Monetary, financial and fiscal policies under rational expectations, *Staff Papers*, vol. 27, No. 4, Washington, D.C., International Monetary Fund (IMF), December.

Caballero, R. (1993): On the dynamics of aggregate investment, in L. Servén and A. Solimano (eds.), *Striving for Growth After Adjustment: The Role of Capital Formation*, Washington, D.C., World Bank.

Cashin, P. (1995): Government spending, taxes, and economic growth, *Staff Papers*, vol. 42, No. 2, Washington, D. C., IMF.

Cruz, B. (1997): *Relação entre investimento privado e público no Brasil: 1947-1990*, Brasilia, Universidad de Brasilia, August (Master's dissertation).

Dalamagas, B. (1995): Growth, Public Investment and Deficit Financing, *Australian Economic Papers*, vol. 34, No. 65, December.

Dixit, A. and R. Pindyck (1994): *Investment Under Uncertainty*, Princeton, New Jersey, Princeton University Press.

Doornik, J. and D. Hendry (1994): *PC-GIVE 8.0 -An Interactive Econometric Modeling System*, London, International Thomson Publishing.

Enders, W. (1995): *Applied Econometric Time Series*, New York, John Wiley & Sons, Ltd.

Ferreira, P. (1994): Infra-estrutura pública, produtividade e crescimento, *Pesquisa e Planejamento Econômico*, vol. 24, No. 2, Rio de Janeiro, Institute of Applied Economic Research (IPEA), August.

Greene, J. and D. Vilanueva (1991): Private investment in developing countries: An empirical analysis, *Staff Papers*, vol. 38, No. 1, Washington, D. C., IMF.

Gujarati, D. (1995): *Basic Econometrics*, New York, McGraw-Hill.

Harris, R. I. (1995): *Using Cointegration Analysis in Econometric Modelling*, London, Prentice Hall.

Hendry, D. (1995): *Dynamic Econometrics*, Oxford, U.K., Oxford University Press.

Jorgenson, D. (1963): Capital theory and investment behavior, *American Economic Review*, vol. 53, No. 2, Washington, D. C., American Economic Association.

Mackinnon, J. G. (1991): Critical values for cointegration tests, in R. Engle and C. Granger, *Long-Run Economic Relationships*, Oxford, U. K., Oxford University Press.

Musalem, A. (1989): *Private Investment in Mexico: An Empirical Analysis*, Working Papers, No. 183, Washington, D. C., World Bank.

Nazmi, N. and M. Ramírez (1997): Public and private investment and economic growth in Mexico, *Contemporary Economic Policy*, vol. 15, No. 1, Huntington Beach, California, Western Economic Association.

Pardahn, B., D. Ratha and A. Sarma (1990): Complementarity between public and private investment in India, *Journal of Development Economics,* vol. 33, No. 1, Amsterdam, Netherlands, Elsevier Science Publishers, B.V., July.

Pindyck, R. (1993): Irreversibility, uncertainty and investment, in L. Servén and A. Solimano (eds.), *Striving for Growth After Adjustment: The Role of Capital Formation*, Washington, D. C., World Bank.

Ram, R. (1986): Government size and economic growth: A new framework and some evidence from cross-section and time-series data, *American Economic Review*, vol. 76, No. 1, Washington, D.C., American Economic Association, March.

Ramírez, M. (1991): The impact of public investment on private capital formation: A study relating to Mexico, *Eastern Economic Journal*, vol. 17, No. 4, Trenton, New Jersey, Eastern Economic Association.

Rocha, C. H. and J. Teixeira (1996): Complementaridade versus substituição entre investimento público e privado na economia brasileira: 1965-90, *Revista brasileira de economia*, vol. 50, No. 1, Rio de Janeiro, Fundação Getúlio Vargas, July/September.

Rodrigues, S. (1988): *Determinantes do investimento privado no Brasil: um estudo econométrico,* Rio de Janeiro, Catholic University of Rio de Janeiro, Department of Economics (Master's dissertation).

Ronci, M. (1991): *Política econômica e investimento privado no Brasil (1955-1982)*, Rio de Janeiro, Fundação Getúlio Vargas.

Sánchez, F. and E. Lora (1992): *Ahorro público y perspectivas de crecimento de Colombia,* Santafé de Bogotá, Fundación para la Educación Superior y el Desarrollo (FEDESARROLLO).

Sant'Ana, T., C.H. Rocha and J.R. Teixeira (1994): The impact of public investment on private capital formation in Brazil: 1965-1985, *Proceedings of the Brazilian Meeting on Operational Research*, No. 26, Curitiba.

Shafik, N. (1992): Private investment public policy: The Egyptian case, in A. Chibber, M. Dailami and N. Shafik, *Reviving Private Investment in Developing Countries: Empirical Studies and Policy Lessons*, Amsterdam, Netherlands, North-Holland Publishing Company.

Studart, G. (1992): Investimentos públicos e privados no Brasil: análise empírica da relação de curto e de longo prazos durante o período 1972-1989, *Anais da Encontro da ANPEC*, Brasilia, Asociación Nacional de Centros de Postgraduados de Economía (ANPEC).

Sundararajan, V. and S. Thakur (1980): Public investment, crowding-out and growth: A dynamic model applied to India and Korea, *Staff Papers*, vol. 27, No. 4, Washington, D. C., IMF, December.

Chile and its *"lateral" trade policy*

Sebastián Sáez
Former Head of the FTAA-North America Section, Department of International Economic Relations, Ministry of External Relations, Chile.

Juan Gabriel Valdés S.
Director-General of International Economic Relations, Ministry of External Relations, Chile.

This article looks at the bases, objectives and results of the "lateral" trade policy adopted by Chile in the 1990s. In particular, it seeks to give a clearer idea of the role of bilateral agreements and to incorporate into the discussion the empirical evidence observed in the case of Chile. It concludes that the criticisms levelled at this policy, especially by those who advocate unilateral trade openness rather than other options, are based on an incomplete analysis of basic international trade theory. It is therefore argued that the economic concepts taken into account in evaluating the economic and political rationality of this strategy must be expanded to acknowledge the complementarity of the available options and to incorporate the analysis of game theory, the existence of economies of scale, the transaction costs existing in the functioning of international markets, and foreign policy elements. Through this multidimensional strategy, Chile has sought to overcome various problems and to stimulate the areas of its economy which have been most dynamic in the 1990s: exports of products with greater added value, services and capital. By traditional standards of appraisal, the results obtained do not reflect any negative impacts but they do show positive effects.

I

Introduction

Chile has been one of the Latin American countries which has promoted one of the most active policies of bilateral trade agreements during the 1990s, based on both foreign policy and economic considerations. This experience differs from the integration policies promoted from the 1960s onwards in three respects: i) it is based on the signing of broad free trade agreements within the framework of an outward-looking development policy rather than the creation of common markets or customs unions; ii) with varying degrees of success, the agreements have stimulated the inclusion of the different dimensions of trade, thus reflecting the greater complexity of the international economic relations of today, and iii) the efforts to conclude agreements are not limited to the countries of the region, although these are given priority (especially in the case of the members of the Latin American Integration Association (ALADI): efforts have also been made to progress in integration with the United States and Canada, the Asia-Pacific economies, and the European Union. This is an acknowledgement of the geographical diversification of Chile's economic links.

This policy has not been free from criticisms based on various arguments, especially in the area of trade policies. In the context of the discussions on the proposal to reduce tariffs from 11% to 6% over a period of five years, which was approved by Congress, however, a group of economists of various political beliefs argued in favour of the proposal for a uniform tariff reduction presented by the government, pointing out that this would correct serious distortions in the prevailing tariff scheme and allow the country to improve its linkages with the international economy and adding that the signing of a considerable number of trade agreements had caused the uniform 11% tariff to develop in practice into a highly differentiated tariff resulting in negative effective protection for some sectors and a level of protection considerably greater than 11% for others (*El Mercurio*, 1998).

This discussion is similar to that which took place in the early 1990s about the type of trade policy that the United States Government should follow in order to promote greater trade openness. Lawrence Summers, the present Under-Secretary of the Treasury of the United States, stated with respect to this dispute that there should be unquestionable support for all lateral reductions in trade barriers, whether they be multi-, uni-, tri– or pluri-lateral (Frankel, 1997). By that he meant that the discussion was not particularly relevant: what was important was to take advantage of the trade opportunities that presented themselves, and in that respect all "lateral" initiatives were good.

There are two important aspects underlying the public debate in Chile: i) a sufficiently representative number of economists reject differentiated tariffs and their effects, and ii) a policy of unilateral openness is to be preferred over other options.

The purpose of the present paper is to set forth the bases and objectives of the "lateral" trade policy followed by Chile since 1990. In order to do this, we will analyse the aspect of unilateral openness, explaining the justification for the policy options followed since the restoration of democracy in Chile.[1] In particular, an effort will be made to clarify the role that bilateral agreements have played and still play in the trade policy of the governments of the Democratic Coalition, so as to further a better understanding of the objectives pursued, which are at once economic and political, and to incorporate into the discussion the empirical information applicable to the Chilean case which has been accumulated so far in this respect.

□ The authors wish to express their gratitude for the valuable comments made on a previous version of this article by Alicia Frohmann, Patricio Leiva, Raúl E. Sáez, and staff members of the Dirección General de Relaciones Económicas Internacionales (DIRECON) of the Ministry of External Relations of Chile.

[1] For an analysis of the period of President Patricio Aylwin, see Sáez, Salazar and Vicuña, 1995.

II

The role of economic agreements and trade policy options

The main conclusions that economic theory offers on trade policy hold that unilateral openness is the best policy for a small country like Chile, since it helps to ensure better resource allocation and hence maximizes the well-being of the community as a whole. It has been recognized by economists of different political persuasions that the unilateral openness policy applied by Chile since the mid-1970s has helped to achieve rapid growth of its exports, both traditional and non-traditional, while at the same time stimulating greater diversification in terms of products and market destinations.[2] An equally important factor was the role played by the State in the 1960s and 1970s in establishing incentives of different types which helped to reduce the risks of exporting and thus helped to create an endogenous trade development process.[3]

The governments of the Democratic Coalition have recognized the validity of this argument and have promoted and enhanced the unilateral openness process. Thus, in 1991 tariffs were reduced on an across-the-board basis from 15% to 11%, and Congress recently approved a further reduction of 5 percentage points over a period of five years. As a result, the uniform tariff applicable to imports from the countries with which Chile has not signed free trade agreements will be only 6%: the lowest level in the last four decades.[4]

However, the Democratic Coalition has made still further efforts to secure greater openness in areas that affect trade from other dimensions: in particular, in the telecommunications sector it has promoted broad deregulation and introduced greater competition, and in financial matters it has expanded the available field of business while at the same time improving the supervision of banks, insurance companies and securities. The private sector has begun to invest in the public infrastructure. Finally, the process of privatization of public enterprises has continued, with special attention to ensuring transparency and protection of the interests of the State in this process. In such an important area as intellectual property rights, in 1991 Chile became the first Latin American country to grant protection for pharmaceutical products. The government has also ratified important international treaties such as the Paris Convention (in 1991) and the international agreement for the protection of plant varieties (in 1996). In the area of foreign investment, it has signed numerous agreements for the promotion and protection of investments, thus giving a clear sign of the stability of its policies.

In short, the process of greater openness promoted by the governments of the Democratic Coalition cannot be evaluated solely in the light of the traditional trade parameters (tariff reduction and elimination of non-tariff measures), but must also be understood in the context of the whole set of elements making up the new dimensions of trade policy.

[2] See, for example, Wisecarver (ed.), 1992, and Meller, 1996.
[3] See the comments by Meller, 1996, and the studies by Sáez (1994a and b).

[4] It should be added that the Chilean trade regime is marked by the absence of non-tariff barriers and other types of additional protection mechanisms (except for a very limited number of agricultural products). If we take into account the agreements already in force, then the tariff rate will be substantially lower.

III

The role of economic agreements

1. What role has been played by the international economic agreements negotiated by Chile?

The international multilateral, plurilateral and bilateral economic agreements have complemented and completed the process of unilateral openness in the aspects in which this process cannot of itself intervene or take decisions.

This assertion may be examined in the light of the specific case of a "minor" non-traditional export product: fresh and frozen scallops. In the late 1980s, after substantial investments in the north-central area of Chile, the export of such shellfish began to be developed, with 60% to 70% of the exports going to the French market. In 1993, however, the French Government decided that scallops from Chile (and other areas) were not the same as the French ones, and it imposed a labelling and marketing regulation whereby only scallops of the species *Pecten* could be sold as "*coquille Saint-Jacques"*. All others, including the Chilean product, must be sold as *"pétoncle"*, which French consumers associated with a product of lower quality and price. This "scientific" classification artificially affected the conditions of competition, giving rise to a concealed form of protection of the French product, which maintained its position in the market, while adversely affecting the Chilean product.

After the failure of diplomatic approaches and private-sector efforts, the Chilean Government resorted to the Dispute Settlement Body of the World Trade Organization (WTO), on the grounds that this regulation was a form of arbitrary discrimination which sought to protect French producers.

Although the case was finally settled through direct negotiations which corrected this distortion, the existence of this obligatory, independent and binding machinery provided for in the WTO promoted a satisfactory solution which the diplomatic approaches of a small country had not been able to secure. Obviously, this is not the only example of such a situation; mention may also be made of the restrictions on fresh apples imposed by the European Economic Community in 1993 and the restrictions on exports of tobacco imposed by the United States in 1993, both of which were settled in the context of the former General Agreement on Tariffs and Trade (GATT).[5]

2. What lessons may be drawn from these experiences?

The first lesson is that international trade does not take place in a vacuum: the possibilities of taking full advantage of its benefits do not depend only on the domestic policies adopted by a country, but also, and fundamentally, on those adopted by its trading partners.

The second lesson is that one of the main functions of international agreements is to correct market failures that unilateral openness cannot correct itself. They are designed to reduce the transaction costs faced by private agents when taking investment decisions. The economic literature defines transaction costs as the costs of measuring the value of the attributes of the goods which are being traded and the costs of protecting rights and monitoring and enforcing agreements.[6] In the opinion of Coase (1988), without the concept of transaction costs, which is largely absent from current economic theory, it is impossible to understand the functioning of the economic system, usefully analyse many of its problems, or establish a basis for policy formulation.

International economic relations suffer, among other problems, from asymmetrical information; market flaws and uncertainty (such as lack of knowledge of market conditions and of laws which affect trade and the stability of mutual trade); lack of transparency; and the existence of permanent incentives to depart from certain patterns of behaviour (as for example through the proliferation of protectionist pressures). All these problems increase the cost of operating in international markets.

[5] It must be admitted that the solutions reached do not fully satisfy the aspirations of Chile, but they have allowed the economically acceptable continuation of these activities

[6] For other definitions, see Dixit, 1996.

Agreements have two essential functions. Firstly, they contribute to mutual trade openness which makes it possible to take advantage of the benefits of trade. In this context, game theory provides the economic bases for agreeing on trade openness between countries. This case is a simple example of the application of the prisoner's dilemma: the ideal world for a country A is to cause country B to dismantle its trade barriers, while maintaining its own barriers, but finally both country A and country B decide to maintain their respective barriers, which is the worst possible result for both of them in terms of well-being. Trade negotiations of all types open up opportunities for ongoing co-operation once countries have identified their preferred joint strategies, but in order to construct this trading space mechanisms are needed to identify and punish "fraud".

Secondly, agreements are designed to reduce the transaction costs of international economic relations, especially in view of their current multidimensional nature, since they provide a set of rules applicable to the members which ensure stability, stimulate transparency through specific obligations, and ensure the fulfillment of the rules through binding instruments which reduce the incentives to depart from them. Charles Kindleberger has described this latter function as the provision of international-level public services because these are a necessary "good" for the stability of commercial transactions and if they did not exist this would bring us to a situation similar to that experienced by the world in the 1930s.

We thus see that international agreements promote trade through at least two mechanisms: i) the elimination and regulation of trade barriers through the provision of a framework for co-operation, and ii) the reduction of transaction costs. Both these aspects, as well as those of a political nature, are usually ignored in the public debate in Chile on the rationality of the government's strategy with regard to trade agreements. As Coase (1988) notes, it is necessary to introduce explicit positive transaction costs into economic analysis in order to be able to study the world as it actually exists.

But if we already have the WTO, which is a multilateral institution with over 130 member countries, then what is the point of negotiating bilateral economic agreements? The answer to this question involves not only economic but also political elements.

IV

The multilateral trade system

From the point of view of Chile, the multilateral trade system represented by the WTO is the international economic negotiation forum par excellence, since most of Chile's main trading partners participate in it.[7] In this case, not being a member of the WTO is simply not a viable alternative. Negotiations in this environment represent the best possible option for Chile and offer the greatest benefits because they are at a multilateral level, do not involve trade diversion, and reduce the transaction costs with a broad group of trading partners operating under common rules: Chile benefits from the economic concessions exchanged among the members of WTO regardless of their size and relative weight and their level of development. However, this institution also has a number of limitations and imperfections, and some of the latter stem from its own multilateral nature.

The last round of multilateral negotiations, and the most important in this century, was the Uruguay Round of GATT (ECLAC, 1994). This round, which concluded in December 1993, enabled over 120 countries to arrive at an ambitious set of agreements, thanks to which Chile's links with the rest of the world have been further strengthened, and gave a strong boost to the rights and duties laid down in the system, especially non-discrimination, national treatment and the most-favoured-nation clause.

However, the negotiations were highly complex –the longest in the history of GATT– and often involved great difficulties. Indeed, they were originally supposed to have ended in December 1990, but this did not occur and between 1990 and 1993 there was great uncertainty about what was really going to happen to the multilateral trade system which had

[7] The absence of the Chinese People's Republic and Russia is a serious defect which needs to be corrected as quickly as possible.

TABLE 1

Main regional agreements, 1957-1996 [a]

	Africa/Middle East	Europe	Americas	Asia-Pacific
1957		1957 - Rome Treaty		
1960		1960 - European Free Trade Association (EFTA)	Latin American Free Trade Association (ALALC)	
1965 1970			1969 - Andean Pact	Australia-New Zealand
1975	Economic Community of West African States			1978 - Association of South-East Asian Nations (ASEAN)
1980	South African Conference		Latin American Integration Association (ALADI)	
1985	1989 - Arab Union of the Maghreb		1988 -USA-Canada Agreement	1985-1987 - ASEAN expands
1990-1996	1991 -Economic Community of Africa	1991 - European Economic Area (EFTA + EU) 1993 - Maastricht Treaty	1991 - MERCOSUR 1992 -NAFTA 1996 - the Andean Pact becomes the Andean Community	1992 - South-East Asian Regional Association 1993 - Asia-Pacific Economic Council (APEC)

Source: Frankel (1997).
[a] This is not a complete list.

TABLE 2

Regional agreements notified to the World Trade Organization by its members
(Number of members notifying agreements)

1957-1990	1991	1992	1993	1994	1995	1996	1997	1991-1997
30	1	9	7	3	7	14	20	61

Source: WTO.

been developed around GATT since 1948. Academics of different schools of thought wrote books warning of the trade wars that were likely to break out between the United States, Japan and the European Union (Thurow, 1991; Krugman, 1996; Bhagwati, 1991).

Furthermore, in this highly uncertain situation, the United States made a significant turnaround in its trade policy, embarking on an active policy of bilateral trade negotiations (Israel, 1985; Canada, 1989, and NAFTA, 1992). Leaving behind the approach taken since the Second World War, the European Union negotiated and signed the Maastricht Treaty (1992), the most important since the Rome Treaty, and continued to incorporate new members (Frankel, 1997) into what some authors called "Fortress Europe". It is worth recalling that the Asia-Pacific Economic Council (APEC) consolidated its position as a regional economic forum for the Asia-Pacific region in those years, especially in 1993 (tables 1 and 2). It has been estimated that 90% of the members of WTO belong to some kind of regional agreement (Lawrence, 1996).

In Latin America, MERCOSUR has become the main economic integration initiative, with the biggest scope, and has had considerable effects on trade in the hemisphere, especially that of Chile, extending beyond exclusively economic aspects.

The results of the Uruguay Round were highly significant, strengthening and clarifying rights and obligations in a significant number of aspects, securing the incorporation of the agricultural and textiles

and clothing sectors into the multilateral rules, and establishing the first multilateral agreement on trade in services and on trade-related aspects of intellectual property. The WTO has provided a serious juridical framework for the settlement of disputes.[8] Indeed, from the time when the WTO came into being up to 27 July 1998, 141 consultations had been requested under the Understanding Governing the Settlement of Disputes. It must be admitted, however, that it has not been possible to make all the progress hoped for by countries like Chile –for example, with regard to access to markets for agricultural products or the dismantling of the trade-distorting Multifibre Agreement– and there are still extensive possibilities for the application of arbitrary and concealed trade restrictions, as well as gaps in terms of trade discipline.

Thus, the speed and depth of the trade openness that can be achieved at the multilateral level are limited, although their strengthening and enhancement continue to be one of Chile's priorities.

Within this world situation at the beginning of the 1990s, in which there was a considerable likelihood of entering on a period of international economic "disorder", with conflicts between the economic powers and the formation of exclusive economic blocs (NAFTA, the European Union, the Asia-Pacific area, MERCOSUR, etc.), and the lower leadership capacity of the United States in trade matters was evident, Chile sought a way of "protecting" and deepening the development scheme adopted over the last two decades, marked by economic openness and growth led by external trade. This, together with foreign policy considerations, explains why Chile seeks international economic agreements as a complement to its policy of unilateral openness.

This was acknowledged by the WTO itself in its report on Chilean trade policy prepared in September 1997, in which it said that Chile's present interest in regionalism stems from a clear determination not to be left out of the preferential systems which are being formed, which would cause it to lose markets, but its proclaimed intention of making further unilateral tariff reductions is proof that at the same time it maintains its commitment to apply free trade policies based on the most-favoured-nation principle.[9]

Chile has made the greatest efforts, and has insistently sought opportunities for negotiations, with the countries or groups of countries with which it trades most extensively (the United States, MERCOSUR, the Asia-Pacific area and the European Union) and which are also those which have undertaken integration processes with highly significant economic repercussions;[10] it has also tried to ensure and expand the trading possibilities of its production sector and to avoid being excluded from international trade or trying to protect itself from it.

Fortunately, the most pessimistic scenarios have not so far materialized: in 1990-1996, international trade grew by an average of 6% per year, while the world GDP grew by only 1.5%, but Chile's exports increased by 11%. Moreover, studies by the Organization for Economic Cooperation and Development (OECD) and the WTO itself have recognized that the spread of regional agreements has been a complement to multilateral trade openness, or at least has not affected it adversely.[11]

[8] See, inter alia, Jackson (1997) and Petersman (1997).

[9] See the summary and conclusions in WTO (1997).

[10] Thus, although the trade gains from the entry of Chile into NAFTA or from a bilateral agreement are estimated to be only small, no estimate has been made of the impact of the fact that countries whose exports compete with those of Chile may obtain preferential access to that market, as occurs, of course, with the countries forming part of the corresponding group and also those enjoying preferences granted under the Generalized System of Preferences (GSP) to which Chilean exports do not have access. Something similar could also occur in the case of an agreement between MERCOSUR and the European Union or between the latter and South Africa.

[11] Partly because rounds of negotiations have taken place at least once every decade in the context of the multilateral trade system. See OECD (1995) and WTO (1995).

V

The existing bilateral agreements and their effects

In order to analyse the bases underlying the "lateral" trade policy that Chile has followed it is necessary to address four different but inter-related questions: What type of agreements should be negotiated? With which countries should Chile negotiate? What are the objectives pursued? And what appraisal may be made of the agreements?

In answering these questions, it should be noted that the agreements which have been negotiated do not solve all the problems faced. Nor are they perfect. In many aspects they have been unsatisfactory, and an effort has been made to correct this with new proposals for improving and deepening them. The present agreements have indeed progressed in the direction of promoting free trade, however (table 3).

1. What type of agreements should be negotiated?

Economic theory does not give a completely satisfactory or unambiguous answer to this question. Dornbusch (1993) says that "In the area of trade policy a good dose of common sense must fill the gap left by an absence of hard theory that might otherwise set the guideposts". In this sense, there are criteria on what trade agreements should *not* do: i) they should not divert trade (a criterion already expressed by Jacob Viner in 1950) and ii) they should maintain the volume of trade of their members with regard to the rest of the world and increase the volume of trade among their members (Kemp and Wan's theorem), that is to say, they should not create additional trade barriers with respect to third countries: this rule ensures that the agreements are reflected in an increase in overall social well-being.

A second aspect which is not addressed by economic theory is what the content of the negotiations should be. When Viner (1950) wrote his study distinguishing between the effects of creation and diversion of trade (which has served as a guide for the research since then) the agreements to which he referred were fundamentally in respect of tariffs and, to a lesser extent, non-tariff measures (quotas, licenses, contingents, prohibitions, etc.). In the present context, however, the agenda for the negotiations is much broader and more complex and refers to the need to negotiate "all aspects affecting trade". In this context, since the Tokyo Round of GATT in 1974-1979 there has been a clear tendency to address new aspects of trade: technical barriers, government purchases, antidumping duties, subsidies and countervailing duties. The Rome Treaty, NAFTA and the results of the Uruguay Round represented a step forward by incorporating new issues such as services, intellectual property, and some aspects of investments. The pressure to incorporate matters relating to the environment and labour rights has been less successful, although these matters are very much present in the current trade agenda.

Chile has recognized this multidimensional aspect by promoting the incorporation of most of the aspects relating to trade in the negotiations which it carries out, but it has done so with a good deal of realism. Thus, the current treaty with Canada incorporates the highest rights and duties so far registered in free-trade agreements signed by Chile in respect of services and investments, but it does not incorporate such aspects as intellectual property, technical standards, sanitary and phytosanitary measures, government purchases, etc., because when negotiating the agreement both countries considered that the WTO rules, together with their own respective legislations, already addressed these matters satisfactorily.

On the other hand, the Treaty recently negotiated with Mexico does incorporate these aspects, because in the bilateral relations with that country these questions are important (the current problems of access to Mexico are connected with matters of this type, such as technical standards).

The realism with which this strategy has been approached also takes into account the fact that not all Chile's potential trading partners are interested in going beyond what was achieved in WTO regarding the incorporation of all dimensions of trade, or else

TABLE 3

Chile: Status of bilateral agreements

Agreement	Status	Coverage
With Canada	Came into force: 5 July 1997 Tariff elimination programmes under way as scheduled; process will be completed in 2014 Opening of negotiations on financial services scheduled for 1999.	Trade in goods, services and investments.
With Mexico (ECA No. 17) [a]	Came into force: 1 January 1992 Tariff elimination programme completed. The new treaty, incorporating new areas, will be submitted to Congress shortly. Opening of negotiations on financial services, anti-dumping measures and government purchases scheduled for 1999.	Trade in goods. New treaty: services, investments, intellectual property, technical obstacles. Sanitary and phyto-sanitary measures. Air transport.
With Venezuela (ECA No. 23)	Came into force: 1 July 1993 Tariff elimination programme to be completed by 1 January 1999.	Trade in goods. Treaty envisages an undertaking to expand trade in services.
With Colombia (ECA No. 24)	Came into force: 1 January 1994 Tariff elimination programme to be completed by 1 January 1999.	Trade in goods. Negotiations have been begun to incorporate trade in services and investments.
With Ecuador (ECA No. 32)	Came into force: 1 January 1995 Tariff elimination programme to be completed by 1 January 2000.	Trade in goods. Treaty envisages an undertaking to expand trade in services.
With Peru (ECA No. 38)	Came into force: 1 July 1998 Tariff elimination programme under way; to be completed by 1 January 2012.	Trade in goods. Treaty envisages an undertaking to expand trade in services.
With MERCOSUR (ECA No. 35)	Came into force: 1 October 1996 Tariff elimination programme under way; to be completed by 1 January 2014. Participation in institutional structure of MERCOSUR.	Trade in goods. Physical integration. Undertaking to negotiate on trade in services.
With Bolivia (ECA No. 22)	Came into force: 6 April 1993.	Partial-Scope Agreement covering a specific number of products. It is proposed to expand this agreement to incorporate more products.

[a] ECA: Economic Complementation Agreement.

they are simply not in a position to do so, because of institutional or other weaknesses.

2. With which countries should Chile negotiate?

Economic theory has not been able to formulate a simple rule or recommendation, in terms of social well-being, regarding the countries that should be chosen as partners in a bilateral agreement (Srinivasan, Whalley and Wooton, 1993). For example, it is considered that the main trading partner of a country is a natural candidate, but Chile has various "main trading partners", depending on the form of aggregation used. It is also claimed that a country should negotiate with others that have a similar pattern of exports or imports, as a means of modifying the terms of trade in its favour, but this is not very feasible for Chile. Geography plays a very important role in selecting a trading partner: the most recent empirical information indicates that two countries which have a common frontier trade 82% more than two similar countries which are not immediate neighbours. These estimates also show that a 1% increase in distance reduces trade by 0.6%, all other things being equal (Frankel, 1997).

The political dimension, which is recognized in the economic literature as an important factor for explaining the formation of regional agreements, has naturally been present in the case of Chile. Thus, Foreign Minister Insulza has said that "the economic complementation and integration agreements which we have promoted in recent years, although mainly concerned with trade, can also have implications as regards increasing the security of Chile in our regional environment". These words are also backed up by the results of empirical studies which estimate "security externalities": there are higher levels of trade between countries which are strategic allies than between those which are, or consider themselves to be, adversaries (Mansfield, 1993).

The composition of Chile's trade with Latin America, which favours the export of goods with higher added value, services and investments, together with the cultural and historical links that exist (also recognized in the economic literature as determinants of trade)[12] and the political dimension already referred to, explain the priority which Chile has given to the Latin American region in its trade policy.

3. What are the objectives that have been pursued?

a) *Market access*

The policy of negotiating international economic agreements has been aimed primarily at opening external markets in order to ensure the best possible development of Chile's exports. Obviously, unilateral openness is not necessarily reflected in openness of the markets of Chile's trading partners. For example, it does not necessarily have any effect on their customs practices or the way they adopt and administer technical barriers, nor does it eliminate the restrictive practices applied by countries through the adoption of anti-dumping measures. Through agreements, however, it is possible to achieve preferential, assured and predictable openness which facilitates the development of export projects.

b) *Ensuring access conditions and stability for exports*

Latin America has been marked by unstable economic conditions and trade policies. In the 1990s, however, there has been a noteworthy increase in trade openness in all dimensions of trade. It has been possible to safeguard these conditions through bilateral agreements. The following three examples illustrate this point. Since 1997, because of its external financial difficulties, Brazil has been applying restrictions on its imports which it also extended to Chile, Bolivia and the rest of its MERCOSUR partners, but two of these measures –the restriction on credits to finance imports and the application of non-automatic import licences– have been applied to Chile, Bolivia and the other MERCOSUR members on special terms which, although not eliminating their application, have nevertheless permitted the partial maintenance of the trade flows in question. For its part, Mexico raised its tariffs for WTO members after 1993, but not for Chile. Finally, Colombia recently wanted to impose restrictions that would have affected some Chilean textile exports within the framework of WTO, but because of its bilateral agreement with Chile it did not do so. There are some cases –for example, in connection with MERCOSUR– which it has not yet been possible to settle satisfactorily, but the framework for settling them does exist.

c) *Eliminating trade barriers that it would be hard to remove in any other way*

The multinational trade system has certain rules regarding negotiations which can inhibit the bargaining power of small countries like Chile. Thus, for example, the most-favoured-nation clause, which is a pillar of the system whereby Chile has benefitted from conditions of greater openness negotiated by other countries, is also to some extent a limiting factor: as Chile, in some cases, is not an important world-level producer of certain goods, its scope for bargaining is narrow (the "major supplier" and "substantial interest" rule).

This may be illustrated with a concrete example. There are currently three companies that assemble motor vehicles in Chile: General Motors, Peugeot and Renault (the latter firm also produces some parts and components). The agreement between Chile and Mexico opens up the export of vehicles to that market on favourable conditions, outside the provisions of its motor industry legislation: the rules of origin are much simpler than those of NAFTA, and since 1996 trade between these two countries has been completely free. Chilean exports of vehicles to Mexico increased from US$ 7,500 in 1995 to US$ 105,000 in 1996, US$ 33 million in 1997, and US$ 29 million in the

[12] See the estimates in Frankel, 1997.

first half of 1998. The elimination of these barriers would not have been possible for Chile in a multilateral negotiation, because Chile is not a major producer in the world market. Bilateral negotiation, however, stimulated exports in a way that unilateral openness could not have achieved.

d) *Progressing in all dimensions of trade*

The Uruguay Round negotiations sought to incorporate a significant number of new dimensions into the multilateral rules which had been in force since the creation of GATT in 1947. Although the results have been very noteworthy, there are nevertheless a number of weak points. The complexity which is added to trade negotiations by the incorporation of more dimensions, many of them of a sensitive nature, strengthens the idea that there might be better prospects of satisfactorily settling these kinds of difficulties on a bilateral basis.

Consequently, a first objective is to promote and protect Chile's investments abroad, the exports of services normally associated with them, and also those which are not associated with investments. Thus, for example, within the framework of these agreements it has been possible to further and consolidate measures to ensure that Chilean shipowners can have unrestricted access to bilateral freight, as well as to cargos to and from third countries, in the area of maritime transport. Recently, within the context of the negotiations on the new treaty with Mexico, the indirect restriction on the transport of vehicles, which benefitted Mexican shipowners, was eliminated, so that Chileans and Mexicans are now subject to the same conditions. This controversy had dragged on since 1991.

Another important issue for Chile is the possibility of eliminating the application of anti-dumping duties. This objective, which is very difficult to attain at the multilateral level, was achieved in the negotiations with Canada, and it is hoped to do the same with Mexico in the near future. Such advances represent an example for the hemispheric trade negotiations which are currently under way.

e) *Protecting and stabilizing market access*

The existence of programmes of unilateral preferences which discriminate against some exports; the implementation of NAFTA (or the negotiation of bilateral agreements by the United States) in countries whose exports compete with those of Chile in the United States market; the negotiation of agreements between the European Union and MERCOSUR or South Africa, and indeed the formation of MERCOSUR itself, are events which could be very unfavourable for Chilean exports, because of their effects in terms of trade diversion or loss of competitiveness in those markets. Chile seeks to avoid such effects by maintaining at least the same conditions of access as those enjoyed by its most direct competitors.

f) *Promoting exports of manufactures and services*

The composition of Chile's trade with the Latin American countries is different from that of its trade with the rest of the world. Chile's exports to the region include products of greater added value and more stable prices, and the bilateral agreements make it possible to take advantage of the economies of scale offered by a broader market and to incorporate more employment, technology and innovation, which are central elements in economic development, provided that the rules of origin are simple and are aimed at the creation and not the diversion of trade.

Another of the features of Chile's links with the region is the importance of exports of services. The complexity of negotiations in this field is significantly reduced when a smaller number of countries are involved.

4. What appraisal may be made of the agreements?

In order to answer this question it is necessary first of all to highlight the fact that preferential access to markets totalling almost 500 million persons has resulted in the expansion and diversification of Chile's exports (table 4).

These agreements operate in macroeconomic and international economic environments which are a reality that must be taken into account but whose effects the agreements are designed to relieve. At the beginning of the 1990s, the growth prospects for the countries of the region appeared to be very promising, but since 1994 they have suffered from various problems which have affected their macroeconomic performance. We may recall, for example, the so-called "tequila effect" of the Mexican crisis, the adjustment problems of the Brazilian and Argentine economies, and the political and economic instability which have prevailed in recent years in Colombia, Venezuela and Ecuador.

TABLE 4

Chile: Trade and investment, by agreements signed or on negotiating agenda
(Millions of dollars)

Year	Andean Community [a]	MERCOSUR [b]	Mexico	Canada	United States	Central America [c]	Asia-Pacific area [d]	European Union	Total
Exports of goods									
1990	304.6	652.0	57.7	56.2	1 469.2	12.9	2 159.8	3 279.8	8 580.3
1993	566.8	1 089.2	130.8	61.1	1 655.2	54.4	2 839.7	2 544.5	9 416.2
1997	1 118.8	1 863.1	376.3	131.0	2 710.5	96.9	5 629.0	4 146.6	17 024.8
Imports of goods									
1990	506.3	1 124.0	100.8	224.3	1 373.4	4.4	915.4	1 882.4	7 023.4
1993	454.7	1 761.0	209.7	203.1	2 477.4	19.4	1 853.8	2 312.3	10 629.6
1997	914.2	3 193.2	1 076.2	432.5	4 332.6	79.7	2 905.3	3 957.0	18 111.6
Foreign Direct Investment [e]									
1990	1.5	6.1	-	252.9	270.9	-	56.7	328.7	1 320.4
1993	7.5	59.3	0.4	480.5	623.7	-	97.6	193.2	1 729.8
1997	26.6	94.7	9.9	678.8	913.4	-	181.8	2 181.0	5 041.2
Chilean direct investment [f]									
1990	-	13.9	-	-	-	-	-	-	15.9
1993	55.3	616.1	2.5	-	-	-	-	-	2 795.1
1997	1 014.7	3 545.8	18.0	-	75	-	30	-	4 730.9

Source: Prepared on the basis of data from the Department of Economic Studies of DIRECON.
[a] Chile has some form of Economic Complementation Agreement (ECA) with all the member countries of this group (see table 3).
[b] Comprises figures for Argentina, Brazil, Paraguay and Uruguay.
[c] Comprises figures for Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua.
[d] Comprises the APEC economies, excepting the United States, Canada and Mexico.
[e] Investment made under D.L. 600. Does not include figures for investment made under Chap. XIV, which is a mode of investment frequently used by countries from the Latin American region.
[f] Investment officially detected.

This, together with the evolution of the relative exchange rates of Chile and these countries, explains on the one hand why Chile has not been able to take advantage of all the new options. On the other hand, however, it means that when this situation, which has not been linked to the Asian crisis but to the economic reforms undertaken, has been overcome, Chile will have a context of trade preferences which it will be able to use to advantage.

The present Asian crisis also gives some indications of how trade with the countries of that region has behaved. Thus, exports to the countries with which there are trade agreements grew by 8% in the first six months of 1998, although total exports to the Asia-Pacific area fell by 11.4%. Obviously, this growth cannot be attributed entirely to the existence of the agreements, but largely to the way the crisis has hit and the composition of trade with these partners.[13] However, the dynamism of this trade does indicate the importance of having a privileged relationship in these markets.

The evaluations of Chile's agreements with MERCOSUR, Mexico, Colombia and Venezuela (see Meller and Donoso, 1998, and Meller and Misraji, 1998) give grounds for optimism. If we look at the effects in terms of trade diversion and creation, which is the criterion used for measuring the impact of the agreements on well-being, the figures indicate that the amount of trade diversion was very small but the creation of trade was very significant in some sectors. As noted earlier, this criterion is limited because it concentrates on the effects of eliminating tariff barriers but does not take account of other dimensions of trade included in these agreements.[14] In particular, it cannot measure the reduction in transaction costs deriving from the greater certainty and transparency of the trade regimes prevailing in these markets or the expansion in trade linked with the process of outward-oriented investment.

[13] It should be recalled that exports of copper and of the fisheries sector had the greatest incidence in the reduction in the amounts exported, because of the effect of the drop in international prices.

TABLE 5

Chile: Estimate of gains in well-being from trade agreements
(As percentages of GDP)

Product coverage	MERCOSUR	NAFTA	NAFTA and MERCOSUR	NAFTA, MERCOSUR, and European Union	NAFTA, MERCOSUR, European Union and rest of South America	Canada and Mexico, MERCOSUR, European Union and rest of South America
No exceptions	-0.43	1.04	1.48	5.24	8.4	8.16
With exceptions	-0.43	1.04	1.48	2.02	2.48	0.44
With exceptions and 6% tariff	0.35	1.70	2.01	2.29	2.66	0.87
Agricultural products excluded only in agreement with European Union	-0.43	1.04	1.48	2.02	5.48	3.90
Agricultural products excluded only in agreement with European Union, and 6% tariff	0.35	1.70	2.01	2.29	5.71	4.44

Source: Harrison, Rutherford and Tarr (1997).

Another criterion used by economic theory for evaluating trade agreements (Kemp and Wan, 1976) is the following: when trade among the members of an agreement expands and their trade with the rest of the world either remains constant or increases (i.e., no obstacles are created for the trade of third countries) there is a clear increase in well-being both for the members of the agreement and for the non-members. If we look at what happened before the Asian crisis in Chile's trade with its trading partners and with the rest of the world, we see that in global terms Chile's trade has continued to expand, both with the countries with which it has signed agreements and with the rest of the world.[15]

With regard to the composition of Chilean exports, the studies indicate that the agreements have promoted or at least maintained exports of goods with high levels of added value. This has been one of the main concerns of the governments of the Democratic Coalition. But the increase in exports of high added value has also been accompanied by an increase in traditional Chilean exports and exports of agricultural products which, in some cases, were not being exported because of the various barriers affecting their possibilities of access to foreign markets (for example, phytosanitary barriers).

[14] Nor does it consider questions such as the existence of economies of scale (Pomfret, 1997).

[15] It should be repeated once again that this conclusion concerns trade as a whole; it does not pretend to be a generalization at the sectoral level, where the situation may be different. For a

Estimation of the economic impact of a trade agreement is an extremely complex exercise from the technical point of view, and the results obtained depend very much on the assumptions taken as the basis of the calculations.

Harrison, Rutherford and Tarr (1997) have evaluated the various trade policy options open to Chile and their impact on social well-being as measured in terms of a percentage of annual GDP (table 5). The options correspond to an "additive" strategy, that is to say, one which takes account of the effect on social well-being of the incorporation of new agreements. The possibilities evaluated in the table are: agreement with MERCOSUR; agreement with NAFTA; NAFTA plus MERCOSUR; NAFTA plus MERCOSUR and the European Union; NAFTA plus MERCOSUR, the European Union and the rest of South America; and finally, agreements with Canada and Mexico plus MERCOSUR, the European Union and the rest of South America. These authors also examine the impact these policy options would have if certain products are excluded (such as sensitive agricultural products) and if the most-favoured-nation tariff is reduced from 11% to 6%.

The main conclusions to be drawn from table 5 may be summarized as follows: the best option is to include all products in the agreements –i.e., that there should be no exclusions– which is the policy that Chile has been applying. The best strategy is to sign agreements with as many trading partners as possible in order to avoid the costs arising from trade diver-

sion; it might be said that this backs up the strategy of open regionalism supported by the Government of Chile. In a situation like that described, excluding the United States does not have a significant impact on well-being. When the possibility of excluding certain products is considered, however, the presence or absence of the United States becomes very important. Finally, the table indicates that if only the agreement with the European Union excludes agricultural products, the effect on well-being is greater than in the option in which all the agreements exclude this type of products, because of the importance that non-cereal agricultural products have for Chile in a bilateral agreement with the United States.

VI

Conclusions

In this article we have examined the bases, objectives and results of the "lateral" trade policy adopted by Chile since the beginning of the 1990s. The criticisms which have been levelled at this strategy are based on a limited analysis of the theoretical bases of international trade. In this paper we argue that in order to evaluate the economic and political rationality of this strategy it is important to broaden the economic concepts by acknowledging the complementarity that exists between the available options and incorporating into the analysis game theory, the existence of economies of scale, the transaction costs involved in the functioning of international markets, and also foreign policy elements.

The aim of this multidimensional strategy has been to overcome the problems referred to earlier and to stimulate the most dynamic economic activities of the Chilean economy during the 1990s: exports of goods with higher added value, services and capital.

Using traditional parameters of appraisal, the results obtained have not shown any negative effects but they have registered clear positive effects.

(Original: Spanish)

Bibliography

Bhagwati, J. (1991): *The World Trading System at Risk*, Princeton, New Jersey, Princeton University Press.

Coase, R.H. (1988): *The Firm, the Market and the Law*, Chicago, Illinois, The University of Chicago Press.

Dixit, A. (1996): *The Making of Economic Policy: A Transaction-cost Politics Perspective*, Cambridge, Massachusetts, The MIT Press.

Dornbusch, R. (1993): The case for bilateralism, in D. Salvatore (ed.), *Protectionism and World Welfare*, London, Cambridge University Press.

ECLAC (Economic Commission for Latin America and the Caribbean) (1994): *La Ronda Uruguay de Negociaciones Comerciales: una evaluación para América Latina y el Caribe*, Santiago, Chile, September.

El Mercurio (1998): Santiago, Chile, Empresa Periodística El Mercurio, S.A.P., 14 July.

Frankel, J. (1997): *Regional Trading Blocs*, Washington, D.C., Institute for International Economics (IIE).

Harrison, G. W., T. F. Rutherford and D.G. Tarr (1997): *NAFTA, MERCOSUR, and additive regionalism in Chile: A quantitative evaluation*, Washington, D. C., *mimeo*.

Jackson, J. H. (1997): *The World Trading System*, Cambridge, Massachusetts, The MIT Press.

Kemp, M. and H.Y. Wan (1976): An elementary proposition concerning the formation of customs unions, *Journal of International Economics,* vol. 6, No. 1, Amsterdam, Netherlands, North-Holland Publishing Company.

Krugman, P. (1996): *Pop Internationalism*, Cambridge, Massachusetts, The MIT Press.

Lawrence R. (1996): *Regionalism, Multilateralism and Deeper Integration*, Washington, D. C., The Brookings Institution.

Mansfield, E. D. (1993): Effects of international politics on regionalism in international trade, in K. Anderson and R. Blackhurst (eds.), *Regional Integration and the Global Trading System*, Geneva, Switzerland, Harvester Wheatsheaf.

McMillan, J. (1993): Does regional integration foster open trade? Economic theory and GATT's Article XXIV,

in K. Anderson and R. Blackhurst (eds.), *Regional Integration and the Global Trading System*, Geneva, Switzerland, Harvester Wheatsheaf.

Meller, P (1996): *Un siglo de economía política chilena*, Santiago, Chile, Editorial Andrés Bello.

Meller, P. and R. Donoso (1998): *La Industria Chilena y el Mercosur*, Santiago, Chile, Dolmen Ediciones.

Meller, P. and D. Misraji (1998): *Chile y los ALC con México, Colombia y Venezuela*, Santiago, Chile, University of Chile, Facultad de Ciencias Físicas y Matemáticas, Departamento de Ingeniería Industrial, January.

OECD (Organization for Economic Cooperation and Development) (1995): *Regional Integration and the Multilateral Trading System*, Paris.

Petersman, E.U. (1997): *International Trade Law and the GATT/WTO Dispute Settlement System*, The Hague, Luwer Law International.

Pomfret, R. (1997): *The Economics of Regional Trading Arrangements*, Oxford, Clarendon Press.

Sáez, R. (1994a): La Corporación de Fomento de la Producción y la diversificación industrial de Chile, *Hombre del siglo XX*, Santiago, Chile, Dolmen Ediciones

——(1994b): La Corporación de Fomento de la Producción a cuarenta años de su creación, *Hombre del siglo XX*, Santiago, Chile, Dolmen Ediciones.

Sáez, S., J. Salazar and R. Vicuña (1995): Antecedentes y resultados de la estrategia comercial del Gobierno Aylwin, *Estudios CIEPLAN,* No. 41, Santiago, Chile, Economic Research Corporation for Latin America (CIEPLAN).

Srinivasan, T.N., J. Whalley and I. Wooton (1993): Measuring the effects of regionalism on trade and welfare, in K. Anderson and R. Blackhurst (eds.), *Regional Integration and the Global Trading System*, Geneva, Switzerland, Harvester Wheatsheaf.

Thurow, L. (1991): *Head to Head*, Princeton, New Jersey, Princeton University Press.

Viner, J. (1950): *The Custom Union Issue*, New York, Carnegie Endowment for International Peace.

Wisecarver, D. L. (ed.) (1992): *El modelo económico chileno*, Santiago, Chile, International Center for Economic Growth (ICEG)/Catholic University of Chile, Instituto de Economía.

WTO (World Trade Organization) (1995): *El regionalismo y el sistema mundial de comercio*, Geneva.

——(1997): *Trade Policy Review: Chile 1997*, Geneva.

Restructuring in *manufacturing:* case studies of Chile, *Mexico and Venezuela*

Carla Macario

ECLAC Division of Production, Productivity and Management.

The economies of Latin America have undergone important transformations during the past years. Yet, while there have been many studies on the macroeconomic changes that have taken place in Latin America, studies on the microeconomic changes are relatively scarce. The purpose of this paper is to provide evidence that leads to a better understanding of how firms respond to new circumstances. The research on Latin American manufacturing firms presented here shows that the new state of the economic environment has led to a substantial change in firms' behaviour. Innovative firms have adopted flexible forms of behaviour and are upgrading their production and marketing capabilities, and they have introduced significant changes in terms of vertical integration, input procurement, technological innovation, incentive pay systems and management techniques, training, subcontracting, distribution and retailing. At least for the most innovative consumer goods manufacturing firms, their core activities have shifted from being mainly concerned with production to combining the manufacture of goods with their distribution, and often also the distribution of other domestic and imported goods as well. This provides them with a better chance of simultaneously increasing their profits and defending their market share. Finally, the investigation also showed that uncertainty surrounding economic policy leads to a substantial decrease in investment by firms. Such uncertainty explains why more firms do not change, or why they do not change faster. It has a twofold negative effect on entrepreneurs' decisions to modernize their firms: they are uncertain about what they should do, as well as about the sustainability of the economic policy. There is therefore an important role for policies that redound in programmes that seek to encourage firms to upgrade. At the same time, it must be stressed that the most important role for policy is that of creating a stable economic environment in which firms can plan long-term investment.

I

Introduction

The countries of Latin America have undergone important transformations in the past few years. There have been radical changes in macroeconomic and trade policies and in the general economic environment, such as in matters relating to State intervention and the regulatory framework, accompanied by increased globalization of world markets. As a result, there have been important changes at the macroeconomic level and in the way the economies of the region relate to the world economy, as well as in the behaviour of firms.

While there have been many studies on the macroeconomic changes that have taken place in Latin America, studies on the microeconomic changes are relatively scarce. One of the first of these studies examined how Chilean firms adapted to such changes during the 1970s and early 1980s (Corbo and Sánchez, 1984). In recent years, along with a consensus in most countries on what macroeconomic policies should be adopted to achieve long-term stability, there has been a growing interest in research into changes in manufacturing companies' behaviour and the way they are adapting to the new economic environment (Baumann, 1994; Bielschowsky, 1994; Castillo, Dini and Maggi, 1994; Katz and Burachik, 1997).

This paper presents the results of an investigation into manufacturing firms' strategies and changes in these strategies as a result of trade liberalization, globalization, and transformations in the economic environment in which they operate. The main questions this research set out to answer were the following: Are Latin American firms in traditional consumer goods manufacturing sectors changing their strategies, or are they for the most part functioning as they did 20 years ago? How decisive is the influence of macroeconomic events on microeconomic ones, and what is the margin that companies have for individual behaviour? If traditional consumer goods manufacturing firms' behaviour is changing, what are the most important areas in which these changes are taking place? What are the strategies of the firms in these industries that are most advanced in the modernization process in the region?

This investigation was carried out in medium-sized and large traditional consumer goods manufacturing firms in Chile, Mexico and Venezuela. From the beginning, it was decided to focus mainly on such firms, since it was assumed that they were among the most representative of the medium-sized and large manufacturing firms that could be found in all three countries. The sectors included covered a wide range of industries but strongly emphasized garment firms, as a way of comparing the behaviour of firms across countries in comparable industries, because garment manufacturers belong to an industry that was established several decades ago, not only in the countries included in the research, but in most other Latin American countries as well. It was also interesting to study this industry because it has been strongly exposed to competition from imports and has been strongly affected by the globalization of the garment sector worldwide.

Over 40 garment firms were included in the study, although comparable data were only available for 38 of them:[1] hence, the conclusions presented in this article are inferred mainly from this type of firm.[2] Interviews with executives of the firms on the basis of open-ended questionnaires were complemented with plant visits, as well as with meetings with trade association representatives, industry experts and government officials. Firms were chosen so as to provide a diversity of companies, but it is not claimed that they make up a representative sample. Most of the

□ The author wishes to thank Ricardo Bielschowsky, Jorge Katz and Joseph Ramos for their many valuable comments that led to this paper. The basic research was carried out as part of the ECLAC/UNDP Project on Innovation and Competitiveness. ECLAC staff members Wilson Peres, Martine Guerguil and the author herself carried out the interviews.

[1] See Macario (1998a).

[2] However, they appear to be valid for other traditional consumer goods manufacturing firms, such as those in the footwear and leather industries (see Macario, 1998b).

interviews took place in 1993, but some were conducted in 1994 and 1995. In some cases, the initial interviews were supplemented by follow-up visits, so as to obtain a better perspective of changes in company strategy over time.

The following section of this paper (section II) describes the main characteristics of the behaviour of traditional consumer goods manufacturing firms under import substitution. It is partly based on the same interviews with the executives, who were questioned about the history of their firm. Section III presents the main findings of the research concerning the behaviour of traditional consumer goods manufacturing firms in the process of modernization, and the last section (section IV) presents the main conclusions.

Finally, a warning is in order: while there are many different definitions of competitiveness and indicators for measuring it, in this paper the term "competitive" is used as a synonym of "modernizing": when a company is described as being competitive, this should be understood as meaning that it is an innovative firm, striving for survival and change and trying to find the most appropriate ways to adapt to a new environment and thereby increase its market share.

II

Company behaviour under import substitution

What are the main strategies of a firm manufacturing consumer goods under import substitution? This section tries to answer this question by describing the main features of the evolution of a representative firm.

The typical firm interviewed in this survey is a family company that was initially set up in a small workshop in sectors such as garment or shoe production, or a small metal-casting plant. This small workshop slowly expanded, buying new equipment, moving to new premises and becoming an authentic manufacturing firm.

The transition from small workshop to manufacturing plant was often quite difficult and risky, in the face of competition from many other similar workshops. Financial assistance for small firms was generally not available, so that one of the critical factors in the transition was the ability to accumulate enough financial resources to expand. Hence, very few workshops were able to be become manufacturing firms unless the entrepreneurs were successful in obtaining sufficient funds, often thanks to family support, lobbying with government agencies, or sheer luck.

Production was generally initially organized along the same lines as in the workshop, slowly evolving subsequently into a pattern broadly based on the organization of work in plants in industrialized countries.

Plant layout was often designed by the entrepreneur himself. The firm manufactured a wide variety of products with unsophisticated design and quality standards. This was good enough for a growing body of consumers who were just beginning to have access to manufactured goods and were therefore not very demanding.

Management was generally the responsibility of family members and did not follow professional criteria. Production workers were paid fixed wages or, in some cases, were on piecework, without strict quality requirements. Firms did not provide training.

Most production operations were carried out internally in the firm. Subcontracting was very rare and was only used for very specific operations that were difficult to carry out in the plant itself, or to satisfy unexpected surges in demand.

In general, inputs were manufactured within the country, in view of the prevailing import substitution policies, as well as the costs and delays involved in importing them from abroad. Larger firms tended to be vertically integrated, manufacturing inputs not only for their own use but also to sell to other domestic firms. There was a powerful incentive for firms to become as integrated as possible, since companies selling intermediate goods were often rivals in the finished product market.

Most goods produced were sold on the domestic market. It was generally difficult for consumer goods manufacturers to export on a regular basis for a number of reasons, such as the anti-export bias result-

ing from high tariffs or from non-tariff barriers; the relatively low level of the exchange rate in most countries throughout nearly all of the import substitution period; and the very high transportation costs within the region.

Tariff and non-tariff barriers in other Latin American countries which could have been among the most attractive markets also helped to make exporting less appealing. Protectionism and transport costs made it difficult to export to the industrialized countries.

For the most part, firms tended to export occasionally to neighbouring countries, particularly those with a lower degree of industrial development. Exports were countercyclical, increasing when there was a drop in domestic demand or a depreciation of the exchange rate. The products exported were the same ones that the firms sold on the domestic market. The system of incentives was such that most consumer goods firms specialized in producing for the domestic market, protected from external competition.

When they managed to overcome the initial financial constraints and reached a certain production threshold, companies generally had relatively easy access to financial support from the government, which provided credit at low and often subsidized interest rates. This allowed them to continue expanding. Once they reached this stage, the pressures to increase productivity were not as strong as in the previous stage.

In addition, by the time the firm had established a manufacturing plant of an adequate scale for the dimensions of the domestic market, competitive pressures from similar domestic companies were considerably reduced. The small size of the domestic market often allowed it to be controlled by a limited number of firms engaged in collaborative behaviour, dividing it up into market shares which remained quite stable over time.

Therefore, once a typical consumer goods manufacturing firm had achieved a certain minimum production scale and a given share of the domestic market, it would reach a plateau. It was perfectly possible for the firm to continue operating in this way: with family-style management there were no strong pressures pushing the firm to continue evolving, and its environment became quite stable and safe.

The lack of strong competitive pressures, once the firm had passed a certain threshold, had repercussions on the way production was organized. Hence, while production was broadly organized following the guidelines used in industrialized countries, firms were not obliged to continue introducing changes to improve productivity and quality.

The import-substitution-based development model allowed the countries of the region to create a manufacturing sector. Without it, most of them would now have a substantially smaller number of industrial firms. This model made possible the learning and evolution that allowed a workshop to be turned into a manufacturing firm. It also helped to transform several generations of rural migrants into industrial production workers. Indeed, a substantial proportion of the manufactured goods the region exports nowadays comes from firms that exist thanks to import substitution industrialization policies. However, by the 1960s this model had become a constraint on the development of the Latin American countries (ECLAC, 1994).

Between the mid-1980s and the late 1990s, most of the countries in the region substantially transformed their macroeconomic and trade policies, as well as most of the regulatory environment. These changes had a considerable impact on firms in the region, altering the framework they were used to operating in and submitting them to strong competition from imports.

III

The behaviour of firms in the 1990s: Main findings

1. The influence of macroeconomic and trade policies

What influence do macroeconomic and trade policies have on firms' behaviour? An examination of the differences in behaviour between firms in Chile, Mexico and Venezuela, and of the evolution within a given country over time, would be useful for assessing this influence.

Most Chilean firms had maintained or increased their production levels in the year that preceded the interviews, thanks to the general macroeconomic stability and sustained growth of Chile. This result was also due to the fact that the firms which had managed to survive the shock of the industrial restructuring that took place at the end of the 1970s and the beginning of the 1980s were relatively strong, even under the pressure of increased competition from imports.

Mexican firms displayed two types of behaviour. Most of them had suffered a sharp drop of up to 30% in their output in response to the slow rate of growth of the Mexican economy up to 1993 and the increased import penetration. However, several firms which had invested heavily in upgrading and/or which exported had increased their output.

In contrast, most Venezuelan firms had suffered a sharp drop in output owing to the considerable decrease in demand resulting from the political uncertainty in the latter part of 1992 and very strong competition from imports.

Macroeconomic changes appear to have become even more important for manufacturing firms after trade liberalization. For example, appreciation of the exchange rate results in a substantial increase in competition from imports in a very short period of time.

Further evidence of the impact of macroeconomic trends on firms' behaviour is the evolution of exports by Chilean firms. While in 1990 several of the companies surveyed in that country belonged to a category that could be classified as having "moderate exports", regularly exporting between 5% and 10% of their output, by 1992 there were no firms in this category in Chile: either they had opted out of the export market completely or had substantially increased their export efforts and the percentage of output they exported. The growth of domestic demand, combined with an appreciation of the exchange rate, polarized the firms' export behaviour, causing most of them to focus exclusively on the domestic market, while those which wished to continue exporting had to become increasingly specialized in that market. This is illustrated by the fact that while, among Chilean firms interviewed in given sectors, the number of firms exporting decreased as the exchange rate appreciated, the average exports for those that habitually exported increased from 15.6% of their output in 1990 to 44% in 1992.

The fact that the evolution of the firms' output was heavily influenced by macroeconomic events in all three countries shows the importance of the macroeconomic environment for company behaviour.

Similarly, there is a clear link between export behaviour and the degree of openness of the economy: none of the Venezuelan firms visited were exporting at the time of the interviews (March 1993), whereas there were several exporting firms in Chile and even more in Mexico. These two countries had liberalized trade before Venezuela, and it was clear that there would be no reversal of this policy. Venezuela, on the other hand, had liberalized trade late in the 1980s but, at the time of the interviews, there were serious doubts that this policy would be sustained. The events which have taken place in Venezuela since then have proved that this was a correct assessment of the situation.

The strong influence of macroeconomic and trade policies on firms' behaviour means that the implications of these policies must be carefully evaluated. Similarly, the effects produced on firms' behaviour by uncertainty in respect of economic policy must also be taken into account. An example of this is what took place in Venezuela from 1993 on.

2. The margin for microeconomic behaviour

However, in spite of the considerable influence of the economic environment on firms, the research also leads to the conclusion that there is a margin for company strategy: not all the Chilean firms were modernizers, not all the Venezuelan firms were going under.

Some firms can manage to be competitive in spite of an adverse environment and of being in a subsector where there is very strong competition from imports. One example of this are two Venezuelan firms that were willing to continue investing, training their personnel and to search for new survival strategies while most firms in that country were seeing their output drop and their market share dwindle owing to the recession and to competition from imports. These modernizing firms had gambled that they would survive and were following an active upgrading strategy in order to be competitive.

Another example can be seen in several Mexican industries characterized by particularly strong import penetration, such as the garment and shoe industries. While many firms in these industries had closed down, several surviving firms were doing remarkably well, thanks to their efforts to adapt to the new environment.

More research should be carried out on individual company strategies and the capability of some firms to learn and adapt to a new environment. There is much to be learnt from these firms, and knowing more about their strategy would be useful for policy design. Efforts should also be made to provide economic theory with a more solid theoretical framework for analysing the scope for microeconomic behaviour (Nelson, 1991).

3. Changes in firms' behaviour

The general behaviour of a manufacturing firm under import substitution, as described above, is still an accurate description of the behaviour of some firms today. However, the research led to the conclusion that the behaviour of many firms in the region is undergoing substantial change.

The interviews with company executives and private-sector representatives carried out during the investigation showed that the entrepreneurial environment is very dynamic and that changes are taking place. It is possible that many more transformations are occurring than can be perceived at an aggregate level, partly because some are still incipient and also because many of the changes are in conflicting directions.

In order to survive, manufacturing firms have been forced to adapt to their new environment. This has required substantial investments, which can be very costly given the limited availability of long-term financing, as well as the high interest rates that have prevailed in the region, particularly under stabilization policies.

From the information gathered during this investigation, what are the changes that may be observed in consumer goods manufacturing firms in Chile, Mexico and Venezuela today? The present section addresses this issue, first by describing the behaviour of most of the modernizing firms and then by concentrating on some specific areas where there have been major changes.

The modernizing firms are specializing: decreasing the number of production lines, while increasing the variety of goods manufactured within the production lines they maintain. They are decreasing the size of production batches and the time that it takes to produce them. They are also decreasing inventories, particularly those of final goods.

To achieve this, the companies are changing their layout, following the advice of external consultants that they hire themselves or that are contacted through foreign firms, such as clients or companies they have a licence from. The changes in layout are no longer conceived as something that will remain in place for a long time, but rather are implemented with flexibility and a willingness to adapt them regularly as changes in demand require.

The aim of the changes in layout is to facilitate the production flow and improve quality control. The introduction of automated control of the production flow also enables the firm to have precise information on individual worker productivity and to detect bottlenecks quickly.

The plants that are modernizing most successfully are those that have been able to systematically apply production standards and efficiency goals in line with Fordist practices. This has enabled them to increase productivity substantially. Production routines have also been modified to introduce more quality checkpoints and, in the most advanced plants, to increase individual worker responsibility for quality standards. With respect to whether flexible speciali-

zation and greater worker autonomy are replacing Fordist practices, the research confirms the findings of a previous case study in the Brazilian shoe industry that "suggests that more important than the boundaries are the connections between Fordism and flexible specialization" (Schmitz, 1995).

Quality has also improved thanks to substantial upgrading of design capability as professional personnel are hired and automated equipment is put in place.

The desire to improve quality and to attain efficiency goals has led firms to modify payment systems. The changes implemented for this purpose, described below, indicate that firms are seeking payment systems that fit their need to upgrade productivity and quality standards.

The changes in the organization of production and in systems of payment are accompanied by changes in management practices, as firms pass from a family-based management style to one following professional guidelines. These changes are in response to the increasingly competitive environment, but they also often coincide with a generational transition as regards company ownership.

The following are the areas in which the most important changes are taking place.

a) *Vertical integration*

An illustration of changes in macroeconomic and trade policies resulting in changes at the microeconomic level is the degree of vertical integration within firms. High degrees of vertical integration were advantageous under import substitution policies because firms selling intermediate goods had considerable market power, particularly when they sold to firms that were rivals in the finished-product market. However, this is no longer the case, given the increased options for input procurement outside the country resulting from trade liberalization.

Indeed, the interviews in vertically integrated plants provided evidence that for many industries a high degree of vertical integration has gone from being an asset to a liability for firms, as it restricts their flexibility for input procurement. On several occasions, managers in charge of producing final goods complained about having to use inputs made within the same firm: an obligation that restricted their possibilities of purchasing a variety of inputs at low cost in a reasonable period of time. In most cases, it was not only cheaper for them to buy inputs outside the firm, but the delays involved were also reduced. Every one of the vertically integrated firms said that they were using increasingly small proportions of inputs produced within the same firm.

Plants manufacturing non-competitive intermediate goods have been particularly severely affected, since there has not only been a decrease in their production of inputs for plants within the same firm, but the demand for their goods from other firms within the country has plummeted. Quite often, unless they provide a very competitive input, vertically integrated plants are an obstacle to the flexibility which firms now need in order to be able to respond quickly to changes in demand.

Some companies have begun to address this issue by setting up different firms within a conglomerate and decreasing the obligations of their firms to buy inputs from related plants. In several cases, the move towards vertical dis-integration has gone even further as firms that were formerly integrated have separated into different firms with different owners. This allows firms to specialize in separate segments of the production sequence, gaining economies of scale.

b) *Utilization of imported inputs*

Along with the decrease in vertical integration there has been a significant change in input procurement, as firms in the three countries use increasing amounts of imported inputs. This was only to be expected after trade liberalization processes combined with currency appreciation. There was evidence of this in all three countries, as all firms had increased their use of imported inputs in the previous three years.

Chilean firms used higher percentages of imported inputs than their Mexican and Venezuelan counterparts. This is because trade liberalization started earlier in Chile than in the other two countries. It is also due to the small size of the economy, which limits the variety of inputs manufactured domestically.

For firms that were not vertically integrated, trade liberalization was an opportunity to buy a greater variety of inputs, often of better quality and at lower cost. The use of imported inputs has played an important role in firms' strategies aimed at becoming more competitive.

c) *Technology*

A rough estimation of the technological level of the firms was made by comparing their equipment during the interviews with firm executives and visits to the plants.

The first finding is that when the technological level of firms in the same industry was compared across countries, the differences, surprisingly, were much smaller than would have been expected in view of the differences in the sizes of the economies. While it is true that some of the firms with the most advanced technologies were Mexican, the average gap between similar industries in the three countries does not seem to be very wide.

In contrast, there was wide dispersion of technological levels between firms in the same industry within the same country. This was the case in Chile, Mexico and Venezuela, and is evidence of the heterogeneity of Latin American industry. At least in traditional consumer goods manufacturing sectors, different technological levels seem to be able to coexist side by side. This dispersion appeared to be greater in Mexico than in the other two countries.

It was also surprising to find that, for large and medium-sized companies, there is no systematic correlation between the size of the firm and its technological level. Several of the largest firms interviewed had quite low technological levels, while some medium-sized firms had better equipment, as well as more modern management practices. This may be due to the fact that some large firms that are older and accustomed to operating in an import-substitution environment are addressing other issues, such as increasing flexibility and subcontracting, before introducing technological innovations.

Similarly, there does not appear to be any systematic correlation between investment in hard technology and company competitiveness. Several firms had relatively sophisticated equipment yet were not very competitive. For example, some firms, particularly in Venezuela, had relatively advanced equipment that they often did not use.

However, while a relatively high technological level does not necessarily mean that the firm is competitive, the reverse does seem to be true. More than the technological level they had attained, what seemed to characterize modernizing firms was their search for ways of raising their technological level by acquiring the specific equipment that would allow them to solve specific problems.

In other words, rather than expenditure on capital goods for the whole plant, what characterized modernizing firms was their efforts to "fine-tune" the incorporation of technology in the plant, and to do so systematically, on an ongoing basis.

d) *Incentive payment systems and management techniques*

In most firms in the region production workers are still paid on the basis of fixed wages that are a function of the time spent at the workplace and are often linked to the evolution of the minimum wage. Some firms also use piecework.

On the other hand, the goal of improving productivity and quality has led many firms to explore new pay systems. A growing number of companies interviewed in the course of the research are trying out new ways to pay production workers that can result in productivity increases. For example, most of the firms exporting a substantial proportion of their output were using new schemes of payment for their production workers which are innovative, at least compared with the usual practices in the region. Such schemes include incentives for attendance and high-quality output, as well as productivity goals based on international industrial standards.

Efforts in this direction were most frequent in Mexico. Half of the firms interviewed in that country had innovative pay schemes in which attendance and quality incentives could amount to up to half the workers' monthly wage. The purpose was clearly to find the pay system that would best enable the firms to improve their productivity, as well as the quality of their products. There are even a few companies in Mexico which are paying an extra bonus in return for a worker's capability and willingness to work in different positions within the plant. Similarly, follow-up visits to Venezuelan firms at the beginning of 1995 showed that the most modernizing firms in that country were also training workers to carry out multipurpose tasks.

The companies that were introducing new ways of paying their workers were also among the most dynamic, as well as the most innovative in other areas, such as in the introduction of new management techniques. In fact, this last characteristic is almost a prerequisite for incentive payment schemes, since setting up more sophisticated pay systems than those generally used in Latin America requires procedures that allow careful monitoring of the productivity and

quality of the work of individual employees.[3] The managers of these modernizing firms say that one of their most important competitive advantages is precisely their human resources practices. While it is not yet obvious which of the systems are the most efficient, companies are clearly aware that improving productivity and quality requires innovations in incentive pay systems.

e) *Training*

Most of the firms interviewed in Chile and Venezuela provided very little training for their workers. This was particularly surprising in the case of the former country, since Chilean firms can obtain a tax credit to cover the cost of some training activities and entrepreneurs in that country stated that deficiencies in human capital were among the greatest competitive disadvantages they faced (Macario, 1995).

Mexican firms, on the other hand, appeared to be much more willing to spend resources on training their personnel, although, on average, the amount spent is quite small. Some of the companies interviewed even had small schools in the plant which provided not only specific training but also general education programmes.

Mexican companies' greater disposition to train their workers is partly due to a combination of the lower average educational level of the workforce and the various training programmes being offered by the government (Federal and regional).

However, the main explanation for Mexican firms' greater training efforts is their managers' desire to achieve a substantial increase in productivity to counter the competitive pressures they are facing. The companies that are investing most resources and energy in training are precisely those which are trying to overhaul their whole organization.

f) *Subcontracting*

When import substitution policies prevailed, there were a few firms in the region that subcontracted part of their production, but this tended to be the exception rather than a frequent practice. Most large companies were not under much pressure to reduce costs and they had a relatively stable market share. If new operations had to be carried out on a regular basis, they ended up being undertaken internally in the firm. Subcontracting was generally used only for very specialized tasks or for unexpected surges in demand.

The situation now appears to have radically changed, and one of the most noteworthy developments observed during the interviews was the remarkable increase in subcontracting by firms in the region. This is the result of changes that are occurring both at the global level and within the region. In the first place, there has been a considerable surge in international subcontracting as firms establish dynamic networks on a worldwide basis, thanks to the decrease in transportation costs and improvements in telecommunications (Dicken, 1992). At the same time, in Latin America the combination of trade liberalization processes and exchange-rate appreciation has exposed firms to very strong competition, forcing many companies to downsize and reduce costs. Subcontracting plays a key role in firms' survival strategies, allowing them to reduce their fixed costs and to respond more quickly to changes in demand.

Most of the companies interviewed had increased their subcontracting of manufacturing operations in recent years. Moreover, most of them expected subcontracting to increase substantially during the years to come. Some of them subcontracted the manufacture of products they had previously produced internally in the firm, but for which the production lines had been closed down. In other cases, firms had decided to centralize product design and subcontract most of the manufacturing process.

While an increase in subcontracting could have been reasonably foreseen even at the beginning of the investigation, the extent to which it is practiced in Chile, Mexico and Venezuela is quite striking. Not only has subcontracting within the same country become prevalent, but also many firms are subcontracting abroad. In some cases, companies subcontracted work to a firm in a neighbouring country which had a cheaper and better trained workforce, as in the case of the Venezuelan firms that subcontracted operations in Colombia. In other cases, companies decided to gain a competitive edge by going to the region that produced the goods responsible for taking away their market shares: in other words, they subcontracted directly in Asia.

This practice, which is being adopted in a large variety of sectors, is particularly widespread in gar-

[3] One of the innovations most frequently observed is the introduction of computerized systems that allow monitoring of the production flow and inventory control.

ment and footwear manufacturing. Rather that letting themselves be displaced from Latin American markets by Asian products, firms have decided to subcontract at least some production lines directly in Asia.

While some companies have gone all the way, practically shutting down domestic production and concentrating instead on distribution, most firms have reacted in a way that will allow them much more flexibility in the long run: they subcontract production in those lines in which they are less competitive, while trying to become very competitive in the lines they retain. In this way, if there are changes, such as a depreciation of the exchange rate, they will still have manufacturing capabilities and can then increase domestic production. Meanwhile, this strategy allows them to defend their share of the domestic market, especially in view of exchange-rate appreciation and the remarkable surge of low-cost Asian exports of increasingly high quality.

This practice is much more widespread than is publicly perceived. Entrepreneurs are reluctant to mention it (more so in Mexico and Venezuela than in Chile) because they fear a negative reaction. Another reason is that many trade associations are demanding government protection against what they claim to be unfair competition from Asian products. Entrepreneurs are also reluctant to reveal what is one of the key elements of their competitive strategy. But the fact is that the most competitive firms in the region are following this strategy, which is really a very reasonable one, since it allows the company to survive and to concentrate on manufacturing the products in which it is competitive.

g) *Distribution and retailing*

For most manufacturing industries, distribution and retailing did not play a key role when import substitution policies aimed at creating a domestic industrial sector prevailed. Productive activities were favoured over distribution, and it was much easier to obtain subsidized credit to set up an industrial plant than for retail outlets. Furthermore, industrial manufacturers had substantial market power over retailers, who did not have much choice in purchasing their merchandise. Hence, production was emphasized rather than retailing. Even though manufacturers often distributed their own goods directly to consumers, the core of the manufacturing business was the plant itself.

Nowadays, circumstances have changed dramatically for most of the traditional consumer goods manufacturing industries. By opening up their economies, the Latin American countries have given their consumers the possibility of choosing among a wide variety of goods. Import penetration is very strong, and retailers are no longer restricted to goods produced domestically. This has produced a shift in manufacturers' activities.

This shift became obvious in the course of the investigation in Chile, Mexico and Venezuela. Most of the executives of modernizing firms said that their main concern was to become competitive in distribution and to achieve name recognition for their brand. They said that this was the single most important factor for the survival of their manufacturing activities, as the market was flooded with goods from other countries.

Because of this, simultaneously with the decrease in the degree of backward vertical integration there has been a substantial increase in investment to increase forward integration: many manufacturing companies believe that ensuring the presence of their brand in the domestic market and securing a strong retail structure will increase their possibility of surviving as a firm.

While this situation was noted in all three countries, it was most evident in Chile. Almost all of the company executives interviewed in that country said that ensuring a good retailing system was of the uppermost importance to them. Sometimes the company itself owned retail stores, sometimes it did not, but at all events retailing is a crucial aspect of company strategy.

While this situation was also observed in Mexico and Venezuela, it was not as prevalent there as in Chile. This is because the relatively small size of the Chilean domestic market makes capturing a market share more important. It is also due to the fact that Chile liberalized foreign trade before Mexico and Venezuela, and many Chilean firms were forerunners in recognizing the importance of retailing for manufacturing company strategy.

Whatever the main reason may be, the fact is that although the trend was much more marked in Chile, the importance of establishing solid distribution networks was also a key element of the strategies of the most competitive firms interviewed in Mexico and Venezuela. One Venezuelan company executive, who runs a very interesting, innovative firm, said: "If I had any investment resources available, I would open new stores". Similarly, the Chief Executive Officer of

the Mexican firm that was among the best-organized manufacturing plants visited believes that his greatest competitive disadvantage is his lack of forward integration.

Another indication of the importance of this trend is the fact that many companies that were making investments were actually concentrating most of the resources on improving the distribution of the firm's products, rather than on manufacturing itself. In fact, technological innovations, such as on-line sales and stock control, were often introduced with that purpose. Similarly, companies frequently tend to focus training efforts on their marketing employees, rather than on production workers.

Moreover, a strong distribution network also allows manufacturers to distribute imported goods, thus defending the market share of their own brand. This provides them with the opportunity to have some control over the prices at which competing imports are sold, as well as making profits on their own sales. This strategy appears to be very sound from the manufacturer's point of view, as it allows firms to benefit from import surges and to continue manufacturing the product lines in which they are still competitive, while at the same time retaining their market share.

h) *Exporting firms*

What were the differences observed between modernizing firms in general and those that regularly exported a significant proportion of their output (over 15% or 20%)?

In terms of sales and employment, the exporting firms included in the investigation were quite similar to those that exported only occasionally, those that regularly exported a small percentage of their output and those that did not export at all. While exporting firms tended to have slightly higher employment and sales levels than non-exporting firms, the differences were not significant between the two groups, for a given industry.

There does appear to be a minimum sales threshold beneath which it is difficult to find firms that export regularly. This is probably due to the fixed costs involved in exporting, such as purchasing equipment that enables the firm to achieve better quality, acquiring clients abroad, and carrying out the paperwork required to export. But above a certain level there no longer seems to be a systematic correlation between company size and export activity: while in a given industry most exporting is indeed carried out by large firms, there are medium-sized firms that export and many large firms that do not export at all. The growing number of medium-sized Latin American firms that are exporting is an interesting phenomenon that deserves further study.

However, the one significant difference between exporting and non-exporting firms was the greater concern that the former have for quality improvement. Exporting firms are increasingly exporting goods manufactured according to export-market specifications, instead of simply exporting goods identical to those they sell on the domestic market. The importance of quality for exporting firms was reflected in plant layout specifications, as well as training and wage incentive systems. Exporting firms provided training more frequently than non-exporters and tended to have introduced more innovations in wage systems.

Exporting and selling on the domestic market should not necessarily be viewed as involving a trade-off. In fact they can often be interrelated choices, particularly in small economies such as Chile. It may be that a firm needs to export in order to attain the scale that allows it to be competitive in the domestic market. Exporting also provides learning opportunities for firms, as they learn how to satisfy requirements in more demanding markets. This learning has a positive spillover effect in the domestic market. At the same time, a solid position in the domestic market allows a firm to bear the cost of going into new export activities.

The investigation leads to the conclusion that in traditional consumer-goods industries there are no significant differences between large and medium-sized modernizing firms that focus mainly on the domestic market and exporting firms. The only exceptions are the importance of quality for exporting firms and the learning opportunities provided by exporting. It may be said that in general exporters are modernizers, but not all modernizers are exporters.

4. Flexibility

The previous sections described how the most innovative consumer-goods manufacturing firms in Chile, Mexico and Venezuela are undergoing important changes in the way production is organized, in vertical integration and input procurement, as well as in management style and in wage systems, among other

features. Companies are adapting and learning how to be competitive in the new economic environment prevailing in the Latin American countries.

Rather than a massive once-for-all overhaul of the firm, however, the most relevant characteristic of these innovating companies is the flexibility they display in continuously improving their performance, for example thanks to the ability to pinpoint the areas where bottlenecks are most severe. Transformations are now carried out on an ongoing basis, sometimes through a series of small changes. These transformations finally result in a massive overhaul of production practices, but of a different nature from that achieved through a once-and-for-all effort.

The importance of such flexibility should not be underestimated, both in production and in distribution: firms that have the highest success rate (and the highest survival rate in the face of very adverse shocks, such as some companies in Venezuela) are those that are able to react quite rapidly and adapt to new circumstances.

For example, one of the areas where flexibility is clearly important is in enabling firms to develop more adaptable production systems that allow them to react to changes in consumer demand and to produce a wide variety of goods with a limited number of production lines. Changes in production are increasingly demand-led, and the time it takes for firms to introduce changes in response to changes in demand has decreased.

Another area in which flexibility is critical is the ability of firms to react to changes in the exchange rate, retaining a minimum production capability that enables them to cover their market share, while being willing to transform themselves rapidly into distributors of some lines of imported goods when there is a substantial appreciation of the exchange rate. The strategy of becoming the main importers of goods competing with their own products and distributing them through their own distribution channels was one of the strategies hesitantly adopted by a few firms in Chile in the late 1970s and early 1980s. In retrospect, we can now see that this strategy was to become very successful.

Entrepreneurs have learnt from this past experience, and the most successful and resilient firms in the three countries are those that have the flexibility to convert themselves rapidly into importers and distributors of competing imported goods. They have realized that this is the best way to be able to manage prices and to set prices of imported versus domestically produced goods, according to their production capabilities. This strategy allows the firm to use its own distribution channels, while continuing the production of its most competitive goods. Behind this strategy is the idea that if the company does not do this, another firm will seize the opportunity and displace it from the market.

However, while becoming distributors of imported goods is a strategy that is increasingly being put into practice by enterprising Mexican and Venezuelan manufacturers, and continues to be practiced by the Chilean ones, it is not always readily acknowledged by them, since they are reluctant to admit that they are becoming major importers of competing goods.

5. The shift in the core of the manufacturing business

In addition to the importance of flexibility for company strategy, another important feature of the changes that are occurring in companies' behaviour is the shift in what constitutes the core of their strategy.

Under import substitution, manufacturing firms had a relatively advantageous position with respect to distributors and retailing firms: they could obtain credit at preferential rates and special permits to import inputs, and they could lobby to stop imports of competing goods once they had set up local production facilities, among many other advantages. Although some manufacturing firms were also retailers, the core of the manufacturing business was production.

Today, the situation for Latin American manufacturing firms is radically different. They face vigorous competition in the domestic market, both from imports and from other domestic firms that are trying to defend their market share. Consumers have also grown more demanding as they have had access to a wider variety of goods, not only as a result of trade liberalization, but also because of exchange-rate appreciation.

A competitive manufacturing firm now not only has to upgrade its organization of production but must also have an active and aggressive retailing strategy. Trade liberalization, particularly in a context of currency appreciation, has significantly increased the importance of distribution and retailing. The most innovative manufacturing firms studied in the survey

TABLE 1

Summary of strategies used by manufacturing firms in the 1990s

	Modernizing firms	Non-modernizing firms
Areas in which differences are highly significant	Flexibility in the continuous introduction of changes in production and distribution in response to changes in demand and in the macroeconomic environment (such as the exchange rate)	Rigid passive behaviour
	Hiring of external consultants for upgrading	Exclusive reliance on in-house expertise
	Productivity is continuously measured	Productivity data not available
	Innovative incentive payment systems	Traditional wage systems
	Professional management	Family-based management
	Production changes are demand-led	Limited changes in response to production concerns
	Large increases in subcontracting based on long-term relationships	Subcontracting is nonexistent or very limited
	Strong interaction between production and distribution	Firm focuses exclusively on production
	Whenever possible, closer ties with retailers or significant increases in retailing carried out by the firm itself	Loose ties with retailers
Areas in which differences are significant	Substantial decrease in vertical integration: related plants become independent firms	Decrease in vertical integration
	Significant increase in the use of imported inputs	Increase in use of imported inputs
	Efforts to improve design capability	Limited design capability
	Reduction in stocks	Large stocks maintained
	Regular changes in production layout	Rigid process layout
	Reduction in the number of production lines	Number of production lines maintained
	Increased product diversity within production lines	Limited product diversity within production lines
	Quality is important	Quality is not a priority
	Individual worker responsibility for quality	Quality control at a few points on the assembly line
	Technological innovations are introduced at key points, after thorough assessment of existing bottlenecks	If introduced, technological innovations are bought in a package, not in response to a careful assessment of the plant's strengths and weaknesses
	Technological innovations are introduced regularly on a continuous basis	Technological innovations are introduced on a once-and-for-all basis
	The firm provides training for its workers	The firm does not train its workers

were those that had a network of retailing outlets, with the goal of preserving their share in the domestic market and benefiting from the sale of imported goods. Retailing also allows manufacturing firms to increase their profit margins, since it is in essence a non-tradeable activity in which profit margins have soared in recent years. It also allows firms to manage flexibly a product mix of goods manufactured in their own plants and imported goods, depending on the evolution of the exchange rate.

The follow-up interviews with Venezuelan firms in 1995 showed that the most competitive firms were putting into practice a strategy of decreasing the amount of goods they sold to intermediaries and increasing the proportion of goods they retailed themselves. Executives of these firms said that the key survival strategy for their firms was to improve the distribution network and retail most of the products themselves.

The transformations in the way the Latin American economies integrate into world markets have had significant consequences for manufacturing firms' behaviour. Manufacturing firms need to upgrade their supply capabilities in response to changes in demand. However, in order to be able to carry out this upgrading, which is crucial for their survival, manufacturing firms must first be able to defend their presence in the market. What has changed as a result of trade liberalization, globalization and the transformations in the firms' economic environment is precisely the core of the manufacturing business: in order to survive and become competitive, manufacturing firms must now improve their marketing capabilities, and in order to do this they must transform their supply capabilities.

6. Uncertainty

Macroeconomic stability and certainty that economic policy would be sustained were among the most important positive characteristics of the economic environment mentioned by Chilean and Mexican entrepreneurs during the interviews. These were carried out in 1993, before the Mexican crisis that began with the December 1994 devaluation.

In contrast, for the Venezuelan firms interviewed in 1993 one of the main obstacles to investing in upgrading and in export projects was the uncertainty surrounding the country's economic policies. This was confirmed by the follow-up interviews with Venezuelan firms in 1995, which showed that companies which had pursued active upgrading policies were either in an extremely vulnerable position or bankrupt, while those which had adopted a passive attitude had benefited from their decision not to upgrade.

The specific cases of the two largest garment manufacturers interviewed in Venezuela, hereafter called firm A and firm B, illustrate this. When the first interviews took place (March 1993), these two firms had decided to adopt two distinctly different strategies: firm A had decided that it would continue operating largely the same way it had operated under import substitution and that it would not invest in upgrading production capability, nor in improving the quality of the goods it manufactured. This conservative strategy was also adopted for exports, in which the firm decided it would not invest any resources.

Firm B, on the other hand, had decided to invest a substantial amount of resources in a complete upgrading of the firm's production capability, both in terms of the quality of the goods produced and the volume of production. To achieve this, it hired international consultants who redesigned the plant and trained the employees. Simultaneously, technological innovations were introduced as new equipment was purchased and production procedures were transformed. The company's goal was to cope with the strong competition from imports in the domestic market and then continue to expand its markets by exporting.

At the time of the initial interviews, it seemed that firm A would slowly die owing to increased import competition and its inability (or the lack of interest of its owners) to react to the change from an import substitution model to an open economy. In contrast, it appeared that the strategy of firm B would allow it to become competitive in the new environment, to survive import competition in the domestic market and to export on a regular basis.

When the follow-up interviews were carried out two years later, in 1995, however, circumstances were strikingly different. The new government of Venezuela had decided to reverse several of the policy reforms carried out at the end of the 1980s and the beginning of the 1990s. While the trade liberalization policy was not formally reversed, this did occur in practice because of exchange controls that made it difficult for firms to have access to hard currency for imports, including inputs. Competition

from imports had thus been slashed. Furthermore, the pegging of the exchange rate at a time of high inflation made it extremely difficult for manufacturing firms to export.

In these circumstances, firm A had been relatively successful thanks to its decision not to invest in upgrading the plant. This strategy had allowed the firm to maintain a solid financial position without incurring debts. It had proved successful because changes in economic policy, such as the introduction of exchange controls, had resulted in a substantial decrease in competition from imports, while at the same time interest rates went up. Thus, firms that had adopted a passive attitude and had decided not to change their strategy and not to upgrade benefited from the decreased import competition in the domestic market and from a sound financial position.

In contrast, companies which had invested in upgrading their production capability were hurt by the increase in interest rates. Firm B, for example, was in severe financial difficulties, having incurred debts to finance the upgrading. Although it was still able to export, exports had been curtailed by the obstacles to importing good-quality competitive inputs, such as exchange controls and the appreciation of the exchange rate. Complex and discretionary administrative procedures also made importing and exporting very difficult. Hence, firms that had invested in upgrading and had tried to become competitive were ultimately losers compared to those that had adopted a passive attitude.

It is clear that in the long run this situation will not last. Venezuela cannot support an artificial exchange rate forever, nor will it always be able to sustain policies that tend to limit competition from imports. Venezuelan firms will eventually find themselves in a competitive environment once again, and in those circumstances firm A will clearly be forced to change or it will lose a substantial amount of market share, while firm B will reap the benefits of its investments.

In the meantime, firm B will undoubtedly gain a bigger market share even if the economy does not open up, thanks to its upgrading efforts. When interviewed in 1995, this company was also gaining market share because so many domestic firms were failing. The question is whether firms that invested in upgrading will still be operating in the long run or whether they will go under because of the financial burden of upgrading and the reversal of economic policy.

Thus, the managers who had believed the government's declarations that trade liberalization would be sustained and that they should invest in export projects were those whose firms were most severely damaged by the policy reversal. The appreciation of the exchange rate that resulted from the exchange controls and the pegging of the currency within an inflationary process made their exports less competitive on foreign markets. The obstacles to importing inputs caused by the exchange controls and customs red tape were an additional difficulty for those firms which had increased the use of imported inputs as one of their upgrading strategies.

Therefore, the interviews carried out throughout the investigation show that uncertainty over economic policy leads to a substantial decrease in company investment. There is no incentive for firms to invest in long-term projects when policy reversals and macroeconomic instability render the rate of return unpredictable.

Comparison of the behaviour of firms in the three countries covered by the research shows that uncertainty explains why more firms do not change, or do not change faster. Uncertainty has a twofold negative effect on entrepreneurs' decisions to transform their firms: they are uncertain as to what they should do, and also about the sustainability of economic policy. They are often aware that they must alter the way their firms operate, but they are not certain what changes should be made, or how. This shows the importance of providing companies with technical support on best practices through public/private sector networks. However, the uncertainty that probably has the most negative impact on firms' decisions concerning upgrading is whether trade liberalization will be sustained or not. If the policy in this respect is not completely credible, many firms will be reluctant to change their behaviour, and this indecision can result in many more firms going under than could reasonably have been expected.

Hence, it is of the utmost importance that major policy changes should be credible, if firms are to change their behaviour and try to become more competitive. It may reasonably be concluded that, if there is uncertainty, most firms will not change, or will not change so quickly. Upgrading requires a willingness on the part of company managers to change their firms' practices and to make heavy investments, as well as the certainty that the new policies are there to stay.

IV

Conclusions

Manufacturing firms in Latin America are undergoing substantial transformations in order to be competitive in the new conditions marked by trade liberalization, globalization and, in general, changes in the economic environment. Many firms still have a passive or reactive attitude, with behaviour quite similar to that described in section II. However, the overwhelming majority of entrepreneurs in the region are aware that they must change the way they operate and have already begun to do so: the behaviour of most companies is completely different now from what it was 10 or 15 years ago.

These changes in companies' behaviour are strongly influenced by the transformations in macroeconomic and trade policies, as well as in the general economic environment. Evidence of this may be seen from the differences in firms' behaviour across countries.

However, the study showed that there were firms in all three countries which were changing their behaviour irrespective of the economic environment, adopting particularly innovative and aggressive strategies. While Venezuelan firms on average tended to be more passive and reluctant to change than their Chilean and Mexican counterparts, the most competitive Venezuelan firms had strategies that were surprisingly similar to those of the most aggressive firms in Chile and Mexico. Much may be learnt from the behaviour of these firms, particularly for the formulation of policy recommendations.

In general, there were no differences between exporting firms and modernizing firms that sell mostly on the domestic market, except that exporting firms seemed to have much greater concern for quality upgrading and had greater learning opportunities than non-exporting ones. The investigation did show, however, that modernizing the firm was a condition for sustained export activity.

The transformation that has taken place in what is seen as the core of the manufacturing business was one of the most significant results of the research. At least for the most innovative consumer-goods manufacturing firms, this core has shifted from concentration mainly on production matters to an approach which combines the manufacture of goods with their distribution, and often the distribution of other domestic and imported goods as well. This is the point in the production/distribution segment where manufacturing firms have greater chances of simultaneously increasing their profits and defending their market share. Whatever strategy allows firms to be successful at this crucial point will be a decisive factor in determining the competitiveness of Latin American manufacturing firms in the years to come.

The changes that are taking place in the economies of the region have had significant consequences for Latin American manufacturing companies and have brought about substantial changes in their behaviour. Finding out more about these changes is a prerequisite for understanding trends, as well as for making policy recommendations aimed at improving company competitiveness.

Innovative firms have adopted a flexible type of behaviour and are upgrading their production and marketing capabilities. They have made significant changes in terms of vertical integration, input procurement, technological innovations, incentive payment systems, management techniques, training and subcontracting, as well as in distribution and retailing.

However, even modernizing entrepreneurs frequently felt that they needed to make even more effort to upgrade their firms. The cost of doing so and, more importantly, the difficulties in obtaining appropriate information on the best practice in a given industry, have been obstacles to the introduction of large-scale transformations in a short period of time. These obstacles were naturally even greater for non-modernizing firms, whose managers knew they had to change the way they operated, but were uncertain about what needed to be done and how. While some entrepreneurs in the region will remain passive and will continue operating as they did under import substitution as long as they can, there are many managers who would like to upgrade their firms but lack the necessary information for doing so.

This suggests that governments have an important role to play in giving support to programmes that provide firms with information on best practices, particularly in matters relating to changes in layout, quality improvement, incentive payment systems, training, etc. A key activity that yields many positive externalities is providing firms with information on export markets.

An effective way of supplementing inadequate information is through setting up industry-specific technological centres to promote the upgrading of firms' supply capability. These centres should cover the areas in which innovation is crucial, such as those described above. Governments should sponsor such centres, but they should be created jointly with the private sector, particularly with entrepreneurial associations. These centres could also foster associations in which firms could join together to obtain better conditions for input procurement, technical assistance and distribution than they could obtain individually. A good example of such a centre is that established in Colombia by the Asociación Colombiana de Industrias Plásticas (ACOPLASTICOS), or the Centro de Productividad Industrial (CEPRI) recently set up in Chile by the private sector with government support.

Finally, there are several important criteria that must be taken into account when considering policy formulation:

i) The most important role for policy is that of creating a stable economic environment in which firms can plan long-term investments. As already noted, uncertainty promotes non-productive behaviour;

ii) Policies should be designed for effective implementation and should be subject to regular evaluation. If not, they may prove ineffective and give rise to private-sector distrust of the government;

iii) Policies should explicitly seek to promote the upgrading of firms and not be a disguised pretext for a return to protectionism;

iv) To be effective, policies should be designed and implemented in close coordination with the private sector.

The new economic framework existing in most Latin American countries today, together with the increase in globalization worldwide, represents both a challenge and an opportunity for most manufacturing firms in the region. Many firms have already completely transformed their behaviour. Others will not change, irrespective of the policy environment they are in. There is a third group, however, made up of the vast majority of manufacturing firms, whose managers are willing to change and have begun to make some changes. This is the group that economic policy should target if the goal is for the region to have the capacity to grow at reasonably high rates.

(Original: English)

Bibliography

Baumann, R. (1994): *Exporting and the Saga for Competitiveness of Brazilian Industry: 1992*, Working Paper No. 27, Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC).

Bielschowsky, R. (1994): *Two Studies on Transnational Corporations in the Brazilian Manufacturing Sector: The 1980s and Early 1990s*, "Desarrollo Productivo" series, No. 18, Santiago, Chile, ECLAC.

Castillo, M., M. Dini and C. Maggi (1994): *Reorganización industrial y estrategias competitivas en Chile*, LC/R.1467, Santiago, Chile, ECLAC.

Corbo, V. and J. M. Sánchez (1984): *Impact on Firms of the Liberalisation and Stabilisation Policies in Chile: Some Case Studies*, Documento de trabajo, No. 91, Santiago, Chile, Catholic University of Chile, Instituto de Economía.

Dicken, P. (1992): *Global Shift: The Internationalization of Economic Activity*, London, Paul Chapman Publishing Ltd.

ECLAC (1994): *Reestructuración y desarrollo productivo: desafío y potencial para los años noventa*, "Estudios e Informes de la CEPAL" series, No. 92, LC/G.1831-P, Santiago, Chile. United Nations publication, Sales No. S.94.II.G.4.

Katz, J. and G. Burachik (1997): La industria farmacéutica y farmoquímica argentina en los años noventa, in J. Katz (ed.), *Apertura económica y desregulación en el mercado de medicamentos*, Buenos Aires, ECLAC/International Development Research Centre (IDRC)/Alianza Editorial.

Macario, C. (1995): *Competitividad de las empresas latinoamericanas: comportamiento empresarial y políticas de promoción de exportaciones*, Documento de trabajo, No. 38, Santiago, Chile, ECLAC.

——(1998a): *Restructuring in Manufacturing: Case Studies in Chile, Mexico and Venezuela*, "Desarrollo Productivo" series, No. 44, Santiago, Chile, ECLAC.

——(1998b): *Why and How do Manufacturing Firms Export: Evidence from Successful Exporting Firms in Chile, Colombia and Mexico*, Ph.D. thesis, Columbia, Missouri, University of Missouri.

Nelson, R. R. (1991): Why do firms differ, and how does it matter, *Strategic Management Journal*, vol. 12, New York, John Wiley & Sons, Ltd.

Schmitz, H. (1995): Small shoemakers and Fordist giants: Tale of a supercluster, *World Development*, vol. 23, No. 1, Oxford, U. K.

Apparel-based *industrialization in the* Caribbean Basin: *A threadbare garment?*

Michael Mortimore

Officer-in-Charge, Business Strategies and Investments Unit, ECLAC Division of Production, Productivity and Management.

In a world of some two hundred countries, only a relatively few –mainly members of the Organization for Economic Cooperation and Development– can be identified as "winners", that is to say, countries with high and sustained annual per capita incomes in the order of US$ 20,000. Among other factors, some of the principal features of winner countries are that: i) they have been through an intense industrialization process, ii) they have projected that process into the international economy in the form of exports of manufactures, and iii) the leading national companies which have exported manufactures have been transformed into transnational corporations (TNCs) in the process. Many developing Asian countries have used the apparel industry as a springboard to deepen their industrialization process, especially by becoming suppliers of "full packages" to international buyers, involving the complete manufacture of apparel according to the designs provided by their international clients. For many Caribbean Basin countries, apparel exports represent their principal link with the international economy. In this case, however, since those exports stem from a low wage-export processing zone-special access package designed to help United States apparel TNCs to compete better in their home market against Asian imports, they do not produce the desired developmental results in the Caribbean. The United States apparel TNCs employ only those factors that allow them to improve the efficiency of their international system of integrated production, which are essentially the low wages paid in the case of the Caribbean Basin. Consequently, instead of deepening the local industrialization process, they truncate it. The exports do not represent the external projection of the local industrialization process, but merely the assembly of imported components. The local apparel companies are not internationalized in the process, but instead have their very existence threatened. Thus, as part of a developmental trajectory, these activities have worn threadbare and need replacement by something better.

I

A stylized history of the economic growth of countries

In a world of some two hundred countries, it can be argued that only about ten or fifteen per cent of them –basically the members of the Organization for Economic Cooperation and Development (OECD)– can be considered to have "made it" in terms of growth and development. They have done so in the sense that they have enjoyed sustained economic growth over many decades, if not centuries, that has allowed them to reach a significant level of per capita income (say, US$ 20,000 a year).[1] Figure 1 captures this notion in terms of the "winners' circle" of prominent examples of such successful countries.

The remarkable rise of some nations –in terms of their growth and development– began with the Industrial Revolution in England. It may be noted that the original winners (such as the United Kingdom and the United States) advanced at relatively low annual rates of growth (2% or less) over centuries to reach a level of sustained per capita income that placed them in the winners' circle. Relative latecomers from the old world, like France and Germany, achieved that same goal in less time by growing at a faster rate (about 2.5% a year). Japan, the first of the Asian nations to achieve winners' status, advanced at about double the rate of the original Anglo-Saxon winners. Other European countries, like Italy and Spain, exceeded the Japanese rate of growth by 50%. East Asian newly industrializing countries (NICs) (such as South Korea, Taiwan, and Hong Kong) are outdoing even these speedsters (5.5% a year) in approaching their targeted income levels, and China, while far from the goal, is advancing at an even faster rate (7.5% a year). Within this small group of prominent countries in, or approaching, the winners' circle, latecomers have been able to outperform their predecessors, "making it" in less time by increasing their per capita income at a quicker pace.

What explains the success of these winners? There are undoubtedly numerous factors that influence this outcome, but the three central factors taken into account here are:

i) an intense process of industrialization;

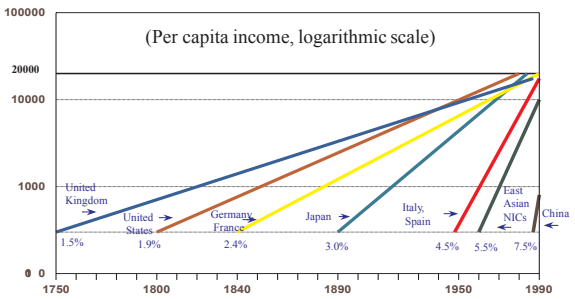
ii) the extension of that process to the international market in the form of exports of manufactures;

iii) the creation of national leader companies that develop into world-class global competitors.

A glance at any of the countries in the winners' circle immediately brings to mind some of the principal aspects of their original industrial specialization, the nature of their success in exporting manufactures, and even the names of some of their national champions operating in the international market. Examples of the latter range from United States electrical machinery producers (General Electric and Westinghouse), automobile makers (General Motors and Ford), and computer companies (IBM and Microsoft), to Japanese consumer electronics companies (Matsushita, Sony and Toshiba) and automobile makers (Toyota, Nissan and Honda), and to newcomers from East Asian NICs in the areas of computers (Acer, Hyundai), consumer electronics (Samsung, LG) and motor vehicles (Hyundai, Kia, Daewoo), to name but a few.

FIGURE 1

The Winners' Circle: a stylized history of the economic growth of nations



Source: Based on Ramos, J., "Industrial Policy and Competitivenes in Open Economices", *CEPAL Review,* No. 34, September, 1996.

[1] This argument has been developed in much greater detail in Mortimore, 1997.

II

Apparel as a motor of growth

The apparel industry was an important manufacturing activity and responsible for part of the success of the winner countries' industrialization processes. Indeed, vestiges of that industry can still be encountered in the export profile of those countries. Table 1 shows the 50 most important supplier countries of apparel to the OECD market by import market share during 1980-1995, based on the CAN computer programme developed by ECLAC.[2] It is an activity of declining importance in these economies as their industrialization processes move into more technologically sophisticated activities, but even so many winner countries are still formidable apparel exporters. Italy is the second most important supplier (even though its OECD market share dropped from 12.89% to 7.88% between 1980 and 1995). Germany is fourth (declining from 6.93% to 3.87%), while France is eighth (from 5.37% to 2.74%). The UK is twelfth (from 4.12% to 2.24%) and the United States is fifteenth (from 2.04% to 1.76%). With the exception of Italy, which has specialized more in high fashion (apparel still accounts for a significant proportion of its total exports to the OECD – 7.3% in 1995), apparel represented less than 2% of the exports of the other winner countries in 1995. This industry was a motor of growth in the early phases of industrialization.

The apparel industry has been a central element of the export success of the East Asian NICs (especially Hong Kong, Taiwan and South Korea) and the impressive advances of the new Asian Tigers (in particular Indonesia, Thailand, the Philippines and Malaysia) and China. Three of the East Asian NICs are among the top ten apparel suppliers of the OECD: Hong Kong is ranked third (even though its import market share fell from 13.72% to 7.28% during 1980-1995), South Korea is fifth (from 9.13% to 3.82%) and Taiwan is in tenth spot (from 6.62% to 2.45%). Except in Hong Kong, where apparel continued to account for more than one-third of total exports (consisting in part of transshipments from China), the importance of apparel in the overall exports of other NICs, such as Korea (dropping from 25.8% to 9.1% of total exports) and Taiwan (15.4% to 5.3%), declined between 1980 and 1995.

The opposite was taking place in the case of the new Asian Tigers and China in that period. They were becoming more important apparel suppliers and the proportion of apparel in total exports was rising sharply. China, of course, is the new global force in the apparel industry, ranking first with an OECD import market share of 17.57% in 1995 (up from 2.74% in 1980). The share of apparel in China's exports to the OECD rose from 10.5% to 20.4%. The new Asian Tigers have also made their presence felt. Indonesia ranks eleventh (with its OECD import market share for apparel rising from 0.21% to 2.39%), Thailand is thirteenth (from 0.66% to 2%), the Philippines is in sixteenth spot (from 1.41% to 1.68%) and Malaysia is in seventeenth place (rising from 0.48% to 1.66%). The importance of apparel exports in total exports to the OECD has risen substantially for all these countries.

Clearly, the apparel industry has been an important stepping stone for winner countries to get their industrialization processes rolling and to generate solid export streams to the international market. Between 1980 and 1995 the importance of apparel (SITC 84) in the total imports of the OECD rose from 2% to about 3.5% placing it among the more dynamic industries in international trade. Moreover, the import market share of countries other than OECD ones jumped from 49.3% to 67.3% of the total. A good part of that dynamism stemmed from the relocation of apparel production, especially to developing countries, rather than from surges in world demand for apparel products (see Audet, 1996; ILO, 1996, and van Liemt, 1994).

[2] The "Competitive Analysis of Nations" (CAN) computer programme of the United Nations Economic Commission for Latin America and the Caribbean (ECLAC) measures the international competitiveness of countries in terms of import market shares (at three digits of the Standard International Trade Classification (SITC, Rev.2)) in five main markets (OECD, Western Europe, North America, Japan, and Latin America). A DOS version on diskettes or a Windows 95 version on CD-ROM can be purchased from ECLAC (contact wperes@eclac.cl).

TABLE 1

The 50 main supplier countries of apparel (SITC 84) for the OECD market, 1980-1995

	Country	Share of OECD market [a]			Apparel as % of country's total exports		
		1980	1995	% change	1980	1995	% change
1	China	2.74	17.57	540.64	10.52	20.36	93.63
2	Italy	12.89	7.88	-38.87	8.17	7.25	-11.27
3	Hong Kong	13.72	7.28	-46.90	37.53	35.56	-5.25
4	Germany	6.93	3.87	-44.19	1.78	1.50	-15.35
5	South Korea	9.13	3.82	-58.20	25.82	9.08	-64.84
6	Turkey	0.36	3.73	925.75	5.97	37.63	530.43
7	India	2.09	3.32	58.79	13.60	22.67	66.66
8	France	5.37	2.74	-48.90	2.45	1.86	-24.27
9	Portugal	1.72	2.56	49.16	16.25	19.21	18.24
10	Taiwan [b]	6.62	2.45	-62.95	15.44	5.27	-65.85
11	Indonesia	0.21	2.39	1 060.49	0.35	10.51	2 862.06
12	United Kingdom	4.12	2.24	-45.59	1.98	1.80	-9.06
13	Thailand	0.66	2.00	202.20	5.66	8.60	51.85
14	Mexico	0.77	1.85	139.21	1.59	3.76	136.82
15	United States	2.04	1.76	-13.75	0.50	0.71	42.25
16	Philippines	1.41	1.68	19.01	9.17	17.14	86.99
17	Malaysia	0.48	1.66	244.06	1.86	5.79	210.85
18	Tunisia	1.00	1.64	65.01	20.05	51.30	155.87
19	Poland	0.80	1.59	97.94	5.75	13.89	141.72
20	Morocco	0.37	1.56	324.76	6.30	37.13	489.29
21	Netherlands	1.79	1.34	-25.12	1.05	1.39	33.18
22	**Dominican Republic**	**0.28**	**1.31**	**369.15**	**9.17**	**46.52**	**407.43**
23	Pakistan	0.24	1.18	397.88	7.41	33.08	346.22
24	Belgium/Luxembourg	2.30	1.14	-50.40	1.63	1.39	-14.75
25	Greece	2.73	1.07	-60.68	24.25	21.65	-10.75
26	Romania	1.01	0.92	-8.84	10.50	27.00	157.10
27	Hungary	0.98	0.76	-21.70	12.65	10.62	-16.06
28	Canada	0.45	0.68	49.90	0.26	0.54	105.56
29	Austria	1.60	0.66	-58.99	4.59	2.39	-47.83
30	Honduras	0.04	0.62	1 445.69	1.66	44.08	2 557.47
31	Spain	0.77	0.61	-20.63	1.83	1.26	-31.12
32	Denmark	0.95	0.59	-38.09	2.43	2.47	1.70
33	**Costa Rica**	**0.12**	**0.58**	**384.03**	**4.65**	**24.49**	**426.57**
34	Singapore	1.01	0.52	-49.06	5.12	1.81	-64.63
35	Guatemala	0.01	0.51	3 649.02	0.47	32.54	6 844.42
36	Israel	0.71	0.50	-29.62	6.20	5.01	-19.14
37	Jamaica	0.04	0.41	861.60	1.71	34.03	1 892.24
38	Ireland	0.61	0.41	-32.50	2.81	1.68	-40.07
39	El Salvador	0.06	0.39	539.53	2.33	46.16	1 882.51
40	Switzerland	0.82	0.38	-53.87	1.05	0.78	-25.90
41	Colombia	0.10	0.31	204.37	1.05	5.71	443.16
42	Egypt	0.04	0.30	631.87	0.34	9.72	2 799.81
43	Bulgaria	0.17	0.27	53.71	6.96	13.38	92.24
44	Japan	1.11	0.21	-81.25	0.59	0.13	-78.76
45	Brazil	0.25	0.21	-16.27	0.63	0.96	53.79
46	South Africa	0.13	0.17	33.56	0.36	1.55	329.95
47	Peru	0.03	0.14	330.53	0.42	6.40	1 439.67
48	Sweden	0.61	0.14	-77.24	0.86	0.33	-61.39
49	Finland	1.63	0.13	-92.23	5.53	0.66	-88.14
50	Australia	0.04	0.10	140.89	0.10	0.51	436.62
	Total	*94.05*	*90.14*				

Source: Lall and Mortimore, 1997.

[a] Export values for 1980 are three-year averages; for 1995, two-year averages.

[b] Taiwan's exports were calculated as residual after other exports were taken into account. The CAN database does not include some large apparel exporters such as Sri Lanka, Bangladesh and Mauritius, each of which exports around US$ 1.5 to 2 billion of garments per year, about the same level as Morocco.

III

The situation of small countries

Small countries face an especially difficult task in making it to the winners' circle. In scale-based industries, for example, they have difficulty in reaching minimum efficient economic scales of production. They cannot rely on a sufficiently large domestic market –one that will allow them to reach the required levels of production efficiency– in order to develop the kind of operations that will permit them to venture into the international market with the aim of becoming significant competitors. They often start off their industrialization processes in simpler, more labour-intensive industries, such as apparel, and look to trade agreements or economic integration initiatives to expand their markets in order to sustain their industrialization processes and to permit national leader companies to arise and evolve into world players.

This is by no means a trivial observation. Small countries are increasingly becoming the norm in today's world. Eighty-seven countries have populations under five million, 58 have fewer than 2.5 million, and 35 have fewer than 0.5 million. Measured in another way, half of the countries of the world have a smaller population than the United States state of Massachusetts (*The Economist*, 1998).

The Caribbean Basin is a case in point. Six of the small countries of the Caribbean Basin are among the fifty main suppliers of apparel to the OECD. These small countries have import market shares of less than 1% each, except for the Dominican Republic, which has more. All are making dramatic advances. The Dominican Republic is in 22nd position (increasing its share from 0.28% to 1.31% between 1980 and 1995), Honduras is in 30th place (from 0.04% to 0.62%), Costa Rica reached the 33rd spot (from 0.12% to 0.58%), Guatemala is in 35th position (0.01% to 0.51%), Jamaica reached the 37th spot (from 0.04% to 0.41%), and El Salvador is in 39th place (from 0.06% to 0.39%). In all cases, apparel accounts for between one-quarter (Costa Rica) and about one-half (Dominican Republic, Honduras and El Salvador) of their total exports to the OECD. The apparel industry represents their principal export link with the international economy. However, as we shall see, this is a very peculiar link in the case of the Caribbean Basin.

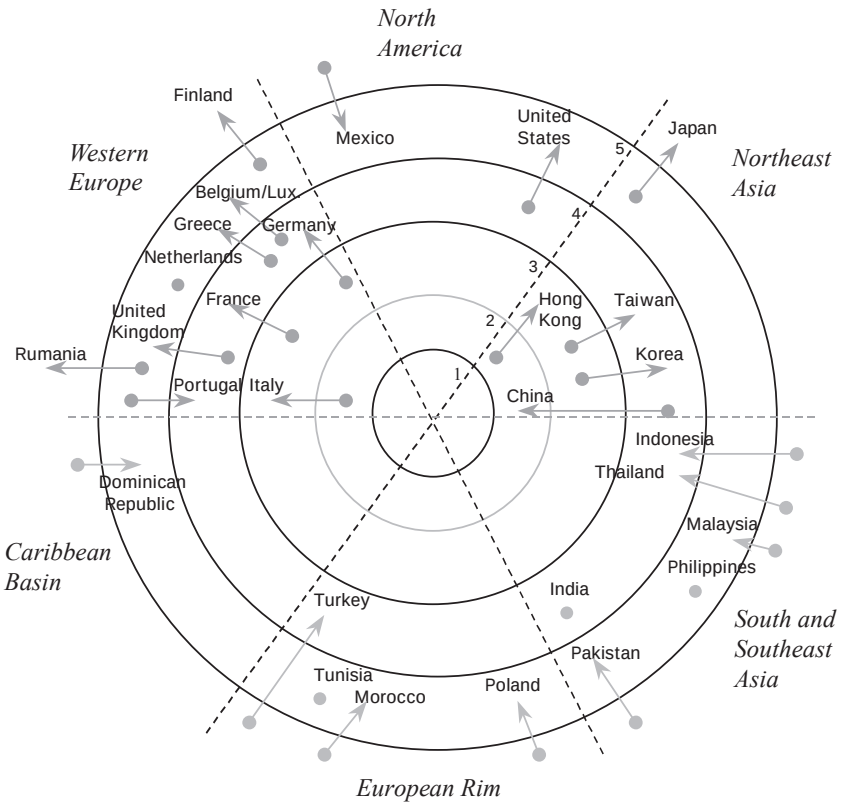
Significant changes are taking place in the sourcing of OECD imports of apparel. In general, the major "winner" countries of North America and Europe are losing market shares to Asian challengers, but even within Asia, the new major challengers, such as China and the new Asian Tigers, are displacing the East Asian NICs as the sources of such exports (figure 2). Other significant developing country challengers are to be found on the European rim (Turkey, Morocco and Tunisia) and in Latin America (Mexico and the Dominican Republic). As figure 2 suggests, the effect of the North American Free Trade Agreement is to integrate the Mexican industry into the North American one. Apart from Mexico and the Caribbean Basin countries, no other major apparel exporters are found in Latin America.

Except for the dominant Asian suppliers, which are present in all major markets, a very significant regional aspect may be observed in the supply of apparel to the OECD. Figure 3 shows that in the North American market (the United States plus Canada), there are two major apparel-supplying groups of developing countries: those of Asia and those of Latin America (especially Mexico and the Caribbean Basin). China is the principal supplier, followed by Hong Kong, Korea and Mexico. The next level of suppliers are basically Asian (Indonesia, Thailand, Malaysia, the Philippines and India) but also include the Dominican Republic. The outer ring of more minor but rising suppliers consists almost exclusively of Caribbean Basin countries (such as Jamaica, Honduras, Costa Rica, Guatemala and El Salvador), though it also includes Turkey. Latin America is a significant and growing apparel supplier for the North American market.

Other major markets also display regional aspects. In the Western European market the principal developing country suppliers are China, Hong Kong and Turkey. The next level of suppliers come mainly from the European rim (Tunisia, Morocco and Poland) but also include India. The following group of suppliers is a mixture of European rim and Asian suppliers. Latin American and especially Caribbean Basin suppliers are completely absent. The European

FIGURE 2

Shifts in the regional structure of OECD (25 countries) apparel imports from 1980 to 1995 [a b]



Source: Calculated using the CANPLUS computer programme of UN-ECLAC.

[a] The rings indicate the share of total OECD imports in United States dollars by partner country: 1) > 50%; 2) 10-49.9%; 3) 5-9.9%; 4) 2-4.9%; 5) 1-3.9%. Annual average total value of OECD apparel imports was US$ 29.4 billion in 1979-1981 and US$ 120.5 billion in 1994-1995. A minor amount of double counting took place.

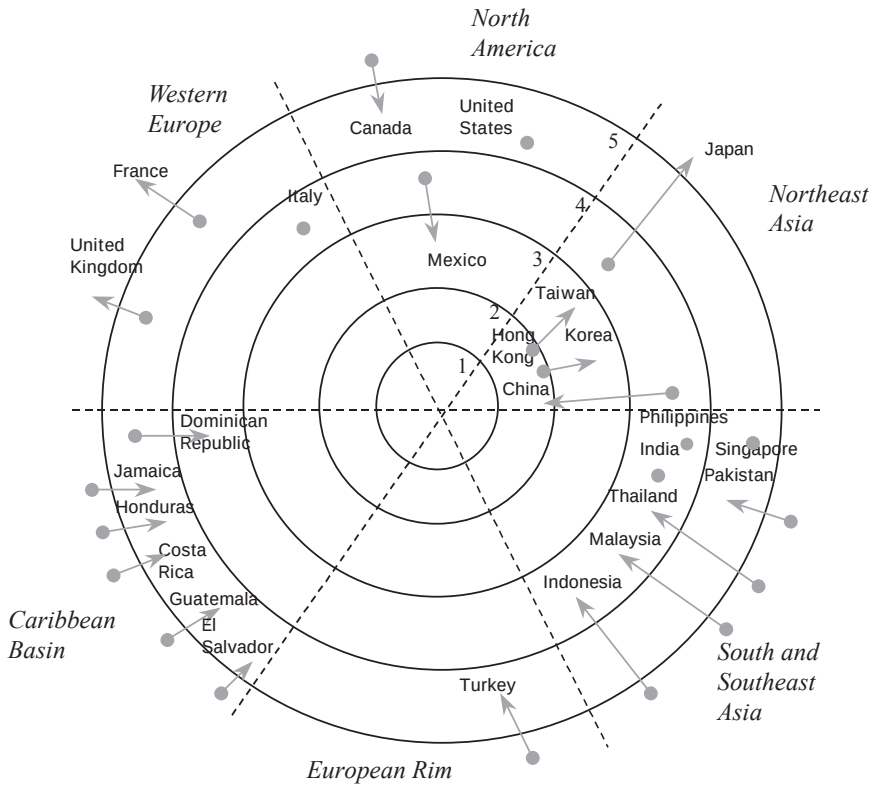
[b] The 1994-1995 position corresponds to the ring where the country's name is located; the 1979-1981 position, if different, is indicated by a circle. The arrows represent the magnitude and direction of change over time. This manner of presenting the relative shifts, using a different data base, first appeared in Gereffi (1997).

rim represents an important and growing supplier base for the Western European market, similar to the relationship between the North American market and its Caribbean Basin suppliers. The Japanese market is supplied basically by a single source country: China. South Korea represents the second most important developing country source of apparel. The next level of developing country suppliers consists of Hong Kong, Thailand, Indonesia and, to a lesser extent, Taiwan. The Japanese market is supplied almost exclusively by other Asian countries; the major suppliers from both the European rim and the Caribbean Basin are totally absent.

In other words, there are two predominant realities in the supply of apparel to the countries making up the OECD market. On the one hand, the Asian countries, led by China, the East Asian NICs and the new Asian Tigers, have impressive import market shares in all the major elements of the OECD market: North America, Western Europe and Japan. On the

FIGURE 3

Shifts in the regional structure of North American (United States and Canada) apparel imports during 1980-1995 [ab]



Source: Calculated using the CANPLUS computer program of UN-ECLAC.

[a] The rings indicate the share of total North American imports in United States dollars by partner country: 1) > 50%; 2) 10-49.9%; 3) 5-9.9%; 4) 4-4.9%; 5) 1- 3.9%. Total value of North American apparel imports was US$ 7.9 billion in 1979-1981 and US$ 42.8 billion in 1994-1995.

[b] The 1994-1995 position corresponds to the ring where the country's name is located; the 1979-1981 position, if different, is indicated by a circle. The arrows represent the magnitude and direction of change over time.

other hand, significant and growing import market shares are observed in the case of Mexico and the Caribbean Basin, in the North American market, and the European rim countries, in the Western European market. The Caribbean Basin plays a significant supplier role only in the North American market.

The examples of the Dominican Republic and Costa Rica illustrate this point. Tables 2 and 3 provide the relevant information on the competitive situation of these countries in the North American market. Table 2 indicates that the Dominican Republic has significantly increased its overall share of imports by that market (from 0.28% to 0.38% during 1980-1995). That improvement was concentrated in manufactures (0.13% to 0.40%), because in both natural resource-based products (0.45% to 0.31%) and "others" (0.82% to 0.38%) the Dominican Republic suffered a contraction in its shares of imports by that market. During the 1980-1995 period the structure of Dominican exports to that market was transformed

TABLE 2

Dominican Republic: Aspects of its international competitiveness in the North American market

			1980	1985	1990	1995
I. Share of the North American import market			**0.28**	**0.25**	**0.31**	**0.38**
Natural resources [a+b+c]			0.45	0.50	0.32	0.31
Agriculture [a]			1.66	1.31	0.83	0.68
Energy [b]			-	-	-	-
Textile fibres, minerals, etc. [c]			0.35	0.04	0.09	0.07
Manufactures [d+e]			0.13	0.14	0.29	0.40
Based on natural resources [d]			0.55	0.49	0.86	0.91
Not based on natural resources [e]			0.09	0.12	0.26	0.37
Others [f]			0.82	0.99	0.59	0.38
II. Contribution (export structure of Dominican Republic in this market)			**100.0**	**100.0**	**100.0**	**100.0**
Natural resources [a+b+c]			65.5	46.0	20.8	12.5
Agriculture [a]			62.5	45.8	20.4	12.3
Energy [b]			-	-	-	-
Textile fibres, minerals, etc. [c]			3.0	0.2	0.4	0.2
Manufactures [d+e]			26.5	41.2	72.9	84.2
Based on natural resources [d]			9.6	8.1	11.4	9.4
Not based on natural resources [e]			16.9	33.0	61.5	74.8
Others [f]			7.9	12.8	6.3	3.3
III. 10 main exports of Dominican Republic to this market	[g]	[h]	**44.8**	**46.1**	**66.1**	**73.6**
842 Outer garments, men's and boys', of textile fabrics	*	+	1.1	5.4	13.5	17.4
846 Undergarments, knitted	*	+	4.6	5.6	8.2	12.5
843 Outer garments, women's and girls', of textile fabrics or crocheted	*	+	2.2	5.8	10.2	10.7
612 Manufactures of leather, parts of footwear, etc.		+	1.2	3.4	6.3	6.5
872 Medical instruments and appliances, n.e.s.		+	0.2	-	4.3	6.5
845 Outer garments, other articles, knitted/crocheted	*	+	0.7	0.9	4.7	5.5
772 Electrical apparatus for making and breaking elec. circuits	*	+	0.7	1.3	3.9	4.1
061 Sugar and honey		-	32.3	17.8	7.2	4.0
897 Jewellery, goldsmiths' and silversmiths' wares, etc.	*	+	0.1	3.7	4.8	3.8
844 Undergarments, textile fabrics (not knitted/crocheted)	*	+	1.9	2.2	3.0	2.6

[a] Sections 0, 1 and 4 ; divisions 21, 22, 23, 24, 25 and 29 of the Standard International Trade Classification (SITC Rev2).
[b] Section 3.
[c] Divisions 26, 27 and 28.
[d] Divisions 61, 63 and 68; groups 661, 662, 663, 667 and 671.
[e] Sections 5, 6 (minus the divisions and groups mentioned in d), 7 and 8.
[f] Section 9.
[g] Groups which correspond to the 50 most dynamic ones (*) in this market during 1980-1995.
[h] Groups in which the market share increased (+) or decreased (-) during 1980-1995.

from natural resource-based (65.5% of total exports in 1980) to manufactures-based (84.2% of the total in 1995). Manufactures not based on natural resources became the strong suit in the Dominican export repertoire, accounting for three-quarters (74.8%) of all exports to the North American market in 1995. Almost three-quarters (73.6%) of Dominican exports were concentrated in just 10 product groups at the three-digit level of SITC-Rev.2 in 1995. The Dominican Republic was gaining market share in nine of those ten groups, and seven of the products corresponded to the group of the fifty most dynamic items in the North American market. Half of these principal export items pertain to the apparel industry and their share increased from 10.5% of total exports in 1980 to 48.7% in 1995. Without doubt, the apparel industry is by far the principal link between the Dominican and the North American markets and should therefore represent the extension of the national industrialization process into the international market.

Table 3 presents similar information for Costa Rica, which also improved its import market share in the North American market (from 0.15% to 0.23% between 1980 and 1995). This improvement was cen-

TABLE 3

Costa Rica: Aspects of its international competitiveness in the North American market

			1980	1985	1990	1995
I. Share of North American import market			**0.15**	**0.15**	**0.19**	**0.23**
Natural resources [a+b+c]			0.31	0.45	0.48	0.61
Agriculture [a]			1.20	1.17	1.25	1.36
Energy [b]			-	0.01	-	-
Textile fibres, minerals, etc. [c]			0.03	0.05	0.02	0.04
Manufactures [d+e]			0.03	0.06	0.12	0.16
Based on natural resources [d]			0.03	0.04	0.07	0.06
Not based on natural resources [e]			0.03	0.06	0.13	0.16
Others [f]			0.07	0.04	0.08	0.11
II. Contribution (export structure of Costa Rica in this market)			**100.0**	**100.0**	**100.0**	**100.0**
Natural resources [a+b+c]			85.2	71.0	49.6	41.8
Agriculture [a]			84.8	70.1	49.5	41.6
Energy [b]			-	0.5	-	-
Textile fibres, minerals, etc. [c]			0.4	0.5	0.2	0.2
Manufactures [d+e]			13.5	28.1	49.1	56.6
Based on natural resources [d]			1.0	1.2	1.4	1.1
Not based on natural resources [e]			12.5	27.0	47.7	55.5
Others [f]			1.3	0.8	1.3	1.6
III. 10 main exports of Costa Rica to this market	[g]	[h]	**78.4**	**74.0**	**73.0**	**72.6**
057 Fruit and nuts (not oil nuts), fresh or dried		+	34.4	34.1	27.2	24.3
846 Undergarments, knitted or crocheted	*	+	5.2	5.0	9.9	12.6
842 Outer garments, men's and boys', of textile fabrics	*	+	0.5	3.7	9.7	11.6
844 Undergarments, textile fabrics (not knitted/crocheted)	*	+	0.1	2.0	2.9	4.6
071 Coffee and coffee substitutes		+	17.6	12.5	6.0	4.1
845 Outer garments, other articles, knitted/crocheted	*	+	0.3	0.6	3.1	4.0
843 Outer garments, women's and girls', of textile fabrics	*	+	2.6	5.4	6.8	3.5
897 Jewellery, goldsmiths' and silversmiths' wares, etc.	*	+	-	0.4	1.2	2.7
011 Meat and edible meat offals, fresh, chilled or frozen		-	17.0	9.3	4.7	2.6
054 Vegetables, fresh, chilled, frozen or simply preserved		+	0.8	1.0	1.6	2.5

[a] Sections 0, 1 and 4; divisions 21, 22, 23, 24, 25 and 29 of the Standard International Trade Classification (SITC Rev2).
[b] Section 3.
[c] Divisions 26, 27 and 28.
[d] Divisions 61, 63 and 68; groups 661, 662, 663, 667 and 671.
[e] Sections 5, 6 (minus the divisions and groups mentioned in d), 7 and 8.
[f] Section 9.
[g] Groups which correspond to the 50 most dynamic ones (*) in this market during 1980-1995.
[h] Groups in which the market share increased (+) or decreased (-) during 1980-1995

tered on both agricultural products (0.31% to 0.61%) and manufactures (0.03% to 0.16%). During this period, the export structure of Costa Rica was transformed from one heavily based on natural resources (85.2% of total exports in 1980) to one in which manufactures came to represent the larger part (56.6% in 1995). Manufactures not based on natural resources accounted for 55.5% of all exports to North America in that year. Three-quarters of Costa Rica's total exports correspond to products in the top ten, and half of those export items are from the apparel industry, which accounts for five of the six items among the 50 most dynamic North American imports. The share of apparel in Costa Rica's total exports to the North American market jumped substantially (from 8.7% in 1980 to 36.3% in 1995). Costa Rica gained market share in nine of these ten items. Again, apparel was the principal link between the Costa Rican and North American markets and presumably represented the extension of the Costa Rican industrialization process into the international market.

These countries are representative of the general situation in the Caribbean Basin: small countries which have, to different degrees, wagered on the apparel segment of the North American market. Their

apparel exports go *solely* to that market, suggesting that either they are not plentiful enough to be spread around or they are not competitive enough to enter other markets. As we shall see, the manner in which these countries supply the North American market determines to a large extent the impact that the apparel industry has on the growth and development trajectories of the Caribbean Basin countries.

IV

The North American apparel connection

Gereffi (1997) has demonstrated that the nature of the apparel marketing chain has changed considerably over time. Buyer-driven chains have progressively supplanted producer-driven chains: that is to say, companies that buy apparel (usually by contracting out fashion articles of their own design) for sale to their up-market clientele are increasingly calling the shots in the United States industry compared to companies that produce standard clothing for distribution to retailers. In the United States market, large retail stores (such as Sears, Wal-Mart, J.C. Penney, K-Mart, etc.) and branded marketers (such as Liz Claiborne, Donna Karan, Polo, Tommy Hilfiger, Nike, etc.) have come to possess greater influence over the whole chain itself (Gereffi and Korzeniewicz (eds.), 1994, pp. 95-122).

As was also suggested by Gereffi (1997, pp. 16-31), this evolution allowed "full package" suppliers from developing countries in East Asia (i.e., those who provide the complete article required by the buyers) to play a more important role, cutting the United States clothing producers out of the relationship. This strengthened the position of the East Asian domestic companies capable of organizing the complete production of the article, and such companies capable of providing all the organization necessary to convert retailers' or branded marketers' designs into finished products which met the buyers' required volumes on time as well as fulfilling their quality standards became significant competitive forces in the apparel industry, particularly in women's wear. Moreover, they also provide a strong boost to the national growth and development trajectory.

East Asian full package suppliers from Taiwan, Hong Kong and South Korea did this by establishing their own regional production systems which organized integrated production from textiles and cloth through the apparel assembly process to final delivery to the retailers or branded marketers. Some even developed into international competitors of their original clients. This gave a significant impulse to their domestic economies. Although these countries appear to be losing import market shares in the OECD market, in fact, their apparel companies often export their products from overseas factories that assemble components from the home country of the Asian manufacturers/traders, so that although their market shares in final markets for direct apparel exports decline, their exports of textile and cloth inputs to offshore assembly sites (such as China, Thailand, Indonesia, etc.) rise. Thus, in Asia, full package suppliers in Taiwan, South Korea and Hong Kong have developed their own networks of assembly operations in other parts of Asia, where full package suppliers and simple assembly operations for export coexist.

The situation is considerably different for apparel production in Latin America (essentially Mexico and the Caribbean Basin). The apparel companies operating there tend to be subsidiaries of branded manufacturers (especially for women's underwear) or foreign or national companies which compete for in-bond assembly contracts (mostly for men's outerwear) from the overseas buyers of the large United States retailers and which do not provide full package services. In this case, full package suppliers have not arisen because the competitive advantages stem strictly from locating the final assembly stage in those countries, primarily in order to take advantage of lower wages. The overseas buyers, or the branded manufacturers themselves, handle all the other aspects of the package. Thus, simplifying somewhat, one can distinguish two different realities in the apparel industry of developing country suppliers of the OECD market. One is an Asian version in which local companies of the East Asian NICs act as full package suppliers (mostly of women's wear) to large retailers and branded marketers. The other is a Latin American version which isolates the assembly process in

those countries, mainly for the supply of women's underwear through subsidiaries of branded manufacturers or of men's outerwear via foreign or national subcontractors to overseas buyers. The Asian "full package" manufacturer/trader version is in stark contrast with what could be called the Caribbean Basin "special access-export processing zone-low wage" version. These differences are of central importance for defining the local impact in terms of national growth and development.

The North American apparel connection has been responsible for the huge increase in apparel exports from Latin America. Textile and apparel exports from Latin America to the United States market grew from US$3.4 billion (12% of total United States imports of such) in 1990 to US$14.5 billion (27%) in 1997 (14.2% originated in the Caribbean Basin and 11% came from Mexico during 1997).[3] Latin American countries were gaining ground as apparel suppliers to the United States market, but they were doing so in a very different way from their East Asian competitors.

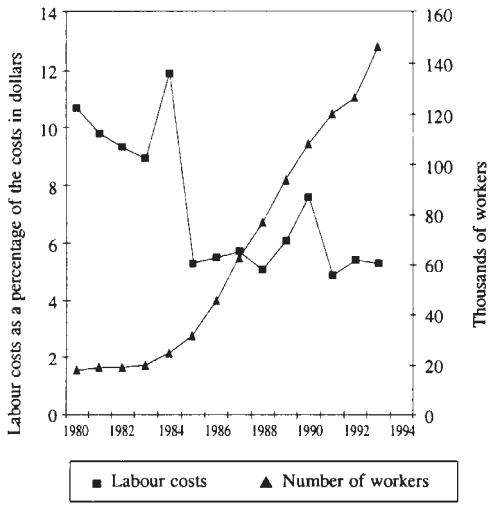
The original Mexico/Caribbean Basin variant[4] was considered to have special access because it rested heavily on the so-called "production sharing" mechanism of the United States tariff code. This HTS 9802 provision allows United States-sourced apparel inputs to be assembled offshore, paying tax upon re-entry into the United States market solely on the value added (mainly wages) outside the country. The share of United States textile and clothing imports made under this scheme has risen from US$1.4 billion (6% of all such imports) in 1987 to US$8.9 billion (21%) in 1997. Mexico (37% of the apparel imports via HTS 9802) and the Caribbean Basin (56% of such imports) together provide over 90% of textile and apparel imports into the United States via this mechanism (United States International Trade Commission, 1997a). In sharp contrast with the Asian countries, a very substantial proportion of all Latin American exports to the United States entered under the HTS 9802 mechanism in 1996: Mexico (37.6%), Dominican Republic (58.7%), Costa Rica (35.4%), Honduras (54.6%), Guatemala (34.2%), El Salvador (62.1%) and Jamaica (53.6%). It is in this sense that one can speak of "special access" for apparel from Mexico and the Caribbean Basin.

These Latin American countries also made increasing use of export processing zones (EPZs) to give incentives to the assembly trade related to the HTS 9802 mechanism. Between 1980 and 1992, for example, the importance of EPZ operations in total exports rose from 11% to 68% in the case of the Dominican Republic, from 16% to 41% for Mexico, and from virtually nothing to 21% in Costa Rica (Willmore, 1996). The EPZs provide total tax exemption for imports of inputs and components and exports of final products, and total or temporary exemption from income, profit and profit remittance taxes. Complementary aspects include the provision of facilities in terms of foreign exchange operations, limited access to the domestic market and expedite customs service. The EPZ facilities and tax exemptions represent the national counterpart to the United States HTS 9802 mechanism intended to provide additional incentives for United States-based apparel firms to make use of assembly operations in the Caribbean Basin and Mexico.

The third element of the original Latin American variant of apparel exports to the United States market rested on low labour costs. Figure 4, for example, shows that after the massive devaluation of the na-

FIGURE 4

Dominican Republic: Ratio of labour costs to employment in the export processing zones



Source: Mortimore, Duthoo and Guerrero, 1995, p. 26.

[3] Figures from United States International Trade Commission, 1998.

[4] Since the inception of the North American Free Trade Area in 1994 the first signs of full package suppliers, mostly United States companies, have appeared in Mexico. See Gereffi and Bair (1998), pp. 26-35.

tional currency in the Dominican Republic in 1985 the relative wage costs there declined from the equivalent of 12% of those in the United States to a little over 5%. At the same time employment in the EPZs exploded from less than 40,000 to about 150,000 in 1993. The lower wage rates (measured in dollars) resulting from the huge devaluation in 1985 (itself related to the external debt crisis) explain more than any other single factor why EPZs took off between 1986 and 1993. For example, the number of EPZs in the Dominican Republic grew from 8 to 30, the number of companies installed in them jumped from 168 to 447, the gross value of exports shot up from US$246.2 to US$1,250 millions, and the value of net foreign exchange earnings from those zones soared from US$88.4 to US$368.5 million (Reyes and Domínguez, 1993). This was a very significant factor in the recuperation of the economy of the Dominican Republic, since its other exports (mostly natural resources) had entered into a secular nose dive, falling from about US$900 million in 1984 to only about US$500 million in 1993, while those from the EPZs rocketed from US$200 to about US$1,250 million over the same period (Mortimore, Duthoo and Guerrero, 1995).

Thus, the example of the Dominican Republic poignantly captures the relationship between the special access to the United States market, the use of EPZs and the low wages which characterize the Caribbean Basin variant, and its wildly increased exports of apparel to the United States market. Unfortunately, this variant also has its costs.

V

The down side of the special access-EPZ-low wage variant in the Caribbean Basin

Each one of the components of the Caribbean Basin variant for apparel exports to the United States suffers from severe deficiencies as regards its ability to help these small countries to "make it" into the winners' circle.

First, special access represents a direct challenge to the national industrialization process. The very nature of the HTS 9802 mechanism penalizes practically all value added outside of the United States. This limits its use to activities in which low wages are prominent (and compensate for the United States duty on value added) and in which local physical inputs are neither needed nor desired by the manufacturer or buyer. It is extremely difficult for the national government of the assembling country to implement policies that effectively promote greater local integration of the industry. That is the case for both higher-level training of the workforce, which would eventually command higher wages for more skilled and complex work, and for the incorporation of local suppliers of inputs such as thread and buttons: let alone major inputs such as cloth or cutting operations. Thus, the HTS 9802 mechanism tends to truncate the industrialization process itself, making use only of the assembly operation in the Caribbean Basin, to the detriment of any integrated national industrialization process in the assembly country.

Another weak point in the special-access relationship between the Caribbean Basin and the United States market has to do with what are known as "calls" in United States legislation. A United States firm which feels that it has been unduly affected by what might be considered an abnormal increase in imports into the United States can request a decision by the United States Department of Commerce to determine if import disruption has taken place. The Department of Commerce can issue "calls" (warnings) to the local textile offices that allocate quotas in exporting countries in order to restrain the growth of such items. This occurred, for example, in March of 1995 when calls were issued to Caribbean Basin producers of underwear and pyjamas (some of the more important apparel exports of the region). While most assemblers of these items bowed to the United States demands, Costa Rica –which was one of the countries hardest hit by this measure– took the case to the

World Trade Organization and won, although the damage done to Costa Rican underwear and pyjama exports was not compensated. In this sense, special access is sometimes less special than it appears for the countries involved.

Another problem associated with special access is that some assembly countries become more special than others. For example, the implementation of the North American Free Trade Agreement (NAFTA) in 1994 effectively gave Mexico advantages that the Caribbean Basin countries did not possess. Mexico enjoyed a six point tariff rate advantage in the United States market, was no longer subject to import quotas on many apparel items and, most notably, could count Mexican inputs as part of the requisite NAFTA content, thus giving it a huge advantage over the Caribbean Basin countries. For that reason, since the inception of NAFTA the apparel assemblers of the Caribbean Basin have been lobbying the United States Congress in search of "NAFTA parity" for their apparel exports. Thus, not all assemblers are special in the same way.

There are also deficiencies in respect of the export processing zone mechanism, which is the local counterpart to the HTS 9802 mechanism. The intense interest of Caribbean Basin countries in developing new exports in the context of the debt crisis of the 1980s and the structural decline of natural resource exports led them to enter into "incentives wars" for foreign direct investment (Mortimore and Peres, 1997). This competition was so severe that the level of incentives granted came to signify that huge assembly operations accounting for 40% or more of these countries' whole exports to the United States provided virtually no fiscal income for the local government. Moreover, as a result of competitive pressures, incentives which were intended to be temporary (8-12 years) became renewable and, in practice, endless. Thus, in the heat of the battle to attract FDI to local EPZs, many governments give away as incentives virtually all of the potential fiscal income that could be derived from such activities. These lost resources could have been used to strengthen the local industrialization process or to promote other exports or improve the international competitiveness of the national economy through investments in infrastructure (ports, airports, roads) and basic (electricity, water) and other services (telecommunications, financial services, etc.). Rather than representing a starting point for many industries, as was the case for some of the East Asian NICs, EPZs became an end in themselves that eventually came to limit and distort the nascent industrialization process of many of these Latin American countries.

Finally, the low-wage element of the Caribbean Basin variant of apparel exports to the United States has also demonstrated very significant deficiencies. More than ten years after the massive national currency devaluations of the 1980s, the labour costs (including social and fringe benefits) in the apparel industry of the Caribbean Basin countries have been rising steadily (measured in dollars). This translates into pricing many of their apparel assembly operations out of the market, without any real manifestation of industrial upgrading or specialization in higher-value output. Table 4 presents labour cost data for forty apparel producers during 1990-1995, ordered from highest (Switzerland, Japan and Germany had hourly labour costs over US$ 20 in 1995) to lowest (five Asian countries, including China, had hourly labour costs of under US$ 0.30 in the same year). The Caribbean Basin countries are generally in the middle of the pack (ranging from positions 13 to 24). All of the Caribbean Basin countries had significant increases in their hourly labour costs during 1990-1995: Costa Rica's costs went up from US$ 1.09 to US$ 2.23; Jamaica, from US$ 0.91 to US$ 1.55; El Salvador, from US$ 0.69 to US$ 1.43; and Guatemala, from US$ 0.45 to US$ 1.30. In other words, labour costs in the Caribbean Basin are increasing faster than in most other areas and are substantially higher than many of the assemblers of standard apparel in Asia. Even within the Caribbean Basin, there is a considerable distance between higher cost Costa Rica and lower cost Guatemala. This suggests that as the level of competition in this industry increases in keeping with the demise of the Multifibre Agreement perhaps these countries may be tempted to follow a strategy of competitive devaluations of their national currencies in order to artificially prolong the life of their apparel exports. But that would only make matters worse.

A more fundamental concern is that the current Caribbean Basin variant of exporting apparel to the United States market simply does not meet the requirements of the stylized view of the growth of countries presented in Section I. It is evident that apparel assembly in the Caribbean Basin resulted in

TABLE 4

Labour costs in the apparel industry, 1990-1995

Rank	Country	Hourly costs in US$ [a]			1990-1995 annual growth rate (%)
		1990	1993	1995	
1	Switzerland	14.19	18.08	22.42	9.6
2	Japan	6.34	10.64	20.95	27.0
3	Germany	7.23	17.22	20.35	23.0
4	Italy	12.50	12.31	13.68	1.8
5	United States	6.56	8.13	9.62	8.0
6	Spain	7.08	6.41	7.78	1.9
7	Greece	4.33	5.85	7.19	10.7
8	Taiwan	3.41	4.61	5.18	8.7
9	Hong Kong	3.05	3.85	4.32	7.2
10	Singapore	2.43	3.06	4.01	10.5
11	Portugal	2.30	3.03	3.85	10.9
12	South Korea	2.46	2.71	3.29	6.0
13	**Costa Rica**	**1.09**	**1.08**	**2.23**	**15.4**
14	Hungary	0.92	1.62	1.68	12.8
15	Mexico	0.92	1.08	1.61	11.8
16	Malaysia	0.56	0.77	1.59	23.2
17	South Africa	1.07	1.12	1.58	8.1
18	Czech Republic	2.79	1.29	1.55	-11.1
19	**Jamaica**	**0.91**	**0.78**	**1.55**	**11.2**
20	Turkey	1.35	3.29	1.52	2.4
21	**Dominican Republic**	**0.67**	**0.63**	**1.52**	**17.8**
22	**El Salvador**	**0.69**	**0.63**	**1.43**	**15.7**
23	Poland	0.50	0.44	1.42	23.2
24	**Guatemala**	**0.45**	**0.78**	**1.3**	**23.6**
25	Mauritius	...	1.04	1.28	...
26	Morocco	0.92	1.06	1.22	5.8
27	Thailand	0.63	0.71	1.11	12.0
28	Philippines	0.46	0.53	0.72	9.4
29	Egypt	0.34	0.43	0.51	8.4
30	Zimbabwe	...	0.35	0.45	...
31	Sri Lanka	0.24	0.35	0.41	11.3
32	Kenya	0.47	0.23	0.34	-6.3
33	Indonesia	0.16	0.28	0.33	15.6
34	India	0.33	0.27	0.29	-2.6
35	Pakistan	0.24	0.27	0.29	3.9
36	Vietnam	...	0.26	0.29	...
37	China	0.26	0.25	0.25	-0.8
38	Nigeria	0.2	0.27	0.24	3.7
39	Bangladesh	...	0.16	0.20	...
40	Tanzania	...	0.18	...	...

Source: Werner International, *Apparel Hourly Labor Cost,* New York, 1996, cited in Lall and Mortimore, 1997.
[a] Costs include social and fringe benefits.

an impressive explosion of apparel exports. However, given the characteristics of the particular way this was achieved, this phenomenon did not represent an intensification of the national industrialization processes (on the contrary, it truncated them). These exports do not represent the extension of the national apparel industry into the international market, but simply the localization of the assembly function itself. As a consequence, this process does not create national leader companies. There is no transformation of the industry such that the assembler country extends its industrialization into the more technologically complex or more fashion-centric aspects of the apparel industry.

VI

The example of Costa Rica

Costa Rica's apparel exports to the United States market increased steadily until 1995, when they declined by over 7%, falling from US$ 776.3 million in that year to US$ 710.0 million in 1996 (United States International Trade Commission, 1997b). Costa Rica saw its apparel exports decline in four of the five principal apparel categories (at three digits of the Harmonized Tariff System) that together accounted for over half such exports:

- HTS 347 - cotton men's trousers (from US$ 156.6 to US$ 148.2 million),
- HTS 352 - cotton underwear (from US$ 112.2 to US$ 77.1 million),
- HTS 649 - synthetic fibre brassières (from US$ 84.7 to US$ 60.4 million), and
- HTS 338 - synthetic fibre underwear (from US$ 51.5 to US$ 45.3 million).

The Costa Rican apparel industry apparently had developed wrinkles.

A detailed analysis of ten of the principal export items of this industry in 1994 (at six digits of the HTS) revealed that by 1996 each item had lost import market shares, on average by 23.6%.[5] While Latin American countries were winning United States import market shares for these same items, Costa Rica was losing out, primarily to Mexico and Central American countries such as Honduras, El Salvador and Guatemala, but not to the Dominican Republic. Was Costa Rica being priced out of the market? An in-depth study of the international competitiveness of the Costa Rican apparel industry was carried out to respond to that concern (Mortimore and Zamora, 1998). A formal questionnaire was administered to 16 firms in the sector, and the information from the interviews and analysis of results of the questionnaire threw light on the specific competitive situations of these enterprises.

The sixteen firms could be classified into three different groups:

Group I: Very large subsidiaries of United States TNCs assembling undergarments for export to the United States market via HTS 9802, which faced "calls" in 1995 after having improved their international market shares considerably during 1990-1995. They accounted for the lion's share of Costa Rica's apparel exports to the United States. An indicator of their success, aside from their domination of Costa Rican clothing exports, is that their employment doubled between 1985 and 1990 and doubled again between 1990 and 1995. Examples are the subsidiaries of large United States branded manufacturers such as Hanes (Sara Lee), Warnaco and Lovable.

Group II: Other, mostly new, foreign subsidiaries which mainly assemble clothing subject to quotas in the United States market, which they access via HTS 9802, and which had a less successful performance in general during 1990-1995. This group accounts for an appreciable portion of the remaining Costa Rican clothing exports and its employment levels rose by 50% between 1985 and 1990 and by about 40% between 1990 and 1995. They employ fewer personnel than the companies in Group I and are also less dynamic. Examples are the subsidiaries of United States firms such as Tropical Sportswear, Cluett Peabody, Todd Uniform and Gilmour Trading.

Group III: Old-established national firms, mostly small ones using the export contract regime which accessed the United States market via non-HTS mechanisms and have had some success in improving their international market shares. Their exports are not significant in the context of the Costa Rican clothing industry. While the employment of these companies doubled between 1985 and 1990, it fell by one-third between 1990 and 1995. Their domestic market shares have been collapsing due to increased import competition. Examples include the Cia. Textil Centroamericana, El Acorazado, Tejidos El Aguila, etc.

Given their different competitive situations, these companies also had different corporate strategies. Group I firms, which possessed more sophisticated, specialized operations in which quality is extremely important, had set up integrated regional

[5] Calculated using the MAGIC computer programme, which measures international competitiveness in terms of import market shares in the United States market at up to 10 digits of the HTS. Available from the ECLAC Subregional Headquarters in Mexico. Contact *rbuitela@un.org.mx*.

production systems in the Caribbean Basin some time ago. Typically, they had subsidiaries in 4 or 5 different sites, such as the Dominican Republic, Jamaica, Honduras, El Salvador and Mexico, as well as Costa Rica. In this fashion, they could adapt to changing national competitive situations (labour costs, exchange rate variations, and other changed circumstances) by adding/dropping lines of production in particular sites. They had no need to be "footloose". Generally they assembled apparel products for their headquarters firm which sold the output to retailers in the United States market. Their success in Costa Rica allowed them to implement "expansive" strategies until the 1995 "calls" were made.

Group II enterprises had less sophisticated, less specialized operations, and wages rather than quality was considered to be the principal element in their international competitiveness. In this sense they had more of a strict "cost centre" mentality. They tended to have much smaller corporate networks in the Caribbean, based on only 1 or 2 main sites. They were more "footloose" and prone to adapt to changing national competitive situations by moving away when the going got rough. Rather than producing for their headquarters corporation itself, these firms generally competed for the assembly portion of buyers' contracts, often delivering the product directly to the contractor. Given their more limited success, their strategies tended to be more neutral than expansive.

Group III companies were the least sophisticated and least specialized of the three groups. These national firms considered foreign technology to be the principal element of their competitiveness both in Costa Rica and in the international market. They possessed no international corporate network to speak of and were, effectively, at the mercy of the national competitive situation. Because of the collapse of their domestic market shares due to import liberation, these companies were obliged to compete increasingly for the assembly portion of buyers' contracts in the international market in order to survive. Their strategies can be considered defensive.

The most interesting finding of this empirical study in Costa Rica is that these three different groups of firms which implemented different corporate strategies all provided some exceptionally negative indications of the problems associated with the special access/export processing zone/low wage formula for exporting apparel to the United States market from Costa Rica. For example, one of the parent firms –a major United States branded manufacturer owning two of the five large Group I firms in Costa Rica (and others in the Dominican Republic, Mexico, and more recently other Central American countries)– announced that it was to be restructured (selling off its United States yarn and textile operations). It would therefore no longer manufacture many of the goods that it sells. What does that forebode for the relatively high-cost plants in Costa Rica? Closure? Sale? Hopefully, it will not follow the example of its arch-rival, Fruit of the Loom.[6] Another example is a Group I firm which closed one of its three plants in Costa Rica only to expand activities in neighbouring Panama. In 1996 a Group II company simply disappeared from Costa Rica, leaving behind huge outstanding liabilities, especially in respect of wages and social security payments. Workers claimed that there was no advance warning of this "fly-by-night" exit over the weekend. Will more follow this example as Costa Rica's international competitiveness in this industry wanes? A final example has to do with a Group III enterprise. In 1996 one of the four national companies, owned by a prominent local businessman (then President of the National Manufacturers' Association), that attempted to survive by competing for export assembly contracts simply went broke due to the increasing competitive pressures.

What does all this mean? At the very least, it would seem to suggest that the problems of apparel exports via the special access/export processing zone/low wage mechanism would appear to be systemic. They do not relate to any particular kind of firm with any particular corporate strategy: rather, all apparel firms see their international competitiveness crumble. If one were to prepare a kind of Costa Rican scorecard on the capacity for the apparel industry to propel the country towards "the winners' circle" mentioned in Section I, some interesting conclusions can be drawn about this experience. First, in terms of intensifying the national industrialization process, the reliance on the HTS 9802 mechanism does indeed

[6] Fruit of the Loom has been imploding: laying off 16,355 of its 29,112 United States workers since 1994, suffering operating losses of US$ 283 million in 1997, and provoking complaints of poor service from key clients, such as Wal-Mart Stores Inc. and Kmart Corp. The solution proposed by its CEO is to move its domicile to the Cayman Islands to save on taxes. See *Business Week*, 1998, pp. 50-54.

truncate the national industrialization process in respect of apparel. Only the assembly stage is located in the country and, aside from labour, no significant local inputs are incorporated into the final products. Moreover, the tax incentives for the export processing zones so limit the fiscal income received by the State from this central export activity that it cannot be said to provide resources for other urgent activities, which include stimulating the national industrialization process, promoting new exports, and improving the international competitiveness of the economy as a whole through the development of infrastructure, basic services, or indeed the training of human resources for more sophisticated and better-remunerated tasks.

Second, as regards extending the national industrialization process into the international market by way of exports of manufactures, it is abundantly clear that these apparel exports are not linked to the national economy in any integral way. These exports are "competitive" only in the United States market, and they cannot be directed to other markets when problems arise in that one, such as the "calls" on pyjamas and underwear in March 1995. In the particular case of Costa Rica, one could go so far as to say that the WTO dispute proved that the United States can be an extremely unpleasant trading partner when its nose is tweaked in international fora.

Finally, does the apparel industry in Costa Rica create leading national companies that evolve into major players in international markets? On the contrary, the opposite took place when the opening up of the economy gave rise to competition from imports that destroyed most of the ISI-based integrated operations of national firms. These firms do not possess a Caribbean network of assembly operations, thus they grow or decline in keeping with the evolution of the international competitiveness of the Costa Rican economy. Even their ability to compete for buyers' contracts is severely limited by the size and characteristics of the local economy, let alone their ability to manufacture (rather than assemble) apparel. They have a hard time surviving.

So, what makes apparel-based industrialization in the Caribbean Basin such a "threadbare garment"?

It takes place by way of a mechanism that is designed exclusively to make United States apparel firms more competitive in their own market (by taking advantage of low wages in the Caribbean). What is needed is one that explicitly and consciously aims at raising the long-term growth of the host economies, and especially at achieving the sustained rise in per capita income that will place them in the winners' circle.

Instead of deepening national industrialization it truncates it.

Instead of producing exports that represent the international extension of the industrialization process, it represents the simple assembly of foreign components, which is no more than a potential starting point for industrial activities.

Instead of giving birth to national companies which evolve into global competitors it threatens their very existence.

Clearly, when an activity which generates a major part of a country's exports does not serve to raise that economy to a higher level, closer to the goal of significant and sustained per capita income growth achieved by the winner countries, then apparel-based industrialization can justly be said to have become a "threadbare garment".

Dire consequences are foreseen for those apparel exporters that do not possess a local industrialization process when the Multifibre Arrangement comes to an end in 2005 under the terms of the Textile and Clothing Agreement of the Uruguay Round of GATT, for that is when the quotas placed on apparel by the United States and other countries are to be terminated. Caribbean apparel assemblers will face a difficult task to compete in the United States (or other markets) against the integrated apparel producers of East Asia. The latter produce textiles and apparel at scales of production far beyond the reach of the truncated Caribbean operations. Lacking a competitive local or subregional industrialization process to sustain apparel exports, most Caribbean operations will probably collapse in the face of the Asian steamroller.

In the few years remaining before that happens, the Caribbean Basin apparel industry can attempt to improve its situation. It must continue to insist on NAFTA parity in the North American market so that national or subregional local inputs can count as NAFTA inputs and thereby promote some degree of industrial integration. It must look for opportunities for associating in some way with the full package suppliers appearing in Mexico as a consequence of NAFTA. Finally, it must learn from the East Asian experience itself in terms of becoming full package suppliers. A stitch in time…

(Original: English)

Bibliography

Audet, D. (1996): Globalisation in the clothing industry, in OECD (Organization for Economic Cooperation and Development), *Globalisation of Industry: Overview and Sector Reports*, Paris, OECD.

Business Week (1998): Strategies: A killing in the Caymans, New York, 11 May.

ESCAP (Economic and Social Commission for Asia and the Pacific) (1994): *Transnational Corporations and Technology Transfer in Export Processing Zones and Science Parks*, New York.

Gereffi, G. (1997): Global Shifts and Regional Response: Can North America Meet the Full Package Challenge?, *Bobbin*, San Francisco, California, Miller Freeman, Inc., November.

Gereffi, G. and J. Bair (1998): U.S. Companies Eye NAFTA's Prize, *Bobbin*, vol. 39, No. 7, San Francisco, California, Miller Freeman, Inc.

Gereffi, J. and M. Korzeniewicz (eds.) (1994): *Commodity Chains and Global Capitalism,* London, Praeger.

ILO (International Labour Organisation) (1996): *Mundialización de las industrias del calzado, los textiles y el vestido*, Geneva.

Lall, S. and M. Mortimore (1997): *The garment industry in Dominican Republic, Costa Rica and Morocco*, paper presented in the UNCTAD Research Project on Industrial Restructuring and International Competitiveness, Geneva, United Nations Conference on Trade and Development (UNCTAD), October.

Mortimore, M. (1997): *La competitividad internacional: un CANalisis de las experiencias de Asia en desarrollo y América Latina*, "Desarrollo Productivo" series, No. 40, Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC).

Mortimore, M., H. Duthoo and J. A. Guerrero (1995): *Informe sobre la competitividad internacional de las zonas francas en la República Dominicana*, "Desarrollo Productivo" series, No. 22, Santiago, Chile, ECLAC, August.

Mortimore, M. and W. Peres (1997): *Policy competition for foreign direct investment in the Caribbean Basin: Costa Rica, the Dominican Republic and Jamaica*, paper presented in the OECD Development Centre Research Project on Policy Competition and FDI, Paris, OECD, February.

Mortimore, M. and R. Zamora (1998): *The International Competitiveness of the Costa Rican Clothing Industry*, "Desarrollo Productivo" series, No. 46, Santiago, Chile, ECLAC.

Ramos, J. (1996): *Industrial policy and competitiveness in open economies*, "Desarrollo Productivo" series, No. 34, Santiago, Chile, ECLAC.

Reyes, F. and A. Domínguez (1993): *Las zonas francas industriales en la República Dominicana: su impacto económico y social*, Documento de trabajo, No. 73, Santo Domingo, Banco Central de la República Dominicana/ILO.

The Economist (1998): Little countries: small but perfectly formed, London, 3 January.

United States International Trade Commission (USITC) (1997a): *Production Sharing: Use of U.S. Components and Materials in Foreign Assembly Operations, 1992-95*, Washington D.C., December.

——(1997b): *The Impact of the North American Free Trade Agreement on the U. S. Economy and Industries: A 3 Year Review,* USITC investigation No. 332-381, Washington D.C.

——(1998): *Annual Statistical Report on U.S. Imports of Textiles and Apparel: 1997*, Washington, D.C., April.

van Liemt, G. (ed.) (1992): *Industry on the Move. Causes and Consequences of International Relocation in the Manufacturing Industry*, Geneva, International Labour Office/World Employment Programme.

Willmore, L. (1996): *Export Processing in the Caribbean: Lessons from Four Case Studies*, Working paper, No. 42, Santiago, Chile, ECLAC.

The in-bond assembly *industry and* technical change

Rudolf M. Buitelaar
Industrial and Technological Development Unit, ECLAC Division of Production, Productivity and Management.

Ramón Padilla
Ruth Urrutia
Staff members of the Industry Unit, ECLAC Subregional Headquarters in Mexico.

This article analyses the export offensive made by Mexico, Central America and some Caribbean countries since the mid-1980s. Notwithstanding the differences between them, in all the countries in question this offensive has been aimed mainly at the United States market, has been stimulated by import tariff privileges and other incentives, and has been based on poorly-paid assembly operations: i.e., it involves the in-bond assembly or "maquila" industries. This study seeks to determine whether these industries contribute to local technological development. The answer, based on a questionnaire sent to 75 maquila firms in six countries, must be "yes". The maquila industry uses production techniques close to the best international practices –something matched only in a very few domestic manufacturing firms– and it helps to train human resources and introduce modern concepts of organization and management. Moreover, it makes intensive use of unskilled labour. Consequently, in order to progress towards sustainable development with social equity it would appear to be necessary to turn the maquila industry into an increasingly competitive activity by increasing its productivity and the added value of its products. The evolution of maquila industries in the direction of activities using a more highly skilled labour force is perfectly possible, as the case of Mexico shows, and it will become unavoidable when pressures on the labour market cause real wages to rise, as in Costa Rica. This will not happen automatically, however, and even less so in countries that lack institutions to support that process.

I

Introduction

The export structure and performance of Mexico, Central America and some Caribbean countries has changed greatly over the past two decades. These countries used to depend heavily on exports of primary products, but began to face declining market shares in that activity. Today, they mainly export manufactured products and are rapidly gaining market shares. Apparently, this is exactly what conventional wisdom would suggest such countries should do in order to achieve economic development: increase their participation in international trade and change the product composition of their exports. Indeed, ECLAC has formulated policy statements in this sense (ECLAC, 1990).

But is this particular kind of export drive a good engine for development? ECLAC distinguishes various different ways for a country to expand exports (ECLAC, 1990), and some may be more conducive to development than others. International competitiveness can be achieved by constantly lowering real wages, at the expense of the environment, or via government subsidies to firms, at the cost of increasing fiscal deficits. Exports based on one of those factors may not lead to sustainable development. The late Fernando Fajnzylber, who coordinated the ECLAC study in question, labeled these forms as "spurious" competitiveness. On the other hand, international competitiveness can be based on increasing productivity, which requires continuous technical progress. The same author considered technical change to be the only "authentic" source of competitiveness, and the most conducive to sustainable development. The 1990 ECLAC propositions therefore aimed at increasing competitiveness through technical change.

Let us consider the export drive carried out since the mid-1980s by the countries mentioned above. Naturally, there are conspicuous differences between Mexico on the one hand, and the Central American and Caribbean countries on the other. This paper will discuss those differences at some length. Nevertheless, it is true for all these countries that the export drive has been i) chiefly oriented towards the United States market; ii) stimulated by import tariff privileges and local tax exemptions and other incentives, and iii) it has been based on low-wage assembly-type operations: what have come to be known as "maquila industries", the definition of which is not very clear-cut. At all events, the last two points seem to fit closely the description of "spurious competitiveness".

To dismiss the export success of these countries as being based on "spurious competitiveness" and "less conducive to development" would be too rash a conclusion, however. Does the maquila industry contribute at all to technological progress? Is there technical change in the maquila industry? If it is not, as yet, a sign of "authentic" competitiveness, could it perhaps lead to it? These are the questions this paper seeks to answer.

A questionnaire was applied to some 75 maquiladora firms in six countries,[1] on the basis of which we are able to describe in some detail the technology transfer and learning processes in maquila firms. Differences between the Mexican experience and that in the other five countries became apparent. Also, differences between firms with capital of different national origin were observed. In all, we conclude that there is (albeit quite limited) some form of technology transfer and an upgrading of local productive capacities through maquila. This aspect has been rather neglected in the development strategies of those countries, in which maquila is seen mainly as an employment generating device and to some extent also as a foreign exchange earner. It has hardly been considered as a source for the upgrading of productive and technological skills. Our proposition is that maquila should also be considered as a strategy for the development of productive capacities, which would imply a different policy approach to this activity.

□ This paper is based on ECLAC (1998) and is a revision of a paper presented at the 21st Conference of the Latin American Studies Association, Chicago, 1998.

[1] Mexico, four Central American countries (Costa Rica, Guatemala, El Salvador and Honduras) and one Caribbean country (the Dominican Republic).

This paper starts (section II) with the presentation of foreign trade data that reveal the change in the international insertion of those countries in which the maquila industry has risen fast over the past decade or so. Next (section III), the term "maquila industry" is defined and the growth of this industry is described. The third and most important part of this paper (section IV) presents the results of the questionnaire survey. Finally, section V contains some concluding remarks and reflections on policy approaches.

II

Export performance and composition

In this chapter we will use the same type of information and methodology as proposed by Fajnzylber (1991).[2] This methodology illustrates well the drastic change in the international insertion of the economies studied. First, let us consider the market share of the group of selected countries in the total imports of the industrialized countries. Table 1 shows that the selected countries as a group increased their market share between 1989 and 1995 at a pace comparable to successful South-East Asian countries.

Next, we will follow the approach of Fajnzylber (1991) to analyse this export performance in two dimensions: the quality of product composition, and the competitiveness (defined as ability to gain market share) for each product group. Using a rather simple form of shift and share analysis, Fajnzylber presented a matrix inspired by the typology introduced by the Boston Consulting Group. With it, he devised a simple set of indicators which he used as proxies for competitiveness and the quality of the composition of exports.

Algebraically, the indicators are defined as follows. The change in the market share of country *i* in OECD imports *M* of product group *j* between base year *b* and final year *f* is represented by:

$$(Mij\ (f) / Mj\ (f)) - (Mij\ (b) / Mj\ (b)) \qquad (1)$$

If the formula gives a positive result, country *i* is a "winner" in the OECD market for product group *j*. If negative, then country *i* lost market share.

TABLE 1
Selected regions and countries: Shares in industrialized countries' imports
(Percentages)

Year	Latin America	Asian Tigers [a]	Mexico, Central America and the Dominican Republic
1977	5.21	6.52	1.47
1984	6.16	8.34	2.32
1989	4.61	9.68	1.74
1995	4.97	12.66	2.48

Source: ECLAC, CANPLUS data base.
[a] South Korea, Hong Kong, Taiwan and Singapore.

The change in product share for each product *j* in total OECD imports may be expressed as:

$$(Mj\ (f) / M\ (f)) - (Mj\ (b) / M\ (b)) \qquad (2)$$

If the second formula gives a positive value, this means that imports of product group *j* grew faster than total imports, so that it may be called a product group with "dynamic demand growth", or simply a "dynamic product". In contrast, a negative value indicates a "stagnant product". It may be noted that Fajnzylber implicitly assumed a positive correlation between "dynamic products" and "technology-intensive" or "new" products. The exercise can be shown in a two-by-two matrix, with formula 1 on the vertical axis and formula 2 on the horizontal axis (figure 1.)

The sum total of all products in all four categories for country *i* equals the total exports of that country to the OECD market (*Mi*). Now two indicators may be calculated.

[2] It is necessary to use information on industrialized countries' imports instead of export data, because maquila exports are not always well registered in the latter sources.

FIGURE 1

The competitiveness matrix

Declining Stars (DS) Stagnant products in which country *i* gains market share	**Rising Stars (RS)** Dynamic products in which country *i* gains market share
Retreats (R) Stagnant products in which country *i* loses market share	**Lost Opportunities (LO)** Dynamic products in which country *i* loses market share

TABLE 2

Efficiency and positioning of selected countries, 1979-1988 and 1989-1995

(Percentages)

Country	Years	Efficiency	Positioning
Mexico	1979-1988	83	64
	1989-1995	84	65
Guatemala	1979-1988	39	24
	1989-1995	93	71
El Salvador	1979-1988	8	26
	1989-1995	92	94
Honduras	1979-1988	41	24
	1989-1995	81	80
Costa Rica	1979-1988	94	38
	1989-1995	94	41
Dominican Republic	1979-1988	74	60
	1989-1995	86	80

Source: ECLAC, CANPLUS data base.

The ratio ($\Sigma RS+\Sigma DS$) / *Mi* may be considered an indicator of competitiveness, given that it reflects the percentage of total export value of products in which country *i* gains market share. Fajnzylber called this "efficiency", and it is a proxy for revealed "competitiveness".

The ratio ($\Sigma RS+\Sigma LO$) / *Mi* may be considered an indicator of the quality of the product composition of exports, given that it reflects the percentage of total export value consisting of dynamic products. Fajnzylber called this "positioning". Both the efficiency and the positioning indicators may vary in theory between 0 and 100. The efficiency indicator is 0 when the country has lost market shares in all products with which it participated in OECD imports; and is 100 if it gained market shares in every exported product. The positioning indicator will be 0 if all product markets in which a country participated grew less than the growth of total OECD imports, and it is 100 if all product markets grew above average.

Table 2 presents both the 1979-1988 period (Fajnzylber 1991) and the update to 1995 made for this article. It shows that Mexico and the Dominican Republic[3] already scored high on both indicators in 1988, and in the subsequent period, up to 1995, these countries improved slightly on their already good performance. Costa Rica was also already a "winner" country in 1988, more because of its competitiveness (94% of total exports was in products in which Costa Rica gained market shares) than because of good positioning.[4] Indeed, "stagnant" products were the mainstay of Costa Rican exports in the second period too. In all three countries, the maquila industry started to grow early in the 1980s, which explains a good deal of the good performance indicators in 1988.

A dramatic shift can be observed in the situation of the other three Central American countries. From being among the world's worst export performers in the 1980s, all three countries advanced to a place among the best performers. Not only did they displace competitors from the product markets in which they participate, but their export product groups are in dynamic demand (United States imports of these products grow faster than average).

[3] With regard to the Dominican Republic, see for example Mortimore, Duthoo y Guerrero (1995)

[4] Mortimore and Zamora (1998) offer detailed information on Costa Rican apparel exports.

Will this impressive performance, both in terms of increased market shares and of improved product composition of exports, lead to sustainable development? It may, in the view of ECLAC, if it is based on technical change and productivity increases. This paper analyses in particular the contribution to technical change made by maquila exports. In order to show the particular importance of such exports, the following tables present data on maquila exports as a percentage of total exports for Mexico (table 3) and Central America and the Dominican Republic (tables 4 and 5). The Mexican statistics differentiate maquila exports from other exports, and the percentage increased from 11-15% at the beginning of the 1980s to around 40% in the 1990s. It is clear that such exports have grown significantly faster than other exports.

TABLE 3

Mexico: Maquila exports as a percentage of total exports [a], 1980-1997

Year	Percentage	Year	Percentage
1980	14.0	1989	35.1
1981	13.8	1990	34.1
1982	11.7	1991	37.1
1983	14.0	1992	40.4
1984	16.9	1993	42.1
1985	19.0	1994	43.1
1986	25.9	1995	39.1
1987	25.7	1996	38.5
1988	33.1	1997	40.9

Source: Banco de México, http://www.banxico.org.mx

[a] Both maquila exports and total exports are FOB values, and represent the gross production value. Maquila exports are those exports registered under the "Maquila Programme".

TABLE 4

Central America and Dominican Republic: Maquila exports as a percentage of total exports to the United States [a], 1990-1997

	1990	1991	1992	1993	1994	1995	1996	1997
Costa Rica	39.9	36.8	40.2	46.3	41.5	44.0	43.1	...
El Salvador	30.6	58.8	52.5	57.5	70.8	79.3	82.3	81.0
Guatemala	43.3	50.6	57.9	58.0	62.6	60.8	55.6	57.8
Honduras	43.7	43.1	51.8	59.6	71.2	81.2	72.7	70.0
Nicaragua	...	10.6	17.9	12.7	13.6	13.2	17.1	31.6
Dominican Republic	...	...	40.4	44.5	45.7	...	...	...

Source: U. S. Department of Commerce and ECLAC, BADECEL data base.

[a] United States imports are valued FAS (Free Alongside Ship), and therefore do not include port services, while the countries' exports correspond to their FOB value. Both values represent the gross production value.

TABLE 5

Central America and Dominican Republic: Maquila exports as a percentage of total exports, 1990-1997

	1990	1991	1992	1993	1994	1995	1996	1997
Costa Rica	21.6	20.7	23.6	26.9	23.5	23.1	23.4	...
El Salvador	12.6	32.9	26.7	28.1	34.7	39.6	46.3	44.5
Guatemala	22.8	27.5	32.5	34.1	34.8	32.4	31.4	32.9
Honduras	28.0	28.4	35.5	45.1	55.8	64.1	60.7	61.1
Nicaragua	...	2.3	4.9	5.6	6.1	5.8	8.3	17.2
Dominican Republic	...	...	36.2	40.4	41.6	...	...	...

Source: U. S. Department of Commerce and ECLAC, BADECEL data base.

TABLE 6

Mexico, Central American countries and the Dominican Republic: Shares in selected import markets
(Percentages)

	1979	1984	1989	1998
	Market shares in North American imports [a]			
Mexico	3.56	4.86	4.74	6.78
Costa Rica	0.16	0.14	0.17	0.23
El Salvador	0.16	0.11	0.05	0.09
Guatemala	0.17	0.12	0.12	0.18
Honduras	0.17	0.12	0.09	0.16
Dominican Republic	0.27	0.25	0.28	0.38
Central America + Dominican Republic	0.92	0.74	0.72	1.03
	Market shares in European imports			
Mexico	0.14	0.60	0.24	0.19
Costa Rica	0.08	0.04	0.04	0.05
El Salvador	0.05	0.03	0.01	0.02
Guatemala	0.08	0.03	0.02	0.02
Honduras	0.04	0.03	0.02	0.02
Dominican Republic	0.03	0.02	0.02	0.02
Central America + Dominican Republic	0.27	0.15	0.11	0.13
	Market shares in Japanese imports			
Mexico	0.43	1.53	0.83	0.46
Costa Rica	0.01	0.01	0.01	0.01
El Salvador	0.09	0.03	0.01	-
Guatemala	0.13	0.04	0.02	0.03
Honduras	0.03	0.04	0.04	0.04
Dominican Republic	0.01	0.01	0.02	0.01
Central America + Dominican Republic	0.28	0.13	0.10	0.09

Source: ECLAC, CANPLUS data base.
[a] The United States and Canada.

National data for Central America and the Dominican Republic do not incorporate maquila exports. United States import data do, but information is available only from 1990 onward (due to the introduction of the Harmonized System). By deducting from the United States imports originating in Central America and the Dominican Republic the exports to the United States registered in the national data[5], an approximation of the maquila exports of those countries can be obtained. Table 4 shows that maquila exports from El Salvador and Honduras account for 70-80% of total exports to the United States, a percentage that has increased sharply in the 1990s, while maquila exports from Costa Rica, Guatemala and the Dominican Republic account for around 50%. As a percentage of total exports to the world (table 5), maquila exports amount to as much as 61% in the case of Honduras, and close to 50% in El Salvador and the Dominican Republic.[6]

Finally, table 6 shows the market shares of Mexico, the Central American countries and the Dominican Republic in the North American market (the United States and Canada), Europe and Japan. The rise in maquila exports accounts for the notable increase in market shares in the North American market in the 1990s, whereas market shares in Europe and Japan remained virtually unchanged. Their striking export performance was therefore mainly based on their exports to the United States, and in particular on the exports from maquila industries to that market.

[5] According to ECLAC's BADECEL data base.

[6] It is generally accepted that maquila exports embody less local raw materials than "non-maquila" exports. Consequently, the contribution of the value added in maquila exports to total export added value would be less than the percentages shown in tables 3, 4 and 5.

III

The maquila industry: origin and evolution

As demonstrated above, the increase in market shares achieved by the selected countries is largely the result of the "maquila industry". But what precisely is maquila? The dictionary says that it is a word of Arabic origin, meaning the portion of grain or oil a miller receives as payment for the milling. In broader economic terms, it would be an activity in which the owner of the raw material hires the owner of the capital good and his labour force to perform a production process, the payment being a fixed percentage of the processed product.

In present-day Mexico, the term "maquila" is associated with a type of economic activity that was first made possible by the Programa de Industrialización Fronteriza (Border Industrialization Programme). This programme was adopted in 1965 to provide employment for approximately 200 000 Mexican labourers who had to return from the United States because of the ending of the Braceros Program, which had provided them with temporary employment in the United States in times of labour shortage, especially during the Second World War and the Korean War.

The Border Industrialization Programme allowed tariff-free imports of capital goods and inputs, for export of the finished product. It perhaps resembles the old notion of maquila in that Mexico offers its territory and labour force to a foreign entrepreneur who provides inputs and takes back the processed product. It was essentially a programme to attract foreign direct investment of United States origin for export-oriented assembly operations along the Northern Border. As such, it was an important departure from prevailing import-substitution policies. In 1971 the legislation was modified to allow maquila industries to settle in coastal areas and cities in the interior of the Republic.

The exemptions from duty offered by Mexico in respect of foreign direct investment establishing assembly operations for re-export were complemented by the tariff treatment the assembled products received in the United States. Since 1930 the United States Tariff Schedule had included item No. 806.30, under which certain metal products manufactured with raw material of United States origin could be re-imported into the United States, paying the applicable tariff only on the value added abroad. This provision was established to facilitate operations between firms in the United States and Canada. Later item 807.00 was added, applicable to goods processed abroad with materials of United States origin. This provision facilitated the operations abroad of United States transnational firms.

Central America and the Dominican Republic followed a different approach from that adopted by Mexico to attract foreign direct investment for the establishment of assembly operations for export, but the aim was likewise to take advantage of the item 807.00 import tariff provision. Here, export processing free zones were created following the example of several South-East Asian countries. In these Free Zones, which were State-owned industrial parks, firms were also allowed to import free of duty raw materials, inputs and capital goods for the re-export of the finished product. Some parks also provided buildings and basic services for the assembly operations. With varying success, all countries except Costa Rica established these Free Zones in the early 1970s. Costa Rica used a special tariff regime to allow the establishment of assembly activities for export.

The crisis of the early 1980s led to profound changes both in the economic environment surrounding the maquila industry and in the legal framework in which it operated. From being an exception in an otherwise inward-oriented policy framework, the export-oriented assembly industry became a spearhead in the change towards an export-led development model. The high political priority attached to exports first translated into changes in the legal framework. In 1984 Costa Rica enhanced the fiscal incentives for exports to destinations outside the Central American region; improved the law regulating temporary entrance of goods for re-export,

Box 1

CENTRAL AMERICA: EVOLUTION OF THE LEGAL FRAMEWORK GOVERNING MAQUILA INDUSTRIES

Initial situation

Most laws only considered special export promotion programmes.
Only public ownership and administration of free zones was allowed.
Installation of free zones restricted to certain locations.
Only production for export allowed.
FDI restricted to certain activities.
Maquila benefits restricted to certain activities.

Present situation

Three different regimes are now in place: i) Export processing free zone laws; ii) Temporary entrance laws and iii) Drawback systems.
Ownership and administration of free zones are now open to private capital.
Tendency to allow free zones throughout the national territory; in some countries individual plants can receive free zone status.
Tendency to allow local sales, after paying import duties.
Liberalization and sectoral diversification of FDI.
Maquila benefits open to all export-oriented activities.

Source: Prepared by the authors, and ILO (1996).

and allowed private capital to participate in the ownership and administration of Free Zones. Guatemala and Honduras also introduced legislation in the same year regarding temporary entrance and export-processing free zones. In the Dominican Republic, the liberalization of the exchange-rate regime proved fundamental for the attraction of assembly operations. In many countries this legislation was subsequently revised and enhanced, and the legal framework was fully operational by the beginning of the 1990s. Box 1 resumes the changes in the legal framework.

Another important development in the first half of the 1980s was the creation of private sector institutions to attract foreign direct investment. Cases in point are the Coalición Costarricense de Iniciativas de De-sarrollo (CINDE, Costa Rica), the Gremial de Exportadores de Productos No Tradicionales (GEXPRONT, Guatemala), the Fundación para las Inversiones y el Desarrollo Económico (FIDE, Honduras), the Fundación Salvadoreña para el Desarrollo Económico y Social (FUSADES) and the Consejo para la Promoción de la Inversión (Dominican Republic). In many cases, these institutions received considerable support from the United States Agency for International Development (USAID), sometimes channeled through its Regional Office for Central America and Panama.

The local fiscal benefits for export-oriented assembly operations and the establishment of supporting institutions came to complement the important privileges of access to the United States market. The Caribbean Basin Economic Recovery Act (CBERA) of 1983 (renewed in 1990) granted to certain countries a unilateral concession of duty-free access to the United States market for a substantial number of products. Apparel was initially excluded, because its access to the United States market is governed by bilateral quota-restrictions under the Multifibre Agreement. Starting in 1986, however, the United States negotiated Special Access Programmes with CBERA countries to facilitate apparel imports. Most importantly, Guaranteed Access Levels were granted to countries in Central America and the Caribbean that gave those countries freer access to the United States market for apparel products made with United States fabric. Mexico, for its part, negotiated with the United States in 1988 a Special Regime for apparel exports, providing for treatment comparable with that given to the CBERA countries.

In the case of Mexico, the most important legal changes concerned the authorization to maquila industries to sell up to 20% (1983) and 50% (1989) of their production on the local market. More recently, the North America Free Trade Agreement has gradually raised this percentage, and local sales will be allowed in full by 2001.

The existence of NAFTA has of course made the benefits of the Mexican maquila programme less significant for exports to the United States market, because most tariffs immediately dropped to zero and others were gradually reduced. This does not mean that assembly operations have become less attractive. In the apparel industry in particular, NAFTA meant quota-free access and significantly lower import tariffs for exported products of Mexican origin. Furthermore, transport and telecommunication services and immigration facilities for businesspeople were improved. Maquila industries may, however, take other options into account instead of the Maquila Programme. The PITEX programme is another export-promotion scheme that is increasingly used for assembly operations for export (SECOFI, 1996). It was created for domestic export-oriented firms and also allows duty-free imports of raw materials and capital goods. Unlike the Maquila Programme, it offers no exemption from asset tax, but it does include a drawback mechanism, under which firms can secure the return of import duties paid on inputs for exported goods.

Fiscal benefits in Caribbean Basin countries, including Mexico7, the establishment of supporting institutions for the attraction of foreign direct investment, privileged access to the United States market and the competitive pressure on United States firms have provided the setting for explosive growth of export-oriented assembly operations.

It has been noted, in the literature on Mexico, that the character of maquila operations has changed over time.[8] The changes refer to organizational systems and human resource management, the importance of quality, and technological changes. The so-called first-generation maquila plants were plants based on the intensification of manual operations, more concerned with volume than with quality. Their presence predominated until the early 1980s. In contrast, second-generation plants needed the ability to respond quickly to changes in demand for products with short life-cycles and higher quality standards (Carrillo, Mortimore and Estrada (1998)). New technologies were introduced as well as new forms of organization of the production process and changes in human resource management. Production lines were automated, workers had to perform multiple functions, and the proportion of engineers and technicians increased. This is the type of maquila plants that predominate at present. A third generation of maquila plants has also been observed, in which knowledge-intensive activities of product development and design are performed by Mexican engineers with relatively lower salaries. Until now, these cases are very exceptional.

At this point, it seems clear that there is no internationally valid clear-cut definition of maquila industries, and therefore there is no uniform data source on the growth and characteristics of the industry. Mexico uses its own definition, grants maquila status to certain plants and operations and collects statistical information accordingly. In the countries of Central America and the Caribbean, information exists on firms in Export Processing Free Zones and firms qualified to receive export promotion benefits and drawback rights, while from the United States standpoint, the information on United States imports may shed light on the development of the industry.

Maquila exports from Mexico have grown by close to 20% per year between 1983 and 1997.[9] Growth rates were particularly strong in 1987 (26%) and 1988 (43%). Employment in maquila industries grew in the same period at an annual rate of 13%. In 1997, 2 867 plants employed directly almost 940 000 workers (figure 2). The increase in the number of plants and jobs has recently been particularly marked outside the border zone.

Between 1988 and 1997, the percentage of total employment in maquila operations represented by the

[7] See Mortimore and Peres (1998) for some interesting comments on policy competition.

[8] See Carrillo and Hualde (1997), Mertens and Palomares (1988), Wilson (1990), and Brown and Domínguez (1989).

[9] Calderón, Mortimore and Peres (1995) analyse the growth of Mexican exports.

FIGURE 2

Mexico: Employment in the maquila industry

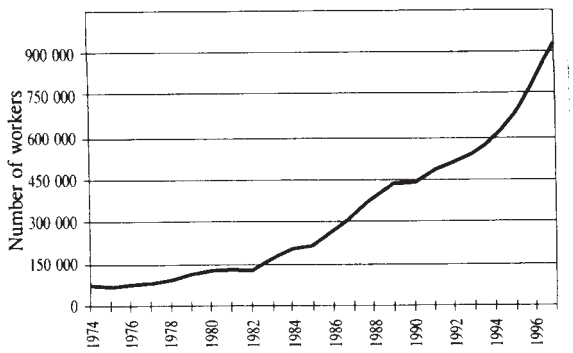
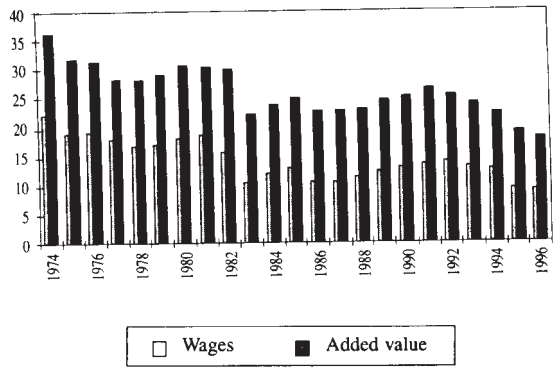


FIGURE 3

Mexico: Shares of added value and wages in the gross value of production



assembly of electrical and electronic products and components went down from 40% to 34%. Components for automotive vehicles have continued to account for 20% of such employment, while apparel products have increased their share from 9% in 1988 to 20% in 1997.

Local value added of maquila exports went down from 37% of Gross Production Value in 1974 to only 20% in 1997. Local procurement of direct inputs continues to be negligible. Wages, which are the main component of local value added, reduced their share in GPV from 23% in 1974 to 10% in 1996 (figure 3). This reveals the trend towards more capital-intensive sectors and production techniques, as well as the fall in real wages (Banco de México, various years; INEGI, various years).

It has not been possible to construct time series on exports and employment for the Central American countries. In 1996, some 800 plants provided close to 250 000 direct jobs, according to Gitli (1997). In contrast to Mexico, the vast majority of maquila plants in Central America are devoted to apparel products. Some electrical and electronic maquila firms exist, especially in Costa Rica. This sector received a considerable boost from the establishment of a microprocessor assembly plant early in 1998.

Table 7 shows the origin of capital; it is interesting to observe the presence of Korean-owned plants, especially in Guatemala, and other Asian (Taiwan) plants in Nicaragua. The presence of Asian capital is mainly explained by the quota restrictions on apparel exports to the United States from the Asian countries themselves. There is also a significant presence of local capital in maquila industries, especially in El Salvador, where the law permits the granting of free-zone status to individual plants (*Predios Fiscales*). In Costa Rica, which is the country where maquila plants were first established, the predominance of US-owned firms is evident.

In the Dominican Republic, maquila exports and employment grew fast from 1985 onward. By 1996, 434 plants in 36 free zones exported a total value of US$ 2.8 billion and employed directly 165 000 workers. Almost two-thirds of total maquila exports consist of apparel products.

In short, in the selected countries close to 4 000 plants classified as "maquila industries" provided in 1996 close to 1.5 million direct jobs.

Another way of gaining an approximate picture of the evolution of maquila industries in the countries considered is to take a look at United States imports for the main product group involved: apparel products (table 9). It should be noted that these data do not necessarily coincide with what are considered to be maquila industries in the countries of origin.

Whereas in 1990 only 9% of all United States apparel imports originated in the selected countries, eight years later this figure had increased to well over 26%. In current dollars, apparel exports from these countries to the United States expanded from US$ 2.1 billion to US$ 12.1 billion. Another revealing feature of table 9 concerns the tariff applied. The

TABLE 7

Central America: Origin of capital, number of plants and employment

Country	Plants	Origin of capital					Employment
		Local	United States	Korea	Other Asia	Other countries	
Costa Rica	189	39 (21%)	113 (60%)	4 (2%)	3 (2%)	30 (16%)	47 972
El Salvador	190	123 (65%)	20 (11%)	16 (8%)	12 (6%)	19 (10%)	42 000
Guatemala	220	95 (43%)	20 (9%)	96 (44%)	4 (2%)	5 (2%)	61 800
Honduras	174	56 (32%)	62 (36%)	37 (21%)	17 (10%)	2 (2%)	78 583
Nicaragua	19	3 (16%)	6 (32%)	3 (16%)	6 (32%)	1 (5%)	13 000
Total region	792	316 (40%)	217 (28%)	156 (20%)	42 (5%)	57 (7%)	245 355

Source: Gitli (1997).

TABLE 8

Dominican Republic: Export Processing Zones, 1990-1996

	1990	1991	1992	1993	1994	1995	1996
Exports (millions of dollars)	1 123.5	1 415.8	1 839.3	2 165.1	2 453.9	2 700.1	2 851.9
Value added (millions of dollars)	351.7	448.1	575.7	677.7	768.1	845.1	892.6
Number of EPZs	25	27	30	31	32	33	36
Number of plants	331	357	420	462	476	469	434
Employment	130 045	135 491	141 056	164 296	176 311	165 571	164 639

Source: National Council of Free Zones.

implicit tariff is calculated as total duties levied divided by total value of imports. In 1990 it showed a rather uniform picture, with tariffs between 17% and 20%. NAFTA meant the virtual elimination of tariffs for Mexican apparel exports, while the special access provisions for Central America and the Dominican Republic brought the implicit tariffs down to a range of 5%-10%. Apparel exports from countries without preferential access to the market continue to pay a substantially higher implicit tariff.

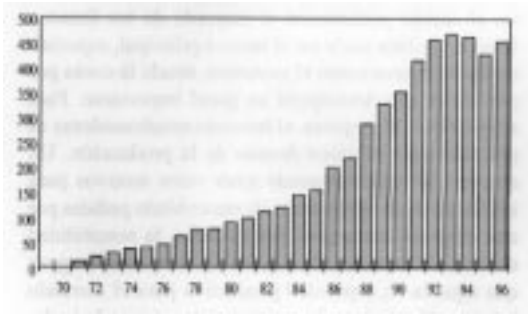
In the Mexican case, maquila exports of car parts and electrical and electronic equipment are substantial. Cars and parts thereof come under tariff heading 87, where Mexico increased its market share from 5% in 1990 to 13.4% in 1997. Implicit tariffs fell from 2.8% to 0.6%. Electrical and electronic equipment and parts thereof come under heading 84, where Mexico's market share increased from 3.6% in 1990 to 7% in 1997, with implicit tariffs falling from 1.9% to 0.3%.

All this evidence clearly shows the impressive performance of the maquila industry after the changes in the legal framework, supporting institutions and market access conditions that occurred in the 1980s and 1990s. The next section discusses the industry's impact on technical change in the selected countries.

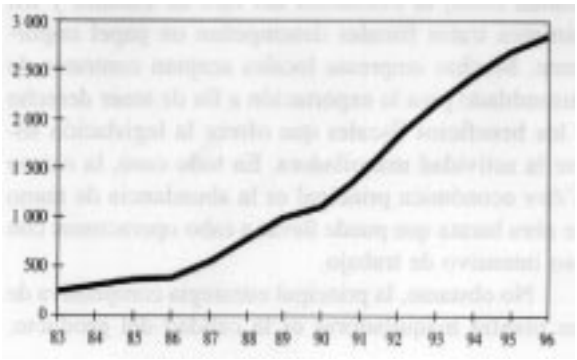
FIGURE 4

Dominican Republic: Export Processing Zones

A. Number of plants, 1970-1996



B. Exports, in millions of dollars, 1983-1996



C. Direct employment, 1970-1996

(number of persons employed)

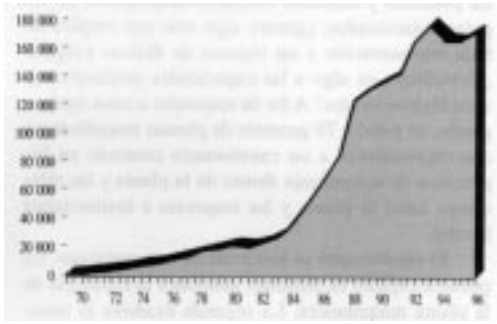


TABLE 9

United States: Imports of apparel products

(Tariff chapters 61 and 62 totalized)

Country of origin	Market share		Implicit tariff	
	1990	1997	1990	1997
Mexico	1.79	11.75	17.12	0.70
Guatemala	0.83	2.16	19.41	9.85
El Salvador	0.24	2.36	17.88	6.54
Honduras	0.49	3.78	19.54	5.72
Costa Rica	1.64	1.89	19.78	5.12
Dominican Republic	2.98	4.90	19.94	5.90

Source: United States Department of Commerce, *US Imports of Merchandise* (published on CD-ROM), processed using the MAGIC software programme developed by ECLAC.

IV

Maquila and technical change: results from a questionnaire study

Does the strong and growing maquila industry in the selected countries generate more than low-wage employment and a little foreign-exchange income? What, if anything, does it contribute to local productive and technological capabilities? To explore these questions, some 75 managers of maquila plants were asked to answer a questionnaire focused mainly on learning processes within the plant and the relations between the plant and local firms and institutions.

The questionnaire was divided into three sections. The first explored in general terms the strategy of the maquila plant. The second explored the situation within the plant regarding human capital formation and research and development activities. The last section investigated the links between the plant and its surrounding environment in terms of relations with other firms, with governments and with local institutions of education and training and technological development.

1. Strategies of the maquila plant

First, the questionnaire asked about the motives behind the existence of the plant. For a maquila plant belonging to a United States-owned corporation, the main motive is the lowering of costs by using cheap labour in the selected countries. For a non-US foreign firm, preferential access to the United States market is usually another main motive, especially in product markets –such as those for apparel– where quotas per country of origin play an important role. For both types of firms, the United States market is virtually the only destination of production. In order for a national entrepreneur to engage in assembly operations ordered by a foreign firm, some other motives may be involved: for example, the rate of return should be higher or less risky than in the case of an investment in production capacity for the domestic market. In this regard, expectations about local demand, the evolution of exchange rates, and different fiscal treatment play an important role. Many local firms take on assembly contracts for export in order to qualify for the fiscal benefits offered under maquila legislation. At all events, the main economic *raison d'être* is the abundance of cheap labour that can perform labour-intensive operations.

The main competitive strategy of maquila plants is product quality, however. Another element that may give a plant a competitive edge is timeliness. The challenge is to produce the highest quality in the shortest period of time, using the relatively cheap labour force that all the other plants also use. This competitive strategy fits clearly within the description of "second-generation maquila industry". An illustration of the quest for quality is that a substantial number of firms interviewed had ISO 9000 certification, and almost all were in the process of applying for it.

Finally, in the section about strategy a question was included which was designed to explore the degree of autonomy of the maquila plant (table 10). The answers shed a clear light on what kind of learning processes may be expected. With the exception of some surprising answers, in general the managers at a maquila plant do not have decision-taking power on i) the procurement of raw material, ii) selection of the end-products, and iii) marketing. If there is a department of procurement at all, it is for the local acquisition of inputs that do not enter directly into the production process. A maquila plant usually does not have a sales department.

Managers at a maquila plant may have a say in the selection of machinery and the financial and investment strategy. They are usually completely responsible for the recruitment and training of personnel and the organization of production. It should be noted that in plants with local capital, managers tend to have a broader range of responsibilities.

2. Human resources development

The characteristics of the human resources employed are similar in virtually all the plants visited. Around 80% of all employees have at most secondary education; virtually no employees do not have at least primary education. Especially in Mexico, the trend is to hire people who have completed their secondary education. Over 50% of the total employees are between 18 and 24 years of age, while a further third are under 35. In apparel plants, between 60% and 90% of all employees are women.

TABLE 10

Mexico and Central America: Participation in strategic decisions
(Percentages)

	Mexico			Central America		
	None	Some	All	None	Some	All
Procurement of raw material	67	24	10	68	27	5
Selection of end-products	67	33	-	77	18	5
Selection of machinery	24	19	57	9	27	64
Organization of production	-	24	76	5	9	86
Training and recruitment	-	10	90	-	14	86
Sales and marketing	52	24	24	59	27	14
Investment and financing	29	43	29	9	18	73

Source: Prepared by the authors.

Although it may seem far removed from "contributions to local technological capabilities", the training young men and women receive at a maquila plant is a very important matter. For a good many, often with a rural background, it is their first contact with the formal, urban and industrialized world. They receive formal training regarding the firm and their specific job, but also in social habits, hygiene, and so forth. Virtually all firms have continuously programmed courses on quality control, efficiency and cost reduction, and prevention of accidents.

The job-related training received by workers is modest in the sense that they are required to perform only simple tasks, for which a few days of on-the-job training suffice. The learning curve is short, especially in maquila industries outside the apparel sector. A worker may reach normal productivity levels within a week. In some apparel plants, however, the learning curve may be longer.

Formal training is also provided for supervisors and managers. Two important trends became clear during the interviews: the proportion of employees with advanced technical and academic education is increasing, and they are increasingly locals. The greater complexity of production processes accounts for the first trend, while cost-awareness accounts for the second. Local engineers and skilled technical personnel receive courses on training techniques, quality control, teamwork and human resources management. They are in frequent contact with foreign engineers who visit the plant and provide technical assistance, supervision and training. Moreover, local engineers frequently have to visit corporate headquarters and plants in other countries in order to learn in situ about production techniques. This type of interaction seems to be more frequent in fully owned subsidiaries of foreign firms than in maquila plants with national capital. Administrative personnel receive training on strategic planning, leadership, customer satisfaction, fiscal and labour regulations, and other self-improvement courses such as "the seven habits of highly efficient people".

Finally, a comment may be made regarding the contribution of maquila industries to the formation of entrepreneurs: perhaps the one human resource most lacking in underdeveloped countries. Local capital participates significantly in maquila industries. Consequently, a group of national entrepreneurs exists that have both plants for domestic sales and assembly plants for export. The relation with a foreign client allows them to stay informed of product and process innovations and to receive technical assistance. The knowledge thus acquired can be transferred to their plants producing for the domestic market, thus generating important productivity gains. The automation of production processes and the introduction of modern organizational techniques are frequently mentioned among the benefits received in this way.

TABLE 11

Mexico and Central America: Methods and programmes for the organization of production applied in the maquila firms interviewed

(Percentage of affirmative answers)

	Mexico	Central America
Total quality control	90	64
Just-in-time production	65	68
Continuos improvement	80	55
Team work	75	77
Manuals, procedures and internal rules	90	82
Workers' suggestions programmes	50	77
Sharing of technical and economic information with workers	65	72
Programmes to increase security on the job	85	91
Ergonomic programmes	55	64

Source: Prepared by the authors.

Nevertheless, maquila does not seem to be a very suitable source for upgrading entrepreneurial skills. Only exceptionally have local managers and technical personnel of maquila plants been able to start their own firms. The problem seems to be the absence of a sufficiently aggressive and innovative group of local entrepreneurs and the lack of financial and technological support. Furthermore, the strict requisites of transnational corporations regarding their suppliers represent a barrier to entry into the industry.

The results of the questionnaire study show that the contribution of maquila to technological learning lies in particular in the realm of the organization of production (table 11). Most of those interviewed confirm the use in their plants of modern organizational techniques, such as flexible production, total quality control, just-in-time production, and continuous improvement. Without doubt, the degree of utilization of these techniques is more widespread in maquila plants than in other national firms. Furthermore, these techniques are not just plain copies, because most manag-

ers confirmed the need to adapt organizational techniques to local conditions and to the idiosyncrasies of the workforce.

In all the countries studied, maquila plants are under pressure to deliver large volumes of the best quality products on time, while keeping production costs in check. This pressure generates a continuous search for the most efficient way of organizing production. New management and organizational systems are introduced all the time, and almost all maquila plants use production teams, quality control programmes, operating manuals and norms, and workers' suggestions programmes.

3. Technological evolution of production processes in maquila plants

The contribution of maquila industry to the knowledge about production processes is also important. Second-generation maquila plants use state-of-the-art technology, to be able to meet the quality standards of clients. Technical and supervisory personnel receive constant training in the use of the machinery, and stay on top of technological development. Maquila plants make virtually no contribution to the introduction and development of new products, however: product development remains an activity of corporate headquarters.

At the plants visited in all six countries, an interesting process has been observed in terms of the evolution of the tasks performed. In many cases, an assembly plant starts off with only a limited number of simple assembly operations. When the plant meets the standards of the client, other and more sophisticated parts of the production process are transferred to the plant, and sometimes even the whole production process. After a number of years, the maquila plant may even give feed-back to the corporate headquarters and suggest changes in production processes. In some cases, it has been found that the whole process of testing and adapting a new production line is carried out at the maquila plant. There seem to be two types of reasons for this trend. First, there are those relating to learning processes within the plant: as the quality and efficiency of the labour force increases, the clients in the United States increase their confidence in the capabilities of the maquila plant and entrust it with a broader range of tasks. Second, there are reasons outside the sphere of the plant: there are competitive advantages in having complete manufacturing processes (and even product and process design) concentrated in one location. The need to respond with agility to changes in demand, and the positive effects that arise from the interaction between product and design departments, generate a trend towards geographical concentration of tasks.

In the case of maquila plants in Central America and the Dominican Republic (especially in apparel assembly) this evolution takes the form of a higher degree of integration of production processes and the introduction of more sophisticated machinery. A dual movement can be observed toward "full package production"[10] and automation. Technicians and engineers who were interviewed underlined the importance of being in contact with the complete production process for ensuring a better learning process (Vicens, Martínez and Mortimore, 1998).

In Mexico, four plants were observed to have product design departments, with foreign and local engineers. These departments contribute through the design of small parts of the final product (usually not the more technologically demanding parts). In two plants –one producing television sets and another electric organs– the design of the external structure is done locally. In a third plant, producing air conditioning systems, tubes and connectors are designed locally. Only in a furniture factory is the full design done at the maquila plant.

While these four cases are obviously exceptional, all the plants visited had quality control departments with some technological capabilities. In the apparel sector, product design is carried out closer to the place of final sale, in order to be in direct contact with customers, and the foreign corporation sends patterns and exact product specifications to the maquila plant. Nevertheless, in all countries several cases were found of plants that work with prototypes and perform testing. What happens is that product specifications and operating manuals are received from abroad and tested at the plant, and feed-back reports with recommendations on product specifications and inputs are prepared for discussion with the foreign corporation.

[10] In "full package production" the maquila firm orders the fabric and trimmings, and cuts, sews, finishes and packages the product, while the client concentrates on marketing and distribution. In other arrangements, maquila plants only cut, sew, finish and package the product, with the client providing the fabric and accessories.

In Mexico, activities were observed which involved incremental improvements in product specifications and design. More than 50% of the plants visited reported that they had contributed, albeit sometimes only in minor details, to the product characteristics through, for example, suggestions for the use of different raw materials, recommendations that led to reductions in the use of inputs, modifications that allow easier assembly and better functioning of the final product, and changes in product presentation. In all these incremental improvements, the final decision is not made by Mexican or foreign engineers at the plant, since the suggestions must be submitted to the research and development centres at corporate headquarters, where the final decision is taken.

Generally speaking, at the maquila plant no research and development activities are carried out concerning machinery. The machinery is usually selected by the foreign corporation, and the installation of production lines is carried out, or at least supervised, by foreign engineers. However, local engineers can and do learn from participating in the installation of production lines, and in some cases subsequent production lines are installed by local engineers, without technical assistance from the headquarters corporation.

In most cases, local personnel do perform some maintenance operations, but if a major problem arises, especially with the more sophisticated machines, specialists must come from abroad or parts of machines must be sent to the supplier. If any "innovations" are made to machinery by the maquila plant, they involve peripheral components that speed up the production process. Also, small ergonomic improvements have been introduced by local engineers to adjust the machinery to the size and proportions of Mexican and Central American workers, and some auxiliary tools have been designed and fabricated.

4. Diffusion of technological learning outside the maquila plant.

As noted earlier, the weak linkages between the maquila plant and local firms mean that there are no direct processes of transfer of technological capabilities and know-how. If there is some diffusion of the learning processes, it is through the training of the work force, which may improve human resources capabilities in general.

Along the northern border of Mexico, in Costa Rica, and to some extent in the Dominican Republic and Honduras, formal relationships exist between maquila plants and their trade associations, and training institutes and schools. The idea is to improve the preparation of the work force before workers enter maquila plants. In the North Mexican case, the CONALEPs, CECATIS, CETIS, State Universities and the different campuses of the Technological and Higher Studies Institute of Monterrey (ITESM) are clear examples of educational institutes that maintain a strong relation with the maquila industry and define their curricula partly in the light of the needs of those plants. In particular, in Ciudad Juárez there is an active "liaison committee" in which representatives of educational centres and maquila plants discuss the training needs of the future work force. In Costa Rica, most of the plants visited recognized the importance of their relationship with the Costa Rican Technological Institute and the Vocational Training Institute. The installation of a plant the size of INTEL in Costa Rica, with its policy of hiring only people who have a technical degree on top of their secondary education, speak English and are skilled in the use of the Microsoft Office computer programme has naturally shaken the whole educational system. The company has explicit ideas on educational policy in Costa Rica, and works closely with national authorities to improve the quality of the entire system. Most schools and training institutes have introduced changes in their programmes in order to supply human resources for the incipient microelectronics maquila industry.

A special comment is in order regarding locally owned maquila plants. Local firms that engage in assembly operations for foreign clients usually do not devote all their production capacity to these assembly operations, and they maintain production lines catering to domestic demand. Consequently, there may be a transfer of knowledge between the maquila plant and the other production activities of the local firm. The effective transfer of technology through this channel depends on the type of relation with the foreign client, the characteristics of the products assembled, and the similarity between the maquila assembly line and the other production lines.

According to several managers who were interviewed, the technological and productive capabilities of local firms have improved because of the assembly operations and the interaction with foreign specialists of transnational corporations. New products, new production techniques and new forms of organization of the firm and of the production process have been introduced in this way.

V

Conclusions

The central question in this paper is whether maquila industries contribute at all to local technological development. The answer has to be affirmative. Maquila industries employ production techniques close to international best practices: something that can only be said of a small number of local manufacturing plants. Additionally, maquila plants contribute to the formation of human resources and introduce modern concepts of organization and management.

This being said, it remains true that maquila activities are above all intensive in the use of low-skilled labour, of which there is an abundant supply in the Caribbean Basin countries and Mexico. It does not therefore seem appropriate to suggest that maquila could be the type of international insertion that would allow those countries to reach a sustainable growth path with social equity. Its high import content and low local value added limit its multiplier effect on demand, so that its contribution to growth is lower than could be expected from the volume of the activity. If maquila industries in their present form were to multiply and completely dominate the production and export structure, these countries would be specializing in the supply of low-wage labour, and their growth would depend solely on the cost-competitiveness of this production factor. This does not seem to be compatible with a long-run strategy of growth with social equity. In the short run, of course, given the abundant supply of low-skilled labour, maquila industries do contribute positively to social equity, given their impressive capacity to generate employment, especially for the presently unemployed or underemployed poor.

In its present form, the maquila industry does not seem to be an engine of sustainable development with social equity, although its contribution is without doubt a positive one. The road to follow seems to be the transformation of maquila industry into an activity that does not only base its competitiveness on low wages and privileged market access conditions, but also on increasing productivity and a higher value-added content. At the same time, maquila industry could mean a transfer of technology to the economy as a whole, although the diffusion of knowledge acquired through maquila to other sectors of the economy is still limited, because of the strong dualism between maquila and domestic production, and also because of the limited absorption capacity of the domestic economies.

Furthermore, there are a number of external obstacles that hinder a stronger contribution of maquila industry to sustainable development with social equity. In the first place, transnational corporations still maintain the policy of transferring "ready-made" technologies, without transferring technological research and development activities. In the second place, transnational corporations do not stimulate procurement of local inputs, either because the corporation is vertically integrated, or because they have an established network of suppliers that it is difficult for local firms to enter, because of the certification process for suppliers that requires time, money and technological capabilities those firms lack.

The change from apparel maquila activities to the so-called "high-technology" maquila industry that is underway in Costa Rica does not seem to be a sufficient means for maquila to become a mayor source of technological progress. The questionnaire study clearly showed the limitations of microelectronics maquila in this regard. Firstly, manual assembly tasks predominate, as well as manual control of machinery and visual quality inspection. Second, technology is transferred "ready to use", without local research and development. Third, no microelectronics firms exist in the local economy that could absorb personnel who acquire increased knowledge through maquila. Fourth, the lack of local content limits the diffusion of knowledge. Finally, the rapid pace of technological development in microelectronics tends to nullify the possibilities of local managers becoming agents of "endogenization" of the tecnology.

If the above is a fair picture of what maquila industries contribute to technological progress in the selected countries, three questions remain to be answered. First, if maquila industries will evolve from an activity highly intensive in the use of low-skilled and low-paid labour to other activities more intensive

in the use of productive knowledge and capabilities; second, if technological progress in maquila industries spreads throughout the domestic economy; and third, how public policies may help to obtain affirmative answers to the first two questions.

With regard to the evolution of maquila industries, the contrast between national cases provides certain answers. The maquila industry has existed in Mexico for over 30 years, and its production structure differs notably from maquila in Central America and the Dominican Republic. In Mexico, most plants are in high-technology sectors such as autoparts, electrical appliances and microelectronic goods. While it is true that only the labour-intensive parts of the production processes are performed in Mexico, it is nevertheless true that these firms hire increasingly qualified personnel. Only rarely do they employ workers with just primary education, and the proportion of local technicians and engineers is increasing. A similar pattern is observed in Costa Rica with the entry of important plants in the microelectronics sector.

The pressure maquila activities exert on the local labour market is increasing real wages. This, in turn, requires the maquila industry to evolve toward activities of a higher value-added content that will allow higher wages. However, this evolution will not be possible without effective support from the national systems of human resource formation and institutions that further technological development.

In sum, the evolution of maquila industries toward activities that require higher qualifications of the work force is possible, as shown by the Mexican case, and it will be unavoidable when pressures on the labour market push real wages upward, as shown by the Costa Rican case. But it will not occur automatically, and even less so in countries that do not have supporting institutions for such development.

With respect to the second question, the spread of technical change throughout the domestic economy is limited because of three circumstances. First, because the technical progress in maquila industries is itself of a limited nature; second, because the linkages between maquila and the domestic economy are weak; and third, because the absorption capacity of the domestic economies is limited.

With regard to the issue of human resource formation, the main question concerns the usefulness of the knowledge thus acquired in other firms and other functions, which would be an indicator of the possibility that the abilities could be used in other economic activities. Here a distinction may be drawn between apparel maquila activities and other types of maquila. In the apparel sector, the abilities acquired by the workforce are widely used in domestic activities and also in local apparel firms. There is some evidence that people who have learned production techniques in maquila plants start small tailoring workshops for the domestic market. In other maquila activities, however, the type of know-how acquired seems to be so specific that its utility outside the maquila plant is very limited. In general, maquila firms tend to prefer to hire people without previous experience because of their greater willingness to learn specific job-related skills required by the plant.

In contrast, the knowledge acquired by local technicians and engineers is more likely to be useful to other firms, even if they are not in the maquila business. The demand for those human resources is so strong that frequently technicians and supervisors are attracted away from maquila firms by offering them higher salaries and better fringe benefits.

Some knowledge regarding production processes may be transferred to other economic activities, even outside the maquila industries, especially in the apparel sector. The diffusion of knowledge does not seem to be of such a magnitude as to affect the level of productivity of manufacturing industry as a whole, however. The reason for this may be that, except in the case of the apparel industries, the other sectors in which maquila industries operate are not represented in the domestic economy. Another factor may be that the level of quality requirements in domestic industries is lower than in maquila activities. Finally, domestic firms may have less financial possibilities for acquiring state-of-the-art machinery and do not have the same access to technical assistance.

A second factor that limits the spread of technical change in the domestic economy is the low level of linkages between maquila industries and local firms and institutions. Because of the nature of assembly operations and the legal framework in which they developed, maquila industries import virtually all raw materials and inputs used in the production process and therefore do not develop local suppliers. Because the plants export almost all that they produce, there is also no direct competition with local plants on the domestic market: something that would oblige local firms to catch up with the technological standards of the maquila industries. Some linkages

exist with local human resource formation institutions, but virtually no relations exist with institutions engaged in technological research and development.

The third aspect –the low absorption capacity of domestic firms for the technological progress generated in maquila industries– requires an analysis which is outside the scope of the present paper. It may be noted that there is a difference between Mexico and Costa Rica, on the one hand, and the Central American countries and the Dominican Republic on the other. The level of development of human resources and of the local institutions supporting technological progress is significantly higher in the first two countries.

This leads to the answer to the third question, regarding policies to promote the evolution of maquila plants toward activities that are more knowledge-intensive, as well as to promote the linkages between maquila plants and local suppliers. Our main finding is that maquila industry needs to be seen as an integral part of strategies for the upgrading of productive development. In the past, maquila was exclusively considered to be part of employment policies. Later it was also seen as a foreign-exchange earner. Until now, it has not been regarded as a strategy for the development of local productive capabilities.

This may perhaps explain the existing duality between the productive specialization in maquila industries and in the rest of the economy. The element of promotion of productive linkages was simply not considered relevant at the time the promotion schemes were devised. But the maquila industry nowadays is a phenomenon of such a magnitude that it undoubtedly forms part of the production structure of the selected countries.

To consider maquila as an integral part of a strategy of production development does not mean increasing government interference to a level that would hinder the growth of the industry. Clearly, in the Mexican border zone local governments and maquila organizations interact for mutual benefit. In any case, production development strategies in Latin America do not discriminate nowadays beforehand between production sectors. They concentrate instead on the improvement of human resources, strengthening of institutions to support technological development, investment in infrastructure, and financial support programmes. In these policy areas, the interests of maquila industries should be taken into account in the same way that those of other production sectors already are at present. Only by strengthening local productive and technological capabilities in a general sense can maquila industries be made to evolve successfully towards activities of a higher local value-added content, with stronger linkages between the maquila sector and the domestic economy and enhanced capacity of the domestic economy to absorb the know-how generated.

One particular aspect deserves special attention, and that is the tax regime for maquila industries and local firms. The essence of maquila programmes and export-processing free zones was exemption from import taxes. Today, domestic exporting firms may also receive those benefits, through drawback schemes. In this respect, they operate under roughly the same conditions. However, local efforts to attract foreign direct investment have also included the granting of tax holidays regarding other corporate taxes, notably profit tax (in Central America) and asset tax (in Mexico). At present, the trend is to allow maquila industries to sell on the local market too, after paying import taxes, which are increasingly negligible. When they do this, however, maquila industries still retain the privilege of not paying other corporate taxes, and this difference in tax regimes encourages domestic firms to set up shop in free zones or otherwise apply for maquila status. If maquila firms are to be considered equal to other manufacturing industries, these differences in tax regimes should be eliminated.

(Original: English)

Bibliography

Banco de México (several years): *Indicadores económicos, sector externo, balanza comercial*, Mexico City.

Brown, F. and L. Domínguez (1989): Nuevas tecnologías en la industria maquiladora de exportación, *Comercio Exterior*, vol. 39, No. 3, Mexico City, Banco Nacional de Comercio Exterior, S.N.C.

Calderón, A., M. Mortimore and W. Peres (1995): *Mexico's Incorporation into the New Industrial Order: Foreign Investment as a Source of International Competitiveness*, "Desarrollo Productivo" series, No. 21, LC/G.1864, Santiago, Chile, Economic Commission for Latin America and the Caribbean.

Carrillo, J. and A. Hualde (1997): *Maquiladoras de tercera generación: el caso de Delphi-General Motors*, Mexico City, El Colegio de la Frontera Norte, *mimeo*.

Carrillo, J., M. Mortimore and J. A. Estrada (1998): *El impacto de las empresas transnacionales en la reestructuración industrial de México. El caso de las industrias de partes para vehículos y de televisores*, "Desarrollo Productivo" series, No. 50, LC/G.1994, Santiago, Chile, ECLAC.

ECLAC (1990): *Changing production patterns with social equity*, LC/G.1601-P, Santiago, Chile. United Nations publication, Sales No. E.90.II.G.6.

——(1996): *México: la industria maquiladora*, "Estudios e Informes de la CEPAL" series, No. 95, Santiago, Chile.

——(1998): *Centroamérica, México y República Dominicana: maquila y transformación productiva*, Santiago, Chile.

Fajnzylber, F. (1991): International insertion and institutional renewal, *CEPAL Review*, No. 44, LC/G.1667-P, Santiago, Chile, ECLAC.

Gitli, E. (1997): *La industria de la maquila en Centroamérica*, San José, Costa Rica, International Labour Organisation (ILO).

ILO (International Labour Office) (1996): *La situación sociolaboral en las zonas francas y empresas maquiladoras del Istmo Centroamericano y República Dominicana*, San José, Costa Rica.

INEGI (National Institute of Statistics, Geography and Informatics) (several years): *Industria Maquiladora de Exportación*, Mexico City

Mertens, L. and L. Palomares (1988): El surgimiento del nuevo tipo de trabajador en la industria de alta tecnología: el caso de las electrónicas, in E. Gutiérrez, *Restructuración productiva y clase obrera*, Mexico City, Siglo XXI.

Mortimore, M. and W. Peres (1998): *Policy Competition for Foreign Direct Investment in the Caribbean Basin: Costa Rica, the Dominican Republic and Jamaica*, "Desarrollo Productivo" series, No. 49, LC/G.1991, Santiago, Chile, ECLAC.

Mortimore, M. and R. Zamora (1998): *La competitividad internacional de la industria de prendas de vestir en Costa Rica*, "Desarrollo Productivo" series, No. 46, Santiago, Chile, ECLAC.

Mortimore, M., H. Duthoo and J. A. Guerrero (1995): *Informe sobre la competitividad internacional de las zonas francas en la República Dominicana*, "Desarrollo Productivo" series, No. 22, Santiago, Chile, ECLAC, August.

SECOFI (Ministry of Commerce and Industrial Development) (1996): *Programa de importación temporal para producir artículos de exportación*, Mexico City

Vicens, L., E. Martínez and M. Mortimore (1998): *La competitividad internacional de la industria del vestuario de la República Dominicana*, "Desarrollo Productivo" series, No. 45, LC/G.1973, Santiago, Chile, ECLAC.

Wilson, P. (1990): *The New Maquiladoras: Flexible Production in Low Wage Regions*, Working Paper series, No. 9, Austin, Texas, Community and Regional Planning.

Science and technology *policy and the* National Innovation *System in Argentina*

Daniel Chudnovsky

Director of the Centre for Research for Change (CENIT) and Professor of Economic Development in the University of Buenos Aires.

This article looks at the strengths and weaknesses of the policies proposed in the Argentine National Multi-year Science and Technology Plan, 1998-2000, within the conceptual framework of the National Innovation System (NIS) approach. In the light of a severe diagnosis of the weaknesses of Argentine efforts in this field, the new public policies are designed to promote the interaction of the many agents and institutions involved in those efforts, to change the rules governing the allocation of public resources to research, to promote strategic plans and evaluation mechanisms in public bodies in this field, and to induce greater voluntary spending by the private sector through fiscal credits for technological research and development and a Technological Advisers Programme, in order to give better attention to the demands of small and medium-sized enterprises. However, there are very profound and severe shortcomings in the ability of the Argentine financial system to provide finance for long-term investments in intangible assets, in the capacity of the educational system to link up with the needs of the production sector, and in the ability of the scientific institutions to interact with the educational system and the production sector. Although these shortcomings are mentioned in the Plan, they are not given the amount of attention needed to begin to reverse them. The long and frustrating past history of science and technology policies in the country, which have registered more failures than successes, and the partial success of the *laissez-faire* policy applied in the 1990s, which was considered to be a good policy by most of domestic and foreign big business, militate against the success of the initiatives under way. At the same time, and in spite of its stimulating suggestions, the approach taken by the NIS reflects serious ambiguities in its normative and conceptual aspects which limit its practical applicability.

I

Introduction

In December 1997, the government Science and Technology Cabinet (GACTEC) approved the National Multi-year Science and Technology Plan 1998-2000 (Argentina, GACTEC, 1997), hereinafter referred to as the Plan, whose central objective is no less than "the development and strengthening of the national science, technology and innovation system" (Argentina, GACTEC, 1997). This was the first time in Argentina that the National Innovation System (NIS) approach was put forward at the official level, and the fact that a science and technology plan was prepared was also almost a novelty.[1]

The Plan was the result of a series of institutional changes initiated in July 1996, when the Department of Science and Technology was once again brought under the Ministry of Culture and Education and the reorganization of the science and technology sector was begun.

After an intensive debate which was reflected in the document entitled "Bases for the discussion of a science and technology policy", prepared by a hundred or so experts, at the end of the year GACTEC was set up, to be chaired by the Head of the Cabinet of Ministers and made up of the Ministers of the economy, education, health, foreign relations and defence, and natural resources and sustainable development. The Department of Science and Technology acts as the executive secretariat of GACTEC.

The National Agency for the Promotion of Science and Technology (hereinafter called "the Agency") was also set up at the end of 1996, to be responsible exclusively for financing non-profit-making research projects in the public and private sector and promoting technological innovation in the private sector. In October 1997, GACTEC prepared the Plan, which was submitted along with the draft national budget for 1998 and simultaneously thrown open for public discussion.

This dynamism is in sharp contrast with the laissez-faire with regard to technology policy (and also to some extent scientific policy) displayed not only by the Menem government up to 1996 but also by the preceding Argentine governments, both civil and military (for details of the situation in this respect in the 1960s and 1970s, see Adler, 1987).[2]

Whereas up to 1990 *laissez-faire* was practiced fundamentally by omission and in macroeconomic situations which were not very favourable to growth, we argued in a previous paper that under the present administration laissez-faire has been applied as part of orthodox economic theory, as a mainstream economic approach (Chudnovsky and López, 1995). Such theory considers science and technology basically as exogenous variables[3] and, in general, adheres to the policy recommendations of the so-called Washington Consensus (Williamson, 1990), which gives priority to trade liberalization, privatization of public enterprises and the promotion of foreign direct investment (FDI) as the fundamental instruments for securing the technological modernization of developing countries.

According to the mainstream economic approach, opening up the economy to imports would stimulate an improvement in the efficiency of the

□ This is a revised version of the study prepared for the OAS-MCT (Brazil) project "Globalization and local innovation: Case studies of local systems within MERCOSUR and proposals for science and technology policies". The author wishes to thank Juan Carlos Del Bello and Jorge Katz for their comments on a preliminary version, without of course associating them in any way with the views expressed herein. The data used were those available at the beginning of 1998; the National Multi-year Science and Technology Plan 1999-2001, which is due to appear shortly, will provide updated data and policy descriptions.

[1] The only precedent goes back to 1971, when the Secretariat of the National Council for Science and Technology prepared a National Science and Technology Plan, 1971-1975.

[2] The most outstanding exceptions to this historical trend were in the second half of the 1950s, when the authorities of the time set up the National Atomic Energy Commission (CNEA), the National Institute of Agricultural Technology (INTA), the National Institute of Industrial Technology (INTI), and the National Council for Scientific and Technological Research (CONICET); in the period between 1969 and 1975, when the National Council for Science and Technology was set up and laws were adopted on the transfer of technology; and to a much smaller extent in 1984-1989, when a policy on informatics was proposed and the Office for the Transfer of Technology was set up in CONICET, together with some other initiatives (Chudnovsky and López, 1995).

[3] Only in recent years has technological change begun to be incorporated as an endogenous variable in economic growth models (e.g., in the works of Paul Romer).

productive sector through the greater competition on the local market, while at the same time it would facilitate access to the latest machinery and equipment, whose importation was favoured by the zero tariff in force until a little while ago in Argentina. The privatization of public enterprises would not only make them more efficient in the provision of goods and services but also, through the elimination of the "Buy National" clauses, it would give rise to greater competition among their own suppliers.

Liberalization of the rules on FDI, for its part, would promote the incorporation and dissemination of the technical and management know-how of foreign investors. The deregulation of technology transfer agreements would be a further stimulus for the technological modernization process.

Among the various policies adopted by the present administration, these policies have undoubtedly been those which have had the greatest impact on the technological modernization of the country. In an economy with stable prices and a rapid growth rate, a big increase in imports of capital goods and FDI inflows, together with the substantial rise in the productivity of labour in the 1990s, would appear to bear witness to the success of the policies applied.

However, the fact that a large part of the production apparatus has had great difficulty in coming closer to international best technological practices and that, in spite of the increase in expenditure on science and technology in the 1990s,[4] the crisis in the public institutions responsible for these activities prevents them from defining their objectives and research priorities as a function of the economic and social demands of the country, reflects the marginal role of endogenous scientific and technological efforts in the current policies.

The growing spread of non-orthodox theoretical approaches among those responsible for defining technology policy in the member countries of the Organization for Economic Cooperation and Development (OECD) has created a favourable setting for the adoption of views on the problems of technological modernization and policies for furthering it which are considerably different from those advocated in the mainstream economic approach and the Washington Consensus.[5]

Since, in the case of the complex phenomena of the acquisition, adaptation and development of technology, markets either do not exist or suffer from serious faults, the transmission of information and knowledge is imperfect and enterprises act with only limited rationality. Public policies have an important role to play in this field, especially with respect to small and medium-sized enterprises (SMEs), which are those that have the greatest difficulty in adapting to the new competition conditions.

Furthermore, while the importation of machinery and equipment and the inflow of FDI facilitate technological modernization and the codifiable aspects of technological know-how give rise to commercial transactions, this process also generates a series of positive externalities and synergies which are not expressed through the market and may require coordination and promotion agencies at the national and local government level, which obviously means abandoning the principle of laissez-faire.

This view of the problem had already been promoted by some officials of the present government through isolated initiatives such as Law No. 23877 on the Promotion and Development of Technological Innovation, adopted in 1990 and provided with the corresponding regulatory mechanism in 1992, and the Technological Modernization Programme, co-financed with the Inter-American Development Bank, which came into effect in 1994. With the recent institutional changes and the application of the National Science and Technology Plan ("the Plan"), official status has been given to an active and, in principle, much better coordinated policy in this field.

The dynamic approach recently displayed by the government in this field is undoubtedly a promising development, because it seeks to make a start on reversing the profound crisis suffered by the main public institutions and bodies responsible for science and technology and to stimulate the private sector to make a bigger effort in this area. In view of this, the present article aims to analyse the main policies proposed in the Plan and to identify their strengths and weaknesses from the standpoint of the conceptual framework provided by the National Innovation System approach.

[4] Expenditure on science and technology, as a percentage of GDP, went up from around 0.33% in 1985-1990 to 0.40% in 1994 and 0.46% in 1996 (Argentina, GACTEC, 1997).

[5] Although Williamson (1997) has modified some of the original recommendations of the Washington Consensus, especially with regard to exchange-rate policy and the way trade liberalization should be carried out, the problems of technology policy are not dealt with in the new recommendations.

II

The conceptual framework

In the mainstream approach, intangible technology is seen as a code of knowledge generated by the research and development (R&D) departments of specialized firms. To a greater or lesser extent, these departments make use of the scientific knowledge generated in the universities and public R&D institutes.

According to the logic of the linear approach to science and technology policy (OECD, 1992), which is inspired in part by mainstream economics, the results of public-sector R&D efforts spill down to users as public goods. In private enterprises, innovative efforts are generated in their R&D departments, from which they spread internally to the production and marketing departments and reach the market in the form of product and process innovations.

To the extent that knowledge is codified, its users can reproduce the respective instructions without much difficulty. Technology would therefore be an exogenous factor for most enterprises. If it were privately owned, through patents or other mechanisms, they could acquire it in the market by paying royalties or other compensations. If it were freely available, they would simply obtain it as technical information.

In these types of approaches, the main objectives of science and technology policy are to ensure a continuous flow of innovations –through adequate State finance for the scientific and technological research carried on in universities and public laboratories, protection for intellectual property, and fiscal incentives for R&D expenditure by the private sector– and to favour the dissemination of innovations throughout the system of production by means of an efficient information system, directed mainly at the SMEs. Monopolistic conduct that might arise in the use of intangible assets would be offset by policies designed to protect competition.

In contrast with the approach taken by mainstream economics, evolutionary or neo-Schumpeterian theories consider that scientific and technological knowledge is not perfectly codifiable, so that its transferability is not perfect. Both the generation and the use of knowledge require an endogenous effort based on the accumulation of scientific, technical and organizational capacities, which gives rise to increases in productivity and efficiency and, ultimately, the generation of a growing flow of innovations with regard to products and production processes.

The notion of technological capacities tries to cover the wide range of knowledge and skills needed in order to purchase, assimilate, use, adapt, change and create technologies. This concept goes beyond the traditional notions of engineering and technical know-how, to include knowledge of both organizational procedures and structures and of patterns of behaviour (of workers or clients, for example). Firms need certain supplementary assets in order to create, mobilize and improve their technological capacities, including such assets as organizational flexibility, financial resources, quality of human resources, and sophisticated support and information services (OECD, 1992).

The process of acquiring the scientific, technical and organizational knowledge needed in order to use the available technologies efficiently is long, risky and unpredictable. It involves the development of technological and organizational capacities through deliberate efforts of learning in the production process ("learning by doing"), in marketing and contacts with clients ("learning by using") and in an ongoing search for new technical solutions in R&D units or in less formal places such as technical offices ("learning by searching"). In addition to major in-house efforts, this process involves interacting with suppliers of equipment, parts and components, with licensors, with foreign partners, with technological institutes and universities, and with clients ("learning by interacting"). It is a collective learning process in which, although the epicentre consists of the manufacturing enterprises themselves and the various sectors in which they operate, other public and private actors and institutions are also involved.

The tacit, localized and accumulative nature of technological knowledge, the emphasis on the learning process and the various sources underlying it, and the importance of feedback and of the numerous interactions which characterize and induce it, all go to make

up a complex and constantly changing social setting which is completely different from the simplified scheme which the mainstream economic literature uses to address these issues.

The numerous actors and institutions participating in the innovation process and the importance of their interaction in order to achieve a form of innovation which bears fruit in terms of private and social benefits have been effectively described in the neo-Schumpeterian literature through the concept of the national innovation system.

The first definition of this system, suggested by Freeman (1988), identified it with the network of public and private institutions whose activities and interactions initiate, import, modify and disseminate new technologies. In a subsequent study, Freeman says that List was the first author to use that approach, although he gave it a different name (Freeman, 1995). In the studies by Lundvall (1992), by Nelson (ed., 1993) and by Edquist (ed., 1997), the NIS is analysed from various angles and on the basis of various different national experiences. At the same time, the concept of the NIS has gradually been spreading from the academic world to the world of policy-makers, and it is being used in one form or another both in OECD documents (OECD, 1992 and 1996b) and in those of a number of OECD member countries.

In Edquist (1997) there is an excellent study of the approach based on the NIS. In our opinion, Edquist's study is right in considering that this is not a formal theory but rather a conceptual framework for addressing the issues in question from a holistic, interdisciplinary and historical (albeit conceptually vague) standpoint.

To put it briefly, the main point in an approach based on the NIS is that it considers innovation and learning as crucial aspects. Although enterprises are the backbone of the NIS, they do not innovate alone. Innovation is an interactive process, and in the final analysis the approach stresses above all the importance of the interactions among the various different actors and institutions that participate in the complex collective process. Unlike the linear model, which placed emphasis essentially on the generation of innovations, the NIS approach places just as much or even more stress on their dissemination.

Although different authors have somewhat differing views in this respect, the approaches based on the NIS refer to greater or lesser innovations in products, processes and forms of organization. Furthermore, they do not only deal with innovations in the countries that are on the leading edge of technology but also in those following a strategy of trying to catch up and keep up with the most advanced economies (Mytelka, 1996).

At the same time, these approaches try to get away from the usual dichotomy of addressing the problem in the light of only two fundamental institutions –the market and the State– and they also take into account, among many other elements, universities, banks, intellectual property legislation, and technological research and services institutes.

Apart from the enormous difficulties involved in trying to identify and quantify the various indicators (in addition to R&D expenditure and the number of patents taken out) that would give an idea of the level of performance of an NIS, the weakest points in this approach are connected with the relative weight of inputs imported from abroad compared with endogenous efforts to absorb[6] and generate innovations, and, above all, with its normative aspects as regards the role of public policies in forming NISs.

In a globalized economy where FDI grows faster than international trade and the costs of the transmission of information and transport are continually going down, external flows of technological knowledge take on growing importance. In so far as the knowledge generated in processes of innovation is tacit, accumulative and localized, however, there is a good deal of room at the national and local level for the development of endogenous technological capability. Indeed, such capability is indispensable in order, at the very least, to be able to efficiently absorb the knowledge coming from the exterior and, obviously, to be able to adapt, modify and generate new knowledge.

In spite of the growing interdependence of the industrialized countries as regards flows of investment and technology, the pilot studies on NISs carried out in a number of OECD countries clearly indicate that in those countries enterprises base their innovation process essentially on their own R&D efforts and make relatively little use of imported flows (OECD, 1996a).

[6] This fundamental issue is ignored in the study by Edquist (1997). In the footnote on page 44 of that study, however, the author notes that in all countries except the economically largest ones, this dissemination (of technology) mainly represents absorption from the exterior. This is the case in Sweden as well as in Mexico and India.

In contrast, most of the developing countries generally display the opposite situation. Not only are the resources allocated to R&D by the private sector relatively scanty, but enterprises interact much more with suppliers of technology from abroad than with local firms or institutions. Furthermore, the links are generally in only one direction (licenses, franchises, subcontracting) and there are few two-way agreements regarding R&D, production or marketing (following the classification proposed by Mytelka, 1992).

Moreover, in the case of the Asian countries which have successfully followed strategies aimed at catching up with the most advanced countries in this respect it may be noted that although efforts to absorb technologies from abroad have been a generalized feature of their industrialization strategies, the channels used have differed considerably from one country to another, as have the industrial sectors selected in the different stages of their strategies (Mowery, 1993; Lall, 1992).

The opinions of different authors regarding the role of public policies in the formation of NISs vary considerably. Whereas Nelson and Rosenberg consider that NISs evolve spontaneously and are thus not designed in a deliberate manner, other authors maintain that the State has an important role to play in their formation. Edquist's position seems the most plausible: some elements of the NIS do evolve spontaneously, but others are the subject of deliberate public policies. This author also considers that the NIS approach is useful for policy formulation in so far as it provides an analytical framework for the identification of specific policy issues which is different from that resulting from the application of orthodox economics.

However, the NIS approach does not generate very precise normative elements for policy formulation. Authors like Nelson and Dahlman would appear to be basically in agreement with the recommendations of the Washington Consensus regarding the positive role of FDI and trade openness, though they supplement them with horizontal policies designed to increase technological capability and the capacity for the social absorption of knowledge (Dahlman and Nelson, 1993). In contrast, other authors such as Freeman and, above all, Lall seem to assign much more importance to selective policies on industrial and technological matters (Lall, 1995).

With regard to the late-industrializing countries, there can be no doubt that first of all the experience of Japan and later that of the "Asian Tigers" has been a source of inspiration on what relatively successful NISs should be like. Although this inspiration is clearly visible in the works of Freeman (1988 and 1995) and Lall (1992 and 1995), however, it is much less evident in the studies by Nelson.

As noted by David and Foray (1995), from the social point of view it is important that an NIS should have "distributive power" in order to facilitate the efficient distribution and use of the scientific and technological knowledge available in society. This view assumes that the same means used to ensure greater private profitability of innovative activities may reduce the distributive power of the NIS. Consequently, there may be a conflict between "appropriability", which would favour greater accumulation of new knowledge, and "distributive power", which would help to ensure that such knowledge was more socially "useful".

Hence, in the case of the industrialized countries, the OECD has rightly noted that the dilemma for public policies is that they have to reconcile two main objectives. On the one hand, they must develop an environment with abundant incentives, so that the expected private benefits are substantial and motivate enterprises to generate increasing amounts of innovations. These incentives should not only consist of tax deductions for R&D expenditure and protection of intellectual property but should also extend to the financing of pre-competitive research, the promotion of strategic alliances, and public sector purchases, among other aspects.

On the other hand, public policies must promote numerous spillover effects, so that firms only appropriate a part of the benefits of innovation and its social profitability is maximized. This involves a number of actions including not only the defence of competition but also measures to promote linkages among enterprises and between enterprises, universities and research institutes at the regional level; the provision of advisory and consultancy services for SMEs; the operation of enterprise brooders, and training and retraining programmes for technical and management staff (OECD, 1992 and 1997).

To sum up, although the NIS approach is conceptually vague, it is undoubtedly useful for addressing and analysing the problems of innovation in developed and developing countries. It identifies the most important agents and institutions that must be taken into account when forming NISs, and it is flexible enough to adapt

to the various different historical and institutional situations. Although it does suggest the areas where public policies should act and generally rejects the idea of laissez-faire, however, it does not make any specific recommendations about the policies that should be followed.

III

The new science and technology policies in Argentina

1. The diagnosis

Although it does not go into the underlying causes, the Plan makes a searching diagnosis of the Argentine situation with regard to science and technology. In general terms, we agree with this diagnosis, which is summarized below.

First, the noteworthy recent growth of the Argentine economy (almost 6% per year on average between 1990 and 1996) and of labour productivity (47% between 1990 and 1996)[7] has been based on machinery, inputs and knowledge mainly brought in from the exterior. The data on imports of capital goods, foreign direct investment and patents clearly illustrate this.

Imports of machinery and equipment increased from US$635 million to US$6037 million between 1990 and 1994, went down by 20% in 1995, but registered an upward trend again in 1996 and 1997.[8] FDI flows increased from an annual average of US$2.7 billion in 1990-1993, when they corresponded mainly to the acquisition of State enterprises, to US$3.8 billion in 1994-1996, when industry, mining and some services were the main recipients. Patent applications submitted in Argentina by non-residents increased from 1955 in 1990 to 4012 in 1996. After having amounted to over 1000 per year in the 1980s and over 900 per year in the early 1990s, patent applications by residents went down to less than 700 in 1994 and 1995, recovering to 1097 in 1996. Argentine residents take out hardly any patents abroad.

Consequently, it is noted in the Plan that the significant economic growth process in the 1990s has generated few opportunities for making use of the country's stock of human resources. It has left out a large part of the SMEs, which have displayed serious difficulties in adapting to the new rules of the Argentine economy, and it has not generated sufficient incentives for the big firms to make systematic research, development and innovation efforts.

As may be seen from table 1, private-sector expenditure on science and technology is completely out of line with international levels. It is estimated at 0.13% of GDP, which is far below the levels not only of the industrialized countries (over 1%) but even of Chile and Brazil (0.27% and 0.18%, respectively).

Although a large part of the inputs for product and process innovation come from abroad, it may be assumed that the more intensive competition registered in the Argentine economy in recent years is giving rise to sizeable endogenous innovation activities and technological efforts to absorb and adapt this knowledge. Thus, it is estimated that, altogether, companies have increased their R&D expenditure, in constant 1996 pesos, from 214 million in 1993 to 369 million in 1996 (i.e., from 0.08% to 0.13% of GDP).[9]

[7] According to official information, labour productivity in industry grew by 58% (6.8% per year) between 1990 and the first half of 1997, whereas in the 1980s it grew by an average of only 0.8% per year (CEP, 1997).

[8] Gross fixed domestic investment increased from 13.4% to 23.6% of GDP between 1990 and 1994. The investment coefficient went down to 20.7% in 1995 but recovered in 1996 (21.5%) and is estimated to have amounted to 25% of GDP in 1997. Within this investment, the share of imported capital goods increased from 13% in the first quarter of 1991 to 40% in the first quarter of 1997, while the share of domestic capital goods went down from 20% to 12% over the same period (Argentina, Ministry of the Economy and Public Works and Services, Economic Policy Department, 1997).

[9] As it may be assumed that this estimate does not take into account all the innovation efforts which are probably being made in most large foreign-owned and national firms and in small and medium-sized enterprises, the Department of Science and Technology is carrying out a survey on the technological conduct of Argentine industrial enterprises, through the National Institute of Statistics and Censuses (INDEC).

TABLE 1

International comparison of investment in science and technology [a]

Country	Total investment in science and technology		Government and others[b]		Enterprises	
	Millions of US$	% of GDP	Millions of US$	% of GDP	Millions of US$	% of GDP
United States	184 300	2.48	66 822	0.87	117 478	1.53
Japan	76 004	2.78	22 573	0.82	53 431	1.96
Germany	37 149	2.48	14 785	0.99	22 363	1.49
France	26 721	2.38	11 788	1.05	14 933	1.33
South Korea	12 200	2.69	3 282	0.72	8 918	1.97
Spain	4 376	0.92	2 464	0.52	1 912	0.40
Brazil [c]	5 888	0.87	4 107	0.61	1 850	0.27
Mexico [c]	1 114	0.33	1 039	0.31	75	0.02
Argentina [c]	1 353	0.46	984	0.33	369	0.13
Chile [c]	398	0.78	310	0.60	88	0.18

Source: Argentina, GACTEC (1997).

[a] Last available year.

[b] Includes non-profit-making institutions and private higher education.

[c] Corresponds to total expenditure on science and technology, which covers more than expenditure on research and development.

At all events, regardless of the actual size of the corresponding investment, the Plan rightly notes that the private sector efforts are generally of a short-term nature, do not include systematic scientific and technological research activities, are not linked up with public science and technology institutions, and are not carried out in networks with active participation of suppliers, users and clients. In short, they are far from having the scale required in order to tackle the challenges involved in the formation of an NIS.

Second, Argentina is at a clear disadvantage compared with the industrialized countries and South Korea, though it is relatively better off than Mexico, Brazil and Chile in terms of the proportion of researchers in relation to the economically active population (table 2). In contrast with what occurs in the industrialized countries and South Korea, almost all the research personnel work in national public sector bodies, including CONICET, and in national universities.

Although Argentina has highly-trained human resources and some of its scientific researchers and research groups have won worldwide recognition for their contributions (Argentina is the only country in the region which has several Nobel science prizewinners), it is impossible to overlook the ageing of the research staff and the scanty relative development of many scientific disciplines. As may be seen from table 2, the productivity of scientific research, as measured by the number of papers published in international reviews, is not very high compared with the industrialized countries.[10] Nevertheless, it is higher than that of a number of developing countries, including South Korea. At the same time, there has been a disturbing relative decline in the number of students studying fundamental and applied science (from 40% in 1986 to 33% in 1996).

Furthermore, the interaction of the educational sector with the scientific and technological sectors and above all with the production sector is still very limited. Teaching has few links with research, and the research efforts in the universities have few links with each other and with the needs of the production sectors.

Third, public sector expenditure on science and technology represented only 0.33% of GDP in 1996, which is very little by international standards (see table 1). Moreover, it is estimated that in 1996 fundamental research accounted for 28% of this total, applied research for 50% and experimental development for 22%. This structure is very different from that of the industrialized countries, where experimental development accounts for about two-thirds of the total and fundamental and applied research account

[10] It is hard to determine from the available information whether the productivity of scientific research in Argentina is rather low because of the scarcity or faulty allocation of funds or because a number of the researchers shown in the records are not actually engaged in research.

TABLE 2

Number of researchers in science and technology and papers published in international reviews [a]

Country	Number of researchers	Researchers/ EAP	Number of papers published (annual average 1992-1995)	Number of papers per researcher	Number of papers published/ EAP [b]
United States	962 700	7.4	253 347	0.26	20.27
United Kingdom	140 000	5.0	51 840	0.37	18.51
Germany	240 802	5.7	47 036	0.20	11.20
France	129 780	4.9	37 107	0.29	14.27
Spain	41 681	2.8	13 698	0.33	9.13
Argentina	22 147	1.9	2 306	0.11	1.92
Brazil	37 300	0.7	4 415	0.12	0.75
Mexico	19 434	0.6	2 254	0.16	0.68
Chile	6 429	1.3	1 228	0.19	2.46
South Korea	98 764	4.9	1 108	0.01	0.55

Source: Argentina, GACTEC (1997).
[a] Last available year.
[b] Per 100 000 members of the economically active population (EAP).

for relatively much smaller proportions than in Argentina.

Finally, in the public sector bodies there is a lack of priorities, serious shortcomings in management, lack of coordination and of quality evaluation mechanisms, and serious imbalances in budgetary allocation. Thus, 72% of the national budget in this area is concentrated in four institutions: the national universities, CONICET, the National Institute of Agroindustrial Technology (INTA), and the National Atomic Energy Commission (CNEA). The weight of the latter institution in the national budget is a clear reflection of the high priority given to nuclear energy in the past. In contrast, although the manufacturing sector generates 25% of GDP, the National Institute of Industrial Technology (INTI) receives less than 5% of the national science and technology budget. Furthermore, in a federal country like Argentina the provinces receive practically no share of the public finance for scientific and technological activities.

Although the evaluation of public sector activities in this field is a task which has only recently been begun, it is known that most of the activities carried out at present are of a short-term nature, even though there are institutions which have shown that they are capable of carrying out long-term scientific and technological development projects. Lack of coordination among the programmes of the different organizations, lack of precise objectives and evaluation mechanisms, and concentration on the provision of routine services and technical assistance are the most notable features of public sector scientific and technological activities.

It is evident that the science and technology effort of the public sector –and even more so that of private firms– is not only clearly insufficient but is also uncoordinated, is mostly not designed to meet the needs of the production sector in general and the SMEs in particular, and does not generate the synergies called for in the NIS approach.

When trying to understand how and why the present situation has been reached, it is necessary to take into account the long and complicated prior history of the scientific and technological institutions, the characteristics assumed by the industrialization process, the role played in it by public and private enterprises and the scientific community itself, and also the actions of the Argentine State, but this task is outside the scope of the present article.[11] The main responsibility belongs to the national government, however, and we will therefore deal primarily with recent institutional changes and with the policies adopted in order to begin to change the situation identified in the diagnosis.

2. Recent institutional changes

In the course of its history, the Department of Science and Technology has come under various higher bodies, most frequently the Office of the President of

[11] For an analysis of this matter, see Chudnovsky and López (1995).

the Nation and the Ministry of Education. However, it was never able to effectively fulfill the coordination and planning function originally assigned to it. Consequently, the science and technology institutions have generally been left to their own devices or to the logic of the sector with which they were most closely related.

As from July 1996, the Department has formed part of the Ministry of Culture and Education.[12] Its political function and its coordination and planning functions have taken on greater importance since the establishment of GACTEC as a mechanism for dealing with scientific and technological issues in the most important ministries, and because of its responsibility in the formulation of the Plan. An Inter-agency Action Commission has also been set up, made up of all the national public sector science and technology bodies (except the universities).

In addition, in order to involve the provinces in the setting of regional priorities, the Federal Council for Science and Technology (COFECYT) has been established, chaired by the Secretary for Science and Technology and made up of the top officials responsible for these matters in the 23 provinces and the city of Buenos Aires.

Unlike the United States and various Latin American countries, in Argentina there was no institution responsible exclusively for the promotion and development of scientific research and/or technological development, since CONICET is an executive agency which also carries out functions of promotion and development. Consequently, it was decided to set up the National Agency for the Promotion of Science and Technology.

As well as strengthening the promotion machinery and making it accessible to all research groups, regardless of the institution they belong to, the establishment of the Agency is designed to reorganize and improve the coordination of the existing instruments. For this purpose, it has two funds: FONCYT and FONTAR.

FONCYT subsidizes the following activities through public competitions: i) scientific and technological research projects (costing up to 25 000 pesos per year) carried out by groups of researchers working in public or private non-profit-making institutions; the results of these projects are to be published *a priori* in open-circulation reviews; ii) research and development projects whose results are *a priori* public goods but may be subject to conditions of confidentiality for commercial reasons, with the sponsor having priority for their acquisition; these projects (which may cost up to 1 200 000 pesos) are concerted between the enterprise involved and the non-profit-making institution carrying out the research and must receive financing from the sponsor.

FONTAR finances technological innovation and modernization projects whose results are appropriable and are designed to improve the competitiveness of enterprises producing goods or services. This fund brings together the various instruments for this purpose which were previously dispersed, such as Law No. 23 877 and the IDB Technological Modernization Programme. The clients of FONTAR are innovative enterprises and also non-profit-making institutions wishing to obtain better equipment in order to improve their capacity to provide technical assistance to the private sector.

The conception, formulation and public discussion of the Plan represent an important institutional change. The Plan is basically a programme of work marked by its flexibility, which allows it to incorporate new policy initiatives each year, and by its multidimensional nature, since it covers both horizontal policies and sectoral, regional and thematic policies.

In view of the lack of coordination and planning of science and technology efforts and the conflicts of interest which may arise in institutions that are responsible both for executing projects and for promoting research, these changes not only involve a healthy dose of common sense but are also in keeping with the direction suggested by the NIS approach. Naturally, their virtues or defects will only be revealed in the course of their practical execution, through the policy measures indicated in the Plan.

3. The main policy measures and their effects on the public sector

In order to begin to reverse the situation described earlier, the Plan proposes that the national effort in the field of science, technology and innovation should be improved, augmented and made more efficient by promoting a greater effort on the part of the private sector and the provinces through the co-financing of projects by private enterprises and the provincial authorities.

[12] In addition to CONICET, the National Atomic Energy Commission also comes under the Department of Science and Technology.

Instead of concentrating almost exclusively on supply, as has traditionally been the case, the policies proposed in the Plan aim to guide national and regional efforts in the area of science, technology and innovation as a function of the demands of the production sector and the social and regional needs of the country. At the same time, they are inspired by the NIS approach and seek to promote better coordination and linkages among the public and private sector actors and institutions taking part in the process of generating, disseminating and absorbing knowledge and innovations.

The Plan is much more specific with regard to horizontal policies than with respect to thematic, sectoral and regional policies, so we will concentrate on the first-named. In this section we will refer to those that fundamentally concern the public sector, while in the following section we will deal with those that seek to promote a process of innovation in the private sector.

At all events, some comments are called for regarding sectoral, regional and thematic problems. As the demand for science, technology and innovation stems from the demand for the economic and social goods and services that incorporate these factors, this should be a central element of sectoral policies, as the Plan document rightly asserts.

Whereas correct diagnoses have been made and some appropriate policy measures have been outlined in such activities as food and agriculture and mining, this is far from having occurred in such important sectors as the rest of manufacturing, the environment, education and health. In this respect, the unequal degree of preparation of sectoral priorities in the Plan is a reflection of the levels of interest displayed by the respective responsible authorities in the execution of the task and, to a certain extent, the effectiveness of GACTEC as a coordination and planning mechanism.

Be that as it may, it is worth bearing in mind that, unlike what happened in the past, in the 1990s the national government has shown little propensity to formulate and implement sectoral policies, the most noteworthy exceptions to this in the production sector being the motor industry, mining and the Spatial Organization Plan (although the latter is an activity rather than a sector).

At the level of the regions, the Plan incorporates the results of a Pilot Programme for the Identification of Needs with regard to scientific and technological applications and knowledge, although these results are far from constituting policy guidelines for guiding the efforts of the provinces in the field of science and technology and much less for forming regional innovation systems.

Biotechnology and studies on the Argentine marine environment are the only two thematic areas dealt with in the Plan. In the first of these areas, research priorities are proposed and some activities are suggested, such as the implementation of a system for evaluating biotechnology projects and promoting microenterprises and small-scale enterprises through a system of enterprise brooders. In the second, priorities are suggested for allocating the funds of the Agency.

Although, among the horizontal policies proposed in the Plan, some measures are suggested for securing better access to information from satellites and the Internet, no policies are proposed for the promotion of endogenous efforts in the areas of microelectronics, informatics, telecommunications, or new materials: generic technologies which are abundantly referred to in most of the official documents on science and technology in both industrialized and developing countries. In the 1999-2001 Plan, it has been decided to place emphasis on the field of microelectronics in order to try to concentrate on applications in this area, in spite of the scanty interest displayed in Argentina in these generic technologies, except as mere users.

The main horizontal policy measures for the public sector are designed to increase the available funds, to bring about changes in the management of the respective bodies, and to change the manner of allocating funds for research by introducing competitive mechanisms.

The national budget for 1998 provided for a 12.6% increase in credit for public science and technology bodies (to 881 million pesos). This increase benefited in particular the National Water and Environment Institute (INA), INTA, INTI, the Argentine Geological and Mining Service (SEGEMAR) and CONICET.

At the same time, all bodies are required to formulate strategic plans in which they must clearly identify their institutional priorities, objectives, indicators of results and impacts, and self-appraisal mechanisms. It is proposed in the Plan that bodies which have formulated Strategic Plans and Proposals for Change in accordance with the guidelines of the Multi-Year National Plan and which are subject to the

process of external appraisal to be carried out in the period 1998-2000 should be allowed more flexible conditions of management than those currently applied, including, among other things, the possibility of incorporating staff incentives based on the achievement of goals and results. Such changes are indispensable in order to establish greater links between the science and technology bodies and their users and to encourage their scientific staff to participate in technological tasks.

What is sought is to set in motion a significant process of restructuring of the public bodies in this field, whose performance has been very uneven and which, in general, lack goals and objectives defined as a function of the new context in which the Argentine economy and society are operating. Although it is obviously too early to pass judgement on a process which has only just been begun, both the complex past history of the bodies and the budgetary difficulties under which they have to operate, as well as the unequal levels of political will that seem to exist in GACTEC, shed doubts on the possibility of success in such a complicated process.

It is important to acknowledge, however, that INTI –one of the bodies whose functioning and organization we questioned in a detailed earlier study (Chudnovsky and López, 1995)– seems to have begun to overcome some of its past shortcomings by defining its action in the new context better, changing the generational profile of its staff, and strengthening both its horizontal activities and the linkages of the sectoral centres with users. Likewise, the National Commission on Spatial Organization (CONAE) now has a strategic plan which clearly defines its goals and tasks, and it has been one of the few public bodies which has effectively carried out auditing and evaluation activities.

Together with the launching of this reform process in the public science and technology bodies, part of the funds available to the Agency will be allocated to research projects put forward by these bodies (and non-profit-making foundations) through competitive mechanisms.

This means that, in addition to the funds they receive from the national budget, these bodies will be able to gain access to extra resources if the research projects they present are favourably evaluated in terms of their quality (judgement by their peers) and appropriateness (impact on economic and social development and on the educational sector, and conformity with the priorities laid down in the Plan).[13] As the projects subsidized by the Agency also have to be co-financed by their executing bodies, by the private sector and by the provinces, it is essential that the extra funds should be allocated on a competitive basis and should back up the effects of public financing.

Although they are not very significant compared with the national public sector budget, which, as we already noted, amounts to 881 million pesos, the funds that FONCYT will have at its disposal as from 1998 are by no means negligible. It will have a budget of 36 million pesos, which, with the additional resources provided by the bodies executing the projects, will increase to 44.5 million pesos. It is proposed that FONCYT should allocate 75% of its budget[14] in line with the priorities laid down in the Plan, with the remainder being allocated to research projects in the other disciplines or subject areas.

With the aim of furthering the linkages which are of central importance in the NIS approach, the Plan provides that FONCYT will give priority to projects tending to form research networks, presented jointly by researchers from a given region, researchers from different regions of the country, or in conjunction with institutions of other countries under the various international cooperation agreements.

The introduction of competitive mechanisms for the allocation of public funds for research is undoubtedly a major change in the rules and places a big responsibility on the Agency, whose learning process is only just beginning and whose decisions will affect vested interests within the scientific community.

4. Measures directed towards the private sector

As well as promoting greater participation by enterprises in the research and development projects financed by FONCYT, FONTAR will continue promoting the existing credits, subject to compulsory repay-

[13] It is these resource allocation criteria which have given rise to most resistance and heavy criticism of the Plan among important segments of the scientific community (such as the Forum of Argentine Scientific Societies), which would obviously prefer to continue with the practices of the past in CONICET, since these largely benefit their members.

[14] In turn, this 75% will be distributed as follows: 25% for projects on priority matters in the areas of health, education and the environment; 25% for projects in the food and agriculture, industrial and mining sectors, and 25% for projects reflecting priorities agreed upon with the provinces.

ment, granted to enterprises through the Banco de la Nación Argentina and the other financial instruments at its disposal.[15] At the same time, its performance will be strengthened with the launching of a programme of technological advisers for SMEs and a fiscal credit mechanism for promoting greater efforts in technological activities by private enterprise.

Although the unification of the various financial instruments within FONTAR is a sensible decision, in view of the experience of recent years it is hard to be optimistic about the impact this can have on the technological modernization process of the SMEs.

Of the various instruments provided for in Law No. 23 877 for the promotion of technological innovation, it has only been possible to implement –and even then in quite an erratic manner– the credits for R&D projects presented by entrepreneurs or "technological linkage units".[16] These are credits at subsidized interest rates which are granted directly by the Science and Technology Department and require collateral to guarantee their repayment. Between 1993 and 1997, 25 credits were granted in the country as a whole for a total of 10.3 million pesos, with a total investment of 16.3 million pesos. The granting of these credits has been displaying a downward trend, going down from 13 in 1993 to 8 in 1996 and only one in 1997. Apart from the problems that have arisen in obtaining the necessary funds, a high proportion (45%) of these credits have proved impossible to collect.

The compulsory repayment credits granted by the Banco de la Nación Argentina from its own funds and those of the Inter-American Development Bank are intended for relatively simple, low-risk technological modernization projects. Their maximum amount is US$2 million, the interest rate is variable, and real guarantees are required. From 1995 to the present 29 credits have been granted to small and medium-sized enterprises for a total of US$17.7 million, for total investments of US$48 million.

Although there is an upward trend in the granting of these credits, only a small number have been granted so far, for various reasons: the high level of indebtedness of the SMEs; the Banco de la Nación Argentina's requirement that real guarantees be given; the limited experience of this bank in granting loans other than those of a traditional nature intended for fixed investments and the priority given to repayment capacity in deciding whether to grant them or not, and the impossibility of financing working capital and granting loans to new companies.

The fact that this bank is the only financial institution which has become involved in loans of this type, in spite of its limited experience, is also symptomatic of a deeper fault in the Argentine financial system: its lack of interest in channelling funds to technological modernization and innovation projects. This is a crucial matter which should be addressed in future versions of the Plan and discussed from the angle of the NIS (see OECD, 1995).

In view of the limitations of an approach based exclusively on the supply of loans, as part of the preparation of the Plan the Industrial Institute of the "General Sarmiento" National University has made a diagnostic study of demand: that is to say, of the technological challenges faced by small and medium-sized industrial enterprises. As a function of this study, and in the light of similar schemes in the industrialized countries and the Programme for Rural Change of the Ministry of Agriculture, a Programme for Improving the Technological Capacity of SMEs has been proposed which seeks to facilitate the progressive development of the supply of technological services so that they can make an effective contribution to improving the competitiveness of the user firms and to promote greater linkages between those requiring technical services and the public and private suppliers of such services.

In the various meetings held with small and medium-sized enterprises it became clear that their demands were for access to qualified information on product and process technology, including mechanization, improvements in quality, and technical standards. They also require specialized assistance on the optimization of production processes, technologically more complex products, suitable materials, quality

[15] Among these are subsidies of up to 100 000 pesos for projects involving high technical risk presented by SMEs, which must co-finance at least 50% of the total cost of the projects.

[16] The idea of "technological linkage units" (TLUs) is one of the innovations of Law No. 23 877, inspired in theory by the NIS approach. TLUs are defined as non-State bodies formed for the identification, selection and formulation of R&D projects, transmission of technology and technical assistance. They may or may not be related with a public body, and their juridical status may be that of a commercial company or a civil association. The Science and Technology Department explicitly authorizes the functioning of TLUs, which, in spite of their potential virtues as means of favouring interaction between the supply and demand of technology, have not played a very significant role in practice.

assurance, conversion of their firms, and new market and product niches. In short, they need assistance to improve their skills and also to satisfy certain specific training needs.

At the same time, the shortcomings in terms of information on the supply of services from public bodies, universities, enterprises and other institutions were highlighted. In the cases where SMEs made use of these suppliers it became evident that the services needed to be more flexible and better adapted to the special conditions of these kinds of enterprises. A demand thus arose for specialized services which not only diagnose the technological problems of the SMEs more effectively but also help them to find possible solutions.

Technological advisers form the hub of the Programme to Improve the Technological Capacity of SMEs, which we will therefore refer to as the Technological Advisers Programme. The role of the adviser is to enable the enterprise to evaluate its technical capacity, identify its needs and seek the solutions and options considered most useful. The adviser expands the range of material available for helping to take decisions and helps to set in motion the process of strengthening the firm's capabilities. The adviser's job is not to overcome these shortcomings but to help to overcome them.

The Technological Advisers Programme aims mainly to develop a technological advisory services market for the approximately 15 000 Argentine industrial SMEs operating in tradeable goods sectors. Two types of advisory assistance are envisaged: institutional technological advisory assistance and individual technological advisory assistance. In the first case, an advisory assistance scheme will be established on the basis of internships by young graduates in engineering and other appropriate technological and scientific subjects. Their participation will be organized through private and/or public non-profit-making institutions (such as the engineering faculties of universities) which will offer SMEs advisory support through interns stationed in each firm and supervised by experienced professionals.

In the second case, there will be individual advisers supporting and advising a small group of enterprises on a personal basis. Through chambers of industry and business associations or temporary associations of enterprises, groups consisting of a dozen or so SMEs will be formed which will be provided with an exclusive adviser through a collective programme of activities and needs. Each group will present a programme of work when FONTAR invites applications for advisory assistance.

The Technological Advisers Programme will be financed with funds made available under Law No. 23 877 and administered by FONTAR (5.4 million pesos in 1998), with the contributions of the firms making use of the service, and with other funds available to the bodies that will provide the advisory services.

This programme is undoubtedly a good initiative which fits in well with the NIS approach and is inspired by some elements of the best international practices (Humphrey and Schmitz, 1996, and OECD, 1997).

In contrast with the many programmes existing in Argentina which are based on the supply of financing or non-financial services to individual firms, and which generally subsidize physical investments or working capital, the Technological Advisers Programme has been motivated by the demands of the production sector itself and is designed to link up public technological institutions and universities with groups of firms rather than individual firms. The subsidy that firms can obtain in order to help pay for the advisory services will enable the SMEs to bring highly-qualified engineers into their staff (often for the first time) and will help them to begin to appreciate the importance of their services.

At the same time, the Technological Advisers Programme offers employment opportunities for young engineers and facilitates contact with the realities of the production sector right from the start of their professional career. It will also give an opportunity to experienced professionals to establish closer links with the specific needs of the production sector, to supervise the work of the young graduates, and to enrich their own work in their institutions with first-hand information on what really takes place on the shop floor. The fact that the advisers do not merely visit the firms occasionally but actually participate systematically in the activities of the firms should make for smoother transmission and development of tacit know-how. At the same time, an essential mission of the advisers is to facilitate the access of the firms to the services of public sector science and technology institutions and, in turn, to cause the latter to take more account of the specific requirements of the production sector.

However, the difficulties that the initiation of this programme may involve must not be underesti-

mated. Apart from the lack of experience of FONTAR and of the country as a whole in this type of policy instruments, enterprises may be reluctant to participate for various reasons: reluctance to work in groups, lack of confidence in the ability of the advisers and institutions to provide good service, difficulties in financing that part of the services which is not subsidized by the State, etc. Moreover, the universities and other institutions may not be sufficiently motivated to take on tasks they are not used to and which will not provide significant direct benefits, while the knowledge possessed by the young graduates may not be sufficient for the tasks involved and the SMEs may very soon feel disappointed. Furthermore, as proposed in the Plan, the Technological Advisers Programme should interact closely with the various other programmes already in operation for the SMEs,[17] but this aspiration comes into conflict with an existing situation which is hard to change, marked by extensive dispersion of efforts and lack of coordination in this field.

While some of these initial obstacles may be overcome as the work proceeds and the Technological Advisers Programme may steadily gain experience and credibility, it is necessary to bear in mind some other types of problems that may occur in demand-led mechanisms for small and medium-sized enterprises. In an interesting study on the recent experience of the Chilean Production Development Corporation (CORFO) in putting into effect a scheme of this type, it is noted that the costs of gaining access to the development system may mean that a handful of enterprises may, by definition, have preferential access, although these firms are the most dynamic in their field and, in theory, have the least need of public support. Moreover, as what is involved are tacit activities subject to incomplete specifications and highly imperfect transferability, it is unlikely that the beneficiary firms will have much incentive –or even much possibility– to pass on their own experience to others, thus sharply reducing the externalities (Dini and Katz, 1997).

With regard to other policy instruments for incentivating both large and small domestic enterprises and subsidiaries of foreign companies to make research and development efforts with their own qualified personnel or under contracts with research institutions, fiscal credit amounting to 20 million pesos has been provided for in the 1998 national budget.[18]

In order to try to obviate the abuses to which these types of incentives sometimes give rise, the fiscal credit certificates will be awarded by competition to the research and development projects submitted to the Agency. These certificates can be used by their holders to pay off future profits tax commitments, up to a percentage which goes down according to the size of the relevant annual tax commitment.

Inasmuch as they help to finance up to 50% of the cost of executing projects, these public funds will serve as an incentive for increased private expenditure on R&D. Thus, it is estimated that this fiscal credit will generate an additional private sector contribution of some 30 million pesos.

With this fiscal credit, Argentina is placing itself on the same footing as many other countries –especially Brazil, for example– which use this instrument, accepted by the World Trade Organization, to encourage the private sector to make research and development efforts. Unlike the financial incentives which are designed primarily to help SMEs, this fiscal credit will not only be useful for those firms which have tax obligations but will undoubtedly also be of interest to large enterprises in general.

According to the available estimates, private sector expenditure on R&D in 1996 came to 369 million pesos, so that the impact the fiscal credit may have on private sector behaviour is quite small and will probably only benefit large companies which already engage in activities of this type. At all events, this credit can become an incentive for firms to do more in this area –as is shown by the recent experience of Brazil in the implementation of Law No. 8661/93– and thus have multiplier effects.

While not denying the importance of a stable macro economy and high growth rates, and while acknowledging the value of the financial and fiscal incentives, the research and development projects financed by FONCYT, and the Programme to Improve the Technological Capacity of SMEs, there can be no doubt that this context and these instruments are nothing like big enough to bring about a substantial change in the behaviour of large or small firms in technological matters.

[17] The corresponding part of the Plan lists 31 existing instruments directed towards the SMEs, of which 13 are closely linked with the Technological Advisers Programme.

[18] In reality, this represents the fulfillment of an outstanding task: adoption of the regulations for the fiscal credit provided for in article 9 of Law No. 23 877.

In order to cope with the change in the rules of the game involved in competing in economies which are more open to international trade and to the entry of new competitors, the surviving enterprises have generally redoubled their technological efforts to gain efficiency and secure improvements in productivity and quality. However, this process has been very heterogeneous as regards the activities involved, the size of the firms, and their geographical location.

While most of the SMEs which have survived have done so by trying to improve their productivity and quality, a considerable number of firms (especially big companies) have not only invested in imported capital goods but have also made use of licenses or technical assistance from abroad or have been bought out by foreign investors. At the same time, these firms have presumably also made efforts to absorb the technologies received from the exterior and to adapt them and make some innovations in products and processes. However, the information available for analysing this complex process of "creative destruction" is very fragmentary and only provides evidence of this phenomenon in some foreign-owned firms and large domestic enterprises.

At the beginning of the 1990s, a group of 39 subsidiaries of transnational corporations operating in various industrial sectors registered average R&D expenditure equivalent to around 1% of their sales (Kosacoff and Bezchinsky, 1993), which is rather higher than the level estimated for the Argentine manufacturing sector as a whole. Our studies on FDI have revealed that endogenous efforts in the subsidiaries are concentrated on staff training and improvements in quality and productivity. Of the privatized enterprises, only one of the telephone companies maintains a research and development laboratory, not linked to that of the parent company, for operational reasons. In the manufacturing firms, the biggest efforts in this field (generally equivalent to less than 1% of sales) were found in the manufacturers of telecommunications equipment and some firms in the food industry engaged in the export of staple goods (Chudnovsky, Porta, López and Chidiak, 1996).

Likewise, significant efforts to improve the technological training of suppliers are only to be found in the motor industry, where in many cases they have involved the acquisition of local automobile component firms by foreign companies. The technological externalities generated by the presence of transnational corporations appear to be only weak, in view of the small scale of innovative activities in the subsidiaries and the scanty technological linkages of these firms with local suppliers or research institutes.

In the pharmaceutical sector, significant research and development efforts have been made by some local firms. In other areas of activity, the expenditure of these firms is similar to or less than that of the subsidiaries of transnational corporations. In the few economic conglomerates which engage in activities of this type, their expenditure is equivalent to less than 1% of their sales. As long as strategic alliances with international corporations continue to be frequent in these conglomerates it is doubtful that there will be many agreements giving priority to technological innovation activities. However, this is a matter which calls for greater study.

The fact that the private sector spends little on R&D is partly a consequence of the type of branches in which production investment is concentrated in Argentina. These are generally activities which are based on natural resources or in which economies of scale are important, and in which R&D expenditure is not very high at the international level either. The same is true, at the international level, of the activities in which the privatization operations have been concentrated (water, electricity, gas, petroleum). Only the telecommunications sector makes intensive use of R&D, but not in Argentina.

However, the backward or forward linkages of the sectors in which investments have been concentrated could give rise to activities making intensive use of knowledge; moreover, some segments of the specialized machinery and equipment industry could be revitalized, along with some activities based on the country's stock of scientific personnel.

It is possible that domestic and foreign enterprises may slowly and spontaneously increase their innovative activities and even invest in knowledge-intensive branches. In this case, it could be argued that, in addition to a growing macro economy and the horizontal instruments mentioned earlier, laissez-faire would be the most suitable policy for the private sector.

If it is considered, however, that this process should be deliberately accelerated and that such activities should be promoted through specific policies, it does not seem possible to ignore the sectoral context, for that is precisely where the weaknesses of the new science and technology policy make themselves felt. Only in the case of mining, where there is a well-defined sectoral policy, and food and agricul-

tural production, where an effort to define policy lines is beginning to be made, is the technological variable being explicitly incorporated in sectoral dynamics.

In the rest of manufacturing, in contrast, the technology variable has been absent from the decisions that the national government has taken with regard to schemes to permit the adaptation of various industrial sectors within MERCOSUR and the treatment given to the local machinery and equipment industry.[19] In the scheme for the motor industry, the transnational corporations and/or their local licensees have been allowed to act in matters of technology according to their own interests, without trying to obtain too many externalities with regard to the development of suppliers, environmental management, staff training and links with technological institutes.[20]

As we noted earlier, in sectors which are of crucial importance for the NIS such as health, education and the environment the question of science and technology is mentioned in rhetorical rather than effective terms in the policies indicated in the Plan.

While the government's efforts to promote traditional activities based on natural resources –such as mining, agroindustry, gas and petroleum– are clear for all to see, there is a conspicuous absence of initiatives designed to promote knowledge-intensive activities (except those outlined in the Plan in the area of biotechnology) in the sectors producing goods and services.

IV

Final observations

In a stable and growing economy, the reorganization of the science and technology sector, tardy but nevertheless finally under way, and the concepts, diagnoses and horizontal policies set forth in the Plan are undoubtedly positive elements.

Inasmuch as it centers much of public policy on the promotion of interactions between supply and demand, between the public and private sectors, between science and technology institutions and users, between inputs from abroad and local efforts, and between provincial activities and national priorities, the Plan is clearly inspired by the NIS approach.

By increasing financing and at the same time beginning to change the rules for allocating public resources to research (establishment of the Agency, with competitive allocation of funds and evaluation by peers); by promoting strategic plans and appraisal mechanisms in the public science and technology bodies; and by trying to establish some priorities in the allocation of funds, such public policy fosters institutional changes which can invigorate the anaemic scientific and technological complex and begin to reduce its most obvious systemic flaws.

Likewise, by introducing fiscal credit for R&D and trying to link up the financial incentives more effectively with the prevailing technological modernization process, and above all by launching the Technological Advisers Programme, the Plan seeks to give better attention to the requirements of the SMEs and to begin to reverse the reluctance of enterprises to make investments in technological innovation to complement the massive inflow of inputs from abroad.

Unfortunately, these horizontal policies are only matched by adequate sectoral efforts in the case of

[19] In order to favour the investment process and the technological modernization of users, in 1993 it was decided to apply a zero tariff to imported capital goods and to compensate local manufacturers through a subsidy to purchasers of their equipment equal to the value of the tariff forgone. Apart from the delay in granting the relevant subsidy, which aggravated still further this sector's difficulties in adapting to the new rules of the game, the question of the technological development potential of the local capital goods industry was totally absent from government policy. As from 1995 the tariffs on the capital goods sector were raised within the convergence operations agreed in MERCOSUR, but there continues to be no specific policy for such an important sector in the NIS.

[20] In 1994 the Ministry of Industry launched an interesting Supplier Development Programme, which, however, for reasons that are worth investigating, does not seem to have been a success.

the mining sector and, possibly, food and agricultural production. They are far from being adequately complemented by sectoral efforts in the rest of manufacturing, health, education and the environment.

This brings us to the most obvious negative aspects that militate against the objectives and policies of the Plan. The flaws which exist in Argentina with regard to the ability of the financial system to finance long-term investments in intangible assets, the inadequate capability of the educational system to link up with the needs of the production sector, and the limited capability of the scientific institutions to interact with the educational and production systems are extremely deep-seated. These flaws are mentioned in the Plan, but they are far from receiving the attention needed in order to begin to correct them.

Although GACTEC seems to be a good institutional solution for tackling the cross-sectional problems displayed by science and technology policy, it is still far from functioning as a means of coordinating science and technology policy with sectoral policies, and still further from designing a long-term vision to guide investment efforts in tangible and intangible assets and in the training of human resources in the country. For this purpose, it would be necessary, at the very least, for the level of commitment to scientific and technological problems displayed in the current actions of the Department of Science and Technology to be repeated in the other ministries and departments involved.

However, the public discussion of the Plan, in which a thousand or more persons have participated in various workshops and seminars, has enriched its final version, and it may be expected that in the successive annual reviews it will be further perfected and some of its shortcomings will begin to be corrected. Nevertheless, time is obviously needed in order for the effects of the changes in the rules and proposed policies to make themselves felt.

At all events, caution is called for in trying to predict the effect that the present policies may have in terms of reversing the crisis that affects the public sector in this field and changing the patterns of behaviour of the private sector.

In Argentina, the long and frustrating history of science and technology policies registers more failures than successes, whereas the laissez-faire approach of the 1990s has been partly successful and is supported by most of local and foreign big business. Both of these are weighty factors that militate against the success of the initiatives under way. At the same time, in spite of its very interesting proposals, the NIS approach displays profound normative and conceptual ambiguities which limit its practical application.

In these circumstances, the merely incipient level of commitment to the science and technology issue in the national cabinet reflects long-standing problems in the country. In civil society, and particularly in the productive sectors, there is little awareness of how important the contribution of science and technology may be for the country's economic and social development. In the big domestic and foreign firms, much more importance is attached to inputs from abroad than to endogenous efforts that go beyond the need to ensure the proper management of production facilities and the quality of the goods produced. Likewise, society and the production sectors set little store by the activities of Argentine scientists and technologists. Nor indeed have the latter made much of an effort in general to link up their research projects with the far-reaching and changing needs of the country.

In spite of the structural limits facing the present policies, the diagnosis of the Argentine situation in this field will be more accurate and the possibilities of improving and broadening the corresponding public policies will be increased if, through future research, a number of questions can begin to be answered:

First, it is necessary to follow up and analyse with close attention the way that the initiatives already launched are being put into practice, especially with regard to the reorganization of the science and technology bodies, the management of the competitive funds administered by FONCYT, fiscal credit, and the FONTAR Technological Advisers Programme, and the policies in the fields of mining and food and agricultural production.

Second, the results of the survey on the technological conduct of Argentine industrial companies will make it possible to analyse the size and nature of the innovation efforts of the private sector (both small and medium-sized enterprises and big domestic and foreign firms) and to determine to what extent the various inputs from abroad complement local efforts in various branches of manufacturing. It will also be important to study the kind of interactions firms have been establishing in the country with the various local and foreign agents and institutions.

Third, the potential for the development of knowledge-intensive activities in Argentina is worth studying in depth, together with the feasibility of applying policies like those followed in other countries to promote this kind of activities (enterprise brooders, innovation parks, etc.).

Fourth, it is necessary to examine the faults in the Argentine financial system and the possibility of correcting them in order to promote greater availability of financing for intangible activities.

Lastly, the problems faced by higher and technical education and its possibilities of training the human resources needed by the NIS represent a vital issue which has not yet been addressed in the necessary depth. The training of human resources for an economy increasingly based on knowledge calls for detailed studies not only of supply but also of demand, as a function of medium- and long-term scenarios for the country's economic and social development.

(Original: Spanish)

Bibliography

Adler, E. (1987): *The power of ideology. The quest for technological autonomy in Argentina and Brazil*, Berkeley, California, University of California Press.

Argentina, GACTEC (Gabinete Científico-Tecnológico) (1997): *Plan nacional plurianual de ciencia y tecnología, 1998-2000*, Buenos Aires.

Argentina, Ministerio de Economía y Obras y Servicios Públicos, Secretaría de Política Económica (1997): *Informe económico. Segundo trimestre de 1997*, year 6, No. 22, Buenos Aires.

Carlsson, B. (ed.) (1995): *Technological Systems and Economic Performance: The Case of Factory Automation*, Dordrecht, Netherlands, Kluwer Academic Publishers.

CEP (Centro de Estudios para la Producción) (1997): *Notas de la economía real*, No. 4, Buenos Aires, Ministerio de Economía y Obras y Servicios Públicos, Secretaría de Industria, Comercio y Minería, October.

Chudnovsky, D. and A. López (1995): *Política tecnológica en la Argentina ¿Hay algo más que laissez faire?*, Documentos de trabajo, No. 20, Buenos Aires, Centro de Investigaciones para la Transformación (CENIT).

Chudnovsky D., F. Porta, A. López and M. Chidiak (1996): *Los límites de la apertura*, Buenos Aires, CENIT/Alianza Editorial.

Dahlman, C. and R. Nelson (1993): *Social absorption capability, national innovation systems and economic development*, Maastricht, Netherlands, United Nations University, Institute for New Technologies (INTECH), *mimeo*.

David, P. and D. Foray (1995): Accessing and expanding the science and technology knowledge base, *STI Review. Science and Technology Industry*, No. 16, Paris, Organization for Economic Cooperation and Development (OECD).

Dini, M. and J. Katz (1997): Nuevas formas de encarar las políticas tecnológicas en América Latina, *REDES. Revista de Estudios Sociales de la Ciencia*, vol. 4, No. 10, Buenos Aires, Universidad Nacional de Quilmes, Centro de Estudios e Investigaciones.

Edquist, C. (ed.) (1997): *Systems of Innovation: Technologies, Institutions and Organizations*, London, Pinter Publishers.

Edquist, C. (1997): Systems of innovation approaches: Their emergence and characteristics, in C. Edquist (ed.), *Systems of Innovation: Technologies, Institutions and Organizations*, London, Pinter Publishers.

Freeman, C. (1988): Japan: A new national system of innovation?, in G. Dosi, C. Freeman, R. Nelson, G. Silverberg and L. Soete (eds.), *Technical Change and Economic Theory*, London, Pinter Publishers.

——(1995): The national system of innovation in historical perspective, *Cambridge Journal of Economics*, vol. 19, No. 1, London, Cambridge Political Economy Society.

Humphrey, J. and H. Schmitz (1996): The triple C approach to local industrial policy, *World Development*, vol. 24, No. 12, Oxford, U. K., Pergamon Press.

Kosacoff, B. and G. Bezchinsky (1993): De la sustitución de importaciones a la globalización. Las empresas transnacionales en la industria argentina, in B. Kosacoff and others, *El desafío de la competitividad. La industria argentina en transición*, Buenos Aires, Economic Commission for Latin America and the Caribbean (ECLAC)/Alianza Editorial.

Lall, S. (1992): Technological capabilities and industrialization, *World Development*, vol. 20, No. 2, Oxford, U. K., Pergamon Press.

——(1995): *Governments and industrialization*, paper presented at the international seminar on Productivity, Technical Change and National Innovation Systems in Latin America, Marbella, Chile, ECLAC, *mimeo.*

Lundvall, B. (1992): *National Systems of Innovation. Towards a Theory of Innovation and Interactive Learning*, London, Pinter Publishers.

Mowery, D. (1993): *Inward technology transfer and competitiveness: The role of national innovation systems*, Berkeley, California, University of California, Haas School of Business, *mimeo.*

Mytelka, L. (1992): *Strategic partnering: Some lessons for Latin America*, Paris, Université de Paris, *mimeo*.

——(1996): Competition, innovation and competitiveness: A framework for analysis, in L. Mytelka (ed.), *Competition, Innovation and Competitiveness in Developing Countries*, Paris, OECD Development Centre.

Nelson, R. (ed.) (1993): *National Innovation Systems. A Comparative Analysis*, New York, Oxford University Press.

OECD (1992): *Technology and the Economy. The Key Relationships*, Paris.

——(1995): *National Systems for Financing Innovation*, Paris.

——(1996a): *OECD Programme on National Innovation Systems*. Synthesis report, No. 4, Paris, *mimeo*.

——(1996b): *Science, Technology and Industry Outlook 1996*, Paris.

——(1997): *Diffusing Technology to Industry: Government Policies and Programmes*, Paris.

Williamson, J. (1990): *Latin American Adjustment. How Much has Happened?*, Washington, D. C., Institute for International Economics (IIE).

——(1997): The Washington Consensus revisited, in L. Emmerij (ed.), *Economic and Social Development into the XXI Century*, Washington, D. C., Inter-American Development Bank (IDB)/The Johns Hopkins University Press.

Concessions and *road and rail transport* optimization

Ian Thomson

Transport Unit, ECLAC International Trade, Transport and Financing Division.

The Latin American railways faced serious competition from another means of land transport for the first time in the 1930s, and one of the results of this was a significant loss of income from the transport of products of relatively high unit value. This income had covered their fixed costs in terms of management and infrastructure. The financial difficulties of the railway companies drove them to seek aid from the State sector, but in subsequent decades governments gradually lost interest in them because of their financial deficits and dwindling importance in the national economy. The services with the least volumes of freight and passengers were steadily eliminated, and rail services had already become quite sparse when governments decided to return the railways to the private sector as from the late 1970s. The growing tendency of railways to devote themselves to the transport of bulk cargo between a limited number of points means that in corridors without navigable waterways almost the only competition comes from heavy trucks. The subsidies for the transport of goods by such trucks have been reduced, but not impeded, by the granting of highway management concessions. Within a few years it will be technologically feasible to charge heavy trucks tolls that really reflect both the external costs of their operation and those deriving from the wear and tear on the infrastructure. In the meantime, rail and road transport could be placed on an equal footing in terms of competition by compensatory subsidies for the former. This would channel each type of traffic towards the means of transport that could move it at lowest cost. In order for the benefits to be received by the community in general rather than by the private-sector concessionaires of railways and highways, however, the policy on compensatory subsidies should be laid down before the award of the concessions.

I

Historical background

1. Rail tariffs before the emergence of competition from road transport

As far as land transport was concerned, until the appearance of the railways road transport had virtually no competition, although in some countries, including many European nations, canals and rivers were viable options, and in the Americas –in pre-Columbian and colonial times when, especially in the period of Spanish and Portuguese rule, much of economic and social development took place in the strips of land along the coast or in areas of mineral wealth– coastal shipping was often preferred to the primitive roads.

When the railways came on the scene, this represented a major technological leap forward: before the invention of the steam locomotive the human race had never had any form of self-propelled transport. The appearance of the railways brought with it a very significant reduction in transport costs, and indeed –except for very short-distance movements– road transport virtually disappeared in every corridor where there was a railway. This monopoly position of the railways attracted the attention of the incipient Ministries of the Economy, which began to subject the railway companies to rules which restricted their freedom of action regarding the tariffs they charged (Thomson, 1998). Even in cases where the railway companies continued to enjoy some degree of flexibility regarding their tariffs, they tended to levy relatively high charges for transporting products of comparatively high unit value, which was logical enough in commercial terms as long as the railways did not face significant competition. In 1886 an observer noted that "All the railways in the world have accepted differentiated tariffs, because otherwise low-value goods could not pay the high transport charges for long distances" (EFE, 1887). In 1932 the Chilean State Railways charged 36 cents per ton-kilometre for the transport of brandies, alcohols and liquors, 21 cents for wine, and only 15 cents for mineral water, although the cost of transporting each of these categories of beverages must have been very similar to that of the other categories.

By transporting products of higher unit value, the railway companies were able to finance not only the direct costs of the transport proper but also the fixed costs in respect of infrastructure, management, etc. It should be noted that the proportion of the sales value of the product accounted for by its transport was still very small in the case of goods of high market value, even though the absolute cost of the transport was much higher than that paid by lower-priced goods.

2. The impact of competition on rail transport charges, and its consequences

Generally speaking, the economic problems of the railway companies began with the appearance of competition from road transport, which was particularly interested in transporting precisely those products whose transport enabled the railway companies to cover their fixed costs as well as modernizing their operations and paying dividends which kept their shareholders interested. This phenomenon did not take place at the same time for all railways: for example, in the case of the line between Santiago and Valparaíso, where the volume of freight transported by road trebled between 1934 and 1937, it took place a long time ago (Huidobro, 1939), while there are other cases where it has still not occurred, as in the international rail links between Salta and Baquedano and between São Paulo and Santa Cruz de la Sierra, where there are still no good-quality highways. Table 1 shows this phenomenon in the case of the Chilean section of the railway from Arica to La Paz. During the years covered by the table (1992 to 1996), the paving of the highway between these two cities was completed, and this greatly increased the competition from road transport. The railway freight charges for all the products covered by the table went down in real terms, but those which went down most were the charges that were highest in 1992: i.e., the freight rates for products of relatively high unit value, such as motor vehicles and manufactured goods in containers.

This phenomenon largely explains why in many countries the railways were taken into the govern-

TABLE 1
Arica - La Paz Railway (Chilean section): Relation between absolute value of freight charges and relative changes in that value, 1992-1996

Product	Freight charge for product, as a percentage of average freight charge, 1992	Change in real value of freight charge, 1992-1996 (%)
Wheat	91	-33
Diesel fuel	122	-45
Wheat flour	85	-20
Vehicles	270	-44
Manufactured products in containers	120	-58
Zinc	58	-21
Lead	60	-21
Paper and pulp products	95	-27

Source: Prepared by the author on the basis of data presented in EFE (several years).

ment sector between 1935 and 1965. Over that period it became evident that private enterprises could not attract sufficient capital to compete in the long term, and sometimes they could not even cover their operations in the short term, at least as long as they continued to maintain high-cost services such as branch lines. In some cases –as for example in Paraguay– railways had to stop running before the government realized that they had a socio-economic or strategic value that exceeded their financial deficit. Without the railways, great volumes of products of low value (and hence of low freight rates) would have serious difficulties in reaching the ports, the factories or the points of consumption. Likewise, the absence of railways would seriously complicate the travel of lower-income sectors of the population.

In government hands, however, the railways often suffered the adverse consequences of deficient management and administration, and in some cases, as in Argentina, they were subjected to politically motivated interference that severely compromised their economic efficiency. Their managers did not receive clear instructions from governments regarding the relative importance to be assigned to the provision of a social service, the promotion of economic development, or the need to cover their expenses from their income, thus tending to reduce the efficiency of their management still further. As they were not obliged to pay their way, however, they almost always managed to survive and, in a number of important cases, thanks to the injection of government funds or government-backed loans, to modernize their operations in technological but not in institutional terms. There was a tendency to modernize in the aspects that most attracted the attention of voters, such as passenger coaches or locomotives, while relegating investment in the permanent way to the background.

As it was no longer necessary to cover all the expenses, and also because of the desire of governments to favour the development of particular geographical or economic sectors, many of the freight tariffs charged only tended to reflect the marginal costs of the transport (indeed, according to the managers of some recently privatized railways, sometimes they did not even cover these costs).

3. Governments decide to return railways to the private sector

By the mid-1980s, many governments, such as those of Argentina or Brazil, had begun to sharply reduce their investments in railways, and towards the end of that decade they began to ask themselves why they were channelling large amounts of resources to balance the accounts of railway enterprises whose role in the national economy seemed to be shrinking year by year. In Latin America, the first government to ask this question was that of Colombia, followed by Argentina and then most of the others, culminating in the privatization of the railways, normally by way of concessions. Sometimes, as had occurred thirty years before in Paraguay, as a result of their transfer from private to State management or their return to private ownership, railways stopped operating for a time, as happened in Guatemala and Costa Rica.

4. Commercial attitudes of private companies

The new private sector railway managers were not very interested in carrying freight at rates equal to or below their marginal costs, and they expected all the traffic transported to help at least to some extent to finance their fixed costs. Therefore, although the volumes transported have generally tended to rise with privatization, some types of freight have ceased to be transported by rail. A typical case is that of the Chilean railway company Ferronor, which has negotiated a contract for the bulk transport of five million tons of iron ore from the Los Colorados mine to the port of Huasco, while it has ceased to accept traffic of low volume and even lower profitability, such as cement

from La Calera to Copiapó or automobiles from Iquique to Barranqueros (Argentina).

When traffic ceases to be transported by rail it must either find another means of transport or simply cease to exist, with unfortunate consequences in both cases. If it moves to another means of transport, the economic costs may be higher than those of rail transport, while if it ceases to exist this will probably give rise to idle resources, at least in the short term.

It is important to note that the growing concentration of railway companies on the most profitable types of freight, which are generally those most suitable for transport by rail, means that long-distance buses and low-capacity trucks no longer compete with the trains. Increasingly, the companies or individuals which compete with the railway companies are those that operate heavy trucks.

5. A concrete example of determination of the economic and social benefits of the railway

Let us take the case of Ferronor once again as an example. In 1986 the military government of the time, tired of having to pay for the deficit of this railway, decreed the elimination of almost the whole of the southernmost 850 kilometres of its main line (Thomson, 1997). It was decided to close the line rather than privatize it because at that time privatization was not yet seen as a viable option in Chile or indeed in the rest of the world. The little traffic transported at that time over the stretch of line whose elimination was approved (between La Calera and Copiapó) consisted almost entirely of copper ore, because of an imbalance in the geographical distribution of the capacity for the concentration of the ore, on the one hand, and its refining, on the other.

At that moment, ECLAC was developing a methodology that would make it possible to compare the cost of the wear and tear on the roads caused by heavy vehicles, the tolls (if any) paid by those vehicles, and the various taxes involved, such as the fuel tax (ECLAC, 1987a). This methodology was applied to the hypothetical transport by road of the freight carried at that time by Ferronor over the stretch of line whose closure had been authorized, and it was determined that every ton-kilometre transported by road would represent a net cost to the government equivalent to approximately 0.41 US cents (US$ 222 000 per month) at current prices.[1] In other words, if the subsidy needed to keep the railway going was less than that amount, then from the point of view of the community it would be better to pay it in order to avoid a greater cost in terms of wear and tear on the roads. A few months later, the government of the time decided to issue a second decree annulling the previous one.

II

Highway tolls and the cost of road infrastructure

1. Wear and tear on the roads caused by heavy vehicles

It is generally acknowledged that the passage of heavy vehicles causes structural damage to roads which vary exponentially in line with the weight of the vehicles per axle. The value of the exponent varies, according to the circumstances, from 2.4 to 6.6: it is considered that the value is normally around 4.5 (Rolt, 1981). The default value in the World Bank's highway design and maintenance model (HDM model) is 4.0. This model identifies an "axle equivalent" as the destructive power of an axle bearing a load of 18 000 pounds (equal to 8.165 tons) and uses this as the basic unit of analysis. Thus, a truck with two axles with axle loads of 5.0 and 6.0 tons respectively has an axle equivalent value of 0.36, assuming that the exponent has a value of 4.5. The same truck with loads of 7.5 tons on the front axle and 15.0 tons on the rear axle has an axle equivalent of 16.1, and if the rear axle load is increased by 2.5 tons the equiva-

[1] In 1992 Ferronor had favourable operating results, while in 1993 it had a deficit of US$ 272 000 per month.

lent rises to 31.6. The axle equivalent fluctuates a little according to the quality of the pavement, and generally speaking a truck with a given axle equivalent value will do more damage to a low-quality highway than to a better-quality one.

2. The toll structure on Latin American highways

In some Latin American countries, such as Peru and Chile, the public authorities have for years or decades past been charging tolls for the use of some sections of the road system, especially main highways with relatively high standards of construction. More recently, the charging of tolls has been becoming more frequent due to the granting of concessions to private enterprises for the construction or reconstruction, maintenance and administration of highways.

As we have seen, a mere change in cargo distribution which results in the transfer of some weight from the less heavily loaded to the more heavily loaded axle of a two-axle truck, without altering the total gross weight of the vehicle, can significantly increase the axle equivalent value. For theoretically ideal cargo distributions, table 2 shows the axle equivalent values for three different types of trucks, loaded with two different amounts of cargo, and travelling in one case on an asphalt road and in the other on a concrete highway. Even with such ideal cargo distribution conditions, it is evident that the wear and tear caused to a highway is critically dependent on the axle load of the vehicles using it.

It should be noted, for example, that the axle equivalent value for a truck with a gross weight of 35 tons and four axles is 2.39 (asphalt) or 3.02 (concrete), whereas a truck of the same tonnage but with five axles has an axle equivalent of only 1.74 or 2.02, respectively.

The toll structure, by type of vehicle, varies relatively little from one country to another. Generally speaking, when awarding the concession for a highway the government determines the relation between the toll charged for a vehicle of type *i* (e.g., a light truck, three-axle non-articulated truck, three-axle semi-trailer truck, two-axle bus) and the toll for private cars, and then uses the toll per private car as the critical variable for awarding the concession, which is granted to the applicant offering to charge the lowest toll per private car.

TABLE 2
Argentina: Relation between axle equivalents and tolls on highways under concession. Axle equivalents corresponding to various classes of trucks [a]

Type of truck	Asphalt highway, Structural No. = 10	Concrete highway 20 cm thick
1. Single front axle, twin rear axles, non-articulated, with total gross weight of 18 tons	0.20	0.46
2. Ditto, with total gross weight of 24 tons	0.97	1.55
3. Tractor unit with two axles and semitrailer with twin rear axles, with total gross weight of 29 tons	1.09	1.37
4. Ditto, with total gross weight of 35 tons	2.39	3.02
5. Type No. 1 above, with trailer, with a total gross weight of 35 tons	1.74	2.02
6. Ditto, with total gross weight of 44 tons	3.21	3.75

Source: Chile, Comisión Nacional de Energía (1981), through ECLAC, 1987a.

[a] Assuming ideal cargo distribution: i.e., with maximum axle load permitted by law.

3. The relation between tolls and the marginal costs of using the infrastructure

Clearly, the variation between the tolls charged for the different types of vehicles does not reflect the variation between the corresponding axle equivalent values. Table 3 shows the toll structure for the highways transferred under concessions in Argentina and table 4 gives the toll structure for Brazil; generally speaking, the situation is similar for the highways transferred under concessions in Colombia, Chile and Mexico.

In the case of highways not subject to tolls, apart from the purchase of fuel, maintenance services and the other economic costs involved in the use of any motor vehicle, virtually the only other payment is the fuel tax, the level of which often displays in one way or another an inverse relation with the wear and tear on the road infrastructure, since the tax is higher on gasoline than on diesel fuel.

It may be concluded that, even when tolls are charged, private cars and other light vehicles have to pay excessive charges compared with the cost of the damage they do to the highways. In contrast, the

TABLE 3
Argentina: Relation between axle equivalents and tolls on highways under concession

Type of vehicle	Indicative axle equivalent value	Maximum toll at normal times of day, %
Up to two axles and 2.10 metres high, without twin rear wheels	-	100
Up to two axles and over 2.10 metres high, or with twin rear wheels	1.50	200
Three or four axles, up to 2.10 metres high, without twin rear wheels	3.00	200
Three or four axles, over 2.10 metres high, or with twin rear wheels	4.00	300
Five or six axles, with twin rear wheels	4.00	400
Over six axles and over 2.10 metres high, with twin rear wheels	4.00	500

Source: Prepared by the author. With regard to axle equivalents, based on Archondo (1989), World Bank (1989, table 6-11), ECLAC (1987a and b) and Chile, Comisión Nacional de Energía (1981); values of relative tolls are taken from FLACSO, 1998.

TABLE 4
Brazil: Relation between axle equivalents and tolls on highways under concession [a]

Type of vehicle	Indicative axle equivalent value	Maximum toll at normal times of day (private car = 100%)
Private car, pickup truck or van	-	100
Bus or truck with two axles and twin rear wheels	1.87	200
Private car or pickup truck with semitrailer; three axles and single rear wheels	-	300
Articulated bus or truck with three axles and twin rear wheels	1.66	300
Private car or pickup truck with trailer; four axles and single rear wheels	-	400
Articulated truck with four axles and twin rear wheels	5.00	400
Ditto, five axles	4.00	500
Ditto, six axles	2.00	600
Motorcycle or scooter	-	50

Source: Prepared by the author. With regard to axle equivalents, based on Archondo (1989), World Bank (1989, table 6-11), ECLAC (1987a and b) and Chile, Comisión Nacional de Energía (1981); values of relative tolls are taken from Pereira, 1997.

[a] Official vehicles and those belonging to the armed forces and Military Police are exempt from payment of tolls.

charges levied on heavy trucks, in terms of their axle equivalent value, are very modest compared with the cost of the damage these vehicles do.

4. Is heavy truck traffic subsidized?

The conclusion reached in the preceding paragraph does not necessarily mean that there is an implicit subsidy for heavy truck traffic, since it may be that all types of vehicles are charged tolls that more than cover the corresponding costs. In other words, there is a possibility that there may be a positive levy (that is to say, a negative subsidy) on the traffic of all types of vehicles, with this levy being relatively higher for private cars than for heavier vehicles. However, this does not appear to be the case.

In table 5, which refers to the highways transferred under concessions in Chile, comparison of the figures in the last two columns shows that only in the case of trucks, and especially those with more than two axles, is the cost of wear and tear on the roads higher than the sum of the fuel tax plus tolls.[2]

It should be noted that in Chile the tax on diesel fuel is higher than in some other Latin American countries. Obviously, in countries where this tax is lower than in Chile there will be still more likelihood that the traffic of the various types of vehicles will cause wear and tear on the roads that exceeds those vehicles' contribution through the fuel tax and tolls that they pay.

In the case of trucks and also of buses with two axles, from the concessionaire's point of view the wear and tear they cause to the highway costs more than they contribute in tolls, and it is also obvious that in the case of highways which are free of tolls the traffic of trucks and buses with two or even more axles gives rise to costs in respect of wear and tear on the road that exceed the amounts collected through the fuel tax.

[2] Table 5 should be interpreted as a conceptual example rather than as a faithful reflection of the situation in a specific case. It is likely, for example, that the axle equivalent values of the vehicles using the highways transferred under concessions are not exactly equal to those used in the calculations summarized in the table. It should also be noted that the table does not take account of the value added tax or the variable costs for policing and other aspects.

TABLE 5

Chile: Relation between axle equivalents and tolls on highways under concession

Type of vehicle	Indicative axle equivalent value	Toll (US$/km)	Fuel tax (US$/km)	Sum of previous two columns (US$/km)	Cost of wear and tear on road (US$/km)
Private cars	-	0.0231	0.0176	0.0407	-
Pickup trucks	0.10	0.0231	0.0220	0.0451	0.0046
Trucks with two axles	1.87	0.0416	0.0286	0.0702	0.0851
Trucks with more than two axles	4.00	0.0925	0.0400	0.1325	0.1820
Buses with two axles	1.25	0.0416	0.0333	0.0749	0.0569
Buses with more than two axles	1.00	0.0717	0.0400	0.1117	0.0455
Private cars and pickup trucks with trailer	0.10	0.0347	0.0275	0.0622	0.0046

Source: Prepared by the author on the basis of the preceding tables and their respective sources; *Transporte Moderno,* 1996; IMF (several years), and information provided by Alberto Bull, ECLAC consultant.

5. Subsidized concessions

Another factor that must be taken into account when deciding whether or not there are subsidies on truck transport is whether or not there is a global subsidy for the concessionaire. It is very difficult to reach definitive conclusions in this respect. In some cases –as for example the Santiago-Talca and Talca-Chillán sections of the "Panamericana Sur" highway in Chile– the concessionaire is obliged to make a net positive payment to the State, but in other sections with less traffic and/or higher investment costs it is the State that makes payments to the concessionaire (table 6).

Subsidies have been given to companies operating highway concessions in Colombia, while in Argentina the government does not charge rent and several highway concessions are eligible for subsidies, although there are arrears in the payment of the latter.[3] Heavy subsidies have been paid to concessionaires in Mexico. In the case of the "El Melón" road tunnel in Chile, however, the concessionaire has to make payments to the government. Obviously, the situation varies considerably from one case to another. Although there are few specific references to the matter, it seems likely that any subsidy paid is intended to help finance the initial investment, expansion of traffic capacity or improvement of the design standards rather than helping to cover the cost of maintaining the highway once the initial investment has been made.

TABLE 6

"Carretera Longitudinal" (Panamericana) (Chile): Cross-subsidies among the concessionaires of different sections of the highway under concession [a]

Section	Subsidy to concessionaire (-) or payment to government (+) (millions of dollars)
La Serena-Los Vilos	-147
Los Vilos-Santiago	-20
Santiago-Talca / Expressway	
Santiago-San Fernando	+228
Talca-Chillán	+166
Chillán-Collipulli	-95
Collipulli-Temuco	+91
Temuco-Río Bueno	-94
Río Bueno-Puerto Montt	-129

Source: Friedmann and Hinojosa (undated).

[a] There have been some differences between the values envisaged and those finally included in the contracts.

6. Some preliminary conclusions

It may be concluded from the foregoing that:

i) truck traffic on toll-free roads is almost always subsidized, in the sense that the amounts collected through the fuel tax and other taxes not directly re-

[3] According to a source in the bus operators' association, the arrears of subsidies amounted to some US$ 45 million in 1998. See Cámara Empresarial de Larga Distancia, 1998.

lated to the distance covered are less than the cost of the wear and tear caused to the roads;

ii) in the case of highways transferred under concessions, there are probably impicit subsidies for trucks with higher axle loads,[4] and

iii) the whole matter is very complex, and there may be significant differences between one case and another, so that a case-by-case analysis is called for.

7. The importance of subsidies for heavy trucks in highway financing

An implicit subsidy of the order of US$ 0.05 per kilometre for a truck with more than two axles using a toll highway operated under a concession corresponds approximately to a net subsidy of some 0.25 cents per ton/kilometre. Is such a subsidy quantitatively significant?

Let us take as an example the "Ferrocarril del Pacífico" (FdP) in Chile, which transports around 800 million net ton/kilometres per year. If it could receive some US$ 2 million per year extra –i.e., if it could receive a subsidy at the same rate of 0.25 cents per ton/kilometre transported– its income would rise by some 6%. The FdP has currently achieved a delicate balance between its costs and income, and an increase of 6% or so in the latter would strengthen the company's economic situation in the long term.

Another example which could be cited is that of Ferronor in the year 1995 (when it was still in State hands).[5] If it had been able to receive US$ 0.25 more per ton/kilometre transported, its income would have increased by some US$ 750 000 and the yield on its net assets would have risen from 0.2% to 1.7%. In the particular case of Ferronor, the highways in its geographical area are not subject to tolls, so that the effective subsidy for its road transport competitors was a good deal more than US$ 0.25 per ton/kilometre: probably around US$ 0.71 per ton/kilometre. If Ferronor had been able to raise its freight charges by the latter amount, its yield would have risen to 4.6%.

In other words, although the impact of the subsidies effectively paid to heavy truck transport on the railway companies' finances is relatively small, especially when tolls are charged and the highways are transferred under concessions, it can nevertheless significantly affect the companies' economic situation. Furthermore, if the financial situation of the railways were improved, this should allow them to compete better in the market and absorb a higher proportion of the volume of cargo transported.

8. The feasibility of making heavy trucks pay fair tolls

In practice, the structure of the tolls charged on Latin American highways has more to do with facilitating the collection of the tolls than with seeking to charge tolls that reflect the wear and tear caused to the roads. The employees who collect the tolls would be perfectly capable of noting the number of axles of the trucks that pass through their toll stations, but normally they would not be capable of estimating their axle equivalent value. Consequently, they could apply a toll structure using the number of axles of a truck as an independent variable, but not a structure in which the toll charged depends on the axle equivalent value of each vehicle.

In some countries such as Iceland and New Zealand, the authorities are already selling licences to travel 1 000 (or multiples of 1 000) kilometres over the road network, at prices which depend on the axle equivalent value of the vehicle in question (ECLAC, 1993). For cultural reasons, however, this kind of system might not work effectively in Latin America.

However, it is not technically impossible to provide each toll station with a weighing machine capable of determining the load on each axle of a vehicle passing over it at low speed. Such installations are already used on the main highways of many countries in order to verify observance of the rules on maximum permitted weights. Moreover, modern technology is capable both of determining the weight on each axle and of automatically charging the corresponding toll and deducting it from an amount deposited in advance by the vehicle owner, using a "smart card" inserted in a device placed above the vehicle's

[4] The source of the subsidy varies according to each individual case. If a highway is transferred under concession without any subsidy or rental and the cost of the wear and tear attributable to trucks exceeds the amount they contribute in tolls, there is obviously a cross-subsidy which is financed by motorists and the occupants of other vehicles. If the concessionaire does receive a subsidy, the source of the latter may be the community at large.

[5] Ferronor has been in private hands since early 1997. The year 1995 is used for estimating the impact of the road transport subsidy on the company's finances because more statistical data are available on its operations when it was a public enterprise.

windshield (ECLAC, 1999). In other words, it is already possible to envisage that in the relatively near future it will be possible to apply toll structures whereby every vehicle is charged an amount reflecting the cost of the damage it has done to the road it is using.

In reality, the most difficult obstacle to the levying of efficient tolls on the vehicles which do most damage to Latin American highways may well be of a social or political rather than a technological nature, because of the power wielded by the truckers' federations, which would undoubtedly be against higher tolls.

III

How can the inefficiencies in highway toll structures be taken into account in railway privatization processes?

1. The system of compensatory payments made to the "Ferrocarriles del Estado" railway company in Chile

In the short term, when heavy truck traffic will continue to be effectively subsidized even on highways operated under concessions, in order to promote optimal distribution of traffic between road and rail transport compensatory mechanisms should be envisaged in order to promote the use of the railways, as we suggested in a 1992 study dealing with this issue from the conceptual point of view (ECLAC, 1993).

The year after the study in question, a simple system of compensatory payments (per net ton/kilometre) was established in Chile to assist the "Ferrocarriles del Estado" company (but not the other railway companies in that country).[6] It has been announced that this system will be terminated as soon as that company's rail operations have all been transferred to the private sector, which suggests that the real aim of its application was not to improve the modal split of traffic. It has been criticized for various reasons: for example, even after the separation and privatization of freight transport services, these compensatory payments continued to be made to Ferrocarriles del Estado rather than to the company operating the freight trains (FdP), without there being any guarantee that the beneficiary would use them to reduce the charges made for the use of the railway tracks or to improve the quality of the permanent way used by freight trains (one of the responsibilities of Ferrocarriles del Estado is to maintain the infrastructure of the main lines; the maintenance of branch lines has been delegated to FdP).

Although it has been criticized, however, the system of compensatory payments adopted in Chile (which will be analysed below from the conceptual standpoint) was undoubtedly preferable to not having any system at all. In other countries, not even a scheme of this nature has been introduced, although the Swedish experience is also interesting in this area (Nilsson, 1993).

2. The desirability that compensatory payments to railway companies for freight transported should be offered before the concessions have been awarded

In the study mentioned above (ECLAC, 1993) we analysed the conceptual dimensions of the problem of creating the necessary conditions for optimizing the modal split. In the present article we will limit ourselves to highlighting the importance of recognizing this problem when awarding railway concessions.

If the problem is only recognized at a later date, the government will only be able to solve it by adopting measures that favour a private-sector enterprise: namely, the railway company. These measures could be economic, such as a compensatory payment for every ton/kilometre transported by rail, or qualitative, such as the application of greater restrictions on maximum truck weights. At all events, the proposal of such measures by the political party in office

[6] Very small compensatory payments were also made on the basis of passenger/kilometres.

would give rise to criticism from the opposition parties, because the measures favour a private enterprise, and the trucking sector would assuredly join in the opposition's criticism.

If, on the other hand, the tendering conditions specified the compensation that would be paid to the concessionaire (or purchaser) of the railway, the economic offers submitted by the interested groups would naturally include an estimate of the present value of the income they expected to receive under this heading during the period of the concession. In this case, the government would not be open to criticisms of favouritism.

It would also be desirable to decide on the payment of compensation for freight transported by rail before granting operating concessions for highways competing in the same market. The benefits generated by such compensatory payments, which are the main subject of the present study, are reflected in lower road maintenance costs; clearly, it is preferable that these should be enjoyed by the community in general, through the government that represents it, rather than by a private company holding the concession for sections of the highway system. (There may also be other benefits –such as those connected with the reduction of congestion, of road accidents and of environmental pollution– which will also naturally be enjoyed by the community).

3. The disparity between what is conceptually preferable and what can be achieved in reality

The subsidy effectively received by truckers will naturally vary considerably from one type of traffic to another, depending inter alia on the following factors:

i) the incidence of tolls on the section of road used by the trucks engaged in the traffic: the greater the proportion of the journey effected over toll-free roads, the higher will be the effective subsidy;

ii) the quality of the roads used: the greater the proportion consisting of dirt roads, riprap surfaces, or roads which are paved but in poor condition, the higher will be the subsidy;

iii) the type of truck, with the subsidy inversely related to the number of axles; and

iv) the load carried by each truck, since the subsidy is directly related to this weight.

Consequently, conceptually speaking the compensation should be determined for each particular type of traffic. This could be done, for example, according to a methodology described in the study referred to earlier (ECLAC, 1993). According to this methodology, before making its offer of freight services for each kind of traffic to be awarded by the market, the railway company would ask the Minister of the Economy or of Transport how much compensation the government would pay it if it won the transport contract.

On the other hand, at the time of participating in the tendering process for the railway concession and preparing the corresponding economic offers the interested groups will not be in a position to estimate exactly how much traffic they will transport during the period of the concession, nor can they know how much they will receive from the government in each case. Consequently, from a practical point of view it is necessary that the tendering conditions should specify the amount of money that the government will pay the concessionaire for each ton/kilometre transported. Although this value would not be exactly equivalent to the compensation corresponding to a particular type of traffic, it would allow the consortia taking part in the tendering process to make a realistic estimate of the income they would obtain under this heading, which they would include in their final bid.

4. The beneficiaries of the proposed system of compensatory payments

We shall end the present article with some comments on the beneficiaries of a system of compensatory payments to railway companies like that proposed here. Obviously, in all cases the objective should be to maximize the benefits received by the community at large.

Three different situations may be identified, as described below:

i) When the Ministry of Public Works or an equivalent body administers the road system directly, the lower volume of traffic by the types of vehicles which cause most damage to the roads means a corresponding reduction in the cost of maintaining and reconstructing highways. The reduction in this cost would be greater than the reduction in fiscal income from fuel taxes or tolls (if any). The government could use the increase in its net income for other road projects or projects in other areas, or it could reduce taxes in general. In this case, the transfer of the benefits to the community at large is quite direct.

ii) The transfer mechanism is not so direct when the highways are in the process of being transferred to concessionaires. In this case, the groups participating in the tendering process would recognize, or at least should recognize, that the compensatory payments offered to the railway companies would reduce not only the amount of tolls collected but also the cost of road maintenance and reconstruction. As the reduction in the amount of tolls collected would be lower in absolute terms than the reduction in their costs, they should take into account in their offers the consequent increase in net income that the concessionaires could receive. This could be done in one of two ways, depending on the circumstances. If the values of the tolls are defined in the tender conditions, each applicant would raise his offer, thus increasing the funds available to the government and allowing it to finance other projects or lower taxes. If the values of the tolls are not defined in the conditions, each applicant would reduce the value of the tolls he proposed to charge, in which case the beneficiaries would be the users of the highway transferred under concession, rather than the community at large.

iii) The most difficult situation is when the highways have already been granted in concession, in which case a renegotiation process between the government and the concessionaire would be needed. Generally speaking, the transfer of a cargo flow from road to rail transport means a benefit for the concessionaire of a highway participating in the same market as the railway. In this case, however, the benefits would assuredly have to be divided between the community (represented by the government) and the concessionaire.

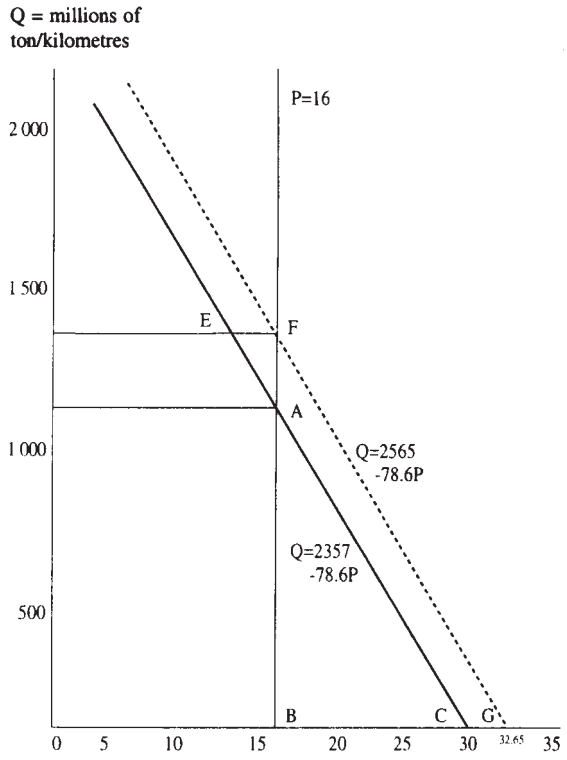
In all three of the above situations the economic cost of the transport would go down, because each type of traffic would be directed to the form of transport which could handle it at the lowest marginal cost.

5. Compensatory payments to the railway company only in respect of "new" traffic

As already mentioned, in 1993 the Chilean government decided to pay the Ferrocarriles del Estado (EFE) railway company a subsidy of 2.65 pesos (US$ 0.0066) per ton/kilometre in order to compensate it for the effective subsidy received by the heavy trucks with which it competed.

FIGURE 1

Diagram of effects of different criteria regarding payment of compensation to a railway company for the subsidies enjoyed by heavy trucks [a]



Source: Prepared by the author.

[a] Based on the case of the Chilean railway company "Ferrocarriles del Estado".

In 1993, EFE transported approximately 1 100 million ton/kilometres of freight on its Southern Network. Figure 1 shows the effects of making compensatory payments to an enterprise for each ton/kilometre transported, based on the case of EFE. It was assumed in the figure that the marginal cost of transporting cargo was around 16 pesos per ton/kilometre, and as EFE had a good deal of idle capacity it was also assumed that the marginal cost was equal to the average cost.

Assuming that EFE negotiated specific contracts with its various clients, charging them the maximum freight rates they were willing to pay, the volume transported by its trains would be given by the equation $Q = 2357 - 78.6P$, where Q represents that volume in millions of ton/kilometres per year and P is

the freight rate per ton/kilometre. Before receipt of the subsidy, the net operating income from freight transport would be given by the triangle *ABC*: i.e., it would be 7 689 million pesos.

Thanks to the compensatory payment received for each ton/kilometre transported, EFE would begin to receive not only the freight rates paid by its clients but also the 2.65 pesos per ton/kilometre contributed by the government, so that the function relating its income to the volume transported would be $Q = 2565 - 78.6P$. The volume transported by the company would have risen from 1 100 to 1 307 million ton/kilometres and its net operating income would have risen to 10 881 million pesos, equivalent to the area FBG.[7] The government would have paid it a sum corresponding to the area EFGC, that is to say, 3 464 million pesos (US$ 8.66 million). If EFE had been a private company it would have been politically unacceptable to pay it such a large subsidy, but it must be recalled that in actual fact EFE was and still is an enterprise belonging to the public sector.

The compensation based on the traffic of 1 100 million ton/kilometres that EFE already transported would not have caused a shift in the modal split from road to rail transport: it would simply have increased EFE's operating income from freight transport. The company would not have renegotiated existing contracts at lower freight rates but it would have quoted lower rates for new business from new or existing clients in order to obtain traffic. It could have made various kinds of investments to improve the quality of the product offered, which would have increased the volume it could transport in the future, but in the short term the respective sum (some 2 915 million pesos) was merely a transfer from the government to the company. In any case, EFE was not under any obligation to invest its resources in this way, and it would only have done so if the yield were higher than that from investing them in other projects.

Obviously, in principle the government could have offered EFE the unit compensation in question, i.e., 2.65 pesos per ton/kilometre, only in respect of new traffic transported by it. In this case, the total amount transferred to the company would have been only 549 million pesos (US$ 1.37 million), which would have been politically more acceptable if EFE had been a private company.

But, is it feasible to offer compensation only in respect of new traffic? Above all, this would raise the problem that, with the passage of time, it would be increasingly difficult to distinguish new traffic from existing business. Take, for example, a two-year contract between the railway company and a mining or industrial concern: in its negotiations with the government the railway company could maintain that this traffic should be considered "new" as from the end of the existing contract, so that from then on the government should pay the corresponding compensation, provided that a new contract was signed. The distinction between new and old traffic will also become increasingly unclear because of the relocation of plants or installations generating transport needs, changes in the quality of the road network, and other factors.

Another item which would create difficulties is that the railway company would receive the full value of the subsidy (2.65 pesos in the Chilean case) for the first unit of the new traffic transported (in figure 1, the 1,100,000,001st ton/kilometre), while the net income it would derive from the last unit of the existing traffic (the 1,100,000,000th ton/kilometre) would be virtually nil, so that it might tend to use its resources preferentially to transport types of traffic whose transport by rail might generate fewer benefits for the country than others.

It may therefore be concluded that, in practice, it will not be possible, and might not be desirable either, to pay compensation solely in respect of new traffic.

(Original: Spanish)

[7] In reality, the volume transported went down in 1993 because the market was shrinking for such reasons as the decline in the output of the coal mines.

Bibliography

Archondo, R. (1989): *EBM Case Study,* Washington, D.C., World Bank, September.

Cámara Empresarial de Larga Distancia (1998): *Larga distancia,* Buenos Aires, January/February.

Chile, Comisión Nacional de Energía (1981): *Proposición de un sistema de tarificación por uso de la infraestructura caminera,* Santiago, Chile, March.

ECLAC (Economic Commission for Latin America and the Caribbean) (1987a): *Sinópsis de problemas y opciones de política del transporte terrestre de carga en Chile. Estimación de los costos variables del uso de la infraestructura vial,* LC/R.566/Add.1, Santiago, Chile, 23 July.

——(1987b): *El transporte interurbano de pasajeros en Chile,* LC/R.520/Rev.1, Santiago, Chile, February.

——(1993): La metodología de la tarificación del uso de la infraestructura y la eficacia del sistema de transporte nacional, in ECLAC, *Reestructuración y privatización de los ferrocarriles de América Latina. Resultados de un simposio,* Santiago, Chile.

——(1999): *El desarrollo histórico y aceptación política del concepto de la cobranza por el uso de la vialidad urbana congestionada*, Santiago, Chile.

EFE (Empresa de Ferrocarriles del Estado) (1887): *3a Memoria de Ferrocarriles del Estado,* Valparaíso, Chile, Imprenta del Universo de Guillermo Helfmann.

——(several years): *Anuario estadístico,* Santiago, Chile.

FLACSO (Latin American Faculty of Social Sciences) (1998): *Transformación en el sistema vial argentino: las concesiones por peaje,* Buenos Aires, February.

Friedmann, J. and S. Hinojosa (no date): *Tarificación de la red vial interurbana; aspectos teóricos y aplicaciones,* Santiago, Chile, Ministerio de Obras Públicas.

Huidobro, C. (1939): *Política ferroviaria nacional,* Santiago, Chile, Ministerio de Economía, Fomento y Reconstrucción.

IMF (International Monetary Fund) (several years): *International Financial Statistics,* Washington, D. C.

Nilsson, J. (1993): La separación entre la propiedad de la infraestructura y la operación del transporte ferroviario: la experiencia sueca, in ECLAC, *Reestructuración y privatización de los ferrocarriles. Resultados de un simposio,* Santiago, Chile.

Pereira, J. (1997): Concesiones de carreteras en Brasil, paper presented at the *"Seminario Provial de las Américas",* Cartagena de Indias, Colombia, September.

Rolt, J. (1981): *Optimum Axle Loads of Commercial Vehicles in Developing Countries,* Transport and Road Research Laboratory Report No. 1002, Crowthorne, Berkshire, U.K., Transport and Road Research Laboratory.

Thomson, I. (1997): *Red Norte*: *The Story of State-Owned Railways in the North of Chile,* Birmingham, U.K., Locomotives International.

——(1998): The evolution of the State's role in the regulation of land transport, *CEPAL Review*, No. 64, LC/G.2022-P, Santiago, Chile, ECLAC.

Transporte Moderno (1996): May, São Paulo, Editora TM.

World Bank (1989): *HDM-PC: The Highway Design and Maintenance Standards Model,* Washington, D. C., January.