

Structural change and microeconomic behavior in the Brazilian industry

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1. Introduction

Brazilian industrialization process transformed a typical exporting economy of primary goods into an ample productive structure. Even under protectionist methods, credit and tax subsidies, and a lag in public service rates and prices of basic inputs produced by public companies, a diversified industrial base was formed in the country in just a half-century period between 1930 and 1980. These accomplishments were not very different from those found in other countries that experienced industrialization throughout the following decades. The difference that determined the course of their experience was the competitive direction taken by each one. While in some cases the goal of economic planning was to integrate into dynamic foreign markets, this was not exactly the priority of the many industrial development policies implemented in Brazil.

Between the 1930s and the mid-1950s, economic policies influenced by protectionism stimulated “import substituting industrialization process” (ISI), which gave rise to the industrialization process. Later this process ended up being driven by an increase in demand in the domestic market and by industrial structure diversification that resulted from economic planning, such as the Target Plan (Plano de Metas) in the late 1950s, the sector policies in the late 1960s and mid-1970s, and the 2nd National Development Plan (II Plano Nacional de Desenvolvimento – II PND) in the late 1970s. As a result the country reached the end of the 1970s with a well-integrated and diversified industrial structure, but overprotected, low in productivity levels, significantly behind in technology, and with unimpressive integration in the international market.

The Brazilian industry’s transition from the 1970s to the 1980s offered an historic opportunity to correct its course of direction by reducing protectionism, incorporating the

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activities representative of the then emerging paradigm of information and communication technology, and seeking international integration in dynamic markets. This, however, is not what happened. The macroeconomic crisis and consequent instability kept industry stagnant throughout the 1980s and interrupted the industrialization process. Ten years later, therefore, the Brazilian industry found itself even more behind technologically and ill-equipped for innovative activities. Opening the economy and especially trade liberalization in the beginning of the 1990s placed a serious challenge before the industry – to confront international competitors both in domestic and foreign markets.

Unprepared and immersed in an adverse macroeconomic scenario, the industry's only possible reaction was to ration its productive processes so as to decrease costs and increase efficiency. The 1990s were marked by frequent industrial product fluctuations parallel to consistent drops in employment within the industry. The positive result was exactly what was expected from opening the economy – a productivity shock to the Brazilian industrial base. These efforts of decreasing necessary resources while maintaining the same level of return led to the inevitable integration of a large part of Brazilian industrial companies into markets where competition is predominantly established by price as opposed to those in which product differentiation exerts the main competitive influence. However, it is in these markets that technological innovation generates relative market power for companies, which, even if temporarily, permits a greater return for invested capital and greater protection for employees against recurring price fluctuations of standardized products. In other words, if technological innovation plays a central role in the economic development trajectory, growth related to productivity and industrial employment is competitively integrated into these markets. This, in turn, only happens when national companies intensify innovative efforts like investment in research and development.

With that in mind, this paper argues that the Brazilian case of industrial restructuring after the trade opening presents certain unique traces that distinguish it from conventional perspectives regarding the specialization of developing economies in labor and natural resource industries. This uniqueness is based on the fact that, although Brazil is a country recognized for its competitiveness in more standardized agricultural and industrial goods, there is a significant group of Brazilian companies – responsible for about one fourth of industrial sales – whose international integration is predominantly

achieved by producing goods with medium to high technological content. Therefore, instead of generating regressive specialization, the new competitive environment induced a new business perspective of the country's potential in the world economy that is strongly associated to competition standards in innovation and product differentiation areas. Part of today's business community is distancing itself from recurring passivity and traditional dependency on government initiatives and beginning to consolidate itself as a segment that is willing to equip itself and face the best international competition practices – especially those associated to technological innovation – typifying a new stance in terms of company strategies.

This article is divided into five parts, besides this introduction. The next part presents a summary of the industrial development process experienced in Brazil between 1930 and 1980. The objective is to demonstrate that this process, based on protectionism, direct investment by the State, and tax and credit incentives for private capital, was responsible for creating a business perspective that is lethargically and passive compared to the main international trends. The third part analyses some of the conditions that determined the change in the competitive environment beginning in the 1990s, notably trade opening and State system reform. The fourth part analyses the repercussion of this new scenario on Brazilian industry performance in order to show that, in part five, this performance is based on a new business perspective – one that strongly conflicts with conventional approaches to competitive integration of developing countries in labor and natural resource industries. Finally, some conclusions will be presented.

2. Brazilian industrial development from an historical perspective

Before the 1930s economic policies were not systematically concerned with promoting industrial development. There were in fact some initiatives to protect domestic industrial activities and to foster certain industries, but they were sparse and inconsistent. It was only after the 1930s that, as a result of the Great Depression and the crisis in the agriculture export industry, that clearer action was taken in favor of industrial development, albeit the original intention of some measures were to defend the agriculture export industry.

With the foreign exchange crisis that resulted from the Great Depression came exchange rate devaluation policies, foreign exchange market control, and import quantity control, with the double intention of defending the export industry while maintaining its income levels and re-balancing Brazilian foreign accounts. The indirect consequence of such measures was increased protection of manufacturing industries in the domestic market, which ended up meeting the demands that had previously been met by imports. This energized industrial production growth for the domestic market and opened the way for industry to lead the economic growth of the country by substituting imports – notably consumer goods and some intermediary goods of simpler technology.

Subsequently, between the 1930s and mid 1950s, the State began to deliberately intervene in favor of industrialization by financing private investment or investing directly in the development of some primary industries (i.e. ironworks, mining, alkali, petrochemicals) and in the economic infrastructure (i.e. energy and transportation). However deliberate, this State action in favor of industrialization did not exactly follow an industrial development strategy. That would only take place in the mid 1950s.

Changes in trade policies brought on by continuous crises in the foreign industry caused the protection of domestic market industry to increase considerably until immediately after the war. Foreign exchange policies⁴ continued to be the main protection instrument by way of devaluation until the end of the 1930s, and later by introducing market exchange controls that prioritized imports. During the post-war, with the exchange rate kept fixed (over valued), these controls were intensified and broadened in the discretionary administration of import policies.

The need for financing policies regarding industrial investments became more evident as investments that substituted imports grew. The private financial system (trade banks) did not have the instruments for obtaining resources that would permit it to guarantee medium and long-term loans for industrial investments. This task was taken on by the State through the Bank of Brazil's Agricultural and Industrial Credit Portfolio (Carteira de Crédito Agrícola e Industrial – CREAM), created in 1937.

Although a strategy to coordinate the State's industrialization efforts was never formulated, several attempts were made to create an economic development plan during

⁴ The other historically important instrument – customs tariffs – had lost its effectiveness due to reduction of nominal rates and an increase of import prices in domestic currency. Its role was only restored after the customs tariff reform parallel to creating the Customs Policy Council (Conselho de Política Aduaneira) in 1957.

that time. This demonstrated that those responsible for economic policies (and for the emerging industrial class) were concerned with the need to promote industrialization as an alternative for social and economic development. In this sense, the Joint Brazil-United States Economic Development Commission created in the late 1950s to broadly diagnose the economic situation in Brazil was important. The Commission identified “strangulation points” that needed to be eliminated in order to make economic development viable. To do that, 41 projects were elaborated in the areas of transportation, energy, agriculture, and industry. Although the latter of these was associated to only two of the projects – which represented 2.8% of estimated investments – it is important to note that, based on the Joint Commission’s studies on financing the administration of these projects, the idea for creating a development bank was born. The result was the National Economic Development Bank (Banco Nacional de Desenvolvimento Econômico e Social – BNDES), founded in 1952. It is well known that the role of BNDES was fundamental in the subsequent phases of the industrialization process and economic development of the country in that it financed private and public investments that diversified the industrial structure and broadened the economic and social infrastructure.

Similarly, the State’s direct investment in implanting capital goods industries and in generating electricity greatly motivated industrial development during that period. The State’s main accomplishments included⁵: creating the Vale do Rio Doce Company in 1942 in the mining sector; founding National Steel Company in 1941 along with Bank of Brazil’s acquisition of the control shares of Itabira Special Steel (ACESITA) in 1952 in the iron and steel area; creating the National Alcalis Company in 1943 in the chemical commodity industry; creating the National Motor Factory in 1943 for producing heavy motors; and founding the São Francisco Hydroelectric Company in 1945 to generate and distribute electricity.

The first industrial development plans with defined broad-spectrum goals and strategies for developing specific industries began in the mid 1950s. The most significant ones were the Target Plan (Plano de Metas) in 1956-60 and the II PND in 1975-79.

The Target Plan effectively established the beginning of a period in which the Brazilian government performed actively and in an organized fashion to promote industrial

⁵ See Suzigan (1976); Malan et al. (1977:369-70).

development in the country. The starting point was the group of “strangulation points” that the Joint Brazil-United States Commission had identified in areas of transportation, energy, agriculture, and industry. With BNDES in operation, the government initially began directing funds toward investments in infrastructure, but soon after the bank began financing investments in capital goods industries. Similarly, other measures that had been taken in the first half of the decade contributed to boosting industrial development throughout the rest of the 1950s. Of special note is the creation of PETROBRAS in 1953 that caused petroleum activities such as refining, production, and prospecting to expand more quickly; the Instruction 70 (1953) of the old SUMOC⁶ that established a system of foreign exchange auctions with five import categories that favored industrial machinery and equipment imports; and the Instruction 113 (1955) of Currency and Credit Superintendence (Superintendência da Moeda e do Crédito – SUMOC) that permitted foreign company subsidiaries established in the country to import machinery and equipment without foreign exchange coverage. Those most benefited by the latter measure were the automobile, chemical, and capital goods industries.

However, it was only after 1956/57, following the implementation of the Target Plan, that a deliberate and coordinated industrial development policy could be identified. It consisted of a general economic development strategy that defined the role of the State toward private funds (both domestic and foreign) by establishing goals for infrastructure investments and the developing specific industries. Executive Groups made up of government technicians and entrepreneurs were created for this purpose, with the power to manage incentives (granting land and improvements, tax exemptions, and financing) and regulate investment in the respective industries.

One of the main instruments of this strategy was a protection system that substantially increased industrial protectionism in the domestic market. This system was mainly made up of a new customs tariff, *ad valorem* for the first time and strongly protectionist (1957 Tariff); a new foreign exchange policy with two import categories (general and special), which subsidized machinery, equipment, and primary industries, as well as recorded the importation of “less essential” goods; and the imposition of non-tariff barriers on imports, notably by applying the so called Law of Similar Domestic Production (Lei do Similar Nacional) by the Customs Policy Council (Conselho de Política Aduaneira).

⁶ Superintendencia da Moeda e do Crédito (Currency and Credit Superintendency), begun by the Central Bank of Brazil.

BNDES financing for industrial investment focused initially on capital goods industries, especially steel. However, by the end of the 1950s and the beginning of the 1960s the bank began financing the private investment of domestic capital in practically all types of transformation industries.

The State's direct participation in the economy through investment in primary industries (steel, mining and petrochemicals) and in infrastructure increased significantly. At this time the State also began its first initiatives to create institutions that would coordinate research and bring together human resources for higher education, these being CNPq (The National Council for Scientific and Technological Development) and CAPES (Coordination for the Improvement of Higher Education Personnel).

As a result, the structure of Brazilian industry evolved and incorporated segments of heavy industry, durable goods industries, and capital goods industries, substituting imports and initiating a broader and more diversified industrial structure. The economic infrastructure became better equipped for industrial development and the beginnings of institutions that represented a scientific development system began to form. It was based on these results that an accelerated growth of industrial production was made possible in the initial phase of the expansion cycle of 1968 to 1973/74. Before that, however, the industrialization process experienced strong discontinuity.

In 1963 the Brazilian industry entered a recession that lasted until 1967. The beginning of the recession had a predominant cyclical component – the reduced growth rate of the gross fixed capital formation, which was related to the “conclusion of the voluminous public and private investment packages initiated in 1956/57” (Serra, 1982: 80). But there were also other components related to the economic policy administration, among which the following should be mentioned: 1) the new law to control profit remittance approved by Congress in 1961, which possibly contributed to reduced foreign direct investments. It should be noted that foreign capital had substantial participation in the investment package afore mentioned, and its growth “had already showed a declining tendency since the end of the fifties” (Serra, 1982: 82); 2) alterations in the foreign exchange policy, also in 1961, which substantially reduced subsidies of capital goods imports implicit in the “general category” of the multiple exchange rate system; 3) credit reduction and public expense restrictions, including investments, in the midst of the anti-inflation policies of 1963 - Triennial Plan (Plano Trienal); 4) the macroeconomic

stabilization policy of 1965-67 that aggravated the cyclical tendency and prolonged the recession.

During this crisis period, and in the midst of reforms promoted by the authoritarian regime established in 1964, economic policy institutions experienced broad reorganization. From an industrialization point of view, the most relevant measures were: 1) the creation of the Industrial Development Commission, later changed to Council, (Comissão de Desenvolvimento Industrial – CDI) in 1964. The CDI incorporated the old executive groups and was responsible for administering industrial incentives and formulating the country's industrial policies. The main incentive administered by the CDI was an import tax exemption (and others by extension) on capital goods destined to industrial projects approved by the entity; 2) the strengthening of Bank of Brazil Foreign Trade Portfolio (Carteira de Comércio Exterior - CACEX) as the entity responsible for import administration, when the Customs Policy Council (Conselho de Política Aduaneira - CPA) transferred the implementation of the Law of Similar Domestic Production (Lei do Similar Nacional) to CACEX in October, 1967. It is important to remember that in March of 1967, a unification of the foreign exchange system had been put into effect, and in that same year customs tariff rates in general had been reduced (Bergsman, 1970: 34-5; Suzigan, 1975: 460-1). This would later accentuate the importance of the Lei do Similar and other discretionary tools (non-tariff barriers) managed by CACEX for the purpose of controlling imports; 3) the diversification of the private financial system by applying indexation to financial assets, long-term deposit accounts, and savings accounts in order to conciliate non-bank financial intermediaries specialized in supplying mid-term credit, including direct credit, and the Housing Financial System (Sistema Financeiro da Habitação); 4) the growing diversification of the types of investments made by BNDES and other official banks in funding industrial investments that encompassed a greater number of industry types and different levels of companies (e.g. small and medium size) in the transformation industry.

This institutional reorganization caused production and industrial investments to begin growing anew and lead the accelerated economic growth that began in 1968. The Brazilian industry experienced its fastest growth cycle and structural changes after the recession and institutional reforms of 1964-67. Despite the liberalizing rhetoric of the authoritarian regime, the State played an active role in expanding the domestic market and promoting manufactured product exports, which was added to the favorable

conditions of the world economy in terms of dynamic international trade and easier foreign investment.

In the first phase of the cycle the industrial production growth was based on using the idle capacity left by investments made during the Target Plan's term. Minimum rates and other indivisibilities had over expanded investments in some industries such as the automobile industry, and the excess capacity had been accentuated by the 1963-67 recession. However, once these margins of idle capacity were absorbed, investments were resumed with even greater vigor beginning in 1970.

The State strongly subsidized the formation of industrial capital in the new investment cycle. The main instruments were: 1) exemptions or reductions in customs tariffs and other taxes such as federal VAT (Imposto sobre Produtos Industrializados - IPI) and merchandise sales tax (Imposto sobre Comercio de Mercadorias- ICM), levied on machinery and equipment imports destined to industrial projects approved by either the CDI or by sector and regional development agencies. After 1971 the IPI and ICM exemptions were extended to machinery and equipment purchased on the domestic market, so as to eliminate discrimination against the domestic production of capital goods; 2) implicit subsidies in long term financing for industrial investment granted by BNDES. This financing had pre-set indexation with significantly more inferior limits than the inflation rates observed throughout the 1970s; 3) tax incentives administered by regional development agencies for industrial investments in less-developed areas.

A broader market for products manufactured between 1968 and 1973/74 was the result of both demand increases in the domestic market and export growth and diversification. The greater demand for products manufactured in the domestic market had three main sources: expansionist macroeconomic policies, a housing construction boom, and recovered consumer levels. The main component of the first of these was a broad public investment program in social and economic infrastructure (energy, transportation, communication, urbanization, and basic sanitation), as well as direct investments by public companies in capital goods industries – mainly petroleum exploration and mining, steel, chemistry, petro-chemistry and fertilizers, and the arms and aeronautics industries. These investments were, to a large extent, financed by foreign resources given the facilities available at the time for obtaining currency loans and import financing on the international financial market, even after the international crisis in the mid 1970s. On the other hand, private domestic companies were financed by funds subsidized by BNDES

and regional and state development banks, besides having benefited from tax incentives administrated by public agencies in various government spheres.

Financing facilities for real estate construction contributed to the urban housing construction boom and drove the domestic demand for manufactured products. This began amidst the institutional reforms of the mid 1960s with the creation of the Habitation Financial System (Sistema Financeiro da Habitação – SFH) that is made up of a “central bank” (Banco Nacional de Habitação - BNH) and of institutions and instruments specifically for medium and long-term loans and funding within the financial system, such as real estate notes and savings accounts.

Favorable conditions for consumer growth were also created, which had been previously repressed during the long recession of 1963-67. Consumer demand grew not only as a result of higher employment rates and increased payrolls, but also due to financing facilities focused on developing a segment that specialized in direct credit within the private financial system. With that, durable goods production – particularly automobiles and household appliances – expanded rapidly, leading the industrial production growth during the peak period of the expansion cycle (1968-1973).

Two types of measures stimulated the growth of manufactured products: a substantial devaluation of the exchange rate in August, 1968, followed by the adoption of a mini-devaluation system of the exchange rate in step with the inflation rate, and the creation of new fiscal and financial subsidies and incentives for exportation, forming trading companies, and special production programs for exports. The latter of these was done through the Commission for Granting Fiscal Benefits to Special Export Programs (Comissão para Concessão de Benefícios Fiscais a Programas Especiais de Exportacao – BEFIEEX), created in 1972. It should not be forgotten, however, that a dynamic world trade that lasted until the international crisis emerged in middle of the decade also contributed to the growth of Brazilian manufactured products exports.

After the petroleum shock and raw material price increases on the international market (1973-74), the State began to intervene even more in industrial development. Although macroeconomic policies had maintained moderate growth – at the cost of greater foreign debt – the growth rhythm of industrial production and consumer rates fell during the late 1970s. The trade deficit balance caused the incentives and subsidies of manufactured exports to be maintained and expanded, and caused non-tariff barriers on exports to be

increased. However, industrial investments remained high due to actions taken by the State similar to those taken in the 1950s.

By implementing the II PND in 1975/79, the State began a new phase of public and private investments in the primary and capital goods industries, besides public investment in infrastructure. The objective was to cause the industrial structure to match patterns observed in other industrialized countries, as well as to enable exports of basic inputs in which the country had comparative advantages. Despite certain financing difficulties – especially from private investment – that compromised the total completion of its goals, there is no doubt that II PND's investments represented “an unprecedented effort to accumulate capital and to diversify the industrial structure toward heavy industry in the history of Brazilian industrialization” (Tavares and Lessa, 1984: 6).

At the same time, the State sought to move forward by establishing a National System for Scientific and Technological Development (Sistema Nacional de Desenvolvimento Científico e Tecnológico – SNDCT). Two institutions were created in the 1960s: a Technological Development National Fund (Fundo Nacional de Desenvolvimento Tecnológico - FUNTEC through BNDES, and an Agency to Instigate Technological Development (Financiadora de Estudos e Pesquisa – FINEP) that managed the National Fund for Scientific and Technological Development (Fundo Nacional de Desenvolvimento Científico e Tecnológico – FNDCT). FNDCT was the most important financing instrument for scientific and technological activities in the country for many years. Later, research and post-graduate education programs were established in universities, and several research institutions were created, such as: technological institutes, research and development centers in public companies, specialized and other laboratories, including for agriculture (e.g. Empresa Brasileira de Pesquisa Agropecuária - EMBRAPA), which are the source of the success cases on the international market. The general direction of these initiatives in science and technology was given by the Basic Plans for Scientific and Technological Development (Planos Básicos de Desenvolvimento Científico e Tecnológico) along with National Development Plans (PNDs).

Therefore, by the end of the 1970s the country had built a well-integrated and diversified industrial structure, and was beginning to develop a corresponding institutional structure to support scientific and technological development. The State strongly encouraged the creation of these structures, whether by protection policies (customs tariffs, non-tariff

barriers, exchange rate policies, and private investment regulation) and promotion policies (tax incentives and subsidized credit) or by action plans and direct investments.

Although effective, these State operations left after-effects. While striving for a “complete industrial structure” with an elevated and permanent scheme of protection and promotion, they generated a series of inefficiencies that harmed specialization and greater integration in the international market. As a result the Brazilian economy became extremely closed, with one of the lowest exports rates in the world and causing many industries to lose competitiveness in both domestic and foreign markets.

3. Macroeconomic crisis, industrial stagnation, redirecting the role of the State, and the opening of the economy

The transition from the 1970s to the 1980s was a decisive moment for the development process of the Brazilian industry. It was possible to change the pattern of industrial development policies by reducing protection and subsidies and changing the focus of the policies. The industry tried to stop striving for sector or industry structuring goals and instead tried to begin establishing qualitative goals focused on innovation, technological development, quality, and productivity. This change had been considered when an attempt to reform foreign trade and tax incentive policies was made at the end of 1979. The first policy measure for developing new information technology industries was to create the Information Technology Special Department (Secretaria Especial de Informática), which would later birth the Information Technology Law (Lei da Informática) enacted in October 1984. However, this process of change was crushed by the change in command in the economy at the end of 1979 and by the macroeconomic crisis that began in 1980-81.

Therefore, from 1981 forward, instead of change there was a reversal in the industrial development process, where industrial and institutional structures regressed, the economic infrastructure deteriorated, and the infant National System for Scientific and Technological Development (Sistema Nacional de Desenvolvimento Científico e Tecnológico - SNDCT) was abandoned. Development and State intervention in political and economic policy fields lost ground, and instead macroeconomic stability goals predominated. Since then, stabilization targets followed by monetary policies and

exchange rate policies have dominated the industry and the productive sector as a whole, making the continuity of industrial development unfeasible. Several attempts to implement industrial policies were thwarted or only partially completed⁷.

All types of coordination were abandoned. The sequence of economic, scientific, and technological development plans was interrupted and targets and sector programs were deactivated. The policy instruments that had once served industrialization began being administered according to macroeconomic stabilization objectives. By the end of the 1980s non-tariff restrictions closed access to imports even more, exports were subsidized, public investments in infrastructure were reduced, public budgets for industrial financing and SNDCT (National System for Scientific and Technological Development) were drastically cut, incentives to foster development were reduced, and the control of public prices and tariffs became tighter. Timid signs of change appeared in 1988-89 with a customs tariff reform. However, it was harmless in every way because protection was provided by non-tariff restrictions and new incentives for fostering investment and technological development created by the New Industrial Policy (Nova Política Industrial – NPI) of 1988. Nonetheless, the failure of the inflation stabilization policy buried any hope of recapturing industrial development.

By contrast the 1990s saw great transformation. Although industrial development had momentarily returned to the economic policy agenda, an attempt to implement an industrial policy within the Collor Plan failed and the only component of Industrial Policy and Foreign Trade (Política Industrial e de Comércio Exterior – PICE) that was effectively implemented was the liberalization of foreign trade. The multilateral trade agreements signed within the WTO sphere, and the subsequent overvaluation of the *Real* completed the picture of trade opening in the country. This was combined with greater openness to foreign direct investment and the State's renouncement of its role in fostering industrial development. A broad course of action was taken to privatize industries and infrastructure.

Due to this privatization process the State's new role implied a need to establish regulatory frameworks and supervise responsibilities that were previously in the hands of the State. As a result regulation agencies were created. Three types of institutions were

⁷ At the end of 1984 and beginning of 1985, after the election of the New Republic government; in 1988 during the Sarney administration – New Industrial Policy (Nova Política Industrial - NPI); at the beginning of the Collor administration – Industrial Policy and Foreign Trade (Política Industrial e de Comércio Exterior – PICE), and at the beginning of Fernando Henrique Cardoso's first term.

defined under this new system. First there are the departments responsible for formulating public policies and that participate in strategic decisions made by the government. Next come the agencies responsible for executing policies that are defined by the government. These include: the National Water Agency (Agência Nacional de Águas – ANA), the National Health Vigilance Agency (Agência Nacional de Vigilância Sanitária – Anvisa), and the National Supplementary Health Agency (Agência Nacional de Saúde – ANS). Last there are the regulatory agencies that are capable of greater autonomy and responsible for creating and applying rules instead of the competitive market. They are: the National Petroleum Agency (Agência Nacional de Petróleo – ANP), the National Telecommunications Agency (Agência Nacional de Telecomunicações – Anatel), the National Electricity Agency (Agência Nacional de Energia Elétrica – Aneel), the National Waterway Transportation Agency (Agência Nacional de Transportes Aquaviários – Antaq), and the National Ground Transportation Agency (Agência Nacional de Transportes Terrestres – ANTT).

The impetus for creating regulatory agencies began to cool in 2003 when they lost power due to budget cuts and recurring delays and hesitations in appointing directors and selecting company employees. It is evident that all of this was because of increasing pressure by the ministries and their respective offices together with Congress's debate of bill 3.337/04 that includes measures that would withdraw the agencies' power to attain government privileges and limit their anti-competitive practices. In this manner the previously planned institutional framework is being left behind, and yet no alternative models are being developed for regulating infrastructure industries.

Another aspect that shaped the new competitive environment of the 1990s was the increasing international liquidity and the spread of new financial instruments that triggered widespread mergers and takeovers, both as a result of the State's redefined role as well as the actual competitive positioning of private companies.

The 1994 consolidation of the Brazilian Competition Defense System (Sistema Brasileiro de Defesa da Concorrência) was essential in preserving these aspects of competition by coordinating the actions of the Economic Law Department (Secretaria de Direito Econômico – SDE) of the Ministry of Justice, the Economic Monitoring Department (Secretaria de Acompanhamento Econômico – SEAE) of the Ministry of Finance, and especially the Administrative Council of Competition Defense (Conselho Administrativo de Defesa da Concorrência – CADE), an independent government entity linked

administratively to the Ministry of Justice. Thus, equipped with the necessary controlling power, this system played an important role in the fight against anti-competition behavior – a role that would become more important as the economy became more open and processes of privatization and deregulation of the economy were put into practice.

It was in this new competitive environment – different from the many industrial policy experiences – that the Industrial, Technological and Foreign Trade Policy (Política Industrial, Tecnológica e de Comércio Exterior – PITCE) was introduced at the end of 2003. Besides the post economic opening scene and the State's new role, PITCE has also distinguished itself from other Brazilian experiences with its predominant focus on innovation and technological development. It emphasizes the importance of specific strategic sectors in propagating technology and innovations (i.e. semiconductors, software, capital, and pharmaceutical products) and thinking about long-term competitiveness when determining certain activities of the future, such as biotechnology, nanotechnology, and biomass.

It was within the PITCE sphere that the creation of the National Council of Industrial Development (Conselho Nacional de Desenvolvimento Industrial - CNDI) and the Brazilian Industrial Development Agency (Agência Brasileira de Desenvolvimento Industrial - ABDI) was proposed. They would be responsible for coordinating the many instruments of industrial policies⁸. The most important aspects of PITCE are focusing on technological innovation, setting specific goals, and recognizing the need for a new institutional organization to coordinate this policy. Despite the merit of regulating the Bio-safety and Innovation Laws, any noticeable advances are still modest, and opportunities for advancement continue to be in broadening and reducing credit costs, objectifying and solidifying proposed measures, and consolidating excesses in current legislation⁹.

4. Productivity, integration in the foreign market, and employment in the Brazilian industry

⁸ ABDI was regulated in February 2005. The CNDI is presided over by the Minister of Development, Industry and Foreign Trade, in addition to 12 other ministers, the president of BNDES, and by representatives of private initiatives and the labor force.

⁹ For more information about PITCE see Suzigan and Furtado (2005).

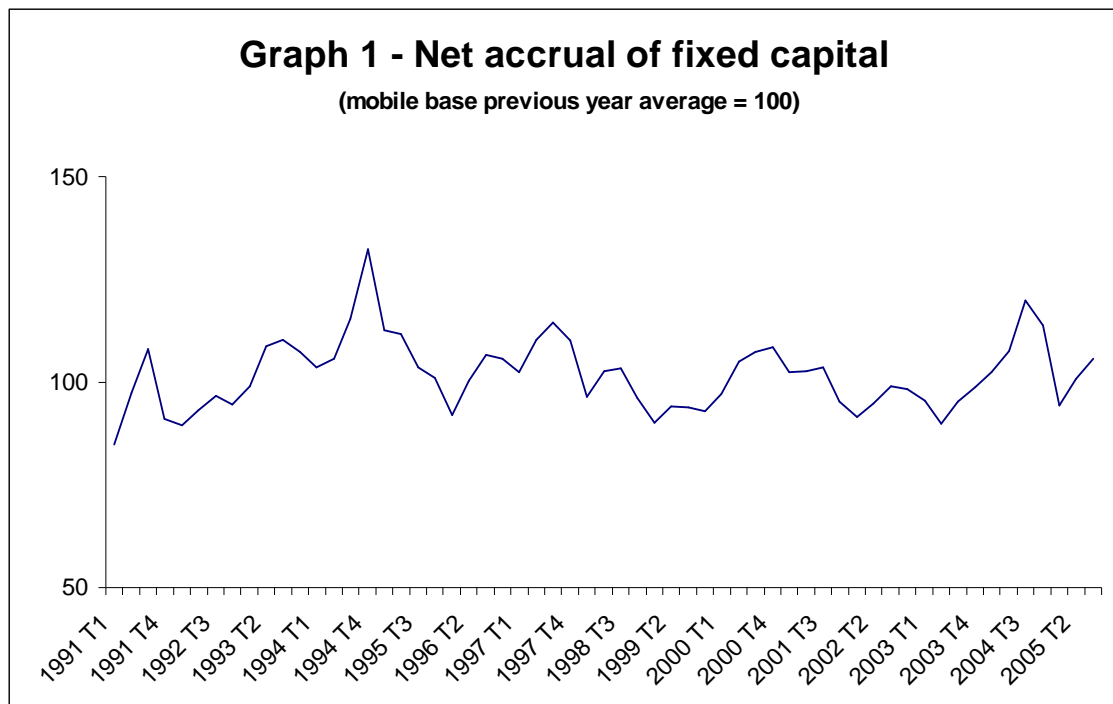
There are two significant points that characterized the industrial GDP in the beginning of the 1990s. First was the reduced average growth rate, especially when compared to the 1970 numbers as shown in table 1. But more importantly is the fact that the average was actually a result of intense fluctuation. Volatility was less in the 1990s than in the 1980s, although the industrial activity growth continued to be stable.

Table 1 – Average growth rate of industrial GDP and of investment proportional to GDP

	1971-1980	1981-1990	1991-2000	2001-2004
Growth of industrial GDP	9,38%	0,45%	2,12%	2,16%
Investment / GDP	21,87%	21,92%	19,41%	19,02%

Source: Ipea-Data

This behavior partly reflects the variation in the level of investments. Graph 1 shows the gross fixed capital formation as it relates to the previous year. It is evident that there is a series of fluctuations analogous to industrial production. Even more evident are the so-called small investment cycles that peaked in the fourth trimester of 1994, third of 1997, fourth of 2000, and third of 2004 respectively. Bielschowsky (1999) states that these small cycles reflect the fact that these investments did not foresee the growth of productive capacity, but anticipated instead the technological modernization of the industrial base.



The numbers that refer to labor productivity and employment growth show that the industrial production growth in the 1990s was due more to productivity growth than to industrial base expansion proper. Table 2 shows the average annual growth rate of labor productivity for each of transformation industry sector in each of the last 3 decades. It is clear that productivity growth throughout the 1990s was superior to the two previous decades in all sectors, with the exception of leather and furs, chemistry, plastic products, and tobacco. The two main highlights in the transformation industry are materials for transportation and the textile industry, with annual averages of 9.10% and 9.04% respectively.

Table 2 – Work productivity growth in the manufacturing industry

	1972-1980	1981-1990	1991-2000
Total manufacturing Industry	4.43%	1.44%	7.75%
Non-metallic minerals	6.45%	1.10%	6.85%
Metallurgy	3.98%	1.40%	7.59%
Mechanical	2.75%	0.41%	8.33%
Electric material and Communication	6.01%	3.87%	8.86%
Transportation material	3.80%	-2.65%	9.10%
Wood	-	-	5.34%
Furniture	-	-	4.55%
Paper and cardboard	2.63%	3.47%	7.69%
Rubber	6.31%	0.04%	7.96%
Leather and fur	-	-	-1.13%
Chemistry	7.70%	3.29%	7.23%
Pharmaceutical	-	2.35%	2.44%
Perfume, soap, and candles	5.36%	5.01%	5.56%
Plastic material products	7.71%	-1.05%	6.86%
Textile	3.46%	-0.25%	9.04%
Clothing, shoes, and cloth supplies	2.90%	-0.45%	6.66%
Food products	3.13%	0.78%	5.30%
Beverages	5.74%	3.61%	8.68%
Tobacco	6.07%	6.97%	6.07%

Source: Created by the authors based on Ipea-data

A decline in employment rates followed the increase in productivity. Table 3 shows the average annual growth rate of employment over three decades. There are significant drops in all the industrial transformation sectors that are even more significant than those observed throughout the 1980s. It is worth noting that the two sectors that present the greatest drops in employment are characterized by intensive labor use, namely the textile and clothing, shoes, and cloth goods industries.

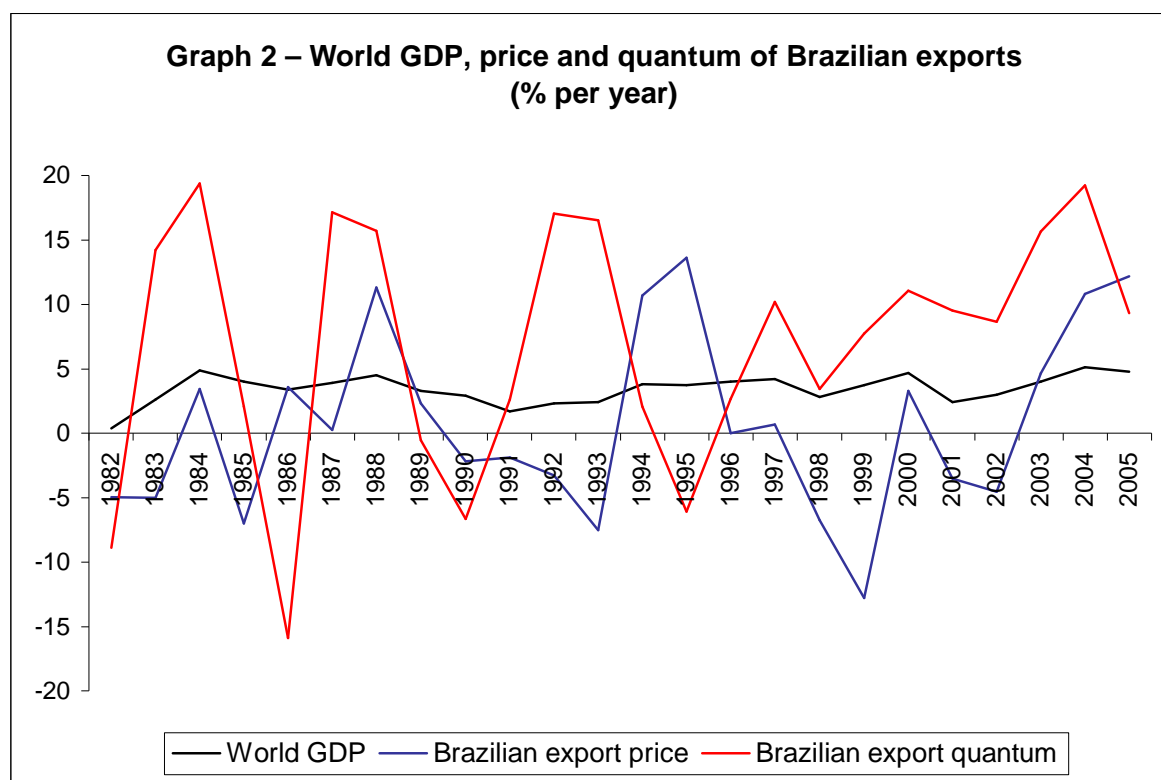
Table 3 – Employment growth in the transformation industry

	1972-1980	1981-1990	1991-2000
Manufacturing Industry	4.07%	-1.44%	-5.13%
Non-metallic minerals	3.60%	-2.03%	-4.13%
Metallurgy	4.55%	-1.64%	-4.45%
Mechanical	8.17%	-2.62%	-6.02%
Electric material and Communication	6.27%	-2.51%	-5.60%
Transportation material	6.81%	0.01%	-3.83%
Wood	-	-	-4.04%
Furniture	-	-	-1.71%
Paper and cardboard	4.14%	-0.70%	-3.89%
Rubber	3.58%	1.18%	-5.42%
Leather and fur	-	-	-3.85%
Chemistry	2.13%	-1.71%	-4.57%
Pharmaceutical	-	-1.08%	-1.37%
Perfume, soap, and candles	3.11%	0.00%	-1.96%
Plastic material products	5.60%	0.85%	-4.23%
Textile	0.71%	-1.04%	-9.44%
Clothing, shoes, and cloth supplies	3.83%	-2.00%	-8.41%
Food products	3.04%	0.67%	-2.80%
Beverages	2.61%	-0.39%	-5.52%
Tobacco	0.55%	-3.16%	-5.68%

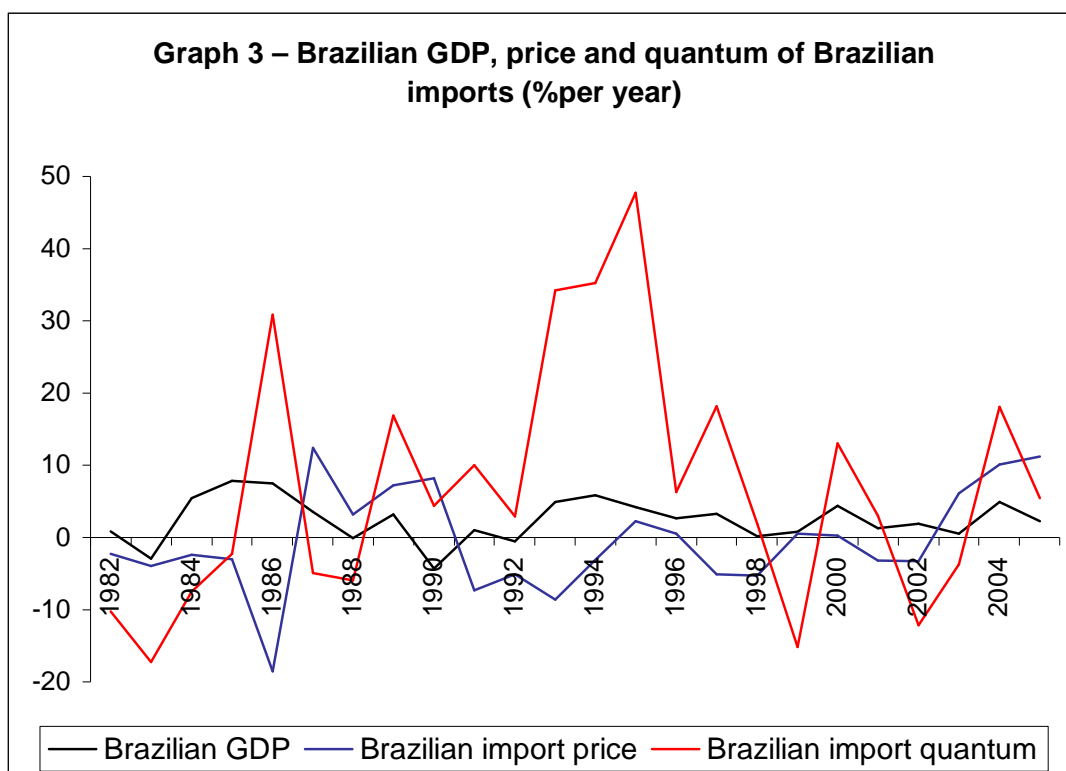
Source: Created by the authors based on Ipea data

The changes that occurred throughout the 1990s were reflected in Brazilian foreign trade. Its modernization was under strong pressure by threats of import competition, forcing the manufacturing industry as a whole to present significant productivity gains in order to survive in the new competitive arrangement. The sectors that were successful at such a task achieved growth in their foreign markets as a consequence of productivity gains.

A structural characteristic of Brazilian foreign trade is found in the differences between the export and import lists (De Negri (2005)). Historically the Brazilian export list predominantly contained commodities and labor-intensive products. These types of products face uncompromising competition, causing their prices to suffer recurring fluctuations because of world economic activities. This behavior is evident in graph 2 where years of high world GDP growth are normally followed by increases in Brazilian export prices, while the opposite happens in years of more modest world activities.



On the other hand, products of greater technological content are very present on the import list, and their prices are secularly more stable through time. The correlation in this case is that between Brazilian import quantum and its GDP. In graph 3 one sees that the years of greater Brazilian economic activity growth are followed by jumps in this quantum, which in turn presents relative stability in periods when the Brazilian economy cools down.



This scenario causes the fluctuations of Brazilian foreign trade to be subject to both domestic cyclical factors that greatly influence imports, as well as to foreign factors that have a more relevant effect on exports. Resende (2000) tests a hypothesis regarding the function of imports in adjusting the balance of payment as a consequence of alterations in the availability of foreign currency, which affect the growth cycles in the Brazilian economy. The author shows that during periods of decreased availability of these currencies the use of barrier and non-barrier tariffs on Brazilian imports increased, as did adjustments of other variables that affected import demand, such as the real exchange rate and income.

The specialization of Brazilian exports in standardized products – despite bringing large increases in productivity – leaves little room for more stable long-term growth and reinforces the need for investments that would generate technological innovation. Innovation opens the door for companies to acquire the market power necessary for competitive integration in markets of higher technological content, which enables a greater return on the capital invested and greater protection against recurring price fluctuations.

The significant increase in Brazilian exports in the 2000 was, therefore, accompanied by increased capability of Brazilian firms to enter more technological markets. De Negri (2005) corroborates the idea that productivity gains seen throughout the 1990s contributed to the increase in efficiency of these firms, with clear consequences for their international competitiveness.

Once a significant portion of the Brazilian industry became more globalized, the results of the trade opening became clearer in terms of employment. The drop in employment in the manufacturing industry immediately after the opening of the economy was contrasted by a dynamic and more globalized productive structure that acts as an important source of employment growth.

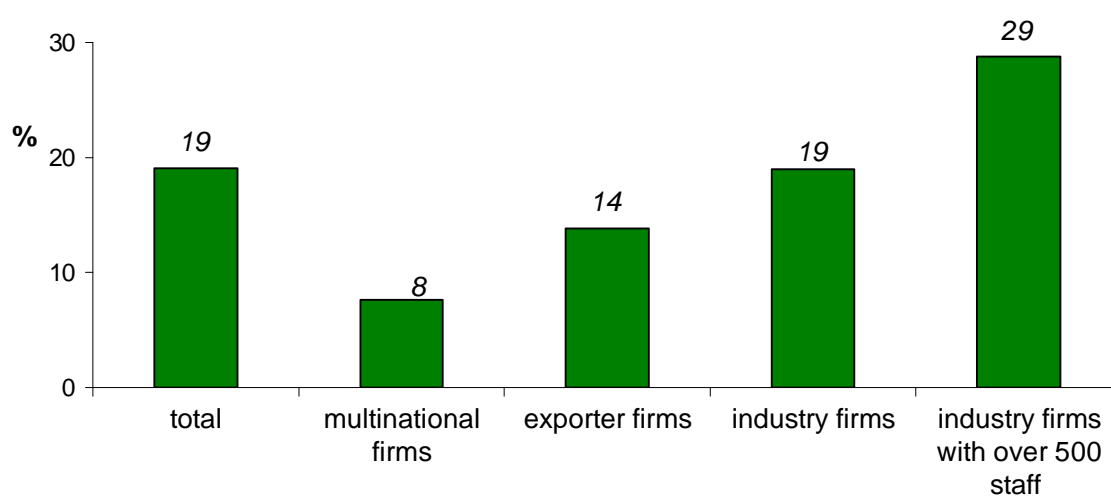
The integration of Brazilian firms in the international market brought new sources of enthusiasm and greater productivity. Araújo (2006) demonstrated that firms that begin as exporters and remain exporting see their sales increase by 53.1% in the first year, and by 61.4% in the second year, compared to firms that do not export. Likewise, employment increases 21.3% in the first year and 20.3% in the second year. The fact that the companies' revenue is increasing more than their employment level allows them, on one hand, to have significant productivity gains, and, on the other hand, to contract more workers.

These numbers indicate that a larger contingent of exporting firms, and their necessary maintenance in the competitive international environment, is in fact an effective means for generating employment in the country. Therefore, according to Araújo (2006), companies that continuously export were responsible for generating approximately 400,000 new job posts between 2000 and 2004. De Negri et al (2006) show that a significant portion of hiring and dismissals of employees was consequent to the births and deaths of companies, especially due to the great number of firms that open or close each year in Brazil. In this sense, it could be said that new firms generated a significant portion of the employment growth. By only analyzing firms that maintained themselves in the Brazilian market in the period between 1997 and 2003, Homsy and Costa (2006) confirm that exporting firms generated more employment in that period than similar ones that did not export.

Graph 4 also shows that large Brazilian firms with more than 500 employees, that are more innovative, and that are more technologically advanced generated much more jobs than the country's average. There was a 29% increase in employment in these firms,

which means that almost 500 thousands new job posts were created. These results suggest that, despite cutting down on labor, technology is truly capable of creating new growth opportunities for companies, including being able to compensate an eventual initial negative effect on employment levels.

Graph 4 – Job growth rate with labor papers signed in Brazilian firms 2000 - 2004



Source: De Negri et.al. (2006)

5. The new Brazilian businessmen behavior

The new Brazilian competitive scenario of the 1990s motivated a series of studies regarding the industrial transformations that took place since then. The research focuses primarily on topics such as the development of sector imports, changes in company controls, and the retraction of certain industrial segments. In this context a clear debate has been the Brazilian comparative advantages and the regressive specialization of the domestic industry.

According to the first analysis topic – see Franco (1998) and Moreira (1999) – the industry, up until that point, benefited from protectionism that favored the development of sectors that used scarce domestic resources (i.e. capital and technology) more intensely, to the detriment of others that used plentiful resources (i.e. labor and natural

resources). Besides that, protection of the domestic market had caused an excessive number of producers in capital and technology-intensive sectors to emerge, causing inevitable scales of inefficiency. Both these factors combined caused an inefficient industry base for the development of these sectors, at the cost of wasted resources, high prices for the domestic consumer, and inability to integrate with international markets.

Therefore, it was necessary to establish new competitive scenarios focused on generating specific pressure to correct these inefficiencies. The consequence, on one hand, would be specific structural adjustments by increased import penetration, to the detriment of capital and technological-intensive sectors. On the other hand, there would be pressure for greater efficiency to be reached through productivity growth and reduced mark-ups. All this would lead to a greater specialization of the Brazilian industrial base that would more adequately reflect the availability of the country's resources and its comparative advantages.

The second analysis topic attempts to safeguard this process. The combination of the trade and financial opening with a policy that combated inflation based on exchange rate appreciation and high real interest rates, had distorted the competitive ability of certain sectors in the Brazilian industry. In this scenario the only ones able to compete internationally were producers of commodities that concentrated on agriculturally based raw materials and natural resources with a relatively low level of industrial transformation. Therefore, primarily these sectors would receive productive investments, which would cause specific industry segments to be dismantled and specific links in the domestic productive chain to be broken. Directing investments toward sectors in which Brazil is historically competitive, and weakening higher value-added sectors would lead the country to the so-called regressive specialization. See Coutinho (1997) and Kupfer (1998).

However, the results of these two analysis topics were unexpected. Despite recognizing the country's competitive ability in these lower value-added sectors (i.e. agricultural goods and more standardized industries), a significant group of Brazilian companies – responsible for about one fourth of industrial turnover – currently achieve international integration by producing goods of medium and high technological content. Seeking to better understand this phenomenon, new contributions regarding the foreign integration of Brazilian industrial companies were made through a series of studies by the Institute for Applied Economic Research (Instituto de Pesquisa Econômica Aplicada - IPEA)

through the Innovation, Technological Standards, and Brazilian Industrial Firms Performance Project (Projeto Inovações, Padrões Tecnológicos e Desempenho das Firms Industriais Brasileiras)¹⁰. For this project, Brazilian industrial companies were classified according to their competitive strategies¹¹ in three categories: (i) Firms innovating and differentiating products, or in other words, companies of greater technological content that compete through product differentiation, with more promising competitive strategies, by concentrating the most dynamic leading edge of the industry, and by tending to achieve a greater portion of the income it generates; (ii) Firms specializing in standard products. A category which brings together companies that are somewhat up to date in terms of specific operational characteristics (i.e. manufacturing and logistics), but out of date in other more modern competition tools such as research and development, marketing, brand marketing, etc. and that basically compete via price and cost; and (iii) Firms non-differentiating and with lower productivity. A category that includes companies that offer inferior quality products, are not exporters, yet are capable of finding space on the market through low prices and other possible advantages¹².

Based on the result of this project, Arbix and De Negri (2005) argue that there are strong indicators that the competitiveness of the Brazilian industry is supported by a new business perspective that began with the economic opening. The authors reach this conclusion after analyzing competitive behavior found in the Brazilian industry and certain characteristics of these firms those show business reactions due to the breakdown of the domestic-developmental model. The aspects of this new Brazilian businessmen behavior will be discussed next.

Competitive strategies of companies focused on technological innovation and on product differentiation

The first indication that a new business perspective is taking shape in the Brazilian industry is the number of firms that innovate and differentiate products in industrial

¹⁰ See De Negri and Salerno (2005)

¹¹ To do this the largest combination of information ever brought together regarding the Brazilian industry was used.

¹² The Brazilian industry could also have considered a fourth group that is made of up technology-based firms that are in the initial phase of operation or in a position to leave the incubators in which they were conceived. This category of firms was not analyzed in this project.

production. According to more conventional perspectives, these companies would have a very small, or even marginal participation in the net sales of developing country industries. However, despite numerically representing only 1.7% of the Brazilian industry, they are responsible for 25.9% the total industrial sales. At the same time, companies that do not differentiate products and have less productivity make up the large majority of Brazilian industrial firms – a total of 77.1% - but answer for only 11.5% of those sales. Firms that are specialized in standardized products represent 21.2% of the total companies and 62.6% of sales¹³.

A second aspect is regarding companies equipped with technology. Although it is difficult to measure, the characteristics of the workers employed at different companies demonstrate the companies' perspective regarding knowledge accumulation. For example, higher remuneration of workers in specific companies is an undisputable sign that the company values knowledge, experience, and the need to avoid losing more productive workers.

With that in mind, it is revealing to note that the average wage is R\$ 1,254.64 in firms that innovate and differentiate products, while at firms that specialize in standardized products it is R\$ 749.02, and at firms that don't differentiate and have less productivity it is R\$ 431.15.

De Negri and Freitas (2006) show that, besides the characteristics of the individual, the firm, and the industrial sector that affect wages, there is in fact a wage-premium paid by firms to their workers that is related to their competitive strategy. According to the authors, firms that innovate and differentiate products remunerate their employees approximately 23% more than firms that do not differentiate and have less productivity, which in turn has a salary advantage of 11% less than those that specialize in standard products. This greater remuneration by Brazilian firms that innovate and differentiate products clearly demonstrates that their competitive integration is not based exclusively on product offered at low prices – via price cuts or poorer quality – which would be

¹³ Indicators for the year 2000 show that the production rate of firms that innovate and differentiate products is significantly greater than those in other categories. The average sales of these firms is R\$ 135.5 million, while the average for firms that specialize in standardized products is R\$ 25.7 million, and for firms that do not differentiate and have less productivity it is R\$ 1.3 million. Besides significant difference in the average size of these firms in different categories, De Negri et al (2005) show that the rate of efficiency of firms that innovate and differentiate products and firms that specialize in standardized products are very similar.

expected within the conventional productive integration perspective of developing economies.

A third aspect is regarding the different innovation standards adopted by each of these categories. While 70.6% of firms that innovate and differentiate products simultaneously innovated both products and the process between 1998 and 2000, those that specialized in standardized goods mostly innovated only the process. In other words, the innovative behavior of these companies is strongly associated to the spread of technology, especially by introducing machines and equipment that are normally imported.

This idea is also corroborated by observations of the agents responsible for innovation in each category. While 78% of firms specialized in standard products that employed process innovation indicated that other companies are mainly responsible for their innovation, only 47.5% of firms that innovate and differentiate products said the same.

Corporate alliances and structural changes aimed at technological innovation

The advantage of technological innovation standards in firms that innovate and differentiate products for themselves verifies a new business perspective, and characterizes in details specific structural differences between firms. The data also points out a second sign of the new perspective that must be highlighted: cooperation in technological innovation, and structural and organizational changes in firms.

The ability of firms to establish cooperative alliances and partnerships for technological innovation is an important aspect of their innovative efforts. In fact, 29.3% of the firms that innovate and differentiate products were able to innovate products either together with another company from their business group or in cooperation with other companies. However, in firms that specialize in standardized products that percentage is 15.9%. In the same way, firms that innovate and differentiate products also spend more than other firms on research and development (R&D) and acquiring foreign knowledge, such as sales proportions, which corroborates the fact that they cooperate or innovate with their company groups¹⁴

¹⁴ It should be observed that the cause and effect relationship between performance related to technological innovation in the firm and cooperation is not trivial. Firms can innovate and, with that, broaden the specter of cooperation/partnerships and exchange information with other firms

Another relevant aspect of the competitive process is the capacity of firms to promote changes both in market strategies and organizationally. Companies that are more willing to promote this kind of transformation are usually more dynamic, and possibly directed by more visionary business people¹⁵. Therefore it is not surprising that 39.1% of firms that innovate and differentiate declare they have implemented changes in their corporate strategies related to product alteration and/or the market in which it operates, and more than half have implemented changes in administration, organizational structure, marketing, and management. This result is not unexpected, because innovative firms are normally more aggressive in conquering the new markets that come on the heels of launching their new products.

Adaptation to international standards and norms via technological innovation

The results of the effort to achieve technological innovation are structurally different in firms that innovate and differentiate products. The executives of these companies guide their efforts with a view to broaden their market, improve the quality of the product offered, and achieve a more competitive position. An especially relevant number calls attention to itself: among firms that innovate and differentiate products, 23.1% attributed the high importance of innovation to conforming to foreign market norms. In firms specialized in standardized products this number is 13.2%.

This result is relevant in that in the recent past there was a widespread understanding among Brazilian industrial firms that the strategy for integration into international trade by was a residual of its performance on the domestic market. In other words, in these firms' growth strategies, exports were seen only as an alternative when the domestic market was down, and therefore, sales obtained on the foreign market had a secondary role that was restricted to specific moments of the companies' performance. Therefore, the fact that a significant portion of both companies that innovate and differentiate products as

that innovate as well, or can form associations to reach the intended technological innovation. Regardless of the direction that the cause and effect relationship takes, the fact is that cooperative alliances are more frequent among firms that innovate and differentiate products than in other firms.

¹⁵ Once again, there is not a well-defined cause and effect relationship between these changes and technological innovation. Although technological innovation drives the process of change, it is also driven by it.

well as those that specialize in standardized products reached technological innovation in order to adapt to international standards and norms constitutes a third indicator that something new is present in the Brazilian business perspective, that is different from the traditional perspective of developing economies integration.

Export performance of companies via technological innovation

Literature on the determinants of international trade affirms that exports can be related, on one hand, to traditional comparative advantages, which are determined by the relative endowment of factors of production (e.g. labor and natural resources), and intimately related to inter-industry trade. On the other hand, exports are also influenced by economies of scale, technological innovation, and product differentiation. In this case they are essentially associated to intra-industry.

Brazil is a country with abundant labor and natural resources, which makes it competitive in goods markets that require greater relative endowment in those factors. However, the size of the domestic market and the innovative efforts of its firms also make the country more competitive in certain segments in which technological innovation and production rates are fundamental for international competitiveness.

These conditions place a unique aspect on Brazil in terms of the international integration process. While the country is competitive in segments that are intensive in labor and natural resources, the innovative efforts by its industrial firms also positively influence its integration in the international market. Therefore, the business community's recognition that it is possible to seek a more beneficial integration in international trade through technological innovation besides being rich in labor and natural resources, offers the fourth indicator for this new business perspective.

It is also important to observe that foreign trade indicators signal a very distinct standard among firms that innovate and differentiate products and that specialize in standardized products. In fact, firms that innovate and differentiate products obtain better prices on the international market when compared to other Brazilian exporters. However, they also demand more imports of components or products that are complementary to domestic production lines because the country is partially or totally non-competitive in many technologically intense segments. So in order to maintain competitiveness in the

international market and at the same time complement the product lines offered on the domestic market, these companies import higher technology components for their production line. In this manner they adopt a pattern of part intra-industry, part intra-firm trade characterized largely by technological complements with foreign countries.

Firms that specialize in standardized products produce and export goods that are less differentiated, more homogeneous, and less technological. Because of this they can take more advantage of the abundance of the relative endowment of factors of production available on the Brazilian market. These companies are particularly competitive in inter-industrial trade with other countries – a type of trade that is less dependent on imports and has greater participation in exports in sales. The goal of importation here is to take advantage of the intra-industrial complements that is based on the potential created by the domestic production rate.

Globalization of companies focused on technological innovation

The need for eventual negotiation with foreign countries manifests itself in many ways. On one hand, there is a portion of the business community that establishes these negotiations in a loose way, through, for example, participating in events such as fairs, meetings, etc. abroad. On the other hand, another portion has other companies in foreign countries as a main source of information for technological innovation. This type of entrepreneur – whose globalization is the focus of technological innovation – establishes alliances with certain foreign firms or even makes foreign direct investments, and uses them as a kind of technological antenna. Therefore, the fifth indicator that a new business perspective is consolidating itself in the Brazilian industry is based on evidence of a significant portion of entrepreneurs seeking the necessary information for technological innovation abroad.

In 2003, according to data from the Central Bank of Brazil, there was US\$ 82.7 billion in Brazilian capital in other countries. Brazilian direct investments – that is, stockholdings above 10% and inter-company loans – totaled US\$ 54.9 billion. Of this total Brazilian industrial firms accounted for US\$ 13.7 billion.

Alliances formed with foreign firms, or even with domestic firm subsidiaries, contribute to the export performance in several ways, such as giving access to trade channels,

adapting products to specific market demands, creating new markets, giving access to cheaper financial resources, appropriating technology that is not available on the domestic market, etc. Abris, Salerno, and De Negri (2004 and 2005a) show that globalization processes that are focused on technological innovation have a positive affect on the export performance of companies. The authors verified that globalized firms focused on innovation remunerate labor better, hire employees with higher education, and therefore, generate better quality employment. Besides that, globalized companies have higher expenditures on labor training regarding company sales, which improves the qualification of domestic laborers. In terms of the characteristics, they export more than other firms that do not pursue this kind of globalization. Therefore, there is evidence that the increase in competitiveness is positively influenced by technological innovation that is a consequence of the globalization process.

The authors also highlight the link between technological innovation, the globalization of Brazilian firms via foreign direct investment, and premium price in exports (Abris, Salerno, and De Negri: 2005b). According to them, this link exists because technological innovation produced specific assets that enabled and facilitated globalization. This globalization in turn contributed positively to obtaining premium price in exports. Therefore, Brazilian firms that make direct investments in the United States and Europe have 17.40% and 14.01% more chance respectively of exporting with premium price than Brazilian exporting firms that don't make such investments. It is also important to highlight the reciprocity mechanism where globalization favors innovation and innovation increases the possibility to obtain premium price relative to other exporters.

6. Conclusion

The Brazilian industry development process was able to consolidate an industry that is relatively coordinated, dense, and endowed with a significant network of local suppliers. However, the combination of a protected domestic market and state subsidiaries was responsible for a relatively lethargic and passive business perspective compared to the leading international tendencies. The relative lethargy created a distance between Brazilian industrial companies and modern competing standards on the international market, which are basically guided by a company's ability to innovate technologically

and to differentiate products. As a result these companies' domestic pro-market bias and their negligent performance on the international market was accentuated.

The opening of the economy in the 1990s sought to correct these inefficiencies, and made it necessary for companies to adapt to a new competitive scenario that is subject to competition in imported products as well as in foreign direct investments. The consequence of this for the transformation industry was the conjunction of important productivity gains and significant falls in industrial employment levels.

However, evidence regarding the restructuring of the manufacturing industry shows a relative distance between the Brazilian experience and the traditional perspective that says that international competitive integration, similar to other developing countries, is strictly associated to labor and natural resource-intensive sectors. Despite the great importance of these segments for the Brazilian export agenda, it is noticeable that the modernization process of the industrial base has enabled the international integration of a significant number of Brazilian companies in medium and high technological markets. They are successful because they adopted a competitive standard based on technological innovations and product differentiation, showing a new business behavior in Brazil, based especially on a willingness to compete and to be equipped with better international competition practices.

There is truly a series of indicators of a new businessmen behavior that appeared within the new competition environment established in the 1990s: i) technological innovation and product differentiation that shaped competitive strategies adopted by companies; ii) cooperative alliances and organizational changes focused on technological innovation; iii) firms fitted to norms and international standards through technological innovation; iv) significant influence of technological innovation on the export performance of companies; v) the globalization process of firms focused on technological innovation.

These results show that the idea of industrial development based on segments with higher technology and less dependent on low value-added sectors is rooted in competitive strategies adopted by a large number of Brazilian entrepreneurs. In this new context, it is up to the State to produce the necessary stimulus to cause industrial companies to adopt these competitive standards – whether by reducing risks to entrepreneurial and innovative activities, by sharing information and eliminating bureaucratic barriers, or even by refining and coordinating the financing instruments necessary for researching and developing companies.

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