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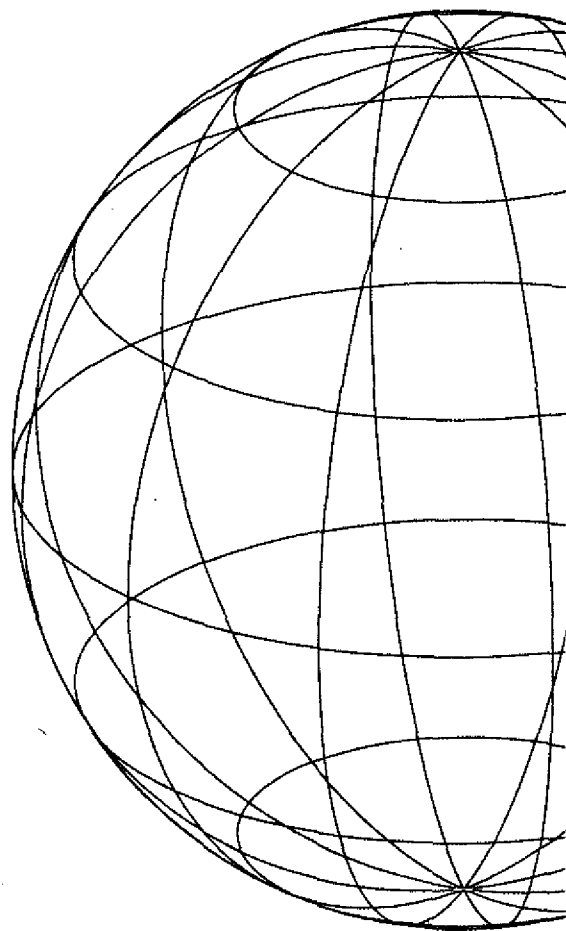
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Productivity
Performance in
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Country Case Studies

∴ Argentina



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Productivity Performance in Developing Countries

Country Case Studies

Argentina

Daniel Chudnovsky and Andrés López



UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna, 2005

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Executive summary

Background and context

In a country that has exhibited high political instability, extreme economic volatility and persistent institutional fragility it is hardly surprising to encounter a poor long-term economic performance. This was, in fact, the outcome in the period of over 40 years reviewed in this report. There were, however, two “growth spurts” with relatively good productivity during this period, the first between 1964 and 1974 and the second from 1991 to 1998.

What determined productivity development during those growth spurts and why they failed to give place to a sustainable pattern of productivity growth are the key questions addressed in this report.

The information available on the evolution of total-factor productivity (TFP) at the aggregate level for the period 1962-2000 is usually broken down into three periods. During the first period (1962-74), TFP growth averaged 0.5 per cent per year. In the following period (1975-90), the Argentine economy suffered one of the great depressions of the twentieth century and TFP registered negative growth. The last period covers the 1990s (until 1998), when growth was resumed and TFP grew at 2.9 per cent per year (see Table 2.1).

Investment and knowledge as major determinants of productivity growth during the first spurt

The first growth spurt took place against a background of persistent inflation and a recurrent balance of payments and political crisis. In this unfavorable climate, the manufacturing industry led economic growth, favored by protectionism and industrial promotion as key government policies. While the economy was virtually closed to imports of domestically produced final and intermediate goods, it was open to foreign direct investment and technology inflows and duty-free capital goods imports were allowed under industrial promotion schemes.

The entrepreneurial response to this incentives regime led to a substantial growth in fixed investments – mainly undertaken by TNCs. This naturally led to a remarkable increase in industrial production capacity. *Pari passu*, a technological learning process took place at enterprise level and a local technological capability gradually accumulated in the manufacturing sector. This allowed both significant labor productivity gains – with rising industrial employment - and increased industrial exports. These trends were also favored by the tempering of the anti-export bias in the prevailing trade policy. At the same time, the export-oriented agricultural sector had left behind almost two decades of stagnation and was again expanding at a rapid pace. In this scenario, it seemed possible that, by the end of the ISI period, the stop-and-go cycles that had periodically affected the Argentine economy could finally be at an end, following an expansion in export capacity.

However, some of the main structural problems of the ISI period were far from being resolved, including excessive levels of vertical integration, diseconomies of scale and deficient quality standards in most of the manufacturing sector. In this economic scenario, it is hardly surprising to find that there was largely extensive GDP growth in the period 1962-74 based on factor accumulation, while TPF growth was relatively low.

Public policies in place during this period did little to address these issues. Protectionism *cum* technology imports formed the basis of the “developmentalist” project, which aimed at “completing” the Argentine industrial structure by promoting investments in heavy goods and capital-intensive sectors. Efficiency, quality, export or domestic technological development were, at best, secondary objectives, and only in the late 1960s were some of those issues addressed for the first time by public policies, albeit in an increasingly unstable political environment. Institutional fragility also impaired the impact of public policies on problems such as access to finance, given the frequent changes both in the public authorities and in policy orientations.

Notwithstanding policy failures and as previously stated, industrial productivity gradually improved and some ambitious technological projects were actually undertaken in sectors such as pharmaceuticals and electronics. Unfortunately, it is not possible to ascertain whether this process – with the aid of more effective industrial policies - would have ultimately guided Argentina towards a more competitive manufacturing sector. Increasing political violence and growing macroeconomic turbulences paved the way for a military coup in 1976. The new economic policy after the coup meant a departure from the old regime and the beginning of the end of the ISI period in Argentina.

The long recession

Between 1976 and 1981, trade and financial liberalization, backed by a growing appreciation of the domestic currency, led to a fall in industrial output and employment. However, while skilled and R&D technology-intensive activities were the most affected by the new policy regime, intermediate goods production - in which domestic conglomerates had a major share and often associated with military interests - were favored by industrial promotion policies and trade protection measures.

The banking and currency crisis of 1981 was soon followed by the foreign debt crisis, giving way to a serious recession and forcing a new closing of the economy. All the crucial economic indicators, except exports, showed a negative performance during the 1980s. The recessive and inflationary economic climate was hardly conducive to investment and productivity growth, and increasing exports were, to a large extent, the outcome of investment projects planned during the late 1970s and which found a much smaller domestic market than originally envisaged.

The return to democracy was the only good news in the 1980s – and naturally it is important to highlight its great significance for a country that, for over 50 years was periodically hit by military coups. Unfortunately, however, this neither led to an improved institutional infrastructure nor to the end of political instability.

High productivity under structural reforms

Having undergone two hyperinflation crises, Argentina finally achieved in the early 1990s with the adoption of the Convertibility Plan. At the same time, a far-reaching program of structural reforms was implemented, comprising trade liberalization (mild reforms in that direction had already been adopted in the late 1980s), privatizations and market deregulation. Foreign investment and technology transfers were completely liberalized – a task that had been initiated by the military government in 1976. Furthermore, Argentina aligned its domestic policies with international compromises assumed at the WTO, and with “best practice” norms in the banking area (e.g. Basel regulations). The country also signed several investment treaties and joined Brazil, Paraguay and Uruguay to establish MERCOSUR.

The aims of this reforms package were to boost productivity in the Argentine economy and to gain reputation among foreign investors. Both objectives were attained. The growth spurt between 1991 and 1998 was led by TFP growth, although capital deepening also progressed rapidly. FDI played a key role in this regard, since it not only contributed to financing the balance of payments – together with the more volatile portfolio inflows -, but also was a key source of technology and productive modernization. Capital goods imports and technology transfers were also key channels for economic restructuring.

All major economic sectors grew during this period. Privatized activities, including public utilities, energy and fuels, showed substantial improvements in terms of productivity, quality and increased output, albeit in a business climate of high tariffs and weak regulations. Mining also expanded due to a special incentives regime. The agricultural sector also boomed with the introduction of new technologies, including GMOs. However, many small farmers had to abandon production while the domestic contribution to technological modernization in agriculture was smaller than in previous periods, both in biological as well as in mechanical technologies.

Regarding the industrial sector, it was more efficient in the 1990s, but smaller and quite different from that of the ISI period. Product and process technologies were closer to international trends, but local innovative activities were, on average, below the levels of the ISI period. Labor-intensive sectors diminished in importance in the industrial structure, while resource processing and scale-intensive sectors increased their share. Capital goods production fell even more than in the previous decades after a zero tariff for imports was adopted, while the high-tech sector was even smaller in the 1990s than in previous decades.

Whereas during the first growth spurt, industrial labor productivity increased with rising employment, this was not the case during the 1990s. This period was marked by a reduction in the number of manufacturing firms and the more widespread use of sub-contracting services. The job losses were, however, mainly due to the growing use of new labor-saving equipment and the implementation of organizational technologies that increased labor productivity, and to the decline in output in labor-intensive industries following trade liberalization.

Job losses in manufacturing were not offset by the growth of employment in services and agriculture and in fact coincided with massive layoffs in the public sector and in privatized firms. This combination gave place to a substantial increase in unemployment,

one of the key factors that contributed to gradually eroding popular support for the reforms program.

Growing unemployment, poverty and income inequality are undoubtedly the worst aspects of the 1990s legacy. Although structural reforms had a direct impact on those phenomena, their effects were amplified by the fact that low-income groups had often received poor quality education and were less likely to obtain higher educational qualifications.

In late 1998, GDP and TFP growth stopped. From then on until 2001 the economy entered into a recession that finally led to the major crisis in the country's history. Although analyzing the causes of this crisis is well beyond the scope of this study, a combination of external shocks with a rigid exchange rate regime, high foreign debt, large fiscal imbalances and a weak government were (according to literature on this subject) the main factors behind the end of the Convertibility Plan. However, the weaknesses of the economic restructuring process induced by structural reforms also help to explain why the growth spurt of the 1990s was ultimately unsustainable.

Labor productivity in industry during the two growth spurts

A comparison of both growth spurts shows that the dynamics of the manufacturing industry were very different during each period. This should not be a surprise in the light of the dramatic changes both in the domestic economic policy regime and in the international scenario. However, similarities – some of them perhaps unexpected – also arise. Below we list the main factors underlying the strategies of industrial firms and their performance in both periods.

While industrial production was mainly oriented towards the domestic market, significant export increases (mostly oriented towards Latin American countries) were attained in the second half of both growth spurts, as a result of the maturation of new investments and gradual productivity improvements. However, productivity and competitiveness gains in both periods were not enough to effect a decisive transformation of the industrial sector and make it internationally competitive. The only exceptions here were some few manufacturing plants in certain natural resource and scale-intensive sectors.

In view of the growing import penetration ratios, competition in manufacturing production in the 1990s was greater than during the ISI period when import penetration was only significant in machinery and equipment industry. Nonetheless, the adoption of non-tariff barriers and the lack of an effective anti-trust legislation constrained the influence of imports as a competitive force in several manufacturing sectors.

A sharp reduction in the degree of vertical integration of local production took place in the 1990s as compared with earlier periods and allowed lower production costs. Firms were also able to achieve economies of specialization by reducing their product mix and complementing their local supply with imports of final products. This, however, resulted in an industrial sector with fewer inter-sectoral linkages than in the past.

Foreign firms were key actors in industrial restructuring during both growth spurts. In spite of the fact that domestic firms accounted for most of the industrial production, affiliates of TNCs dominated key sectors, had higher productivity levels than domestic

firms and contributed to the bulk of investments in the manufacturing sector (in fact, during the 1990s their share in terms of sales, employment and value added was substantially higher than in the ISI period). In spite of significant changes in the trade regime, most FDI in both periods was market-seeking. However, both export and import coefficients of affiliates of TNCs increased during the 1990s, both as a consequence of trade liberalization and of efficiency-seeking investments in some sectors.

Whereas in the first phase foreign firms mostly undertook Greenfield investments (although sometimes with second-hand equipment), takeovers of domestic firms were the predominant means of entry for TNCs in the 1990s. These takeovers generally led to substantial productivity and quality gains in the firms acquired and improved business performance. They were, however, accompanied by increasing industrial concentration, lower domestic linkages and – frequently - reduced endogenous R&D activities.

The presence of TNCs generated different kinds of spillovers for domestic firms. During the ISI period, spillovers were mostly in the form of knowledge leakages from TNC affiliates' introduction of technologies previously unknown in Argentina. In the 1990s, productivity spillovers were measured by econometric techniques. These could have been the outcome of knowledge leakages and competitive pressures on domestic firms on account of increased foreign enterprise presence. Positive spillovers were experienced only by domestic firms with high absorption capabilities – which comprise several variables such as the employment of skilled personnel, the use of modern organizational technologies, the magnitude of innovation activities (including R&D and technology and capital goods imports) and the level of training expenditures.

Domestic conglomerates gradually increased their presence in the Argentine economy, initially in the ISI period and later on during the long recession between 1976 and 1990, when they acquired preeminence in industrial leadership. Reforms had a heterogeneous impact on these firms. While some of them went out of business or drastically shrank, others concentrated on their core activities to consolidate their positions in the domestic market. In some cases domestic groups also gained presence in foreign markets through exports and FDI.

The ISI period was more favorable for SME development than the rules of the game prevailing in the 1990s. In both periods, SME productivity and innovative performance were on average weaker than that of large firms, and public policies often discriminated against them (despite some pro-SME initiatives in the 1990s). Some key trends of the 1990s severely affected this group of firms. Firstly they were poorly prepared for competition from imports as their technological, management and marketing capabilities were weak. Secondly, in the 1990s there was less scope for technological imitation and, thirdly, massive FDI inflows in a climate of trade liberalization resulted in lower linkages with domestic suppliers, affecting SMEs in particular. Fourthly, they had to adapt to new competitiveness requirements in areas such as quality and environmental management. Fifthly, the adoption of stringent financial regulations and increasing presence of foreign banks further reduced the already limited access of SMEs to credit.

The main source of technological innovation and productivity improvements in both periods were inputs from abroad, in the form of imported capital goods, disembodied technology transfer and FDI. Imitation through reverse engineering and other means also took place, but was seemingly more intense in the first growth period – to some extent,

due to changes in the intellectual property regime (e.g. acknowledgement of pharmaceutical patents) and also in the domestic and international technological scenario.

Product and process innovations in both periods were the outcome of enterprise-level learning processes through which important tacit and knowledge was acquired as well as codified knowledge received from machinery suppliers, licensors, consulting firms and foreign partners or headquarters. In contrast, linkages with local technology institutions were generally non-existent in both periods.

The individual ad hoc technological efforts to adapt imported inputs and foreign products and to extend the life cycle of industrial machinery were quite important elements in the dynamics of innovation in the 1960s and early 1970s. These efforts, together with production and process engineering and labor organization improvements, were behind the productivity gains of that period. In the 1990s, in the context of domestic reforms and technology globalization in many sectors, there was less need for individual initiatives. At the same time, there was less opportunity to copy imported products. In fact, the intensity of R&D activities, though very low in international terms in both periods, was even lower during the 1990s as compared with the ISI period.

However, substantial technological requirements arose from the modernization process that took place in the 1990s. They were related to the launching of new products, the adoption of modern production processes and organizational, advertising and marketing techniques. Other factors which played a role were the diffusion of quality improvements and advances in environmental management. All these tasks required the allocation of human and financial resources, both to acquire (mainly imported) knowledge, and to absorb and exploit it.

While no similar study is available for the ISI period, our econometric findings for the 1990s indicate that involvement in innovative activities (in house R&D and technology acquisition) enhances the probability of becoming an innovator (i.e. of launching a new product or process). Continuous R&D efforts have a considerably greater impact on the probability of having an innovative output than a pattern of discontinuous expenditures. Innovators also performed better than non-innovators in terms of labor productivity.

Large firms are more likely to engage in innovative activities and to launch innovations on the market. This also applies to firms with high levels of skilled personnel and which are more export-oriented than the average for the manufacturing industry. In contrast, affiliates of TNCs are neither more active in terms of innovative activities nor in launching new products or processes on the market.

The role of public policies

Beyond the critical influence of the macroeconomic environment, trade and foreign investment regimes have, by far, contributed most to shaping the long-term evolution of Argentine productivity records.

During the ISI period, incentives from import competition were non-existent and this favored industrial expansion, but failed to provide enough stimuli for productivity and quality improvements. Since there were no selection criteria or time constraints in place for the protectionist measures adopted, and they were applied without *quid pro quo*

commitments from favored firms and sectors, it is hardly surprising to find many cases of “eternal” infant industries. The excessively inward-oriented policy of the time also precluded the achievement of the economies of scale needed to compete internationally and led to higher than desirable vertical integration levels. Although export promotion regimes were in place from the late 1960s in order to mitigate the anti-export bias of the protectionist regime - no evidence is available on their apparent impact on the growth of industrial exports at the time. Their lack of stability in the light of budgetary restrictions and frequent economic policy shifts undoubtedly undermined their effectiveness.

Industrial promotion regimes were the other “big policy” during the ISI period. They clearly favored massive, mainly foreign investments during the “*desarrollista*” government and, from then until the late 1980s, most large-scale industrial investments in Argentina were undertaken under the auspices of special incentive regimes of different scopes. Beyond their frequently very high fiscal cost, these regimes were mostly aimed at promoting productive capacity expansion and seldom established performance commitments – i.e. in terms of productivity, exports, technological development, etc. Productive and technology learning processes observed at enterprise-level were largely spontaneous events. Hence, although they played a positive role for investments in a scenario in which there was no access to long-term finance and institutional and macroeconomic uncertainty prevailed, they largely failed to build up a competitive industrial sector.

After 1976, a trade liberalization experiment took place initially. As it mixed pro-efficiency with anti-inflation goals, and was adopted against the background of an overvalued peso, unsurprisingly, it ultimately had negative consequences for the manufacturing sector. Later on, the economy was closed for macroeconomic reasons.

However, unlike in the ISI period, protectionism went *pari passu* with a chaotic and recessive macroeconomic environment, hence failing to provide any stimulus for industrial development.

In turn, different kinds of investment and export promotion regimes were put in place during most of the period from 1976-1990. Since their aforementioned weaknesses were never resolved, the available evaluations on their impact are, for the most part, negative.

In the 1990s, a deep and rapid trade liberalization process was implemented. Some of its key objectives were met. On the one hand, greater competition from imports in the local market with was a major incentive for productivity improvements in tradable sectors. On the other hand, imports of capital goods were a major source of technology modernization. Trade liberalization was especially successful in helping the technological modernization of the agricultural sector, which experienced a boom from the mid-1990s onwards.

However, trade liberalization also had negative consequences. Firstly, it was implemented in a drastic manner at a time when the industrial sector had gone through over a decade of contraction and private firms had developed strategies and routines to enable them to survive in a closed and volatile economy. Secondly, no complementary policies were adopted – or when they were - their real impact was marginal – in terms of helping industrial firms to adapt to the new scenario. Hence, a form of Darwinian selection took

place and this led to the closure of several, mainly small and medium-sized firms and to the contraction of skilled and non-skilled labor-intensive industrial sectors.

Naturally, manufacturing firms affected by trade liberalization often resorted to lobbying activities to get protection against imports. The proliferation of anti-dumping, safeguards and other non-tariff barriers at the time illustrates how these pressures were successful in many cases. The special protection for the automotive sector is another example of the protectionist measures adopted. "Contamination" of tariff policy with macroeconomic objectives also contributed to distorting the signals coming from the trade liberalization process.

A number of WTO-compatible export promotion policies were in place during the 1990s. One relevant innovation in this area was the adoption of a so-called "mirror" criterion which equalized export reimbursements with tariffs paid on the same items. However, this instrument, together with others such as indirect tax refunding, were often subject to changes and delays in their operation due mostly to fiscal restrictions and were not linked with other enterprise and technology policies in place during the same period.

The creation of MERCOSUR facilitated access to a huge market for Argentine exports, making it possible to attain economies of scale and specialization that had been barely feasible in the domestic market. In fact, it was so successful in the trade arena that it led to a high concentration of Argentine exports in the Brazilian market. However, the lack of macroeconomic coordination and the difficulties in the negotiation of non-tariff barrier regimes, investment policies and other "deep integration" issues turned MERCOSUR from a major opportunity to a source of conflicts, especially after the Brazilian devaluation in early 1999.

Depending on the level of economic activity in each country, real foreign exchange rate fluctuations and competitiveness levels in individual sectors, the integration with Brazil was, alternatively, an inducement for productivity gains and a source of problems that led to a variety of trade conflicts. Unfortunately, little progress was made to go beyond defensive trade policies to deal with these problems, since MERCOSUR never had regional instruments in the areas of industrial, export, technology and enterprise policies.

Investment promotion regimes were almost completely abolished in the 1990s. A form of "rules-based competition" for investments was followed, through macroeconomic stability, privatizations, trade liberalization and an "investor-friendly" regulatory regime. No regulations on FDI entry or on the activities of affiliates of TNCs were put in place. Within the manufacturing industry, only the automobile sector benefited from a sectoral preference shown in investment attraction. The prevailing investment promotion policy also gave preference to privatizations and the mining and forestry sectors.

This regime had a novel system for encouraging model specialization in the automobile industry by increasing foreign trade flows whilst aiming to maintaining a balance between imports and exports. Later on a common trade regime was negotiated with Brazil. This regime was plagued by discussions on issues such as investment diversion, local content requirements and mechanisms to address the impact of changes in macroeconomic policies on bilateral trade. It also failed to design a strategy that could lead to a pro-competitive restructuring of the MERCOSUR automobile industry as a whole.

Furthermore, while the motor vehicles regime encouraged substantial investments by TNCs, it also led to excess capacity and induced investments that mostly aimed at taking advantage of the regime incentives without having real perspectives of surviving in a liberalized market – a similar situation arose soon after the first automobile regime was adopted in late 1950s. At the same time, beyond the aforementioned discussions on local content requirements, no attention was paid to strengthening backward linkages. Furthermore, automobile firms did not always meet their commitments and, although penalties were foreseen in such an event, ultimately they were not made effective.

In fact, the lack of attention to issues such as the need to foster domestic linkages and enhance endogenous innovation capability is a common feature of most economic policies adopted at the time. This is seen not only in the automobile sector, but also in privatizations, during the agricultural boom and in the mining and forestry sectors.

This is hardly surprising since one of the cornerstones of the economic policy regime prevailing during this period was that the key inputs for technological modernization were to come from abroad – in the form of FDI, capital goods or intangible technology transfer. The notable increases in these three areas show that the aim of the reformers was met, although this achievement was not enough to pave the way for a sustainable development path for the economy as a whole.

Notwithstanding the aforementioned basic features of the economic policy regime of the 1990s, the difficulties experienced by many firms in adapting to the new rules of the game and the dramatic growth in unemployment led the government to launch a number of enterprise and technology policies. These were mostly aimed at dealing with market failures in areas such as credit access, information, technology development and facilitating SME access to foreign markets and fostering their linkages with domestic consultancy and technology services.

Although most of these initiatives were based on a sound theoretical rationale and on the imitation of best international practices, they appear to have failed to make a significant impact on the performance of the business community targeted. Hence, despite their implementation, survival and progress during the 1990s were depended largely on each firm's capacity to adapt to the new scenario. According to the available evidence, the main factors that led to this outcome include:

1. Enterprise and technology policies had no priority for the national government and were not part of a long-term strategy in which the public and private sectors engaged in a shared pro-competitive restructuring policy process.
2. The policies were often based on a parallel bureaucracy financed through multilateral agencies' programs. The programs' continuity over time was threatened by financial uncertainty and the risk of being abolished and changed by new authorities with other priorities. Naturally, the policy-learning process was impaired by these factors.
3. There was a lack of coordination among the many agencies operating the programs. This institutional fragmentation eliminated the advantage of synergies among the different programs, led to bureaucratic duplication and often prevented firms from getting a comprehensive diagnosis of their problems and the possible solutions.

4. There were no adequate evaluation mechanisms in place to assess the effectiveness of the programs.
5. There was excessive emphasis on horizontal policies and assistance to individual firms, while the importance of cluster-type support was only acknowledged after the failure of the Convertibility Plan.

The old and new problems of the Argentine economy were not adequately addressed by the public policies applied. Among the new problems, the environmental dimension of industrial restructuring was neglected by the government, as environmental regulations were not complemented or linked with existing enterprise and technology policies. Hence, any progress observed in environmental management in the manufacturing industry, beyond the adoption of legally required end-of-pipe systems, was an ad hoc, market-driven, outcome of strategies and learning processes at enterprise level.

With regard to the old problems, the limitations imposed by the lack of effective linkages between the public science and technology (S&T) institutions and the educational system and the productive and technological development requirements of the private sector were never resolved. Furthermore, the once renowned quality of Argentine education, which granted the country a privileged position among developing countries, has been eroding dramatically in recent decades and has not made any significant contribution to productivity growth.

In the area of finance, the problems detected during the ISI period showed no apparent signs of improvement in the 1990s. These problems included insufficient financial deepening, the absence of a well-developed domestic capital market and pervasive banking system market failures that prevented many viable firms and projects from having access to credit. SMEs were those most affected by these problems as large firms had access to international sources of finance.

I. Productivity performance in Argentina: Introduction

1.1 Overview and context

The objective of this study is to document and analyze over a relatively long period of time the main determinants of productivity growth in the Argentine economy, with special emphasis in the manufacturing sector. The approach followed is qualitative and based on the analysis of the findings of many studies carried out on the subject. Attention is paid in this study both to the patterns of investment in fixed assets and in knowledge and to the availability of human capital. Issues related to the institutional, macroeconomic and policy framework in which productivity changes have taken place also receive due attention.

The period analyzed in this study includes two phases of what Cortés Conde (1997) has termed “growth spurts” (1964-1974 and 1991-1998), which were followed by a deep crisis and recessionary periods in which all the gains attained during the growth periods were dissipated. In 1990, GDP per capita in constant pesos was below that of 1965, after a fall of 23 per cent in comparison with that of 1975. In turn, GDP per capita in 2002 was 5 per cent lower than that of 1992 and 11 per cent lower than in 1974 (see Table 1.2).

Naturally, being one of the key determinants of economic growth, productivity evolution closely matched GDP per capita trends. In this paper we analyze both the reasons behind productivity growth in expansion periods and the factors which prevented that growth from being sustainable in the long run. Although the main objective of the paper is to deal with productivity, in the light of the comments above our analysis will also be relevant for discussions on why Argentina failed to sustain a successful catch-up process after the end of World War II. It should be remembered that, at the time, many leading economists, including Nobel Prize-winner Paul Samuelson, believed that Argentina was going to be a high-growth economy in future years.

The information available on the evolution of total-factor productivity (TFP) at the aggregate level for the period 1962-2000 is usually differentiated in three periods. The first period is 1962-74, when TFP growth averaged 0.5 per cent per year. In the following period (1975-90), the Argentine economy suffered one of the great depressions of the twentieth century and TFP registered negative growth. The last period covers the 1990s, when growth resumed and TFP increased at 2.9 per cent per year (see below Table 2.1). However, it must be noted that, in 1998, both GDP growth and TFP levels began to decline.

Whereas in the 1960s and early 1970s Argentina was following an inward-oriented industrialization strategy of import substitution with a highly protective trade policy and a further set of policies to promote investment in the manufacturing sector, the scenario was very different in the following periods. In 1976-81 a trade and financial liberalization strategy was applied in a context of growing appreciation of the peso – the exchange rate was used as an anti-inflationary tool -. This experiment ended in a major financial and currency crisis and, soon after the debt crisis of 1982, paved the way for a new policy regime in the 1980s. The economy was closed again – at this point mostly to macroeconomic reasons. Later on from 1987, mild pro-market reforms were

implemented but failed to prevent Argentina from being trapped in a vicious circle of recession and high inflation.

After two periods of hyperinflation in the late 1980s and early 1990s, a far-reaching program of structural reforms was applied – including trade liberalization, deregulation and privatizations - together with the adoption of a currency board scheme, the so-called “convertibility plan”. These measures drastically changed the rules of the game and created a more competitive environment which was supposed to induce firms to increase productivity to be able to survive and grow. Stabilization and growth were attained, but were accompanied by rising unemployment and income inequality.

In late 1998, growth stopped and the economy entered into a long recession that ended in the worst crisis in the country’s history in 2001 with the external debt default, the abandonment of the currency board scheme – and a mega-devaluation of the peso - and the collapse of the banking system. GDP per capita in the first quarter of 2002 was 24 per cent below that of the second quarter of 1998, more than 50 per cent of the population was below the poverty line and unemployment reached more than 20 per cent of the working population.

1.2 Objective of study

This study aims to investigate productivity performance in Argentina, with the growth of the overall economy as the main focus. The investigation is intended to analyse general factors as well as factors specific to Argentina.

1.3 Methodology

Secondary data from official government documents have been used. In particular, comparative cross-country TFP data provided by UNIDO were used to discern trends. Primary data were generated through a limited sample survey to validate some of the assertions made.

1.4 Organization of report

In the light of the dramatic changes briefly described above, it is clear that we cannot properly deal with the issues under review without taking into account the specific context and key features of the evolution of the Argentine economy and polity in the 20th century, and, in particular since the early 60s, the start of the period to be analyzed. After describing these features in the first section, in the second section an account is made of the total factor and labor productivity evolution in the Argentine economy and her manufacturing sector.

In Sections 3 and 4 we discuss the major determinants of productivity evolution in 1962-1975 and 1976-2000 respectively. These determinants include macroeconomic and institutional variables as well as the different public policies that were implemented in those areas which have a direct impact on productivity growth.

In the last section an attempt is made to answer the key question mentioned above: what factors allowed strong growth and relatively good productivity records in 1964-74 and 1991-98 and which ones cut short these periods. The role of public policies in this process is highlighted, which allows us to distill some policy implications that may contribute to the present debate about the future prospects and needs of the Argentine economy after the 2001-2002 crisis.

II. Growth of the economy and productivity trends

This section presents an analysis of the growth of the economy and productivity trends. The discussion starts with a brief account of GDP growth over the years.

2.1 Record of GDP growth

Growth performance

Argentina is a developing country with strong comparative advantages in agriculture due to her vast amount of fertile land. Up to the World War I, Argentina enjoyed a great economic expansion largely based on her exports of corn and beef. In this catching up process, the country received not only large inflows of immigrants from Europe, but also abundant flows of foreign capital and technology.

The population increased from 4 to 8 million between 1895 and 1914, and the annual growth of the GDP per capita was 2.8 per cent in 1900-13. Between 1890 and 1913, the Argentine income per capita as percentage of a group of advanced countries increased from 63 to 77 per cent¹. Furthermore, wages in Argentina were relatively high and income distribution (measured as the proportion of wages in income per capita) fairly equal – when compared with developed countries such as Great Britain- (Gerchunoff and Llach, 2003).

As seen in Graph 1.1, Argentina was a very open economy in the past, as reflected in the high share of exports and imports in tradable production². Exports were mostly concentrated in agricultural produce (beef, wheat, corn, wool, leather) – which is why historians have termed this period as corresponding to the “agroexport model”-, and most imports were manufactured goods. However, although agriculture was the leading economic activity, a rapid process of industrialization took place, and a modern services sector developed. The importance of industry and services in the economy during this era is clearly shown in Table 2.1.

At the same time, universal education received government priority. The illiteracy rate was reduced from 54 percent in 1895 to 35 percent in 1914 and to 12 per cent in 1930. Enrollment in primary education increased from 30 to 59 per cent between 1895 and 1930 (Véganzones and Winograd, 1997).

However, as shown in Graph 2.2, the successful catching-up process stopped after 1930, and from then on, with fluctuations, a clear and steady “falling behind” trajectory was observed. Productivity performance was also weak, as shown in Table 2.2. Argentina’s labor productivity fell in relative terms compared both with developed countries and vis-

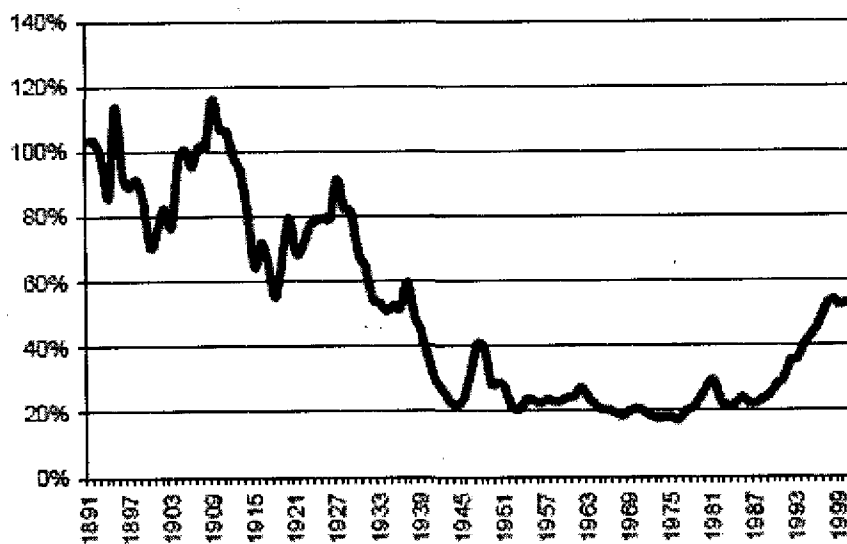
¹ According to Della Paolera and Taylor (2003), by 1900 Argentina’s income per capita had risen from about 67 percent of developed-country levels (a weighted average of Western Europe, Western offshoots and Japan) in 1870 to 90 percent in 1900 and 100 percent in 1913. For all practical purposes they considered that Argentina was an advanced country by that time. In Graph 1.2 a different sample of countries is used for comparison purposes, but the main trends are the same as those reported by Della Paolera and Taylor.

² Gerchunoff and Llach (2003) use exports and imports in the numerator and tradable production in the denominator to avoid the inclusion of services, whose share in the Argentine economy has grown throughout the 20th century.

à-vis Latin American nations such as Brazil and Chile between 1950 and 1973 and from 1973-1990. A growth trend was apparent until 1998, but was far from being adequate to restore the relative productivity levels of 1950.

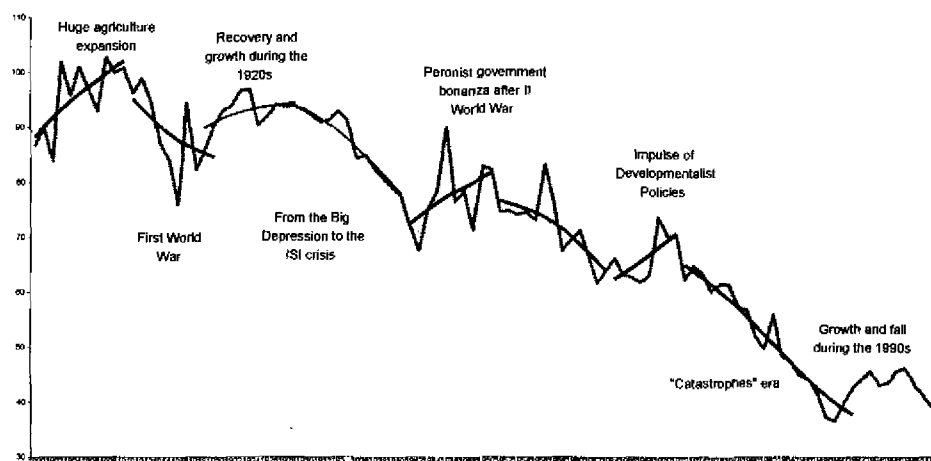
This “reversal of fortune” story has been analyzed extensively in literature, and the poor performance of the Argentine economy in the post World War II era is one of big puzzles for historians and economists. Although a survey of the various interpretations put forward to explain this puzzle is beyond the scope of this paper, it is necessary to address some of the arguments presented in the aforementioned literature when dealing with the issue of this report (productivity evolution).

Graph 2.1 Argentina's foreign trade as a percentage of domestic tradable production, 1891-1999, 1993 constant prices



Source: Gerchunoff and Llach (2003).

Graph 2.2. Evolution of Argentine GDP per capita as a % of the average GDP per capita of USA, United Kingdom, France Germany, Italy, Japan, Canada, Australia and New Zealand



Source: Own elaboration on the basis of Gerchunoff and Llach (2003) and Maddison (2002)

Table 2.1 Employment by sectoral distribution, 1895-2001, percentages

	1895	1914	1947	1960	1970	1991	2001
Primary sector	34.9	26.8	27.2	20.3	16.7	11.5	8.7
Secondary sector	29.8	35.6	29.7	35.4	33.8	25.1	18.1
Manufacturing	27.1	31.3	25.0	27.8	23.9	17.5	11.4
Tertiary (services) sector	35.4	37.6	43.1	44.3	49.5	63.3	73.2

Source: Galiani and Gerchunoff (2003) for 1895-1991 and authors' estimates based on census for 2001.

Table 2.2 Argentina's labor productivity - GDP per hour worked – as a percentage of labor productivity in other countries, 1950-1998

Argentina as a % of	1950	1973	1990	1998
Weighted Average West Europe*	111	66	40	47
Australia	64	62	43	50
Canada	60	54	41	52
United States	49	45	32	39
Brazil	248	185	137	171
Chile	132	120	101	102
Japan	296	92	51	60

*: Austria, Belgium, Denmark, Finland, France, Germany, Italy, Netherlands, Norway, Sweden, Switzerland and United Kingdom.

Source: Maddison (2001).

During the period under consideration in this study, both the relative gap with leading countries widened – in spite of the growth spurts mentioned in the introduction - and the average compound per capita GDP growth rate was very low (one per cent per year), in a country with a population growth of only 1.5 per cent per year between 1962 and 2000³. As shown in Graph 2.3, this poor economic performance showed high volatility in terms of GDP per capita evolution (see also Table 2.3), due to recurrent periods of crisis associated with political and institutional instability, macroeconomic and financial turmoil and/or sharp modifications in the economic policy regimes.

Table 2.3 Argentina's GDP per capita, 1962-2002

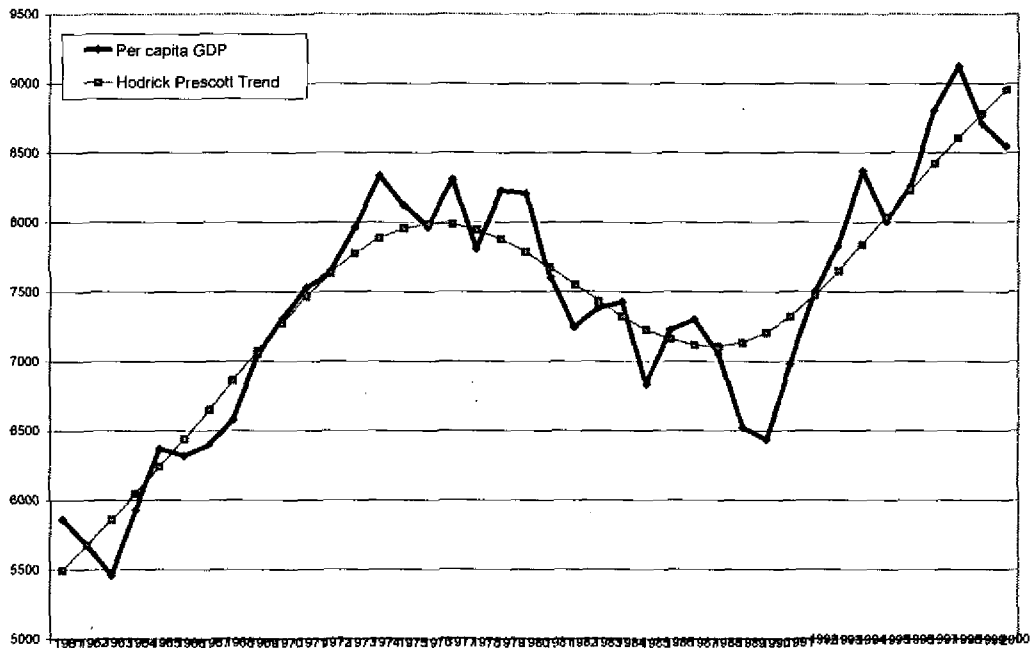
Year	Per Capita GDP (Thousand 1993 Pesos)	Growth Rate (%)	Year	Per Capita GDP (Thousand 1993 Pesos)	Growth Rate (%)
1962	4989	-3.1	1983	6577	1.8
1963	4795	-3.9	1984	6600	0.3
1964	5209	8.6	1985	6067	-8.1
1965	5601	7.5	1986	6403	5.5
1966	5556	-0.8	1987	6500	1.5
1967	5622	1.2	1988	6270	-3.5
1968	5782	2.8	1989	5749	-8.3
1969	6185	7.0	1990	5537	-3.7
1970	6420	3.8	1991	6138	10.9
1971	6618	3.1	1992	6744	9.9
1972	6711	1.4	1993	7106	5.4
1973	6998	4.3	1994	7445	4.8
1974	7247	3.6	1995	7161	-3.8
1975	7068	-2.5	1996	7481	4.5
1976	6840	-3.2	1997	8007	7.0
1977	7070	3.4	1998	8231	2.8
1978	6726	-4.9	1999	7873	-4.4
1979	7187	6.9	2000	7732	-1.8
1980	7305	1.6	2001	7280	-5.8
1981	6868	-6.0	2002	6422	-11.8
1982	6463	-5.9			

Source: Authors' calculations on the basis of national accounts data.

Before referring to them, it is important to bear in mind two important structural changes that took place during the period under analysis. Firstly, after decades of being a relatively closed economy, Argentina's openness to trade significantly increased in the 1990s (see Graph 2.1). Secondly, the share of the primary and secondary sectors in total employment declined throughout the past century, while the services sector became the leading source of employment, a trend which accelerated since the 1970s. Hence, by 2001, the manufacturing sector only accounted for 18 per cent and services for 73 per cent of total employment – against less than 50 per cent in 1970- (Table 2.1).

³ Total population increased from 21.3 million in 1962 to 36.8 million in 2000.

Graph 2.3 Per capita GDP, 1990 international Geary-Khamis dollars, 1961-2000



Source: Authors' calculations based on data from Maddison (2003).

Political instability

In the 38 years between 1962 and 2000, Argentina had 18 presidents – of which 16 took office between 1962 and 1988 – and 37 ministers of the economy. In contrast, in the 36 years between 1928 and 1962, the country had 12 presidents (the same number as in the 48 years between 1880 and 1928). Hence, it is apparent that (growing) political instability has been the norm rather than the exception in Argentina, a factor which is quite apparent in the frequent military coups which took place up to 1983.

Since the return to democracy that year, there has been less instability at presidential level but frequent changes in the teams in charge of the Ministry of Economy (and in other areas) and, as discussed below, a fragile institutional framework.

In 1962, an institutional crisis led to a military coup resulting in the election of President Frondizi in 1958 and the deposition of the leader of the so-called “*desarrollismo*” (developmentalism) movement. The 1976 military coup that paved the way for the bloodiest dictatorship in Argentina’s history marked the end of a series of civilian and military governments that had been unable to finish their mandates between 1962 and 1976.

After General Videla's presidency from 1976-81, three military presidents took office in less than two years. A new democratic government led by President Alfonsín took office at the end of 1983. Having faced several military rebellions during his presidency, Alfonsín finally resigned a few months before the end of his mandate amidst hyperinflation and a severe social crisis (which included massive looting in many large cities).

The ten years in which Menem was President (following a reform in the constitution that allowed his re-election in 1995) and the five years in which Domingo Cavallo was Minister of Economy –1991/1996– were clearly an exception in the long history of political instability in Argentina. However, it must be noted that Menem also suffered a military rebellion during his presidency, his government is perceived as one of the most corrupt in Argentina's history and that, at the end of his second mandate, he tried to force a new constitutional reform to allow his re-election yet again. All these factors were signs that Argentina was far from having attained political stability.

The following President, Fernando De la Rúa, resigned in 2001, two years before ending his mandate and in the middle of the deepest economic, financial and institutional crisis in country's history. In 2000, his Vice-President had already resigned – in disagreement with the government's attitude to a corruption scandal - and during De la Rúa's mandate there were three Ministries of Economy, none of which were able to prevent the final collapse of the Convertibility Plan.

Economic volatility

Volatility has been a key feature of the Argentine economy, deeply influencing every aspect of the society and, in particular, the actions and the investment decisions of private economic agents. More specifically, long-term decisions have been particularly affected by the uncertainty about the future levels of key economic indicators (growth rate, exchange rate, relative prices, etc.) and, as seen below, the instability of the "rules of the game" (policy regimes, regulatory norms, property rights enforcement, etc.).

Major events due to external shocks – such as the debt crisis in the early 1980s - or across-the-board shifts in the policy regime - the package of structural reforms and currency board adopted in the early 1990s - are very frequent in Argentina and induce sharp fluctuations in the level of economic activity and discontinuous jumps in the growth rate.

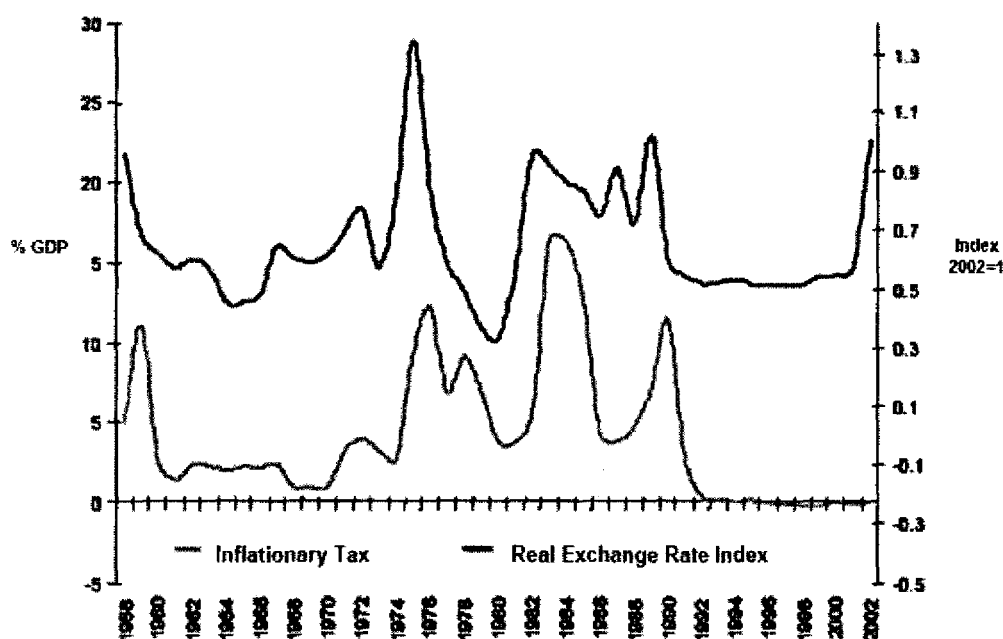
Severe foreign exchange crises occurred in 1975, 1981, 1982, 1989 and 2001. The recurrence of systemic financial crisis leading to violation of property rights and the breach of private contracts has also been a feature of the Argentine economy over the last 30 years. Large income transfers among different groups of the society have been one of the consequences of these crises, as well as huge wealth gains or losses for economic agents.

In this scenario, it comes as no surprise to find that the frequency of growth downturns in Argentina is well above the developing country's average. The 1975 crisis represents a breaking point concerning instability. Between 1950 and 1974, the probability of a downturn was more or less in line with that of developing countries (21 per cent). In 1975-2001 this probability increased to 52 per cent. This means that GDP per capita fell

in more years than it grew and that volatility has been increasing in Argentina (Fanelli, 2002).

The variations in the real exchange rate and the inflationary tax are also good examples of the volatility of the Argentine economy (Graph 1.4). Both sets of variations have a similar trend and their peaks are associated with periods of macroeconomic adjustment. It seems that both instruments were used for income and wealth redistribution to deal with the consequences of the several crises that have taken place in the country (Fanelli, 2003).

Graph 2.4 Inflationary tax on the monetary base and real exchange rate index ARG-USA, 1958-2002



Source: Fanelli (2003).

Institutional fragility

Both the economy in Argentina and its economic policies are highly volatile. “In a ranking of countries by the volatility of the “economic freedom index” published by the Fraser Institute for the period 1970-1999, Argentina shows up as the seventh most volatile case in a sample of 106 countries” (Spiller and Tommasi, 2003, p.284).

This is a symptom of a more general problem regarding the weak institutional foundations of the policy-making process in Argentina. In fact, Argentina has a long history of institutional instability, a problem that has worsened over the last decades. Public policies lack credibility, stability and coherence and their implementation is often poor. According to Spiller and Tommasi (2003), the following are the main factors underlying this situation.

Firstly, the inter-temporal linkages among political actors lead to short-sighted behavior not conducive to self-enforcement of cooperative arrangements. Alternative enforcement mechanisms, whether by judicial means or bureaucratic delegation, have been relatively

weak. Secondly, key government officials, legislators and justices have all usually had short-term horizons. The shortness of horizons in the Argentine polity is not only a consequence of past institutional instability but also of the electoral mechanisms and executive powers that work against having a Congress populated by long-term legislators.

Thirdly, the country does not have a professional bureaucracy with a long-term principal. In these conditions, the bureaucracy⁴ faces weak long-term incentives facilitating shirking and requiring intrusive administrative controls to avoid corruption. Each new executive unable to motivate (or to fire) the permanent bureaucracy has nominated large numbers of political appointees creating a "parallel bureaucracy". The frequent rotation at ministerial and secretarial levels implies rotation in the "parallel bureaucracy", limiting the accumulation of organizational knowledge. The lack of a system of meritocratic-recruitment of public officials has also been detrimental for the quality of policy-making (see Sikkink, 1993).

Finally, a Supreme Court with justices with very short periods of tenure has tended to be politically aligned with the President and has failed to be an important enforcer of political agreements over the last several decades.

In the opinion of the international business community, these features of public policies are quite costly for the operation of the private sector. This accounts for Argentina's position in 61st place in a ranking of 75 countries in this respect and its position in 70th place concerning tax evasion. The private sector perception as regards the competence of public officials is also negative and, in this regard, Argentina is ranked in 71st place among the 75 countries. (Spiller, Stein and Tommasi, 2003).

As regards the private sector perception with respect to corruption in Argentina, Table 1.4 shows that in the 1980s the country was in a relatively good position *vis-a-vis* the other countries considered and had the best performance in 1988-92. The ranking noticeably worsens in the nineties and since 1996 Argentina is in a worse position than Brazil and, with the exception of 1988-92, Chile shows a better performance than Argentina for the whole period.

Table 2.4 Trends in perceived corruption, 1980-2001

Country	1980-85	1988-92	1995	1996	1997	1998	1999	2000
Mexico	1.9	2.2	3.2	3.3	2.7	3.3	3.4	3.3
Brazil	4.5	3.5	2.7	3.0	3.6	4.0	4.1	3.9
Argentina	4.9	5.9	5.2	3.4	2.8	3.0	3.0	3.5
Chile	6.5	5.5	7.9	6.8	6.1	6.8	6.9	7.4

Source: Transparency International, "Historical Comparisons" (1996) and rankings for 1995, 1996, 1997, 1998, 1999 and 2000, *Corruption Perception Index*. In Nef (2003). The index refers to the perception of the private sector and ranges between 10 (highly clean) and 0 (highly corrupt).

⁴⁴ Rauch and Evans (2000) rank Argentina in the bottom 5 among 35 developing countries in terms of quality of bureaucracy as quoted in Spiller and Tommasi (2003).

Social indicators

While enrollment rates in primary education are almost one hundred per cent since the 1960s, big increases are apparent in enrollment rates in secondary education (from 23 in 1960 to 77 per cent in 1996) and in tertiary education (from 14 in 1965 to 42 per cent in 1996). However, the attrition rates are very high and the quality of education has been deteriorating (see Section 4).

Despite the important achievements in key components of the human development index⁵, there are other less encouraging trends in income distribution, poverty and unemployment.

Regarding income distribution, the share in national income prior to the 1940s was about 40 per cent. During the first Peronist government (1946-1952), it reached 50.9 per cent, but after 1954 fell again to low levels. The share increased again during the 1960s and early 1970s, but dropped sharply in 1976, reaching a minimal level as a consequence of the repressive wages policy imposed by the military government. Since then, it has fluctuated considerably around 35 per cent.

Income distribution among workers remained almost unchanged until the mid-1970s, but strongly worsened after 1974. This is apparent in a comparison of the wage distribution in 1974 and the late 1990s: almost all the deciles lost, except those workers in the ninth and tenth deciles, an indication that high-wage workers have gained at the expense of the rest of the labor force (Galiani and Gerchunoff, 2003).

Inequality and poverty have been consistently measured since 1974, when the first Household Permanent Survey was carried out in the Greater Buenos Aires, to be later extended to cover all the urban population of the country.

The Gini coefficient in Greater Buenos Aires increased from 34.5 in 1974 to 48.8 in 1999. Inequality strongly increased during the second half of the 1970s and the early 1980s in the areas of trade liberalization, civil liberties and labor union repression and macroeconomic crisis. Inequality has remained quite stable since the return of democracy in 1983, but hyperinflation at the end of the 1980s dramatically worsened income distribution. With the implementation of the Convertibility Plan, an improvement in income distribution was apparent – a result of price stabilization. However, since 1993 the country has returned to a pattern of growing inequality which, by the end of the 1990s, had reached levels similar to those experienced during the hyperinflationary peak (Bebczuk and Gasparini, 2001).

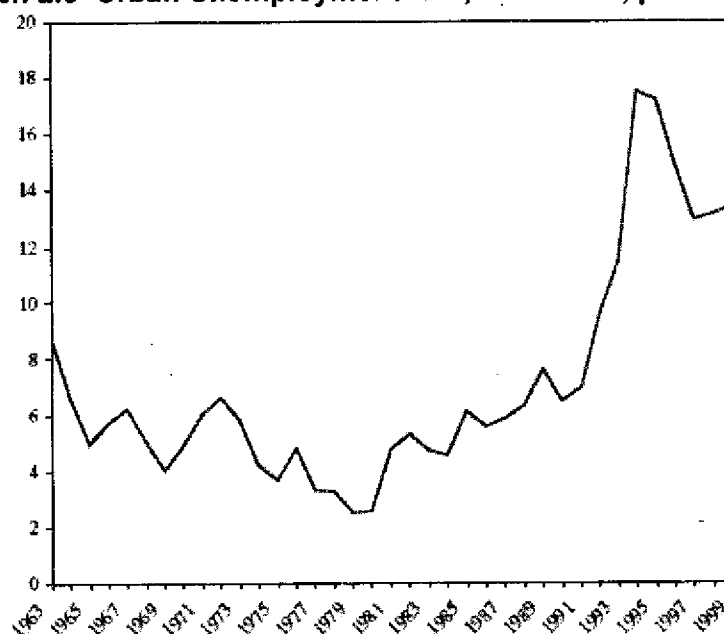
With regard to poverty, its evolution is similar to that described in the case of inequality. It increased strongly during the 1980s, especially during the hyperinflationary peak, to later fall after macroeconomic stabilization in 1991. However, from 1993 to 1996 it grew again and then stabilized at very high levels until 2000.

⁵ Argentina has a relatively good position in the UNDP human development index. In 2002, the country had the rank 34 out of 177 countries. Life expectancy at birth is 74 years – *vis-a-vis* a world average of 67 years – and the adult literacy rate reached 97 per cent – very close to developed country standards.

The recession that began in late 1998 and ended in the aforementioned severe crisis in 2001 and 2002 has brought poverty and inequality indices in Argentina to unprecedented levels in the country's history. 28.9 per cent of the population was below the poverty line in Greater Buenos Aires in 2000, a figure that escalated to a historic peak of 54.3 per cent in 2002 (Household Permanent Survey). In turn, The Gini coefficient in Greater Buenos Aires increased from 48.8 in 1999 to 50.9 percent in 2000, and 52.8 per cent in 2002.

When considering the evolution of unemployment, it is clear that, in the early 1960s, it affected around 8 per cent of the working population. Later on, it decreased to a below 5 per cent until the mid-eighties, when it reached 7 per cent. This shows that, despite all the economic and political fluctuations in Argentina during that period, unemployment always remained at relatively low levels. In the mid-1990s it increased to two-digit levels and has remained in these proportions ever since (Graph 1.5). The dramatic increase in unemployment during the nineties was due to a combination of macroeconomic shocks, the consequences of structural reforms and labor shedding in the manufacturing sector (Galani and Gerchunoff, 2003) as discussed in Section 4.

Graph 2.5 Urban Unemployment rate, 1963-1999, percentages



Source: Galani and Gerchunoff, 2003.

2.2 Productivity Evolution from 1962-2000

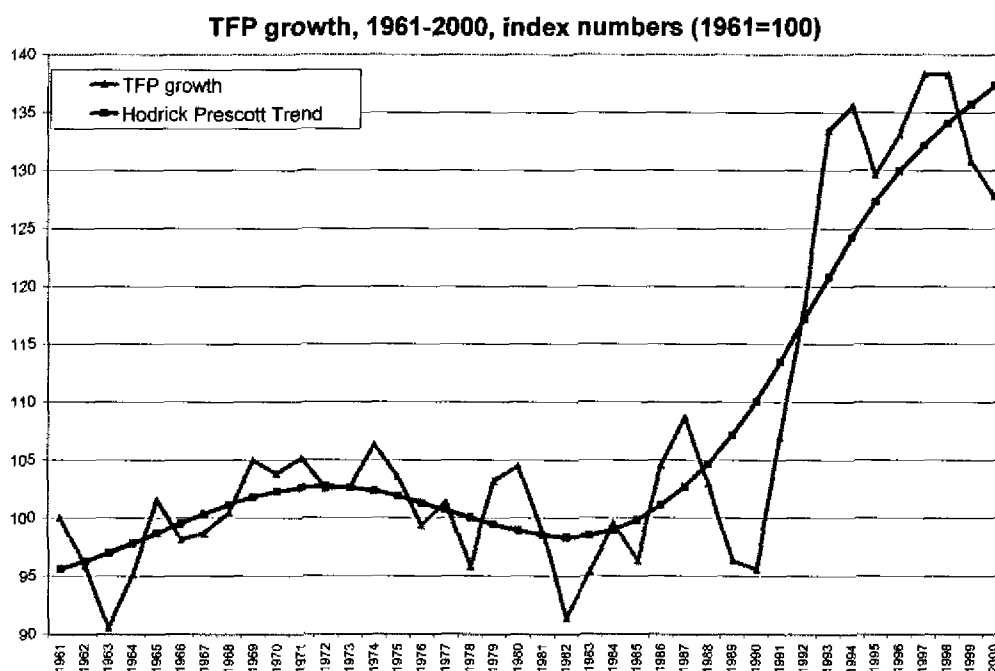
Total Factor Productivity (TFP)

TFP exhibited a growing trend from the beginning of the 1960s until the mid-1970s. Since then and until 1990 - a period in which the economy experienced what some authors describe as "The Argentine Great Depression"⁶ - TFP growth was negative. When the economy resumed growth in the 1990s, TFP again showed a good performance until growth stopped in 1998 (Graph 2.6).

⁶ Hopenhayn and Neumeyer (2003).

The received literature usually considers three main periods when analyzing the evolution of the Argentine economy since the 1960s: 1960-1974, 1975-1990 and 1991-2000. The beginnings and ends of those periods were marked by severe economic crises and radical policy regime changes. Hence, we will consider the same sub-periods in our analysis.

Graph 2.6



Source: Authors' estimates based on UNIDO figures.

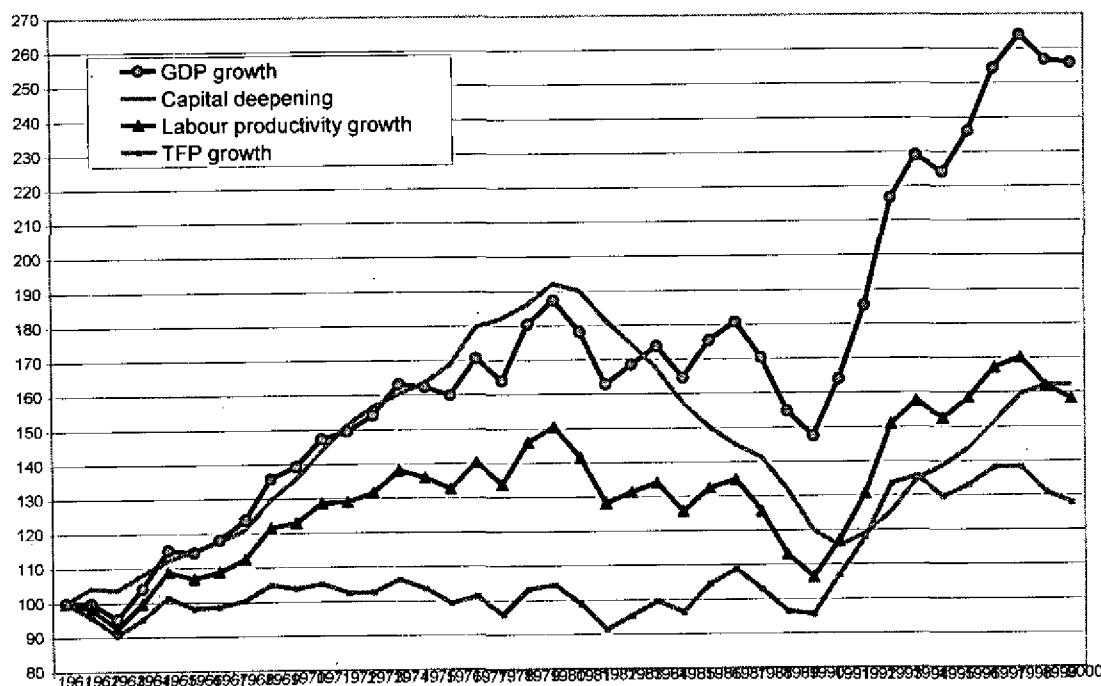
For the first period, the data in Table 2.5 show an average GDP growth rate of 3.8 per cent. Capital grew at roughly the same rate, while labor productivity increased at 2.5 per cent per year. TFP grew very slowly (0.5 per cent per year), accumulating an increase of 6.3 per cent during the whole period (see also Graph 2.7).

Table 2.5 Productivity and GDP growth, 1962-2000, annual percentage rates⁷

Period	TFP growth	GDP growth	Capital deepening	Labor productivity growth
1962-1974	0.5	3.8	3.7	2.5
1975-1990	-0.7	-0.6	-1.8	-1.6
1991-2000	2.9	5.7	3.1	4.0

Source: Authors' estimates based on UNIDO figures.

Graph 2.7 Sources of growth, 1961-2000, index numbers (1961=100)



Source: Authors' estimates based on UNIDO figures.

In the following period, GDP showed an annual average growth rate of -0.6 percent. TFP grew at a rate of -0.7 per cent. For the whole period, TFP accumulated a drop of 10.1 per cent. Labor productivity also fell and as shown in Table 2.5, capital stock, measured in constant pesos, barely expanded between 1982 and 1992.

Finally, GDP grew at an annual average rate of 5.7 per cent in the 1990s. TFP increased at 2.9 per cent yearly during the same period, accumulating an increment of 33.7 per cent.

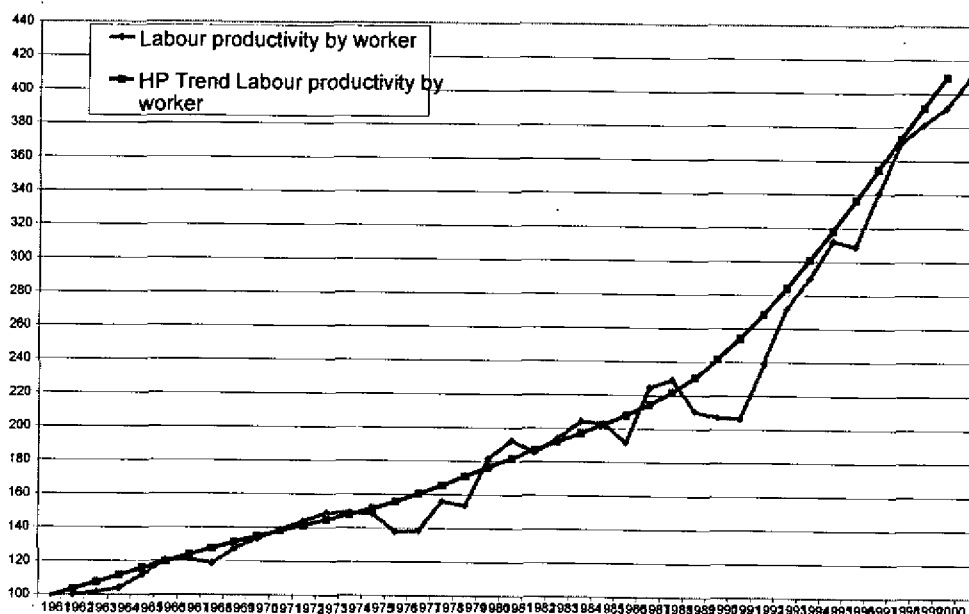
⁷ The production function used by UNIDO has GDP as output, and labor and capital as inputs. The data come from Penn World Tables 6.1, and UNIDO generates its own estimates for capital from investment data - using PPP investment deflators and assuming 13.3 per cent depreciation rate, following Leamer-. In order to compute TFP growth, they use Data Envelopment Analysis (DEA) to obtain estimates of technical efficiency and technical change, and the Malmquist index to obtain TFP growth. This method does not require the assumption of any functional form, perfect competition or profit maximization. DEA involves the use of linear programming methods to construct a non-parametric piece-wise frontier (or surface range in the case of several outputs).

In contrast to the first period, labor productivity growth was higher than capital deepening in these years.

Labor Productivity in the Manufacturing Industry

Labor productivity in the manufacturing industry grew steadily throughout the period under review, with a notable acceleration in the 1990s (Graph 2.8). The growth rate of labor productivity moved from 3.1 per cent in 1962-1974 to 2.1 per cent between 1975 and 1980 and 7.1 per cent in 1991-2000. For the whole period covered in the present study, labor productivity in the manufacturing industry grew at 3.7 per cent on annual average (Table 2.6). This was a consequence of an increase in the physical volume of production at 1.8 per cent on average, and a reduction in the number of workers at the same rate. However, we have to take into account that this performance is in fact the result of very different phenomena observed in the three sub-periods under analysis.

Graph 2.8 Manufacturing Industry: Labour productivity by worker, 1961-2000, index numbers (1961=100)



Source: Authors' calculations based on INDEC and BCRA.

As shown in Table 2.6, between 1962 and 1974 the physical volume of production increased by 5.2 per cent and the number of workers by 2.0 per cent on annual average. Hence, in this period productivity growth increased with rising employment. In 1975-1990, both variables decreased, with negative growth rates of -1.5 per cent and -3.5 per cent respectively. In this manner way, labor productivity increased with decreasing production and shrinking employment.

From 1991-2000, the physical volume of production grew by 2.8 per cent and the number of workers fell by 4.0 per cent per year. This impressive difference in the evolution of both variables explains the remarkable growth observed in labor productivity. It must, however, be noted that, to some extent, available data do not allow us to make a precise estimate of the magnitude of this phenomenon. The fall in industrial employment was due to outsourcing and subcontracting. Hence, workers who were previously considered as belonging to industry were now counted as services workers, although they probably performed the same task in the same manufacturing plant as before. The other element to be considered is that most analysts state that black market employment has grown over the last two decades. The statistics presented above include to some extent informal workers, but do not capture the whole magnitude of the phenomenon. If the gap between total effective employment and formal employment has been widening, official statistics may be overestimating the magnitude of the fall in the industrial workforce. Although there is a consensus on the fact that employment in the manufacturing industry substantially fell during the 1990s⁸, the real magnitude of the fall is perhaps lower than that reported above.

Despite the need to take the aforementioned into account, there has been a steady reduction in the number of industrial workers in Argentina since the mid-1970s. (Graph 2.9) This happened both in the turbulent times of the 1980s and in the expansionary period of the 1990s. Regarding physical output, a growth trend was interrupted in the 1980s. However, the growth rate of output in the 1990s was much lower than between 1962 and 1974, a sign that the manufacturing sector had ceased to play the role of "growth locomotive" assumed during the Import Substitution Industrialization (ISI) process.

Table 2.6 Average growth rates of physical volume of production, number of workers and labor productivity, 1962-2000

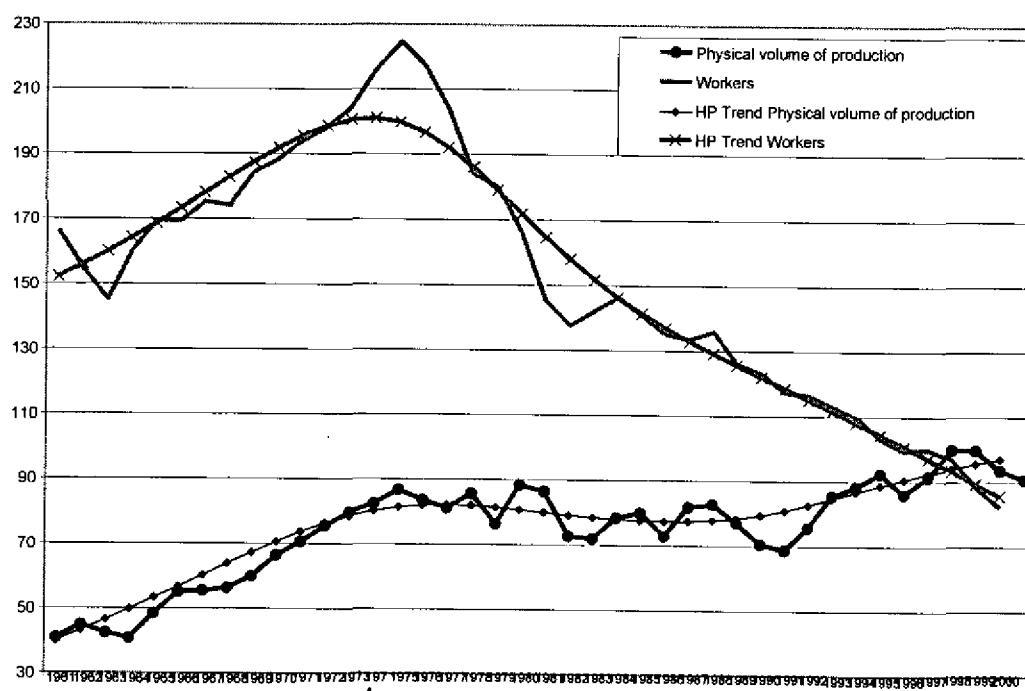
	Physical volume of production	Number of workers	Labor productivity
1962-1974	5.2	2.0	3.1
1975-1990	-1.5	-3.5	2.1
1991-2000	2.8	-4.0	7.1
1962-2000	1.8	-1.8	3.7

Source: Authors' calculations based on INDEC and BCRA.

The reduction in industrial employment was relative as well as absolute. The first part of this phenomenon – known as de-industrialization - is the reduction of the capacity of industry to generate employment *vis-a-vis* other sectors of the economy and, in particular services. It is a process that takes place in most industrialized countries in the world. While the manufacturing industry employed 27.8 per cent of the total workers in Argentina in 1960 and 23.9 per cent in 1970, this figure fell to 17.5 per cent in 1991 and to 11.4 per cent in 2001 (Table 2.1). Instead, absolute decreases in industrial employment are less frequent, especially with the magnitude observed in Argentina (Graph 2.9).

⁸ Estimates based on information from the Household Permanent Survey – that are not exempt of problems themselves - suggest that industrial employment fell at an annual average rate of 1 per cent between 1991 and 2000.

Graph 2.9 Physical volume of production and workers, 1961-2000, index numbers (1997=100)



Source: Authors' calculations based on INDEC and BCRA.

We have suggested two factors that may partially account for the reduction in industrial employment (and hence, for the increase in labor productivity). In the following considerations we will see that they are also explained by industrial restructuring in the post-ISI stage. In this regard, and to understand the evolution of labor productivity, we also have to take into account the structural changes that took place during the period under review. As observed in Table 2.7, resource-processing industries increased their share in manufacturing production by 9.5 percentage points between 1970 and 1996. These industries are highly capita-intensive and often have low domestic value added. In turn, labor-intensive industries reduced their share by more than 9 percentage points⁹. Hence, sizeable shares of the increase in labor productivity and the reduction in industrial employment may be explained by changes in the composition of manufacturing production.

What happened with the evolution of labor productivity in manufacturing industry *vis-a-vis* that of the U.S. (Table 2.4)? While in 1970 labor productivity in manufacturing in Argentina was 52 per cent of that recorded in the U.S., the gap was reduced initially in the 1970s and then expanded again in the 1980s. In 1990 the gap was around the same level as in 1970 and in the 1990s domestic labor productivity in Argentina rapidly approached that of the U.S.

⁹ The automobile industry benefited from special regimes during those years (see Section 4, Box 1).

Table 2.7 Changes in the relative share of different industrial sectors, 1970-1996

Industrial sectors	1970	1996
Metal-working industry (excluding automobiles)*	15.6	13.1
Automobiles**	9.9	12.1
Natural resource-intensive industries. Foodstuffs, beverages and tobacco*** and resource- processing industries****	36.2	45.7
Labor- intensive industries*****	38.2	29

*: ISIC groups 381, 382, 383, 385.

** : ISIC group 384.

***: ISIC groups 311, 313, 314.

****: ISIC groups 341, 351, 354, 355, 356, 371, 372.

*****: ISIC groups: 321, 322, 323, 324, 331, 332, 342, 352, 361, 362, 369, 390.

Source: Katz (2001).

It must, however, be noted that these trends may be the outcome of different factors. In particular, being an aggregate, industrial labor productivity movements comprise both changes in productivity levels in each industrial sector and changes in the composition of the manufacturing output. Hence, the closing of the gap may be the result of productivity levels in Argentina's different manufacturing sectors approaching those of the U.S., as well as of changes in the relative share of each sector in the aggregate manufacturing output in both countries (this is of importance in the light of the above comment on the contraction of labor-intensive industries in Argentina).

Furthermore, the real gap between the Argentine and the U.S. productivity levels is probably higher than that documented in Table 2.8. Since the 1990s manufacturing value added figures in Argentina include an estimate of the "black market" contribution, although as previously stated - informal employment is not recorded in official industrial statistics. Hence, real productivity levels in Argentina are undoubtedly lower than those on which the comparisons presented in Table 2.8 are based.

Table 2.8 Argentine industrial labor productivity relative to the US levels¹⁰, 1970-2000

1970	1980	1990	2000
0.52	0.58	0.55	0.80

Source: Author's calculations based on data from World Bank, OECD and INDEC.

¹⁰ Estimated as the ratio between manufacturing value added (measured in US constant dollars) and total employment in the manufacturing industry.

III. Assessment of the major determinants of productivity

3.1 The macroeconomic and political evolution

The relatively good performance of the Argentine economy in terms of labor productivity growth for the whole economy and for the manufacturing sector (as shown in Tables 2.1 and 2.2) in the period under review took place in the middle of recurrent balance of payments and institutional crises and growing social unrest.

The Argentine economy, as depicted in the Braun and Joy model (1968), had a dual character. On the one hand, there was a competitive sector, agriculture, which was the principal source of foreign exchange and supplied key wage goods. On the other hand, there was another sector, manufacturing, which produced (almost) exclusively for the domestic market and was protected by high tariffs (Table 3.1). This sector relied on imported inputs and capital goods. Hence, its growth depended directly on the foreign currency generated by agricultural exports. This was the rationale for promoting import substitution in intermediate and capital goods, a strategy that was explicitly followed by the government from the late 1950s.

Table 3.1 Legal tariff rates, 1959-1997, percentages

	1959	1969	1976	1988	1991	1993	1997
Non-durable consumer goods	197	142	200	53	25	30	23
Durable consumer goods	198	142	149	63	21	20	19
Intermediate goods	118	102	86	44	17	20	14
Machinery	147	93	87	57	22	8	14
Transport equipment	188	124	132	57	27	9	21
Weighted average	141	107	99	48	19	17	16
Mean (un-weighted average)	145	103	97	52	19	17	15
Standard deviation	56	42	41	16	5	8	5
Dispersion (per cent)	38	41	42	30	27	44	30

Source: Berlinski (2003).

During the periods of economic expansion, the high elasticity of imports in the manufacturing sector led to a situation in which the foreign currency generated by the agricultural sector was not sufficient to pay for growing imports. As a result a balance of payments crisis set in and was resolved by devaluing the domestic currency. The devaluation was supposed to increase – with a certain lag – agricultural output and exports, but it immediately contained imports. Inflation was another outcome of the crisis. Since wage goods were also the main export items, their prices tended to rise.

This also applied to industrial products with a high import content. Naturally, real wages declined as the consequence of inflation and this led to a fall in consumption which, together with the reductions in imports that affected manufacturing production, resulted in a decline in economic activity. Stabilization policies exacerbated the fall in aggregate demand by reducing money supply. The ensuing recession led to a temporary improvement in the balance of payments, which was the objective of the devaluation.

Although the growth in manufactured exports since the early 1960s and the launching of incomes policies not based on the reduction in real wages in late 1960s (see below) modified somewhat this "stop and go" growth model of the Argentine economy, the frequent fluctuations in the level of economic activity and the distributive conflicts between capital and labor and between agriculture and industry were key features of the period under review.

The "*desarrollista*" (developmentalist) government that took office in 1958 launched an ambitious industrialization project aimed at "deepening" import substitution by promoting (mainly foreign) investment in the intermediate and capital goods industries. The final objective of this project was to reduce industry dependence on imports, hence eliminating what was perceived as the main obstacle to sustained growth in Argentina.

An investment boom took place in the wake of the government's strategy. However, the "*desarrollista*" project was implemented while dealing with balance of payments crises and huge devaluations, stabilization measures negotiated with the International Monetary Fund (IMF), an increasing incidence of strikes (see Table 3.2) and growing discontent among the armed forces. The latter ultimately led to a military coup in 1962, when a temporary civilian government was appointed. Although import substitution policies were also pursued by the subsequent governments, the "*desarrollista*" project aimed at almost complete self-sufficiency was never fulfilled.

A civilian government led by President Illía took office in 1963 with only 25.4 per cent of the votes in national elections in which the Peronist party was proscribed. The new government had to deal with the 1962-63 recession, which was overcome by applying expansionary monetary and fiscal policies and promoting exports¹¹. The sharp increase in agricultural output and exports and the maturation of several of the import substitution investment projects launched in the late 1950s also helped to restore growth.

The fact that the press operated without restrictions, labor unions were free from state intervention and civil liberties and political rights were respected strengthened Argentine democracy. However, the context in which the Illía government won the election, its moderate nationalism (as reflected in the cancellation of contracts with foreign oil companies) and weak political management created growing tensions in society fuelled by the labor unions, the establishment and the Armed forces.

In June 1966, the military removed President Illía, dissolved the Congress and the political parties and appointed General Onganía as President. Its authoritarian tendencies were clearly reflected in many measures taken by the government such as the removal of all judges from the Supreme Court, the imposition of severe limitations on judicial autonomy, the interference in the universities and the sacking of leading professors.

The first economic team of the new government was replaced in December 1966 when Krieger Vasena was appointed Minister of Economy. Although Onganía's government preserved the import substitution strategy, it also stressed the need to foster efficiency improvements in the industrial sector – an increasingly widespread concern among local

¹¹. In order to reduce the anti-export bias derived from the tariff structure, the draw back and temporary admission regimes were established in 1962-63. In those years promotional credit lines for industrial exports were also implemented for the first time in the country's history.

economists. To attain this objective, tariffs were reduced (see Table 3.1) and industrial exports were promoted – although estimates by Berlinski and Schydłowski (1982) still showed a strong anti-export bias in the 1969 tariff structure. Furthermore, the new economic team favored large domestic and foreign firms in order to stimulate a new investment boom in the country.

On the macroeconomic front, Krieger Vasena attempted to stabilize wages and prices on the basis of a freeze in the real income distribution of 1966. This income policy, together with an unorthodox monetary policy, substantially reduced the inflation rate and favored economic recovery. A devaluation of the exchange rate by 40 per cent was also implemented. For traditional (agricultural) exports, the devaluation was almost offset by a tax, while subsidies for non-traditional exports were removed. On the import side, reductions in tariffs did not fully offset the devaluation. Inflationary cost increases in 1968 and 1969 were offset by a reduction of the export taxes and the reintroduction of the export subsidies (Berlinski and Schidłowski, 1982).

While agricultural producers were critical of the policies followed by Krieger and his team (due to the export taxes), large manufacturing and services enterprises were predominantly in favor of them. By contrast, local SMEs, which were almost exclusively oriented towards the internal market, criticized the orientation of the economic team towards large businesses and its overtures to foreign capital.

The GDP annual cumulative growth rate reached 5.2 per cent between 1966 and 1970, due to a significant increase in gross domestic investment. Unemployment remained very low and the total number of salaried workers increased in the same period. The main issues for the working class opposition to the military regime were political rather than economic: workers' demands were met with repression and the political unity of the labor movement was shattered (see Smith, 1991 for further details on the Krieger policies).

The drastic decline in strikes in 1967 and 1968 was reversed in 1969, the year in which the "Cordobazo" took place (see Table 3.2). This was a mass uprising against the Onganía regime and the Krieger economic policies, led by militant labor unions mostly in the motorcar factories. The social explosion expressed in the "Cordobazo" not only forced Krieger's resignation but also contributed to the emergence of strong revolutionary movements dedicated to guerrilla warfare.

Although revolutionary "direct action" was not new (see Table 3.2), it increased dramatically from 1969. Most of the kidnappings, bombings and assassinations carried out by guerrilla organizations were aimed at managers and owners of large firms, although military installations were also regular targets (Smith, 1991). Paramilitary repression started in those years and sharply expanded in 1974-75.

Table 3.2 Indicators of Socio-Political Protest (1956-1972)

Year	Strikes	Revolutionary "direct action"*	Year	Strikes	Revolutionary "direct action"*
1956	37	107	1964	265	215
1957	118	158	1965	291	173
1958	124	73	1966	263	158
1959	206	347	1967	68	146
1960	134	223	1968	50	84
1961	215	169	1969	93	341
1962	181	309	1970	116	447
1963	143	87	1971	237	608
			1972	187	737

*Includes bombings, all assassination attempts (whether successful or not), kidnappings, "armed propaganda", and other acts.

Source: Archive on Socio-Political Protest in Argentina, 1956-1974 from Smith (1991).

Until a new civilian government led by Peron took office in 1973, several changes took place in the leadership of the military government and in the economic policy framework. Successive devaluations of the peso created a race between the exchange rate and nominal wages, which fuelled inflation. At the same time, measures were taken to promote exports and control imports (including technology transfer payments). The deepening of the ISI process was fostered through special policy regimes that favored investments in intermediate goods. When Ferrer was appointed Minister of the Economy in 1970 by Onganía's successor, Levingston, several measures to favor locally-owned firms were announced, especially in the credit system, and through the so-called "Buy National Law". Local firms were also favored to undertake the large investment projects promoted by the government.

However, the policy agenda was dominated by the politics of the transition from the military to a civilian government that was managed by Lanusse, the successor of Levingston, in an increasingly turbulent social and political climate.

The Peronist government was initially favored by the rise in world prices that fostered exports. The government took advantage of the improved balance of payments position to expand demand and raise real wages. The new economic policy was at odds with that implemented by Krieger, since it clearly favored local capital and introduced several restrictions on foreign investment. Strong quantitative import restrictions were reintroduced together with foreign exchange controls. At the same time, generous promotion schemes were put in place for non-traditional exports and the taxation of traditional exports.

The economic boom lasted only until the trading conditions began to turn against Argentina in mid-1974 in an increasingly difficult fiscal and political situation (aggravated by the death of Peron in July 1974 and the appointment of his widow as President and of Martínez de Perón as Vice-President). In 1975 a severe economic crisis set in and, against the background of a huge fiscal deficit, a drastic devaluation of the peso ("Rodrigazo") was applied. This gave rise to pressures from labor unions to achieve

an increase in nominal wages greater than the devaluation. The outcome was an acceleration of inflation to (at the time) unknown levels for the country.

The impaired economic situation, coupled with the weak government and the increasingly violent political and social scenario, paved the way for the 1976 military coup which marked the beginning of the end of the ISI process in Argentina.

3.2 Investment and knowledge as major determinants of productivity growth in the manufacturing sector

The investment drive

The investment drive was fostered by two key legal instruments: Law 14780 on foreign direct investment and Law 14781 on industrial promotion¹². They jointly defined the incentives regime through which significant physical investments in new plants making chemicals, petrochemicals, motor vehicles and other metal products were made. Furthermore, tariff protection against imported goods was very high (see Table 3.1) and provided significant incentives for the domestic production of final goods.

Industrial production grew at an annual rate of 7 per cent between 1964 and 1974. The figures for employment and labor productivity were 1.5 and 5 per cent respectively (Barbero and Rocchi, 2003)¹³. In turn, industrial exports grew from US\$ 100 million in 1969 to US\$ 800 million in 1974, representing 20 per cent of total exports in the latter year¹⁴. Total manufacturing exports (including agricultural products) surpassed US\$ 2300 million in 1974, accounting for almost 60 per cent of total exports (Bisang and Kosacoff, 1995).

The leading sectors during this phase of the ISI were automobiles, chemicals, metallurgy and electrical machinery and equipment, while food and textiles lagged behind. Capital deepening took place in most industrial sectors, but it was more intense in chemicals, metallurgy and electrical machinery and equipment. As shown by Katz (1972), technical progress (measured as the “residual” of the production function), accounted for almost 70 per cent of industrial production growth in the 1960s. The same three aforementioned sectors were those which enjoyed the highest impact of technical progress.

The maturation of investments made since the late 1950s, together with the progressive accumulation of technological capabilities in many firms, allowed the manufacturing sector to gradually increase productivity¹⁵.

¹² Industrial promotion policies granted fiscal and credit subsidies as well as duty-free imports of capital goods.

¹³ These figures were taken from the manufacturing census of 1964 and 1974 and differ from the data employed to calculate Table 2.2.

¹⁴ Those manufacturing sectors with the highest increases in exports were automobiles, machine tools, agricultural machinery, capital goods for the food industry, chemicals and petrochemicals, steel products and calculation machines.

¹⁵ All references to productivity in this section are to labor productivity. No data on total factor productivity in industry are available since no capital stock series exist for the manufacturing industry in Argentina.

At the same time, between 1958 and 1963 some 200 foreign companies made green-field investments in the country. By the early 1970s, TNCs' share in industrial production reached 33 per cent (Kosacoff and Bezchinsky, 1993).

Production by affiliates of TNCs grew at an annual rate of 8.8 per cent between 1955 and 1973, while the respective figure for local firms was 4.3 per cent. In contrast, employment in such affiliates only grew at a 0.94 per cent during the same period, compared with 1.2 per cent in domestic firms.

The massive inflows of foreign investment and the establishment of some large state plants, paved the way for a more modern industrial structure. This process meant an increase in the level of concentration of the manufacturing sector. The rise of oligopolistic structures was a consequence of the expansion of capital-intensive industries and the quest for economies of scale that substantially increased the previously low levels of manufacturing productivity (Katz, 1969; Gerchunoff and Llach, 1975).

However, in spite of this substantial transformation of the manufacturing industry, the plants established in this period of the ISI, including affiliates of TNCs, generally fell short of international standards in terms of competitiveness. They were less automated and more vertically integrated than their counterparts in developed countries. A key issue was that most of them had been established to sell in the domestic market, which was not large enough to permit efficient operations and adequate economies of scale.

Summarizing the findings of several studies on the subject, Katz and Kosacoff (1998) list as follows the basic features of what they call "the microeconomics of the ISI":

1. the size of industrial plants was much smaller than the average in developed countries (the standard ratio was 1 to 10);
2. the layout of the plants and the organization of the work processes were much less sophisticated, both because of their adaptation to the different relative production factor prices and the lack of adequate information, equipment and organizational expertise;
3. capital goods were frequently second-hand or homemade;
4. the degree of vertical integration was very high – given the flaws in the production structure and the lack of independent suppliers of spare parts- and the internalization of scale economies was much lower than that observed in developed countries;
5. the level of diversification of the production mix was often higher than that observed in specialized plants in advanced nations, which resulted in short runs of many different products and put limited the attainment of specialization economies.

On this basis, the authors state that the static efficiency levels and the dynamic learning path of the ISI model gave rise to considerable difficulties and idiosyncratic features.

In turn, R&D expenditures were very low (see below) and the technological efforts of the industry were not oriented to reach the best practices frontier, but rather to solve mainly adaptive and individual problems (Nochteff, 1994a and b). The relatively small domestic

market size and the prevalence of affiliates of TNCs in many modern industrial sectors were among the factors that explained the pattern of innovation activities in Argentina's industry as previously described.

It is also important to bear in mind some additional factors that constrained the performance of industrial enterprises. Among these were the low levels of financial deepening, which were the main obstacle to investment and frequently even to access to working capital. Given the high levels of economic and political volatility, it is no wonder that the ratio of bank deposits to GDP fell from the mid-1940s until the early 1960s. At that point in time they resumed a growth trend, but fell far short of the pre-war levels. Financial repression in the form of negative interest rates also contributed to the observed low levels of financial intermediation. In this scenario, and considering also the existence of pervasive market failures in the financial system, it is easy to understand that access to long-term finance was hardly an option for domestic firms, especially for SMEs (Fanelli 2003; Veganzones and Winograd, 1997).

Regarding human capital, the inadequate supply of qualified workers, technicians, engineers and administrators, *vis-s-vis* the level of economic development of the country, was pointed out in several studies undertaken at the time (ECLAC, 1958; OECD, 1967)¹⁶. Furthermore, cooperation linkages between the educational system and the productive sector hardly existed. Educational organizations – with few exceptions – tended to autonomously establish their strategies when defining their curricula and career opportunities, without taking into account objectives related to the technological and productive development needs of the country.

Despite these structural problems, an interesting process of knowledge development at enterprise-level took place in the manufacturing sector and had a significant impact on productivity growth

A technological learning process

Following Katz and Kosacoff (1998), even in the difficult initial conditions of this phase of the industrialization process, many firms engaged in technological efforts aimed at sequentially improving product design, production and process engineering and labor organization (time and motion studies, lay-outs, etc.). These activities led to significant productivity gains. A large number of firms created departments or ad hoc groups for research and development, technical assistance, engineering, etc, that engaged in different types of innovative activities. Affiliates of TNCs also had to undertake substantial efforts to make technological adaptations. Gradually, activities such as product engineering and design, then production and methods and, finally, organization and planning were undertaken in a systematic manner and consolidated the accumulation of an internal technological capacity. This capacity was not only specific to each firm, but also generated spillovers for the rest of the industrial sector.

¹⁶ The university enrollment was mainly oriented towards “liberal” professions – as it had occurred in earlier periods. Compared with other countries, Argentina showed low enrollment rates in careers related to pure and applied sciences – including non-civil engineering – and high rates in medicine and law (OECD, 1967). In turn, there was a lack of high-quality technical education at secondary level.

These adaptive and highly individual technological efforts led to a gradual reduction in the productivity and quality gap *vis-avis* firms in industrialized nations.

Though many TNCs brought second-hand machinery to Argentina, they also transferred modern product and process technologies, quality control techniques and subcontracting practices to their subsidiaries (Katz and Kosacoff, 2000). This, together with the use of less labor-intensive techniques and their propensity to locate in capital-intensive sectors, ensured higher labor productivity levels in affiliates of TNCs than in local firms.

Data from the National Economic Census revealed that, in 1963, labor productivity in affiliates of TNCs was around 185 per cent higher than that of domestic firms in the manufacturing sector. Between 1955 and 1973, labor productivity in foreign firms grew at an annual rate of 7.7 per cent, *vis-a-vis* only 3 per cent in domestic firms (Sourrouille *et al*, 1985).

Furthermore, by the end of the ISI period, significant technology exports were flowing into other Latin American countries – e.g. “turnkey” plants, licenses, technical services, etc. (Katz and Ablin, 1985), and several local firms were engaged in internationalization processes through foreign direct investment (FDI) in neighboring countries (Katz and Kosacoff, 1983). In both cases, the key intangible assets of local firms were product and process technologies designed and/or adapted to the conditions of the countries in the region.

On the basis of these facts, Katz and Kosacoff (1989) consider that this was the most successful phase of the ISI. Llach (2002) states that the manufacturing sector was ready to start a self-sustained growth process which, according to the author, was unfortunately frustrated by macroeconomic instability and political violence.

Technology imports

It is important to bear in mind that domestic innovative activities were far from being as relevant as other technology sources during the period under review.

Katz (1972), surveying a number of large industrial firms, showed that while they expended 0.35 per cent of their gross production value in R&D activities¹⁷, the payments for technology transfer – including patents, know how agreements, trademarks, etc.-reached 1.3 per cent of the surveyed firms’ sales. Chudnovsky *et al* (1974), analyzing a pool for firms that had signed technology transfer contracts, found similar results (the relation between payments for imported technology and R&D expenditures was more than 3 to 1). The firms surveyed by Chudnovsky allocated 0.55 per cent of their sales to R&D activities¹⁸. It must be noted that these estimates did not take into account imports of capital goods which would have rendered the balance between local and foreign technology even more favorable for the latter.

However, R&D expenditures seemed to have had a positive impact on the observed rate of technical progress in the manufacturing industry – and hence on productivity growth –, although this impact was lower than that estimated for U.S. industry for a similar period

¹⁷. This ratio was obtained by dividing total R&D expenditures on total gross production value of the surveyed firms.

¹⁸. This ratio was estimated as explained in the previous footnote.

(Katz, 1972). In contrast, no association was found between technology transfer payments and technical progress in the Argentine manufacturing industry.

In order to deal with this apparent lack of impact of technology imports on domestic productivity, Katz (1972) observed that the amounts involved in technology contracts did not actually reflect a real knowledge transfer in all cases, since they included trademark payments and the prices charged had a strong monopolistic component¹⁹.

Chudnovsky *et al* (1974), in turn, stated that, in many cases, domestic buyers had weak technological competencies – which would have led to underutilization of the imported technology and to very high prices for the transferred items. The authors also indicated that technology transfer contracts often included limitations or prohibitions for the buyer in terms of exporting the products based on the acquired technology.

The process of technological learning in local industry reached peaks in some R&D-intensive sectors: the metal-working industry (machine tools, in particular, where reverse engineering was common), pharmaceuticals (where many local firms benefited from the lack of patent legislation in this sector by copying recently-discovered molecules and entering the domestic market with specialties under their trademarks)²⁰ and electronics (where one local firm (FATE) advanced from the production of calculating machines to planning the eventual production of computers²¹). Those sectors showed the highest ratio between R&D expenditures and sales within Argentine industry, although, they were also those where the gap with the same ratio in the U.S. industry was larger (Katz, 1972)²².

¹⁹. There were also suspicions that payments for technology items could include disguised profit remittances.

²⁰. Local pharmaceutical firms spent proportionally more in R&D than TNC affiliates in the same sector (1.6 vs. 1.1 per cent in 1972). The pharmaceutical sector also spent the most in R&D in the manufacturing industry (Chudnovsky, 1976; Arce *et al*, 1968). In the 1970s, a group of national laboratories was vertically integrated into the production of active principles or pharmaceutical raw materials through small multi-purpose plants in which they produced limited amounts for their own use in specialties under their own trademarks (Burachik and Katz, 1997). An important technological capacity was developed in antibiotic fermentation and teams to develop process innovations at plant level were consolidated. As a result, productivity grew and the firms gradually started to make exports. This process was interrupted in the second half of the 1970s, when the acceleration of technological change at world level made it difficult for local producers to follow the innovation patterns of firms at international level. Even though this industry was born in the 1950s with production scales similar to the international ones, diseconomies of scale eventually appeared. Capital equipment obsolescence also emerged due, in part, to the high cost of imported capital goods. The lack of strong interaction among the different stakeholders in the knowledge base in this sector (private firms, universities, public laboratories) also explains the gradual slackening of the innovation path. Last but not least, the liberalization process *cum* foreign currency undervaluation that started in 1977 meant the *coup de grace* for the most ambitious vertical integration and technology development strategies in this industry.

²¹. FATE's technological strategy was based on the avoidance of licenses and trademark payments and focused on finding and exploiting non-proprietary technological information. This included visits to other countries, and the training of its technicians in excellence centers, such as the Massachusetts Institute of Technology (MIT). The firm spent up to 7 per cent of its sales in R&D. In turn, it was in contact with local S&T institutions such as the National Commission of Atomic Energy (CNEA), the National Institute of Industrial Technology (INTI) and the University of La Plata. The firm produced some microcomputers and the prototype of a medium-sized computer. However, there are discrepancies among analysts as regards the ability of this computer to be competitive in the market. Furthermore, software development and marketing activities were poor (Adler, 1987). In any event, the project was cancelled in 1976, due to problems internal to the firm and given the unwillingness of the new government to support this kind of infant industry.

²². While the R&D/sales ratio in large firms in Argentine industry was around 20 per cent of the same ratio in the U.S. industry, in the case of the aforementioned sectors that ratio did not exceed 13 per cent.

The attitudes of different economic agents

It is clear from the previous remarks that not all entrepreneurial activities were *rent-seeking*, as is frequently assumed in conventional literature. The attitudes and contributions of the economic agents in the technological learning process were determined both by a combination of their size, sector and source of capital and their different capacities and strategies.

The massive arrival of TNCs in the late 1950s and early 1960s had a substantial impact on Argentine industry and well beyond that derived from the installation of new plants. Many of these firms created engineering departments and supplier development programs. They trained their labor force, introduced their personnel to the technological and entrepreneurial culture of their parent companies and diffused the use of quality norms as part of the routine industrial practices. In some cases, they even played a role in the transfer of engineering services within the corporation to affiliates operating in similar environments (Katz, 1999a).

Even though these firms did not invest in Argentina with the explicit intention of developing a local technological capacity – and, in fact, their expenditures in R&D were usually low – in practice they often contributed to such development. In view of the idiosyncratic characteristics of the host country, it was often necessary for the affiliates to allocate resources to innovative adaptive activities in order to be able to apply product and processes technologies developed in their respective parent companies²³.

As TNCs invested in Argentina with market-seeking strategies²⁴, exports played a marginal role in their activities. They often used product and process technologies which fell well short of international practices and operated plants with diseconomies of scale. However, the aforementioned technological learning process contributed over time to increased export flows²⁵. These flows were mostly – but not exclusively – destined to Latin America (Katz and Ablin, 1977)²⁶. When these exports were part of the corporations' intra-firm trade within Latin America, Argentine affiliates tended to specialize in the more technologically complex business segments.

²³ To illustrate these efforts, it is worth quoting at some length a paper by Cimoli and Katz (2003) "Launching the Ford Taunus to the Argentine market, back in 1974, demanded some 300 thousand hours of domestic engineering efforts carried out by a local team of 120 professionals employed by Ford's Engineering Department. These people were responsible for generating a steady flow of incremental units of production organization and engineering knowledge required for the adaptation of the German-designed 'blue prints' to the local environment, to the available raw materials, to the idiosyncrasies of the Argentine plant – not bigger than 10% of Ford's production facilities in Germany – to the technological capabilities of domestic subcontractors producing parts and components for the referred vehicle, and so forth. One and a half year of domestic engineering activities were required in order to introduce changes and adaptations in the design of the vehicle, in production planning and organization routines, in the technologies employed by local subcontractors for the production of parts and components, etc before the car could be brought to the market. Domestic content for such car was close to 90% of the total value of the vehicle. Nearly 400 subcontractors supplied parts and components under Ford's stringent specifications. Direct expenditure in the above mentioned engineering efforts was in the order of 6 million US\$ dollars in activities which would normally classify as 'development' expenditure in contemporary R&D statistics".

²⁴ Market-seeking investments are aimed at exploiting the host country's market – and, eventually, neighboring countries' markets- (Dunning, 1993).

²⁵ In 1977, U.S. TNC affiliates in Argentina exported 15.4 per cent of their sales (Kosacoff and Azpiazu, 1989). At the time, the average for all U.S. TNC affiliates in the world was 38 per cent.

²⁶ For example, IBM exported its production to affiliates in Japan, Switzerland and Canada, among other countries. Exports included, for example, printers, perforating machines and card classifiers.

With regard to family-owned SMEs, most of them were set up with disordered structures, second-hand or self-manufactured machinery and scant technological knowledge. However, many of them were able to grow and create technical and engineering teams to launch new products and production processes, train their personnel and advance along their own particular learning path. This process took place largely without external support by copying imported technologies and/or relying on the skills of their owners (often immigrants), which naturally involved frequent risks along the learning path.

The learning curve of these firms generally started by copying relatively old products. At the beginning of the ISI period, their main objective was to produce in a protected and undersupplied market, without deference to costs, quality, delivery times or efficiency. It was only when the conditions of the market started to stabilize, that their technological efforts were oriented to designing more sophisticated products better adapted to international standards. It was during this phase that management and planning activities, improved company structures, quality and export marketing initiatives gained momentum (Katz, 1999a)²⁷. However, these firms seldom developed “genuine” innovations (i.e. new products or process for world markets) Finally, there were a significant number of mainly family-controlled domestic conglomerates²⁸, with connections and other links through crossed shares in the boards of directors of the respective firms. Large stand-alone local firms – especially those in family ownership – were also important. Both groups of firms generally made highly standardized products and their level of technological expertise lay in machinery and equipment. Hence, their technological performance was largely dependent on their linkages with the machinery producers.

Several of these firms created engineering departments to improve their production processes. They gradually accumulated technological capacities that allowed them both to reach dominant positions in the local market and, in some cases as previously mentioned, to export technology and invest abroad. However, few of these firms seriously tried to move towards more technologically complex segments -which would have implied systematic R&D activities, and they rarely contributed to create knowledge in scientific disciplines related to their activities (Katz, 1999a)²⁹.

²⁷. Among the several cases analyzed in the received literature, the learning experience of Turri, a producer of machine tools, is one of the most interesting (Castaño *et al*, 1981).

²⁸ These conglomerates usually had a high level of diversification, including not only industrial, but also agricultural and serviceactivities. They also often owned banks or investment companies to help the finances of the whole group. This gave them a relevant differential advantage *vis-a-vis* other agents in a context in which the access to finance was restricted (Lewis, 1993).

²⁹. The aforementioned experience of FATE, and that of the local pharmaceutical companies, is perhaps one the main exceptions.

3.3 Institutional and policy weaknesses

Although the industrialization strategy started in 1958 was termed “developmentalist”, the Argentine state was far from being what Evans (1995) calls a developmental state (Japan, Korea or Taiwan) or even an intermediate state (Brazil or India). Whereas in the case of Brazil an “isolated high level bureaucracy” was crucial in implementing the ISI strategy, this bureaucracy was absent in Argentina. According to Sikkink (1993) Frondizi “was forced to elude the bureaucracy to formulate and instrument his policies” (authors’ translation, p.545).

The frequent changes in ministries, secretaries and other government departments naturally led to rotations in the bureaucrats, since it was common that the newly appointed officials distrusted the previously existing bureaucracy. This not only affected the efficacy of government action, but also impeded the formation of a stable and meritocratic bureaucracy.

In this context, it is not surprising to find that the received literature repeatedly shows failures in the design and implementation of the industrialization policies adopted at the time.

Tariff policy was erratic and was often unable to grant (and remove) protection to sectors according to their technological and efficiency gaps *vis-a-vis* international practices. The deepening of import substitution was also in itself an obstacle for a progressive reduction of tariffs in mature sectors. As the latter replaced imported with local inputs, the higher costs offset the productivity gains previously obtained (Nochteff, 1994b). Furthermore, and in contrast to what happened in Asian developmental states, there was no effective capacity to discipline protected sectors and to obtain reciprocity or *quid pro quo* commitments regarding productivity gains, rising exports and other objectives.

The investment promotion policies also failed to yield better results. In the case of the automobile sector, for example, in 1960 there were 21 plants operating in a market of 100 thousand vehicles/year. A few years later most of these plants had to close down when the overcapacity *vis-a-vis* the existing and projected local demand became evident. This clearly shows the failure of the government to design long-term sectoral strategies (Katz and Kosacoff, 1989). In turn, projects promoted for the production of basic inputs were carried out against a background of conflicts, corruption complaints, delays and other problems which obviously implied high costs for the society as a whole (Schvarzer, 1996)³⁰.

In general, these regimes lacked performance requirements with regard to technology, local provision of equipment or exports, unlike the situation in Brazil or East Asia. The main criterion for success was actual import substitution. A central point to bear in mind is the influence of the Armed Forces in the definition of the promotion policies in sectors such as aluminum, iron and steel or petrochemicals. This obviously introduced extra economic elements in decisions on the approval of investment projects to produce basic inputs and probably disregarded microeconomic efficiency.

³⁰. See López (1997) for a description of industrial promotion initiatives in the petrochemical sector, one of the most favored by this regime.

Regarding credit policies, in the late 1960s the government tried to reform the Industrial Bank which had been created in 1944. The objective of this reform was to have the bank assume a leading role in the promotion of medium and long-term investments in the manufacturing sector³¹. In fact the bank had been assigned this role on its inception, but it had never fulfilled it. However, even in this new period, a substantial share of the credits was given to State suppliers or to firms that faced threats of bankruptcy (Rougier, 2004). Hence, the author suggests that the allocation of credits did not follow the theoretical guidelines lines established in respect of the type of firms to be supported and the sectors to be promoted. The performance of the Bank was also impaired by institutional instability³² and by the volatility of the macroeconomic environment.

In the area of S&T, no initiatives were adopted at that time to foster R&D or innovative activities in private firms via fiscal, financial or other type of incentives. This was in contrast with what was the practice in other countries. On the contrary, inspired on the ideas of the so-called "linear model" of innovation (see Kline and Rosenberg, 1982), the government focused on the creation of public scientific and technological institutions (and research departments in some State firms, as in the case of the oil company, YPF). This approach by the government was based on the assumption that the private enterprises would eventually be "users" of their services.

Key institutions created in the late 1950s under this approach did not generally play a relevant role in the technological development of the manufacturing industry. This is particularly true of the National Council of Scientific and Technological Research (CONICET) headed up by the winner of the Nobel Prize for Medicine, Houssay, whose main aim was to foster basic scientific research.

The National Institute of Industrial Technology (INTI) was rarely involved in R&D or technological development activities, and its main goal was to provide routine services (metrology, tests)³³. Only the National Commission of Atomic Energy (CNEA) had a deeper impact on certain segments of the manufacturing industry on account of its technological capabilities in metallurgy and its development programs for suppliers.

The creation of the public scientific and technological institutions led to an increase in R&D expenditures in relation to GDP. This ratio grew from 0.1 per cent in 1954 to about 0.4 percent by the mid-1970s. However, considering this indicator and others such as the number of scientists and engineers dedicated to R&D activities and the expenditures in R&D per researcher, Argentina was clearly lagging behind in any international comparison.

Besides the creation of these public institutions, no effective policies on science and technology existed during the ISI. The INTI started to register and control technology transfer contracts started in the early 1970s, but without an explicit policy of fostering private indigenous innovative activities. Other measures were taken to regulate technology imports and promote the development of local technologies, especially in state

³¹ Even the name of the bank was changed to National Bank of Development (BANADE)-.

³² Between 1967 and 1976 BANADE had eleven presidents and none of the over forty directors appointed during those years completed their three-year term (Rougier, 2003).

³³. In their influential account of the Argentine industrialization process, Katz and Kosacoff (1989) do not make a single mention to the role of INTI.

firms and organizations. However, given the increasingly unstable institutional and economic context in which these measures were applied, they had little or no impact.

Notwithstanding the flaws and failures of the industrial and trade policies of the time, most of them had a theoretical rationale, provided that one accepts the idea that Argentina needed to promote industrialization. For example, the investment promotion policies were probably the only way of fostering a massive investment program in an environment in which private banks did not offer long-term financing for the industrial sector, the capital markets were clearly underdeveloped and a high level of economic and institutional uncertainty prevailed. This also applies to the BANADE. Tariff protection for new sectors finds a rationale in the traditional "infant industry" argument although the latter calls for selective and temporal protection, two features that were notably absent in Argentina. In any case, it seems that the aforementioned institutional, political and macroeconomic problems and the failures in their design and implementation led these policies to have fewer benefits and more costs than originally expected. It is also plausible to argue that the excessively inward-oriented nature of Argentina's industrialization strategy and the lack of technology policies also contributed to the relative failure of industrial policies, in contrast to the situation in East Asian countries which adopted more outward-oriented development patterns and paid more attention to technology policies.

3.4 Technological modernization in the agriculture sector

As shown in Graph 3.1, after a long period of decline agricultural production started to grow from the late 1950s. As a result of outdated technologies in use in Argentina, yields had been stagnating or falling since the 1940s and showed a huge gap vis-à-vis US yields (Graph 3.2) The need to foster agricultural output and exports was widely accepted at that time, since the latter were the main source of foreign currency, hence putting a limit on industrial growth, as we saw above.

The main economic advisor of the "*Revolución Libertadora*" that overthrew the first Peron government in 1955, Raul Prebisch, emphasized the need to increase agricultural exports. Among his recommendations were the creation of a public institute dedicated to technology diffusion and the modernization of infrastructure in agriculture.

The call for pro-agricultural policies was accepted. A process of technological modernization took place and enabled production to recover and exports to expand. In contrast to what happened in the manufacturing sector with INTI, the role of the National Institute of Agricultural Technology (INTA – created 1956 and the CREA groups³⁴(1959) in this process was very relevant. Subsidies and cheap credits also favored agricultural producers during this period.

Product and process innovations were adopted from the late 1950s. Among the former, the more important were the introduction of hybrid seeds³⁵, soyabean and grain sorghum and improved varieties of existing seeds. There was a significant increase in the use of

³⁴ These groups were integrated by farmers and their objective was to develop and diffuse better agricultural and livestock handling techniques.

³⁵ According to Barsky *et al* (1988), the expansion of agriculture between 1960 and 1973 was due to the diffusion of hybrids, as they allowed substantial production increases without demanding large investments or changes in the productive structure.

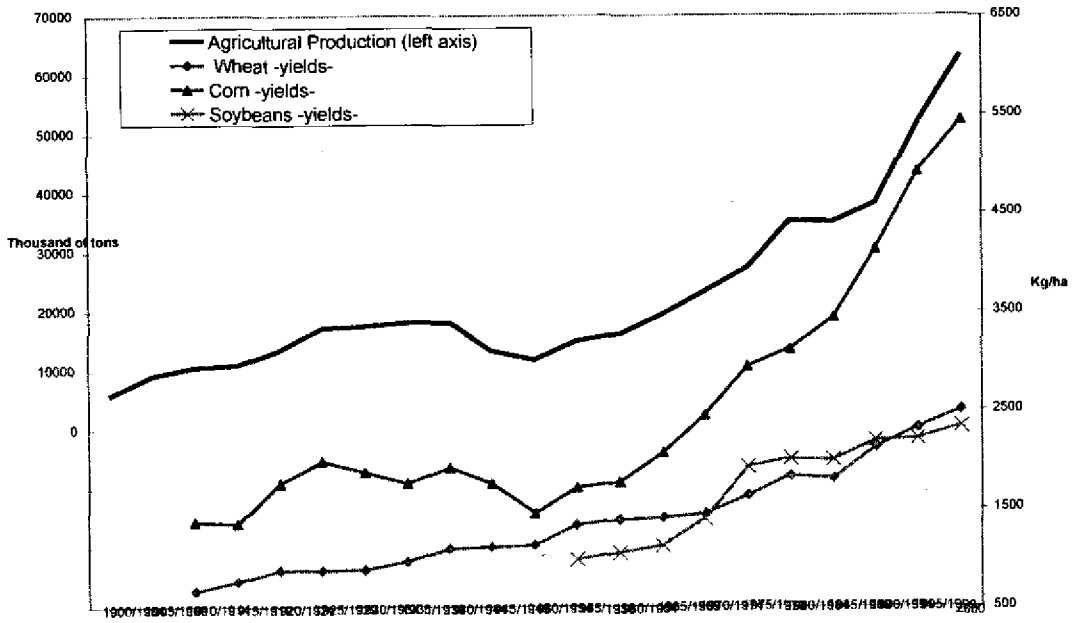
tractors with improved mechanical capacities and better availability of agrochemicals and fertilizers (Obschatko *et al*, 1984; Barsky *et al*, 1992). Furthermore, soya bean demanded new types of handling and farming practices which were later transferred to other crops. Artificial insemination systems were diffused and improvements in health techniques in livestock breeding were introduced. The State played a key role in this regard, but there was also a surge in private services such as soil analysis laboratories, insemination centers, specialized machinery contractors, etc. (Becerra *et al*, 1997)³⁶.

These new "technological packages" allowed significant increases in land productivity (Graphs 3.1 and 3.2), which, from the mid-1960s led to a gradual closing of the gap that had been steadily widening *vi-a-vis* U.S. agricultural yields³⁷. They also made it profitable to undertake farming activities in new areas and this formed the basis which sustained the abovementioned process of agricultural expansion (Obschatko and Del Bello, 1986; Obschatko *et al*, 1984).

³⁶ This process of technology modernization often required domestic research efforts. In soyabean, for example, it was necessary to develop research activities on the characteristics of the imported varieties characteristics to adapt them to different ecological zones.

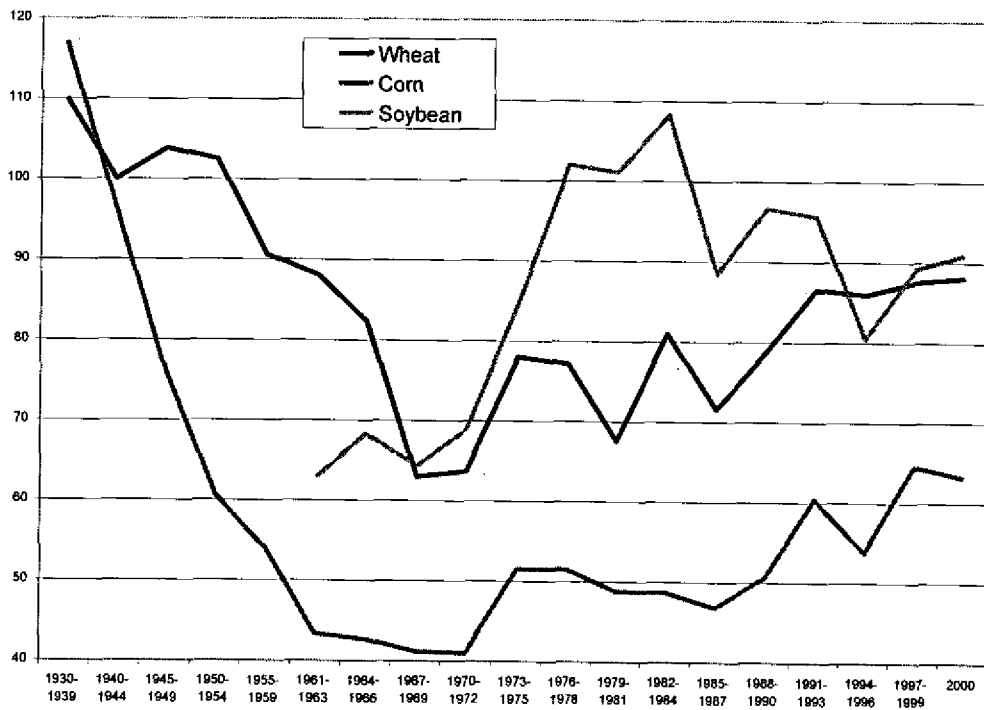
³⁷ It must be noted that, until the 1930s, agricultural yields in Argentina were similar to those in the U.S.

Graph 3.1 Agricultural production and Agricultural yields in Argentina, thousand of tons and Kg/ha, 1900-2000



Source: Own elaboration of SAGPyA data and Barsky et al (1988)

Graph 3.2 Argentina's agricultural yields as a % of US yields, 1930-2000



Source: Own elaboration of the basis of USDA and SAGPyA data.

IV. Determinants of productivity from 1975-2000

4.1 The productivity record in the long recession (1975-1990)³⁸

The macroeconomic and political evolution

The military dictatorship that took office in March 1976 decided to fight against guerrilla movements with a kind of “dirty war”, in which human rights were systematically violated. At the same time, political parties and labor unions were neutralized by the government (either through suspension of constitutional rights and changes in the labor legislation or through direct repression). It is in this context that a new economic policy was implemented, supposedly aimed at radically changing the structure and performance of the Argentine economy.

During the first months of the military government, trade liberalization measures were taken together with the implementation of a stabilization plan that resulted in a drastic fall in real urban wages. At the same time, a new foreign investment law was passed³⁹ and a financial reform implemented which liberalized interest rates and modified the criteria for credit allocation.

Although strong reductions in import tariffs were imposed in 1976 (on average 40 percentage points)⁴⁰, imports failed to rise significantly in the subsequent three years. This was due to the fact that there were loopholes in the tariffs – i.e. the legal rates were not fully utilized by domestic producers (Berlinski, 2003). Furthermore, the devalued peso discouraged imports. In this context, production of durable consumer goods and capital goods entered a period of recovery.

Nonetheless, inflation remained at relatively high levels. This led to a new policy package in late 1978. A pre-established schedule was adopted to steadily reduce over time the devaluation of the local currency against the US dollar (the so-called “*tablita cambiaria*”), and, at the same time, a new round of trade liberalization was launched⁴¹. This policy was based on the assumption that domestic interest and inflation rates would gradually converge to the corresponding international rates.

³⁸ Only the key determinants of productivity in this long and very complicated period are considered here. Some references to education, science and technology in this period are made when considering the 1990s.

³⁹ Law 21382 guaranteed equal treatment of foreign and domestic investors and the free remittance of profits and principals.

⁴⁰ It is important to mention that several sectors producing intermediate goods continued to be protected through non-tariff measures and benefited from subsidies under the national industrial promotion law (see below). The Armed Forces had a direct influence on these sectors, both through the ownership of some industrial firms as well as through the control of regulatory schemes, a fact that could well explain why they were exempted from trade liberalization.

⁴¹ The program, adopted in December 1978, envisaged a progressive reduction in tariffs (and a reduction in their dispersion) up to an average level of 20 per cent in 1984. However, in practice, the government modified the program accelerating the rate of reduction in tariffs. For example, the tariff for capital goods was reduced to 0 per cent soon after liberalization was launched. Furthermore, the program was used as a short-term policy instrument, as the authority was allowed to reduce tariffs in the presence of monopolistic practices which could have negative effects on inflation.

However, convergence was not achieved. The actual inflation rate was higher than the forecasted one, leading to an overvaluation of the peso. Interest rates also failed to fall to international levels due, in part, to economic and political uncertainty and the high cost of financial intermediation. Taking advantage of financial liberalization, there were substantial inflows of short-term capital into the country and these offset the current account deficits.

In view of the ample supply of international credit, fiscal spending increased and investment rates reached high levels. Investment projects were mainly related to the infrastructural developments, defense sector objectives and capacity expansion in intermediate goods such as steel, paper and pulp and petrochemicals. In the latter case, projects were mainly undertaken either by state companies or domestic conglomerates which were often partners of the state and received substantial incentives from different promotion regimes⁴². Foreign indebtedness was a major source of finance for investment in those years.

By early 1980 the policy had succeeded in bringing the annual rate of inflation to below 100 percent, but at the cost of a profit squeeze for a large part of industry. At the same time, the prevailing high domestic interest rates in a period of weak government supervision led to the bankruptcy of the most important private bank in March 1980. This was the beginning of a banking crisis which continued with the closure of other banks.

In this situation, public confidence in the government program began to erode. The anticipation of future currency devaluation increased the demand for dollars and sharply reduced the reserves in the Central Bank. The government took on additional foreign debt in order to satisfy the growing demand for dollars as international interest rates started to rise in 1981.

In March 1981, in accordance with a previously stipulated schedule, a new military President took office. The economic team was also replaced. After some delays, the anticipated devaluation was decided amidst a worsening economic situation. By this time, a high level of foreign debt had accumulated. After the Mexican default that affected all Latin American countries, Argentina suffered a foreign debt crisis in 1982. With a huge public deficit, high inflation, continuous currency devaluations and an external debt crisis, conditions in the country in 1981-82 were comparable with those which had prevailed in 1975.

In mid-1982, exchange controls and import restrictions were re-established, again closing the economy to competing imports. In this connection it should be noted that, while protectionism in the 1960s was a main tool of the industrialization strategy, in the 1980s it was driven by macroeconomic conditions.

Relief measures were taken for financial institutions (and their borrowers) and the State took most of the private foreign debt through a system of exchange rate risk insurance. "This huge transfer of wealth rescued many enterprises from bankruptcy, but it was a gift to others, who, by having foreign liabilities backed by foreign assets, got rid of the former

⁴² While domestic conglomerates gradually became the leading actors in the Argentine economy, the role of TNC affiliates declined. Between 1976 and 1981 most FDI inflows were directed at the oil and financial sectors, while new FDI in manufacturing was quite low. In fact, some large TNCs closed their subsidiaries or scaled down their operations in those years.

while keeping the latter. The effect was to place the private sector in a net creditor position, leaving the government as the sole debtor without means of domestic financing" (Canitrot, 1994 p.80).

The 1982 foreign debt crisis resulted in the intensification of both the external and the fiscal structural imbalances in the Argentine economy. These two basic imbalances were complemented by the short-run dynamics of the high inflation regime. Financial fragility amplified the consequences of the measures adopted to deal with these imbalances. The high inflation regime produced self-propelling propagation schemes that resulted in volatile inflation rates (Damill *et al*, 1989).

At the same time, the precarious financial situation caused both by the demonetization process and the lack of external financing was one of the main obstacles to economic policy management. This produced a permanent climate of uncertainty that damaged the investment process and encouraged substantial capital flight (Kosacoff, 2000).

Following defeat in the Malvinas war in 1982, the military called for elections to reinstate a constitutional regime. The Radical party that won the election emphasized democracy and the defense of human rights. The military leaders were tried for their crimes during the "dirty war" in 1985 and the manner in which the judicial process was conducted and the fact that the military leaders were sentenced were well-received by the public.

Regarding economic policy, after a failed attempt to control inflation by a general agreement on prices and wages, the Austral Plan launched in 1985 focused on inflationary inertia and adopted a price freeze at the core of the stabilization policy. Early attempts by the Argentine government to consider the external debt as illegitimate evolved into a rollover agreement with the US government in exchange for the payment of debt arrears.

The success of the Austral Plan in reducing inflation without a recession gave popularity to the government for a while. The price freeze was then replaced by a system of price guidelines, including the exchange rate, loosely adjusted to current inflation. Although the trend toward peso overvaluation was checked, inflation grew and resulted in falling fiscal revenues in a context in which there was no political consensus for dealing with the sources of the fiscal deficit⁴³.

A last unsuccessful attempt to stabilize the economy was made in mid-1988 with the so-called Spring Plan. Pressures on the exchange rate soon became unsustainable and faced with growing demand for dollars, the Central Bank suspended sales in early 1989. The exchange rate accumulated a substantial growth in period of a few weeks and inflation surged and turned rapidly into hyperinflation (Canitrot, 1994). Poverty increased to previously unknown levels, leading to massive public protests, lootings and widespread social unrest. In July 1989 Alfonsín resigned and Menem, the Peronist candidate who had won the presidential election held in May, had to assume the presidency before the scheduled date.

⁴³ In this connection, it is important to mention that, besides the payment of interest on the external debt (reduced to a half in successive renegotiations), the subsidies to the private sector from the industrial promotion schemes were another key component of the fiscal deficit. While debt servicing amounted to 5 per cent of the GDP in the period 1985-88 (Machinea, 1990), industrial promotion subsidies amounted to 2.6 of the GDP in 1986.

Before analyzing the following phase in Argentina's development, it is useful to briefly outline the economic and industrial evolution from 1975 to 1990. The next section is devoted to this period.

Economic and industrial performance

As stated in the introduction GDP per capita was 22 per cent lower in 1990 than in 1975. This figure in itself provides a clear indication of the magnitude of the crisis suffered by Argentina during this period.

Between 1975 and 1981, GDP per capita fell by 3 per cent and real wages by 25 per cent. In the 1980s the crisis deepened and the fall in GDP per capita amounted to 20 per cent between 1981 and 1990. GDP declined by 8 per cent, imports by 59 per cent, consumption by 16 per cent and investment by 70 per cent, between 1980 and 1990, while the unemployed doubled over the same period (see Kosacoff, 2000).

The only economic indicator with a positive performance during the 1980s was export trade which expanded by almost 80 per cent, favored by prevailing exchange rates and a domestic recession⁴⁴. Exports of manufactured goods (accounting for a growing proportion of total exports – see Table 4.1) benefited from various types of government subsidies from the government and also from cross-subsidization due to high prices commanded by firms operating in concentrated and protected domestic markets (Bisang, 1990). Furthermore, a program to foster co-operation and expand bilateral trade with Brazil was launched⁴⁵ in 1986.

Despite severe fiscal restrictions, the export promotion policies during the 1980s provided for different fiscal and financial incentives regimes for exports of manufactured goods. Draw back and temporary admission schemes were also in place during that period. These mechanisms were adopted for different reasons in each case, but the three main underlying objectives were to compensate for the anti-export bias due to the closing of the local economy, to reimburse indirect and/or direct taxes paid internally and to address market failures in the financial system which prevented access for local to credit for exports.

According to Bisang (1990) institutional fragmentation, instability and lack of coherence plagued the export promotion system as its benefits were concentrated on a small number of firms/sectors. The system also lacked transparency and effective control mechanisms. It should also be noted that explicit export subsidies complemented the aforementioned mechanism of cross-subsidies between the internal and the export market. The activities which mostly benefited from the explicit promotion system were in fact often those which were in a position to subsidize their exports with the high prices obtained in the protected domestic market⁴⁶.

⁴⁴. Many new industrial plants, especially in the intermediate goods sectors, such as steel and petrochemicals, had to begin exporting because actual domestic demand was lower than that expected at the time when the respective investment decisions were taken.

⁴⁵ Machine tools were one of the segments of the manufacturing industry in which Argentine firms did well in the preferential trade agreement with Brazil (Chudnovsky and Erber, 1999).

⁴⁶. Interestingly, in this case, instead of leading to an anti-export bias, domestic market protection functioned, in a context of economic recession, as a non-planned export-promotion tool.

Table 4.1 Argentine exports, 1980-2000, current US\$ million, five-year averages

	Total	%	Primary products	%	Manufactures of agricultural origin	%	Manufactures of industrial origin	%	Fuels and energy	%
1980-84	8,147	100	3,513	43	2,857	35	1,346	17	430	5
1985-89	8,064	100	2,399	30	3,275	41	2,112	26	279	3
1990-94	13,104	100	3,397	26	5,065	39	3,499	27	1,144	9
1995-99	24,189	100	5,617	23	8,395	35	7,379	30	2,799	12
2000	26,341	100	5,346	20	7,864	30	8,230	31	4,902	19

Source: Authors' calculations on the basis of INDEC data.

Productivity gains the manufacturing industry

The manufacturing industry was particularly hit by the crisis. Between 1975 and 1990, industrial output fell by around 25 per cent, industrial employment by 45 per cent and industry's share in GDP dropped from 28.3 per cent to 20.7 per cent. As output fell less than employment, productivity gains were obtained. The mechanisms in force were, however, not exactly the same throughout the whole period under review.

Between 1976 and 1980, there was a drastic reduction in the number of industrial workers⁴⁷, which was in part a response to the previous "over employment" as a result of closed-economy conditions, strong unionization and the decline in labor-intensive industries. Also noteworthy in this context is the fact that labor unions had been systematically repressed since 1976. Until 1979-1980 industrial production had recorded an increase *vis-a-vis* 1975-76 levels and a technological modernization process had taken place. This benefited large firms in particular which were able to take advantage of trade liberalization by upgrading their machinery and equipment (Kosacoff, 2000). In contrast, from 1981 to 1990 both production and employment fell and the process of technological modernization was impeded by the high volatility and economic uncertainty, tariff barriers, lack of external credit (with the exception of some special lines granted by foreign governments - see below) and high exchange rate levels.

Within this general scenario, there were significant differences in the performance of different sectors. Basic metals, chemicals and (to a lesser extent) paper and pulp were the fast-growing industries in the period under review. These are capital-intensive, large-scale sectors which mostly rely on natural resources.

In contrast, the machinery and equipment sector experienced a sharp decline (with a brief recovery in the second half of the 1980s). This is a skill-intensive sector with major design and engineering capabilities. Labor-intensive industries such as textiles were also severely affected by the long crisis. The food-processing sector remained stagnant, although there was a remarkable growth in the export-oriented sector producing edible vegetable oils and a contraction in the traditional meat-packing industry.

⁴⁷. Overall unemployment stayed at low levels during this period due to employment absorption in other sectors (notably, services).

The heterogeneous paths of the different industrial sectors were, in part, a reflection of the differences in sectoral investment performance during the period under review. In 1976-1990 the national industrial promotion program provided subsidies to about 50 projects to produce intermediate inputs in large capital-intensive plants (Kosacoff, 2000). Although these projects were justified in the early 1970s within the previous ISI model, they were largely implemented during the military government and, to a lesser extent, in the 1980s.

The investment promotion regimes also favored certain regions and firms, including the aforementioned domestic business conglomerates. In terms of regions, a special incentives scheme was established in Tierra del Fuego in the late 1970s to encourage the production of consumer electronics with little local content and engineering inputs.

During this same decade, a regime to foster investments in less developed provinces was also established and attracted projects which were mostly oriented towards the final stages of the production process in order to maximize tax deductions. These promotion schemes were criticized for their fiscal cost and lack of transparency. Performance requirements in terms of innovation, exports, labor training, etc. were also omitted. The absence of *ex ante* clear criteria to select sectors, firms and activities for promotion and the lack of any *ex post* evaluation of the promotional mechanisms were other key weakness of these industrial policy instruments⁴⁸.

Also of relevance are two investment programs put in place in the second half of the 1980s: firstly, the external debt-equity swap programs which facilitated financing of US\$ 660 million for 82 investment projects mostly undertaken by TNCs in the second half of the 1980s. (Fuchs, 1990). These investments were mainly oriented towards the food, automobile, petroleum and chemical industries; secondly, the preferential credit lines granted by the Italian and Spanish governments favored the acquisition of capital goods in the same period. Virtually all the relevant investment projects undertaken during the 1980s were based on one of the aforementioned incentives schemes in place.

In evaluating the evolution of the manufacturing industry in Argentina between 1975 and 1990, Kosacoff (2000) argues that, apart from its drastic contraction, the sector underwent radical transformations during that period. On the one hand, a "regressive restructuring" took place and the economic team that took office in 1976 did not try to improve the existing base of knowledge, skills and equipment accumulated during the ISI, but rather to initiate a rapid restructuring process to result in the disappearance of "inefficient" sectors. This led to the destruction of capabilities that could have formed the basis for a more efficient industrialization pattern if a gradual restructuring strategy had been adopted. The chosen "shock" strategy, instead, gave rise to a new productive structure that was less able to generate employment than more dependant on natural resources endowments, thus opening limiting opportunities for a knowledge-based development path.

On the other hand, Kosacoff observed a growing heterogeneity within the industrial sector, both at sectoral level and at enterprise level. While a large group of firms shrank,

⁴⁸ In this connection, in late 1987 the government sent a project proposal to the Parliament in order to modify the industrial promotion schemes with the aim of increasing transparency and reducing the fiscal costs. The proposal was approved, with some changes, a year later.

closed down or passed from production to import activities (SMEs were prominent within this group), a smaller group expanded, modernized their structures and became more competitive and efficient. As indicated in the further considerations, this heterogeneity was also a feature of the 1990s.

4.2 Determinants of high productivity growth (1991-2000)

Macroeconomic performance and political evolution

With the program of structural reforms launched by the Menem administration⁴⁹ and the application of a currency board scheme in 1991 (the Convertibility Law)⁵⁰, the Argentine economy entered into a stabilization-cum-growth path that lasted until 1998 (only interrupted with the recession in 1995 due to the Tequila effect).

Between 1991 and 1998, GDP grew at an annual average rate of 5.9 per cent. From the hyperinflation levels reached in 1989 and 1990, the consumer price index dropped to 84 per cent in 1991 and 17 per cent in 1992. One-digit rates were registered already in 1993 and 1994, and from that point, there was practically no inflation during the rest of the 1990s.

The success of the Convertibility Plan in reducing firstly the wholesale and then the retail prices, and hence the inflationary tax, led to growing public support for the government policies. This support was enhanced by the increasing availability of consumer credit and the reduction in the real interest rate that resulted in a consumption-led growth in 1992-94. At the same time, these macroeconomic conditions and significant receipts from the sale of state enterprises (see below) led to balanced fiscal accounts.

However, in a context of a fixed nominal exchange rate, the movement of consumer prices (especially in non-tradable goods and services) led to a real appreciation of the peso in the first years of the Convertibility Plan. This, together with trade liberalization (see below) and the recovery of domestic demand, favored a rapid growth in imports. As the latter grew far more than exports, a significant trade deficit developed and was financed by growing inflows of foreign capital⁵¹.

Although exports started to grow in 1994 and, favored by the regional integration process in MERCOSUR (see below), had doubled the 1993 levels by 2000, the 1990s saw the

⁴⁹ After entering office in 1989, the new government made several unsuccessful attempts to stabilize an economy under hyperinflation (the so called Bunge & Born Plan and others). The renewed inflationary episodes in 1990 and the resignation of two Ministers of the Economy led the way to the appointment of Cavallo (and his team) in the Ministry of the Economy in early 1991. See Gerchunoff and Torre (1996) for a good analysis of the political and economic conditions explaining the way the Menem's government launched the structural reforms in a country with such macroeconomic instability.

⁵⁰ One of the pillars of the Convertibility Plan was the separation of the Central Bank from the non-financial public sector, establishing it as an independent monetary authority. The 1991 Convertibility Law created a money-creation rule that effectively limited monetary policy and Central Bank finance of public sector deficits. In September 1992 a new law strengthened the Central Bank's autonomy, and further restricted its ability to extend credit to the government.

⁵¹ It is important to mention that in 1992 the Plan Brady was launched. Argentina officially recognized its debt (around US\$ 21,000 million) jointly with US\$ 8,300 million of unpaid accumulated interests. The total amount was converted into government bonds as new debt: the Brady bonds. This refinancing scheme contributed to reducing the country risk premium for foreign investors.

start of improved international prices for commodities (at least until 1998), growth in agricultural output (see below) and the maturation of some large industrial and energy projects. There were trade surpluses only during recession years (1995 and 2000).

As previously stated, the external shock from the Mexican crisis resulted in a financial crisis and recession in 1995. However, the recovery was rapid and the economy resumed growth in 1996-98, with higher investment and export coefficients than in 1991-94⁵². In turn, productivity growth and the effect of the 1995 recession on consumer prices reduced the real appreciation of the peso in the mid-1990s.

At the same time, however, the fiscal accounts started to worsen⁵³. The increasing fiscal deficit since 1994 was due, among other things, to the growth in the interest paid on the external debt, the increasing public expenditures (exacerbated by the electoral cycle before the re-election of Menem in 1995 and then in anticipation of the presidential elections in 1998-99) and the fall in fiscal revenues. This latter related to the social security reform that was approved after tough negotiations in Congress in 1993 and became operative in 1994⁵⁴. Growing indebtedness was the result of the accumulation of fiscal imbalances.

On the other hand, unemployment – in particular after 1995 – gradually became a serious and unsolved problem. While in May 1992 the unemployment rate in urban concentrations reached 7 per cent of the working population, it had climbed to 18.4 per cent in May 1995. Although there was a subsequent decline, unemployment rates never fell again below 12 per cent and in May 2000 reached a level of 15.4 per cent.

Faced with rising unemployment, the government tried to deepen labor market reforms. In 1991 an employment law (24013) had been passed, introducing fixed-term and special training contracts for young workers and creating an unemployment benefit system. Employer wage taxes were reduced in 1994. In 1995 a new law (24465) formalized the fixed-term contracts regulated by the previous law and introduced a trial period up to six months. The business sector had always been seeking more flexible contracts, given the burden of severance payments imposed by legislation (Galiani and Gerchunoff, 2003). Later on, short-term contracts were eliminated (1998) as a result of criticism of their implications. Some segments of the labor movement and members of the opposition stated that they did not have an impact on unemployment but only made labor relations more precarious.

⁵². Exports in 1996-2000 almost reached 11 per cent of the GDP *vis-à-vis* less than 8 per cent in 1991-1995. In the case of investments, the respective figures were 20 per cent and 18 per cent.

⁵³. This deterioration came about in spite of reforms adopted by the government from 1991 onwards and aimed at simplification of the revenues structure, the elimination of “distorting” taxes and the strengthening of the tax collection agency. Massive layoffs in the federal bureaucracy also took place. However, little progress was made on other fiscal issues (such as the distribution of revenues between the national government and the provinces – the revenue-sharing regime (“*coparticipación federal*”))

⁵⁴. One of the objectives of the new system was to channel long-term financing to the private sector. However, the government had to allow the crowding-in effect by absorbing at least part of the drop in revenues which would go into the pension funds without raising borrowing requirements. To the extent that the implementation of the new system proved feasible over time, the public sector was indeed reducing future liabilities; however, these liabilities under the old regime were not contractually binding in definite amounts while the bonds that the government had to sell to finance the transition represented mostly dollar denominated fixed commitments. In this sense the reform hardened the government’s inter-temporal budget constraints and made it dependent on the evolution of the real exchange rate (Galiani, Heymann and Tommasi, 2003).

During this period, union membership was largely maintained and labor negotiations remained within the scope of the collective working agreement, although some individual company-level agreements were concluded. In fact, although some unions opposed the reforms, most of them supported the government (Etchemendy, 2001). This was reflected in the decline in union activism. The number of general strikes decreased from 13 in the Alfonsín administration to two in the first Menem government and five in the second. In return for the unions' support, the government maintained their power through collective bargaining⁵⁵ and by leaving untouched the union-administered welfare organizations ("*obras sociales*") that were a key source of financing. These organizations were very important in the health market where no significant reform had taken place.

Stabilization-cum-growth, together with the adoption of Basel regulations, was not enough as to overcome the old deficiencies of the financial system. The capital market had booms and busts during the decade, but failed to become a relevant source of finance for domestic firms⁵⁶. The banking system, in turn, discriminated against SMEs generally had a bias towards financing private consumption and government needs rather than productive investments.

Even in the context of increasing financial deepening in the first years of the Convertibility Plan, Argentina still lagged behind by international standards, even vis-à-vis other developing countries. This led to high interest rates and high intermediation costs in the domestic market. As previously stated, social security reform was supposedly to channel funds for private investment, but in practice failed to fulfill that role.

Large firms had much easier access than SMEs⁵⁷ to both domestic and international credit markets which were again opened to Argentine firms. The SMEs were restricted in the international credit markets and had limited access to financing from large domestic banks. Hence, they mostly resorted to small banks with higher interest rates on loans to fulfill their borrowing needs (Fanelli and Machinea, 1995). The situation deteriorated further when many of those small banks were sold to foreign banks with more conservative credit policies than their domestic counterparts⁵⁸. Stricter financial regulations from the adoption of Basel norms also reduced the access of SMEs to credit.

Another key outcome of the reform process was the boom of mergers and acquisitions (M&A) which reflected trends worldwide, but, was also fostered by changes in the domestic business environment. Data from Argentina's Secretariat of Industry, Commerce and Mining show that M&A exceeded US\$ 70 billion between 1990 and 1999 -of which US\$ 22 billion concerned privatizations. Cross-border M&As totaled over US\$ 58 billion during the same period (nearly 83 per cent of all M&A activity). The same source estimates that total investments amounted to US\$ 32 billion between 1990 and 1999.

⁵⁵. In 2000 a law was passed decentralizing collective bargaining. Suspicions were raised that some legislators had been bribed to approve the law, a fact that led to the Vice-President's resignation and to the beginning of the end of the political coalition that had taken office in 1999. In fact, law dispositions were never put in practice.

⁵⁶. The number of firms quoted on the stock exchange fell by 20 per cent between 1989 and 1995 (Llach, 1997).

⁵⁷. In the mid-1990s, only 58 per cent of SMEs had access to banking credit, while another 25 per cent did not even have any relationship whatsoever with banks (Llach, 1997).

⁵⁸. It may be argued that small domestic banks had accumulated a relevant amount of knowledge about their client SMEs, which allowed them to lend to those firms even if they did not meet the standards derived from strict norms of lending evaluation. This "knowledge capital" was lost when the banks were transferred to foreign owners (José Fanelli).

Although no precise data exists on the subject, these trends led to increasing concern about the effects of the growing market concentration process which was taking place in most sectors of the Argentine economy⁵⁹. In this regard, it must be noted that, until 1999, there was no effective control or regulations over M&A operations in Argentina. The government did not use any special instrument to encourage/discourage cross-border M&A vs. Greenfield investments and the 1980 Antitrust Law (No. 22262) contained no special provisions for mergers, acquisitions or joint ventures. In addition, this law was generally deemed to be outdated and ineffective in the 1990s. Arguments had been put forward that competition from imports might compensate for the lack of efficient anti-trust legislation, but the experience of the 1990s showed that, in spite of trade liberalization, market-distorting practices and abuses of dominant positions persisted and that an improved enforcement of domestic competition legislation⁶⁰ was necessary.

The evolution of the different productive sectors was heterogeneous. As indicated below, although all major economic sectors grew during the 1990s, the manufacturing industry lost share in the Argentine productive structure in favor of services.

Heterogeneity is also observed when analyzing TFP evolution. A database with information from both large firms and SMEs FIEL (2002) shows that, while TFP grew in firms belonging to non-tradable sectors, the opposite occurred with firms in tradable activities. This finding may be due to a fall in relative prices of tradable goods –as a consequence of trade liberalization–, and to decreases in the international price of certain export commodities (oil and meat) and to peso overvaluation. It suggests that trade liberalization in the context of the Convertibility Plan had a negative impact on many firms in the manufacturing industry, and that, far from forcing them to increase productivity, the contrary effect was observed. Equally, positive TFP evolution in non-tradables may reflect, to some extent, productivity gains in privatized sectors and other services where extensive microeconomic inefficiencies were present before the 1990s.

In the above scenario, it is no wonder to find that, whereas large and foreign-owned enterprises (especially those participating in the privatization process and generally in the provision of services) largely supported the Menem government's policies, local manufacturing firms (and SMEs in particular) were less enthusiastic about them.

In an unstable macroeconomic situation in which major businesses had serious difficulties adapting to the new rules of the game and in the context of growing social discontent with the results of the reforms, the crises in Russia and Brazil in 1998 and in 1999 had severe consequences for the Argentine economy. The two main consequences were, firstly, a "sudden stop" in capital inflows, and secondly, a new round of peso overvaluation – after the Brazilian devaluation, but also due to the US dollar appreciation (in relation to the euro). In these conditions, external debt indicators (in relation to GDP and to exports) reached dangerous levels, increasing the country risk premium and resulting in growing capital flight. These economic conditions led to a recession and deflation.

⁵⁹ A study found that firms that had gone through a M&A process in the 1990s had a better performance in terms of sales growth than those firms that had remained in hands of their previous owners (Chudnovsky and López, 2000). More research would be needed, however, to learn if that was a consequence of improvements in management and technology in acquired firms, or if it only reflected the fact that buyers tend to acquire the most promising firms.

⁶⁰ In this scenario, parliamentary discussions about a new anti-trust regime began in 1997, but it was only in 1999 when the Congress passed a new Law, which was enacted in September 1999. In fact, the complete takeover of the former State oil enterprise, YPF. (which had been sold to private investors in a public offering in 1993) by the Spanish TNC Repsol in the first months of 1999 accelerated the approval of the new Law.

De la Rúa's government took office in late 1999 and, despite the efforts of its three Ministers of Economy, it could not prevent the ending of the Convertibility Plan. The recession could not be controlled, unemployment reached very high levels and there were growing doubts about the possibility of Argentina maintaining the fixed exchange rate scheme and paying its external debt compromises. This period was also marked by increasing political instability which began with the resignation of the Vice-President in 2000 and was further aggravated after the victory of the opposition in legislative elections in October 2001. A financial crisis was triggered off in late 2001 following widespread withdrawal of bank deposits and despite the strong measures taken after the tequila crisis to strengthen the banking system – i.e. adherence to Basel regulations. This was soon followed by the external debt default and the abandonment of the Convertibility Law in early 2002. De la Rúa resigned at the end of 2001.

Structural reforms and their impact on productivity

As previously stated, during Menem's administration Argentina undertook a far-reaching program of structural reforms that had been cautiously initiated during the last years of Alfonsín's government. By the early 1990s, the country was ahead of other Latin American countries in the areas of privatization of State enterprises, market deregulation, trade and financial liberalization, Central Bank independence and social security reforms.

While reforms were very popular in early 1990s, the public mood towards them gradually began to change, and, by the end of the decade, they were often associated with the most negative consequences of the economic regime adopted during that period.

In the previous section we briefly commented on reforms labor, financial and social security reforms. We will now concentrate on three issues which, according to the architects of the reforms, were key factors for productivity improvements in the private business sector: privatizations, trade liberalization and market deregulation (which included the creation of an enabling climate for FDI and technology transfer from abroad).

Privatizations⁶¹

By late 1980s, there was a broad consensus about the fact that State enterprises delivered low-quality services – although the cause of their inefficiency was disputed.⁶² Their privatization was, therefore, expected to result in substantial improvements in the existing infrastructure, a key element for the successful restructuring of the Argentine economy. Privatization was also seen as a tool for easing fiscal accounts State enterprises usually suffered losses, and as a means to attract FDI⁶³.

⁶¹ The 1989 State Reform Act (23696) set the legal framework to carry forward the privatization process. It presided over the transfer to the private sector of the vast majority of the public sector firms in areas as diverse as telecommunications, ports, energy, airlines, railways, electricity generation and distribution, and sanitation. The transfers were made either through sale or concession contracts.

⁶² While some analysts attributed State enterprise failures to the intrinsic inefficiency of State management, other stated that they had been weakened by lack of investment resources (due to fiscal restrictions) and the political influence on their tariff structures (which were used as an anti-inflationary tool for many years).

⁶³ The Alfonsín government had tried to partially privatize some State enterprises by finding private partners, but it found fierce opposition from the Peronist party which one or two years later was to approve the already mentioned State Reform Act.

Encouraged by the requirement that the consortia participating in public auctions had to include a partner with previous experience in the same field of activity, a high share of public utility firms ended up controlled by foreign investors. Most privatizations, however, involved joint ventures with large domestic conglomerates. Typically, the foreign partner took responsibility for the technical and operational side of the business, while the domestic partner remained in charge of its administrative and financial side. Foreign banks often participated as providers of finance, particularly through external debt-to-equity swaps.

The prevailing macroeconomic environment decisively shaped the details of this ambitious privatization program. Consequently, the privatization of telecommunications, completed in 1990 in the middle of a deep economic crisis, provided for modest investment commitments, a loosely defined regulatory framework, a sharp increase in telephone charges (fixed in US dollars since 1991 and indexed to the US inflation rate) and a guaranteed monopoly for a decade. Despite these benefits and the sizable potential of the telecommunications market (with considerable repressed demand for telecommunications services), only three consortia submitted offers.

By contrast, privatizations made in 1992-1993 took place in the context of a fast-growing/low-inflation economy and greatly improved expectations. This made it possible to streamline privatization procedures and regulatory bodies, as was the case with the privatization of natural gas distribution and electricity generation and distribution.

Even then, significant incentives were offered to attract foreign and domestic investors: most companies offered for privatization were transferred without liabilities (including environmental obligations) and with valuable physical assets⁶⁴. Moreover, the rate-fixing system included highly questionable clauses, such as rates fixed in US dollars (in consonance with the currency board then in place) and indexation mechanisms linking local rates to the US inflation rate. This situation, combined with the fact that many activities were natural monopolies or were granted reserved markets for extended periods of time, made high profits the norm among privatized firms.

The largest privatization was that of YPF, Argentina's largest corporation, with petroleum and natural gas interests and upstream and downstream activities in the petroleum industry. YPF was privatized in 1993 through the sale of shares in small blocks on the domestic and international markets. Fifty-eight percent of the company's stock was floated on the market and an indeterminate share of it was purchased by foreign portfolio investors. The national government and several provincial administrations maintained a minority stake and an employee ownership program retained control of 10 per cent of the capital stock. In January 1999, at the height of the Brazilian foreign exchange crisis, the Spanish oil company, Repsol, purchased the government's 15 per cent share in YPF. A few months later (April 1999), Repsol made a public offer for the remaining 85 per cent of the capital which was mostly in the hands of private domestic and foreign investors.

State firms in manufacturing sectors, such as steel and petrochemicals, were also privatized and were mostly acquired by private firms with interests in the same sectors.

⁶⁴ Some privatizations, in fact, involved subsidies from the government in order to attract investors (passenger railways, for instance) – foreign firms seldom entered into this kind of privatization, which mostly attracted domestic companies.

Ports, airports, the postal service, the national airline company, many provincial banks and other businesses were also privatized during this period.

In a study of the performance of privatized non-financial enterprises, Galiani *et al* (2001) found substantial increases in their profitability and operating efficiency after privatization. Productivity indicators improved due to massive layoffs⁶⁵ and also because privatized firms increased output and introduced modern management practices and production and organizational technologies. In fact, investment by these firms increased at least 350 per cent as a result of privatization, a process that was greatly facilitated both by the easy access to the international financial market and as a result of trade liberalization in capital goods (see below).

Privatizations often had highly positive impacts on the quality, availability and, to a lesser extent, the costs of the respective services and/or products. For instance, the productivity levels of ports improved remarkably. The Buenos Aires Port, which operated with 8,000 employees before the reforms, had only 2,500 employees in 1994. In turn, many labor regulations were abolished and this allowed substantial cost reductions.

In the electricity market, tariffs were reduced, especially for the large business sector, and the capacity increased from 13,267 MW to 18,100 MW five years after the privatization. In the gas sector, transport networks increased their capacity 60 per cent between 1992 and 2000 and the gas distribution network grew 58 per cent, from 66,765 to 105,614 km. In the area of telecommunications, the number of lines increased 100 per cent from 1989-2000. Average productivity increased from 92 lines in service per employee in 1990 to almost 400 lines in 2000 (Gerchunoff *et al*, 2003). Fuel and energy exports were also boosted by privatizations (see table 4.1).

Considering these data, it is interesting to explore the reasons behind the growing unpopularity of privatizations in Argentina at the time. Firstly, some sales of State enterprises were associated with corruption, about which there was considerable public concern in the late 1990s. Secondly, substantial quality improvements were not attained in all cases, passenger railway services, for example, did not improve significantly after privatization-. Thirdly, while the business sector benefited most from tariff reductions, households suffered tariff increases in some areas such as basic telephone services. Fourthly, privatizations resulted in massive layoffs and were therefore perceived as one of the main causes of the high levels of unemployment.

Fifthly, no incentives were put in place to foster backward linkages with local suppliers (in fact, local supplies were largely replaced with imports) or to induce privatized firms to engage in innovative activities. Last but not least, regulatory norms and agencies were very heterogeneous, and, in some cases, were not only weak or deficient, but almost inexistent. This created a situation in which the significant productivity increases in most privatized activities were not fully transferred to consumers, hence limiting the social benefits generated by privatizations.

⁶⁵ Employment in former State enterprises decreased by approximately 40 per cent after privatization. YPF, for instance, reduced its personnel from 36,935 to 9,350 employees.

Trade liberalization

Trade liberalization measures had already started in 1988, when the Alfonsín government limited the number of items subject to quantitative restrictions or prohibitions, and the weighted average tariff rate was reduced to 48 per cent. The new government carried out the second phase in foreign trade reform. From 1989 onwards, successive rounds of tariff reductions were implemented. The tariff structure was extensively modified in April 1991 to include only three levels: 0 per cent for raw materials, 11 per cent for intermediate inputs and 22 per cent for manufactured final goods. The weighted average tariff rate was reduced to 19 per cent by 1991 (Table 3.1).

As shown in Table 4.2, the average effective level of tariff protection was relatively low during this period, with peaks in the areas of textiles and leather, wood and wood products and machinery and equipment and lows in the food and beverages sector. In turn, the government eliminated many specific duties and quantitative restrictions on imports of capital and durable goods.

In subsequent years the scheme was slightly modified: the tax on previously untaxed imports was raised to 5 per cent and the tax on intermediate goods was increased from 11 per cent to 13 per cent. During successive reforms the number of tariff levels increased again.

In 1993, a decision was made to further liberalize trade in capital goods and eliminate the import tariff for such goods⁶⁶. Another instrument at that time that favored the acquisition of foreign technology was the scheme which permitted duty-free imports of "turnkey plants". There was a strong increase in Imports of capital goods, as a result of trade liberalization and the increase in domestic investment. They rose from an annual average of US\$ 800 million between 1982 and 1990 to over US\$ 5800 million in the period from 1992 to 2000. In 1990 imports totaled US\$ 635 million dollars, by 1994 there were in the order of US\$ 6000 and in 1998 reached the maximum level of the decade (US\$ 8500 million). The easy access to imported machinery and equipment favored investments and facilitated productivity gains in all sectors of the economy.

⁶⁶ A tax refund of 15 per cent to the buyers of domestic capital goods was established in order to compensate local capital goods producers for trade liberalization in their sector, but its implementation suffered many delays and was very complex, which caused the regime to have limited real benefits for local firms (see Sirdin, 1997).

Table 4.2 Estimates of the effective tariff protection levels, 1991 and 1997, percentages

Sector-Description	1991	1997
31. Food, beverages and tobacco	9.2	22.5
32. Textiles and leather	23.6	22.9
33. Wood & wood products, including furniture	22.9	19.8
34. Paper & paper products, publishing & printing	12.8	14.4
35. Chemicals and petrochemicals	13.2	15.3
36. Non-metallic minerals	15.2	14.4
37. Basic metallic industries	19.1	15.7
38. Metallic minerals, machinery & equipment	26.7	17.5
39. Other manufacturing industries	22.2	26.1
Industry	n.a	19.1
Weighted Average	12.7	17.3

Source: Berlinski (2004).

All quantitative restrictions were successively eliminated except in the automobile sector (see below). As a result of this series of reforms, the weighted average tariff fell to 17 per cent in 1993, although tariff dispersion was higher than in 1991 (Table 3.1).

In conjunction with unilateral trade liberalization, the integration process with Brazil, initiated by the previous government in the mid-1980s, was deepened with the signature of the Asunción Treaty in 1991. This Treaty drew Paraguay and Uruguay into the preferential trade agreements with Argentina and Brazil, thereby creating MERCOSUR.

The four countries agreed on a schedule of automatic rounds of tariff reduction for intra-regional trade covering the period 1991-1994. After difficult negotiations, an agreement on a common external tariff (CET) structure – largely based on the Brazilian tariff structure – was reached in 1995. This transformed MERCOSUR into a customs union, although each country was allowed to maintain a list of up to 300 goods as exceptions to the common tariff⁶⁷.

Capital goods, information technology and telecommunications goods – which were imported at a 0 tariff rate in Argentina – would converge to the CET only in 2001 and 2006, respectively⁶⁸. A special arrangement was put in place for sugar which had been never exposed to trade liberalization within MERCOSUR due to the low competitiveness of Argentine producers. An administered trade regime was adopted for automobiles (see below). A number of items in the chemicals, steel, paper and footwear sectors were temporarily exempted from free intra-regional trade and placed under convergence programs with gradual tariff reductions until 0 level was achieved in 1999.

After these changes, as observed in Table 3.1, the average tariff was 16 per cent by 1997, slightly lower than in 1993. However, the effective protection increased from 12.7 in 1991 to 17.3 per cent in 1997 (Table 4.2). Food, beverages and tobacco showed the

⁶⁷ By the end of 1997, Argentina proposed a transitory increase in the CET aimed at offsetting the derogation of the "statistics tax" which had been demanded by a WTO panel. As a consequence, from January 1998 to December 2000, the member countries agreed to a transitory increase of the CET by three percentage points.

⁶⁸ In spite of this compromise, in the following years the Argentine government introduced different regimes that established lower tariffs for imports of capital goods not produced in MERCOSUR, and in 2001 the 0 rate for capital goods imports was adopted once again.

highest increase, while there was a significant reduction in the effective tariff protection in the areas of metallic minerals, machinery & equipment (Table 4.2).

Trade liberalization led to a significant growth in imports of manufactured goods and goods produced outside the country were much more easily imported than in the past. For the first time since the liberalization of trade in the period from 1976 to 1981, imported goods flowed into Argentina forcing domestic producers to compete in the local markets by launching new products and production processes and increasing productivity.

Import penetration ratios in the entire manufacturing sector rose from 5.7 per cent in 1990 to 19 percent in 1999. Those ratios were much higher in the areas of unskilled labor-intensive and in technology-intensive goods. Furthermore, a significant decline in the relative prices in all manufacturing sectors was observed after 1990 and a negative and significant correlation between (relative) prices and import penetration ratios was established (Galiani and Sanguinetti, 2003).

In this scenario, and despite the government's initial commitment to liberalization, the unfavorable evolution of the trade balance and the emergence of sectoral pressures amid growing unemployment induced the government to introduce certain *ad-hoc* instruments to restrain imports. The "statistics tax" on imports was, for example increased from 3 per cent to 10 per cent in 1992⁶⁹ and the government made aggressive use of safeguards and defensive commercial legislation such as anti-dumping and compensatory duties.

The number of investigations of cases of dumping and subsidies which were subject to legal judgments increased over the decade. Cases of dumping increased from 24 in 1996 to 65 in 1999 and 98 in 2001, and there were 412 legal judgments between 1996 and 2001. Over the decade there were 16 investigations concerning subsidies, all related to goods of European Union origin (Bouzas and Pagnotta, 2003). In fact, among MERCOSUR members, Argentina was the country with a higher number of these measures during the 1990s and during the period from 1992-97, and among the seven WTO countries with the highest number of anti-dumping investigations on an annual basis.

Although it is clear that trade policy was more liberal than in any other period since 1930, from 1991 to 2000 there were a great number of modifications in the trade protection framework, both through changes in nominal tariffs and through the introduction or removal of special regimes, non-tariff barriers and other charges (such as the "statistics tax"). While sectoral pressures, and short-term economic policy objectives – i.e. those related to inflation abatement, current account imbalances, fiscal revenues – help to explain why there were frequent changes in trade policy during the 1990s, those changes impaired the role of a tariff structure as a guideline for resource allocation by private agents (Bouzas and Pagnotta, 2003).

There was a similar development in the area of regional integration. Although intra-regional trade expanded substantially, periodical disputes arose, especially between Argentina and Brazil, and reached their peaks during moments of economic crisis in one or more of the member countries. The disputes were aggravated by the lack of effective institutional arrangements to deal with trade or other types of conflicts, and by the

⁶⁹. Even though the supposed aim of the statistical tax was to contribute to finance data collection on foreign trade, it is clear from its high levels that in practice it worked as a non-tariff extra charge.

absence of “deep” integration mechanisms beyond trade liberalization. Of particular importance is that MERCOSUR has never had regional competitiveness or sectoral policies aimed at taking advantage of the potential gains from integration. The automotive sector regime considered below has mostly been concerned with regulating bilateral trade between Argentina and Brazil in order to avoid a serious flight of the industry from the former to the latter country. In this scenario, defensive or protective trade measures prevailed, while the underlying structural problems were not solved⁷⁰.

The Brazilian devaluation in early 1999 severely hit the Argentine economy and led to huge pressures from the private sector to establish compensatory mechanisms to deal with the sudden change in the bilateral exchange rate between both countries⁷¹. It also fuelled Argentine claims about the diversion” of foreign investments from Argentina to Brazil. This situation had already been exposed during the period 1997-1998 as a result of several federal and national investment incentive packages on offer in Brazil and even deteriorated during the Argentine recession in 2000 and 2001. The problems associated with the lack of any form of coordination of macroeconomic policies had their fullest impact during this period.

Although MERCOSUR as such has survived so far, it is evident that there has been complete stagnation for several years in the negotiations aimed at deepening regional integration, a fact that has not only led to the aforementioned periodic conflicts, but has also prevented full exploitation of the potential advantages of the agreement.

Deregulation of foreign direct investment, technology transfer and other areas

Deregulation measures may be classified under two headings. There are those aimed at lowering costs, generally through increased competition in the domestic market, or at opening new investment opportunities in areas where legal entry barriers existed.

Among these measures, we have already mentioned those related to labor deregulation, which had been a long-standing demand of the business sector. Other areas where different kinds of deregulation measures were adopted include the oil industry, agriculture, fishing, mining, foreign trade operations, electricity and gas, exchange and capital markets, professional services, wholesale and retail trade, land, water and air transport and insurance. (see Llach, 1997).

The second group of deregulation measures is related to the attraction of foreign investment and/or the technological modernization of the domestic economy. In this regard, it must be noted that, together with capital goods imports, FDI (which was also seen as a source of finance from the point of view of the balance of payments) and technology transfer were viewed by the government as the potential cornerstones of

⁷⁰ In 2002 an initiative to create regional sectoral fora was launched. These fora were conceived as vehicles for producers in different member countries to reach agreements aimed at solving trade conflicts as well as to establish arrangements and common strategies in order to enhance the competitiveness of the region as a whole and to integrate regional value chains. So far, however, only the forum dealing with wood products has been constituted.

⁷¹ The main sectors involved in trade conflicts were dairy products, pigs and hogs, chicken, textiles, steel, wheat and rice.

competitive domestic production and productivity gains in the new trade liberalization scenario.

FDI had been already strongly deregulated in 1976. The Menem administration completed this task, removing almost all the few remaining sectoral restrictions still allowed in the 1976 regime. After this round of reforms, no approvals, formalities or registration procedures or any kind were required for FDI operations. There were neither discriminatory withholding taxes towards income nor taxes applied to the remission of profits and dividends emanating from FDI.

This investor-friendly approach was also followed by the signing 51 bilateral investment treaties, endorsement of the failed Multilateral Agreement on Investment (MAI) proposed by OECD countries and generous concessions in the negotiations leading up to the General Agreement on Trade in Services (GATS). Following the mandate of the TRIPs agreement negotiated in the Uruguay Round of GATT, the old Argentine patent law (Law 111 of 1864) was modified in 1995. Among other changes, patent protection was extended to pharmaceutical products, despite the opposition of the leading domestic manufacturers. The protection period was extended from 15 to 17 years and compulsory licensing was eliminated⁷².

In the area of technology transfer, the military government had enacted a very liberal regime (Law 22426) in 1981 which almost totally deregulated technology imports. Registration of contracts between independent firms was only optional⁷³, while the implementation authority, the National Institute for Industrial Technology (INTI)⁷⁴, had to approve legal deeds between parent firms and their local subsidiaries. This last requirement was removed when the 1993 Foreign Investment Law was enacted.

What happened with FDI inflows and technology transfer following these deregulation measures? In sharp contrast to the previous decade, when very few FDI transactions took place, Argentina was one of the main destinations for FDI inflows in the developing world during the 1990s. Between 1992 and 2001 investment of over US\$ 76,000 million flowed into the country. For several years during that decade, annual inward FDI flows accounted for over 2 per cent of GDP and 10 per cent of gross fixed capital formation⁷⁵.

Most FDI inflows were related to takeovers, initially of public firms and then of private domestic enterprises, and account for around 60 per cent of FDI inflows in the 1990s. The FDI came mainly from the United States and some European countries such as Spain, France, Italy, the Netherlands, Germany and the United Kingdom. Neither Japan nor other East Asian countries made significant investments in Argentina. There were, however, also some major inflows from Chile and, to a lesser, Brazil.

⁷². Patent applications in Argentina increased by 128 per cent between 1990 and 2002. However, almost the entire increase was due to applications by foreign companies aiming to get protection for products already patented in other countries.

⁷³. However, registration allows tax deductions, which is an incentive for firms to register their contracts.

⁷⁴. Later on, the National Institute of Industrial Property (INPI) was granted this role after its creation in mid 1990s.

⁷⁵. These figures were substantially higher than their counterparts during the ISI period. Between 1959 and 1963, FDI inflows to Argentina averaged US\$ 464 million annually (measured in constant 2001 dollars). In the 1990s, the same figure was over US\$ 6760 million. While in the first period FDI inflows amounted to around 0.3 per cent of GDP, in the 1990s they were above 2 per cent of GDP almost every year.

The oil industry attracted one-third of FDI inflows⁷⁶ between 1992 and 2000, while the manufacturing industry received around 22 per cent of those inflows. Chemicals (especially petrochemicals), the automobile and food and beverages sectors attracted most manufacturing FDI. The rest went into services, through in privatizations and also into banking, the retail trade, etc.

The main attractions for foreign investors were the abundance of natural resources and the size and growth rate of the domestic market together with privatization, price stabilization, trade liberalization and, to a lesser extent, integration within MERCOSUR (Chudnovsky and López, 2001). Neither cheap labor – wages in US dollars were relatively high in Argentina during the 1990s – nor loose enforcement of environmental regulations were key factors in attracting FDI⁷⁷. The “investor- friendly approach” was perhaps a necessary pre-condition for the FDI boom, but, in itself, it would not have had a sizeable impact in the absence of the other aforementioned attractive conditions in Argentina.

In 1992, the contracts registered in respect of payments for technology transfer (bearing in mind that registration is for information purposes only) amounted to a total value of US\$ 74 million. The value of such contracts in 1996 was US\$ 632 million and had climbed to US\$ 1455 million in 1999, to later fall to US\$ 765 million in 2001 (Rodríguez, 2004). The bulk of the contracts related to licenses and technical assistance.

While the remarkable growth in technology payments may have been due to a real increase in the amount of expertise transferred from abroad in the context of economic restructuring, it may also have been related to the strong presence of affiliates of TNCs in Argentina and more research on this issue is undoubtedly necessary.

Sectoral, enterprise, export and technology policies

When the program of structural reforms was implemented, no complementary policies were initially adopted to encourage productivity growth in firms, such as SMEs, that would face problems in adapting to the competitive environment. Furthermore, the program was thought to be incompatible with any kind of “old-style” industrial policy, which was blamed for many of the problems faced by the Argentine economy. The government assumed that the new rules of the game – a more deregulated and liberalized economic environment – would foster a restructuring process in which efficient firms and sectors would expand and increase productivity, while inefficient ones would disappear.

However, as early as 1991, a notable exception had to be made in the trade liberalization program: the automotive sector was placed under a special regime which protected it from the pressure of import competition. The main reasons behind the adoption of this regime were fears about the capability of the industry to face competition from imported products – it must be noted that the authorities were particularly afraid of massive layoffs

⁷⁶ The oil industry, together with the mining sector, attracted mainly resource-seeking investments – resource-seeking FDI is motivated by the availability and/or cost of natural and human resources (Dunning, 1993).

⁷⁷ Local environmental regulations are quite stringent, although enforcement is rather loose. As a result, Argentina shows pollutions levels higher than what one would expect for a mid-income country (World Bank, 1995).

in the event of a collapse of the automotive sector-. The regime was presented as a way to allow a gradual restructuring of the industry, after which it would be able to compete in an open market. The extent to which this objective was attained is analyzed below.

As seen before, throughout the 1990s a number of trade restriction measures had to be taken in order to address the difficulties of sectors that were being damaged by import penetration. Unfortunately, at least from our point of view, those measures were never tied to serious programs aimed at encouraging productivity growth and strengthening competitiveness in protected sectors and it comes as no surprise that those sectors had been constantly calling for protectionist instruments.

Pari passu, the consequences of the reform program shed light on the existence of market failures and other types of obstacles that prevented many firms from adopting strategies aimed at adapting to the new rules of the game. These difficulties were clearly reflected in the fact that many SMEs had shrunk or even collapsed⁷⁸, while others had abandoned production for import activities. This situation led to certain horizontal public policies being adopted from 1994 onwards, including those oriented towards facilitating credit access for SMEs.

The need to foster exports in the face of growing trade imbalances led to a redesign of the various incentive programs. Investments were promoted through sectoral schemes aimed at assuring long-term fiscal stability for private firms (i.e. mining, forestry) and through the creation of the Investment and Foreign Trade Bank (BICE), which replaced the failed BANADE (as its name suggests, BICE also lends for export purposes).

Last but not least, even though the government clearly favored foreign technology sources – FDI, capital goods imports, licenses, etc- to provide inputs for the productive restructuring process, some initiatives aimed at fostering local innovative activities have in fact been adopted since the mid-80s. These were intended to deal with market failures which prevent domestic firms from undertaking such activities.

The aforementioned programs are briefly analyzed in following section. Anticipating our conclusions, it may be stated that, with the exception of the sectoral schemes, it is clear that they have not had a substantial impact on productivity growth. In this regard, it must be noted that, by the late 1990s, only 20 per cent of manufacturing SMEs had availed of at least one of the public programs in force during that decade (Yoguel and Moori Koenig, 1999). Most of those that had not utilized the programs argued that there was a lack of information on them, while another group of firms stated that the programs were not suitable for their needs.

Angelelli *et al* (2004) mention some factors that could explain the low response of SMEs to the incentive schemes and these include weak management capability, excessive bureaucracy, the lack of private sector involvement in their design and operation and institutional instability with resulting high staff rotation levels and frequent budget cuts. There was a lack of coordination among the different programs and no strategic or global vision underlying their design. Furthermore, they were rarely been subject to serious evaluations, which give rise to uncertainty as to their actual results. *Last but not least*, it

⁷⁸ A recent study indicates that the number of manufacturing firms fell from 50,000 in 1995 to 45,000 in 2001. Whereas 3,500 enterprises collapsed, 2,500 firms were created annually on average in this period. Preliminary estimates suggest that the majority of companies that closed their doors pre-dated 1995 (JICA-UNGS, 2003).

has often been the case that the firms who used the programs were those with greater dynamism and competitive skills. Hence, it is probable that, at least to some extent, the policies under analysis have contributed to growing heterogeneity among domestic SMEs (Yoguel *et al.*, 1998).

Sectoral policies⁷⁹

The motor vehicles regime

The main elements of the special regime for this sector were put in place in 1991. The regime consisted of a combination of import quotas, investment and balanced trade requirements for established manufacturers, minimum content rules for locally-produced vehicles and preferential import tariffs for domestic producers. The program aimed at promoting specialization and fostering competitiveness among established car manufacturers in order to take advantage of the rapid increase in domestic demand that followed stabilization.

The motor vehicles regime was complemented by an agreement signed with Brazil in 1990, which significantly increased bilateral trade. The agreement established a duty-free balanced trade program for vehicles produced in both countries, subject to minimum domestic content requirements. The bilateral agreement was modified in 1994 and 1995, after Brazil implemented an automotive sector regime similar to that in force in Argentina. Since 1995, trade in finished vehicles and automotive components within MERCOSUR has been free of quotas, but it continued to be subject to compensatory rules between total exports and imports for a four-year period.

Eventually, in July 2000, a MERCOSUR common automotive sector regime was adopted. The common policy established a 35 per cent common external tariff for car imports from third countries (for parts and components the CET was set at 14, 16 and 18 per cent). The regime also provided for preferential import tariff rates on extra-zone imports for established manufacturers and duty-free intra-regional trade subject to balanced trade requirements (to be phased out in 2005). It was envisaged that intra-regional trade would be fully liberalized as of 2005, but liberalization was postponed in 2004 *sine die* due to fears that Argentina would lose most of its automobile production to

Brazil. Negotiations on minimum local contents for bilateral trade in automobiles were particularly tough, as Argentina wanted to preserve a domestic production capacity in automotive components which the national government thought to be in danger without such regulations.

What were the impacts of these changing trade regimes on the automobile sector? Local production, which had reached a historical minimum of less than 100,000 vehicles in 1990, quadrupled between that year and 1994. The production upswing could not cater for the rapidly growing local demand and the share of imports in the market grew from 1.2 percent in 1990 to 26.3 percent in 1994. Exports, which had been historically very

⁷⁹ Besides the automobile and mining regimes, which will be discussed below, a regime for promoting investments in the forest activity was also established. It granted 30 years of fiscal stability and other tax incentives. Substantial investments were fostered by this incentives scheme.

low, rose from in excess of 1,100 units in 1990 to 52,000 in 1995 and the export share vis-à-vis local production grew from 1.1 percent in 1990 to 18.5 percent in 1995. Both the largest shares of imports and exports were related to bilateral trade with Brazil. Production and trade of automotive components showed rather similar figures and trends.

After the tequila crisis, production grew again until 1998, when a historical record of 457,000 units was reached. Exports reached 237,000 units (more than 50 percent of total production), and they were closely matched by imports (which accounted for over half of domestic market sales). Hence, it was quite clear that industry had gone through a complete process of restructuring throughout the decade, not only because production was 4.5 times that of 1990, but also because – from a closed market (around 1,000 units were imported and exported in 1990) –, foreign trade accounted for over half of both production and domestic demand in 1998⁸⁰. However, it must be noted that this internationalization process was not the result of market dynamics, but rather the outcome of a regime of managed trade.

Investments also increased strongly in the 1990s, both from established manufacturers and from newcomers – it should be remembered here that, in the 1980s, many car manufacturers had closed or sold their facilities in Argentina. Between 1990 and 1995 total investments in the automobile sector reached US\$ 2 billion and, according to the automobile makers association (ADEFA), investments during the 1990s totaled US\$ 5.6 billion. There were also substantial levels of investment in the automotive parts and components sector, in which many foreign companies acquired local firms.

While in the 1980s and even in the early 1990s many major car assemblers (Fiat, General Motors, Renault, Citroen, Peugeot, Chrysler) closed their facilities or licensed their technology and trademarks to local producers and left the country, most of them returned and newcomers also arrived (i.e., Toyota) in the 1990s. Between 1990 and 1998, the number of employees in the automotive sector increased by 32 percent, from 17,430 to 22,963. Labor productivity in the sector rose by around 250 percent in the same period.

The sectoral regime and the bilateral agreement with Brazil encouraged a division of labor between plants on both sides of the border. In contrast with the specialization that prevailed in the mid-eighties – based on intra-industry trade in parts and components – the new regime favored assembly firms and particularly those with plants in the two countries. Specialization by model type was also encouraged. In effect, while in 1990 Argentina produced 25 models, only 12 models were produced in the country in 1997. (Campos, 1998). These trends were not only facilitated by the domestic and regional policy framework, but also by changes in the global strategies of automobile TNCs which aimed at closer integration among their subsidiaries in different countries.

Considering the initial constraints and the state of the industry worldwide, the motor vehicles regime was successful in attracting market-seeking foreign investment. It also helped to promote some efficiency-seeking⁸¹ investments by integrating the Argentine automobile industry into the broader MERCOSUR market. The regime also fostered a

⁸⁰It must be noted that finished car exports from Argentina include a high share of imported parts and components from Brazil and elsewhere.

⁸¹Investments made by TNC affiliates aimed at increasing the efficiency of their activities by integrating assets, production and markets to better exploit economies of scale and scope are called "efficiency-seeking" (or "rationalized") investments (Dunning, 1993).

significant upgrading of technological capabilities and production methods. There was a remarkable increase in the productivity of local plants as a result of the exploitation of economies of scale and the introduction of modern practices (such as *just-in-time* inventory management) (Bastos Tigre *et al*, 1999).

However, the regime has also had problems, such as a tendency to create a situation of structural overcapacity. This prevented achievement of the economies of scale necessary to compete in world markets (economies of specialization were not enough to compensate for the lack of scale). This issue will also be dealt with below.

The regime also affected the automotive parts and components sector by bringing about a significant reduction in the number of suppliers per plant in line with international trends and a relatively low domestic content in finished cars, particularly in new models. The modernization of the sector also encouraged the establishment of new parts and component manufacturers that are worldwide suppliers of terminals.

Although this improved quality, scale, costs and delivery periods in the parts and components sector, it also forced a large number of existing domestic firms into bankruptcy, while others had to survive through specialization in the after-market segment (Kosacoff, 1999). This frustrated the possibility of taking advantage of acquired manufacturing capacities and qualified human resources and is a pattern consistent with the absence of initiatives targeted at developing local suppliers, which might have increased positive spillovers into the local economy. Furthermore, key policy issues such as environmental practices, the creation of research, development and design units and human resource training were left completely in the hands of firms.

The automobile industry was severely hit by the recession which began in late 1998. Production fell by 25 percent between 1998 and 2000⁸² and employment was reduced in a similar percentage. The fall in domestic sales was even higher. Car manufacturers could not compensate for the domestic recession with exports since Brazil's devaluation in 1999 put Argentine production at a severe cost disadvantage – exports decreased by more than 40 percent between 1998 and 2000-⁸³.

Furthermore, the change in the bilateral exchange rate with Brazil, together with the domestic recession and the attractive incentives in Brazil for automotive industry investments, forced several parts and components firms to close their facilities in Argentina and move to Brazil. The same happened with some assembly lines in the finished cars segment⁸⁴.

On balance, the automobile industry in Argentina is more open and competitive than in the past, and local customers now have access to vehicles technologically similar to those sold in developed countries (in the past a “tropicalized” versions of car models were often produced). However, after the crisis, a situation of structural overcapacity arose. Furthermore, it is plausible to expect that, in a scenario of trade liberalization with Brazil, Argentina would face difficulties in attracting new investments and even some

⁸². Naturally, the 2001 crisis was even more damaging for the sector: in 2002 production was barely 1/3 of that of 1998.

⁸³. In recent years Argentine car makers have tried to diversify export markets to reduce “Brazil-dependence”.

⁸⁴. See Chudnovsky and López (2001).

established car manufacturers could leave the country and move to Brazil (the same situation could occur with automotive components companies). This is, at least to some extent, a consequence of the heterogeneity of investment projects undertaken in the 1990s. While some of the projects of that period endeavored to reach production scales aligned with international patterns, others had short-term horizons and mostly aimed at capturing the rents associated with the promotional regimes (Llach *et al*, 1997).

Furthermore, as previously stated, modernization came at the expense of linkages with local producers and a severe reduction in local content of finished cars. Even if Argentina's automotive industry did not become a "maquila", it is clear that spillovers from car manufacturing to the rest of the economy are relatively low.

Ultimately, the automotive sector ultimately benefited substantially throughout the decade (see Llach *et al*, 1997 for an evaluation of those benefits)⁸⁵, while the firms did not always meet the commitments they had assumed. For instance, when the export commitments originally agreed had not been fully met by the automobile producers, the penalties established in the 1991 regime were deferred in May 1994 and an additional year was given to offset the huge trade imbalance. Furthermore, the conditions under which imports can be offset by exports were partially relaxed. These benefits were given in exchange for new commitments - some of them vaguely formulated - in terms of prices, competitiveness, production, investments and exports.

A few years later, those firms that were not able to offset with new exports the accumulated previous deficit, despite the more flexible regime, were obliged to cancel the debts (estimated at US\$ 140m) for uncompensated imports. However, in 1999, to compensate for the domestic recession, the government allowed automobile manufacturers to use the paid fines to cancel tax obligations.

The Mining Regime⁸⁶

Although Argentina had implemented different promotional regimes for the mining sector for years, they failed to attract significant resources to explore and exploit areas with mining potential. Following this disappointing experience, a new regime was put in place between 1993 and 1995. The new regime established incentives, such as the possibility to deduct expenditures to determine projects' feasibility from the income tax and accelerated amortization procedures for investments made in equipment, construction and infrastructure. The investors were also authorized to capitalize up to 50 percent of the value of mining reserves and to exclude it from the determination of their tax liabilities. Mining firms were also exempted from wealth tax and from paying import levies and other charges on imported machinery, equipment and inputs.

Moreover, the regime guaranteed investors stability in tax, foreign exchange and import tariffs for a period of 30 years (excluding changes in the exchange rate and in export tax rebates).

⁸⁵ Besides the aforementioned incentives, in 1999, in the face of the domestic market recession, the so-called "Plan Canje" was launched, by which consumers could change their old cars for new ones at a price lower than the market one - the discount was financed by a special tax reduction on cars sold under that regime.

⁸⁶ This section is largely based on Moori Koenig and Bianco (2003) and official sources.

The federal agreement committed provincial governments to charge investors with royalties of up to 3 percent of the value at ex-mine. The agreement gave rise to conflicting interpretations, as mining firms (endorsed by the federal government) adopted a definition of value ex-mine that deducted from royalties the amortization of fixed assets (machinery, technology, etc.). Most provincial governments did not accept this definition and their position was backed by Congress which reformed the National Mining Law in 1999.

The new regulatory framework coincided with a remarkable increase in inward FDI, especially in 1992-1996. The bulk of new investments came from Canada, South Africa, Australia, USA and the United Kingdom. In 1996, the inflow of FDI into the mining industry rose to about US\$ 700 million. However, falling world demand after the Asian crisis and lower international prices contributed to a sharp decline in FDI inflows after 1997.

In 1997-98, mining production and exports increased sharply due to three major metal projects becoming operational: Bajo de la Alumbrera, Salar del Hombre Muerto – both in Catamarca - and Cerro Vanguardia in Santa Cruz. In effect, mining output in 1998 was 138 percent of that recorded in 1996. However, after six years of continuous growth, mining production started to contract at the turn of the decade, mostly due to the aforementioned fall in international prices.

Typically, the linkages of mining projects with the local economy are very limited. Both technology and equipment are mostly imported. This offers an opportunity to formulate policies aimed at developing the value-added chain in order to benefit more fully from the new investments made in the sector.

Although little progress has been made in this area, the government is devising a framework for the sustainable development of mining. The objective is to formulate social, economic, political and environmental indicators to determine the impact of large mining projects on local communities. The expected outcome will be the coordination of policies among different levels of governmental (federal, provincial and local), the communities and mining firms in order to establish sustainable development guidelines for mining in each area.

Enterprise policies

As previously stated, soon after the reforms were adopted the government began to launch a series of initiatives aimed at facilitating the adaptation of local firms, especially SMEs, to the new rules of the game.

In 1992, a so-called specialization regime was adopted. Industrial firms submitted programs of export objectives and tariff reductions were granted for imports of inputs and/or final goods. This regime, which was managed by the Industry Secretariat, ended in the mid-1990s.

In the Industry Secretariat, a National System of Norms, Quality and Certification was created in 1994. The system was supposed to work on the coordination of the different entities involved in the issue of quality in the country. This brought about a significant

increase in the number of ISO certifications in the country⁸⁷, both at national and regional levels – and different programs of subsidies for obtain ISO certifications were implemented in the 1990s. Apart from this progress, there is no further assessment available on the impact of this system, which, in fact, never became fully operational and was abolished a few years after its creation.

In 1994, the Industry Secretariat also launched a Program of Supplier Development, with the aim of developing a reliable and efficient network of suppliers among SMEs in order to strengthen productive linkages with large firms. Due to budgetary constraints, this program had to be dismantled shortly after its launching.

A system of Productive Poles was also designed, aimed at identifying regions, zones or sectors with potential to undertake productive restructuring measures. The INTI provided advice on technological and organizational changes and improvement in production processes. The Industry Secretariat offered financial support in the form of different programs of credits for SMEs. Although some agreements were signed under this scheme, it was also discontinued shortly after its creation.

The only partly successful public programs for SMEs in the first years of the 1990s were those that subsidized the interest rates paid by SMEs on borrowings from the financial system. Although these programs generally assigned all the available resources, it is hard to find any evaluation of their real impact on the beneficiary firms' performance. Their rationale was based on the evidence that SME access to credit was impaired by market failures which substantially increased the interest rates paid by those firms. Later on, the problem of access to credit due to the lack of collateral was addressed through programs that assisted SMEs to obtain the necessary collateral, although there is evidence to suggest that this initiative had little impact.

In 1997, the Science and Technology Secretary designed a Program for Improving the Technological Capacity of SMEs on the basis of an analysis of the problems faced by SMEs with regard to technology and innovative activities. The program was based around a network of "technological advisers" whose function was to detect the technological problems of groups of SMEs, suggest strategies to overcome them and facilitate the development of linkages with public and private S&T institutions to solve these problems (Chudnovsky, 1999).

This is one of the few policy initiatives launched in the 1990s on which an assessment is available (Carullo *et al.*, 2003). The firms that participated in this "technological advisers" program were largely satisfied with the results obtained which included the implementation of quality systems, production layout modifications, reduction of idle times and improvements utilization of raw materials. The impact of this program on the firms' performance was, however, never evaluated.

Due to its limited budget, a very small number of firms (326 between 1997 and 2001) had access to the program and lack of trust and an aversion to cooperation with other firms

⁸⁷ While in 1991 there were no ISO 9000 certifications in the country, between 1992 and 1997 251 certifications were granted in Argentina. In July 1999, 869 firms/institutions had 1112 certifications. At present, the number of valid certifications is around 2600. Different subsidy mechanisms have been available both at national as well as at sub-national government levels for firms wishing to attain ISO 9000 certifications.

and institutions may also help to explain the limited response of firms targeted. One of the criticisms of the program concerns its lack of integration into other S&T initiatives launched at the same time (Carullo *et al.*, 2003).

In 1997 an SME Secretariat was created. Two assistance programs were initiated during this period: the Program of Support to Enterprise Restructuring and the Program of Enterprise Restructuring for Exports (see Ventura (2001) for an analysis of the latter). These programs offered non-reimbursable funding for the firms to avail of advisory and consultancy services in areas such as quality control, management, qualification for standards, access to external markets, etc.

The number of programs directed at SMEs substantially increased in 2000-2001. By 2002, there were 17 such programs devoted to issues such as credit access and cost, supplier development, exports, fostering SME partnerships, improvement of value chains, human resources training, etc (see Angelelli *et al.*, 2004). Due to budgetary constraints and institutional weaknesses there were difficulties in the implementation of these programs, although most of them are still in operation.

In 2000 an "SME Law" was approved which provided for the creation of a special fund for SMEs. The fund – which has not been implemented to date - was to provide long-term financing for SME investments and also to possibly serve as the cradle for the promotion of venture capital funds in Argentina

Finally, it is worth repeating that, the old BANADE was closed in 1992. Its lending capability had been impaired by non-performing loans, the high inflation regime had frequently rendered BANADE lending rates strongly negative, loans had been granted for political reasons, and its technical capability had been damaged by the lack of institutional stability. The BICE was created and this new bank was supposed to contribute to financing investment and, primarily, export operations. In practice its impact has been limited mainly because it was created as a second-floor bank. This had two consequences: i) interest rates in BICE's credit lines were not very different from market rates; ii) BICE did not have contact with its potential clients and actual credit demand depended on the efforts made by commercial banks to publicize the benefits of the credit lines on offer (Bouzas and Pagnotta, 2003).

Export promotion policies

In the 1990s, a number of WTO-compatible export promotion policies were in force. The existing draw back and temporary admission regimes were retained with minor modifications. Exporters could also recover the VAT charged on domestic purchases, provided that those purchases were related to inputs used in the exported goods. This regime, however, was affected by government delays in refunding VAT, mostly due to repeated fiscal pressures.

Export reimbursements were also granted. In 1992, those reimbursements were at the same level as import tariffs, in order to compensate fully for the "anti-export" bias. However, this criterion was later modified, again mainly on account of budgetary restrictions. In addition, there were other special regimes in place which benefited certain regions and activities (see Bouzas and Pagnotta, 2003).

The Export.ar Foundation, a non-profit organization with representatives of both the public and the private sectors, was created in the early 1990s with the aim of assisting private firms in their efforts to access, expand and diversify export markets. The Foundation's services included information and seminars about foreign markets and business opportunities, assistance in organizing business travel and the participation of Argentine international fairs. Its performance has, however, been limited by budgetary constraints.

Science and technology policies

Breaking with the *laissez faire* approach that had traditionally predominated in this area in Argentina, some technology policy initiatives were adopted by the Science and Technology Secretariat from the mid-1990s onwards (see Chudnovsky *et al*, 2004a for an evaluation of the respective programs). The forerunner of these initiatives was the Law for the Promotion and Support of Technological Innovation (No. 23877), which was passed in 1990, and the Program of Technological Modernization launched in 1994 – both programs granted credit assistance for R&D and innovative activities carried out by local firms.

In December 1997, the government Science and Technology Cabinet (GACTEC) approved the National Multi-year Science and Technology Plan 1998-2000. This plan, which is renewed annually, is aimed, *inter alia*, at setting priorities for research funding.

By the end of 1996, a National Agency for the Promotion of Science and Technology (from now on the Agency) was created within the Secretariat for Science and Technology. The aim of the Agency was to finance non-profit research projects in the public and private sectors (through a fund called FONCYT) and promoting technological innovation in the private sector (through of a fund called FONTAR). Both FONTAR and FONCYT granted subsidies and credits for S&T projects.

A recent survey shows that only 25 percent of SMEs know about FONTAR's existence, while around 4 percent have used funds from that organization (INDEC-SECYT-CEPAL, 2003). Lack of information, bureaucracy, difficulties in getting the required collateral and the inability to document projects were the reasons mentioned by the firms as to why they were unaware of FONTAR and/or have not used its funds.

Furthermore, a recent study based on econometric techniques has shown that funding from FONTAR had no incremental effect on R&D decisions taken by firms that already have a pro-innovation attitude (Sanguinetti, 2004). This casts doubts on the real impact of the program.

A fiscal credit for R&D expenditures by private firms was established and became operative in 1998 (see Chudnovsky, 1999, for details). From 1998 to 2000, 243 firms benefited from fiscal credits for R&D projects (76 percent of those firms were SMEs).

In 2001 the program was discontinued due to budgetary restrictions, but in 2002 it was again in operation (34 of 100 project submissions were approved). The program is still operating on the basis of annual requests, and its original budget was raised from \$20 to \$25 million.

A survey of 55 firms which benefited from the program between 1998 and 2001 showed a positive impact on the magnitude and quality of their innovative activities and that the program facilitated the implementation of projects which would otherwise not have been carried out. (Chudnovsky *et al*, 2004a). R&D expenditures rose from 0.3 to 0.8 percent of the sales of firms surveyed, compared with the periods 1995-97 and 1998-2002. However, no rigorous cost-benefit evaluation was carried out to date and, by financing specific projects, the program fails to give firms an incentive to adopt R&D as part of their core activities.

In the 1990s, the government also tried to foster public S&T institutions in order to establish closer linkages with the private sector. In the case of CONICET, this objective was pursued with little enthusiasm or success⁸⁸. The same can be said to a large extent for the University system⁸⁹. Regarding INTI, too much emphasis was placed on self-financing, which reinforced the historical bias of the organization in favor of metrology and routine tests. Naturally, the heretofore not very relevant innovative and research activities were further displaced within INTI (see Chudnovsky *et al*, 2004a).

In this scenario, it comes as no surprise to find that universities and public S&T institutions ranked among the least important sources of information for innovative activities in manufacturing firms and that technological linkages of private firms with those organizations were weak (INDEC-SECYT-CEPAL, 2003; INDEC-SECYT, 1998).

To complete this section, it is relevant to take a look at the evolution of expenditures in S&T during the 1990s, although, from what has been said above, it is difficult to establish a link between that evolution and the aforementioned programs. The share of S & T expenditures ⁹⁰ in GDP increased from 0.3 percent in the period between 1985 and 1990 to 0.5 percent between 1996 and 2000. R&D expenditures reached 0.45 percent of the GDP in 1999, with an average of 0.41 percent from 1996 to 2000 (Table 4.3). Despite these slight increases in the 1990s, the figures are low by international standards, both in relation to developed countries and the "Asian tigers" and also *vis-à-vis* neighboring nations such as Brazil and Chile.

Table 4.3 Average S&T expenditures and R&D expenditures as a percentage of GDP

	S&T Expenditures/GDP	R&D Expenditures/GDP
1985-1990	0.32	n.a
1991-1995	0.41	n.a
1996-2000	0.50	0.41

Source: SECyT.

⁸⁸ In the last two or three years some initiatives have been taken aimed to change the CONICET's traditional reluctance to engage in technological activities. Even if so far no information is available on the impact of those initiatives, they are in the right direction.

⁸⁹ However, available evidence suggests that while in larger public universities linkages with the private sector are scarce, in smaller and newer universities there is more interest in entering into partnerships.

⁹⁰ They include R&D expenditures plus others related to the diffusion of S&T activities, specialized libraries, etc.

If the composition of the expenditure by sector is analyzed, the most important change is the increase in the share of the business sector, which grew from almost 16 percent of S&TA expenditures in the second half of the 1980s to 31 percent in 1998 –*pari passu*, the relative share of public institutions declined.

However, the share of the private sector in the financing and performance of R&D expenditure is low *vis-à-vis* both developed nations and developing Asian countries. In part, this is explained by the small size of the productive sectors in developed countries with the highest R&D expenditures relative to their sales: informatics, aviation, fine chemicals, etc.-. However, certain sectors in developed countries (e.g. the pharmaceutical, automotive and industrial chemicals sectors) spend considerable shares of their sales in R&D, but do not show the same performance in Argentina. As a consequence, the low expenditure on R&D is partly a result of differences in the productive specialization pattern in Argentina compared to that of developed countries. The innovative patterns in the Argentine private sector are analyzed in greater depth below.

Productivity growth in the manufacturing sector

Main trends in manufacturing sector evolution

Value added in the manufacturing industry accumulated almost a 19 percent increase between 1991 and 2000. However, the share of industry in Argentina's GDP fell steadily during that decade, from 18.5 percent at the early 1990s to 17 percent in 1998 and to less than 16 percent in 2001. In other words, industry grew at a slower pace than the rest of the economy both during the growth as well as during the recession periods-. The services sector, including privatized public utilities, gained the share lost by industry.

Industrial exports grew substantially throughout the decade (the annual average for the period 1995 to 1999 was over 80 percent higher than that of 1990-1994), but, as with production, they lost their position within total exports – in which fuels and energy were the rising stars in terms of share(see Table 4.1).

As mentioned in Section 2, the increase in the physical output in manufacturing industry took place against a background of loss of employment⁹¹. The response of industry to trade liberalization was a quantitative adjustment, reducing the number of jobs and increasing the length and intensity of the working day. The growing share of imported goods in the local market and the difficulties of adapting through higher prices on account of the intense competition in a context of price stabilization led industry to seek higher levels of labor productivity to enable enterprises to survive over the decade (CEP, 1999).

There were five main factors behind the reduction of employment in the manufacturing industry during this decade) the implementation of *soft technologies* –improvements in the organization, productive processes and procedures with more efficient use of personnel and longer working days; ii) the substitution of foreign parts and inputs for those of domestic origin; iii) the use of new labor-saving equipment and technology as a result of the extreme change in relative prices between capital and labor at the beginning of the decade; and iv) the bankruptcy of firms with old productive processes and their replacement by new enterprises operating in line with international state-of-the-art

⁹¹ All manufacturing sectors experienced job losses between 1993 and 1998.

practices and low labor requirements; v) subcontracting or outsourcing of activities previously undertaken inside the firm⁹² (see Bisang, Bonvecchi, Kosacoff and Ramos, 1996).

The performance of the different manufacturing sectors was heterogeneous during the period under analysis. When comparing 1993 and 2000, the "winning" sectors were food & beverages, petroleum refinement, chemicals, rubber and plastics and, to a lesser extent, metals and pulp and paper. These activities mainly depend on the stock of natural resources and/or produce industrial commodities with scale-intensive processes. In general, they are able to easily enter external markets in times of falling local demand.

The sectors which declined in importance in terms of industrial production included textiles and clothing, metallurgy and machinery, electro-technology and transportation equipment. These are sectors either with high levels of unskilled (textiles) and skilled (machinery) labor or which are engaged in areas in which there are rapid technological advances (electronics). They were also severely affected by the commercial liberalization of the 1990s. Naturally, output contraction in these sectors also contributed to growing unemployment.

Heterogeneity is also observed when analyzing sectoral differences in export performance. Chemicals and petrochemicals, together with motor vehicles, accounted for around 60 percent of the increase in manufacturing exports between 1990 and 2000. Paper and pulp, steel and machinery and equipment contributed with another 25 percent.

In contrast, exports of shoe and leather goods declined and the share of textiles in total non-resource industrial exports fell from 6.3 to 3.7 percent during the same period.

MERCOSUR was the main destination for the growing industrial exports, accounting for almost 70 per cent of the increase in non-resource based manufacturing exports between 1990 and 2000. MERCOSUR's share on those exports jumped from 23 to 49 per cent over this two-year period. These figures indicate the positive role played by MERCOSUR for a large part of Argentine industry. Nonetheless, the low share of developed markets as destinations for manufacturing exports reflects both the weak competitive capabilities in many sectors and the influence of TNC strategies which account for a growing proportion of Argentina's foreign trade.

In this connection, it is relevant to briefly comment on the results of research into the trading performance of affiliates of TNCs in the 1990s. The available evidence suggests that, as in the ISI stage, market-seeking strategies were predominant. However, most foreign firms also took advantage of the opportunities created by MERCOSUR and in some cases, as seen in the automotive industry, had efficiency-seeking objectives.

Affiliates of TNCs tend to export and import on a larger scale than local firms. In 2000, TNC affiliates of the largest 500 industrial firms exported on average 26.7 per cent of their sales, compared with 23.2 per cent on the part of domestic firms. In the same year, imports reached 18.4 per cent of TNC affiliates' sales, while the corresponding figure for

⁹². As seen above, outsourcing often implies that employees formerly included in the industrial workforce, are considered as service workers after outsourcing.

local firms was only 7.3 per cent. In both cases, differences between the two groups of firms turned out to be statistically significant (Chudnovsky, López *et al.*, 2002).

Comparisons with the trading performance of TNCs during the ISI period are only available for US affiliates. According to data from surveys undertaken by the U.S. Bureau of Economic Analysis, export/sales ratios for U.S. affiliates in the manufacturing industry increased from an average of 12 per cent in 1983 to 21 per cent in 1999. Although it is clear that U.S. affiliates are much more export-oriented than in the past, it is also true that their export propensity is lower than in other regions (all U.S. affiliates in the world exported, on average, 41 per cent of their sales in 1999).

The trade performance of TNC affiliates in Argentina (at least, until the mega-devaluation of 2002) showed a form of “asymmetric integration” with the world economy. While they produced for the internal and the regional market (i.e. MERCOSUR), they imported inputs, equipment and final goods from developed countries. Affiliates obtained productivity and/or costs gains in the 1990s due to their access to better and/or cheaper inputs and capital goods and to the possibility of reducing their local product mix (they could complement it with imports of final products), imports), hence benefiting from economies of scale without losing economies of scope (Chudnovsky, López *et al.*, 2002; Chudnovsky and López, 2004).

Different entrepreneurial strategies

The structural changes described above were reflected in entrepreneurial performance. Most manufacturing firms had been established during the ISI period and engaged in learning processes in a highly protected domestic market, where growth was interrupted by recurrent crises and institutional and political instability was the norm.

Since the mid-1970s, this scenario had been changing, initially with trade liberalization and then with a “forced” closing of the economy, albeit in a situation of stagnation and increasing macroeconomic instability. The best-adapted strategies to this environment were those with short-term horizons, a preference for high liquidity preference – to take advantage of speculative financial transactions – and avoidance of long-term commitments (i.e. investments in fixed assets and innovative activities).

Naturally, reforms *cum* stabilization were a sudden change in the rules of the game that forced private firms to redefine their strategies to adapt to the new economic regime.

However, and contrary to what is often supposed in the neoclassical tradition, firms do not instantaneously adapt to changes in the environment in which they move. On one hand, firms’ strategies have a strong path-dependent component –i.e. inertia may delay the adaptation to the new environment. On the other hand, even if firms perceive the need to restructure their activities, market failures (related to finance, innovation, etc.) may prevent them from doing so. As seen before, even if some public policies were adopted in the 1990s to deal with these problems, they did not have a substantial impact on the general course of the economic restructuring process.

In the first one or two years after the reforms were implemented mostly “defensive” measures were adopted – aimed primarily at cost reduction. Then, as the firms perceived that reforms were irreversible, and growth and stabilization seemed to have been consolidated, a number of significant transformations took place in the manufacturing sector. These included: i) a bias

towards less labor-intensive “production functions”; ii) a deep reduction in the degree of vertical integration of local production due to the substitution of local for imported inputs; iii) a higher level of specialization of local firms as a result of the reduced product mix width – taking advantage of trade liberalization that made it possible to complement domestic supplies with imported goods-; iv) a trend towards the outsourcing of auxiliary services; v) the introduction of managerial and organizational innovations; vi) an increasing importance of marketing and advertising activities; and vii) growing attention to quality and environmental issues (Kosacoff, 1998)⁹³.

The need for adaptive technological initiatives was far less important than in the past. On the one hand, changes in global TNC strategies have often led to worldwide production systems, in which products and process technologies used by affiliates in different parts of the world are more standardized than in the past. *On the other hand, trade liberalization made imported capital goods and inputs cheaper and more easily available.* Moreover, modern equipment usually embodies computer-based process technologies which are far more efficient than outmoded electromechanical production techniques. This renders unnecessary a number of engineering activities carried out either to extend the life cycle of old machines or to perform technical operations now come incorporated in the new equipment. Similarly, R&D and project engineering departments can be eliminated when affiliates become part of worldwide integrated production systems and R&D and engineering efforts are transferred to headquarters⁹⁴. In this scenario, sources of foreign technology sources acquire even more preeminence over domestic sources than in the past (see Katz, 1999b; Cimoli and Katz, 2003).

Notwithstanding the existence of these general trends, below we will have the opportunity to learn more about the magnitude and impact of R&D and other innovative activities in the Argentine manufacturing industry during the 1990s. A less somber and more nuanced picture will emerge from this analysis.

Predictably, beyond the abovementioned general features of the manufacturing restructuring process, the available evidence suggests that heterogeneity was the norm in terms of firms’ performance and strategies in the previous decade.

Affiliates of TNCs⁹⁵ were the main “winners” in the restructuring process (Chudnovsky and López, 2001). Their number among the 1000 largest firms in Argentina increased from 199 to 472 and their share in the sales of those leading firms grew from 39 per cent

⁹³. For instance, the privatization program in the steel sector reduced the number of workers from 32,148 in 1989 to 16,220 in 1994 (Eichemendy, 2001). This, together with an increase in the level of use of the installed capacity, increased labor productivity from 120 tons of steel per worker in 1989 to 204 tons in 1994 (Bisang and Chidiak 1995). The privatization program in the petrochemicals industry showed an improvement in management techniques, a reduction in employment (from 12,500 in 1990 to nearly 9,000 in 1994), increased labor productivity and enhanced quality control systems, coupled with low expenditures in R&D (López and Chidiak 1995).

⁹⁴. It must be noted that the strategies of TNC affiliates regarding R&D activities is far from being homogenous across countries that have gone through similar reform processes. *On the basis of data from the U.S. Bureau of Economic Analysis, it can be seen that the R&D/sales ratio of U.S. TNC affiliates in Argentina shifted from 0.21 to 0.11 per cent between 1991 and 1999, while in Brazil it increased from 0.45 to 0.51 per cent.* Considering only the manufacturing industry, the differences are more striking: from 0.29 to 0.15 per cent in Argentina, and from 0.56 to 0.8 in Brazil. These findings suggest that the creation of MERCOSUR, by allowing the deployment of efficiency-seeking strategies by TNC affiliates, may have led to a diversion of some innovative activities in Argentina for the national market to Brazilian affiliates, which now have regional and in some cases even global responsibilities in R&D activities.

⁹⁵. Foreign firms in Argentina are largely fully or majority -owned by non-resident investors.

in 1992 to 67 per cent in 2000. By the end of the 1990s, affiliates of TNCs had contributed with 55 per cent of exports, 70 per cent of imports and over 75 per cent of the valued added of the leading Argentine firms, in all cases gaining large shares compared with local firms.

Similar trends and figures are observed when considering only the manufacturing industry. In fact, the share of TNCs in manufacturing during the 1990s was notably higher than that observed in the ISI stage. Considering, for example, the group of leading industrial firms in each year, while in 1963 affiliates of TNCs affiliates accounted for 46 per cent of valued added and 36 per cent of employment, in 1997 the same figures were 79 and 61 per cent respectively. Moreover, the TNC share in the sales of the leading 100 manufacturing firms moved from 43 per cent in 1974 up to 61 per cent in 1988. In the next section we will show that industrial affiliates of TNCs affiliates also performed better than domestic firms in terms of labor productivity during the 1990s.

In contrast, local conglomerates showed heterogeneous strategies and performances, while, as a whole, they lost the central role they had had since late 1970s. Although some of these conglomerates disappeared or drastically shrank⁹⁶, others – such as Techint and Arcor – strengthened their positions in the domestic market, often concentrating their activities on their “core business”. At the same time, these successful conglomerates increased their presence in external markets, both through exports and FDI (Kosacoff, 1999).

Considered as a whole, the domestic conglomerates undoubtedly show a series of weaknesses both in terms of their impact on the local economy and the evolution of their own business activities: i) their development has been mainly based on activities that generate limited linkages with the rest of the economy; ii) they usually operate in resource-intensive sectors, having a low presence in R&D based activities⁹⁷; iii) in their respective markets, their size is frequently small *vis-a-vis* the international leaders – the abovementioned case of Techint and Arcor is an exception to this rule (Bisang, 1998).

Before the reforms, most SMEs had obsolete machinery, inefficient production layouts, lack of skilled human resources, an excessively diversified product mix, little or no export experience, few cooperation linkages with other firms and organizations – including those offering technological or entrepreneurial services, weak quality control systems and marketing capabilities and a management style strongly based on the technological and other expertise of the owner. This naturally seriously affected their competitive potential and, in any event, SMEs are generally more exposed to market failures in issues such as finance, technology, information, etc. These aspects were never successfully addressed by the set of public policies in force in Argentina in the last decade (Cepeda and Yoguel, 1993; Gatto and Yoguel, 1993; Yoguel, 1998 and 1999).

⁹⁶. For instance, domestic conglomerates had a dominant position in the petrochemical industry in the 1980s. However, by 2000 they were almost no longer present, having been replaced by TNC affiliates, which gained the lead by takeovers of public and private firms in the industry, as well as through substantial new investments.

⁹⁷. In fact, in some cases domestic conglomerates abandoned their business in R&D-intensive sectors during the 1990s (that is the case of Pérez Companc, for instance, which had a partnership with NEC for making telecommunications equipment – Pérez Companc sold their share to NEC in mid 1990s).

The SMEs process of adaptation to the new market conditions was especially difficult. Some of them went bankrupt, while others lost market share, had to retreat to the lower ends of their respective markets, sold their businesses and r totally or gradually became importers. However, there was a group of dynamic SMEs, estimated to be around 20 per cent of the SME manufacturing sector, that managed to survive and expand in the domestic market, and in many cases even export⁹⁸, on the basis of their accumulated and/or enhanced technological capabilities, management skills and human capital stock (Yoguel and Rabetino, 2000). This group of SMEs was the one that most took advantage of the enterprise and technology promotion policies in place over the past decade.

In the next section we will further analyze the firms' strategies and their impact on productivity within the context of reforms on the basis of microeconomic data from two innovation surveys undertaken in 1997 and 2001 (INDEC-SECYT, 1998; INDEC-SECYT-CEPAL, 2003). This will facilitate a better understanding of the "microeconomy" of the Convertibility Plan.

Technological innovation and foreign investment as key determinants of labor productivity

In spite of the heterogeneity in their behavior and performance in the post-reform scenario, it could be expected that, overall, manufacturing firms would increase their investments in technology modernization and make efforts to improve their productivity levels in order to face the challenges coming from trade liberalization.

This was in fact the case as revealed by the first national survey on innovative activities in manufacturing firms carried out in 1997 (INDEC-SECYT, 1998). In an environment of booming sales and productivity, innovation expenditures (including R&D activities, acquisition of related capital goods and expenditures on training, consultancy engineering and design services) increased from 3 per cent in 1992 to 3.7 per cent of total sales in 1996. In addition to increasing their innovation expenditures during this period, manufacturing firms were also very active in introducing new product and process technologies.

What happened when the growth cycle was over? In the adverse conditions that prevailed since 1998, a drastic reduction in innovative activities would have been expected in a situation in which firms were trying to cut expenditures and postpone investment decisions in order to face the recession. This presumption was confirmed by the second national survey on innovation in the manufacturing sector (INDEC-SECYT-CEPAL, 2003), which showed that, as sales (as well as productivity and investment) fell sharply, innovation expenditures were drastically reduced between 1998 and 2001. Understandably there were also fewer firms introducing new technologies during this period. However, and unexpectedly, in-house R&D expenditures increased substantially, although they remained at modest levels.

The ratio of R&D expenditures to total sales of firms surveyed increased from 0.15 per cent in 1992 to 0.17 per cent in 1998 and to 0.26 per cent in 2001. However, it must be noted that one firm alone – a TNC affiliate – contributed with 32 per cent of R&D

⁹⁸ Around 8,000 firms were exporting between 2000 and 2002, of which 7,500 were SMEs. However, the latter accounted for less than 9 per cent of total exports during those years (CEP, 2003).

expenditures in 200. Since the firm did not have R&D expenditures in 1998, it accounts for the entire increase in the aggregate between that year and 2001 (INDEC-SECYT-CEPAL, 2003).

It is tempting to compare this data with the data reported for the ISI period based on studies by Chudnovsky and Katz. That exercise would reveal a fall in the intensity of R&D activities in the manufacturing sector, since those studies reported averages of 0.55 and 0.35 per cent respectively. Since those studies comprised mainly large firms, it would be more accurate to draw a comparison with R&D expenditures of large firms in the last decade. In that case, the decline would be even greater, since large firms allocated only 0.11 per cent and 0.23 per cent of their sales to R&D activities in 1998 and 2001 respectively. However, caution is required since the data may not be entirely comparable, in particular considering that Katz, referring to the statistics reported in his study, states that "many of these activities were non-routine in the local context even though some of them would not have been covered by OECD or NSF standard definitions of R&D expenditures" (Katz and Bercovich, 1993, p. 456).

An interesting finding relates to the number of workers assigned to R&D activities. In the context of a drastic reduction in employment in the firms surveyed (6 per cent between 1992 and 1996 and 8 per cent between 1998 and 2001), the number of workers in R&D activities grew by 14 per cent between 1992 and 1996 and 19 per cent in the following period. As a consequence, the share of R&D personnel in total employment increased from 1.2 to 1.7 per cent between 1992 and 2001. Based on these data, in INDEC-SECYT-CEPAL (2003) it is estimated that there were around 14,000 people working in R&D activities in the manufacturing industry in 2001.

What was the position with regard to sources of foreign technology during this period? Payments from foreign technology transfer remained at around 0.4 per cent of total sales of the firms surveyed. Considering only large firms, the ratio is only somewhat higher (0.5 per cent). Comparing this scenario again with data from the ISI period, it seems that, while the relation between technology imports and endogenous R&D activities is not very different from that observed in the past, the magnitude of the expenditures in both items have fallen relative to the firms' sales.

Capital goods acquisition was, during the whole period under analysis, the main source of technology on innovative activities. At the same time, this area of expenditure showed more sensibility to the changes in the macroeconomic cycle.

Between 1992 and 1996, over half of the capital goods associated with the introduction of new technologies came from abroad. The growth rate of capital goods imports was almost triple that of purchases of domestic capital goods.

As was the case during the ISI period, the other key source of foreign technology during this period – was FDI. As we have already seen, the presence of affiliates of TNCs in the Argentine economy increased substantially during the 1990s and they were expected both to introduce new products, process and organizational technologies, and to generate knowledge spillovers for domestic firms and/or induce the latter to improve their productivity in order to stay in the market. Although the innovation surveys do not

directly provide information on this subject, their data allowed us to undertake research in order to establish to what extent those expectations were fulfilled⁹⁹.

In three recent papers (Chudnovsky *et al*, 2004b, 2004c, 2004d), we carried out research using econometric techniques and based on data from the two aforementioned innovation surveys. The results of our research enable us to answer key questions regarding the connection between innovation, foreign investment and productivity in the manufacturing industry during the 1990s. The main findings of these studies are as follows:

- Large firms, firms with highly skilled workers and export-oriented firms are more likely to engage in innovative activities and to launch innovations on the market. In contrast, affiliates of transnational corporations (TNCs) are not more innovative in terms of innovation activities or in launching new products or processes to the market.
- Involvement in innovative activities (including in-house R&D and tangible and intangible technology acquisition) enhances the probability of becoming an innovator.
- Continuous R&D efforts have a considerably larger impact on the probability of achieving an innovative output than a pattern of discontinuous expenditures on such activities.
- Innovators (i.e. firms which introduced new or radically modified products and/or processes for themselves and not necessarily for the country or the world)¹⁰⁰ performed better than non-innovators in terms of labor productivity.
- Size, being part of a group of firms, the use of skilled labor, the magnitude of investments in physical capital and export activity¹⁰¹ all have a positive impact on labor productivity.
- Affiliates of TNCs have higher labor productivity levels than domestic firms.

⁹⁹. An important concept must be considered at this point. In its origin, the notion of FDI spillovers was associated with knowledge leakages from TNC affiliates which could benefit domestic firms. However, when studies began to be made in order to learn whether those spillovers really existed, they were based on productivity measures, without distinguishing between the ways in which foreign presence could affect domestic firms' productivity. In some cases, these studies found negative spillovers from TNCs, something that makes no sense if we identify spillovers with knowledge leakages (since we would be forced to assume that domestic firms reduce their productivity or get out of business because of those leakages). However, if FDI spillovers are understood in a broad sense (including all the effects derived from TNCs' competition with domestic firms), then it is possible to find both positive as well as negative spillovers (the latter would be the case when domestic firms are forced to reduce their production due to the arrival of TNC affiliates – causing lower productivity in their establishments if they are operating with high fixed costs-). Although it would be desirable to be able to distinguish between knowledge spillovers and other effects on domestic firms' productivity derived from TNCs, to our knowledge no study has been made on that subject. In our case, the available database does not allow us to make such distinctions, hence we will understand spillovers in the aforementioned broad sense (see Chudnovsky *et al*, 2004c).

¹⁰⁰ Patents are hardly used by the firms surveyed. According to INDEC-SECYT-CEPAL (2003), 98 firms registered 317 patents in the period 1998-2001. About 10 per cent of the innovators obtained patents. That is why we prefer to use another indicator, more suitable to the Argentine situation.

¹⁰¹. The abovementioned FIEL (2002) study also finds that exports are positively related to productivity -in this case, TFP.

- FDI generated neither positive nor negative spillovers – either horizontal or vertical – for domestic firms¹⁰².
- However, domestic firms with high absorption capabilities¹⁰³ are more likely to benefit from positive spillovers from TNCs than those with low absorption capabilities. This finding is valid both for horizontal or intra-sector and for vertical (backward) spillovers.

In order to interpret those findings, it is important to take into account the descriptive statistics that emerge from our set of data. This set is based on matched information related to a panel of 718 firms interviewed for the surveys undertaken during the periods 1992-1996 and 1998-2001¹⁰⁴.

SMEs and domestic firms account for the majority of the 718 firms interviewed. The share of foreign firms increased from 11 per cent in 1996 to 19 per cent in 2001¹⁰⁵. While most of the firms in our set of data were established before 1975 during the ISI period, only 7 per cent were founded between 1992 and 2001. However, over 50 per cent of the firms which pre-dated 1975 had changed ownership. These changes in ownership occurred mostly in the 1990s and generally resulted from the acquisition of indigenous firms by TNCs.

Considering the evolution of labor productivity (measured by sales per employee), Table 4.4 shows that, between 1992 and 1998, the firms surveyed experienced a period of high growth (37 per cent), while this trend was reversed between 1998 and 2001 (-12 per cent). Total employment showed a steadily decreasing trend throughout these years, although there was a significant “composition” effect, since the share of professionals in total employment increased without interruption from 6.8 per cent in 1992 to 8.7 per cent in 2001.

Turning to innovative activities, the total expenditure figures (reported in Table 4.4) include not only R&D and technology acquisition, but also management, engineering and industrial design investments. Table 4.4 shows that, after increasing between 1992 and 1996, the number of firms with positive levels of expenditure on innovative activities decreased markedly from 59 per cent to 45 per cent between 1996 and 2001.

¹⁰² Horizontal spillovers are those that arise among firms competing in the same industry. Vertical spillovers may appear among firms that are mutually related through backward or forward linkages.

¹⁰³ In order to measure absorption capabilities, following Yoguel and Rabetino (2002), we drew up an index of R&D capabilities, that includes the following different factors: i) quantitative variables: the ratio of R&D employees relative to total employment, the ratio between expenditures in consultancy and sales, the payments for technology licenses relative to sales, the expenditures in capital goods related to new process or new products relative to sales and the ratio between innovative activities (including both expenditures in formal R&D and in adaptive and incremental innovative activities, project engineering, etc.) and sales; ii) qualitative variables: the degree of formalization of R&D activities (i.e., whether the firm has an R&D department or not), the use of modern organizational techniques, the importance assigned to product innovation in firms' strategies, the use of information technology in the relationships with customers and suppliers and the importance of passive and codified sources of technological information; iii) qualitative-quantitative variables: whether the firm undertook training activities and, if so, the expenditures relative to sales.

¹⁰⁴ These firms accounted for 29 per cent of sales, 27 per cent of employment and 24 per cent of exports in the manufacturing sector in the period 1992-1996. For the 1998-2001 period, the figures were 27, 20 and 19 per cent respectively.

¹⁰⁵ Since our data set focuses on the evolution of a given group of firms over time, this fact reflects the acquisition of domestic firms by foreign investors.

Furthermore, among these firms, the intensity of total expenditures on innovative activities decreased to almost 3 per cent of total sales in 2001, from a maximum level of over 4 per cent in 1996.

Table 4.4 Performance and innovative activities, 718 firms, 1992-2001

	1992		1996		1998		2001	
	Average*	Per cent**	Average*	Per cent**	Average*	Per cent**	Average*	Per cent**
Performance								
Sales/Employment (1992=100)	100		127		137		122	
Growth (per cent)			27		8		-12	
Employment 1992=100	100		93		91		80	
Skilled labor/Employment (per cent)	6.8	75	7.4	75	7.7	76	8.7	77
Innovative Activities***								
R&D	0.89	22	0.83	29	0.86	25	0.94	28
Technology Acquisition	4.99	28	4.22	45	4.26	33	2.82	31
Total Expenditures	3.93	46	4.08	59	3.91	45	3.04	45

* Calculated for firms that report a positive value of the respective variable.

** Percentage of firms that report a positive value of the respective variable.

*** Expenditures as a percentage of total sales.

Source: Authors' calculations based on data from Argentine Innovation Surveys (INDEC-SECYT, 1998 and INDEC-SECYT-CEPAL, 2003).

This trend is largely explained by the main component of innovative expenditures during the decade - the acquisition of technology external to the firms. This includes capital goods (related to innovative activities within the firm) and local or foreign technology transfers (patent rights, licenses, trademarks, designs). After a substantial period of growth from 1992-1996, there was a marked decline in the proportion of firms investing in technology acquisition and the level of expenditure on innovative activities. In contrast, Table 4.4 shows that the share of firms engaged in R&D activities rose from 22 per cent to 28 per cent from 1992-2001 and was accompanied by an increase in the intensity of R&D expenditures among the same firms.

While most firms (80 per cent) were innovators in the period 1992-1996, that figure decreased notably between 1998 and 2001 (59 per cent). Table 4.5 shows that innovators reached labor productivity levels at least 1.3 times higher than in non-innovators, although productivity growth rates were similar in both groups. In the case of employment levels, non-innovators reduced labor much faster than innovators¹⁰⁶ which also employed a higher proportion of skilled labor.

Table 4.6, shows that foreign firms, during the period under analysis, has labor productivity levels between 1.5 and 2 times higher than domestic firms and, between 1992 and 1996, productivity grew by 49 per cent in the former and only by , 25 per cent in the latter group of firms. The reduction in productivity which was experienced by both groups of firms during the recession period was lower in foreign firms (10 vs. 14 per cent).

¹⁰⁶ Hence, although labor productivity increased approximately at the same rate in both groups, it could be suggested that this result was mainly attained by market expansion among innovators, while non-innovators resorted to labor force reductions.

Table 4.5 Performance of innovators vs. non-innovators, 1992-2001

	1992		1996		1998		2001	
	Average*	Per cent**	Average*	Per cent**	Average*	Per cent**	Average*	Per cent**
Innovators								
Sales/ Employment 1992=100	100		130		146		130	
Growth (per cent)			30		12		-11	
/ Non innovators***	1.36		1.62		1.34		1.36	
Employment 1992=100	100		94		109		96	
Skilled labor/Employment (per cent)	6.9	81	7.5	82	8.5	85	9.6	87
Non innovators								
Sales/ Employment 1992=100	100		110		145		126	
Growth (per cent)			10		31		-13	
/ Innovators***	0.74		0.62		0.75		0.73	
Employment 1992=100	100		83		89		76	
Skilled labor/Employment (per cent)	6.2	53	6.6	51	6.3	64	6.9	63

* Calculated for firms that report a positive value of the respective variable.

** Percentage of firms that report a positive value of the respective variable.

*** Quotient of average sales per employee between innovators and non-innovators.

Source: Authors' calculations based on data from Argentine Innovation Surveys.

Table 4.6 Performance of domestic vs. foreign firms, 1992-2001

	1992		1996		1998		2001	
	Average*	Per cent**	Average *	Per cent**	Average *	Per cent**	Average *	Per cent**
Foreign Firms								
Sales/Employment 1992=100	100		121		149		135	
Growth (per cent)			21		23		-10	
/Domestic firms***	1.61		1.55		1.88		1.98	
Employment 1992=100	100		88		85		72	
Skilled labor/Employment (per cent)	13.7	94	12.7	96	14.1	95	14.8	96
Domestic Firms								
Sales/Employment 1992=100	100		124		125		108	
Growth (per cent)			24		0.9		-14	
/Foreign firms***	0.62		0.65		0.53		0.50	
Employment 1992=100	100		86		80		70	
Skilled labor/Employment (per cent)	5.8	73	6.1	72	5.9	72	6.6	72

*Average per firm. Calculated for firms that report a positive value of the respective variable.

** Percentage of firms that report a positive value of the respective variable.

*** Quotient of average sales per employee between domestic and foreign firms.

Source: Authors' calculations based on data from Argentine Innovation Surveys.

The contrasting trends in labor productivity were recorded against a background of falling employment in both groups of firms, though to a lesser extent among foreign firms. In other words, the productivity increases of TNCs, contrary to a somewhat common perception in Argentine society, were apparently not attained by a greater reliance on labor rationalization than that of local firms.

R&D and technology acquisition activities are more common in affiliates of TNCs than in domestic firms. However, R&D intensity (R&D expenditures/sales) in domestic firms is higher than in foreign firms – the average ratio in the former was between 50 and 100 per cent higher than in the latter during the period under analysis.

This suggests that in-house technology development is of less importance in affiliates of TNCs than in domestic firms, as the former naturally tend to rely on foreign sources, – mainly, though not exclusively internal to the corporation to which they belong.

Finally, it is relevant to discuss the implications of one of the reported findings – that, the smaller the firm the lower the probability of engaging in innovative activities and of becoming an innovator. As involvement in innovative activities enhances the probability of becoming an innovator and innovators perform better than non-innovators, the aforementioned finding implies that smaller firms are at a disadvantage in terms of productivity performance (in fact, large firms have higher labor productivity levels). Although no comprehensive study has been undertaken on the reasons why SMEs have a lower probability of engaging in innovation activities and of becoming innovators, the innovation surveys – and other scattered evidence available on the subject – suggest that lack of access to credit is the main obstacle to innovative activities in SMEs¹⁰⁷. Furthermore, Chudnovsky *et al* (2004b) found that, during recession periods, small firms may become even more restricted in their ability to undertake innovative activities. A key challenge for policy-makers is to remove the obstacles, which may be preventing SMEs from engaging in innovative activities.

These obstacles include not only access to credit but also others mentioned by SMEs such as lack of skilled personnel, information failures and weak cooperation links with others firms and institutions. As seen before, although some policies aimed at dealing with these issues were put in place during the last decade, their impact to date has been negligible.

Environmental management in the manufacturing industry

Although not directly related to labor productivity, it is relevant to explore the available evidence on the environmental dimension of industrial restructuring¹⁰⁸ in order to complete our analysis of the manufacturing sector performance in the 1990s.

Argentine environmental policy comprises both federal laws (which can be adhered to voluntarily by provinces) and provincial and municipal norms. These legal provisions establish command-and-control style environmental regulations. Performance standards are fixed and firms are fined if they fail to meet them. Market-based norms – e.g. pollution taxes, tradable permits, etc. – are almost non-existent (see OECD, 1994 for a

¹⁰⁷. Access to credit was mentioned as an obstacle for innovation by 74 per cent of small firms – the corresponding figure for medium-sized firms was 59 per cent and for large firms 45 per cent.

¹⁰⁸. It is important to take into account that this evidence is only related to environmental management activities, while no data are available on the environmental performance of manufacturing firms.

discussion of both kinds of instruments) As far as the division of responsibilities between the federal government and the provinces is concerned, the 1994 constitutional reform established that natural resources belong to each province, but that the provinces delegate to the nation the capacity to determine "minimum environmental standards". This process is embodied in pieces of legislation establishing uniform environmental parameters throughout the nation to secure adequate protection of the environment. Nevertheless these norms are applied according to complementary laws passed by each provincial government.

It must be mentioned that the noted that the Argentine legal environmental protection parameters are often very strict, as they were established in line with prevailing standards in developed countries. Nevertheless, the legislation must generally be implemented by technically and financially weak local and provincial authorities.

These often assume – correctly or not - that if they strictly apply the environmental legislation, many firms in their area, especially SMEs, will have to close down or face higher costs which will affect their competitiveness. In other words, the enforcement of environmental norms is often weak, but notwithstanding this, environmental regulations have played a major role in the adoption of environmental protection practices in the local manufacturing industry.

Another relevant aspect to take into account, is that environmental policy is formulated exclusively in terms of setting performance standards, while the connection between the environmental and the productive and technological dimensions of industrial restructuring is simply overlooked. Hence, enterprise and technology initiatives are totally disconnected from environmental policies, although, as indicated, environmental management in private firms is closely linked to their innovative and productive capabilities.

Regarding the evidence on the subject under analysis, firstly, available studies suggest that larger firms are more likely to engage in environmental management activities (EMAs) than SMEs – which are often not even familiar with the environmental legislation. Foreign firms are also more likely to undertake EMAs than their domestic counterparts (Chudnovsky, López and Freylejer, 2000; Chudnovsky and Pupato, 2005). They also generate positive environmental spillovers for their domestic counterparts, since their presence raises the probability of the latter engaging in EMAs, provided that those firms have high absorption capabilities¹⁰⁹.

Secondly, technology seems to be the main obstacle to improving the level of environmental management in SMEs. This includes: i) the high cost of some technologies; ii) the lack of information about feasible technical alternatives; iii) the inadequate availability of technology suited to the specific needs of SMEs (INDEC-SECYT-CEPAL, 2003). Lack of information is also an obstacle for SMEs to engage in EMAs, coupled with the perception on their part that complying with the environmental legislation would have a negative impact on their costs (although this is not necessarily the case, as will be discussed).

¹⁰⁹ The next section contains a description of the methodology to estimate spillovers from TNC affiliates and a description of and method for measuring domestic firms' absorption capabilities.

Thirdly, improving efficiency in the use of water, inputs and energy is the most widespread environmental management activity in Argentine industry. Measures such as the installation of effluent and waste treatment systems, the adoption of internal or external recycling schemes or the replacement or modification of polluting processes, inputs and raw materials have become widespread within the manufacturing sector (INDEC-SECYT-CEPAL, 2003).

Fourthly, there is a significant dispersion across sectors in terms of the proportion of firms engaged in EMAs (Chudnovsky and Pupato, 2005). This might reflect, among other factors, sectoral differences as a function of the magnitude of individual environmental problems, the strength of regulation enforcement, the existence of technological opportunities to improve environmental performance and the type of firms prevailing in each activity.

Fifthly, regulatory pressure, although weakly enforced, is the major factor inducing firms to undertake EMAs (see INDEC-SECYT-CEPAL, 2003; Chidiak and Gutman, 2004). Predictably, regulatory pressure induced end-of-pipe environmental management activities¹¹⁰, while market pressures – associated, for instance, with the aim to improve the “environmental image” of companies – encouraged firms to engage in more complex “clean production” EMAs¹¹¹. Export market requirements have also promoted the adoption of EMAs in some sectors. Moreover, an improved environmental performance was often achieved as a by-product of the efforts made to reduce costs and increase production efficiency to face the growing competition in domestic and export markets (Chudnovsky *et al*, 2000; INDEC-SECYT-CEPAL, 2003).

Sixthly, there is an apparent correlation between innovation and environmental management. The available evidence does not permit testing of the so-called “Porter hypothesis” suggesting that innovation compensations may exist and lead to “win-win” solutions where environmental improvements go hand-in-hand with competitiveness gains. It has, nonetheless, been established that technology acquisition expenditures increase both the probability of undertaking EMAs and the quality of environmental management (Chudnovsky and Pupato, 2005; Chidiak and Gutman (2004) and Chudnovsky, López and Freylejer (2000) also found that innovative capabilities were positively related to the adoption of clean production EMAs.

Last but not least, the adoption of clean production measures – which generally did not eliminate the need to keep end-of-pipe facilities - meant economic advantages in respect of more traditional EMAs. 70 PP projects carried out between 1992 and 1997 were identified in 32 large firms. The expenditures on the PP measures constituted a non-

¹¹⁰ End-of-pipe refers to a set of corrective practices based on the identification, processing and disposal of discharges or wastes after they have been generated. It includes effluent and waste treatment systems as well as corrective measures.

¹¹¹ “Clean production” refers to a design of goods and services production that encompasses the minimum environmental impact under present technological and economic limits. Firms that have adopted “simple clean production” EMAs have managed to establish a preventive approach that aims at increasing overall efficiency and reducing risks to humans and the environment. This category includes recycling, as well as enhanced efficiency in the use of water, energy and inputs. Complex clean production also implies a forward-looking, “anticipate-and-prevent” philosophy aimed at protecting the environment, the consumer and the worker while improving profitability and competitiveness. For our purposes, complex clean production EMAs include the use of new technologies, inputs or practices to reduce or eliminate the creation of pollutants at source and, at the same time, increase industrial efficiency and achieve Environmental Management Certifications (e.g. ISO 14000).

recovered cost only in 17 per cent of the projects and had at least been partially recovered in the remaining projects. In over 20 per cent of the projects, additional monetary benefits had been obtained (Chudnovsky, López and Freylejer, 2000).

The agricultural production boom

Agricultural production continued to expand until the mid-1980s. From then on, production fell throughout the rest of the decade, to later resume growth. Only in 1994/95 did agricultural production reach the same levels of 1984/85 – its stagnation was a result of high withholding taxes together with low international prices.

In the 1990s, the elimination of taxes and withholdings on agricultural exports, the substantial reduction of import tariffs on inputs and capital goods and the deregulation of some markets, all created favorable macroeconomic conditions. These paved the way for a large expansion of production volumes of cereals and oilseeds - from 26 million tones in 1988–1989 to over 67 million in 2000–2001 (see Graph 3.1), and particularly for soyabean which soon became Argentina's leading export item. The remarkable soyabean expansion has recently brought about fears about the danger of mono-cropping in many agricultural areas (see below). Growing production led to a substantial increase in exports against a background of erratic international prices and in the face of competition from other countries, which, unlike Argentina, benefit from government subsidies for agricultural production and exports.

The extraordinary growth in agricultural production was mainly a result of a substantial expansion of the planted area¹¹² and higher yields (Graph 3.1) following extensive adoption of new technologies¹¹³. Yield increases enabled the gap with U.S. agriculture productivity (Graph 3.2) to be constantly narrowed. In addition, with the increase in the planted area, the Pampas agricultural sector succeeded in reversing job loss trends which had been experienced over the previous decades and went on to generate almost 200,000 jobs between 1993 and 1999.

It is, however, important to take into account that there was an increasing concentration of production in the agriculture sector, mainly due to the fact that new technologies improved efficiency levels. At the same time, the incorporation of new technologies led to massive indebtedness and, in this scenario, it comes as no surprise to find that many small farmers were unable to continue with their production activities (Sonnet, 1999; Bisang, 2003).

Technological modernization was achieved in different ways. Sales of capital goods increased sharply. Trade liberalization permitted not only imports of cheap and more efficient agricultural machinery, but also induced domestic machinery producers to replace domestic with imported inputs, lowering costs and improving quality, but at the cost of lower linkages with local suppliers.

¹¹² Expansion in planted area comes mainly from two sources: enlargement of the agricultural frontier and displacement of livestock. Moreover, a sort of "virtual" expansion also took place, since in many areas now it is possible to double crop wheat and soyabeans (see below).

¹¹³ Soyabean productivity does not show a large improvement because estimated yields average yields from Pampas areas (which have increased significantly) with those from marginal areas where it is nowadays possible to plant soyabean, but where yields are still relatively low.

The use of fertilizers, herbicides and pesticides also boomed, favored by trade liberalization, but also associated with the expansion of domestic capacity in those product categories. With regard to the environmental impact of increased use of chemical inputs, it must be noted that they still are used much less intensively than in developed countries, and that old polluting pesticides and herbicides have been replaced by new more environmentally-friendly products (Chudnovsky *et al*, 1999).

Another key change was the introduction of transgenic crops into Argentine agriculture. The first transgenic crop commercially released into the Argentine market in 1996 was soyabean tolerant to glyphosate herbicide. Later on, the local authorities approved transgenic varieties of corn and cotton tolerant to herbicides and resistant to insects.

The area planted with herbicide-tolerant (RR) soybean shot up from less than 1 per cent of the total area in the 1996/97 season, to more than 90 per cent (around 9 million hectares) in the 2000/01 season. The adoption of lepidoptera-resistant corn has also been rapid, accounting for 20 per cent of the total cultivated area during the 2000/01 farming season (the third year after its introduction). The diffusion of BT cotton has, however, been very limited, amounting to only 7-8 per cent of the total planted area.

At present, Argentina ranks second only to the United States in terms of agricultural area cultivated with transgenic crops and is therefore a major player in the international GMO arena (Trigo *et al*, 2002). Argentina enjoyed favorable conditions for a rapid adoption of GMOs. The Argentine seed industry profited from the active involvement of national companies, subsidiaries of multinational corporations and public institutions¹¹⁴; and, to top it off, the country also cherished a long-standing tradition in the field of germplasm improvement. The aforementioned elements, along with the fact that Argentina constitutes the major area (up to 26 million ha of cultivable land) for the potential use of new technologies outside their country of origin, provided the appropriate incentives and a most favorable environment for the rapid adoption of these biotechnological inputs

However, in the case of the most successful GMO crop, RR soybean, other factors were also in place to foster its rapid diffusion¹¹⁵, including, firstly, the manner in which the RR gene was first transferred to Argentina. Following a series of business deals in the U.S. and Argentina, when Monsanto tried to patent the gene in Argentina, it was unable to do so because it had already been "released". Therefore, conditions were not met for Monsanto, the breeder company, to be entitled to charge the technology fee or to restrict the use of the seed by farmers, as is the case in the U.S.¹¹⁶.

¹¹⁴ Although Argentina has a long tradition in seed research, both in public and private organizations and multinational companies - as well as in many other countries- have taken the lead in the area of GMOs. One of the reasons that explain the minor role of local players in new seed releases is the huge amount of resources that are needed for R&D in agricultural biotechnology. However, it must be noted that, so far, private breeders have been able to keep their businesses through partnerships with TNC affiliates. These affiliates provide the transgenic genes that are combined with varieties well adapted to local conditions and owned by local breeders (Bisang, 2001).

¹¹⁵ See Trigo *et al* (2002) for the details of this process.

¹¹⁶ At present, Monsanto has embarked on a battle to charge a royalty in Argentina on its genetically-modified soyabean seeds. Due to the failure to reach an agreement with associations representing agricultural producers, it has recently threatened to impose a \$15-per-metric-ton fee on soyabean exports. If exporters decline to pay the fee, they will face the prospect of being sued in the courts of European countries that import Argentine soyabeans. The Argentine government has deemed this to be an unacceptable threat.

Secondly, according to the Argentine legislation and under the UPOV Convention of 1978, farmers can legitimately keep seeds for their own use. There are, however clandestine operations (the so-called "white bag") through which seed multipliers offer seeds without the authorization of the companies holding the legal production rights.

Both factors have driven down the price of RR soybean, thus promoting the rapid adoption of said technology. Thirdly, the glyphosate price substantially decreased during the 1990s due to fierce competition in local markets following the introduction of new agents in the manufacturing and commercialization of the herbicide.

In this scenario, and bearing in mind that Argentina has encountered no difficulties to date in accessing target markets for its RR soybean exports and that, in spite of the perceptions of foreign consumers, price differentials between conventional and RR soybeans in the world market do not penalize the latter, it is hardly surprising that almost all Argentine soybean crop is RR. Nonetheless, the INTA (2003) has expressed serious concerns about the consequences of the soybean boom, since the crop has often been introduced at the expense of crop rotation. Furthermore, the "agriculturization" process triggered off by the soybean expansion in the ecologically fragile North Eastern and Western areas of the country is unsustainable. This development could affect both the quantity and quality of the country's natural resource endowment and lead, in the future, to a fall in agricultural production.

The outstanding increase of no-tillage practices¹¹⁷ was another major technological innovation introduced during the past decade. The range of application of this planting system rose from approximately 300,000 hectares in the 1990–1991 seasons to over nine million hectares in the 2000–2001 seasons. This technology constituted an important factor in the expansion of production, as it increased the area cultivated with late soybean, planted after the wheat harvest. During the 1999/2000 season, for example, this generated a further 3 million hectares of arable land.

The combination of no-tillage planting techniques and herbicide-tolerant soybean brings together new mechanical technologies that modify crop interaction with the soil and the utilization of general-purpose, full-range herbicides with glyphosate. These are environmentally neutral on account of their highly effective control of all kinds of weeds and their lack of residual effect. While a more intense use of inputs is necessary, this was nonetheless deemed positive because it simultaneously lowered the consumption of herbicides with the highest toxicity levels. Other innovations introduced over the last decade include modern agronomic practices (related to soils and nutrients management, efficiency improvements in the use of chemical and mechanical technologies and crop rotation) and the diffusion of irrigation techniques (Chudnovsky *et al.*, 1999; Sonnet, 1999).

Finally, although it is clear that a remarkable technology modernization process took place in Argentine agriculture during the 1990s, which allowed a substantial increase in production and exports, it is also true that the spillovers of this process for the rest of the economy were limited by two factors: i) the local agricultural machinery industry went through a restructuring process which involved both plants closures and a strong

¹¹⁷ No-tillage maintains a permanent or semi-permanent organic soil cover (e.g. a growing crop or dead mulch) that protects the soil from sun, rain and wind and allows soil micro-organisms and fauna to take on the tasks of "tilling" and soil nutrient balancing. These are natural processes which are disturbed by mechanical tillage.

reduction in domestic content of locally produced machines; ii) the new chemical and genetic technological packages that are increasingly crucial for agricultural production are provided by a handful of affiliates of TNCs affiliates which seldom engage in biotechnology R&D activities in Argentina. This means that the focal point of technological innovation, which in previous decades was mainly the Argentine Pampas, has now been transferred abroad (Bisang, 2001).

Education, growth and inequality

In contrast to the key determinants of productivity growth in the 1990s examined so far, the problems the Argentine education system has not yet constrained such growth, may affect it in the years to come.

Argentina is in a relatively good position among developing countries with regard to educational indicators. Illiteracy rates are very low and the Argentine population over 25 years has, on average, 8.5 years of education, compared to 5.9 in Latin America, 8.4 in Central and Eastern Europe and 7.6 in East Asia (Holm-Nielsen and Hansen, 2003).

The education system in Argentina has always performed well when measured against other developing countries and, over the last decades, the trend towards steadily improving access to education was maintained (Table 4.7). However, data suggest that progress in this area for the last 30 or 40 years has been slower than in other developing countries – and, in some cases, Argentina has lagged behind some nations which previously had worse educational records (such as Spain, Korea or Taiwan).

Moreover, if we consider the population over age 25 years, Argentina's performance is in line with international trends in terms of its GDP per capita. However, the country falls well short of these trends when only the population with a full secondary or higher education is considered.

Table 4.7 Net schooling rates, 1980-1997

Year	Primary	Secondary	Third-level
1980	90.7	42.4	9.8
1991	98.4	61.3	20.5
1997	95.2	69.0	27.6

Source: Echart (1999).

Beyond quantitative data, when it comes to quality assessments the trends observed are not very positive. A number of studies have shown that the quality of education has been declining over the last decades. A 1993 survey revealed that 40 per cent of secondary school graduates could not read and write in accordance with acceptable standards (World Bank, 1998). An annual test undertaken by public authorities to investigate the language and mathematics skills in primary and secondary schools reveals mediocre results and no clearly improving trend and, in some cases, indicates that standards in fact worsened during the 1990s (in spite of initiatives launched since the mid-1990s to improve the quality of education).

There are few international comparisons of educational quality available that include Argentina. The 1997 UNESCO comparative study of language and mathematics skills in primary schools throughout the Latin American region, found that Argentina was one of the better performing countries in the region, together with Brazil and Chile (UNESCO, 1998). However, a recent study of reading literacy in grade 4 reveals a bad performance of Argentine students, whose skills rank well below European students, and also lag behind those of students from Turkey or Colombia (NCES, 2003).

Another study shows Argentina ranking below Thailand and Mexico in reading literacy of 15 year-old, and only slightly above Chile and found that it had the highest within-country variation among the countries surveyed. Results are similar when mathematical and scientific literacy is considered – in fact, Argentina's relative performance in scientific literacy is clearly worse than in the other two areas - (OECD/UNESCO, 2003). Students' performance is strongly associated – even more strongly than in most of other countries surveyed - with family background, i.e. educational attainments, income, wealth, etc.

The low expenditure per student in primary and secondary schooling is one of the most important factors behind the declining quality of education (Llach *et al*, 1999). The public sector is responsible for the bulk of educational expenditure in Argentina. Hence, fiscal crises have direct and far-reaching consequences for the educational budget¹¹⁸. Among those consequence, budget restrictions limit the possibilities of improving the teachers'/professors' professional skills and lead to insufficient spending on goods and services, such as classroom equipment.

Teachers' salaries are below those paid in other Latin American countries such as Chile and Mexico and remain relatively stable over their professional life cycle. This means that, while in other countries, for instance Brazil, teachers at the top levels of salary scales are substantially better paid than teachers entering the profession, progression is less significant in Argentina. Hence, the teaching career is, in the long run, economically less attractive in Argentina. This makes it difficult to attract and retain most qualified candidates and the rigid wage structures fail to motivate a better performance on the part of teachers (Holm-Nielsen and Hansen, 2003).

As previously indicated, there is a wide disparity in educational quality and students performance, not only compared with the situation 30 or 40 years ago, but also *vis-à-vis* other developed and developing countries. Predictably, students from poor families/regions tend to receive a lower quality of education¹¹⁹ and are also affected by the fact that they often need to work in order to help their families. This helps explain why the attendance rates and the numbers of students completing their studies are low both at primary and at secondary school levels (Llach *et al*, 1999; Decibe and Canela, 2003)¹²⁰.

¹¹⁸ For example, the expenditures at primary level fell by over 60 per cent in the period 1979-1985, and 40/50 per cent for secondary and tertiary education. Since the late 1980s, public expenditure on education has been increasing as a share of total public expenditures, but in 1998 it was still below the 1980 level.

¹¹⁹ Differences in students' performance are observed when comparing private and public schools, but are also apparent within the public system.

¹²⁰ These negative trends took place in spite of reforms that increased compulsory education from 7 to 10 years. The new educational system is now divided into four levels: pre-primary school (from 3 to 5 years old – with only the last year compulsory-), compulsory primary school (from 6 to 14 years), secondary school (from 15 to 17/18 years and college level (universities and technical colleges).

Some institutional reforms undertaken since late 1980s may have contributed to increasing disparity in the quality of education. In 1978, primary schools and some secondary schools were transferred to the provinces. In 1992, this transfer process was completed and the provinces received full responsibility for secondary education with the result that they now control 90 per cent of total education expenditure (Holm-Nielsen and Hansen, 2003).

Although a study by Galiani and Schargrodsky (2002) suggests that, on balance, decentralization resulted in better performance of students in public schools, it has been suggested that the transfer process has had two main weaknesses which may explain why wide performance disparities still exist: i) most provinces lacked the budget and the administrative capabilities to guarantee the efficiency and quality of the educational system; ii) decentralization, at least in 1992, was specifically aimed at enhancing the quality of education, but was motivated by fiscal considerations (Decibe and Canela, 2003). In fact, Galiani and Schargrodsky find that the effects of decentralization were negligible in provinces with significant fiscal deficits, while positive in provinces with balanced budgets.

A source of particular concern from the point of view of industrial development is the low quality of technical education. The equipment in technical schools is often obsolete, programs are outmoded and professors underpaid. Linkages between technical schools and the business sectors are very weak with the result that the schools cannot adequately cater for the technical needs of enterprises (Winkler, 1990; Fuchs, 1994). Private and public training programs exist, but are heterogeneous in their quality and limited in their coverage.

Moreover, it has been stated that the educational system does not promote the creation of "higher-order" skills related to adaptability, flexibility and the capability to identify and access relevant information and make independent analysis based on the data (Del Bellod, 2002, quoted in Holm-Nielsen and Hansen, 2003). This is the outcome, among other things, of outdated teaching strategies and curricula.

What is the position with the university system? Since the return of democracy in 1983, when quotas and entrance tests were removed for public universities, there was a notable increase in enrolment rates. The number of students who completed their studies also increased, albeit at a much lower rate. In fact, in Argentina only 5 per cent of total students graduate annually, while this rate is almost 15 per cent in Brazil and Chile. As suggested by Holm-Nielsen and Hansen (2003), high dropout rates may be the result of the poor quality of teaching and low level of student motivation.

Budget constraints also affected the quality of public university education¹²¹, in a context in which, since the 1980s, the monetary resources increased at a much slower rate than the numbers of students. Professors' salaries, which account for the bulk of the university budget, have fallen substantially in real terms, while there has been a marked increase in the students/professor ratio. The low wages fail to attract and retain the best-qualified young professors (who often prefer to teach at private universities or go abroad) and the

¹²¹. A national evaluation program of university education was adopted in the 1990s. So far, no serious evaluation exists on its impact, but a significant drawback is that the major Argentine University – the University of Buenos Aires - rejected evaluations made under that program, mainly for political reasons.-.

resulting ageing population of professors shows little willingness to update curricula or address other issues in need of improvement. Furthermore, only 12 per cent of Argentine faculty staff had a doctoral degree in 1997 (Holm-Nielsen and Hansen, 2003).

Lack of competition among universities has been mentioned as another weakness of the system. The FOMEC program launched in the 1990s aimed at alleviating that problem by offering competitive funding for projects presented by the universities – related to curricular reform and updating of equipment and faculty skills. To date the program appears to have been successful, but doubts remain as to its long-term impact on the institutional flaws that have plagued the public university system (Holm-Nielsen and Hansen, 2003).

Entry to public universities has traditionally been difficult for people with low resources, and, in the 1990s, the differences in access possibilities between rich and poor candidates widened, although public universities are still free (Etchart, 1999). Of each 100 pesos expended by the national government on university education, only 6 pesos benefit the poorer segment of the population (Decibe and Canela, 2003). Some grant programs exist, but they have a low coverage – 3,000 grants for 40,000 potential candidates (Del Bello, 2002)-.

Regarding the relevance of education for the needs of industrial restructuring, Argentine students, as stated before, had traditionally been more likely to choose “liberal” professions, while science and engineering enrolment rates were relatively low. This bias was even reinforced in the 1990s, when a significantly higher proportion of university students opted for social science careers (Table 4.8). The number of engineering students in terms of the total population of Argentina is low compared to countries such as Korea, Chile, Spain, Portugal or Greece. In contrast, the country has more physicians per inhabitant than Canada, the U.S., Japan or the United Kingdom (UNDP, 1999).

Table 4.8 First-level university graduates, 1990 and 1999, percentages

	1990	1999
<i>Total</i>	100	100
Natural and Pure Sciences	12	8
Engineering and Technology	13	16
Medical Sciences	21	16
Agricultural Sciences	4	4
Social Sciences	36	45
Humanities	13	12

Source: Authors' calculations based on RICYT.

The university system has historically had very weak linkages with the business sector and this situation has not improved in recent decades, despite some negligible government initiatives (it must be noted that public universities have the autonomy to determine their curricula and policies Decibe y Canela, 2003). Universities – and the educational system as a whole - do not cultivate entrepreneurial thinking or capabilities (Kantis *et al*, 2000) and, given this situation, it is hardly surprising to find that Argentine executives in general see the university system as being of little relevance to the needs of the economy (Holm-Nielsen and Hansen, 2003).

With regard to postgraduate university education, the available data shows that the number of doctorate students is low. In 1996, around 400 students completed their doctoral studies and 1,000 their master's degree. Brazil produced almost 2,500 doctoral graduates in the same year. The quality of postgraduate studies in Argentina is, to say the least, heterogeneous, and there is a lack of good educational facilities for many careers (Barsky, 1994).

A further problem which has strongly diminished the stock of human capital is the so-called "brain drain" phenomenon, the emigration flow of qualified individuals since the late 1970s- a consequence of ideological persecution and the economic crisis (see Albornoz *et al.*, 2002a, 2002b).

On balance, although the availability of human capital has been traditionally seen as a strong competitive advantage for Argentina, the declining quality and low relevance of educational skills for the needs of the economy have seriously constrained the contribution of education, if any, to productivity growth in Argentina.

In contrast, educational trends had an impact on growing unemployment and income inequality. Educational attainments are negatively correlated with unemployment rates (CEA, 1997). Higher education levels lead to a wage premium (Etchart, 1999), although this apparently does not apply to the same extent for poorer income groups (Holm-Nielsen and Hansen, 2003). Moreover, wage gaps among groups with different educational qualifications increased during the 1990s (Gasparini, 1999).

Gasparini, Marchionni and Sosa Escudero (2004), on the basis of evidence for 1986-98, and considering not only returns to education, but also returns to experience and unobservable factors and transformation in the occupation, age and educational structure, find that changes in the returns to education explain a very significant part of the increase in income inequality in 1992-98. Changes in the returns to unobservable factors—such as talent, responsibility and disposition to hard work, among others- and in the hours of work had also a significant role in this period. Despite the significant increase in the unemployment rate in this period its effect on inequality was low.

According to the mentioned authors this is explained by the fact that the increase in unemployment was in great part accompanied by a decrease in the inactivity rate of roughly the same magnitude, implying that the sum of unemployed and inactive individuals did not vary much in the period¹²².

Regarding wage inequality, reference will be made in the following considerations to a survey undertaken by Bebczuk and Gasparini (2001). As in other countries, women and skilled workers have increased their share in the labor pool in Argentina.

Furthermore, as shown in Table 4.9, college and high school graduates increased their share in employment, especially in the period from 1992 to 1998. This contrasted with the decreasing share of unskilled workers in the labor pool and in employment.

¹²² In contrast with these findings, Rozada and Menéndez (2002) find that unemployment accounted for a large part of the increase in inequality and poverty between 1991 and 1996 and 1998 and 2001, while returns to education played a minor role. As the unemployment rate fell between 1996 and 1998, it had a positive effect on both variables.

Productivity performance

Assuming stable labor demand, this shift in supply would imply a fall in the relative wage of skilled workers. This is the case until 1992, but not in the more recent period. As shown in Table 4.10 wages of college graduates increased by almost fifty per cent between 1992 and 1998, whereas they remained roughly the same for less skilled employees in the same period.

Table 4.9 Share of employment by educational group, 1980-1998

	Share				Change in share			
	1980	1986	1992	1998	80-86	86-92	92-98	80-98
Without a high school degree	63.0	55.2	45.8	38.2	-7.8	-9.4	-7.6	-24.8
High school graduates	25.2	29.9	32.6	34.1	4.7	2.7	1.5	8.8
College graduates	11.8	14.9	21.6	27.8	3.1	6.7	6.2	16.0

Source: Bebczuk and Gasparini (2001).

Table 4.10 Hourly wages by educational group, Greater Buenos Aires, 1980-1998, \$

	1980	1986	1992	1998
Without a high school degree	12.03	7.79	6.39	6.57
High school graduates	20.25	11.93	9.55	10.12
College graduates	35.97	20.97	14.77	20.26
Total	15.16	9.80	8.25	9.75

Source: Bebczuk and Gasparini (2001).

As relative wages of skilled employees increased despite the large rise in the number of college graduates, the explanation must be found on the demand side. During the 1990s, the growing demand for skilled labor was the result of shifts within and between sectors. Within most sectors, a growing share of skilled personnel (and especially college graduates) has been apparent since 1980 and in the 1990s in particular. Regarding shifts between sectors, the increase in skilled labor demand was led by public sector employment in the period from 1986-92 and by the professional and business sector from 1992-98.

However, sectoral reallocation, in great part due to trade liberalization, explains a significant, though smaller part of the wage premium (see also Galiani and Sanguinetti, 2003). The increase in the intensity of use of skilled labor seems to be a more important factor. Growing demand for skilled labor was probably induced by a fall in the relative price of machinery and equipment and the introduction of new skilled labor-intensive technologies.

Summing up, it is apparent that disparities in access to and the quality of education as experienced by different socio-economic groups further reinforced income inequalities. This vicious circle, in spite of some initiatives mentioned above, could not be broken by educational policies in force during the last decade.

V Concluding remarks

In a country that has exhibited high political instability, extreme economic volatility and persistent institutional fragility, it is hardly surprising to encounter a poor long-term economic performance. In fact, this was the outcome in the 40 years analyzed in this report. There were, however, two “growth spurts” with relatively good productivity records during this period, the first in 1964-74 and the second in 1991-98. The key questions addressed by this report are (i) what were the determinants of productivity in both spurts? and (ii) why did they fail to give rise to a sustainable growth process?

The first spurt took place against a background of persistent inflation and a recurrent balance of payments and political crisis. Against this unfavorable climate, the manufacturing industry led economic growth fuelled by protectionism and industrial promotion policies. While the economy was virtually closed to imports of domestically produced final and intermediate goods, it was open to foreign direct investment and technology inflows, and duty-free capital goods imports were allowed under industrial promotion schemes. Domestic innovative efforts were, however, low and mostly adaptive during this period.

The entrepreneurial response to this incentives regime led to a substantial growth in investments – mainly undertaken by TNCs. This naturally led to a remarkable expansion of industrial production capacity. *Pari passu*, a technological learning process took place at enterprise level and a local technological capability gradually accumulated in the manufacturing sector. This enabled both productivity gains – with rising industrial employment - and increased industrial exports, also favored by the tempering of the anti-export bias in the prevailing trade policy. At the same time, the export-oriented agricultural sector had left behind almost two decades of stagnation and was again enjoying rapid growth rates. In this scenario, it seemed possible that, by the end of the ISI period, the stop-and-go cycles that had periodically affected the Argentine economy could be finally be at an end, following an expansion of export capacity.

However, some of the main structural problems of the ISI period were far from being resolved, including excessive levels of vertical integration, diseconomies of scale and deficient quality levels in most of the manufacturing sector. In this economic scenario, it is hardly surprising to find that GDP growth from 1962 to 1974 was largely extensive, being based on factor accumulation, while TPF growth was relatively low.

Public policies in force during this period did little to attend to these issues. Protectionism *cum* technology imports formed the basis of the “developmentalist” project, which aimed at “completing” the Argentine industrial structure by promoting investments in heavy goods and capital-intensive sectors. Efficiency, quality, exports or domestic technological development were, at best, secondary objectives, and, only in the late 1960s were initial efforts made to address some of those issues by public policies, albeit in an increasingly unstable political environment. Institutional fragility also impaired the impact of public policies on problems such as access to finance, given the frequent changes both in the public authorities and in policy orientations.

Notwithstanding policy failures, industrial productivity gradually improved and some ambitious technological projects were actually undertaken in sectors such as

pharmaceuticals and electronics. Unfortunately, it is not possible to ascertain whether this process – probably under a better structured industrial policy regime – would have finally led Argentina towards a more competitive manufacturing sector. Increasing political violence and growing macroeconomic turbulences paved the way for a *military coup* in 1976. The new economic policy after the coup meant a departure from the old regime and the beginning of the end of the ISI period in Argentina.

Between 1976 and 1981, trade and financial liberalization, coupled with a growing appreciation of the domestic currency, led to a fall in industrial output and employment. However, while skilled and R&D- intensive activities were the most affected by the new policy regime, intermediate goods production - in which domestic conglomerates had a major share, often associated with military interests – was favored by industrial promotion policies and trade protection measures.

The banking and currency crisis of 1981 was soon followed by the foreign debt crisis, giving way to a serious recession and forcing a new closing of the economy. All the crucial economic indicators, except exports, showed a negative performance during the 1980s. The recessive and inflationary economic climate was hardly conducive to investment and productivity growth, and rising exports were, to a large extent, the outcome of investment projects planned during the late 1970s and which found a much smaller domestic market than originally envisaged.

The return to democracy was the only good news in the 1980s and naturally it is important to highlight the great significance of this fact for a country that for over 50 years had been periodically marked by military coups. Unfortunately, however, these changed circumstances neither led to a better institutional infrastructure nor to the end of political instability.

Having undergone two hyperinflation crises, stabilization was finally attained in the early 1990s with the adoption of the *Convertibility Plan*. At the same time, a far-reaching program of structural reforms was implemented, comprising trade liberalization (mild reforms in that direction had already been adopted in the late 1980s), privatizations and market deregulation was implemented. Foreign investment and technology transfer were completely liberalized – an initiative which had been started by the military government in 1976. Furthermore, Argentina aligned its domestic policies with international compromises assumed at the WTO and with “best practices” norms in the banking area (e.g. Basel regulations). The country also signed several investment treaties and joined Brazil, Paraguay and Uruguay to create a customs union known as MERCOSUR.

The aims of this reform package were to sharply boost productivity in the Argentine economy and to enhance its reputation among foreign investors. Both objectives were attained. The growth spurt between 1991 and 1998 was led by TFP growth, although capital deepening also progressed rapidly. FDI played a key role in this regard since it not only contributed to financing the balance of payments – together with the more volatile portfolio inflows –, but also was a key source of technology and productive modernization. Capital goods imports and technology transfers were also key channels for economic restructuring.

All the major economic sectors grew during this period. Privatized activities, including public utilities and energy and fuels, showed substantial improvements in terms of

productivity, quality and increased output, although often against a background of high tariffs and weak regulations. Mining also expanded due to a special incentives regime. The agricultural sector also boomed with the introduction of new technologies, including GMOs. However, many small farmers had to abandon production and the domestic contribution to technological modernization in agriculture was smaller than in previous periods, both in the case of biological and mechanical technologies.

Regarding the industrial sector, it was more efficient in the 1990s, though smaller and quite different from that of the ISI period. Product and process technologies were closer to international standards, but local innovative activities were, on average, at a lower level than in the ISI period. Labor-intensive sectors kept losing position in the industrial structure, while resource processing and scale-intensive sectors increased their share. Capital goods production fell even more than in the previous decades after a zero tariff for imports was adopted, while the high-tech sector was even smaller in the 1990s than in previous decades.

Whereas during the first growth spurt, industrial labor productivity increased with rising employment, this was not the case during the 1990s. This period was marked by a reduction in the number of manufacturing firms and more widespread use of subcontracting services. The job losses were, however, mainly due to the growing use of new labor-saving equipment, the implementation of organizational technologies that increased labor productivity and to the decline in output in labor-intensive industries following trade liberalization.

Job losses in manufacturing were not offset by the growth of employment in the services and agricultural sectors and in fact coincided with massive layoffs in the public sector and in privatized firms. This coincidence of events gave rise to a substantial increase in unemployment, one of the key factors that contributed to gradually eroding popular support for the reform program.

Growing unemployment, poverty and income inequality are undoubtedly the worst aspects of the 1990s legacy. Although structural reforms had a direct impact on these phenomena, their negative effects were amplified by the fact that low-income groups often had poor levels of schooling and a lower probability of achieving higher educational qualifications.

In late 1998, GDP and TFP growth stopped. From then on until 2001 the economy went into a recession that finally led to a major crisis in the country's history. Although an analysis of this crisis is well beyond the scope of this study, a combination of external shocks with a rigid exchange rate regime, high foreign debt, large fiscal imbalances and a weak government are the main factors behind the end of the Convertibility Plan as discussed in the received literature (see Chudnovsky *et al.*, 2003). However, the weaknesses of the economic restructuring process induced by structural reforms also help to explain why the growth spurt of the 1990s was ultimately unsustainable.

Labor productivity in industry during the two growth spurts: differences and similarities

A comparison of both growth spurts shows that the dynamics of the manufacturing industry were very different during each period. This should not be a surprise in the light

of the dramatic changes both in the domestic economic policy regime and in the international scenario. However, similarities – some of them perhaps unexpected – are also observed. Below we list the main factors underlying the strategies and performance of industrial firms in both periods.

While industrial production was mainly oriented towards the domestic market, significant export increases (mostly oriented towards Latin American countries) were attained in the second half of both growth spurts, as a result of the maturation of new investments and gradual productivity improvements. However, productivity and competitiveness gains in both periods were not enough as to bring about a decisive transformation in the industrial sector and make it competitive at international level. The only exceptions here were some few manufacturing plants in certain resource and scale-intensive sectors.

In view of the growing import penetration ratios, the degree of competition in manufacturing production in the 1990s was greater than during the ISI period, when import penetration was only significant in the machinery and equipment industry. Nonetheless, the adoption of non-tariff barriers and the lack of effective anti-trust legislation constrained the influence of imports as a competitive force in several manufacturing sectors.

A sharp reduction in the degree of vertical integration of local production took place in the 1990s as compared with earlier periods and this permitted lower production costs. Firms were also able to achieve economies of specialization by reducing their product mix and complementing their local supply with imports of final products. This, however, resulted in an industrial sector with fewer inter-sectoral linkages than in the past.

Foreign firms were key actors in industrial restructuring during both growth spurts. In spite of the fact that domestic firms accounted for most of the industrial production, affiliates of TNCs dominated key sectors, had higher productivity levels than domestic firms and were behind the bulk of investments in the manufacturing sector (in fact, during the 1990s their share in terms of sales, employment and value added was substantially higher than in the ISI period). Despite significant changes in the trade regime, most FDI in both periods was market-seeking. However, both export and import coefficients of affiliates of TNCs increased during the 1990s, as a result of trade liberalization and efficiency-seeking investments in some sectors.

Whereas in the first phase foreign firms mostly undertook greenfield investments (although sometimes with second-hand equipment), takeovers of domestic firms were the predominant means of entry for TNCs in the 1990s. Although these takeovers generally led to substantial productivity and quality gains in the firms acquired – naturally leading to improved business performance – this was at the cost of increasing industrial concentration, lower domestic linkages and often reduced endogenous R&D activities.

The TNC presence generated different kinds of spillovers for domestic firms. During the ISI period, spillovers were mostly in the form of knowledge leakages from technologies introduced by affiliates of TNCs affiliates' and previously unknown in Argentina. In the 1990s, productivity spillovers were measured using econometric techniques. These could have been the outcome of knowledge leakages as well as of competitive pressures on domestic firms an increased foreign corporate presence. Positive spillovers were experienced only by domestic firms with high absorption capabilities – which comprise

several variables such as skilled personnel, use of modern organizational technologies, the magnitude of innovation activities (including R&D and technology and capital goods imports) and the level of training expenditures.

Domestic conglomerates gradually increased their presence in the Argentine economy initially in the ISI period and later on during the long recession between 1976 and 1990, when they acquired preeminence in industrial leadership. Reforms had a heterogeneous impact on these firms. While some of them went out of business or drastically shrank, others concentrated on their core activities to consolidate their positions in the domestic market. In some cases domestic groups also gained presence in foreign markets through exports and FDI.

The ISI environment was more favorable for SME development than the rules of game prevailing in the 1990s. In both periods, SME productivity and innovative performance was, on average, weaker than that of large firms, and public policies often discriminated against the former (despite some pro-SME initiatives in the 1990s), some key trends of the 1990s severely affected this group of firms. Firstly, they were poorly prepared for competition from imports as their technological, management and marketing capabilities were weak. Secondly, in the 1990s, there was less scope for technological imitation. Thirdly, massive FDI inflows in a climate of trade liberalization resulted in lower linkages with domestic suppliers, affecting SMEs in particular. Fourthly, they had to adapt to new competitiveness requirements in areas such as quality and environmental management. Fifthly, the adoption of stringent financial regulations and increasing presence of foreign banks further reduced the already limited SME access to credit.

The main source of technological innovation and productivity improvements in both periods were inputs from abroad, in the form of imported capital goods, disembodied technology transfer and FDI. Imitation through reverse engineering and other means also took place, but was seemingly more intense in the first growth period – to some extent, due to changes in the intellectual property regime (e.g. acknowledgement of pharmaceutical patents), and also in the domestic and international technological scenario.

Product and process innovations in both periods were the outcome of enterprise-level learning processes through which important tacit knowledge was acquired as well as of codified knowledge received from machinery suppliers, licensors, consulting firms, foreign partners or headquarters. In contrast, linkages with local technology institutions were generally non-existent in both periods.

The highly individual and ad hoc technological efforts to adapt imported inputs and foreign products and to extend the life cycle of industrial machinery were quite important elements in the dynamics of innovation in the 1960s and early 1970s. These efforts, together with production and process engineering and labor organization improvements, fuelled the productivity gains of that period. In the 1990s, in the context of domestic reforms and technology globalization in many sectors, there was less need for these individual initiatives. At the same time and as previously indicated, there was less opportunity to copy imported products. In fact, the intensity of R&D activities, though very low in international terms in both periods, was even lower during the 1990s in comparison with the ISI period.

However, substantial technological requirements arose from the modernization process that took place in the 1990s. These were related to the launching of new products, the adoption of modern production processes and organizational, advertising and marketing techniques, the diffusion of quality improvements and advances in environmental management. All these initiatives required the allocation of human and financial resources both to acquire (mainly imported) knowledge and to absorb and exploit it.

While no similar study is available for the ISI period, our econometric findings for the 1990s indicate that involvement in innovative activities (in-house R&D and technology acquisition) enhances the probability of becoming an innovator (i.e. launching a new product or process). Continuous R&D efforts have a considerably greater impact on the probability of having an innovative output than a pattern of discontinuous expenditures. Innovators also performed better than non-innovators in terms of labor productivity.

Large firms are more likely to engage in innovative activities and to launch innovations to the market. This also applies to firms with high levels of skilled personnel and greater export-orientation than the average for the manufacturing industry. In contrast, affiliates of TNCs are neither more active in terms of innovation activities nor in launching new products or processes on the market.

The role of public policies

A stable macroeconomic environment without sharp cyclical fluctuations is an essential pre-requisite for productivity improvements. Unfortunately, macroeconomic policies have often been unable to achieve this stability in Argentina. Volatility and uncertainty have been features of most of the period under review. They have negatively affected productivity through their impact on the business decisions of economic agents, inducing a preference for short-term strategies and precluding long-term commitments,

A particularly relevant aspect of macroeconomic policy in countries such as Argentina is the exchange rate. Periodic devaluations leading to huge income redistributions marked the stop-and-go cycles that characterized the Argentine economy during the ISI period. Between 1976 and 81, the exchange rate was used to contain inflation, but failed to meet that objective, thus provoking a dramatic financial and economic crisis.

In an environment of very high inflation rates, exchange rate management was extremely difficult in the 1980s. Ultimately, the currency board in the 1990s was undoubtedly a good mechanism to eliminate inflation but proved in the end to be very difficult to sustain in a climate of volatile capital flows and external economic crises.

After the mega-devaluation of 2002, the current policy of a flexible exchange rate with inflation targets has been able to combine stability and growth to date, although its influence on long-term productivity trends is beyond the scope of this study. In particular, the discussion of the appropriate level of the exchange rate is very relevant, since high exchange rates should favor exports - albeit at the cost of discouraging imports - and this could have negative consequences, given Argentina's reliance on sources of foreign technology. Apart from the critical influence of the macroeconomic environment, trade and foreign investment policies have, by far, contributed most to shaping the long-term evolution of Argentine productivity.

During the ISI period, incentives from import competition were non-existent and this favored industrial expansion, without, however, providing enough stimuli for productivity growth and quality improvements. Since there were no selectivity and timing criteria, and protection was granted without *quid pro quo* commitments from favored firms and sectors, it is hardly surprising to find many cases of “eternal” infant industries. The excessively inward-oriented policy of the time also precluded the achievement of the economies of scale needed to compete internationally and led to higher than desirable vertical integration levels. Although export promotion regimes were in place from the late 1960s – in order to mitigate the anti-export bias of the protectionist regime -, no evidence is available on their apparent impact on the growth of industrial exports observed at the time. Their lack of stability in the light of budgetary restrictions and frequent economic policy shifts undoubtedly served to limit their effectiveness.

Industrial promotion regimes were the other “big policy” during the ISI period. They clearly favored massive, mainly foreign investments during the “*desarrollista*” government and, from then until the late 1980s, most large-scale industrial investments in Argentina were undertaken under the auspices of special incentive regimes of different scopes. Beyond their frequently very high fiscal cost, these regimes were mostly aimed at promoting productive capacity expansion, and seldom established performance commitments – i.e. in terms of productivity, exports, technological development, etc. Productive and technology learning processes observed at enterprise level were largely ad hoc activities. Hence, although they played a positive role for investments in a scenario in which there was no access to long-term finance and institutional and macroeconomic uncertainty prevailed, they largely failed to build up a competitive industrial sector.

After 1976, a trade liberalization experiment took place initially. As it mixed pro-efficiency with anti-inflation goals and was adopted against the background of an overvalued peso, unsurprisingly it ultimately had negative consequences for the manufacturing sector. Later on, the economy was closed for macroeconomic reasons. However, unlike the situation in the ISI period, protectionism went *pari passu* with a chaotic and recessive macroeconomic environment, hence failing to provide any stimulus for industrial development.

In turn, different kinds of investment and export promotion regimes were put in place during most of the 1976-1990 period. Since their aforementioned weaknesses were never resolved, the evaluations available on their impact are, understandably, for the most part negative.

In the 1990s, a deep and rapid trade liberalization process was implemented and some of its key objectives were met. On the one hand, greater competition from imports in the local market was a major incentive for productivity improvements in tradable sectors and, on the other hand, capital goods imports were a major source of technology modernization. Trade liberalization was especially successful in facilitating the technological modernization of the agricultural sector, which experienced a boom from the mid-1990s onwards.

However, trade liberalization also had negative consequences. Firstly, it was implemented in a drastic manner at a time when the industrial sector had gone through over a decade of contraction and private firms had developed strategies and routines to enable them to survive in a closed and volatile economy. Secondly, no complementary policies were

adopted or, when they were - see below, their real impact was marginal in terms of helping industrial firms adapt to the new scenario. Hence, a form of Darwinian selection took place and this led to the closure of several, mainly small and medium-sized firms and to the contraction of skilled and non-skilled labor-intensive industrial sectors.

Naturally, manufacturing firms affected by trade liberalization often resorted to lobbying activities to obtain protection from imports. The proliferation of anti-dumping, safeguards and other non-tariff barriers at the time illustrates how these pressures were successful in many cases. The special protection for the automotive sector is another example of the protectionist measures employed. "Contamination" of tariff policy with macroeconomic objectives also contributed to distorting the signals coming from the trade liberalization process.

A number of WTO-compatible export promotion policies were in place during the 1990s. One relevant innovation in this area was the adoption of a so-called "mirror" criterion which equalized export reimbursements with tariffs paid on the same items. However, this instrument, together with others, such as indirect tax refunds, were often subject to changes and delays in their operation due mostly to fiscal restrictions and were not linked with other enterprise and technology policies in place during the same period.

The creation of MERCOSUR favored access to a huge market for Argentine exports making it possible to attain economies of scale and specialization that had been barely feasible in the domestic market. In fact, it was so successful in the trade arena that it brought about a high concentration of Argentine exports in the Brazilian market. However, the lack of macroeconomic coordination and the progress difficulties in the negotiation of non-tariff barrier regimes, investment policies and other "deep integration" issues turned MERCOSUR from a major opportunity to a source of conflicts, especially after the Brazilian devaluation in early 1999.

Depending on the level of economic activity in each country, real foreign exchange rate fluctuations and competitiveness levels in individual sectors the integration with Brazil was, alternatively, an inducement for productivity gains and a source of problems that led to a variety of trade conflicts. Unfortunately, little progress was made beyond defensive trade policies to deal with these problems, since MERCOSUR never had regional instruments in the areas of industrial, export, technology and enterprise policies.

Investment promotion regimes were almost completely abolished in the 1990s. Using the description suggested by Oman (1999), a form of "rules-based competition" for investments was followed, through macroeconomic stability, privatizations, trade liberalization and an "investor-friendly" regulatory regime. No regulations on FDI entry or on the activities of affiliates of TNCs were put in place. Within the manufacturing industry, only the automobile sector benefited from a sectoral preference shown in investment attraction. The prevailing investment promotion policy also accorded priority to privatizations and the mining and forestry sectors.

This regime had a novel system to encourage model specialization in the automobile industry by increasing foreign trade flows whilst aiming at maintaining a balance between imports and exports. Later on a common trade regime was negotiated with Brazil. This regime was plagued by discussions on issues such as investment diversion, local content requirements and mechanisms to address the impact of changes in macroeconomic

policies on bilateral trade. It also failed to formulate a strategy that could lead to a pro-competitive restructuring of the MERCOSUR automobile industry as a whole.

Furthermore, while the motor vehicles regime encouraged substantial investments by TNCs, it also led to excess capacity and induced investments that mostly aimed at taking advantage of the regime incentives without having real perspectives of surviving in a liberalized market – a similar situation arose soon after the first automobile regime was adopted in late 1950s. At the same time, beyond the aforementioned discussions on local content requirements, no attention was paid to strengthening backward linkages. The low level of R&D activities undertaken by affiliates in Argentina on account of regional sectoral restructuring was not a matter of concern for the economic authorities. Furthermore, automobile firms did not always meet the compromises they had assumed and, although penalties were foreseen in such an event, ultimately they were not made effective.

In fact, the lack of attention to issues such as the need to foster domestic linkages and enhance endogenous innovation capability is a common feature of most economic policies adopted at the time. This is seen not only in the automobile sector, but also in privatizations, during the agricultural boom and in the mining and forestry sectors. It is hardly surprising since one of the cornerstones of the economic policy regime prevailing during this period was that the key inputs for technological modernization were to come from abroad – in the form of FDI, capital goods or intangible technology transfer. The notable increases in these three channels of inputs show that the aim of the reformers was met, although this achievement was not sufficient to pave the way for a sustainable development path for the economy as a whole.

Notwithstanding the aforementioned basic features of the economic policy regime of the 1990s, the difficulties experienced by many firms in adapting to the new rules of the game and the dramatic growth in unemployment led the government to launch a number of enterprise and technology policies. These were mostly aimed at dealing with market failures in areas such as credit access, information, technology development and others, and at facilitating SME access to foreign markets and fostering their linkages with domestic consultancy and technology services.

Although most of these initiatives were based on a sound theoretical rationale and on the imitation of best international practices, they appear to have failed to make a significant impact on the performance of the business community targeted. Hence, despite their implementation, survival and progress during the 1990s depended largely on each firm's capacity to adapt to the new scenario. According to the available evidence, the main factors that led to this outcome include:

1. Enterprise and technology policies had no priority for the national government and were not part of a long-term strategy in which the public and private sectors engaged in a shared pro-competitive restructuring policy process (of the style suggested by Rodrik, 2004).

2. The policies were often based on a parallel bureaucracy financed through multilateral agencies' programs. The programs' continuity over time was threatened by financial uncertainty and the risk of being abolished and changed by new authorities with other priorities. Naturally, the policy-learning process was impaired by these factors.
3. There was a lack of coordination among the numerous agencies in charge of the policies. This institutional fragmentation prevented any benefit from being derived from synergies among the different programs, led to bureaucratic duplication and often prevented firms from getting a comprehensive diagnosis of their problems and the possible solutions.
4. No evaluation mechanisms were in place to assess the effectiveness of initiatives taken.
5. There was excessive emphasis on horizontal policies and assistance to individual firms, while the importance of a cluster-oriented form of support was only acknowledged after the collapse of the Convertibility Plan (see below).

Neither the old nor and new problems of the Argentine economy were adequately addressed by the public policies applied. Among the new problems, the environmental aspects of industrial restructuring were overlooked by the government, as environmental legislation was not complemented by or linked with existing enterprise and technology policies. Hence, any progress observed in environmental management in the manufacturing industry, - beyond the adoption of legally required *end-of-pipe* systems - was an ad hoc market-driven outcome of strategies and learning processes at enterprise level.

With regard to the old problems, the limitations imposed by lack of effective linkages between the public S&T institutions and the educational system and the productive and technological development requirements of the private sector were never resolved. Furthermore, the once renowned quality of Argentine education, which granted the country a privileged position among developing countries, has been eroding dramatically in recent decades, and has not made any significant contribution to productivity growth.

In the area of financing, the problems detected during the ISI period showed no apparent signs of improvement in the 1990s. These problems included insufficient financial deepening, the absence of a well-developed domestic capital market and pervasive banking system market failures that prevented many viable firms and projects from having access to credit. SMEs were those most affected by these problems as large firms had access to international sources of finance. On balance, in our view the Argentine experience of the 1990s illustrates the benefits, costs and limits of a mainly market-driven restructuring process. What would have happened in a scenario with more and better designed policies? Notwithstanding the fact that hindsight analyses are always controversial, evidence available on the "micro economy" of the reforms suggests that policies aimed at enhancing absorption capabilities and removing obstacles for undertaking innovative activities in domestic firms would have allowed more firms to survive and expand productivity during the 1990s - a fact that would probably resulted in lower unemployment levels-.

From international experience, it can also be suggested that policies fostering more linkages and collaborative efforts among firms in the different value chains and organizations related to those chains (such as S&T institutions, universities, etc.) - would have been more successful than those applied in Argentina which mostly aimed at helping individual firms. Other areas in which much could have been learned from international experience include environmental policies and finance. In the latter case, seed and venture capital systems were extremely underdeveloped and, in general, entrepreneurship promotion schemes hardly existed.

The lack of policies oriented towards fostering TNC linkages with domestic suppliers, clients and S&T organizations, inducing their affiliates to engage in R&D and other innovative activities and improving their export performance – and that of their suppliers and customers - are all missed opportunities that could have been better exploited in the wake of the FDI boom of the 1990s.

With regard to the lessons for the present and future and given the dramatic changes in the Argentine economy after the end of the Convertibility Plan, an updated and accurate diagnostic survey of the position at enterprise level in the different productive sectors is necessary in order to safeguard, change or eliminate the policies actually in force and determine future action. This is precisely an area in which UNIDO assistance could be of significant benefit.

In this regard, a potentially valuable initiative was launched in 2003 involving the creation of several competitiveness fora in the Secretariat of Industry, Trade and SMEs. These for a are based on a cluster approach, incorporating all relevant agents and organizations within each value chain and addressing a wide range of specific sectoral issues, including human capital requirements, technological needs, etc. This was undoubtedly a very positive step, although most of these fora are still at an early stage, have limited human and financial resources, are well down the economic policy agenda and not yet integrated into any medium or long-term strategic vision. They could yet form the basis for the reversal of what is certainly a historically bad record in terms of policy-making in Argentina.

Finally, both the Argentine experience and the lessons from received international literature suggest that, without institutional and macroeconomic stability, even the best-designed public policy is probably doomed to failure., As policy- making is a learning process – both for public authorities and the private sector directly concerned with the policy instruments - continuity is required to ensure a positive outcome.

Argentina has much to improve in this area, as the institutional infrastructure underlying the policy-making process is very weak and public policies lack credibility, stability and coherence and are often poorly implemented. State capacities also need to be dramatically enhanced, since the country still lacks a stable and efficient bureaucracy -a gap that is generally filled with temporary, politically appointed bureaucrats. In this situation, cohesion and coordination among the different areas of government are seldom attained. In our assessment, restructuring of state entities constitutes a top priority in the economic development agenda of Argentina.

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