

**Rediscovering the Developmental Path?
Development Bank, Law, and Innovation Financing in the Brazilian Economy¹**

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Abstract

This paper examines the financing of innovation by BNDES (Brazilian Development Bank). In spite of representing a tiny portion of the Bank's disbursements, innovation financing contains at least three elements that characterize the new state activism: a new agenda, specific tools and a unique rationale resulting from state intervention. In terms of agenda, innovation is a new item in the developmental action, which is normally driven to pick the winners in traditional sectors. Concerning the tools developed for this new mission, they have represented a break in the Bank's paradigm (used to financing large enterprises with physical assets); it relies on flexible legal structures that, formally or informally, favor a financial relationship subject to trajectory revisions and adaptations. Ultimately, instead of the top-down and pre-defined financial operations, designed to meet economic planning requirements, the financing of innovation has been based on alliances and public-private partnerships between the private companies and the public Bank. This is the case of joint operations established between BNDES and capital market investment groups, which come together to form venture capital private funds. It is far from clear, however, in what extent this new institutional set will dictate the entire future of BNDES intervention. Despite being quite evident that the Bank developed new tools to support the new industries, it is uncertain whether innovation financing will be the hallmark of the new administrative governance or whether BNDES will deal with topics of innovations as only a residual part of its broad agenda. Among other factors, political economy tensions between old industrial sectors and innovative companies may prevent the consolidation of a completely different path for public financing of development.

I. Introduction

The recent trajectory of the Brazilian economic development has three contrasting periods: the apogee, the fall and, the attempt to react. The first period ranged from the 1950s to the 1980s, when the Brazilian economy speeded up and promoted an intense process of catching up. At that moment, Brazil not only posted considerable rates of growth, but was also able to foster an accelerated strategy of industrialization. At that period, this Brazilian pathway showed similar features as other developing countries that also sneaked ahead in the industrial world.

Similarly to their Asian and Latin-American counterparts, Brazilian policymakers were able to shape an institutional arrangement conducive to a new plateau of social and economic development. Most of this developmental engine was based on State tools, such as regulations, tax incentives, and development banks. As a result, in less than 30 years, the country left behind an agrarian economy and became an urban society with an industrialized market.

After this first stage, marked by moments of euphoria, when the Brazilian model was nicknamed "miracle," the economy faced its second and difficult period: the fall. In the 1980s, the accelerated growth was replaced by stagnation, hyper-inflation and lack of an alternative model, one that was able to keep the former pace of development. Different from other developing countries, especially in Asia, Brazil did not reshape its developmental state, and started a long wave of low growth and lack of competitiveness.

In the early 1980s, that incapacity of remaking the developmental tools was particularly worrying. At that moment, something happened in the industrial world: innovation strategies and innovation policies acquired almost the same relevance possessed by heavy industries and traditional industrial policies in the previous decades. However, Brazilian policymakers were not as successful as they were in the developmental heyday. Not by chance, countries like Korea, which had a growth rate

similar to the Brazilian rate between 1950 and 1980, came out significantly ahead since the consolidation of the new economy.

Nevertheless, after having fallen behind in the aftermath of the developmental period, Brazil has been undertaking some effort to react, in order to recover its former capacity of development. Since the 1990s, especially after 2000, both policymakers and a few private companies have been engaging in the redrafting of some blocks of the economic model. Despite still being strongly based on commodities, industrial policies and corporate strategies have been incorporating a new strategic horizon, earmarking increasing resources for fostering innovation and intangible assets. In this new scenario, the developmental state and developmental agencies have been supposed to play a quite central role once again.

In particular, some pieces of evidence suggest that BNDES, the Brazilian Development Bank, which was a strategic actor over the developmental period, has been changing to meet this innovative demand. Since the 1990s, the Bank has been experiencing a remarkable process of institutional learning, which has resulted in a new type of engagement with the industrial economy. In other words, this development bank which was traditionally oriented to finance large companies and physical assets has been adapting to meet the requirements presented by the new economy. Firstly, it has been enlarging its agenda of intervention, by assuming innovation as a new priority of its financial goals. Secondly, BNDES has developed new legal tools, which are more capable of meeting the specificities of small and innovative companies dealing with intangible assets. Ultimately, this new role has been based on more horizontal types of alliances between the public Bank and private companies. Among others, this is the case of joint operations established between BNDES and capital market investment groups, which associate to form venture capital private funds.

The purpose of this paper is to describe these new complex traces assumed by the domestic finance and the Brazilian industrial policy, after the developmental crisis. In particular, this paper will examine the extent to which BNDES's intervention in the Brazilian economy represents the consolidation of a new developmental type of policy-oriented financial intervention. On the one hand, it is undeniable that the Bank has developed a new legal capacity to support the needs of the new economy. On the other hand, it is far from clear whether this institutional learning will effectively be translated into a new institutional practice. It is uncertain whether innovation financing will be the hallmark of a supposedly new developmental state or whether it will remain only a residual part of a broad development bank still concentrated in traditional sectors.

This paper is organized into three further sections. Section 2 provides an overview of the Brazilian financing model, indicating that BNDES has been a prevailing economic actor since the developmental period. The third section presents the two moments that took place after the developmental heyday. In the first part of the third section, the paper describes the period in which Brazil fell behind and the second part of the third section points out, the preliminary efforts of reaction, which started in the 1990s. The fourth section of this chapter pays deep attention to the financing of innovation by BNDES, describing the Bank's recent trajectory, the new legal tools developed in order to accomplish this new mission, and the political economy adjustment that underlies these tools. This fourth section also discusses some of the limits presented by these new development-oriented initiatives. It summarizes some

factors that may constrain the consolidation of the new attributes acquired by BNDES in financing innovation. Lastly, the fifth section concludes the chapter.

II. Developmental State, Industrial Policy and Developmental Bank: some reminiscences of the developmental period

Late-industrializing countries have based their process of economic development on alternative institutional mechanisms, which have supplemented and even substituted the private market order². Relying on this arrangement, in less than 50 years these economies evolved from a predominantly agrarian and rural organization to a diversified urban and industrial economy.³ The Brazilian economy was a typical example of this pathway: from the 1930s to the 1970s, assisted by expressive State intervention, the economy grew and became diversified and industrialized.⁴ Other developing countries such as South Korea, Taiwan,⁵ and Mexico followed a similar institutional path and obtained similar results.

During this period, the government acted as the protagonist for industrial change. It established economic goals, formulated industrial policies, and developed public initiatives to promote the substitution of imports. Accordingly, through a package of institutional devices, which included state-owned companies, tax incentives, subsidies, and trade barriers, among others, the state transformed itself into a spring of development in charge of bolstering the national process of catching up economically.

Among those institutional tools, one of the most important arms of developmental states was the development bank, which was responsible for providing financial resources for the strategies of growth and industrialization. As pointed out by Amsden,⁶ besides measures aimed at strengthening the local capital, development banks were a significant part of developmental arrangements. They not only covered the deep market

² See Amsden on this: “to compensate for its skill deficit, ‘the rest’ rose by devising an unorthodox, original economic model. This model qualifies as new because it was governed by an innovative control mechanism. A control mechanism is a set of institutions that imposes discipline on economic behavior. The control mechanism of the ‘rest’ revolved around the principle of reciprocity. Subsidies (‘intermediate assets’) were allocated to make manufacturing profitable – to facilitate the flow of resources from primary product assets to knowledge-based assets – but did not become giveaways.” A. Amsden. *The Rise of the Rest – Challenges to the West from Late-Industrializing Economies*, (New York: Oxford Press, 2001), p.8. See also similar arguments presented by other analysts of the development process, particularly P. Evans. *Embedded Autonomy – States and Industrial Transformation* (New Jersey: Princeton Press, 1995), pp. 3-20. For a panorama of Asian countries, see R. Wade. *Governing the Market – Economic Theory and the Role of Government in East Asian Industrialization* (New Jersey, Princeton Press, 1990), pp. 24-29.

³ In the Brazilian scenario, Evans stresses that until the industrialization process “coffee and rubber together never accounted for less than three-fourths of the exports. And 95% of the exports were made up by these two plus half a dozen other primary products, like sugar and cacao.” See on this P. Evans, *Dependent Development – the Alliance of Multinational, State and Local Capital in Brazil* (New Jersey: Princeton Press, 1979) p. 58. The situation started to change in the 1930s, and in 1949, for the first time, the industry share was higher than the agriculture share in the gross domestic product. See also P. Evans, *Dependent Development*. pp. 64-74.

⁴ See W. Suzigan and A. Villela on this. *Industrial Policy in Brazil* (Campinas, Unicamp, 1997), pp. 31-44. See also P. Evans, *supra* note 3, pp. 64-74.

⁵ On Asia, see R. Wade. *Governing the Market – Economic Theory and the Role of Government in East Asian Industrialization* (New Jersey, Princeton Press, 1990), pp. 24-29, and A. Amsden. *Asia’s Next Giant: South Korea and Late Industrialization* (Oxford, 1989).

⁶ “A. Amsden (2001), *supra* note 2, p. 125-160”.

failures that affected a large number of developing economies at that period, but also enabled the active coordination of capital formation demanded by the industrialization process. In other words, development banks and their industrial policies were the cornerstone of this alternative institutional engine, which guided the catch-up process experienced by the group of latecomers:

The developmental state was predicated on performing four functions: developmental banking; local-content management; “selective seclusion” (opening some markets to foreign transactions and keeping other closed); and national firm formation. (...). Step by step, government groped toward a new control mechanism that replaced the invisible hand. The new mechanism ultimately shared credit with private initiative for a golden age of industrial expansion. (...) Therefore, the development bank, in conjunction with the developmental plan, filled the void. For a very short time, until balance of payment problems emerged, “the rest” were cash-rich from wartime profits and forced savings. As wealth began to vanish with imports, developmental banks went into action to build local industry.⁷

Particularly in the Brazilian case, this sort of policy-oriented financial arrangement was set up at the onset of the industrialization process in the 1950s. Similarly to what happened in other developing economies, it resulted from the diagnosis spread among policymakers that capital and credit markets had severe shortcomings, both in fundraising and in fund allocation. On the one hand, the volume of savings mobilized by financing channels was at a level below the requirements presented by industrialization plans. On the other hand, private agents did not seem to be willing to take high risks, earmarking their savings for industrial investments with uncertain results.

A case in point is that during the catch-up process, both credit and capital markets have played only a marginal role in ensuring long-term funds. From 1970 to 1990, for instance, the volume of primary issues of shares in the capital market did not exceed the annual threshold of 0.5% of GDP⁸, and the number of public companies did not exceed the level of 500 enterprises listed on the São Paulo Stock Exchange (Bovespa)⁹. Similarly, private banks also failed to fulfill the role of financing long-term

⁷ “A. Amsden (2001), *supra* note 2, p. 25”.

⁸ D. Monteiro Filha, *Aplicação dos Recursos Compulsórios pelo BNDES na Formação da Estrutura Setorial da Indústria - 1952-1989*, (Doctoral dissertation presented at the Institute of Economics of the Federal University of Rio de Janeiro, UFRJ, 1994), p. 46; and MB Associados, *Desafios e Oportunidades para o Mercado de Capitais Brasileiro*, Estudos para o Desenvolvimento do Mercado de Capitais, Bovespa, (2000), p. 5

⁹ About the weakness of the Brazilian stock market in this period, the study carried out by MB Associados, an economic consulting company in charge of presenting a proposal for the reorganization of the Brazilian market, in the first decade after the year 2000, states: “weaknesses in the Brazilian stock market are not recent. In the history of Brazilian capitalism, the stock market has never played a prominent role, raising funds for large and long-term capital investments. Not even after the PAEG (Governmental Economic Action Plan), which streamlining the entire institutional framework of the Brazilian financial system between 1964 and 1967, has ‘theoretically’ fostered the blossoming of the stock market in Brazil”. See MB Associados, *supra* note 8. About the number of listed companies, MB Associados, see *supra* note 8. On the Brazilian capital market in the 1970s, especially on the role of government in fostering it, see D. Trubek. *Law, Planning, and the Development of Brazilian Capital Market – a study of law in economic change*, Yale Law School, Studies in Law and Modernization n.º 3, (1971), pp. 56-77. D. Trubek, D. Trubek. *Toward a Social Theory of Law: an essay on the study of law and development*, vol. 82, Yale Law Journal, n.º. 1, (1972), pp. 40-46.

industrial investments. Instead, they specialized in short-term and low-risk financial transactions.¹⁰ In addition, a lack of coordination prevailed between the financial and industrial sectors, and there was even the question of whether the financial sector possessed the amount of capitalization required by industrial enterprise. In other words, it was far from clear if the financial resources would be directed to those sectors considered strategic to the industrialization process.¹¹

Thus, to overcome these financial and economic bottlenecks that prevented the accomplishment of *developmental* targets, Brazilian policymakers created the Brazilian version of *Amsdenian* institutional arrangements and set up several state-owned banks, which were responsible for various forms of long-term corporate financing. This was the case of BNDES, Banco Nacional de Habitação, Banco do Nordeste, Banco da Amazonia, among many other state-owned entities organized at state level and equally responsible for mitigating the pervasive financial market failures. The Bank of Brazil¹², for instance, which was created prior to this period, was assigned the task of earmarking credit to agriculture, according to the Financial Act enacted in 1964 (Law 4595/1964). The Caixa Economica Federal (Federal Savings Bank) and the Brazilian Housing Bank (BNH), in turn, were assigned the objective of financing housing developments, and BNH was also especially important in financing infrastructure projects, mainly in the area of basic sanitation.

In particular, among these state-owned banks, BNDES¹³ played a quite central role in this policy-oriented financial system during the developmental stage. It was responsible for a large part of industrial financing between the 1950s and 1980s. In that period, BNDES's intervention strictly followed the objectives of the economic planning policies. In other words, it was not only a passive source of supplemental financial resources to compensate market failures, but also a powerful financial instrument that enabled technocratic elites to be in the commanding heights of the economy¹⁴.

In order to ensure financial support for the industrial policy decisions, BNDES's allocation criteria were mostly based on a project's merits in terms of its developmental perspective.¹⁵ During each stage of the industrialization process, the financing decision favored those segments considered strategic by the industrial planning offices. Therefore, it was not by chance that the major part of its disbursement was driven either to benefit infrastructure or heavy industries; both sectors were selected by officials as industries which were strategic to the developmental program. Moreover, the accomplishment of these developmental tasks included also specific contractual rules, which were clearly favorable to the borrowing companies. Among other benefits,

¹⁰ B. Stallings and R. Studart, *Finance for Development – Latin America in Comparative Perspective* (Economic Commission for Latin America and the Caribbean – UN, Washington, 2006), pp. 244-245.

¹¹ Discussing specifically this point, regarding the specificities of the financial sector in charge of developmental finance, see Cepal, *O Desenvolvimento Recente do Sistema Financeiro da América Latina*, in Serra, J. (ed.) *América Latina – ensaios de interpretação econômica*, 2^a Ed. Rio de Janeiro, Paz e Terra, 1979.

¹² The Bank of Brazil was established in 1808, when the king moved the Portuguese royal court from Portugal to Brazil, which at the time was a colony of Portugal.

¹³ BNDES is one of the largest development banks in the world. Its level of disbursements is higher than the World Bank's. In 2010, for example, BNDES disbursed around US\$ 105 bn, whereas the World Bank disbursed around US\$ 40 bn. Information on disbursements can be found at www.bndes.gov.br.

¹⁴ M. Schapiro, *Novos Parâmetros para a Intervenção do Estado na Economia* (São Paulo: Saraiva, 2010), pp. 11-44.

¹⁵ C. Currello, *A Atuação do Sistema BNDES como Instituição Financeira de Fomento no Período 1952-1996* (Mimeo, Dissertation of Masters, presented at the Institute of Economics of University of Campinas - Unicamp, 1998), pp. 11-44.

BNDES' agreements had subsidized interest rates, which were always stipulated at a level below the inflationary rate, for instance.¹⁶ Thus, by prioritizing sectors considered relevant and by drafting favorable contractual rules to ensure the adequate financial support of those companies, BNDES enabled a large part of the Brazilian industrialization program, which was massively based on import substitution solutions.¹⁷

This type of policy-oriented financial activity was particularly clear in at least two periods of the developmental stage: (i) the financing of the Target Plan (1956-1961) and (ii) the financing of II PND (Second National Development Plan). First, between 1956 and 1961, during the first great Brazilian planning experience (Target Plan), BNDES activities were directed towards the infrastructure and metallurgy sector, with a large portion of the resources transferred to the state-owned companies responsible for this type of investment. Accordingly, not only did the Bank allocate a major part of its disbursement to the metallurgy sector (48.6%) and to the electricity sector (33.4%), but it also had an active participation in the creation of two important Brazilian metallurgy companies: Cosipa and Uniminas.¹⁸

After this first period, Brazil experienced its second great phase of economic planning – the II PND (Second National Development Plan), which took place between 1974 and 1979. At this second stage of vigorous developmental initiatives, the industrial policy reinforced industrial investments and expanded the country's national productive platform. Differently from the Target Plan, however, during the II PND, BNDES focused its financial support on private companies, which ever since have become the main beneficiaries of credit operations.¹⁹ Under the II PND, a large part of resources was directed to raw material processing, (mainly metallurgy, chemicals and fertilizers, paper and cellulose), infrastructure (with emphasis on electric power and railways) and capital goods (especially mechanical and electrical equipment).²⁰ Looking specifically at the 1970s, Peter Evans remarks on the importance of BNDES during the industrialization period:

State entrepreneurship in the financial sector is perhaps best exemplified by the National Development Bank (BNDES), which is larger than any other financial institution in the country except the Bank of Brazil. A pamphlet discussing the plight of local pharmaceutical firms in the late sixties listed half a dozen different

¹⁶ On this, see BNDES, *BNDES 50 Anos de Desenvolvimento*, available at http://www.bndes.gov.br/SiteBNDES/bndes/bndes_pt/Institucional/Publicacoes/Paginas/livro_bndes50a_nos.html. The following quotation from this book reveals this modus operandi: “The Bank detected those sectors it considered important to be developed and looked for business people who, under optimum conditions, would be willing to work in those niches. At that time, adjustment for inflation was limited to 20%. The policy followed by the Bank matched that established by the government as follows: providing subsidized interests in a way to foster development the development of economic sectors considered strategic but not duly explored.”

¹⁷ On the sector picked by BNDES, see “BNDES, *supra* note 16”; “Currello (1998), *supra* note 31, pp. 11-44”, and “Amsden (2001), *supra* note 2”, pp. 136-139.

¹⁸ See on this Amsden: “infrastructure was the first major target of postwar development banks.” “A. Amsden (2001), *supra* note 2, p. 126”. On BNDES and target plan, see also “Currello (1998), *supra* note 15, p. 11-44” and “Schapiro (2010), *supra* note 14, pp. 92-93”.

¹⁹ Until 1968, the majority of the financial operations were directed towards state-owned companies. As of 1968, private companies became the main beneficiaries of the Bank. By 1974, private companies were responsible for 66% of the disbursements and by 1978, for 87%. See “Schapiro (2010) *supra* note 14” pp. 103-111.

²⁰ “Currello (1998), *supra* note 15, pp. 31-40” and see also “Monteiro Filha (1994), *supra* note 8, pp. 97-110”.

BNDES-sponsored financial programs to which they could turn for help. Having expanded far beyond its original task of financing public investment in infrastructure, BNDES now plays a variety of roles. An increasing proportion of its loans are going to the private sector, and in this capacity it has been an important auxiliary to the tri-pé.²¹

Throughout this stage, BNDES's financial resources were provided by compulsory savings devices, established through governmental taxes, in order to ensure the necessary funding for the Bank's financial operations. The first source of BNDES's funding was the Economic Modernization Fund, whose resources came from an additional rate levied on the income tax (Law 1628/1952). In subsequent years, the Bank was always funded by governmental provisions such as some federal funds constituted of budgetary resources, or specific taxes, as is the case with PIS and PASEP (federal taxes). Even in a more recent period, public resources have still assisted BNDES; according to the Brazilian Constitution enacted in 1988, 40% of the Workers Aid Fund (FAT), which is formed of social security contributions, must be managed by BNDES. Although currently the main source of funding comes from the repayment of former disbursements, this governmental support enabled BNDES' operation for a long period. Chart 1 below synthesizes some of these sources of funding and the main destinations of the funds.²²

Chart 1 Origin and destination of BNDES' funds (years selected)		
	Main sources of funding	Main destination of resources
1952-1956 (foundation)	<ul style="list-style-type: none"> • Additional income tax levied 	<ul style="list-style-type: none"> • Infrastructure sectors: electricity and railways
1956-1960 (Target Plan)	<ul style="list-style-type: none"> • Additional income tax levied; • Generation of bank-derived funds; • Administration of federal funds 	<ul style="list-style-type: none"> • Power and steel industry
1974-1979 (II PND - Brazilian Development Plan; end of the developmental stage)	<ul style="list-style-type: none"> • Tax contributions of social security (PIS/PASEP); • Internal generation of funds 	<ul style="list-style-type: none"> • Basic inputs and capital goods
Prepared by the author, based on Currello (1998) ²³		

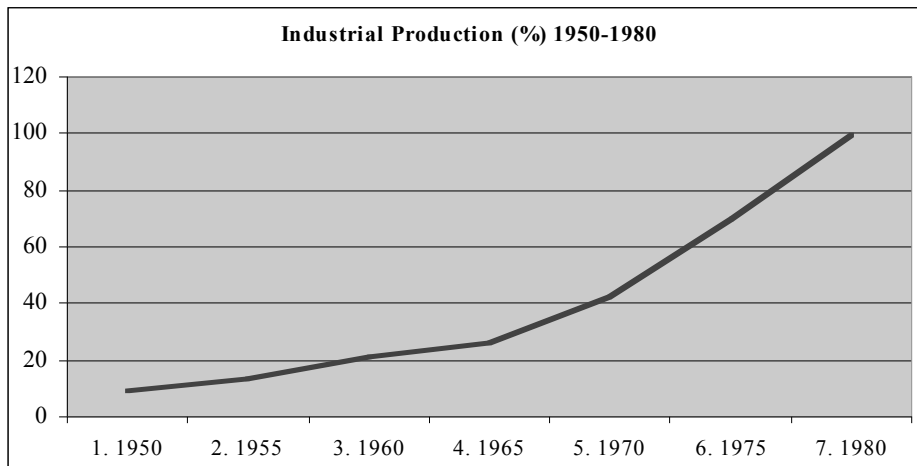
As a balance of this period, it can be concluded that between 1950 and 1980 Brazilian policymakers were successful in setting up an alternative institutional matrix. In tandem with other late-comers, the Brazilian economy was able to build a developmental state and to pursue a successful developmental strategy. As a result, in less than 30 years, it became a recognized and diversified industrial country, from the infrastructure sector to heavy industry and the consumer goods segment. As is shown in Graph 1 below, during these three decades the participation of industrial production in the Brazilian GDP increased considerably, going from 8.9% in 1950 to 99.6%, in 1980. Thus, until the late 1970s the developmental engine worked properly and the first step of developmental catch-up had been adequately completed. Based on state activism and, especially, on the action of BNDES, Brazil became an industrial economy and also

²¹ Evans (1979), *supra* note 3", p. 262. The tri-pé mentioned by Evans refers to the Brazilian model of development, which was based on a triple alliance among multinationals, state and local capital. Evans stresses that BNDES was particularly important to strengthening local capital.

²² On this, see C. Lafer, *JK e o Programa de Metas - processo de planejamento e sistema político no Brasil (1956-1961)*, (transl. Maria Victoria Benevides, Rio de Janeiro, FGV, 2002).

²³ "Currello (1998), *supra* note 14, pp. 11-24".

a predominantly urban country. From the 1980s onwards, however, the continuation of this arrangement faced significant challenges, as will be depicted in the next sections.



Graph 1
Source: IBGE²⁴

II. Crisis of the Developmental State and Innovation Era: Brazil Falling Behind and Attempting to React

The first section summarized the heyday of the developmental period. During this stage, a large number of the “rest”²⁵ were able to move ahead, industrializing their economies in a vigorous process of catching up. Nevertheless, this developmental strategy was partially revised after the 1970s, and it ended in the late 1980s.²⁶ Thus, from that moment onwards, the alternative mechanisms that had guided the industrialization process of the “rest”²⁷ were redrafted in distinct ways, giving different results.

On the one hand, Asian countries were able to adapt their coordination mechanisms and started to write a new chapter in the developmental history. The new Asian strategy, begun in the early 1980s and intensified in the 1990s, led to sophisticated public policies, whose focus was the spurring of industrial innovation and intangible assets into foreign markets. On the other hand, in this same period, Latin American countries experienced a long *stop and go* process, vacillating on building a new developmental arrangement, compatible with the new economy.²⁸

As a consequence of this different developmental path, while Asian economies have become increasingly “makers”²⁹ of their own technological leaps, Brazil and its Latin American neighbors have become nearly perpetual “buyers”³⁰ of innovations

²⁴ Apud “Suzigan and A. Villela (1997), *supra* note 4” p. 197.

²⁵ The idea of rest as group of late comers that undertook a successful process of economic catch up is presented by “Amsden (2001), *supra* note 2”.

²⁶ On the economic crisis of the State in Brazil, see L. Bresser-Pereira, *Crise Econômica e Reforma do Estado no Brasil* (São Paulo, Editora 34, 1996), pp. 29-40.

²⁷ “Amsden (2001), *supra* note 2”.

²⁸ OECD discusses the notion of new economy as a concept which describes the contemporary economy, see OECD, *A New Economy? – the changing role of innovation and information technology in growth*, Paris, 2000).

²⁹ “Amsden (2001), *supra* note 2”, pp. 277-281

³⁰ “Amsden (2001), *supra* note 2”, pp. 277-281

from others. This division of the former relatively homogeneous group of countries which were catching up not only represented a different strategy of development, but also provoked important effects in terms of growth and social equality. Indeed, South Korea and Brazil, which had a parallel economic performance between 1950 and 1980, obtained sharply contrasting results between 1980 and 2000.³¹ This is not by chance: since the last quarter of the twentieth century, several reports and academic diagnoses have been indicating the consolidation of a new economy³², which is based on knowledge and deeply associated with innovation and technological skills. Therefore, for these economies, at that moment, the choice of being a “buyer” or a “maker” was not a trivial or a neutral one. Much to the contrary, it was associated with a completely different trajectory of social and economic development.

Bearing the Brazilian panorama in mind, the choice (or the contingency) of being a “buyer”, when compared to the Asian Tigers, was associated with some negative results such as less competitiveness in the international arena, more dependency on foreign know-how and economic specialization in primary products and commodities. To mitigate these effects which still prevail in the economy, Brazilian policymakers have been creating a set of policies aimed at rebuilding the State’s capacity, making it more robust to deal with the challenges imposed by the new economy. These efforts have begun slowly in the 1990s, and they have been implemented more vigorously since the year 2000. This section will depict both moments: (i) first, the loss of institutional capacity which stemmed from the disorganization of the developmental arrangement in the 1980s and early 1990s; (ii) second, the attempt to recover institutional capacity to foster new rounds of development.

A. Developmental Crisis and the Brazilian Economy Falling Behind

By the late 1970s, the prognosis of policymakers and scholars had already drawn attention to the limits of developmental strategy.³³ Although the import substitution was thought to be successful within the industrializing context, the domestic production sector was already characterized by the low level of technological skills and by the lack of capacity for innovation. According to Suzigan and Villela, the country had been able to acquire an ample and diversified industrial matrix, but it had considerable problems in terms of efficiency and competitiveness:

It was necessary to change not only to correct these problems, but also because there was awareness that the country had reached the zenith of a historical development process (which many erroneously described simply as import substitution). Once an ample and diversified industrial basis had been built, it was necessary to make it efficient and competitive. It was also necessary to incorporate sectors and industries representing new technologies, particularly informatics and telecommunications, and develop innovation ability, a crucial element in competition.³⁴

³¹ L. Coutinho. *Coréia do Sul e Brasil – paralelos, sucessos e desastres*, in Fiori, J. L. (coord) *Estados e Moedas no Desenvolvimento das Nações* (Petrópolis, Vozes, 1999), pp – 351-378.

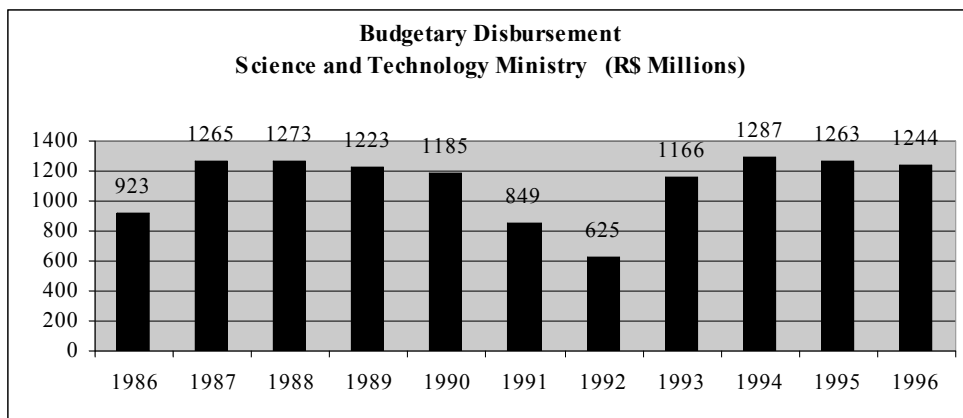
³² “OECD (2010), *supra* note 28”; M. Piore & C. Sabel, *The Second Industrial Divide – possibilities for prosperity* (New York: Basic Books, 1984), pp. 165-193; D. Harvey. *A Condição Pós-Moderna – uma pesquisa sobre as origens da mudança cultural* (transl. Adail Ubirajara Sobral & Maria Stela Gonçalves, São Paulo: Loyola, 1989), pp. 135-162; and B. Jessop (Cambridge: Polity Press, 2005), pp. 55-94.

³³ See on this “Suzigan & Villela (1997), *supra* note 4”, pp. 31-44.

³⁴ Suzigan & Villela (1997), *supra* note 4”, p. 43.

Nevertheless, this prognosis did not materialize into an effective implementation of different industrial policies. Unlike the previous period, policymakers were not able to build an institutional apparatus capable of spurring a new pattern of industrial specialization, one based on innovation and value-added products. Instead, a large part of the developmental state was demolished, while the reshaping efforts were conducted very slowly throughout the 1980s and the 1990s. As a result, during the two decades that followed the developmental disarrangement, Brazil, and its neighbors as well, faced considerable obstacles that prevented the maintenance of their formerly upward trajectory.

In this period, the Brazilian economy was struck by a severe economic crisis, which had two complementary features: (i) the high inflation and (ii) the fiscal crisis. The hyperinflation, which reached the incredible rate of eighty percent per month in the late 1980s, provoked serious macroeconomic imbalances. Among others, due to the lack of macroeconomic predictability, it hindered both the real implementation of long-term policies, on the governmental side, and the adoption of strategies based on innovation and risky bets, on the private side. The fiscal crisis of the State, in turn, brought drastic budgetary constraints, preventing the broad functioning of industrial policies drafted at that moment. The graph below provides a good representation of the problems faced between the 1980s and 1990s, particularly in scientific and technological fields. The data shows that between 1986 and 1996 the disbursement of the Science and Technological Ministry remained practically constant.



Graph 2. Source: MCT

Beyond macroeconomic imbalances and budgetary limitations, part of this period was also characterized by another adjustment in terms of political economy. In the 1990s, the ideas of state-centered development, industrial policies and national growth strategy that had prevailed in the heyday of the developmental model were partially replaced by another type of agenda. Following in some sense the concepts and strategies brought by the Washington Consensus, Brazilian policymakers prioritized policies with a market-oriented bias, such as the openness of international trade and the privatization of state-owned companies. Particularly, this liberal direction was strengthened when the Government refused officially to adopt a comprehensive new industrial policy. At that time, the former Brazilian Minister of Finance, Pedro Malan,

said that “the best industrial policy is not having an industrial policy”,³⁵ suggesting that competition in the private market would be the best way of achieving those results pursued for long time, such as competitiveness and efficiency.

By contrast, the paths followed by some Asian countries during the same period took another route. Unlike Brazil and other Latin American countries, the Asian nations gave rise to a new developmental phase, reshaping the toolbox of economic instruments and driving efforts to improve their innovative capacity. This was the case with South Korea, for example, which was previously known as an imitator of foreign technology, but was able to leverage the domestic standard of competitiveness and industrial capacity. Compared with some Latin American economies, the results achieved by countries like South Korea are particularly remarkable. As will be shown in Chart 2 below, there is an impressive difference between these two groups of countries in terms of patent requests at the United States Patent Office.

These achievements can be partially attributed to the conception and effective implementation of a unique set of industrial policies, which began to focus on bolstering the amount of resources (public and private) employed in R&D activities, in the early 1980s. Part of this new direction of the industrial policies included increased R&D tax incentives and lower import tariffs for equipment related to R&D. Other changes also included the exclusion of R&D credits when calculating corporate tax exemption and the granting of more loans towards technological developments.³⁶ This was also the time of the enactment of the Venture Capital Law, which provides the legal basis for establishing risk ventures. It is quite impressive that already in the first period after its enactment, the Venture Capital Law contributed to the creation of over fifty new venture capital firms.³⁷ Finally, these measures were complemented by the Corporate R&D Incentive Law, issued in 1993, whose purpose was regulating and encouraging the establishment of cooperative partnerships for technological development, with universities and research institutes³⁸. According to Lee³⁹, these initiatives contributed to the increase in interest in innovation, not only in the public sector, but also in private companies. It is remarkable that since 2001, the Korean private sector has accounted for the majority of the investments directed at innovation. Thus, in the last two decades of the twentieth century, South Korea was capable of changing its institutional apparatus in order to keep the former pace of growth and development.

At the same time, however, the initiatives of State rebuilding in Brazil did not prosper, at least not as rapidly and profoundly as the Asian ones. Between 1980 and 1990, there were some attempts to reshape the institutional apparatus, but with few

³⁵ This quotation can be found at M. Campanario, & M. Silva. *Fundamentos de uma Nova Política Industrial*, in Fleury, M. & Fleury, A. (Ed.). *Política Industrial I* (São Paulo: PubliFolha/FEA-USP, 2004), p. 21.

³⁶ W. Y. Lee, “O Papel da Política Científica e Tecnológica no Desenvolvimento Industrial da Coréia do Sul”, in Kim, L. and Nelson, R. *Tecnologia, Aprendizado e Inovação – as experiências das economias de industrialização recente* (transl. Carlos Szlak) (Campinas: Unicamp, 2005), pp. 365-393.

³⁷ M. Schapiro, *Política Industrial e Disciplina da Concorrência pós-Reformas de Mercado: uma avaliação institucional do ambiente de inovação tecnológica* (Master Dissertation, presented at USP Law School, 2005), pp. 194-203.

³⁸ W. Y. Lee (2005), *supra* note 36.

³⁹ For further information on the Korean transition, see W. Y. Lee (2005), *supra* note 36. Moreover, see also Chang, who describes the working of the Industrial Development Law, which is the Korean Law of Industrial Policy adopted in 1986. According to Chang, the Industrial Development Law, among others, provided measures to encourage productivity, such as subsidies for R&D and joint-venture initiatives made between private companies and government funds. H. Chang. *The Political Economy of Industrial Policy* (New York: St. Martin’s Press, 1994), pp. 113-117.

exceptions these actions lacked effectiveness. Formally, one can recognize the adoption of several new measures related to the construction of a new inductive State, able to foster innovation and competitiveness in private companies. This is the case with, among others, the conception of III PBDCT (third basic plan for scientific and technological development),⁴⁰ in the early 1980s, the creation of Science and Technology Ministry, in 1985 and the adoption of the so called *New Industrial Policy* focused on competitiveness and technological improvements, in 1988.⁴¹ However, many of these policies were not consistently implemented. The III PBDCT suffered from several budgetary restrictions which prevented its real implementation. To a great degree, similar difficulties happened also with other instruments designed by the then newly created Ministry and with the industrial policy as well.⁴²

Not by chance, an analysis of the Brazilian industrial pattern during the 1980s and 1990s shows a panorama characterized by a reduced capacity to innovate and less technological competence. Two sets of data confirm this observation: a study of competitiveness conducted in the early 1990s, with few enterprises, and a more comprehensive survey that has been carried out since the late 1990s.

In 1992, the ECIB (Study on Competitiveness in Brazilian Industry), conducted by the Economics Institute of the University of Campinas (Unicamp), involved a sample of 495 companies and showed the technological fragility of the production sector. According to the ECIB, 54% of these companies made no investment in R&D in 1992. The study reveals also that 25% of the companies in this group invested less than 1% in R&D, while 9% of firms invested between 1% and 2%. According to the survey, 3% of companies invested between 2% and 3% in R&D and only 9% invested more than 3% in R&D.

Ten years later, another study, the PINTEC (Industrial and Technological Research), coordinated by IBGE (Brazilian Institute of Geography and Statistics) was conducted using a larger sample and confirmed some findings of the ECIB: Brazilian industries have a low innovation capacity. During the first biennium of the research, between 1998 and 2000, within a universe of 72,005 companies surveyed (companies with more than 10 employees), 22,698 presented some sort of innovation (in products or processes), representing 31.5% of Brazilian companies. In the second biennium, between 2001 and 2003, this percentage registered a positive variation and reached 33.2% of the companies, increasing once again in the third PINTEC, between 2003 and 2005, when 38.9% of the companies presented some sort of innovation. These numbers reveal the incidence of new products and processes in the companies, but not for the market. Taking the market as a reference and observing the introduction of new products (excluding innovations of process), the data is more timid: 4.1% of the companies presented a new innovation for the market, between 1998 and 2000, while only 2.7% of the companies produced a new market product between 2001 and 2003, and 4% of the firms introduced an innovative product for 2003-2005.

Another possible way of verifying this competitive gap is by examining the number of Brazilian patents requested at the United States Patent and Trademark Office (USPTO). In 1980, South Korea registered 33 requests for patents and Brazil registered 53. By 1990, Brazil increased its number to 88, while South Korea jumped to 775. In 2000, Korea boasted 5,705 patent requests, while Brazil had only 220. This gap

⁴⁰ On the scientific and technologic Brazilian trajectory, see G. Arbix & M. Mendonça. "Inovação e Competitividade – uma agenda para o futuro", in Castro, A. et al. (orgs) *Brasil em Desenvolvimento I – economia, tecnologia e competitividade* (Rio de Janeiro: Civilização Brasileira, 2005), pp. 250-255.

⁴¹ Suzigan & Villela (1997), *supra* note 4", pp. 71-78

⁴² On this, see Schapiro (2005), *supra* note 37, pp. 139-159

continued to widen between 2000 and 2009. Particularly remarkable is a broader comparison provided by the chart below between Asian and Latin American countries. While South Korea, China, and Singapore have had outstanding results, Mexico, Argentina, and Chile have presented a stagnated trajectory.

Chart 2				
Requests for patents by independent inventors at the United States Patent and Trademark office – sample countries 1980/1990/2000/2009				
	1980	1990	2000	2009
South Korea	33	775	5,705	23,950
China	7	111	469	6,879
Singapore	6	36	632	1,225
Brazil	53	88	220	464
México	77	76	190	220
Argentina	56	56	137	146
Chile	8	13	24	66

Source: Brazilian Ministry of Science and Technology and USPTO

From the point of view of Brazilian participation in foreign trade, studies agree on a similar diagnosis, showing that the country exports primarily commodities, not technology-intensive products. The global average data gathered by the IPEA (Institute for Applied Economic Research- IPEA) suggest that Brazil exported a greater amount of commodities and a lower number of technology-intensive products.⁴³ Therefore, if the technological ability of the Brazilian industry was already problematic during the import substitution period, the consolidation of the technological paradigm during the 1980s and 1990s widened this gap even more.

B. Brazilian Attempt to React: Innovation-Based Strategies and Innovation-Oriented Policies

In spite of this unfavorable landscape, in the 1990s and even more since the year 2000, the interest in strategies based on innovation has been increasing. As this section will depict, in the last decades the Brazilian economic environment has attempted to undertake a reaction to that negative scenario, although much more slowly and notably later in comparison to its Asian competitors. Both for policymakers and for a few private companies, innovation has been gaining greater relevance, which might be associated with some positive indicators, such as: (i) the growing volume of investment in R&D in more recent years and (ii) the type of patents requested by Brazilian companies at the governmental office of patents. This section will outline these still beginning efforts and timid data that suggest a possible developmental reaction.

On the demand side of this market for bolstering innovation, some private companies have begun to broaden their corporate strategies, expanding the amount of resources directed to R&D, innovation and intangible assets. A diagnosis by Arbix⁴⁴ shows that in the last 20 years, a new business segment has formed in the Brazilian

⁴³ J. De Negri, M. Salerno, and A. Castro. “Inovações, Padrões Tecnológicos e Desempenho das Firms Industriais Brasileiras”, in De Negri, J, Salerno, M. (Eds.) *Inovações, Padrões Tecnológicos e Desempenho das Firms Industriais Brasileiras* (Brasília: IPEA, 2005) p. 18.

⁴⁴ G. Arbix, *Inovar ou Inovar: a indústria brasileira entre o passado e o futuro* (São Paulo: Papagaio, 2007), pp. 105-142.

economy. While the majority of the Brazilian companies still restrain from betting on innovation as a competitive strategy, there is a select group of companies situated in the vanguard of the production process. According to Arbix⁴⁵, this select group of companies and entrepreneurs, forged by the country's institutional redesign during the 1990s, has presented a distinct behavior in relation to the rest of the Brazilian productive segment, such as: (i) it adopts new competitive strategies; (ii) it presents organizational and structural changes within its companies; (iii) it observes international norms and competitive patterns; (iv) it bets on innovation and (v) it presents an internationalization effort.

In the same fashion, a study conducted by De Negri, Salerno, and, Castro⁴⁶ reached similar conclusions. They divided the Brazilian companies into three groups and classified them according to types of competitive strategy. The research dealt with 72,000 Brazilian companies and divided them into the following three groups: (i) companies that innovate and differentiate products; (ii) companies that specialize in standard products and (iii) companies that do not differentiate and have lower productivity.⁴⁷ The results indicate that 1,199 companies presented strategies based on innovation and product differentiation, and are also capable of obtaining good placing for their exports. The second group, formed by companies that focus on standard products, has 15,311 companies and the third group has 55,495. The surprising information is that although the companies from the first group represent just 1.7% of the entire industrial sector, they account for 25.9% of the Brazilian industrial revenue. Thus, this typological analysis by De Negri, Salerno, and, Castro indicates the dimensions of Brazil's new economy: it is still a restricted segment, but it is economically relevant.

Competitive Strategy	Number of Companies	Revenue Participation (%)	Employment Participation (%)
Innovate and differentiate products	1,199 (1.9%)	25.9	13.2
Specialize in standard products	15,311 (21.3%)	62.6	48.7
Do not differentiate and have lower productivity	55,495 (77.1%)	11.5	38.2
Total	72,005	100	100

Source: De Negri, Salerno & Castro

A possible explanation for this private interest (despite being still small) in innovation might have to do with two facts which occurred in the 1990s. Firstly, due to the liberalization trend of the 1980s and 1990s⁴⁸, the market barriers were severely

⁴⁵ "Arbix (2007), *supra* note 44", pp. 105-142.

⁴⁶ J. De Negri, M. Salerno, A. Castro, "Inovações, Padrões Tecnológicos e Desempenho das Firms Industriais Brasileiras", in J. De Negri, M. Salerno (eds.), *Inovações, Padrões Tecnológicos e Desempenho das Firms Industriais Brasileiras* (Brasília: IPEA, 2005), pp. 5-44.

⁴⁷ The companies from the first group are those that presented innovation for the market and increased exports by 30% compared to companies that produce similar products. The companies in the second group have strategies based on costs. They are either export companies that did not obtain a 30% gain or non-export companies that presented operational efficiency superior to export companies in the same product category. Finally, the last group is of smaller and less competitive companies. "De Negri, Salerno, Castro (2005), *supra* note 46, pp. 5-44".

⁴⁸ "Amsden (2001), *supra* note 2, pp. 255-271

mitigated: during a period of two years between 1990 and 1992, the Brazilian import tariff was reduced by around fifty percent and non-tariff trade controls were clearly disarranged.⁴⁹ Consequently, Brazilian companies have been more exposed to international competition, which has been increasingly based on knowledge and innovation.⁵⁰ It is true as well that this abrupt openness has also produced negative consequences for several industrial sectors, in not allowing for a large group of companies with a more planned and strategic adjustment to the international competition. Even so, as occurs with policies in general, a group has come out ahead and has, for many reasons, benefited of this openness.

Secondly, due to privatization, the interest in innovation capacity shifted in some economic sectors from former state-owned companies to private enterprises. Until the privatization process, state-owned companies conducted most of the entrepreneurial innovation, and currently Petrobras, which remained a state-owned company, is one the most innovative Brazilian companies.⁵¹ Therefore, excluding the oil sector, the entrepreneurial center for innovations has become the private side of the economy. Despite being far from clear whether and to what extent Brazilian companies will be able to change the pattern of industrial specialization, which is still concentrated on commodities, there is undeniably a select group of innovative companies inside the business environment. As Arbix⁵² stresses, it represents a new set of entrepreneurs, willing to participate in a market economy with a different competitive pattern, one which involves innovation capacity, and a keenness to compete at international levels.

On the supply side, timidly in the 1990s and more firmly since the first decade after the year 2000, the Brazilian government has been implementing new measures and using new tools directed at fostering innovation and technological capacity. Still in the beginning of 1990, policymakers designed the industrial and international trade policy – PICE, which was partially implemented in the period from 1991 to 1993.⁵³ The focus of PICE was the improvement of industrial competitiveness, and to achieve this, the policy had three main types of measures: (i) the PCI – program for industrial competitiveness; (ii) the PACTI – program to support industrial technological training (iii) the PBQP – Brazilian program for quality and productivity. The implementation of these programs faced an unfavorable macroeconomic scenario of markedly high inflation and turbulence in the political environment.⁵⁴ Of the three programs, only the PBQP, which was directed at strengthening the process of certification, such as ISO measures, was successful. The implementation of PCI stagnated, and the Law of PACTI (Law 8.661 of 1993), which defined tax reductions to R&D, was only enacted in 1993 and began to be enforced in 1994. Even so, complex bureaucratic controls

⁴⁹ “Suzigan & Villela (1997), *supra* note 4, pp. 89-90.

⁵⁰ OECD (2010), *supra* note 28.

⁵¹ The technological growth experienced by these state-owned companies is far from negligible, as it was within this segment that the country acquired technological competence to compete commercially in frontier areas such as aircraft construction (Embraer), deep water oil prospection (Petrobrás) and the development of seeds and agrochemicals (Embrapa). On the role of state-owned companies’ research centers, see F. Erber. “Os centros de pesquisa das empresas estatais: um estudo de três casos”, in S. Schwartzman (Ed.), *Ciência e Tecnologia no Brasil: política industrial, mercado de trabalho e instituições de apoio* (1 ed. Rio de Janeiro: FGV, 1995).

⁵² “Arbix (2007), *supra* note 44, pp. 105-142”.

⁵³ On PICE, see F. Erber and J. Cassiolato, “Política Industrial – teoria e prática no Brasil e na OCDE”, in *Revista de Economia Política*, vol 17, n.º 2 (66), abril-junho, 1997, pp – 32-60. See also Suzigan & Villela (1997) *supra* note 4”, pp - 81-102

⁵⁴ In 1992, Fernando Collor de Mello, former president of Brazil suffered an impeachment, after a severe crisis of corruption.

hindered an extensive utilization of these benefits, and the program reached only 267 companies.⁵⁵

In 1999, after a period of no official industrial policy, the Science and Technologic Ministry set up 16 sector funds driven to support research and development activities in some strategic areas such as oil and gas, telecommunications, biotechnology and agribusiness. Until then, the most resources for science, research and development came from FNDCT (National Fund for the Development of Science and Technology), which had severe budgetary constraints in the 1980s and 1990s, as was shown above. Differently from the FNDCT, whose resources are provided by budgetary sources without distinction as to the source, the sector funds are supported by new specific taxes levied on the corresponding sectors in which the resources must be allocated. Thus, the establishment of the sector funds ensured a more stable budgetary source to finance activities of R&D.

These instruments, however, also have some limits. According to Brazilian law, the public budget has not a mandatory character, it only prescribes the limit for the public expense. Thus, the government is able to control the use of resources, preventing their full allocation in order to produce public saving, among other reasons. In the case of these funds, in particular, from 1999 to 2007, there was always a mismatch between the volume of resources collected and the amount of resources effectively disbursed.⁵⁶ A good example of this mismatch can be traced back to 2007, when the amount of disbursement reached a historical peak, and it represented only 37% of the total collected.⁵⁷ Even so, the sector funds have been an important budgetary instrument, as they have provided more financial stability to R&D activities.

Since then, from 2004 onwards, the Brazilian government has once again been implementing a clear and well defined industrial policy, to a great extent broadening those initiatives previously implemented in the last decades. Since then, two complementary sets of industrial policies have been put into place: the PITCE (industrial, technological and international trade policy) in 2004, and the PDP (productive development policy), in 2008. Both have focused on innovation and industrial competitiveness and also assumed global competition as an indisputable fact. To a great extent, therefore, neither PITCE nor PDP have been directed at making State agencies into commanding heights of the economy, giving to the State the power to control the private strategies, but have been seen as tools designed to improve industrial efficiency in a more horizontal way.

The PITCE, in particular, implemented between 2004 and 2008, had a selective and restrictive focus and a clear drive to innovation. Although this industrial policy had instruments designed for all sectors, it also selected some strategic markets, understood as relevant to the Brazilian economy, and represented future promises for international patterns of competition. They were: (i) capital goods; (ii) medicine; (iii) semiconductors; (iv) software; (v) biotechnology, and (vi) nanotechnology.

On this occasion, as a consequence of the PITCE, three federal laws were enacted in order to institutionalize and promote the Brazilian national system of innovation.

⁵⁵ To have access to this tax benefit, entrepreneurs had to obtain a governmental authorization, which in many cases took long to be granted. As besides this, the government faced a serious fiscal crisis, some concessions were even more postponed. On the programs created by Law 8.661, see M. Schapiro (1995) *supra* note 37", pp. 174-177. See also M. Almeida, "A CF/88 e as Políticas de Incentivo à CT&I Brasileiras", in Cardoso Jr. José Celso. *A Constituição Brasileira de 1988 Revisitada: recuperação histórica e desafios atuais das políticas públicas nas áreas econômica e social* (Brasília: IPEA, 2009), pp. 224-225.

⁵⁶ On the sectional funds, see "Almeida (2009) *supra* note 55", pp. 228-229.

⁵⁷ On the sectional funds, see "Almeida (2009) *supra* note 55", pp. 228-229.

The first one was Law 10.973/04, the so called Innovation Law, which prescribes mechanisms to foster innovation, and in particular, rules to facilitate partnerships between governments, companies and technological institutions. The second Law, 11.080/04, authorized the creation of the Brazilian Agency for Industrial Development (ABDI), a federal agency in charge of industrial policy coordination. Finally, Law 11.196/05 instituted different tax regimes and suspended the payment of a few taxes (PIS and COFINS) by information technology, software and capital goods businesses, as long as they complied with import or export performance targets.

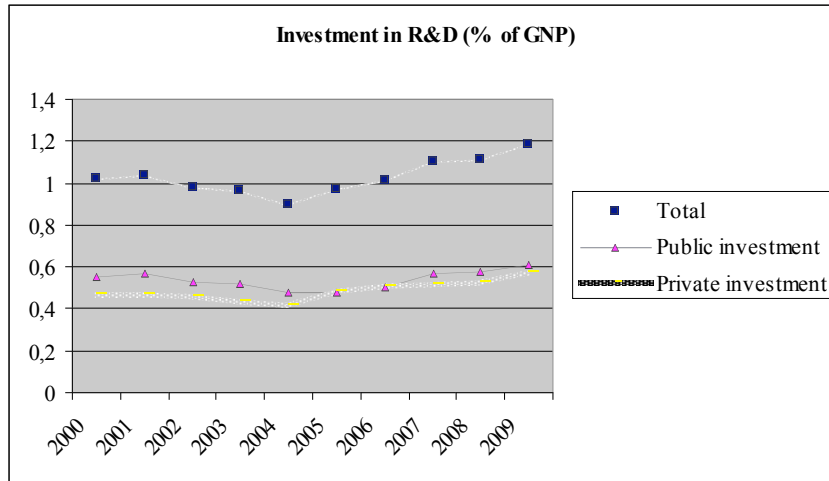
Therefore, besides the traditional directing of resources to companies, which continued to be done by state agencies like BNDES and FINEP⁵⁸, one important branch of PITCE, was the establishment of an institutional framework for the national innovation system. Although there might be problems in the enforcement of these laws, as is typically the case with the Innovation Law, whose model of partnership is not clear, creating obstacles to its widespread employment, the institutionalization of this framework is in itself important. It reiterates and deepens the pace started with the sector funds in 1999, ensuring more stability for innovation strategies and also making the innovation policy more predictable and institutionally embedded. Moving ahead with this trend, in 2008, PITCE was extended and a new industrial policy was designed, called the Productive Development Policy (PDP), which also contemplated measures to stimulate research and development strategies. As will be described in detail below, one of the important achievements of PITCE and PDP has taken place at BNDES, which has extended its program directed at innovation financing since 2004.

As a balance, these instruments seem to have been bringing positive results, despite being restricted and still constrained by macroeconomic⁵⁹ and also institutional problems. Some indicators, presented in graphs 2 and 3 below, show a slight difference in terms of the Brazilian capacity for innovation. First, Graph 2 demonstrates that the amount of resources invested in R&D has increased since 2004. Second, Graph 3 not only indicates a steady increase in the patents requested by Brazilian companies at the Brazilian patent office (INPI), but also shows that there has been a change in the type of patent most frequently requested. The patent for new inventions (new products and processes) has surpassed the volume of patent requests for the utility model (new functional uses for products)⁶⁰ – which may be a sign of a more innovative effort by Brazilian companies.

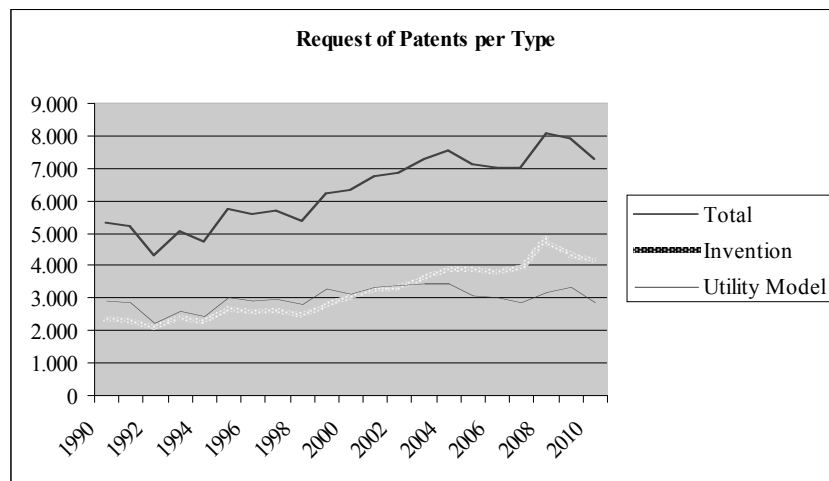
⁵⁸ FINEP is a state-owned enterprise devoted to financing scientific and technologic projects conducted by both universities and companies.

⁵⁹ Problems of exchange rate and high taxes can slow the speed of investment in innovation.

⁶⁰ The Brazilian Patent Law (Law 9279/96) prescribes two different types of patents: (i) inventions and (ii) utility models. As the first is supposed to support more innovative efforts, it has longer protection – 20 years, while utility models are protected for 15 years.



Graph 3. Source: MCT



Graph 4. Source: MCT

Thus, after the pace of development having slowed considerably, Brazil has made some effort to recover its former vitality. In the *new economy*, however, this attempt depends even more on a set of knowledge-based assets and innovative strategies, which make the challenges of development potentially harder, as compared to those one faced during the import substitution strategy. At that time, as explained by Amsden,⁶¹ all catch-up countries took advantage, in some way, of available foreign technology. Yet to the extent that innovation, intangible assets, and high technology have had ever increasing importance in the capitalist economies, the mere ability to acquire external know-how and to produce nationally goods which formerly were imported are not enough anymore. The successful trajectory of Asians and the ruinous path followed by Latin Americans are evidence of that.

There is, however, a parallel between the challenges faced in the beginning of both periods: once again a widening gap between the national economies has been prevailing and once again the developmental state is supposed to play an important role in leveraging the backward countries. Although under new constraints and sharing a

⁶¹ “Amsden (2001) *supra* note 2, pp. 238-245.

different institutional arrangement, developmental tools, if reshaped, might play an important role in the new round of the process of catching up. This is the case of development banks, among others, which had an important position during the developmental period and may have a quite central contribution in the current phase. In particular, the next section will describe the case of BNDES, which, since the 1990s, has been experiencing a process of institutional learning that resulted in new tools suitable to finance intangible assets and innovative enterprises. Nevertheless, in the same fashion as the general set of Brazilian efforts towards innovation, this remolding has still been an incomplete journey and innovation financing represents up to now only a tiny fraction of BNDES's disbursement.

IV. New Developmental State, Innovation Policy and New Development Bank? The Role of BNDES in Financing Innovation

The last section pointed out that after the developmental phase, developing countries began to be challenged by another pattern of economic competition, in which carrying out proprietary innovations or acquiring them from others makes a difference in terms of growth and economic results. Even though this diagnosis is almost a common ground among policymakers, changing the national pathway in order to become a “maker” instead of a “buyer” of innovation, it is far from being a trivial task. Strictly from the financial perspective, it requires a greater involvement of state-owned banks, which could be in charge of providing resources for this new stage. Yet the assignment of this task also encounters barriers that can prevent a full supply of funding from this financial channel.

Firstly, innovation is a type of investment that poses unique characteristics, which make it a risky bet in the best scenario, or even an uncertain question, in the worst panorama. As stressed by Freeman and Soete,⁶² an innovative project can be frustrated for both technical and economic reasons. In the first case, even after having spent a considerable amount of resources in R&D, a private company can simply not be able to achieve a product which is technically suitable. In the second case, although the investment in R&D might have fulfilled a compatible prototype, it can simply get stuck in the market. In the face of these possibilities, investors can individually assume a risk-averse behavior, which can result in a collective problem of underfinancing. This problem is particularly relevant in developing countries, inasmuch as their financial systems are still fraught with pervasive market failures and institutional weakness. As a consequence, an important part of this *attempt to react* is the role played by developmental agencies, especially by development banks. Therefore, after having financed the first round of the catching-up process, these banks might play an important role in financing the new strategic assets.

Secondly, however, this institutional reshaping of development banks might be a long-term process. Normally, policymakers do not reframe institutions in a vacuum.⁶³ Incumbent interest groups, values and ideologies, galvanized in prior institutional layers, have resistance to the whole transformation of the current arrangement. In other words, although the speeding up of investment in innovation may be in the interest of

⁶² C. Freeman & L. Soete. *The Economics of Industrial Innovation* (3rded., Massachusetts: MIT Press, 1999). pp. 197-226

⁶³ M. Trebilcock and M. Prado "Path Dependence, Development and the Dynamics of Institutional Reforms", *University of Toronto Law Journal* 59 (3), 2009.

the whole economy, converting a former development bank which specializes in financing large companies and physical assets into a development bank oriented toward innovation, can be blocked or postponed by vested interests, among other elements.

This is typically what has been taking place in the Brazilian case. On the one hand, BNDES has been experiencing a process of institutional learning during the last decades, through which the Bank has been acquiring the legal capacity to finance innovative companies. To face the problems of uncertainty and minimize the lack of predictability prevailing in some investee companies, BNDES has customized its legal tools in order to make them capable of combining flexibility with stability. As a result, BNDES has set up a toolbox of four legal instruments, which comprehend not only direct contracts adjusted between the Bank and companies but also the Bank's participation in private funds of venture capital. On the other hand, even though BNDES has learned what must be done and how in this sector, innovation financing represents only a small fraction of its disbursement. Among other reasons, path dependence factors and the small size of the Brazilian innovation market can help to explain this apparent mismatch between the institutional learning and the institutional practice.

To explore these features in depth, this section is divided into four major topics. Firstly, the institutional trajectory undertaken by BNDES during the 1990s and mainly from 2004 onwards, which resulted in new instruments and strategies for innovation financing, is outlined. Secondly, particular attention is dedicated to the legal tools that are currently employed to support these financial investments. Thirdly, a political economy argument to interpret this institutional adjustment between the state-owned bank and the private players is provided. Finally, the fourth topic discusses the limits of this innovative agenda, wondering whether and to what extent this small fraction of disbursement will become the prevailing mission of the Brazilian development bank.

A. BNDES' Institutional Trajectory Toward Innovation

Bearing in mind the Brazilian case, one can note that even after the institutional reforms that took place in the 1990s and in the first years after 2000, aimed at expanding the private financial sector⁶⁴ by both opening the banking sector to foreigners competitors and strengthening capital market through a new institutional apparatus, a significant part of the higher risk investments still depends on state-owned

⁶⁴ These reforms basically included the privatization of 18 public state banks, between 1995 and 2003, when the national banking system became open to international competition (in this period, the number of foreign banks rose from 25 to 48), and the definition of new rules for the capital market. Within the capital market in particular, two initiatives were particularly important: (i) the enactment of a new corporate law in 2001 (Law 10.303), with corporate governance regulations to balance forces in publicly traded companies and (ii) the adoption of self-regulation by the market agents themselves, establishing different market levels according to the level of demand of their corporate governance standards. With this, besides the traditional market, the São Paulo Stock Exchange created three other markets: level 1, level 2 and New Market, the latter with a strict set of rules for corporate governance. Besides these, it created the Bovespa Mais, a stock exchange for the IPOs of start-up companies (it has rules similar to New Market, but geared towards small companies' difficulties). Details can be obtained at www.bovespa.com.br, and at "Schapiro (2010), *supra* note 14, pp. 265-274" and also at "Stallings and Studart (2006), *supra* note 10 pp. 222-258". Specifically on the capital market reforms, see R. Gilson, H. Hansmann, and M. Pargendler. *Regulatory Dualism as a Development Strategy: Corporate Reform in Brazil, The United States and The European Union*, 63 *Stanford Law Review* (2011), 482-501. Information also available at Central Bank of Brazil: www.bcb.gov.br.

banks, especially on BNDES.⁶⁵ Neither the capital market nor the private banks or private equity and venture capital industry have been able to completely replace its leadership in providing this sort of financial resources.⁶⁶

As for the capital market, in spite of the rising in Initial Public Offerings (IPO), the market's dimension is still limited, with less than 400 companies listed.⁶⁷ Moreover, the fact that primary funding in the capital market has not yet consistently overcome the volume of resources made available by public agents is particularly noticeable. Except for the year of 2007, the annual volume of BNDES disbursements have still been superior to the volume of resources funded via equity or debt in the capital market.

Still in the securities segment, the private equity and venture capital market is also limited, especially for new and emerging companies. Although the volume of capital committed to these operations grew in the last few years, from US\$ 3.71 billion in 1999 to US\$ 26.65 billion (twenty-six billion and sixty-five million US dollars) in 2008, its participation in relation to the GNP is only 1.71%. Beyond that, most of these investments (37%) are geared towards private equity operations, i.e., larger and more solid enterprises, while a smaller fraction (25%) is dedicated to emergent and start-up companies.⁶⁸

Likewise, despite the fact that the credit rate provided by the banking sector has been increasing, it is still low and mostly for the short run.⁶⁹ In 2009, domestic credit to the private sector reached 54% of the Brazilian GNP. Comparatively, in China the bank credit rate reached 127%⁷⁰ of its GNP, South Korea⁷¹ had 107% and South Africa,⁷² 147% of the GNP. Conversely, data provided by BNDES show that the profile of bank credit is for the short run: in 2010, 48.8% of private loans had maturities shorter than

⁶⁵ For Stallings and Studart, public agents still play a relevant role in the national economy: *The public banks continue to play a vital role in Brazil, contrary to expectations. Both the government and those supporting the reforms in the 1990s believed the changes would revolutionize the credit market. In particular, they expected the entry of foreign banks to expand credit significantly and broaden access for those normally excluded, such as SMEs and poorer households. They further assumed that the public banking sector would continue to shrink because it was less competitive than private, especially foreign banks. The results turned out differently than anticipated, however, and public banks continue to play a key role.* See “Stallings and Studart (2006), *supra* note 10, p. 245.”

⁶⁶ Under the current circumstances, a possible reason for the predominance of public agents in long term operations is the incentives produced by the public debt on private banks and other financial institutions. The public debt is remunerated by a fixed interest rate, set by the National Monetary Council – the SELIC. During the past years, the SELIC (presently around 12%) has been superior to the TJLP (BNDES interest rate). The practical effect of this difference is the creation of an incentive for private banks to secure part of their profit by acquiring public securities, instead of broadening the private credit market. This incentive provokes a similar effect on the other financial institutions, like private pension foundations and other investment funds (crowding out effects). This is indicated by the fact that, over a recent period, the volume of public debt was always superior as compared to the volume of private debt, suggesting greater Government capitalization in relation to private investments. See “Stallings and Studart (2006), *supra* note 10, pp. 222-258”

⁶⁷ Last year (2010) BMF&Bovespa Stock Exchange registered 381 companies. Data provided by the World Federation of Exchanges, available at <http://www.world-exchanges.org/statistics/time-series/number-listed-companies>

⁶⁸ See FGV-Cepe, *Panorãma da Indústria Brasileira de Private Equity e Venture Capital*, Relatório de Pesquisa, (2008), p. 28, available at: <http://www.nsgcapital.com.br/arquivos/PANORAMA%20INDUSTRIA%20BRASILEIRA%20PEVC%202008.pdf>, accessed 15 April, 2011.

⁶⁹ “Stallings and Studart (2006) *supra* note 10, pp. 244-245”.

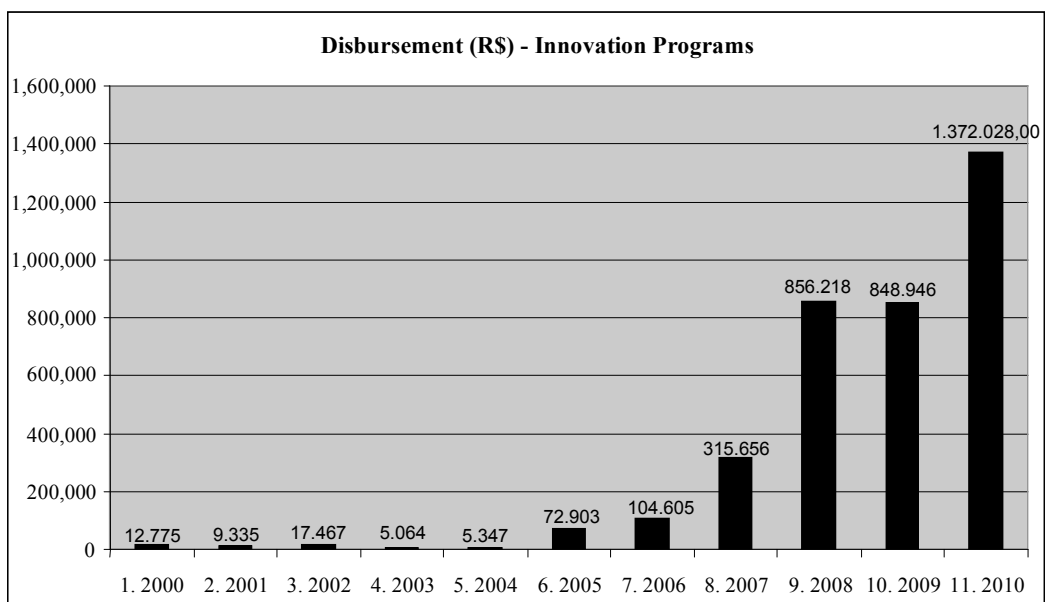
⁷⁰ World Bank, available at <http://data.worldbank.org/indicator/FS.AST.PRVT.GD.ZS>

⁷¹ *Idem*

⁷² *Ibidem*

one year, 29% of loans had maturities between one and three years and only 22% had maturities longer than three years. In contrast, in the same year, 2010, 65% of BNDES's loan portfolio had maturities exceeding five years.⁷³

For these reasons, even under the new institutional arrangement built in the market-oriented reform of the 1990s, there is a considerable role for policy-based financial actors. This is particularly true for innovation financing which usually faces a problem of underfinancing, even in developed economies. Not by chance, little by little throughout the 1990s and more vigorously from 2004 onwards, BNDES has been implementing new programs to cover market failures that might affect the new economy. This process presents three predominant periods, which are: (i) pilot programs, in the early 1990s; (ii) first diversifications, in the late 1990s and (iii) industrial policy resumption and expansion of financial vehicles since 2004. The graph below shows the evolution of BNDES disbursement to innovation programs per year.



Graph 5
Source: BNDES

In the beginning of this institutional experimentalist process, BNDES implemented, in 1991, a pioneering program of venture capital to finance emerging companies – the CONTEC.⁷⁴ In this program, BNDES took on the role of venture capitalist, directly acquiring stocks in emerging companies and playing an active role in monitoring them. The CONTEC was initially structured as an experimental program, incorporating a restricted number of 20 companies. A few years later, as a result of a process of institutional learning, this tool was consolidated and gave rise to a more robust financial operation, including a growing number of investee companies.

⁷³ The second and the third largest long-term lenders are also public banks (Caixa Econômica Federal, with 11% of the portfolio allocated to operations with longer maturities, and the Bank of Brazil, with 8% of the portfolio addressed to the long term). See L. Coutinho. *As perspectivas de investimentos na economia brasileira e o desafio das fontes de financiamento de longo prazo*, presentation available at http://www.bndes.gov.br/SiteBNDES/export/sites/default/bndes_pt/Galerias/Arquivos/empresa/download/apresentacoes/Coutinho_InstTalentPerspectivasInvest_set10.pdf

⁷⁴ See L. Pinto, *Capital de Risco: uma alternativa de financiamento às pequenas e médias empresas de base tecnológica – o caso do CONTEC*, Revista do BNDES, 7, [1997] 20-27.

Nowadays, this variable income program directed at small and medium companies is run by a specific department, the Entrepreneur Capital Area, in charge of managing a portfolio of 130 companies (and also in charge of managing the Bank's participation in 27 investments via funds).⁷⁵

Still in this first phase, a few years later, as a result of the institutional learning, this tool was expanded and gave rise to a second mode of financial operation: the investments in private vehicles of venture capital. Thus, besides acting directly as a venture capitalist, BNDES started to act as an investor in private vehicles,⁷⁶ which are dedicated to screening and financing new ventures. By playing this role, BNDES not only granted resources to new firms, but also contributed to setting up a private market for risk capital (stimulating private venture capital vehicles). The participation of BNDES in the establishment of this market segment has been significant: after pioneering in this sector, instituting the first investment funds, BNDES participates nowadays in about half of all the investment funds registered in the Securities Commission (CVM).⁷⁷

The second period of this pathway started in the late 1990s, when BNDES amplified the range of innovative tools. Specifically in 1997, the Bank introduced a few changes in the rules of fixed income contracts. This allowed for some part of innovation finance to be implemented not only by variable income legal instruments (venture capital programs), but also by credit operations (fixed income tools). The first contractual experiences with fixed income were made within the Prosoft⁷⁸ program, created to serve the specificities of the software sector. Among other modifications, Prosoft waived presentation of collateral in financial operations limited to around US\$ 230,000 (two hundred and thirty thousand dollars). This limit of waiver would later be increased and nowadays is around US\$ 6,000,000 (six million dollars).

Finally, the third period started in 2004, when the Brazilian government implemented the PITCE – Industrial, Technological and Foreign Trade Policy. Focused on the spurring of competitiveness and innovation, the PITCE reinforced BNDES initiatives, stimulating consolidation of former experiments and broadening diversification of programs towards new tools and contractual rules. In this context, BNDES approved the new Operational Policy stating innovation as a financial priority. The Operational Policy is a sort of guideline which describes the contractual modalities

⁷⁵ Data provided by BNDES *Annual Report* (2009), pp. available at www.bndes.gov.br, p. 100.

⁷⁶ In the beginning, the private vehicle for venture capital investments was holding companies, but in 1994 the Securities Commission (CVM) set new rules for this sector, fostering the constitution of funds as a private vehicle for private equity and venture capital investments. (Regulatory Instruction 209/94). The success of investment funds as a legal tool can be verified by the data on its use in the venture capital and private equity market; in 2005, about ten years after Regulatory Instruction 209/94, out of 97 investment entities operating in Brazil, 44 were constituted via investment funds and only 20 via holdings. On this, see A. Carvalho, L. Ribeiro and C. Furtado, *A Indústria de Private Equity e Venture Capital: primeiro censo brasileiro* (São Paulo: Saraiva, 2006), pp. 55-65. The report on BNDES participation in the formation of funds can be found in its 2005 annual report, see BNDES, *Annual Report* (2005), pp. 44-46, available at <<http://inter.bndes.gov.br/english/RelAnnualEnglish/ra2005/Rel-Anual.pdf>>, accessed October 15, 2009.

⁷⁷ This amount refers to funds for emerging companies. This type of fund observes the Normative Instruction CVM 209/94. On this see, “M. Schapiro, *supra* note 14”, p. 242.

⁷⁸ BNDES has credit lines and programs. The lines are permanent, while the programs are temporary and have a pre-defined budget. According to BNDES operational policies, a program is created under three scenarios: (i) there is a specific objective pursued by BNDES; (ii) there is a government policy to be established, with specific objectives and targets and (iii) sector specifications determine changes in contractual and financial rules. Such was the case of Prosoft: the creation of contractual exceptions to favor the sector's specificities – according to an interview conducted on July 30, 2009 with Helena Tenório, BNDES' Planning Superintendent (responsible for the rules of lines and programs).

and procedures to be observed by the Bank's officials. In its presentation text, the new Operational Policy emphasizes the consolidation of a new phase in BNDES intervention, stressing that, similar to other moments in history, the Bank was initiating a new chapter in fomenting Brazilian capitalism, this time driven to innovation:

Over its history of more than 50 years, the actual content of these great objectives has often been revised. There is strong evidence that BNDES once again faces one of these historical moments, in which its strategic objectives must be redefined and updated (...). With regard to supporting the exploitation of new opportunities, the general speed of technological changes, associated with competition agility, imposes on the Brazilian economy rapid advances in relation to the generation and diffusion of innovation. The Bank's support in this field will privilege the exploitation of possibilities for advancement (many times already foreseen by the companies) that could not be enjoyed during the quasi-stagnation period the Brazilian economy is now overcoming. These possibilities, until now repressed, will be combined with many others still to be detected and exploited. These opportunities constitute a new growth frontier based on innovation and, therefore, completely synchronized with the Industrial, Technological and Foreign Trade Policy (PITCE) launched by the Development, Industry and Commerce Ministry, in 2004. Some advance in innovation has undeniably been achieved by BNDES (for example, through Profarma). From now on, however, not only will innovation support not be restricted to technologically sophisticated industry segments, but it will also be considered of maximum priority by BNDES.⁷⁹

As a consequence of this new operational policy, BNDES instituted three other institutional innovations: (i) new program for pharmaceuticals, (ii) horizontal and permanent lines for fixed income contracts, and (iii) non-reimbursed fund for prototypes investments (FUNTEC). These programs would share a portfolio of other vehicles already implemented, such as the variable income programs (direct venture capital and investment in private funds) and the specific rules designed for software.

In 2008, PITCE was partially reviewed and replaced by another industrial policy: the *Productive Development Policy* (PDP). The pace of diversification then went even further, with the introduction of new financial tools.⁸⁰ An example of that is the implementation of a specific financial program for seed money: the CRIATEC fund. This fund was formed of resources from BNDES (R\$ 80 million) and from the Northeast Bank (R\$ 20 million), and had the objective of granting resources for companies at the pre-start up phase.⁸¹ With the establishment of this fund, the scope of

⁷⁹ BNDES, *Políticas Operacionais*, (2005), pp. 5-6.

⁸⁰ Under this process, the former horizontal lines "Innovation P, D and I" and "Production Innovation", created in 2005, were substituted by new credit lines called "Technology Innovation" and "Innovative Capital". With that, not only were their interest rates reduced once again, reaching about 4% per year (on average), but also the threshold of waiving collateral increased to R\$ 10 million (therefore broadening Prosoft's initial limits).

⁸¹ When setting up CRIATEC, BNDES, by means of a selection process, chose a private consortium formed by Antera Gestão de Recursos and Instituto da Inovação to manage the fund (a kind of general partner). This consortium was responsible for managing CRIATEC's financial policy, established by the Investment Committee's quota holder. See <www.bndes.gov.br/programas/outros/criatec.asp>. For further details on CRIATEC, see also D. Coutinho and P. Mattos, *Brazil Pilot*, Research Report presented at Law and New Developmental State Workshop (Madison, 2008), 13-21, available at: <<http://www.law.wisc.edu/gls/lands.html>>, accessed April 10, 2011.

capital risk programs was extended, reaching even fairly incipient companies all around the country.⁸² Table 2 below synthesizes on a timeline the introduction of legal tools for innovation funding.

1991	1993	1996	1997	2005	2008
Beginning of activities as venture capitalist (CONTEC program)	Beginning of indirect participation. Formation of venture capital private companies (holding companies)	Indirect participation through investment funds (instead of holding companies)	Introduction of new contractual rules in fixed income (Prosoft Program).	Creation of credit lines and extension of the contractual rules introduced in 1997. Introduction of FUNTEC	New credit lines. More flexible contractual rules. Extension of the funding programs with CRIATEC

Therefore, as a result of a path initiated at the beginning of the 1990s with an experimental program (CONTEC), BNDES has settled a diversified portfolio of programs and credit lines to fund investments in innovations of products and process. In other words, through this process BNDES acquired legal capacity to carry out innovation financing. At the present, its financial intervention can be effected both *indirectly*, in which case its resources are used to set up private investment funds managed by private agents and *directly*, with financial operations contracted directly between BNDES and innovative companies. The direct operations can be structured by means of equity sharing (variable income), as well as through credit contracts (fixed income), or even via the non-refundable mode (FUNTEC). The chart below synthesizes the current types of funding modes (non-refundable; fixed income; variable income; investment via private funds), and their corresponding financial instrument.

Funding Modes	Instruments and programs
I) Non-refundable resources	FUNTEC
II) Fixed income (credit contracts)	P, D & I Innovation/ Technological Innovation Production Innovation / Innovation Capital Sector programs: Prosoft, Profarma
III) Variable income (acquisition of companies' stocks)	Direct participation of BNDES in private companies
IV) Participation via funds	BNDES participation in private funds Seed money funds – CRIATEC

⁸² The “seed money” sector is one of the risk capital market’s biggest flaws. Not only in OECD countries, but also mainly in developing countries, this type of resource encounters the greatest resistance among investors. This is due to the fact that budding companies present a fragile economic capacity and consolidation level, imposing an even higher risk rate than other initial enterprises (start-up). In Brazil, this tendency is corroborated by the indexes presented by the *Brazilian Private Equity and Venture Capital census*, stating that of all risk capital phases, the “seed” phase is the one in greatest need of resources; of 204 companies that received risk capital in Brazil during the census period, only 36, or 11.8%, were in the seed money stage. Data presented by “Carvalho, Ribeiro and Furtado, (2006), *supra* note 76, p. 74”.

B. BNDES Legal Tools and Legal Action

This section will describe in detail the governance structure of these new tools. They all share two attributes: (i) malleability to administrate the terms of agreement, and (ii) the absence of an *ex ante* risk allocation for all future events established between the Bank and the company. Moreover, they are also convergent with the broad institutional arrangement of the Brazilian economy (hybrid organization between State and market)⁸³, insofar as they are based on more horizontal alliances established between the State's agent and the private actors.

The following exposition does not follow the chronology of the tools' creation: it is organized by the increasing degree of complexity of the tool governance structure. The description starts with non-refundable contracts, followed by fixed income contracts, direct participation and finally indirect participation.

1. BNDES as an angel investor: contracts with non-refundable resources (FUNTEC resources)

The resources of FUNTEC are destined for non-refundable operations, in a performance similar to an angel investor, in the U.S. innovation finance pattern.⁸⁴ In other words, it disburses resources for prototype products in a non-refundable way. The FUNTEC is operated within a governance structure which includes two agents besides the Bank: the Technological Institutes and the intervening companies. The resources are solicited by the technological institutes (IT), which are non-profit legal entities dedicated to the research and development of new products and processes. The objective of the funding is to foster the development of applied technology, capable of producing technical solutions to new demands presented by companies. In this type of contract, the Bank assumes 90% of the cost of the project presented by the IT, and the intervening company, associated with the IT, assumes the remaining 10% (except in the case of small companies).

In this type of contract there are no requirements for collateral or any obligation to repay the Bank. The only obligation assumed by the beneficiaries is restricted to the fulfillment of the technological project. According to FUNTEC regulations,⁸⁵ the areas covered by this modality are those with future potential, whose development solutions are not met by the present Brazilian entrepreneur environment. These areas are: (i) renewable energy sources (biomass and improved technology in hydroelectricity); (ii) environment (with a focus on bio-digestion and biotechnological solutions); (iii) health (in particular, bio-pharmacy, vaccines and new diagnostics); electronics (micro and nano technologies); (iv) new materials, and (v) chemicals (especially new resins, plastics and fertilizers). BNDES's expectation is that the recipients return to the Bank for a loan repayable once the production of prototypes has been made possible.

⁸³ Coutinho & Mattos (2008), *supra* note 81, pp 13-17.

⁸⁴ Angel investors are the first sponsor of a venture, normally providing personal resources through non-formal contracts and which are non-exclusively oriented to financial goals. For greater details, including the contractual structure, see D. Ibrahim. "The (Not So) Puzzling Behavior of Angel Investors", *Vanderbilt Law Review*, Vol. 61, 2008, p. 1405.

⁸⁵FUNTEC regulations are available at <http://www.bndes.gov.br/siteBNDES/bndes_pt/areas_de_Atuacao/Inovacao/funtec.html>.

2. Fixed-income financial contracts: a combination of formal rules and informal governance

Besides the non-refundable contracts, new rules were introduced in contracts for fixed-income operations. The result is a contract for innovation which embodies formal and practical differences, in comparison to the standard type of agreement.

The formulation of these new rules was based on two assumptions: (i) the companies to be financed do not always have a track record (they are new companies) and (ii) normally, these companies do not have collaterals, which is usually required as a condition for obtaining loans from BNDES.⁸⁶ Due to such vicissitudes, BNDES tried alternative ways of structuring operations:⁸⁷ instead of the track record, technicians began to weigh their financial decisions on future prospects presented in the companies' business plans. Besides that, for loans up to R\$ 400,000⁸⁸, no collateral would be required, only the personal surety of the company's controllers.

However, these are innovative enterprises whose business plans are subject to a margin of uncertainty; that is, not all results can be anticipated in detail. To address this problem, the contracts usually determine a gradual allocation of resources, subject to the scrutiny of the business plan execution, which occurs at periodic meetings between the bank administrators and the company representatives (a kind of meeting protocol).

Therefore, instead of elements of contractual guarantee of a discontinuous nature, this type of financing emphasizes ongoing monitoring of financed projects. This monitoring and meetings protocol allows the parties involved to discuss difficulties, mistakes, and successes diagnosed in the execution of the respective business plan. This permanent interaction between the Bank and the company, which might even result in a revision of the activities initially programmed, constitutes a kind of informal structure of contract governance.

This room for maneuvering, though not formally stated in the adjustment clauses, is nevertheless a result of the contractual structure itself. In fact, BNDES contracts include two types of contractual obligations: (i) financial and (ii) non-financial obligations.⁸⁹ The former are formal and strict, identifying clearly what is considered contractual default: the lack of payment of the contracted debt. The latter, on the other hand, refer to the object of the contract and are more flexible than the financial clauses: their non-fulfillment, or fulfillment in a way which is different way from what was initially agreed upon, may not be considered a contractual default⁹⁰. In other words, this dissociation between financial and non-financial obligations allows the latter to be administered with a certain degree of flexibility, without implying a breach of contract.

⁸⁶ BNDES rules state that, except in rare situations, companies must present real guarantees to the value of 130% of the approved loan: "*Art. 27 – The collateral value should be at least 130% (one hundred and thirty per cent) of debt, unless specific regulations establish a different rate for transactions governed by it*". BNDES, *Resolução 665/87- Disposições Aplicáveis aos Contratos*, (1987), available at <http://www.bndes.gov.br/SiteBNDES/export/sites/default/bndes_pt/Galerias/Arquivos/produtos/download/disaplic.pdf>, accessed April 10, 2011.

⁸⁷ This description is based on interviews conducted on July 30, 2009 with the following BNDES administrators: Helena Tenório, Planning Superintendent (responsible for the rules of lines and programs) and Maurício Neves, responsible for the software area.

⁸⁸ Currently this value is R\$ 10 million, which is equivalent to US\$ 6 million (considering an exchange rate of 1.6).

⁸⁹ BNDES, *Resolução 665/87- Disposições Aplicáveis aos Contratos*, (1987), *supra* note 77.

⁹⁰ Information obtained in an interview with Maurício Neves on July 30, 2009.

This division between two types of obligation is not a particularity of innovation contracts. In general, BNDES contracts present both forms of obligation. What is characteristic of innovation contracts is the importance given to this dissociation. Unlike a traditional sector, in which there is little difference in the administration of both obligations, in innovation financing the object of adjustment is less palpable and its realization requires a contractual management that goes beyond the contractual clauses. To some extent, therefore, the existence of two types of defaults favors this informal governance (beyond the contract), by allowing the replacing of *ex ante* risk allocation elements (such as collateral and contractual fine details) by an ongoing monitoring of the company business plan.

This resource seems to be similar to the one diagnosed by Gilson, Sabel and Scott in the innovation contracts established between some companies and their suppliers.⁹¹ In the article, *Contracting for Innovation - Vertical Disintegration and Interfirm Collaboration*, the authors analyze three types of contracts in different economic sectors such as machinery and equipment, software, and pharmaceuticals (respectively, contracts made between Deere and Stanadyne; adjustments established between Apple and SCI, and between Warner-Lambert and Lingard). The authors try to understand the specificity of these contracts, which deal with the supply of ultra-specific assets in an uncertain context, governed by permanent modifications due to constant product innovations made by Deere, Apple and Warner-Lambert.

In the three cases analyzed⁹² the contracts combined two types of clauses: (i) those typically synallagmatic, and (ii) those of governance, leading to informal corrections and adaptations. The predictable elements of the contract, such as the delivery of standard products, among others, are regulated in a formal manner, as in a conventional contract (formal obligations and penalties for default). Beyond that, however, these contracts also present devices that constitute a real governance structure between the parties, allowing the formation of an interactive process of analysis, revision and decision making - adequate for the uncertain elements of the agreement. In synthesis, what Gilson, Sabel, and Scott⁹³ suggest is that, due to uncertainty, the innovation contract combines formal rules for activities containing some degree of predictability with an informal style of governance that addresses the needs of a routine of apprenticeship, monitoring and adjustment between the parties⁹⁴.

⁹¹ R. Gilson, C. Sabel and R. Scott, *Contracting for Innovation: Vertical Disintegration and Interfirm Collaboration*, 109, Columbia Law Review, 3, [2009], 458-494.

⁹² *idem*

⁹³ *Ibidem*

⁹⁴ Alongside typical clauses of a supply contract, Deere, for example, keeps a ranking program of its main suppliers, based on criteria of relationship between the company and its commercial partners. This is a disciplined and public program presenting successive phases of punctuation and promotion of supply companies. The type of supply relationship established by Deere varies according to the status of its suppliers in the punctuation and identification program: the selection of which supplier will make the ultra-specific assets of unpredictable results will depend on their position in the relationship ranking. (Stanadyne, for example, is classified at the highest level, identified as being broadly in tune with the strategies of Deere). In the case of Apple-SCI, besides the formal supply contract for products that both companies know well, there is the provision of an open clause, a manufacturing plan for new products: by contract, Apple is obliged to acquire goods during a three-year period, but the details of the product are stipulated in a collaborative manner through a jointly-devised plan. In both contracts, the formal contractual rules are combined with dispositions which act as management structures, established to discipline the uncertain terms of the business. These management structures are not contingencies, but established from formal contracts, that is, they are programmed by contractual expedients which stimulate the establishment of collaborative relationships. In the case of Deere, the punctuation program is fomented by the long term contracts established for the supply of conventional products and which stimulate permanent relationships; in the case of Apple, the contract stipulates a decision-making process

In the case of BNDES fixed-income contracts, something similar occurs. There is an opening, though not contractually formalized, for a permanent collaboration between the Bank and the borrowing company, thus guaranteeing an informal protocol for the monitoring of the business plan.⁹⁵

3. Equity investments: BNDES as venture capitalist

Alternatively, BNDES financial collaboration can also be guaranteed through equity investments in the beneficiary company. In this type of financing, the Bank's activity is similar to a venture capitalist, meaning that its participation in actively monitoring the company is expressive, cooperating towards the generation of value for the enterprise. Given that these companies are not yet established, the scrutiny of the bank's administrators is comparatively greater and more intense than with larger companies situated in traditional sectors. This participation is, however, temporary; from the initial financing, the Bank establishes its disinvestment strategy.

Formally, the formation of this partnership relies on two predominant types of securities: (i) debt securities convertible into stocks,⁹⁶ and (ii) preferred shares convertible into ordinary shares.⁹⁷ In either of the cases, upon becoming a shareholder, the Bank's participation is always minor, accumulating around 25% of the equity capital.

Despite its minor participation, the Bank's monitoring capacity is disproportionately high. This is supported by the Stockholder Agreement which rules

for the production plan. The ensuing interactive collaboration provides the solution for two problems concerning uncertainties: (i) it promotes the proximity of the agents and therefore a mutual acknowledgement, which allows the companies to recognize their strategies and innovation capacities in a reciprocal manner and (ii) it discourages, due to the proximity, opportunistic conduct in either of the parties. "Gilson, Sabel and Scott (2009), *supra* note 91, pp. 458-494".

⁹⁵ As in the cases analyzed by Gilson, Sabel and Scott, this informal management is a result of the contractual rules; it derives from the existence of two different types of obligations and also from the provision that the allocation of funds be conditioned to the monitoring of the plan's execution (which permits permanent scrutiny of the business plan). "Gilson, Sabel and Scott (2009), *supra* note 91, pp. 458-494".

⁹⁶ Convertible debentures are very flexible debt securities which can be, at the convenience of the underwriter (in this case BNDES), converted into shares over time. The advantage of this procedure in this type of operation is to give the investor time to evaluate the convenience of becoming an effective partner in the company, at which point he will share the risks and benefits of his enterprise. Due to the uncertain nature of the business, prolonging this decision may be convenient for the investor. For this reason, in BNDES' pilot experiences as venture capitalist in the early 1990s (CONTEC), the convertible debenture was the modality employed by the Bank. See "Pinto (1997), *supra* note 67, pp. 21-38" and D. Soledade, E. Penna, E. Sá and L. Pinto. *Fundos de Empresas Emergentes: novas perspectivas de capitalização para pequenas e médias empresas*, Revista do BNDES, s/n., 12-13, available at <http://www.bndes.gov.br/conhecimento/revista/durval.pdf>, accessed October 10, 2009.

⁹⁷ According to Brazilian Public Company Law (Law 6.404/76), a corporation may emit debt securities (debentures) and equity securities (shares). This type of vehicle, however, also presents a disadvantage; because it is formally a debt (up to the time of its conversion), it is registered in the account book as a liability, which restricts the company's indebtedness capacity, limiting its ability to borrow short-term resources (such as working capital loans, leasing, bank loans, etc.) According to the case, this liability may compromise its growth capacity. Currently, with the knowledge accumulated by the Bank, both vehicles (debentures and shares) are used, depending on a cost-benefit assessment conducted for each individual operation, balancing the financial constraints *vis a vis* the risk and the trajectory of uncertainty. On the recent use of both instruments – information taken from an interview conducted on July 30, 2009 with Fabio Sotelino, Superintendent for Entrepreneur Capital (responsible for equity sharing in small and mid-sized companies).

the relations between investors and beneficiary companies. Through contractual clauses the Bank formally ensures an expressive participation in the administration of the company, which guarantees a considerable political advantage in corporate decisions.

Regarding this, the standard Stockholder Agreement for this type of financing combines three types of provisions:⁹⁸ (i) previous consent by BNDES for certain company activities; (ii) participation in the board of directors (regardless of its corporate representation) and (iii) free access to corporate information. Besides this, previous consent by the Bank is required for many company decisions, such as: (i) equity alterations like the increase or reduction of equity capital; (ii) the realization of mergers and acquisitions; (iii) the investment in areas other than the core business; (iv) the concession and acquisition of technology, amongst other topics related to corporate administration.

Participation in the board of directors and free access to corporate information allow a constant scrutiny of and cooperation in corporate decisions. The routine of this scrutiny consists of monthly or bimonthly meetings between Bank representatives and company administrators.⁹⁹ It is in this collective forum that corrective measures, paths and revisions of the investment and business plans are made. As was mentioned above, the role played by BNDES in equity investments (or debentures investments) goes beyond that of mere financier: it also includes the improvement of company administration and cooperation towards the definition of competitive strategies.¹⁰⁰ Furthermore, the standard Stockholder Agreement ensures the Bank's technical team free access to corporate information, including that of a strategic nature, which supports the Bank's participation in decisions concerning corporate issues. An example of that is stated by the following standard clause:

Clause 6.1 The Controlling Quotaholders of the Controlling Shareholder, the Controlling Shareholders and the Corporation make a commitment to BNDESPAR to promote action to assure that the Corporation and its Affiliates implement the following directives and norms concerning its Administration:

XIII. to allow the technical team indicated by BNDESPAR, to be composed exclusively of personnel drawn from BNDES' system, free access to the premises of the Corporation and of its Affiliates, as well as provide information of any nature, juridical, financial, administrative, fiscal, technological or strategic, so that the team is able to develop their studies and diagnostics about the Corporation, the Affiliates or sectors in which they are active.

Along with the routine of corporate monitoring and scrutiny, the capacity to sell its participation is one of the critical matters in the variable income operations. As with a venture capitalist, the objective of the Bank's investment is temporary: once the resources for the company's corporate and financial maturity are guaranteed, the investment is expected to be withdrawn.

⁹⁸ The Superintendence for Entrepreneur Capital provided a copy of the Stockholder Agreement for this research. The following considerations are based on this instrument (file with author).

⁹⁹ Information taken from an interview conducted on July 30, 2009 with Fabio Sotelino, Superintendant for Entrepreneur Capital.

¹⁰¹ BNDES' participation goes from the initial entrepreneurial moment, centered on the figure of the entrepreneur and his frequently personal and intuitive decision-making process, to the consolidation of an administrative model with management rules, in which decisions are made in collegiate bodies with the participation of investors and in many cases of independent advisors. Information taken from an interview conducted on July 30, 2009 with Fabio Sotelino, Superintendant for Entrepreneur Capital.

The IPO is BNDES' preferred option for withdrawal.¹⁰¹ Firstly because it guarantees the return of its investment in market conditions, and secondly, because indirectly, it favors the development of the Brazilian capital market, which in turn expands its investment capacity in new innovative companies due to the broader horizon of disinvestment in the future¹⁰². In the past few years, some innovative firms supported by the Bank have succeeded in guaranteeing disinvestment by IPOs at the most demanding market level of the Brazilian Stock Exchange, Novo Mercado (New Market). This is the case with TOTVS (software sector), with BEMATECH (software sector) and LUPATECH (raw materials for the petroleum production chain), among others.¹⁰³

4. Indirect participation: investment funds

In the investment funds program, the role of BNDES is even closer to that of other agents in the market. In this form of participation, BNDES acts as an investor, financing resources as a quotaholder of venture capital funds, whose management is in the hands of a private administrator responsible for attracting other funders and selecting investee companies.

The legal structure for this private instrument of venture capital is partly similar to the U.S. structure, which is characterized by a trilateral relationship formed of the following actors: (i) the investors (equivalent to the limited partners); (ii) the administrators (equivalent to the general partners) and (iii) the invested firms.¹⁰⁴ In the Brazilian structure, according to normative instruction 209/94 – CVM, the legal form used for investment in risk capital is the investment fund. Formally, investment fund is a condominium in which the quotaholders act as investors and the administrators correspond to a general partner, responsible for the administration and the investment

¹⁰¹ This is, however, a particularly delicate point due to the size of the Brazilian capital market. In this scenario, the option for disinvestment in the capital market is not a predictable route, although it is acknowledged as a relevant strategy. Therefore, the Stockholder Agreement offers two types of procedures to the disinvestments: (i) an IPO and (ii) the constitution of a redemption fund for an installment acquisition of the Bank's shares (formed by a fraction of the company's revenue, usually 30% of the profit).

¹⁰² Information taken from an interview conducted on July 30, 2009 with Fabio Sotelino, Superintendent for Entrepreneur Capital. On the topic of IPOs, the standard Stockholders Agreement obliges the companies to open their capital in the stock market or justify to the Bank the reasons for not doing so. "Clause 7.1. The controlling shareholders are obliged to provide by _____ 20____ the registers of the Corporation and of its public distribution of emission securities with the Securities Commission - CVM, the register of the negotiation of its securities in the Novo Mercado or BOVESPA Mais stock markets, instituted by the São Paulo Stock Exchange, or any other register necessary for opening the Corporation's equity capital, as well as the announcement of the initial public offering of the Corporation's emission securities. Clause 7.1.3. In case the Corporation's conditions at the time, or the circumstances of the capital market, do not allow the realization of the capital opening stated in the previous clause, the Controlling Stockholders will submit their justification of such an impossibility in writing to BNDESpar. In the event of BNDESpar not accepting the justification, the non-opening of capital will imply in the discontinuation of this contract." Besides the IPO and the redemption, there is also the possibility of carrying out a strategic sale of the Bank's equity to companies active in the same productive chain, such as clients or suppliers.

¹⁰³ For a description of these cases see "Coutinho and Mattos (2008), *supra* note 81, pp. 27-29" and on LUPATECH see also "Schapiro (2010) *supra* note 14, pp. 257-260."

¹⁰⁴ In the US risk market, this relationship is based on a Limited Partnership (the investors figure as limited partners, and do not participate in the fund administration). On this see R. Gilson, *Engineering a Venture Capital Market: Lessons from the American Experience*, 55, *Stanford Law Review*, [2003], 2-52 and also W. Sahlman, *The Structure and Governance of Venture-Capital Organizations*, 27, *Journal of Financial Economics*, [1990], 473-521.

policy. Compared to the U.S. model of limited partnership, however, there is a substantial difference in the governance of Brazilian funds: usually they have an investment committee, in which the investors play a very active role in assessing investment options and the performance of portfolio companies. Thus, although for this vehicle, the Bank is formally only an investor in the real world, it performs this function in a very pro-active way.¹⁰⁵

The decision on which fund will be financed by BNDES is a result of a selection process carried out inside the Bank, based on some criteria such as: (i) investment plans of private funds; (ii) structure of governance rules, and (iii) their policy for remunerating administrators and quotaholders. Once the vehicle is selected, the Bank allocates resources following an established payment chronogram. In this way, BNDES takes on the role of investor, working together with the other fund quotaholders on the investment committee. The resources mobilized by the fund are allocated to companies through the acquisition of shares or convertible debentures. As with the variable income investments, this funding ends with a disinvestment, preferentially through an IPO, on which occasion the fund administrator alienates his participation and remunerates the other quotaholders (such as BNDES).

C. The Political Economy of Innovation-Oriented Development Bank

Constituting a group of financing mechanisms, what do these tools reveal with respect to the political economy adjustment prevailing between the State and the private players? This section claims that, as a set, these tools, by means of different governance structures, are designed to allow financial contracts of a public bank within a scenario of uncertainty. Moreover, they embody a different type of adjustment between the State agent and the private companies, one that is based more on horizontal alliances, instead of a top down type of relationships.

As outlined in the beginning of this chapter, the literature on the relationship between the state and development traditionally stresses that in underdeveloped economies, given the absence of major private forces, policy makers have set up alternative institutional mechanisms to supplement and even replace markets. These public coordination mechanisms assign to the states a role of market governor. This is argued by the paradigm of *governing the market*, built by Robert Wade¹⁰⁶, the idea of *new control mechanisms* formulated by Alice Amsden¹⁰⁷, the concept of *embedded autonomy* by Peter Evans¹⁰⁸ or the proposal of *Developmental State*, by Chalmers Johnson¹⁰⁹ and used by other authors such as Chang.¹¹⁰ All these have in common

¹⁰⁵ This figure of the administrative committee with active participation was created by BNDES itself when it began its fund program in the mid 1990's. Due to the pioneering character of this type of activity in Brazil, the Bank administrators were insecure about allocating public resources to a risk capital program whose managers had less market experience than their own employees at the Bank. The active participation of the administrative committee has been characterized as a particularity of the Brazilian model of venture capital, even amongst vehicles which do not have BNDES participation. Information taken from an interview on July 30, 2009 with Fabio Sotelino, Superintendant for Entrepreneur Capital. On this committee, as a Brazilian characteristic of venture capital funds, see also "Carvalho, Ribeiro and Furtado (2006), *supra* note 76, pp. 101-106."

¹⁰⁶ Wade (1990), *supra* note 2.

¹⁰⁷ A. Amsden (2001), *supra* note 2.

¹⁰⁸ "Evans (1995), *supra* note 2.

¹⁰⁹ C. Johnson, "Developmental State: odyssey of a concept", in M. Woo-Cumings (Ed). *The Developmental State* (New York: Cornell Press, 1999).

descriptions seeking to mark the construction of specific public gears in developing countries. They also have in common, however, the fact that all of them fail to deal successfully with the new concerns of these gears: public finance in liaison with private market parameters.

The explanatory limit of this literature on political economy of development to deal with the current face of innovation financing, at least concerning recent Brazilian experience, lies in three recent issues: (i) more limited possibilities of state action, after developmental crisis; (ii) the consolidation of some private spaces after market-oriented reforms, and (iii) the continuing need for some direct intervention in the financial allocation. The balance of these vectors produces a kind of institutional arrangement that lies between the full public direction and full market freedom. In the current financial governance, State agents are still players, but play by the market. It is a form of direct state intervention in the financial system, under which state agents act according to industrial policy guidelines, while respecting the rationale of the market and private initiative. It is finally a legal institutional arrangement that assumes the active participation of the State, but it does not mean a necessary control of the private market. Drawing attention to the new overall traces of State activism, Arbix & Martin point out a similar diagnosis:

The second novelty *via-à-vis desenvolvimentismo* is in the relationship to the private sector. Instead of seeking to impose specific competitive strategies on firms, state initiatives are geared toward providing an enabling environment: emphasis on innovation and technology, and high-level, ongoing dialogue with firms and associations, in order to expand the options available to companies. State actions are more market-adjusting than market-dominating.¹¹¹

This type of intervention can be particularly inferred from the current profile of innovation financing, which is remarkably different from the profile of the policies adopted within the developmental context. On the one hand, despite being proactive in fomenting innovation, the role played by BNDES in this segment does not conform to a “top down” pattern of intervention, in which the Bank would hierarchically select sectors and strategic businesses, developing financial tools compatible with goals and objectives previously determined by the national development plans. In the case under analysis, for instance, the State also attempt to contribute in the promotion of the risk capital market, especially when participating in private investment funds. On the other hand, the State, through its Development Bank, is undeniably a relevant actor in this segment.

In other words, this mode of intervention, formed by the direct action of the State in the economy, open to the formation of partnerships and collaborations with private agents, constitutes a differentiated type of public action. It therefore includes similarities and differences in terms of both canons of the political economy of

¹¹⁰ H. Chang. “The Economic Theory of the Developmental State”, in M. Woo-Cumings (ed). *The Developmental State* (New York: Cornell Press, 1999).

¹¹¹ G. Arbix and S. Martin, G. Arbix and S. Martin, “Beyond Developmentalism and Market Fundamentalism in Brazil: Inclusionary State Activism without Statism”, working paper presented at Center for World Affairs and the Global Economy (WAGE) University of Wisconsin-Madison, 2010, p. 4

regulation which have alternated since WW II: (i) the interpretation of market failures and (ii) the view of government failures.¹¹²

In common with the interpretations and strategies resulting from the literature on market failures is the recognition of the limitations of the Brazilian capital and credit market and the consequent need for public action to guarantee an increase in the volume of resources for the risk loans. To a certain extent, the literature on market failures, by recognizing the existence of maladjustments and irrationalities in the private allocation of funds, has legitimized an active role of the State in national economies, both in developed and developing countries.¹¹³ In common, the infrastructure activities, the introduction of new productive chains and now, the innovation strategies, share a high level of externalities in their investments, which are even more pronounced in less diversified economies such as the underdeveloped ones.¹¹⁴ Therefore, this type of institutional arrangement represents something more in terms of State activism than the orientations of the *Rule of Law* type, which prevailed in the political economy of the 1990s.¹¹⁵

However, if it is true that the State continues to play a relevant role in financing the Brazilian economy, including an expressive participation in the industry of venture capital funds, its role in financing innovations does not follow the same perspective of the developmental period. In the first place, the new lines and programs have a horizontal character: neither the government nor the Bank's administration discreetly chooses sectors or businesses. Even the sector programs, such as software and pharmaceuticals, do not aim at selecting winners (picking national champions). These programs equally present a horizontal profile, in the sense that all businesses in this segment may obtain financial resources. Secondly, it is an intervention dedicated to promoting an activity – *innovation* - and not a specific segment of the economy. And finally, the financing of this *new economy* necessarily assumes an open-ended character: due to uncertainties, the outcome of public intervention cannot be established beforehand and therefore the tools employed are open to adjustments and revisions.

This style of financial intervention by BNDES, less directive and more open to the demands of economic agents, has parallels in other institutional experiences. This is the case of Ireland, whose institutional arrangement has received attention for representing a new type of developmental policy. As pointed out by O'Rian in the quotation below, Ireland's agencies in charge of sponsoring innovation observe a different pattern of intervention; one which is less driven to the direct the market and more devoted to creating an enabling environment to foster industrial competitiveness:

¹¹² On this paradigm, see H. Chang, "The Economics and Politics of Regulation", in H. Chang (ed.), *Globalization and Role of State* (New York: TWN, 2003), pp. 157-198 and also D. Trubek. *Developmental States and the Legal Order: Towards a New Political Economy of Development and Law* (Univ. of Wisconsin Legal Studies Research Paper No. 1075, 2008), 29-32.

¹¹³ See J. Stiglitz. "The Role of Government in Financial System", in proceedings of the World Bank Annual Conference on Development Economics, 1993, Washington, DC, World Bank. See also J. Stiglitz. & M. Uy. "Financial Markets, Public Policy, and The East Asian Miracle", World Bank Research Observer, vol. 11, n° 2, 1996.

¹¹⁴ D. Rodrik, "Industrial Policy for the Twenty-First Century", in D. Rodrik (ed.), *One Economics, Many Recipes: Globalization, Institutions and Economic Growth* (New Jersey: Princeton University Press, 2007), pp. 102-112.

¹¹⁵ D. Trubek, "The 'Rule of Law' in Development Assistance: Past, Present, and Future", in D. Trubek and A. Santos (eds.), *The New Law and Development: A Critical Appraisal* (New York: Cambridge, 2006), pp. 81-93.

The Irish state, in fact, played a critical role in “scaling up” social networks within local technical communities into an innovative and growing industry. These efforts were organized largely through a variety of industrial development agencies that promoted an indigenous development alternative to reliance on foreign investment. The role of the state went well beyond merely gathering information and upgrading infrastructure. The state agencies were the major providers of funding to the industry until 1998 when venture capital flooded the industry. However, agencies also used their connections to firms, established through this funding role, to become educators and guides of the industry. By linking grants to product exporting, R&D, management development, and so on, the state agencies helped to define the nature of the software industry in Ireland and provided a constant pressure on firms to upgrade their capabilities while also directing them to the resources that could make this possible. The agencies networked firms together through these contacts and were instrumental in the formation of a dense network of industry associations, innovation centers, technology programs, and other forums that promoted social networking within the industry. (...) The goal of state action was to shape the character and development path of the industry rather than to influence specific business or technology decisions.¹¹⁶

Similarly, the recent works of Charles Sabel, Dani Rodrik, and Ricardo Hausmann¹¹⁷ draw also attention to the fact that successful experiences of public policies have relied on the efforts of experimentation and interactivity. Viewing the development process as a strategy for experimentation and discovery, whose results cannot be strictly established *ex ante* by policymakers, the authors postulate the role of inductor agent for State intervention. They show skepticism, therefore, as to the effectiveness of public interventions driven by a directive bias, harnessed to implementing goals and pre-established results.¹¹⁸

Due to the contingency of and the need for a permanent revision of public objectives, in face of the dynamics of the markets and social actors, the success of the State role, argue the authors, depends on its capacity to go beyond the terms of a fixed and unidirectional relationship (from State to market). It means an adjustment between the public and private entity which is not limited to a relationship of the agent-principal type, in which the regulator hierarchically establishes Pigouvian incentives to guarantee previously programmed private behaviors. As Rodrik points out, the success of public intervention lies in the capacity to establish a permanent interaction between the policy formulators and the market agents:

¹¹⁶ S. O’ Rian. *The Flexible Developmental State: Globalization, Information Technology and the “Celtic Tiger”*, Politics & Society, Vol. 28 No. 2, June 2000, pp. 165-166.

¹¹⁷ R. Hausmann, D. Rodrik, and C. Sabel, *Reconfiguring Industrial Policy: A Framework with an Application to South Africa*, (2008), 1-22; available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1245702; C. Sabel, *Learning by Monitoring: The Institutions of Economic Development*, (Working Paper n. 102, MIT, 1993), 27-43, available at <http://www2.law.columbia.edu/sabel/papers.htm> and “Rodrik (2007), *supra* note 114, 99-119”.

¹¹⁸ See C. Sabel, “[Beyond Principal-Agent Governance: Experimentalist Organizations, Learning and Accountability](#)”, in E. Engelen and M. Ho (eds.), *De Staat van de Democratie. Democratie voorbij de Staat*. WRR Verkenning 3 (Amsterdam: Amsterdam Press, 2004), pp. 27-43 available http://www2.law.columbia.edu/sabel/papers/Sabel_definitief.doc and also C. Sabel and S. Reddy, *Learning to Learn: Untying the Gordian Knot of Development Today* (Columbia Law and Economics Working Paper No. 308), 2003, 1-14, available at <http://www2.law.columbia.edu/sabel/papers.htm>.

The right image to carry in one's head is not of omniscient planners who can intervene with the first-best Pigouvian subsidies to internalize any and all externalities, but of an interactive process of strategic cooperation between the private and public sectors that, on the one hand, serves to elicit information on business opportunities and, on the other hand, generates policy initiatives in response. It is impossible to specify the results of such a process *ex ante*: the point is to discover where action is needed and what type of action can bring forth the greatest response.¹¹⁹

Therefore, it consists of a State intervention that at the same time unites and surpasses both predominant views, the developmental and the neo-liberal.¹²⁰ Firstly, the formulation of its mode of intervention results from a process of experimentation and institutional apprenticeship which allows space for dialogue with the private agents. Secondly, the governance structures employed in the course of the economic relations admit a continuous administration of the terms initially agreed upon. In this sense, it is open to collaborative interaction among the agents. Finally, it is a public action which, despite having aims, does not select sector objectives or national champions beforehand.

It is far from clear, however, the extent to which this new institutional set will dictate the entire future of BNDES intervention. Despite being quite evident that the Bank developed new tools to support the new industries, a comprehensive employment of these instruments is not a necessary and automatic result. The next section will introduce some caveats to this optimistic scenario.

D. The limits of the innovation-oriented developmental state: from institutional learning to institutional practice

The analysis of the institutional learning process experienced by BNDES reveals a successful setting out of an engine to meet the new requirements of the Brazilian economy. Even so, the question that remains unanswered is whether these innovation-oriented programs will be only an ancillary case study inside a development bank oriented towards financing traditional sectors, or whether it will become the cornerstone of a completely renewed financial sector.

On the one hand, the description above indicates that in some sense innovation finance flowed from a broad change (though gradual) that took place within the Brazilian administrative governance – it is not a foreign body. Indeed, the closer ties between BNDES and financial market which were found in the legal tools analyzed are grounded in new patterns of operation that had been previously instilled in the Bank, in the context of developmental crisis. As was outlined, since the early 1990s, BNDES has been carrying out its mission with greater adherence to the private financial market. It is not by chance that the new Charter approved in 2002 provides that the fostering of the capital market is a mission to be pursued by BNDESpar.¹²¹ Therefore, one can

¹¹⁹ “Rodrik (2007), *supra* note 114, p. 151”.

¹²⁰ D. Trubek. “Developmental States and the Legal Order: Towards a New Political Economy of Development and Law”, working paper, (2010), pp. 29-32, available at http://www.law.wisc.edu/gls/documents/developmental_states_legal_order_2010_trubek.pdf, accessed on June 20, 2011.

¹²¹ BNDESpar is a BNDES’ branch for variable income operations. See BNDESpar’s Charter, which

assume that some traces of innovation financing, such as support to added-value industries, flexibility and closer connection to private investors, will drive the public finance channel entirely in the short run.

On the other hand, there are substantial grounds for suspecting this enthusiastic expectation. Despite having settled new suitable legal-financial tools, BNDES is far from being an innovation-based development bank. A large part of disbursement is still directed to the former clients in traditional sectors.¹²² Big companies are still the major beneficiaries of loans, and it is quite revealing that firms of the old-fashioned meat sector were the largest borrowers over the last two years. This means that even though the legal technology might already be available, other factors, such as those related to political economy, can contribute to hindering the consolidation of a new kind of developmental agenda.

Moreover, there might be another constraint for the achievement of a sustainable new developmental bank – the crowding-out effect. The engagement of state in financial activities always has a potential risk of being poorly designed, thus overlapping private activities. Therefore, there is a latent threat that public finance may provoke asymmetric competition, perpetrating the atrophy of the financial system. Assuming that in the current developmental agenda, state activism is supposed to be oriented toward providing more market-enabling than market-dominating measures,¹²³ risk of financial market predation can also be understood as an undesirable side effect of this model.

The following sections will explore both problems. The political economy factors suggest an *outward* constraint, coming from the external environment to the Bank operation. In the opposite way, the risk of crowding out is an *inward* limitation, being provoked by the Bank action on market arena.

1. Limits of political economy: *outward* constraints

As outlined above, although innovation initiatives are fine-tuned with the overall rationale of the new administrative governance, these disbursements still have little room compared to the other types of loans directed to former clients. Behind this asymmetric distribution of funds there are intricate political economy reasons, which are (i) the small size of markets for innovation finance and the lack of a variety of financial alternatives even for traditional sectors and (ii) the industrial policy tradeoff between serving the incumbent sectors or favoring the entrants.

Firstly, the size of the innovation market is still limited in Brazil. As mentioned above, studies conducted by IBGE (Brazilian Institute of Statistics) indicate that out of 80,000 Brazilian companies with more than ten employees, only 4% have introduced some type of innovation that was truly new to the Brazilian market.¹²⁴ Even the figure

provides the following: “Article 4 The purpose of BNDESPAR is: (...) IV. Help strengthen the capital market through the increased supply of securities and the democratization of capital ownership of firms.”

¹²² See M. Almeida. “Desafios da Real Política Industrial Brasileira do Século XXI”, IPEA, Working Paper n° 1452/2009.

¹²³ See on this “Arbix & Martin (2010), *supra* note 8”, p. 9.

¹²⁴ IBGE- Brazilian Institute for Geography and Statistics is a federal government agency responsible for the production of data and indicators. Data available at

related to the introduction of a broad meaning of innovation (which includes any type of innovation within the production process, such as the purchase of a new machine) shows a low percentage within the Brazilian industrial economy: only 30% of the companies, researched by IBGE, had invested in any kind of innovation.¹²⁵ This panorama indicates that the asymmetric distribution of resources might simply represent a typical problem of demand. To the extent that the non-innovative sector is much larger than the innovative one, the amount of disbursement for innovation tends to be lower than the volume funneled to other industries. Therefore, bearing in mind that the demand for innovation funds is smaller than the demand for funding in the traditional sector, there are significant barriers to an abrupt increase in the amount of resources channeled to innovation.

Furthermore, it should be taken into account that the Brazilian financial system is still fraught with market failures, well illustrated by the low number of companies listed on the stock market, and the small level of credit to GDP. The lack of financial alternatives may contribute to inflating the size of financial demand presented by non-innovative sectors. In other words, not only the innovative sectors represent a smaller part of financial demand, but also traditional sectors figure as permanent borrowers from the public system. Therefore, even though innovation-driven finance might become the core of new administrative governance, whether this will occur in a short time frame is rather questionable.

This discrepancy in the way the Brazilian economy is organized recalls a second and related question: the path-dependence versus path-shaping issues.¹²⁶ The possible roles played by BNDES and the choices that precede the establishment of an industrial policy are subject to a complex trade off, between the past and the future or between the incumbents and entrants. Indeed, by designing an industrial policy and orienting public finance, policy makers and officials face a common dilemma, which is addressing the shortcomings of the existing industrial sectors or fostering new segments. Thus, it is a choice “between the industry that we have and the industry that we want”.¹²⁷

However, this is not a choice between two equal options. The spur of new segments is an uncertain activity. Different from incumbent sectors, the new ones are not previously known and to a large extent it is impossible to predict their potential profitability and their technical performance.¹²⁸ For these reasons, it might make sense for policy makers and officials to prioritize the existing sectors, whose profitability, costs and gains are already known, instead of investing in sectors that have at most future potential. Thus, in this scenario, the expected reaction of incumbent groups

http://www.pintec.ibge.gov.br/index.php?option=com_content_extjs&view=article&id=17&Itemid=6, accessed on April 15, 2011.

¹²⁵ *Idem*.

¹²⁶ On path dependence in corporate finance arrangement, see L. Bebchuk & M. Roe. *A Theory of Path Dependence in Corporate Ownership and Governance*, in Gordon, J. e M. Roe (Ed.). *Convergence and Persistence in Corporate Governance*, New York, Cambridge, 2004, pp. 74-78.

¹²⁷ This expression is employed by M. Almeida (2009), *supra note* 122, p. 54.

¹²⁸ This point is stressed by G. Dosi. “The Nature of Innovative Process”, in Dosi, G. et. al. (eds.), *Technical Change and Economic Theory* (London: Pinter Publishers, 1988), pp. 221-238. See also C. Freeman and L. Soete *The Economics of Industrial Innovation* (3rd ed., Massachusetts: MIT Press, 1999), pp. 242-264.

against policies that are unfavorable to their interests¹²⁹ is even further reinforced by the uncertainty that prevails in the policymaking.

The recent trajectory of the Brazilian industrial policy reiterates the existence of this political economy dilemma.¹³⁰ In 2004, after a decade without implementing an official industrial policy, the Federal Government introduced the PITCE (Industrial, Technological and Foreign Trade Policy). Unlike the policies of the developmental period, the PITCE consisted of initiatives focused on innovation, favoring sectors primarily demonstrating future potential: software, semiconductors, pharmaceuticals, nanotechnology, biotechnology and capital goods. The policy was apparently based on path shaping, trying to stimulate “the industry that we want”.

Yet, after a period of 4 years, the results of the PITCE were considered unsubstantial and the Federal Government decided to formulate a new industrial policy, the PDP (Productive Development Policy). Although the PDP maintained some of the key characteristics of the PITCE, such as its non-directive nature and the investments in innovation, the focus of the policy had changed substantially. While the PITCE was restricted to a few sectors, the PDP involved 24 sectors of the Brazilian economy, most of which representing the current industrial outlook, such as meat-packers, oil, mining and steel, civil construction, textiles and furniture. To a great extent, PDP seems to be more pragmatic than the PITCE, in contemplating not only “the industry that we want”, but also “the industry that we have”. The funds granted by BNDES have been quite consistent with the PDP, favoring traditional sectors included in the policy.¹³¹

Overcoming this political economy tension between incumbents and entrants will not be easily addressed throughout the Brazilian institutional arrangement. Firstly, there is a disproportionate distribution of power among incumbents and entrants; as the innovative sector is much smaller than the others, vested interests are stronger than the challengers. Secondly, the known comparative advantages of incumbent sector against uncertainty embodied in new segments suggest that reformulation of the development path is unlikely to take place without some hindrances.

Therefore, although the legal conditions for consolidating a new path for development actions have already been created, actual and pervasive implementation will depend on negotiation with the whole Brazilian industrial environment. The learning process experienced by BNDES and the customization of legal tools will not necessarily make the Bank into a governmental venture capitalist. What is most likely to happen is that the expansion of innovation programs and the establishment of an entire new agenda will be the result of a dynamic adjustment between the inertia of path dependence and the imperatives of path shaping.

2. Government failure and “crowding out”: *inward constraints*

¹²⁹ On the role of interest groups in keeping the institutional pathway, “L. Bebchuk and M. Roe (2004), *supra* note 126”.

¹³⁰ M. Almeida (2009), *supra* note 122, pp. 12-16.

¹³¹ For a description of this see M. Schapiro, *Administrative Governance, Institutional Dynamics and Industrial Financing in Brazil: new parameters, old problems*, Working Paper presented at Harvard-Stanford Young Faculty Forum, 2010, p. 33 available at <http://blogs.law.stanford.edu/hsforum/files/2010/09/Administrative-Governance.pdf>. accessed in 15 May, 2011. See also M. Almeida (2009), *supra* note 122, pp. 12-16.

Another set of constraints to the new developmental state model comes from the government itself. As was mentioned above, the main feature of the new administrative governance is a different adjustment with the private segment. Instead of emphasizing market guidance, this new mode of state activism seems to pursue either market enhancement or market enabling policies. These objectives, however, can be jeopardized by side effects produced by the public agents. Among several possibilities of negative externalities that can be produced by poor performance in state intervention, one deserves greater attention: the problem of crowding out.

For this case study, the crowding out effect results from asymmetric competition between state-owned banks and private players. Having access to privileged assets such as information and funding sources, state-owned banks can have a comparative advantage over the private financial agents. The potential result of this dislocation of market competitors might be a partial atrophy of the financial system.¹³²

Even though it is far from clear whether this happens in the Brazilian innovation financial sector, which is still incipient and in some sense dependent on public support, this risk does exist and is twofold. The first risk is a direct one: state agencies, like BNDES, may simply prevent the blossoming of a private venture capital segment. The second risk is more indirect: the whole operation of state-owned banks can prevent the consolidation of the capital market, which can indirectly inhibit the venture capital industry.

Concerning the first problem, in comparison to its private competitors, BNDES has some advantages that can strengthen its market leadership, even in innovation financing. Among other factors, derived from its consolidated position in the financial system, like reputation, BNDES might have a *Stiglian* benefit in terms of information. According to Stiglitz,¹³³ despite being quite central to financial activities, information is a public good and as such it presents the problem of the non-excludability of its consumption. Thus, many financial market failures derive from the lack of incentive for lenders and investors to squander resources and spend time on gathering information about several financial topics. It is not by chance that “because of the fixed-cost nature of information, markets that are information-intensive are likely to be imperfectly competitive”.¹³⁴ This is the case in both the banking industry and the capital market.

Accordingly, as BNDES has been financing the industrial sector for over the last fifty years, it has an extensive portfolio of clients and vast information about several sectors. This industrial expertise can lead to competitive advantages even in the screening of new ventures. This is a *Stiglian* benefit in the sense that the level of information about the industrial sector locked in BNDES departments may represent an inaccessible sunk cost for private players. As a result, it can lead to an uncontestable market share in the long-run finance for industrial sector (even for the high tech firms). Not to mention that, in comparison to private equity funds, BNDES is not only a much more consolidated player, it also has a large set of resources to structure investment operations. Besides variable income possibilities, it can also provide resources through fixed-income contract with favorable interest rates.

¹³² On bad consequences of state-owned banks for the whole financial market, see La Porta, F. Lopez-de-Silanes, A. Sheleifer, *Government Ownership of Banks*, Harvard Institute of Economic Research, Discussion Paper n°. 1890, 2000.

¹³³ “Stiglitz (1993) *supra* note 113”, pp. 19-24.

¹³⁴ Stiglitz, *supra* note 113, p. 24.

Beyond that, there is a second potential risk of crowding out resulting from public finance: the dislocation of capital market. This second side effect is not directly related to innovation financing, but can accrue from the entire working of the system. Despite being a chicken-egg puzzle to wonder what provoked the financial market failures, whether it is the lack of private actors or state intervention, there is little doubt that public gigantism can contribute to the underperformance of the private branch. To the extent that firms can obtain subsidized loans from public agents, they have less incentive to consider the cost and benefit of raising funds from public equity markets. This maladjustment is even clearer in the case of investment grade companies, which in spite of having plenty of opportunity to fundraise from the capital market, use the public bank channels instead.

Particularly for innovation financing, the consequence of capital market crowding out is the hollowing out of this arena as a route for disinvestment, which may prevent the development of the venture capital industry. The literature on venture capital and innovation draws attention to the importance of a liquid stock exchange market for the whole success of private equity investments.¹³⁵

The possibility of IPO provides the correct incentives for both entrepreneurs and venture capitalists. Entrepreneurs take the IPO as the chance to reassume the control of their corporations, thus the better they manage the firm, in the prior market operation phase, the earlier the firm will be suitable for the IPO.¹³⁶ Venture capitalists assume the IPO as an opportunity to sell their share and make money, and they also know that the better their job in the investment phase, the higher the amount of funds raised in the market.¹³⁷ These incentives would explain the strong correlation that prevails between innovation finance, venture capital, and capital market.¹³⁸ Therefore, the potential crowding out of the Brazilian capital market caused by inadequate public-private overlapping can prevent the innovation sector from taking off.

To close this section, two caveats should be mentioned. Firstly, even though the aforementioned direct crowding-out effect may occur, nowadays it is more a hazard than a reality. After all, the state of the art of innovation financing seems closer to a market failure scenario than to a government failure panorama. Even so, presenting this possibility is not purposeless. It intends to call attention to the relevance of designing suitable regulatory tools, which should provide for channeling of public resources to cover missing market and to avoid undesirable predatory competition.

Secondly, the analysis of the indirect crowding effect takes into account a US model of innovation financing, which is based on start-up companies, venture capital funds, and market for IPOs. Nevertheless, there are other possibilities to arrange this type of undertaking such as through large enterprises, as discussed by Singh, Singh, and Weisse.¹³⁹ For these alternative models, based on entrepreneurial groups, there might be other sources of finance, like the bank sector or even retained earnings, which reduce the centrality of private equity funds and capital market. Even so, as the Brazilian innovation policy, to a great extent, seeks to emulate the U.S. model, some

¹³⁵ B. Black and R. Gilson, "Venture Capital and the Structure of Capital Markets – banks versus stock markets", *Journal of Financial Economics*, v. 47, 1998; C. Milhaupt, "The Market for Innovation in the United State and Japan: Venture Capital and Comparative Corporate Governance Debate", *Northwestern University Law Review*, 1997.

¹³⁶ B. Black and R. Gilson, *supra* note 135.

¹³⁷ *Idem*

¹³⁸ *Ibidem*

¹³⁹ A. Singh, A. Singh and B. Weisse, "Information technology, venture capital and the stock market", paper prepared for the International Labour Organization's World Employment Report 2000-2001 (2001).

caution is required with the sustainability of both the investment and disinvestment sides.

VI. Concluding Remarks

Focusing on the different roles played by the Brazilian Development Bank – BNDES throughout the recent trajectory, this paper attempted to suggest that the financing of innovations represents a different type of economic intervention in the Brazilian economy. This new profile of State intervention has been building by the Brazilian policy makers in last decade or more.

Inspired by the outstanding economic results achieved by East Asian countries in the 1990s, they have been attempting to redraft public instruments of economic inducement. Among others, this is the case of stimulating development bank intervention and designing industrial policy measures to foster competitiveness.

In terms of agenda, the focus on innovation and competitiveness are new items in the developmental scope, which is normally driven to pick the winners in traditional sectors. Concerning the tools developed for this new mission, they have represented a break in the Bank's paradigm (used to finance large enterprises with physical assets): it relies on flexible legal structures that, formally or informally, favor a financial relationship subject to revisions and adaptations. Ultimately, instead of the top-down and pre-defined financial operations, designed to meet economic planning requirements, the financing of innovation has been based on more open-ended agreements.

Even so, the question that remains unanswered is whether these innovation-oriented programs will only be an ancillary case study within a development bank oriented to financing traditional sectors, or whether they will become the cornerstone of a completely renewed financial sector. On the one hand, BNDES has been experiencing a process of institutional learning during the last decades, through which the Bank has been acquiring the legal capacity to finance innovative companies. On the other hand, even though BNDES has learned what must be done and how in this sector, innovation financing represents only a small fraction of its disbursement. Among other reasons, path dependence factors and the small size of the Brazilian innovation market can help to explain this apparent mismatch between the institutional learning and the institutional practice.