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Abstract
The process of trade and financial liberalization has fundamental consequences on the development of Brazilian industry. The relatively rapid reconfiguration of the institutional form of integration into the international system, in a context of intensification of foreign competition and lack of consistent industrial policy will be the engine of significant changes in the structure of industry. At the end of the 1990s, would be another mode of regulation, based on a new regime of accumulation, which emerged from the structural changes observed. Several empirical studies have highlighted the occurrence of deindustrialization and "Dutch disease" caused by the high appreciation and volatility of the exchange, while others do not see only the opportunity for modernization of plants from the lower prices for the investment. This paper provides new empirical evidence on the chances of industrialization and "Dutch disease", which marks the current debate on the effects of real appreciation of the exchange to the Brazilian economy. For its relevance to the future of the industry in this country, the work also examines the recent evolution of the Brazilian growth front of the spread of American crisis. This system has been characterized by strong dominance of the accumulation of financial decisions on investment and consumption, which would explain the sharp drop in industrial production in late 2008, when the global financial markets were largely affected. Consequently, the prospects of Brazil's macroeconomic performance depends crucially from the reactions of the current mode of regulation, and the regime of accumulation, the challenges posed by the current stage of evolution of the global economy.

Key-words: Brazilian industry, regime of accumulation, financialization

JEL: E44, O11, N26

1. Introduction

Financialization of Brazilian economy is not a new phenomenon. Even before the international literature have tackled the topic more adequately, by defining the status of the theoretical concept of financialization, Brazil in the 1980s was a country subject to the logic of financial accumulation under very specific macroeconomic and structural conditions.

While acknowledging the importance of micro and sectoral analysis provided by the recent international literature, the approach of the phenomenon of financialization used in this study is essentially macroeconomic. Once consolidated, financialization conditions the growth regime and the macroeconomic policy and conjuncture. Its effects on the evolution of aggregate demand and on the rate of accumulation of productive fixed capital will depend on the specifics of the ways in which it develops within a concrete
social formation. There are financialization patterns that can promote growth (Boyer, 1999) while others may hinder them, although the dynamic stability of such schemes depend on structural or institutional requirements that must be empirically tested in each economy under study.

Several empirical studies have attempted to detect the impact of national strategies of economic liberalization on the structure of industrial production. In this issue, changes in exchange rate regimes, defined as the set of rules governing the administration of the exchange rate, have proved to be a natural starting point for a robust analysis of the changes in industry, when the degree of trade and financial opening is significantly improved. However, unlike what happens in the international arena, the economic literature of the Brazilian case still needs further studies on the effects of exchange rates on the performance of industry.

Despite the current discourse about the characteristics almost always regarded as positive of a service-based economy by establishing the use of expressions such as knowledge economy, post-industrial economy and new economy, the historical experience shows that industry is still the basis for development of nations. Even if in current savings services have achieved qualitatively and quantitatively prominent positions, industry remains the main supplier of basic inputs to service activities. The shift from manufacturing employment to tertiary employment does not necessarily imply loss of economic importance in the secondary sector since the creation of value in services remains substantially dependent on the materialization of concepts, technological innovation and infrastructure from industrial productive processes. Reinforcing this tendency of underestimating the importance of the industry, one may be add the fact that many activities once considered typically industrial have been reclassified and placed on the list of services, having in mind the fiscal and organizational benefits of outsourcing processes.

This article proposes an analysis of the relationship between exchange rate and performance of Brazilian manufacturing industry in the period 1980-2008. The main objective is to detect the direction of the changes imposed by the new form of international engagement consolidated throughout the 1990s. The study provides new empirical evidence on the hypotheses of deindustrialization and of Dutch disease, which mark the current debate on the effects of real appreciation of exchange rate on the Brazilian economy. Furthermore, it attempts to show how the current regime of financial growth in Brazil is structurally articulated with the latest industry developments. This helps explain why the U.S. crisis channel of transmission took place first through the real economy and not through the financial sphere. The latter reacted in a much more defensive way in face of the deterioration of expectations and the uncertainties that marked the second half of 2008; above all, because the balance sheets of major banks in the country were not involved with products deemed too risky such as the subprime.

Besides this introduction, this paper is structured as follows. Section 2 characterizes the current process of financialization of the Brazilian economy in their origins and forms of development. Two different configurations of the monetary and financial regime are associated with two different patterns of financialization. Section 3 explores the relationship between financialization and deindustrialization, departing from the regulationist hypothesis of hierarchy and complementarity of institutional forms. The aim is to show how the current mode of competition regulation in Brazil contributed to a rapid spread of the effects of U.S. crisis on the real economy sector, while keeping the banking and financial sector protected from the operations with riskier products, thanks to the high and costly internal public debt. Section 4 analyzes the causes of the sharp decline in the share of industry in GDP as one of the main stylized facts of recent Brazilian economic development. Section 5 sets out the specificities of the competitive regulation mode though in its implications for the spread of U.S. crisis upon the Brazilian economy. Section 6 gives an account of the main findings and reflects on the prospects for the evolution of industry.
2. The process of financialization of the Brazilian economy: origins and forms of evolution

The process of financialization of the Brazilian economy is not new. Its origins are in the structural and economic conditions of the 1980s, which highlighted the fiscal crisis and high inflation with strong inertial component. After a long period of strong growth between 1950 and 1980, the next two decades would be characterized by the tendencies to stagnation and a sharp loss of autonomy in economic policy. Unable to respond rapidly to the challenges of development, fiscal policy should be progressively reduced to a financial policy for cash management of the Central government. The monetary policy would imprison itself to the expectations and evaluation criteria imposed by globalized finance. As a result, inflation targets, systematic search of primary surpluses and real appreciation of the exchange rate came together as the basis of asset accumulation, which has the internal public debt as a starting and final point.

2.1 A dual RMF as a basis of financialization for inflation: period 1980-1993

The hypothesis that in the 1980-1993 period the Brazilian economy was subject to a process of financialization based on inflationary gains derived from the institutional mechanisms of indexation and indexation of wages and salaries have found support in the empirical analysis proposed in Bruno et al. (2009), Bruno (2008) and Bruno (2005). Therefore, financialization in their micro and macro dimensions implies a specific institutional environment, and without which this process cannot emerge nor develop. In other words, specific institutional features of the Brazilian monetary and financial regime were crucial for the rent-heritage accumulation to developed based on the public external (1980) and internal (1990s-present) debt.

A dual and inflationist financial and monetary regime was consolidated throughout the 1980s and at the same time that relative protection was provided to economic agents against rising inflation, this regime helped to reproduce it through the establishment of the indexed currency. The duality came precisely from the coexistence of two currencies: a) the official currency issued by the concept of the M1, and b) the financial-pegged currency that was backed by government bonds, but endogenously issued and managed by private financial sector. The first worked as a unit of account and medium of payment and the second as a store of value and instrument of private enrichment, from assets of high liquidity and profitability with lower risk. It operated as a decoupling of the functions of currency that formed the basis of rentier accumulation and the process of financialization by inflation, while it postponed the violent outburst of a classical hyperinflation.

To support the hypothesis of the existence of dual RMF as a basis for financialization by inflation, there was an econometric analysis of the relationship between the aggregate value (AV) of financial institutions and the Brazilian GDP. Graph 1 shows the joint evolution of inflation and the participation of banking and financial sector in GDP, measured by the method of financial intermediation services indirectly measured (FISIM) used by the IBGE, as recommended by the System of National Accounts (SNA/1993) between 1947-2008. It is clear that the financial institutions expanded their share in GDP as the inflationary process progressed. Since 1970, the higher the inflation rates the higher the participation of the financial system in the total added value of the Brazilian economy. Therefore, the so considered lost decades were certainly not related to this sector. This fact is acknowledged even by the Brazilian currency. It still remains to investigate the possible existence of causality between these variables.

The unit root and Johansen’s tests indicate that the series of inflation measured by the IGP-DI (Brazilian generenal price index) and the financial AV as percentage of GDP cointegrated in the 1964-1993 period, an expression of a long-run relationship of equilibrium between these variables. This balance should not be viewed as commonsense in economics, that is, as a result of the compatibility between supply and demand. The fact that these two series share a common trend of evolution can be interpreted as the result derived from a macro-organizational structure or a specific institutional framework of the monetary and financial system of this period.
Table 1 shows the elasticity of the long-term inflation of the financial AV. A 10% increase in inflation leads to an average increase of 3.4% of financial AV’s participation in the GDP. The cointegration leads to investigate the existence of causal links between these variables.

<table>
<thead>
<tr>
<th>Table 1 – Relationship between financial AV and inflation (1964-2008)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Periods</td>
</tr>
<tr>
<td>[1964-1993]</td>
</tr>
<tr>
<td>[1995-2008]</td>
</tr>
</tbody>
</table>

SOURCE: own elaboration

Granger causality test shows that variations in inflation rates precede changes in financial AV, but the opposite was not statistically significant. This result shows the functionality of inflationary gains for financial expansion observed in the 1964-1993 period, which can be seen in Graph 1.

2.2 The MFR to high monetary restriction as a basis of financialization by interest income: 1995-2008

The strong and rapid reduction of inflation and therefore inflation of earnings in the period after the Real Plan, in an environment of financial liberalization and global markets, will trigger the process of structural change in the Brazilian banking-financial system. The new axis of financial accumulation then moves towards the derivatives and fixed income securities connected to the public debt, but now under extremely high real interest rates through the international standards.

The inflationary gains are quickly and easily replaced by the interest income and rents with other financial assets traded on an international scale. However, a hallmark of the Brazilian banking and financial system would remain: its function with respect to financial intermediation. Despite its growth over the past four years, the share of loans in GDP is still very low, around 45% of GDP for the first quarter of 2009 and,
therefore, well below international standards. The low credit/GDP ratio is the result of an endogenous restriction of financial profitability, for incomes from credit operations represent only 20% of total operating income of the Brazilian financial system, while the income from derivatives and private securities represent about 70%. Of course, the revenue composition significantly reduces the amount of resources allocated in credit operations.

Deliberately promoted by the state as necessary for the new stage of evolution of the Brazilian economy, the institutional forms of integration into the international system (FII) and the monetary-financial regime (MFR) are rapidly transformed, thanks to the removal of various institutional arrangements and rules that restricted the free mobility of capital and import of goods. The institutional architecture corresponding to the mode of regulation and the regime of growth through import substitution would take a sharply competitive format, according to the precepts of neo-liberalism. These requirements were imposed in part to emerging countries, and in part voluntarily accepted as the password to enter a world full of virtues and irrefutable economic and social advantages.

Through its effects on monetary and fiscal policies, as well as on the pattern of trade, systems of exchange rate emerged as one of the key components of the institutional structure of the monetary and financial regime. In this context, the new RMF that emerged from the transformation of the old mode of regulation is widely constrained by the fixed adjustable exchange rate regime (in effect between 1994 and 1999) and, since 2000, by the current floating exchange rate regime. Its consequences on the evolution of the Brazilian economy and, particularly, the Brazilian industry were crucial and will be the main object of the next section.

2. Financialization and deindustrialization: by-product of a new hierarchy of institutional forms

Recent advances in the analysis regulationists led to a greater understanding of the interactions between institutional arrangements and their impact on macroeconomic dynamics. According to Boyer (1998), among the explanations for the consistency of a mode of regulation and how it determines the basic macro-regularities of the accumulation of capital, the analysis of the 1973-1998 period highlighted the importance of hierarchy and complementarity in a particular configuration of institutional forms. Two definitions of the hierarchy of institutional forms have been proposed:

i. Definition 1 - an institutional form is superior to another when it can impose restrictions on the structural configuration of the latter. For example, if certain features of the relations between State and economy are essentially due to the prerogatives of the financial markets and result in loss of autonomy of the economic policy, then there are strong indications that the institutional form of state became hierarchically subordinated to the institutional form of the monetary financial status;

ii. Definition 2 - an institutional form will be considered superior in the hierarchy to another if its development implies a transformation of this second form, be it within its own configuration, be it within its operating logic. According to Boyer (1998), in contrary to the previous definition, this second form does not imply that the mode of regulation that emerges from this complex set of changes is consistent. It considers the possibility that the institutional form hierarchically subordinate evolves in such a way that part of its new features may be in conflict with the settings of other institutional forms.

In conjunction with the previous definitions, the notion of complementarity of institutional arrangements allows the development of analyses seeking to identify those factors that contribute to the genesis of a new mode of regulation. The agreements which govern the various spheres of modern societies are not independent, since several processes are combined. BOYER (1998, p. 20) lists four main results of recent analysis on this problem:

- The emergence of an institutionalized commitment incorporates a component of expectation, which in some cases involves the rational analysis of their impact and their conditions of
viability. But this is not a functionalist perspective, as the emergence of a new regime is highly contingent. BOYER notices that history shows that most of the major institutional innovations have largely unexpected effects. However, a form of constructivism is present in the process of creating forms of economic organization, since the corresponding holistic conception implies the consideration of certain interdependencies, the most evident among institutions, organizations and markets;

- Assuming that ex ante a conflict between a number of innovations prevailed apparently unconnected with each other, the economic dynamics driving them is feasible only if certain structural conditions are fulfilled: the ability to respond to a horizon marked by uncertainty, variability of the macroeconomic conjuncture, the recurrence of social conflict and economic imbalances;

- But the previous process seems to appeal in a privileged way to randomness and non-intentionality. A plausible hypothesis in the context of technology choices with strong indivisibilities. However, the cognitive content is important for the institutional forms, organizing the coordination of strategies and decentralized activities. The political process as one that solves or reduces conflict in this case is its own sphere of action, conditioning the mutations of the institutional forms;

- The complementarity of the institutions of capitalism may come from the existence of a hierarchy whereby some are designed to be structurally compatible with a dominant institution that imposes its logic beyond its sphere of action. For BOYER, a coherent system then is not simply a random result, or a direct effect of tax policy, but the consequence of a fundamental principle: according to the society and time, some institutional arrangements are more important than others.

The new form of integration into the international regime raised the process of financialization of the Brazilian economy to a new level. Our hypothesis is that the current exchange rate regime is subject to the powers of monetary policy, which in turn responds to the demands of profitability in the liberalized financial markets. The floating exchange rate regime, with its tendency to real appreciation, while serving the goals of inflation control, the tables of the target system adopted since 1999, became one of the key pieces of the revaluation of capital in global markets.

As a result, monetary and financial regime along with the pattern of international integration that Brazil adopted and consolidated in the 1990s, are the hierarchically superior institutional forms in the current Brazilian mode of regulation post-liberalization. Its consequences on the evolution of the industry will be the subject of the next section. Figure 1 seeks to clarify the change in the hierarchy of institutional forms in three different periods with their respective systems of economic growth.

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1 BOYER’s argument is analog to the view of LUCKÁS, presented in Chapter 1, in the context of ontological and methodological concept of regulation.

2 BOYER still observes that « (...) En conséquence, conformément à l’intuition des théories évolutionnistes, ex post le divers compromis institutionnalisés doivent manifester une certaine compatibilité, ou dans certains cas faire la preuve de leur indépendance. »
The first regime corresponds to the growth of the Brazilian "economic miracle" (1966-1974) plus the II National Development Plan (1975-1979). This was a regime of the profit-led growth type with high rates of accumulation of productive fixed capital, which resulted in average GDP growth of 7% per year. If we consider only the years of the "miracle", the average rate was 10% per year. The investment was oriented according to the logic of industrialization by import substitution. In this context, the State had several mechanisms for the protection of Brazilian industry, shaping and monitoring the evolution of institutional forms of international integration, competition and the monetary-financial regime. Overall, the finances remained in service of productive accumulation of capital and, consequently, of the development of the country's industrial base. Therefore, the State was the institutional form hierarchically superior to the other four, coordinating and monitoring the evolution of the basic institutional architecture of the model of industrialization by import substitution.

The second period (1981-1993) was characterized by a regime of crisis or contraction, expression of the entry of the Brazilian economy in a long history of macroeconomic and structural problems. The so-called fiscal crisis, the tendencies to stagnation of the product and to the high inflation marked the macroeconomic conjuncture of this period. The Brazilian State lost its ability to promote capital accumulation and the autonomy of economic policy was seriously affected. Priorities changed and the successive governments of this era found themselves under the pressure to take measures to fight inflation and to control public expenditures. The development strategy would then be abandoned with the roles of the State redirected to the question of external and domestic debt and inflation control. From a regulationist point of view, the period is also characterized by a certain institutional inertia in that the mode of regulation inherited from the import-substitution period, although in crisis, still kept its main characteristics. Yet, a very important change is observed that will drive trends for the next decade: the State gradually loses its status as a hierarchically superior institutional form and submits itself to pressures from a financial and monetary regime under the control of finances. The form of international engagement although without significant

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**FIGURE 1 – HIERARCHY OF THE INSTITUTIONAL FORMS IN THREE DIFFERENTS GROWTH REGIMES OF BRAZILIAN ECONOMY (1966-2008)**

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Hierarchy and complementarity</td>
<td>&quot;Brazilian Economical Miracle &quot;</td>
<td>II National Plan of Development</td>
<td>Import-Substitution Industralisation (ISI)</td>
</tr>
<tr>
<td>Superior Institutional forms</td>
<td>FE</td>
<td>RMF</td>
<td>FII</td>
</tr>
<tr>
<td>Subordinates Institutional forms</td>
<td>FC</td>
<td>RMF</td>
<td>WLN</td>
</tr>
</tbody>
</table>

FE = Institutional form of State; FII = Institutional form of international insertion; FC = Form of competition; RMF = monetary and financial regime; WLN= Wage -labor nexus

Hierarchy of Institutional forms
structural changes already started to reflect the priorities given to a reconfiguration for the sake of trade and financial liberalization, one of the foundations of the next regime of growth.

The third period (1995-2008) is characterized by the consolidation of an institutional architecture largely favorable to the holders of capital and national and international financial markets. The Brazilian economy achieves price stability since the Real Plan (1994). In addition, a number of structural reforms are driven by the Brazilian government: privatization, social providence reform, administrative reforms and other neoliberal measures that were given priority to bring the Brazilian economy to a new trajectory of growth. During this period, the institutional form of integration into the international regime, the RMF and the forms of competition are linked to higher-ranking authorities, according to the prerogatives of global financial markets.

Under the pressure of the intensification of international competition, particularly for products imported from Asia, the Brazilian industry is forced to rapidly restructure. Without a consistent industrial policy and coherent with a strategy of long-term development, various branches of manufacturing industry lost their share in GDP. Under the fixed adjustable exchange rate (crawling peg), from 1994-1999, responsible for the "peg", the added value of industry that had already been declining since the mid-1980s, remained at a level well below the expected for an economy still under development. The duration of the floating exchange rate regime, from 2000, would not change this picture of relative deindustrialization or industrial respecialization.

As one of the direct results of this new mode of competitive regulation, the Brazilian economy would work within a regime such as the finance-dominated accumulation regime, perpetuating the historic character of the wage labor nexus (WLN) as an institutional form hierarchically subordinated.

### 3.1 The structural linkage between internal public debt and interest income

Public debt has been the main axis of the rentier-asset accumulation in the 1991-2008 period, but in a more explicit way. In fact, in the pre-liberalization period of the 1980s, the fiscal crisis of the Brazilian government had already articulated with the main macroeconomic regularities that allowed the financial accumulation to develop from inflationary gains and trends to the stagnation of the product. However, the very atmosphere of crisis with high inflation hid in a way, the functionality of public debt to financial expansion. Graph 2 describes the paths of public debt and external debt as a percentage of GDP. Note that the public debt expands in a linear deterministic trend, reaching 50% of GDP in January 2009, while in the early 1990s, it was around 18%.

This evolution suggests the possibility of an explosive path for this variable, since the falls of the debt / GDP ratio happen rapidly, and soon after they return to the trend of long-term growth. The hypothesis of financialization as a process resulting from specific macroeconomic conditions entails the consideration that the current financial macrostructure in Brazilian economy imprison public finances because it controls the monetary and fiscal policy by formatting it according to the prerogatives of the rentier accumulation. For this reason, it can be considered, on the one hand, a part of the endogeneity of the public debt in the neoliberal economic model, and the other hand, the exogeneity of Selic rate, since it became a key instrument of the restrictive monetary policy inherent to financialization by interest income.

Graph 3 shows the strong positive correlation between the stock growth of public debt (DIVPUBINT) at constant prices, and the accumulated factor of real Selic (FATACSELIC), which attempts to capture the logic of the compound capitalization, practiced by financial markets.

It is noteworthy that an investor who had acquired a Selic indexed treasury bill in January 1991 and had not sold it, would have its capital multiplied by 7 in January 2009. This is a spectacular interest income, well above international standards, even for an economy still under development. But the question of causal links between these variables is relevant to the empirical support of the hypotheses proposed in this paper.

An econometric analysis for the 1996-2009 period reveals that these variables cointegrate, thus enjoying a common trend of evolution. In addition, Granger causality tests (Table 2) showed that variations in Selic rate precede changes in public debt, pointing to the existence of unilateral causality of interest income towards the expansion of public sector debt in Brazil.3

### TABLE 1 – GRANGER CAUSALITY TEST FOR DIVPUBINT AND FATACSELIC (1996-2009)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Null hypotheses:</td>
<td>Obs.</td>
<td>Statistics F</td>
</tr>
<tr>
<td>DLFACSELIC does not cause, in Granger’s sense, DLDIVPUB</td>
<td>154</td>
<td>3.25212</td>
</tr>
<tr>
<td>DLDIVPUB does not cause, in Granger’s sense, DLFACSELIC</td>
<td>1.60421</td>
<td>0.20450</td>
</tr>
</tbody>
</table>

SOURCE: Own elaboration

NOTE: Granger test was conducted for the two series in first difference, since both were I(1).

### 3.2 FBKF in two contrasted patterns, but controlled by financialization

The dynamics of productive investment in Brazil remained clearly cyclic until 2003, undermining the foundations for sustainable economic growth (Graph 4).

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3 In order to save space, the whole amount of tests pertaining the econometric analyses here developed will not be presented.
To test the influence of financial income on the behavior of the investment rate in fixed productive capital, a relationship was specified between this variable and two explanatory variables: the gap between productivity and average real wage, as a proxy for the profitability of fixed productive capital (PR\text{ -RW}) and the accumulated financial income as a percentage of gross disposable income (RDB).

The estimation results reveal the existence of a cointegration relationship. This means that there is a balance between long-term investment, corporate profit and financial gain, which could be interpreted as a result of the macro-structure basis of this regime.

### TABLE 2 – INVESTMENT RELATIONSHIP, PROFITABILITY AND FINANCIAL INCOME (19916-2009)

<table>
<thead>
<tr>
<th></th>
<th>L(TXINV)</th>
<th>L(PR_RW)</th>
<th>L(RENDFINY)</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample:</td>
<td>1991: T3 2008: T4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations:</td>
<td>70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard error ( ) and statistics t in [ ]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L(TXINV)</td>
<td>-0.529243</td>
<td>0.283373</td>
<td></td>
<td>-5.577660</td>
</tr>
<tr>
<td></td>
<td>(0.10270)</td>
<td>(0.04989)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[-5.15340]</td>
<td>[5.67961]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SOURCE: own elaboration

NOTE: Granger test was conducted for the two series in first difference, since both were integrated of order one.

In Table 3, the fact that the income elasticity of long-term investment was negative but significant (-0.53), while the financial income elasticity was positive and statistically significant (0.28), is an indication that
financialization acts directly upon the decisions of allocation of business savings of the productive sector. Increases in the mass of profit obtained by the growth of productivity gains are not able to boost the investment, because financial assets offer a much more attractive alternative to upgrading in terms of liquidity and risk than the assets that the FBKF demands. This empirical evidence supports the hypothesis that financialization by interest elevates the liquidity preference of entrepreneurs and owners of capital and, therefore, tends to hold down the growth rate of the stock of productive capital assets (capital accumulation rate).

It should be noted, however, that this result is strongly influenced by data from the subsample 1991-2003, when the interest rates remained even higher and the international environment was under the financial crisis of 1995 (Mexico), 1997 (Asia) 1998 (Russia) and 1999 (Brazil); and again Brazil, in 2002/2003, due to the change of government, since the holders of capital and markets feared a significant change in the basic financial macrostructure of the rentier-asset accumulation. In these macroeconomic conditions, the regime of growth fit the finance-dominated accumulation pattern, hampering the rate of accumulation of fixe productive capital.

In the 2004-2008 period, the international situation is much more favorable to Brazil, the demand for commodities raised, as well as their prices; and with a more enthusiastic internal market, the investment grew again. In these macroeconomic conditions, the characteristic regime is a finance-led growth which may emerge both by the wealth effect derived from the financial income (less likely in the case of Brazil because of the low percentage of population with access to financial assets) and by the greater availability of credit consumption and financing of production and exports.

3. Stylized fact: strong drop of participation of industrial value in GDP

Graph 5 shows the joint evolution of participation of the manufacturing industry in the total product of Brazilian economy (industrial added value / GDP at basic prices) and of the real effective exchange rate in indexes of value. Two different patterns of evolution of the series were noticed and also the fact that exchange appreciation is associated with a loss above 50% participation of the industrial added value in the period of 1980-1998.4

Observe that the relative drop of the industrial AV began during the preopening period, when the industry growth rate could not be concomitantly regarded as a normal process of economic development, where, in the long run, the services sector advances with a consequent reduction of the relative participation of the industrial and agrarian sectors. Until 1993, the relative participation of the manufacturing industry and the exchange rate shared a common tendency of evolution, suggesting the possibility of integrating these series5. From 1994, these variables disconnected, letting show a very different pattern of evolution, where the participation of industrial AV in GDP resists the actual exchange regime. Furthermore, a point to be highlighted is that, in the second period 1994-2007, characterized by the commercial and financial liberalization and by the subsequent structural transformations, this participation represents only half the value observed in 1980. Such signal points to the occurrence of a process of relative deindustrialization of Brazilian economy post-opening and post-Real.

Graph 5 – Real Effective Exchange Rate and Manufacturing Industry Participation in GDP(1980-2008)

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4 Precisely, a drop of 53.37%.
5 Araújo, Bruno and Pimentel (2009) present econometric tests that confirm the existence of cointegration between the series of 1980 to 1993 and a structural breakdown in the relationship between exchange rate and industrial AV in the year of 1993.
A possible explanation can be obtained considering the structural changes in industry due to the new way of international engagement of Brazilian economy. In 1980-1993, the configuration of manufacturing industry still reflected the structures of production consolidated during the process of import substitution and, therefore, of the economic model and of the correspondent industrial development policies. The exchange regime, combined with sector policies, was mobilized as one of the key institutions for the development of productive capacity in the industrial sector. The industry was composed by branches constituted under the logic and economic stimuli of the Import Substitution Industrialization model (ISI).

However, the passage into the second period, 1994-2008, the new way of international engagement in Brazil was marked by an accelerated process of commercial and financial liberalization, together with a strong appreciation of the real exchange rate. The Brazilian option for a new way of joining the international regime without a consistent industrial policy will cause deep changes in the industrial park, removing significant part of the branches that produce goods with higher technological intensity and added value. Such branches would certainly have contributed to reduce the high participation of commodities in exports and, therefore, to reduce the external vulnerability of Brazilian economy during its stage of joining the globalization process.

### 4.1 Evidences of new industrial structure: a cointegration analyses

As mentioned in the previous section, the behavior of the series of the industrial AV / GDP and of the real effective exchange rate, according to Graph 5, suggests the possibility of cointegration among these variables in the period of 1980-1993. In the second period, 1994-2007, the industrial AV / GDP remains stuck at a value close to half of that observed in 1980, characteristic that will reflect on the Brazilian external commerce, today, strongly dependent on the export of commodities.

6 Today, the characteristic example of this strategy has been that of the Asian countries, who maintain the Exchange rates adequate to the development and consolidation of their industry; see, for example, Araújo (2009).
The Chow test for structural breaks (1978) was implemented to the exchange rate and GDP series of the manufacturing industry. This test allows the investigation of whether two or more periods present significant differences between the parameters that establish the relationships between the series. For instance, suppose that the exchange rate positively correlates with the manufacturing industry GDP within a certain period of time, and conversely, they negatively correlate within another period, then the test will indicate this difference of parameter and will determine the date the structural break occurred. Table 3 presents the result of the Chow test.

Table 3 – Structural break test

<table>
<thead>
<tr>
<th>Chow test of structural break: 1993:4</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistics F</td>
<td>80.12383</td>
</tr>
<tr>
<td>Maximum likelihood ratio</td>
<td>102.7527</td>
</tr>
</tbody>
</table>

Table 1 shows that the null hypothesis of inexistence of structural break is rejected by Chow test, and it also indicates the fourth three-month-period of 1993 as the “break” point.

The relevant conclusion pointed by the test is the existence of two distinct phases in the relationship between the two variables, suggesting the existence of two different regimes of growth in the manufacturing industry. Thus, the analyzed period can be divided into two subsamples, being the first from 1980:1 to 1993:3 and the second from 1993:4 to 2008:3.

The next step is to verify if the GDP series of the manufacturing industry and exchange rate share a common trajectory of evolution, which can be determined by the cointegration test. The series are cointegrated when the combination of non-stationary series is stationary, that is, the residues of the resulting series is stationary, I(0). It is the same as stating that the variables do not move independently, can have block trajectories, in such a way that, in the long run, they present relationships of “equilibrium”.

In order to verify if the series are non-stationary, the existence or not of unitary roots must be tested. This research uses the augmented Dickey–Fuller test (ADF), which indicated that the series GDPIND (= industrial AV /GDP) and REER (= real effective exchange rate) are non-stationary in both subsamples.

In order to identify relationships of cointegration between these variables Johansen procedure was used, which determines the number of vectors of cointegration and estimates it. The space of cointegration can be determined by means of two tests of likelihood ratio: Trace and Maximum Value, which are illustrated in Table 4.

Table 4 – Johansen Test

<table>
<thead>
<tr>
<th>Maximum Value</th>
<th>Trace Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Observed Value</td>
</tr>
<tr>
<td>Sample: 1980:1 to 1993:3</td>
<td></td>
</tr>
<tr>
<td>r = 0</td>
<td>23.89248</td>
</tr>
<tr>
<td>R ≤ 1</td>
<td>4.302052</td>
</tr>
<tr>
<td>Sample: 1993:4 to 2008:3</td>
<td></td>
</tr>
<tr>
<td>r = 0</td>
<td>15.91196</td>
</tr>
</tbody>
</table>

7 A more complete presentation of Jonhansen procedure can be found in Enders (1995).
Considering the level of 5% significance, Table 4 shows that both through the Trace test statistics and through the Maximum Value statistics, the null hypothesis of non-cointegration is rejected and the alternative hypothesis of the existence of a cointegration vector between the series in the first sample is accepted.

Yet in the second subsample, the tests indicate that there is no cointegration between the series, that is, they move independently. These empirical results point to the occurrence of significant transformations in the structure of the Brazilian industry, during the period of commercial and financial liberalization post-1994.

In the first period 1980-1993, the industrial structure was highly sensible to current exchange regime. Such behavior could be noticed by the existence of a long term relationship between the participation of the industrial added value in GDP and the real effective exchange rate, given by the cointegration between these two variables.

In order to verify more precisely the relationship between the exchange and the industrial AV the sensibility of the industrial AV was calculated in relation to the exchange rate, both in the short term and in the long run. Table 5 illustrates the results.

<table>
<thead>
<tr>
<th>Table 5 - Elasticity of industrial AV in relation to exchange</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short term elasticity</td>
</tr>
<tr>
<td>Long term elasticity</td>
</tr>
</tbody>
</table>

As in the first subsample, the variables have a unitary root and are cointegrated, the Ordinary Least Squares (OLS) method continues as effective as when it was applied to the level series. Thus, the short term elasticity is calculated through the OLS and the one of long term through the vector error correction model (VEC). In both models the sensibility of the industrial AV in relation to exchange is positive and significant, which shows that industry positively responded to exchange rate devaluations. In the long run, an increase of 10% in the exchange rate causes an increase of 3.3% in the industrial AV, and in the short term, this increase is of 1.4%. In the second subsample, the inexistence of cointegration between the two series derails the long term elasticity calculation; also the OLS model needs to be used with the series in first difference. In this second period, the sensibility of industrial AV in relation to the exchange is no longer significant, which confirms the hypothesis that the industry kept under the process of exchange appreciation is no longer susceptible to exchange rate changes.

The interpretation of the results of the first phase can start from the fact that the industry in this period was composed by branches constituted under the logic and the economic stimuli of the Import Substitution Industrialization model (ISI). Under the rule of this model, a competitive exchange rate or sufficiently depreciated was one of the basic macro-variables to assure a macroeconomic environment favorable to the industrial investments. However, the passage into the second period, 1994-2008, the new way of international engagement in Brazil was marked by an accelerated process of commercial and financial liberalization, together with a strong appreciation of the real exchange rate.
This new macroeconomic postopening environment was determinant to the retraction or closure of several industrial productive units, which found themselves rapidly exposed to international competition, without the intercourse of a consistent industrial development policy, adequate to the needs of national economic growth and development. The hypothesis sustained by this work is that the appreciated exchange regime was harmful to the technologically more sophisticated sectors and branches, favoring the most traditional ones and those connected to primary activities. This regime has changed the profile of specialization of industry, causing a process of relative deindustrialization of Brazilian economy.

In this case, industry loses economic participation even before the economy have reached its highest stages of development. Such deindustrialization has a counterpart, that is, an equally precocious expansion of the services sector (a swelling of the service sector), which leads to precarious work and to high levels of informality, thus blocking economic and social development. Besides, this definition of deindustrialization cannot be solely based on employment levels indicators, since the current productive technical bases are capital intensive, characteristic that would lead to a drop of employed people, thus mistakenly signaling to a loss of participation of industry in GDP.

It is important to highlight that the remaining branches of the deindustrialization process of the Brazilian economy post-liberalization are precisely those whose performance is little affected by the current regime of floating exchange with strong tendency to appreciation. Consequently, this characteristics would point to the occurrence of the Dutch disease. According to Pereira (2008), this connected phenomenon is characterized by the expansion, in a country, of the production of tradeable goods, benefited by some natural comparative advantage (abundance and higher productivity of natural resources, for instance) and the concomitant relative fall of the manufacture activities. As Corden and Neary (1982) and Bresser-Pereira (2008) sustain, a permanent appreciation of the real exchange rate must be associated with a relative increase of the commodity export sector, of higher productivity, and also with a shrink of the manufacture sector.

4.2 An analysis by branches of the manufacturing industry

In order to analyze eventual changes in the internal structure of manufacturing industry from economic liberalization, several segments of industrial activities were classified according to the type of intensive factor. The typology was elaborated by OECD, inspired on Pavitt (1984).

According to this classification, industrial activities can be divided into five groups:

i) **Natural resources intensive industry**: the main competitive factor is the existence of a large offer of natural resources in the country.

ii) **Labor intensive industry**: the main factor is the high availability of labor at a reduced cost; this is also characterized by the fact that a high degree of technology innovation processes are exogenous, that is, accomplished by other sectors.

iii) **Scale intensive industry**: in this group, the competitive factor is the possibility of exploring scale gains, being production characterized by technological indivisibility. It is formed by large oligopoly companies with high capital intensity.

iv) **Differentiated technology intensive industry**: characterized by high acquisition of economies of scope, high diversification of offer and high capacity of productive innovation.

v) **Science based industry**: innovative activities with high expenditures in research and development, whose competitive factor is fast application of scientific research to industrial technologies, and high power of transmission around the whole economic system.

Data used to classify industries according to Pavitt (1984) methodology and to calculate participation in industrial activities in relation to the whole manufacturing industry have been retrieved from industry
research (PIA) of IBGE (2008). Data are divided into two series, the first from 1988 to 1995 and the second from 1996 to 2005. Due to changes in the classification of industrial activities, with the implementation of CNAE (National Classification of the Economic Activity) from 1996, the comparison of some activities between the two periods becomes difficult.

Tables 6 and 7 present the Industrial Transformation Value (VTI) of industries according to Pavitt (1984) classification. VTI is the difference between the Gross value of industrial production and the cost of industrial operations.

**Table 6 – Percentage of Participation in the Industrial Transformation Value - 1988 to 1995**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Scale production</td>
<td>48.34</td>
<td>47.30</td>
<td>46.68</td>
<td>50.56</td>
<td>49.55</td>
<td>50.67</td>
<td>50.79</td>
</tr>
<tr>
<td>Natural Resources</td>
<td>18.36</td>
<td>17.77</td>
<td>18.35</td>
<td>20.73</td>
<td>20.25</td>
<td>20.88</td>
<td>22.47</td>
</tr>
<tr>
<td>Labor</td>
<td>13.67</td>
<td>14.79</td>
<td>15.26</td>
<td>11.59</td>
<td>12.75</td>
<td>12.00</td>
<td>10.02</td>
</tr>
<tr>
<td>Science</td>
<td>10.34</td>
<td>10.83</td>
<td>10.88</td>
<td>10.04</td>
<td>11.06</td>
<td>10.23</td>
<td>10.73</td>
</tr>
<tr>
<td>Differentiated</td>
<td>9.28</td>
<td>9.30</td>
<td>8.83</td>
<td>7.07</td>
<td>6.39</td>
<td>6.21</td>
<td>6.00</td>
</tr>
</tbody>
</table>

Source: IBGE - Annual Industrial Research

Note: Percent of Participation only in manufacturing industry.

Analyzing the tables’ data, it is possible to observe that the activities that most increased their participation in the industrial transformation value (VTI) were the natural resources intensive, with an increase of almost 4 percentage points in the first PIA series, and of more than 6 percentage points in the second series. The main activity of this group is the production of food, though the activity responsible for almost all the growth of its participation was that connected to the refining of petroleum refining.

**Table 7 – Percentage of Participation in Industrial Transformation Value - 1996 to 2005**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale production</td>
<td>40.34</td>
<td>42.08</td>
<td>42.26</td>
<td>41.30</td>
<td>40.25</td>
<td>39.13</td>
<td>40.20</td>
<td>40.97</td>
<td>42.68</td>
<td>40.44</td>
</tr>
<tr>
<td>Natural Resources</td>
<td>30.21</td>
<td>29.41</td>
<td>29.71</td>
<td>32.30</td>
<td>33.68</td>
<td>33.88</td>
<td>34.69</td>
<td>36.31</td>
<td>34.06</td>
<td>36.49</td>
</tr>
<tr>
<td>Science</td>
<td>4.12</td>
<td>3.99</td>
<td>3.48</td>
<td>3.64</td>
<td>4.52</td>
<td>4.58</td>
<td>3.61</td>
<td>2.59</td>
<td>3.01</td>
<td>2.87</td>
</tr>
</tbody>
</table>

Source: IBGE - Annual Industrial Research

Note: Percent of Participation only in manufacturing industry.

The scale-intensive activities are those that have greater participation in VTI in both series. Chemicals, metals and vehicles make up a large part of that group with a generally stable participation in the structure of industrial production.

The other three groups of activities lost participation. The labor intensive group was one of those that presented the highest loss of participation, summing 3 percentage points in each PIA series, with a negative emphasis on the participation of the textile and clothing products.

The differentiated products intensive group had a very significant drop of participation in the period. This sector is represented by the activities of production of machinery and equipment, and it suffered the strong impact of trade liberalization and exchange rate appreciation during the period that led to a large increase of imports of such items. It similarly impacted the production of science-based sectors, responsible for the production of electronics and information technology.

Therefore, considering the data presented on the participation of industrial activities regarding the value of manufacturing, it is possible to observe that a productive specialization of industry sectors, with emphasis on natural resources intensive sectors, occurred in the period after economy liberalization. While traditional
industries like textiles and clothing, and activities related to the production of machinery and equipment lost relative importance. These sectors were heavily impacted by the large increase in the level of imports after trade liberalization.

4.3 The effects of exchange rates on foreign trade

The effects of exchange rate on the industry have direct impact on Brazilian foreign trade, both on the balance of the various export sectors, and on the technological intensity of exports of Brazilian industry.

It is well known that the composition of the trade balance is the main indicator of competitiveness of an economy, however, as will be shown later on, Brazilian exports have focused on commodities and goods of lesser value. Although Brazil exports mainly manufactured goods, its main products are commodities or goods of low technological intensity.

In Table 8 it is possible to verify the dependence of Brazilian trade balance (SBC) in relation to the commodities sector. Results show the importance of the generating capacity of the trade balance of agricultural sectors, especially those of cereals, animal products and tropical agriculture. As for the underprovided sectors, an emphasis is placed on the chemical industry and machinery (electrical and electronic and other). The traditional export sectors have maintained their ability to generate trade balances, as much as the traditionally underprovided sectors remain that way and, still, the latter have significantly increased their participation in the negative trade balance.

<table>
<thead>
<tr>
<th>Table 8 – Trade balance in US$ billions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Petroleum</td>
</tr>
<tr>
<td>2003        2004        2005        2006        2007        2008</td>
</tr>
<tr>
<td>-2.0       -4.6        -3.7        -3.1        -5.1        -8.2</td>
</tr>
<tr>
<td>Raw Materials</td>
</tr>
<tr>
<td>3.0        3.8        6.4        7.8        9.2        10.5</td>
</tr>
<tr>
<td>Forestry Products</td>
</tr>
<tr>
<td>4.3        5.1        5.5        5.9        6.6        6.7</td>
</tr>
<tr>
<td>Topical Agriculture</td>
</tr>
<tr>
<td>5.4        6.2        8.4        11.2       11.2       11.7</td>
</tr>
<tr>
<td>Animal products</td>
</tr>
<tr>
<td>4.3        6.4        8.3        8.6        11.4       14.8</td>
</tr>
<tr>
<td>Cereals</td>
</tr>
<tr>
<td>7.9        11.4       10.8       10.4       13.9       20.2</td>
</tr>
<tr>
<td>Labor intensive</td>
</tr>
<tr>
<td>4.1        5.0        5.7        5.8        5.4        5.7</td>
</tr>
<tr>
<td>Capital</td>
</tr>
<tr>
<td>6.1        8.1        9.8        9.5        9.0        8.7</td>
</tr>
<tr>
<td>Electric and electronic machinery</td>
</tr>
<tr>
<td>-4.1       -6.5       -6.8        -9.1       -12        -17.4</td>
</tr>
<tr>
<td>Machinery and Road vehicles</td>
</tr>
<tr>
<td>3.2        4.8        6.8        6.2        4.5        1.1</td>
</tr>
<tr>
<td>Machinery and other transportations</td>
</tr>
<tr>
<td>1.4        3.6        2.6        2.2        3.9        4.2</td>
</tr>
<tr>
<td>Other machineries</td>
</tr>
<tr>
<td>-2.9       -1.9       -1.9        -2.6       -6.6       -12.9</td>
</tr>
<tr>
<td>Chemistry</td>
</tr>
<tr>
<td>-6.1       -8.1       -7.3        -7.2       -12.2      -21.4</td>
</tr>
</tbody>
</table>

Source: IEDI (2009)

Regarding the performance of SBC, the IEDI (2009) draws attention to two fundamental aspects. The first is that there is a growing relationship of antagonism between the different segments of Brazilian foreign trade, that is, there are, on the one hand, the clearly surplus segments and, secondly, those with extremely negative results. The second aspect, which is related to the first, refers to the fact that the SBC in the country is increasingly dependent on goods with low added value, little or non-industrialized, which generated jobs requiring low qualifications.

IEDI highlights that this aspect cannot constitute a problem for the supporters of the Comparative Advantages Theory or correlated ones, that is, for the idea that each country should specialize in products that have lower costs of production, though it is certainly something negative for those who argue in favor of a project to Brazil undergoing industrialization (IEDI, 2009).

Another important point is to investigate the technological intensity of products exported by Brazilian industry. Table 9 shows the trade balance data processing industry in Brazil.

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8 Data from this section are based on the study of foreign trade conducted by the Institute of Studies for Industry Development (IEDI), 2009.
Table 9 – Trade balance of the Manufacturing Industry in US$ billions

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>19.856</td>
<td>25.197</td>
<td>28.727</td>
<td>31.927</td>
<td>34.761</td>
<td>39.559</td>
</tr>
<tr>
<td>Medium-low</td>
<td>5.488</td>
<td>8.871</td>
<td>10.258</td>
<td>10.545</td>
<td>9.185</td>
<td>5.118</td>
</tr>
<tr>
<td>Medium-high</td>
<td>-3.376</td>
<td>-2.531</td>
<td>443</td>
<td>897</td>
<td>10.344</td>
<td>30.190</td>
</tr>
</tbody>
</table>

Source: IEDI (2009)

It is observed that the most important sector in the generation of trade balance to Brazil, considering the technological content, is the low content, followed by medium-low segment, but with a considerably lower result. The IEDI (2009) points out that the sub-sectors of food, beverages and tobacco, alone accounted for 78.8% of the balance generated by the sector in 2008.

Graph 6 – Trade balance in USS billions (1997-2008)

Source: IEDI (2009)

For the next underprovided sectors, high and medium-high technology intensity, the two have been running negative trade balances or some very close to zero for all the analyzed periods. Noteworthy is the amount of deficit generated by the segment of medium-intensity (U.S. $ -30.2 billion in 2008). Finally, the high tech segment, in 2008, reached a deficit of U.S. $ -21.7 billion.

As regards the trade balance generated by the manufacturing industry, this, which showed a clear upward trend between 2003 and 2005, as shown in Graph 6, in 2006, this trend was reversed, and, in 2008, the deficit of the sector was U.S. $ 7.2 billion.

It should be noted that there was a substantial drop in the outer result determined by the negative performance of the manufacturing industry, highlighting that the last deficit recorded by the sector had been in 2001.

In this respect, the conclusion is that Brazil remains, therefore, dependent on products with low and medium low technological intensity as it pertains to the generation of trade balances in the manufacturing industry. At the same time, the sectors of high and medium-high technology are major importers and major generators of deficits. Moreover, we must consider that after several years of important surpluses, manufacturing industry again generates a significant deficit. Besides the concentration of the trade balance in the country for little industrialized goods, there is also a concentration of exports in low-technology goods and imports of products with high technological intensity.
5 The spread of the American crisis and the current mode of Brazilian competitive regulation

A characteristic of the banking and financial system in Brazil is its propensity to expand credit operations. About 70% of its total operating revenue comes from debt and equity securities, with the focus on fixed income securities and derivatives. Only 20% of its operating revenues come from credit operations. As a result, although on a path of expansion, the credit / GDP ratio reached in early 2009 the low figure of 45% of GDP. This implies that Brazilian financial institutions have not engaged in the same proportion as their foreign counterparts, particularly American, in operations with toxic assets like the subprime type. This feature contributed to the spread of the American crisis in the Brazilian economy through another channel.

The crisis arrives in Brazil through the assets and liabilities of the productive sector, since about 80% of non-financial companies had non-operating income superior to the profit obtained from their activities. This is an important indicator of the financialization of economy and it helps understand why many companies in the productive sector had serious difficulties in the second half of 2008 when the American crisis actually arrived in Brazil. Moreover, considering that the expectations were infected with the generalization of pessimistic behaviors about the unfolding crisis in the country, lines of credit became scarce, prompting the government to encourage the public credit.


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9 These data were obtained in the Accounting for Financial Institutions - COSIF elaborated by the Central Bank of Brazil.
Graph 7 shows that the months of November and December 2008 were very bad for the Brazilian industrial sector, with strong sharp drop in production. Conversely, the first half of 2009 already showed a clear recovery, in part by the recovery of expectations, but also by the effects of anti-cyclical policies that the
government had taken. The same trends can be observed when considering the industrial production by category of goods (Graph 8).

Among the main features of the current mode of Brazilian regulation is its high propensity to pass on the domestic economy to external financial shocks. Recent studies also show that this institutional architecture after liberalization adopted in Brazil contributed to a significant increase in the volatility of exchange rates, undermining the foundations of stability of the regime of growth (Ali, 2009). According to ARAÚJO, Brazil stands out as one of the countries with higher exchange volatility, particularly in the subsample that includes the floating exchange rate regime. At the same time, countries like Vietnam, Malaysia, India and Pakistan, which have been ranked as the most dynamic countries in terms of economic growth, are characterized by low volatility of exchange rates.

In addition to its high volatility, the level appears to be also harmful to the system of Brazilian growth. However, even though some analysts argue that the real appreciation of the exchange rate did not prevent the growth of gross fixed capital formation, particularly in the period 2004-2008, the disaggregated analysis by branches of the industry supports the existence of a process of regressive specialization of the Brazilian industry.


SOURCE: Own calculations based on data from the Annual Industrial Research – IBGE and according to Pavitt classification.

Graphs 9 and 10 extend until 2007 the analysis proposed in section 3.2, but this time using the data of gross fixed capital formation by branches of the Brazilian industry. The GFCF in classes based on natural resources is a clear trend of expansion that, along with industry-based scale, reaches a high figure of 70% of the gross fixed capital formation of industry. Meanwhile, the branches based on science, work, and differences were all below 10%, highlighting the declining trend in the industry based on science. It is therefore an ongoing process of "commoditization" of the Brazilian industry, whose reversal depends on the implementation of an appropriate industrial policy within the frameworks of a consistent strategy for national economic development.
The branch-intensive natural resources showed a growth of more than 230% between 2000 and 2007, while in the same period, the science-based industries fell by more than 50% in quantum produced.

GRAPH 8 – EVOLUTION OF THE INVESTMENT BY TYPE OF INDUSTRY (1996-2007)

6 Final remarks: the prospects for the industry and the Brazilian economy

Relations between financialization, manufacturing industry and economic growth in Brazil opened an important field for further research on the economic development of the country. The duration of a macroeconomic regime subordinated to the financial rentier accumulation does not necessarily imply the impossibility of economic growth or that economy is inevitably doomed to near-stagnation. What empirical evidence shows the countries undergoing a process of financialization is that their economies do not appear able to grow at high and sustainable rates because such schemes are very sensitive to the profile of income distribution (internal market factor) and to changes in the international scenario (external market factor). Besides, they contaminate the expectations of entrepreneurs through short term evaluations of financial markets. After all, a significant proportion of large companies have their asset structure engaged in financial transactions.

For developing countries, financialization becomes an even bigger structural obstacle, since it causes functional reconcentration of income in favor of the holders of capital without necessarily inducing them to raise the level of productive investment, a basic factor in the generation of employment and income. Future work could suggest the development of indicators of financialization for firm and sector level, as well as the formulation of a theoretical macroeconomic model that can clarify the conditions of dynamic stability of the regime of growth. It therefore goes without saying that the current mode of regulation in Brazil is unfavorable to industrial development, but it is highly advantageous to financial accumulation on the basis of public debt, in derivatives and financial products related to them.

The American crisis has impacted the Brazilian economy primarily through the directly productive sectors. This was an important difference with respect to developed countries where the epicenter of the crisis was in the financial markets. Because of financialization of various industries and other non-financial companies, the drop in production was expected to be a normal rational behavior in face of uncertainty in
economic trends that marked the second half of 2008. However, there was also an expectation effect that worsened credit conditions in the Brazilian banking market, even though it had not been involved in transactions with toxic products such as subprime. In the Brazilian economy, the axis of the rentier-asset accumulation is in internal public debt and not in the capital markets or in credit operations to families and companies. The pattern of financialization is therefore quite different from that seen in the U.S. economy.

The analysis of the effects of the level of the exchange rate upon the changes in the manufacturing industry structure shows that the sharp decline in the share of industrial added value in the Brazilian GDP can be explained by the tendency of real appreciation of the exchange rate between 1980 and 1993. This fact must, however, be better qualified with regard to the specificities of the industrial structure pre-liberalization. The plants then established under the economic and industrial policies associated with the model of import-substituting industrialization assumed a high degree of protection inherent in this type of development strategy. However, without having completed their industrialization process, Brazil was reinserted in the international arena with strong competitive disadvantages in strategic sectors such as intensive science and technology. Internally subjected to the adverse macroeconomic environment (very high rates of interest, lack of industrial and sectoral policies, consistent deficit in transport infrastructure, etc.), the reaction of the domestic industrial park was then clearly defensive, guiding itself towards survival in face of increasing uncertainty.

Between 1980 and 1996, the manufacturing industry decreased by 50% its share in gross domestic product. One of the main factors of this development was the strong appreciation started in the pre-opening period. But despite the liberalizing agenda, this loss was not recovered in the 1997-2008 period, when the Brazilian economy consolidated its adherence to the process of commercial and financial globalization. On the contrary, despite the modernization of plants, favored by the import of capital goods and higher productivity gains, the industry continued to lose ground between 2004 and 2008, precisely when the Brazilian economy grew at higher rates. Future research is needed to detect the economic reasons behind this behavior. The choice of paths for intensive accumulation may be an important part of the explanation, but also important is the fact that the industry that survived the appreciation is basically producing goods of lower value.

Historical analyses and international comparisons show that the changes in the forms of international integration are crucial in the reconfiguration of the industry and, more broadly, of their own domestic economic environment. Away from the more optimistic views of the neo-liberal tradition, there is no theoretical or empirical satisfactory basis that may corroborate the interpretations that the processes of economic liberalization are always carriers of profit and irrefutable economic benefits. The experiences of Asian countries confirm that the use of a consistent development strategy with appropriate industrial policies is a necessary condition for the challenges of international competition to become the driving factors in developing nations. The mere adherence to an external environment of high competition can lead to losses in important sectors and branches of national industry. Pro-active policies for industrial development should be the basic resource for coping with foreign competition and the acquisition of dynamic competitive advantages.

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