

# What Do Development Banks Do? Evidence from Brazil, 2002-2009

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## Abstract

Governments, in theory, use development banks to either alleviate capital constraints, benefit politically-connected capitalists, or bail out inefficient firms. Using a new database of publicly-traded firms between 2002-2009, we study the effect of loans and equity investments of the Brazilian National Development Bank (BNDES) on firm performance and investment and find that they do no significant effect, except for a reduction in financial expenditures when companies receive subsidized loans from this bank. We show, however, that BNDES does not systematically lend to underperforming firms. Firms that receive subsidized loans tend to be good performers and those that donate to political candidates who win elections. Therefore, our results reject the view of development banks are used as bailout mechanisms, yet indicate that loans are transferring subsidies to large firms without any substantial firm-level improvement in performance or increase in investment.

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# What Do Development Banks Do? Evidence from Brazil, 2002-2009

## 1. Introduction

This paper deals with the implications of the provision of long-term, subsidized credit by state-owned development banks. Development banks are financial intermediaries specialized on the provision of long-term, usually subsidized, credit to promote industrialization or infrastructure projects (Armendáriz de Aghion 1999). Aside from 25 regional and global development banks, such as the World Bank or the Inter-American Development Bank, there are 286 of these be state-owned development banks focused on the promotion of industrial “catching up” in 117 countries. These banks tend to be among the largest, if not the largest, providers of long-term loans and have been credited with taking a central role in the financing of industrialization in East Asia, Latin American, and Europe (e.g. Cameron 1961; Amsden 2001; Rodrik 2004; Aronovich & Fernandes 2006).

Yet, despite their size and importance, we do not have a clear understanding of what these state-owned, country-level development banks do in practice. Part of our ignorance stems from the fact that most development banks do not disclose detailed data on the loans and investments they make. Thus, most of the work on development banks and their relationship to industrial policy is either theoretical (Amsden 1989; Bruck 1998; Armendáriz de Aghion 1999; Aronovich & Fernandes 2006) or based on qualitative case studies of rapid industrializers, such as South Korea or Brazil (Amsden 1989, 2001; Rodrik 2004). Still, without systematic micro-level evidence, we do not know whether development bank loans actually accomplish their objectives and what criteria they use to select their borrowers. These would be trivial questions if the amounts they lend were

small, but these banks lend large amounts of money and tend to be key players in long-term credit markets in their home countries. In 2010, Germany's KfW had outstanding loans representing 17% of GDP; Brazil's BNDES had loans representing 10% of GDP; and, China Development Bank had outstanding domestic loans representing 9.1% of GDP.

There is a large literature studying the political determinants of state-owned bank lending looking at the loans of state-owned commercial banks (La Porta *et al.* 2002; Dinç 2005; Khwaja & Mian 2005; Cole 2009). For instance, Dinç (2005) finds that, during election years, the lending activity of government-owned banks in emerging markets is greater than that of private banks. Cole (2009) also finds that lending cycles of agricultural loans in India follow election cycles. Sapienza (2004) shows that in Italy the performance of the ruling party in elections affects the lending behavior of state-owned banks. Yet, these works do not study the effects of such loans on firm-level activity (for instance, whether they promote new investment) and focus mostly on loans disbursed by state-owned commercial banks.

In this paper we use company-level evidence from Brazil to examine how and what happens when development banks target publicly traded companies. Brazil offers a good laboratory to examine how development banks work and the effects that their loans have on companies since the National Bank for Economic and Social Development, known as BNDES for its Portuguese acronym, is one of the largest development banks in the world (see Table 1). In 2010, for example, the value of loans disbursed by BNDES (\$101 billion) was more than three times the total amount provided by the World Bank and about 20% higher than that of China Development Bank. Founded in 1952 to provide long-term credit for infrastructure projects, BNDES soon became a central venue for the capitalization of domestic and foreign groups investing in Brazil (Leff 1968). Despite the privatization wave that took place in Brazil in the 1990s, BNDES remained an important source of capital in the economy. By 2010, BNDES' loans amounted to 21% of the total credit to the private sector and the bulk of long-term credit (Figure 1).

Using this micro-level data we test a set of hypotheses emanating from two competing views on the role of public banks. According to the *industrial policy view*, development banks specialize on the provision of long-term capital and lend to companies that would not undertake projects if it was not for the availability of long-term, subsidized funding (Bruck 1998; Yeyati *et al.* 2004). For instance, defendants of state banking see development banks as an important tool to solve market failure leading to suboptimal productive investment. Thus, development banks can solve market imperfections that would leave either profitable projects or projects that generate positive externalities without financing (Bruck 1998; George & Prabhu 2000; Yeyati *et al.* 2004). Moreover, in economies with significant capital constraints, those banks can alleviate capital scarcity and promote entrepreneurial action to boost new or existing industries (Cameron 1961; Gerschenkron 1962; Armendáriz de Aghion 1999). Finally, development banks may finance firms with “latent advantages,” i.e., valuable projects and activities that were not sufficiently developed due to lacking capital and complementary investments (e.g. Rodrik 1995; Lin & Chang 2009). In such circumstances, we would expect to see the firms who borrow from development banks increasing capital investments and overall profitability, on average, after they get funding.

In contrast, the *political view* sees lending by development banks leading to multiple sources of misallocation of credit for at least two reasons. First, development banks may bailout companies that would otherwise fail (this is the soft-budget constraint hypothesis, e.g. Kornai 1979). Second, the *rent-seeking* hypothesis argues that politicians create and maintain state-owned banks not to channel funds to socially efficient uses, but rather to maximize their personal objectives or engage in crony deals with politically-connected industrialists (Ades & Di Tella 1997; La Porta *et al.* 2002; Faccio 2006; Hainz & Hakenes 2008). Thus, rent-seeking capitalists may request subsidized credit or cheap equity even in cases where projects would be normally funded and launched using private sources of capital.

The debate around the mission and effects of development bank actions is nuanced even more when we add the desire of governments to create “national champions.” That is, politicians and officials explicitly target specific firms to receive funds, either debt or equity, as a way to propel them to consolidate their sectors and grow. Some argue, however, that the criteria governments use to select those firms are not clear and can be subject to corruption (Ades & Di Tella 1997). A recent literature has found empirical evidence consistent with the hypothesis that financing can be influenced by political factors such as election cycles and campaign donations (e.g. Sapienza 2004; Dinç 2005; Claessens *et al.* 2008). Therefore, we go beyond assessing impact of development banks on firm-level investment and performance and study the selection mechanism through which certain firms, but not others, get funds from such banks.

We test these hypotheses using a new database on BNDES disbursement of loans and equity investments in publicly traded corporations in Brazil. BNDES, as all country-level development banks, does not disclose detailed data on disbursements. Therefore, our database was built from the annual reports of 286 firms publicly traded in BM&F Bovespa, the Sao Paulo Stock Exchange, between 2002 and 2009. We take advantage of two regulatory mandates. First, in their reports to the Brazilian equivalent of the Securities and Exchange Commission, listed firms in Brazil have to declare their loans according to their origin (BNDES or elsewhere) and have to report the interest rate they pay for large lines of credit. Because BNDES and its affiliates (the other development banks in Brazil that lend BNDES money) lend at a subsidized rate known as TJLP (the Portuguese acronym for Federal Long-Term Interest Rate), which is usually 7.5 percentage points below the market rate, we can identify when a firm has a BNDES loan when they report paying TJLP rates. Using these reports we can also track changes in the amounts borrowed.

Second, Brazilian firms have to report changes in the ownership of the firm, allowing us to identify when BNDES becomes an owner or equity or when it increases the size of its holdings. In addition to loans, some development banks also manage some of the minority equity positions of

their governments. That is, development banks can act as private equity firms, creating another channel through which local firms can capitalize. Therefore, some of the positive effects one would expect to find when firms get development bank loans should also be expected when development banks invest in the equity of those firms. We thus use detailed data on minority positions held by BNDES—through its equity investment arm, BNDESPAR—in all publicly traded companies in Brazil to see the effects of such investments on firm-level performance and investment. In other words, we empirically assess the dual role of development banks as both lenders and (minority) private equity providers.

Our basic cross-sectional analysis shows that BNDES appears to be lending to large, profitable firms. Of course, not controlling for unobservables obscures whether those firms that get BNDES perform better because they get loans or equity, or simply because they were already the best firms when they received the funding. Thus, we run additional regressions using company fixed effects to see the effect of BNDES allocations on firm-level performance and investment, controlling for constant firm-level, industry-level, and time-varying industry-level unobservables. We do not find any consistent increase in profitability, market valuation (Tobin's  $q$ ), or investment in the firms receiving funds from BNDES, either debt or equity. However, BNDES loans reduce these firms' financial expenses in a significant way. This result holds when we combine fixed effects with propensity score matching Heckman *et al.* (1997) to more adequately build control groups without BNDES loans.<sup>1</sup>

Our finding supports the idea that BNDES, rather than providing funding for companies that were capital constrained and in need of resources to pursue large capital investments, actually appears to be supporting firms that would most likely be able to borrow elsewhere. The effect of the

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<sup>1</sup> Inoue, Lazzarini and Musacchio (2011) find some positive effect of equity participations in the period 1995-2002, but not in the subsequent period between 2003-2009, which is covered by the present paper. Their explanation is that capital markets strongly evolved in Brazil after 2003, therefore reducing the capital constraints of most large firms.

subsidized loan appears to be, therefore, a simple transfer from the government to the shareholders of the firms borrowing from BNDES. In sum, our basic econometric analysis does not support the industrial policy view of development banks.

We then examine the selection process through which firms receive debt or equity as a way to test the political view. Under the political view we test two hypotheses. First, we test the soft-budget constraint hypothesis by examining if BNDES systematically chooses underperforming firms. Second, we test the rent-seeking hypothesis, in which we would expect to find that political connections between the firm and the government would be correlated with BNDES lending, controlling for other firm characteristics.

We again employ fixed-effect regressions using firm-level data on loans and equity allocations received from BNDES as dependent variables to show that past financial performance tends to moderately increase the likelihood of receiving a loan. Thus, it is not the case that BNDES is systematically supporting or bailing out bad firms (i.e., we reject the soft-budget constraint hypothesis). This result stands in contrast with Bailey, Huang and Yang's (2011) study using Chinese data, which found a negative association between financial performance and the likelihood of receiving a loan from a state bank. Yet, consistent with the rent-seeking hypothesis, we show that the political market matters. Following previous research (Bandeira-de-Mello & Marcon 2005; Claessens *et al.* 2008; Boas *et al.* 2011), we measure political connections using data on firm-level campaign donations. We find that firms that donate to candidates who won an election are more likely to receive funding in the form of loans from BNDES, while firms donating to candidates who lost an election are less likely to get such loans. Because both profitable and unprofitable firms

appear to be donating to political candidates, however, donations do not cause bad firms to be systematically selected.<sup>2</sup>

Therefore, our findings using data from BNDES lending in Brazil partially support the political view. We find only extremely weak evidence of the industrial policy view (i.e., that the loans are financing projects that would not be financed by the market or are helping to finance latent capabilities of Brazilian firms). A caveat, however, is that we focus only on profitability and investment; we do not measure if allocations support social initiatives or if they yield externalities that are not measured in our database (e.g., employment). For instance, a private project, even if individually unprofitable, may encourage complementary investments in related industries. Moreover, our loan data covers only about 31% of the total loans in a given year, thus our results apply only to large Brazilian firms. These are the most important companies in Brazil, so by no means our results should be interpreted as not telling us something about the impact that BNDES has in the economy as a whole.

Moreover, studies performed by governmental research agencies using larger datasets (which are not disclosed to the public for confidentiality reasons) also have failed to find consistent productivity-enhancing effects of BNDES loans.<sup>3</sup> Therefore, we believe that our results help inform not only the effect of subsidized capital from development banks, but also how those banks behave in terms of their allocation decisions. In particular, although our results reject the view of development banks as mechanisms of bail out, we provide evidence that loans are apparently

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<sup>2</sup> Consistent with our finding, Carvalho (2010) studies the criteria for the allocation of loans and finds that firms in regions governed by politicians allied with the federal government receive more funding from BNDES. However, he uses aggregate, industry-level data instead of firm-level data.

<sup>3</sup> For instance, Ottaviano and Sousa (2007) find that although some BNDES credit lines positively affect productivity, other lines have a negative effect. In another study, Sousa (2010) reports an overall null effect of those loans on productivity. Coelho and De Negri (2010) find that loans have a larger effect on more productive firms. De Negri et al. (2011) find an effect of loans on employment and exports, but not on productivity.

transferring subsidies to large firms without any substantial benefit in terms of improved firm-level performance or investment.

Our paper is structured as follows. In the next section, we provide a brief overview of development banks in the world. We then describe our data on BNDES' allocations and outline our hypotheses building on the industrial policy and political views of development banks, discussed before. We next present our econometric results. As a final analysis, we assess BNDES as a bank, in order to assess its overall performance and its cost of capital. Concluding remarks follow.

## **2. Development Banks throughout the World**

In his study of state intervention in the banking system, Gerschenkron (1962) argues that, without public participation, lack of trust among creditor and debtors would inhibit deepening credit markets. Within this perspective, private banks are reluctant to give credit to long-term, risky investments, thereby leaving value-enhancing projects unfunded (Bruck 1998). Armendáriz de Aghion's (1999) model further refines this argument by proposing that private banks underinvest in expertise required to evaluate and promote new industries in the long run. Subsidized finance in the form of a development bank can therefore prompt new investment.

Existing historical accounts show that development banks exist at least since the 19<sup>th</sup> century with the creation of Société Général pour Favoriser l'Industrie National in the Netherlands (1822) and, later on, a group of institutions in France including Crédit Foncier, Comptoir d'Escompte, and Crédit Mobilier (1848-1852)—the latter having important influence on European infrastructure investments such as railways (Armendáriz de Aghion 1999). The escalating state-led intervention and the decline in private markets that followed the two Great Wars—a trend which Rajan and Zingales (2004) termed “the great reversal”—further reinforced the expansion and importance of development banks. The creation of Germany's KfW (Kreditanstalt für Wiederaufbau) and the Japan Development Bank (JDB) illustrate this trend. Musacchio (2009) also shows that, in Brazil,

the government created BNDES to provide long-term credit after the retraction of bond and equity markets in the 1920s and 1930s.<sup>4</sup>

At the same time, new development theories started emphasizing structural problems inhibiting the industrialization of underdeveloped countries dependent on the production and exports of basic commodities (Prebisch 1950; Hirschman 1958; Furtado 1959). In their view, state-induced savings and credit would be crucial to spur value-added, productive investments (Bruck 1998). Along these lines, Amsden (1989) also stresses the importance of development banks in late-industrializing economies. Financial institutions such as the Korea Development Bank, Amsden (1989) argues, were instrumental not only as a means to infuse long-term capital in the industry, but also as a mechanism to screen good private projects, establish well-defined performance targets, and monitor the execution of investments.

Development banks have persisted over time, in developed and emerging economies alike. Although the liberalization and privatization reforms of the 1990s reduced the scope of development banks in some countries, in several cases banks were preserved and even reinforced. Using various sources such as the World Federation of Development Financial Institutions and EFDI (European Development Finance Institutions), we counted and classified development banks worldwide as of 2011 (Table 2). The majority of the 286 identified banks are in South and East Asia (29.7%), Africa (24.5%), and Latin American and the Caribbean (17.8%). Most cases involve general development banks (40.9%), i.e., banks providing loans to diverse infrastructure and industrial projects (e.g. the Interamerican Development Bank, the Korean Development Bank, and BNDES, among many others). There are also banks more focused on certain segments such as

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<sup>4</sup> An additional view is that the Brazilian government, in particular during the second term of president Getulio Vargas (1950-1955), created BNDES as an isolated entity with technical staff, as a way to protect the bureaucracy from political clientelism. President Vargas did this while simultaneously building a political system based on strong corporativism, with newly-created unions and business association playing an important role. See Nunes (1997) and Schneider (1991).

agriculture and small enterprises (27.6%), as well as commercial banks that have some development programs (24.1%). With the global financial crisis of 2008, development banks gained new momentum. In 2009, the Argentine government announced an intention to create a national development bank mimicking Brazil's BNDES. Even in the United States the federal budget of 2011 included a US\$ 4 billion package to build a development bank supporting large infrastructure projects.

Our study provides a detailed analysis of Brazil's BNDES, one of the largest and most profitable development banks in the world (Table 1). BNDES was created in 1952 after joint commission involving the governments of Brazil and the United States decided to expand Brazil's infrastructure projects and create a mechanism to provide long-term credit for energy and transportation investments. The Brazilian National Bank of Economic Development (BNDE in Portuguese, later changed to BNDES when "social development" was added to its mission) then expanded its scope by providing loans to a host of "basic industries" that the government wanted to develop (such as metals, oil, chemicals, and cement) (Leff 1968). In the 1970s, BNDES also started investing more directly in the *equity* of Brazilian companies. In 1982, its investment arm BNDESPAR was created to manage those holdings.

BNDES survived and remained important even after the liberalization and privatization wave of the 1990s starting with Fernando Collor de Mello (1990-1992) and continuing under the term of Fernando Henrique Cardoso (1995-2002). The bank was actually an active participant in those reforms, in three ways: planning and executing privatizations, providing acquirers with loans, and purchasing minority stakes in several former state-owned enterprises. In the two administrations of President Luiz Inácio Lula da Silva (2003-2010), BNDES was also involved in several large-scale operations and helped orchestrate mergers and acquisitions to build "national champions" in several industries (Almeida 2009). Our database, discussed next, covers the period

2002-2009 and sheds more light on the process through which BNDES selects firms and affects (or not) their performance.

### **3. Data and Hypotheses**

#### **3.1. Data**

We collect panel data from 286 publicly listed companies in the São Paulo Stock Exchange (BM&F Bovespa) between 2002 and 2009. We used multiple sources to build our main variables. Basic financial information came from *Economática*, a financial database, while ownership data were obtained from diverse sources such as the Brazilian Securities and Exchange Commission (CVM) and *Valor Grandes Grupos* (a yearly survey of Brazilian business groups). We cleaned the database by eliminating inconsistent information (e.g. cases where total assets were different from total liabilities) and winsorized at the 1% and 99% percentiles some key performance variables that were shown to vary substantially (return on assets, Tobin's q, etc.). Missing information for some variables and years causes the total number of firms in the panel to vary according to the model specification. We also dropped from our database financial firms and publicly listed holding corporations (i.e. we only kept their listed affiliates).

We collected data on BNDES loans and equity in two different ways. In the case of loans, we analyzed companies' balance sheets in detail, trying to find explanatory notes indicating the origin and yearly composition of outstanding loans. More recently BNDES started disclosing data on approved funded projects; however, for confidentiality reasons the bank does not provide historical data on firm-level loans. Still, because most publicly listed companies report the name of the lender and/or the interest rate associated with the loan, we were able to collect data for a larger number of firms and years. Loans originated from BNDES—supplied directly by the bank or indirectly through another financial intermediary—are associated with a subsidized interest rate called TJLP (Federal Long-Term Interest Rate). Thus, yearly information on BNDES loans was collected based

on cases where the company reported either that the loan came from BNDES or that the associated interest rate was based on TJLP. If the firm did not specify the origin of its loans or their interest rates, we considered that information on BNDES loans for that particular company was missing.<sup>5</sup>

As for BNDES' equity, we observed the ownership composition of each firm to identify cases where BNDES—through its investment arm, BNDESPAR—appeared as an owner. We then collected the percentage of equity ownership by BNDES. We focused on direct ownership relations only, that is, cases where BNDES was a direct owner of the firm instead of an indirect owner through a pyramidal ownership structure (e.g. BNDES owns an intermediary firm, which then owns the observed company). Our focus on direct ownership relation is for two reasons. First, we were interested in computing the size of equity participations; retrieving information on the size of ownership is much more difficult when opaque pyramids are involved. Second, Inoue, Lazzarini and Musacchio (2011), comparing direct and indirect stakes, report that the most consistent performance effects of BNDES equity comes from direct ownership. Thus, our focus on direct equity is apparently appropriate to capture the effect of BNDES ownership as well as its magnitude.

Table 3 shows descriptive data on the number of firms in the database observed with BNDES loans and equity. The number of firms with BNDES loans is much larger than the number of firms with BNDES equity, although the participation of the bank as an owner has increased over the years. The modal firm in our database with BNDES loans has around 31% of its debt coming from the bank; in the case of equity, the modal firm has around 14% of BNDES direct ownership. Our final sample corresponds to around 31% of total outstanding loans and 69% of total equity held by BNDES in 2009. Thus, while we focused on publicly listed firms, our sample represents a

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<sup>5</sup> BNDES can provide the loans directly (“first-tier operations”) or indirectly (“second-tier operations”) through financial intermediaries, such as private and public banks. In both cases, however, loans are associated with the TJLP rate plus a spread that is paid to BNDES if the operation is direct or to the financial intermediary if the operation is indirect. Furthermore, the majority of firms in our sample are large corporations that are eligible to obtain loans directly from BNDES.

substantial fraction of BNDES' loans and equity.<sup>6</sup> Although 84.5% of firms with BNDES equity also have BNDES loans, the majority of firms with BNDES credit (87.9%) are not owned by the bank. Thus, the correlation between the size of observed BNDES loans and equity is small, 0.149. This allows us to simultaneously examine the effect of both loans and equity positions on firm-level performance variables.

### **3.2. Variables**

We employ four sets of variables (see Table 4). The first set corresponds to variables related to firm-level performance and investment activity. Thus, the profitability of firms is measured by ROA (net return on assets) and EBITDA/assets (operational return on assets). The latter is particularly important because the subsidy associated with BNDES loans may distort an analysis of profitability through ROA. We also measure the performance of firms as assessed by the stock market, through a simplified proxy of Tobin's q (market value of stocks plus debt divided by total assets). Because, as noted before, BNDES loans may help reduce the cost of capital, we also add the variable Finex/assets measuring the ratio of firm-level financial expenses (loan payments) to debt. The last two variables are related to investments: Capex/assets and Fixed assets/assets measure respectively yearly capital expenditures and the total stock of fixed capital relative to the stock of all existing assets.

The second set of variables corresponds to BNDES loans and equity. We measure these variables in both absolute and relative (percentage) terms. Thus, Ln(BNDES loans) and Ln(BNDES equity) measure the total (logarithmic) value of loans and equity positions (in the case of equity, we considered the book value of equity times the percentage participation of BNDES).

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<sup>6</sup> Even if our sample has over 100 firms receiving loans every year, the top 20 firms have the largest share of loans. In 2009 alone, the top 20 firms in our sample took around 20% of the total loans of BNDES and 87% of the new loans to firms in our sample.

%BNDES loans and %BNDES equity, in turn, gauge the extent of BNDES capital relative to total debt and total equity respectively.

The third set of variables is related to the political environment. Numerous studies have found that, in Brazil, political campaign financing is a crucial mechanism through which firms establish political connections. Large election districts and an open list competition create incentives for politicians to trade “pork” for private money to support costly campaigns (Samuels 2002). Different from the United States, corporations can make cash donations directly to candidates, and there is no restriction on donations from foreign firms (provided they have a local subsidiary). The official limit for domestic firms is two percent of their gross revenues, but “under the table” donations are pervasive (Araújo 2004). Furthermore, although widespread, collective lobbying efforts are perceived to be not as effective as individual connections. The lack of encompassing peak associations, capable of controlling free-riding, pushes firms to establish their own connections (Schneider 2004). Consistent with this logic, several empirical studies have found a significant association between campaign donations for Brazilian politicians and firm-level profitability (Bandeira-de-Mello & Marcon 2005), preferential finance (Claessens *et al.* 2008), and access to government contracts (Boas *et al.* 2011).

In Brazil, candidates are required to disclose all donors to the Superior Electoral Tribunal (TSE). The electoral authorities then release data on election finances for each candidate. We used this data to match individual firm contributions to politicians with election results. Thus, for each firm we have the total number of candidates (running for President, Senator, State Governor, State or Federal Deputy) to whose campaign the firm officially contributed in the previous election. Given that our panel runs from 2002 to 2009, we consider campaigns that occurred in 2002 and 2006. Thus, data from the 2002 campaign are used to assess outcomes occurred in 2003-2006, while data from the 2006 campaign are used for the years 2007-2009. Because donation data may be plagued with self-selection issues—e.g. the best firms may be approached by a larger number of

candidates—we also separate between donations to candidates who won from donations to those who lost the election, considering that election results have an exogenous component due to random events affecting political competition (Claessens *et al.* 2008). In addition, we compute the variable “donations for winners – losers,” corresponding to the difference between the number of candidates who received donations and won the election minus the number of candidates who received donations and lost the election. In line with previous studies, we consider campaign donations as a sign of the extent of a firm’s political activity, even if “under the table” donations are common in Brazil.

Finally, we employ a set of control variables. Because scholars have argued that membership to business groups (strategically-coordinated diversified set of legally independent firms) affect firm-level performance in emerging markets (Khanna & Yafeh 2007), we add a dummy variable coding whether the firm belongs to a group or not. Variations in the size of the firm are captured by the variable  $\text{Ln}(\text{assets})$ , which is the logarithmic value of total assets. Leverage (debt to assets) and Fixed (fixed assets to total assets) capture respectively variations in terms of debt activity and propensity to engage in fixed allocations. When Fixed is used as a dependent variable, it is omitted as a control. The last control, Foreign, is a dummy variable indicating whether the firm is foreign-controlled or not.<sup>7</sup>

### 3.3. Hypotheses

Based on our earlier discussion on the *industrial policy* and *political* views on the role of development banks, Table 5 summarizes our main hypothesized effects. To tease out alternative explanations, we examine not only whether BNDES affects performance and investments, but also factors that may affect BNDES allocations, i.e., the extent of loans or equity that the firm receives from BNDES.

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<sup>7</sup> We also have a control related to whether the firm is state-owned or private; however, because in our sample there was no instance of privatization, this aspect is automatically controlled for in our fixed-effect regressions.

The industrial policy view rests on the assumption that development banks operate in environments with capital scarcity. By specializing in long-term finance neglected by the private sector, development banks facilitate the execution of valuable investments and projects that would otherwise not happen (e.g. Bruck 1998; Armendáriz de Aghion 1999; Yeyati *et al.* 2004). Development banks may also set high standards for firms and subject them to performance targets conditional on their allocated capital (Amsden 2001). Thus, according to this view, development banks should improve investment and performance. For instance, if firms are constrained in long-term financing, loans from development banks may allow firms to undertake capital expenditures to capture economies of scale or acquire new technology. This should be expressed as improved firm-level profitability (ROA, EBTIDA/assets) or market valuation (Tobin's  $q$ ). Of course, an increase in profitability may be due to subsidized funding (i.e., a reduction in  $Finex/debt$ ). However, if development banks allocations prompt investment in valuable projects, then the effect on performance should occur beyond a simple reduction in interest payments. Following the same logic, BNDES allocations should also positively affect capital expenditures and the stock of fixed capital, whose longer-term horizon may require extended loans or equity allocations not easily found in scarce capital markets.

As for the determinants of allocations, the industrial policy view offers no clear prediction. On the one hand, development banks may pick firms with good performance to either boost "champions" or guarantee repayment (Amsden 2001). On the other hand, development banks may influence firms with latent advantages (e.g. Rodrik 1995; Lin & Chang 2009). If those advantages are "latent," development banks may not necessarily target firms with superior (actual or past) performance.

The political view, in contrast, places higher emphasis on the process of selection. Through their development banks, governments can bail out failing corporations (the soft-budget constraint hypothesis) or benefit politically-connected capitalists (the rent-seeking hypothesis). One way

political connections translate themselves into preferential access to finance is through state banks. In this case, the government uses the control of scarce country financial resources as an instrument with which to bargain for political support and private interests. As discussed earlier, in Brazil campaign donations have been shown to have implications for preferential finance (Claessens *et al.* 2008), and a possible channel for this effect may be through state-owned banks.

Therefore, well-connected industrialists may have superior ability to attract loans or equity from development banks, even in cases where they would be able to get capital elsewhere (Krueger 1990; Ades & Di Tella 1997; Haber 2002). Because, according to this view, allocations may be driven for reasons other than efficiency, there is no clear prediction on the effect of allocations on firm-level performance or investment. Even in cases where development banks promote the creation of national champions through industrial consolidation, the final effect of allocations is not straightforward. On the other hand, reduced competition should increase economic rents; but it may also create incentives for restricted output and investment. The only clear positive effect from allocations (in particular, loans) should be associated with a reduction in interest payments due to subsidized credit. However, in this case the loan simply represents a transfer from the bank to capitalists, without necessarily having any effect on actual business-level activity.

In the next section we test these hypotheses through two sets of regressions. The first set examines the impact of BNDES allocations on firm-level performance and investment, while the second set assesses the determinants of allocations (i.e., using BNDES loans and equity as dependent variables and, as independent variables, performance and political factors). In both cases, to control for unobservables, we employ fixed-effects specifications including time-invariant firm-level fixed effects as well as time-varying year and industry-year effects.<sup>8</sup> Thus, we

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<sup>8</sup> We code industries at the 2-digit SIC level because we would otherwise have few representative firms per industry. Note that our firm level fixed effects already control for (invariant) industry membership effects.

fundamentally measure how variations in BNDES' allocations affect variations in firm-level performance, and vice-versa.

## **4. Results and Discussion**

### **4.1. Cross-sectional analysis**

The first important pattern that comes out of our data is that the cross-sectional variation does show that firms that receive BNDES loans are larger and exhibit superior performance in terms of higher ROA, higher EBITDA/assets, and lower Finex/debt (see Table 6). Although the latter may have to do with loan subsidies, from a cross-sectional standpoint it seems that BNDES loans are associated with firms with superior operational performance (net of financial expenses). Firms receiving loans also appear to have a larger proportion of fixed assets. At first glance, this seems to be consistent with the industrial policy view that development banks are associated with improved investment and performance.

When we look at firms in which BNDES buys equity we do not find such clear cross-sectional pattern. Firms with BNDES equity allocations have lower EBITDA/assets, although they are also larger and apparently have a larger proportion of fixed assets. We note, however, that the number of firms with BNDES equity in our sample is much smaller than the number of firms with BNDES loans, which limits the generalization of our results.

### **4.2. Impact of BNDES allocations on performance and investment**

Table 7 presents regression results on how BNDES affects firm-level performance (ROA, EBITDA/assets and Tobin's q), using fixed-effects regressions. We include loan- and equity-based variables measured in two ways (absolute logarithmic value and percentage), as well as, in some specifications, lagged values to accommodate possible phased effects of the allocations. No significant effect is found for the BNDES variables, in virtually all model specifications and for all

performance variables. Thus, although BNDES appears to be lending to the best firms in a cross-sectional examination, the effect disappears once we control for firm- and industry-level factors. Our data are thus inconsistent with the industrial policy view, which argues that loans from development banks improve firm performance by allowing firms to invest in valuable projects that would otherwise be left unfunded. Once we control for particular industry- and firm-level traits we find that BNDES allocations have no particular effect on profitability or market valuation.

As expected, the first four columns in Table 8 show that BNDES loans have a negative effect on financial expenses. The subsidy included in BNDES loans reduces firms' cost of capital. Consider the results of the second column: because the marginal impact of BNDES loans is simply the estimated coefficient of  $\text{Ln}(\text{BNDESloans})$  divided by the size of BNDES loans, and the dependent variable measures financial expenses relative to assets, the marginal reduction of financial expenses for each additional dollar from BNDES can be computed as the estimated regression coefficient divided by the participation of BNDES loans on total debt—which is 0.303, on average, for the firms with observed loans from BNDES. Thus, each additional dollar from BNDES reduces financial expenses (relative to debt) by 0.04 ( $0.013/0.303$ ), or 4%. Considering, alternatively, the results of the fourth column, an increase in one percentage point in BNDES loans relative to debt (lagged) reduces the ratio of financial expenses to debt by 0.12 percentage point ( $p < 0.01$ ). Thus, our estimates indicate that BNDES loans reduce the cost of capital by a percentage differential somewhere between 4 and 12%, which is more or less consistent with the subsidy included in BNDES' interest rates.

The results of the fourth column also show that an increase in one percentage point in BNDES equity participation (lagged) reduces by 2.1 percentage points the firm's financial expenses to assets ( $p < 0.001$ ). A possible explanation is that creditors see extra equity from BNDES as an implicit guarantee of repayment. These results are consistent with both the industrial policy and the

political views, given that governmental allocations may affect the cost of capital directly through subsidies or indirectly through implicit guarantees.

Table 8 also shows that there is a significant effect of BNDES loans on the ratio of capital expenditures to assets. However, results are not very consistent across specifications. While there is a positive effect once we consider the logarithmic value of loans (sixth column,  $p < 0.05$ ), the effect becomes negative, although with moderate significance ( $p < 0.10$ ), if we take the ratio of BNDES loans to the firm's total debt (seventh column). As for the effect of BNDES loans and equity on the ratio of the stock of fixed capital to assets, no significant result is found, except for a marginally significant negative of %BNDES loans<sub>*t*</sub> in the last column ( $p < 0.10$ ). Those results thus provide at best only weak support for the industrial policy view. In our sample, BNDES allocations are not consistently changing firms' investment decisions, once we control for a host of firm-level factors.

### **4.3. Selection process: impact of firm-level variables on BNDES allocations**

We now examine the selection process by considering BNDES loan and equity allocations as dependent variables. Tables 9 and 10 present regression results for BNDES loans and equity respectively.

Let us first analyze how firm-level performance variables (ROA, EBITDA/assets and Tobin's *q*) affect BNDES allocations. To capture temporal effects, we add lagged values of the performance variables (e.g. BNDES takes into consideration firms' past performance). We find some positive effects of ROA and EBITDA/assets in some specifications (first, sixth, and seventh columns), but the level of significance is marginal ( $p < 0.10$ ). We also fail to detect any significant effect of Tobin's *q*. As for the choice of BNDES equity, these investments do not appear to be affected by our performance variables in any meaningful way (Table 10). Although we do not find strong, consistent effects of performance variables, our data do not support the soft-budget

constraint hypothesis (of the political view) that BNDES is systematically bailing out poor-performing firms. Thus, if anything, allocations are not generally targeting bad projects.

Strong effects are found for the political variables as determinants of loans (Table 9), although no similar effect is found in terms of equity (Table 10). While donations in general do not affect loans, clear effects appear when we separate between donations to candidates who won and who lost the last election—either when we consider these variables separately or when we use the difference between number of winners and number of losers ( $p < 0.01$ ). Because, as noted before, the effect of donations on BNDES loans is simply the estimated coefficient of donations on  $\ln(\text{BNDESloans})$  times the size of BNDES loans (US\$ 166 million on average), estimates in the fifth column of Table 9 indicate that an additional winner who received donations increases loans by around US\$ 28.2 million, whereas an additional loser reduces loans by US\$ 24.4 million. Considering our previous results that BNDES loans reduce financial expenses somewhere between 4 and 12%, then the private gain from each additional donation to a winner would bring net benefits ranging around US\$ 1.1 and 3.4 million. In contrast, the average donation per winning candidate for each firm in our database was US\$ 22,820 in 2002 and 43,903 in 2006. Even if we consider that there may be substantial donations “under the table”—estimated by Araujo (2004) as twice or ten times the official figures—the magnitude of the estimated effect is far from trivial. In addition, by establishing political ties, firms may receive benefits beyond loans.<sup>9</sup>

Our separate findings for winners and losers are of particular importance because it suggests that our results are not merely driven by self-selection. For instance, one might argue that donors receive more loans because BNDES selects profitable firms and those profitable firms have more money to be distributed to politicians. There is, however, no significant correlation between

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<sup>9</sup> The effect of donations also appears cross-sectionally. Thus, if we split our sample considering the difference between donations for winners and for losers, the subgroup involving more donations for winners than losers has on average 28.7% of BNDES loans relative to debt, while the other group has on average 24.4% ( $p < 0.05$ ).

donations for winners and firm-level performance variables. And while there is significant correlation between donations for losers and performance variables ROA and EBITDA/assets, the correlation coefficient is small and *positive* (0.06,  $p < 0.05$ ). In other words, well-performing firms are more associated with giving donations for *losers*, rather than for winners. Furthermore, there is no significant correlation between these performance indicators and the difference variable computing donations for winners minus losers, which is also highly significant in our regressions. An explanation is that the result of an election has an exogenous component due to random factors influencing political competition (Claessens *et al.* 2008). The effect of donations also remains significant when we add in the *same* regression financial performance variables such as ROA and EBITDA (not reported here, but available upon request).

This finding should not be necessarily interpreted as an outright “give-and-take” relation between BNDES bureaucrats and capitalists. BNDES is well known for having a technical, competent staff that scrutinizes the repayment capability of borrowers (Schneider 1991; Evans 1995). A likely explanation is that firms donating to winners are more likely to be engaged in governmental contracts (Boas *et al.* 2011); and large, public projects in Brazil have usually been accompanied by substantial BNDES funding (Lazzarini 2011). Alternatively, certain donors are more likely selected by the government as “national champions,” and their sectors are more likely subject to industrial policy targeting.

Collectively, our results thus provide stronger support for the rent-seeking hypothesis (of the political view) than for the industrial policy view. Now, the evidence supporting the rent-seeking hypothesis shows that campaign donations appear to influence BNDES allocations, although apparently this effect does not cause bad firms to be systematically selected. Thus, it is not the case that BNDES is generally picking bad projects, with negative implications for its own financial health (i.e., there is no evidence to support the soft-budget constraint hypothesis). A likely reason is that politically connected firms in our database do not appear to be systematic underperformers.

These firms want cheaper credit but they are not bankrupt firms in need of a financial lifeline. Even good firms have incentives to be politically connected as a way to guarantee subsidized loans. Furthermore, good firms may use connections as an “insurance” against adverse political decisions.

This is not to say, however, that bailouts never occur. For instance, a group of firms including Electricité de France (EDF) and AES Corporation acquired, in 1998, the control of Eletropaulo, a former state-owned company in the electricity sector. BNDES provided the acquirers with US\$ 1.2 billion in loans. However, by 2003, the acquirers were on the brink of default, and BNDES decided to reconvert part of the loans into shared and convertible bonds. A similar movement occurred in 2011 with Brazilian meat packer JBS-Friboi, which aggressively expanded internationally by acquiring Swift and Pilgrim’s Pride, among other firms. The expansion came at a cost of a substantial debt, and thus in 2011 JBS and BNDES agreed to reconvert part of BNDES loans into shares.<sup>10</sup> However, although these cases are important, our findings indicate that they are not the norm, at least in the period covered by our database.

#### **4.4. Robustness checks**

We now present a battery of tests to check the robustness of our results and assess alternative model specifications. An important source of concern is that our fixed effect regressions, while controlling for fixed firm-level unobservables, as well as time-varying industry-

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<sup>10</sup> The fact that BNDES sometimes prefers to finance firms through convertible bonds could indicate that their way of providing funding follows the kind of incentives that Rodrik (2004) wants in industrial policy. The company has an objective and promises an amortization rate for the debt, if it does not meet those targets, BNDES can dilute current owners by converting its debts to equity at a pre-fixed price. Yet, the conversion of debt to equity is not really a punishment for two reasons. First, even if it dilutes cash flow rights of all shareholders, it does not necessarily dilute control as long as firms retain substantial voting rights. Second, even if controlling and minority shareholders lose some of their cash flow when BNDES enters as a new shareholder, they usually have the first right to buy shares in the new equity issue, thus reducing the dilution effect. Therefore, convertible loans (or debentures) may act more as a bailout mechanism rather than a punishment for not meeting specific goals.

level unobservables, do not guarantee that appropriate comparison groups are satisfactorily handled in the analysis. Heckman, Ichimura and Todd (1997) suggest a procedure combining fixed effect and matching techniques. Propensity score matching allows for the construction of appropriate comparison groups that can be used to assess the effect of a given treatment. In our case, the “treatment” is interpreted as whether the firm is observed or not with BNDES loans; and comparison groups are constructed based on our set of (non-BNDES) observable variables (firm size, leverage, industry membership, and so on). We focus on loans because our previous analysis did not reveal consistent effects for equity positions and the number of those positions is much smaller than the number of firms with loans.

We thus begin by performing propensity score matching in the first year of the sample (2002), and then use the weights computed from the estimated propensity scores to adjust our fixed-effect regressions for the whole panel.<sup>11</sup> Weights essentially make the treatment and control groups more aligned in terms of their observable characteristics, thus reducing potential bias due to the lack of comparability between treatment and control conditions (Nichols 2007). To further reduce comparison bias, although at a cost of a reduced sample size, we also only consider matched observations in regions of common support, i.e., where treated and control observations have similar probabilities of being included in the treatment based on their computed propensity scores (Heckman *et al.* 1997). Results, shown in Table 11, strongly confirm our previous findings: the only significant effect of having BNDES loans is on Finex/assets, i.e., loans do not change performance and investment outcomes in any meaningful way except with respect to a reduction in the cost of capital.

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<sup>11</sup> We employ kernel estimation of the propensity scores. Given the cross-sectional nature of the technique, we compute propensity scores (and weights) in the first period to avoid problems of endogeneity if weights incorporate subsequent variations in the panel (e.g. Saiani 2012).

As an additional test, we follow Fazzari, Hubbard, and Petersen (Fazzari *et al.* 1988) and examine if development bank loans change the financing constraints of Brazilian firms (for an application to state-owned banks, see Behr *et al.* 2012). The basic idea of the model is that firms that are constrained financially have investment ratios (capital expenditures to fixed assets) that are more sensitive to an increase or decrease in cash flow. That is, for those firms an increase in cash flow should have a large positive impact on investment. Following that literature, we measure investment as the ratio of yearly capital expenditures to the initial stock of fixed capital (observed at end of the previous year). We also use, as a proxy for cash flow, the ratio of net profits to the initial stock of fixed capital; and add, as a measure of investment opportunity, Tobin's  $q$ . Within this perspective, if BNDES' allocations reduce capital constraints, then an increase in those allocations should reduce the marginal impact of cash flow on investment. We test this hypothesis by interacting the BNDES variables with the proxy for cash flow, and then we observe whether the coefficient of this interaction is significantly negative or not (see Behr *et al.* 2012). In our regressions, we control for leverage, group membership, foreign ownership, as well as firm, year, and industry-year fixed effects.

Results, shown in Table 12, do indicate that an increase in cash flow positively affects the investment ratio. However, the BNDES variables do not significantly affect investments, either directly or indirectly through the interaction with cash flow. Therefore, at least in our context, there is again lack of support for the hypothesis that development banks reduce credit constraints and promote investment.

We also performed several additional tests to see if the effect of the BNDES variables on performance and investment vary according to certain firm-level traits (not reported here, but available upon request). Thus, using  $\text{Ln}(\text{Assets})$ , we split the sample (at the median) to compare the effect on smaller and larger firms; using the difference between ROA and the median industry ROA, we do the same to detect possible distinct effects for high- and low-performers. No

substantial distinct effects, however, are found. To see if the effect of allocations is larger for firms with high capital intensity, we also interact the BNDES variables with a dummy coded as one if observed capital expenditures are above the median and zero otherwise. In addition, following Rajan and Zingales (1996) we test if BNDES loans and equity investments have a significantly different effect on performance and investment in firms with higher finance dependence. For that purpose we created a variable computed as the difference between capital expenditures and EBITDA, divided by capital expenditures. We then interacted this measure with our BNDES loan and equity variables and find that these interactions were not significant. Finally, we performed split-sample regressions to see if the effect of BNDES' allocations on performance and investment vary depending on whether firms are connected to politicians or not. The logic of the test is that politically-connected firms may be more likely to ask for loans as a way to get lower interest expenses (i.e., capture subsidies) instead of using them to promote new capital investments for the firm. Using the variable measuring the difference between donations for winners and for losers as a criterion to split the sample, we find no consistent results indicating that the effect of BNDES' allocations is substantially differ across those two groups.

#### **4.5. Implications of our Findings for the Brazilian Economy**

What can we say about the broader implications of BNDEs disbursements of loans and equity investments then? The evidence we have presented so far points to the fact that BNDES does not seem to be promoting profitable projects, is not affecting a large increase in capital expenditures for our sample of firms, and may be even allocating loans to politically-connected firms. That means the impact of such loans (and equity investments) on the Brazilian economy is small. Of course BNDES may be generating social benefits or other types of externalities that are not measured in our database. We do not, however, have information to measure other positive impacts these loans and investments may be generating or the distortions that subsidized loans generate in

the credit market. Moreover, since a large part of the financing of BNDES comes from payroll contributions, there may also be distortions associated with the funding schemes of the bank.

## **5. Concluding Remarks**

Our study contributes to the evolving debate on the role of development banks and state-led intervention in credit markets. Our in-depth analysis of Brazil's BNDES, one of the largest development banks in the world, reveals a more nuanced picture of development banks. On the one hand, BNDES does not appear to be systematically picking or bailing out failing firms, and its operations are, to some extent, profitable. On the other hand, its loans and equity allocations do not affect the performance and investment decisions of our firms in a consistent way—except for a reduction in financial expenses due to the effect of governmental subsidies. We also see that politically-connected firms seem to have an advantage obtaining BNDES loans. Yet this mechanism does not seem to self-select poor performers only. All firms, with good or bad projects, have incentives to attract BNDES funding as a way to reduce their financial costs, even in cases in which their projects could be funded using other sources of capital, including stock and bond markets. Therefore, although our results are inconsistent with the industrial policy literature, which sees development banks as mechanisms to unlock productive investments through state-led credit, they do not completely support the opposing perspective of development banks as tools to help and rescue failed industrialists.

To be sure, our focus on a single bank calls for more studies on a broader range of countries with distinct institutional characteristics and stages of development. In addition, our data on publicly traded companies tap into the largest firms in the country. For instance, small and medium enterprises (SMEs) may be subject of more binding credit constraints and be more positively affected by loans or equity investments by development banks. In Chile, for instance, state-owned Production Development Corporation (CORFO) is focused on SMEs and only acts guaranteeing

part of the debt that is provided by private financial intermediaries. Such entrepreneurial role for development financial institutions is not well addressed by the extant literature, and certainly calls for future empirical studies scrutinizing the pros and cons of governmental interventions to spur productive investments.

## 6. References

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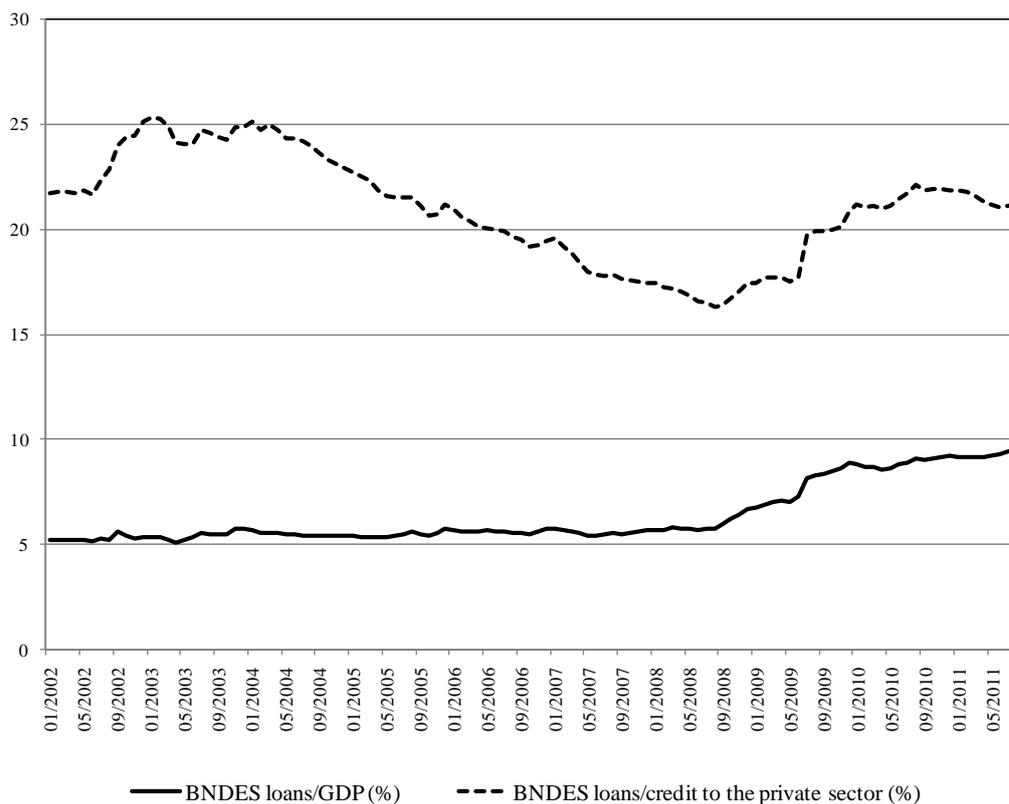


Figure 1  
BNDES: evolution of loans  
Source: Central Bank of Brazil

Table 1  
Comparison of selected development banks (2010)

	Brazil's BNDES	Inter- American Dev. Bank (IDB)	World Bank	Korea Dev. Bank	Germany's KfW	China Dev. Bank
<i>Financials (US\$ bn) and employment</i>						
Total assets	330	87	428	123	596	751.8
Equity	40	21	166	17	21	59.2
Profit	6.0	0.3	1.7	1.3	3.5	5.5
New loans	101	10	26	n.a.	113	84.2
Outstanding loans	218	63	234	64	571	663.2
Staff	2,982	~2,000	~10,000	2,266	4,531	4,000
<i>Performance ratios</i>						
Return on equity (%)	15.0	1.6	1.0	7.8	16.7	9.2
Return on assets (%)	1.8	0.4	0.4	1.1	0.6	0.7
Profit/employee (US\$ M)	2.0	0.2	0.2	0.6	0.8	1.4
Equity/assets (%)	12.0	24.0	38.7	14.0	3.5	7.9
Assets (US\$ M) per employee	110.8	43.6	42.8	54.4	131.5	188.0

Source: based on Torres Filho (2009), with updated information from the banks' annual reports. For the World Bank the financial year is from 6/2009 to 6/2010.

Table 2  
Number of development banks around the world (2011)

	Develop- ment agencies	General develop- ment banks	Special- purpose development banks	Commercial banks with development objectives	Total, by region
	(A)	(B)	(C)	(D)	(E)
Africa	3	26	21	20	70
North America			1		1
South and East Asia	13	23	22	27	85
Eurasia		7	2	9	18
Europe		7	3	2	12
Latin America/ Caribbean	4	29	17	1	51
Middle East		1	3	3	7
Oceania	1	5	5	4	15
Regional/Global		19	5	3	27
Total, by type	21	117	79	69	286

Source: We counted and classified all banks associated with the World Federation of Development Financial Institutions and the EFDI (European Development Finance Institutions), using the information on profiles and missions from their web pages: <http://www.wfdi.org.ph/members/list-of-members/> and <http://www.edfi.be/members.html> <access on February 12, 2012>. Note on the classification scheme:

A. Development agencies: includes investment authorities, training centers, and organizations that provide technical assistance to specific sectors, but that do not specialize in giving out loans.

B. General development banks are those focused on providing loans for or investing in the equity of industrial and/or infrastructure projects. It includes also banks that provide guarantees so that industrial or infrastructure projects can get private funding. They can be regional, such as the Inter-American Development Bank, or domestic, such as the Korea Development Bank.

C. Special-purpose development banks are those financial institutions specialized on credits to agriculture, small and medium enterprises, or the construction industry. That is, we include banks that want to promote construction and housing developments for families who could not get mortgage loans from regular banks. This category can include agricultural banks like The Principal Bank for Development and Agricultural Credit, from Egypt or The Land Bank of the Philippines, or banks with broader objectives such as the National Housing Bank of India.

D. There are many banks that we classify as commercial banks with some development objectives because these banks, public or private, operate as regular banks, but tend to have one part of their portfolio focused on specific sectors that the government is targeting. Examples of this are Azerigazbank in Azerbaijan, the Banco de Desarrollo Productivo in Bolivia, and the Bhutan National Bank Ltd, in Bhutan.

Table 3  
BNDES' participation in the firms included in the database

Year	Firms in sample	Firms observed with BNDES loans			Firms observed with BNDES equity		
		Number of firms	% of sample	BNDES loans to total debt, average (%)	Number of firms	% of sample	BNDES equity share, average (%)
2002	218	115	52.8	25.2	13	6.0	17.0
2003	196	109	55.6	30.1	12	6.1	17.6
2004	179	102	57.0	31.7	12	6.7	14.4
2005	170	96	56.5	31.1	17	10.0	15.4
2006	176	95	54.0	31.4	20	11.4	13.0
2007	203	114	56.2	31.8	25	12.3	12.3
2008	208	128	61.5	28.7	28	13.5	13.3
2009	215	128	59.5	32.9	31	14.4	13.2
Median			56.3	31.2		10.7	13.9

Table 4  
Summary statistics and description of variables

Variable	Description	Mean [std. dev.]	Min	Max
<i>Performance, investment</i>				
ROA	Net profit divided by total assets	0.025 [0.118]	-0.464	0.308
EBITDA/assets	Operational profit (net of taxes, depreciation and interests) to total assets	0.088 [0.121]	-0.377	0.403
Tobin's q	Market value of stocks plus debt divided by total assets	0.880 [0.794]	0.062	4.831
Finex/debt	Financial expenses (loan payments) divided by total debt	0.303 [0.204]	0.000	0.994
Capex/assets	Capital expenditures divided by total assets	0.073 [0.092]	0.000	0.998
Fixed assets/assets	Fixed assets divided by total assets	0.293 [0.248]	0.000	0.995
<i>BNDES financing</i>				
Ln(BNDES loans)	Logarithmic value of BNDES loans reported in the balance sheet (1,000 US\$)	7.479 [4.731]	0.000	16.781
Ln(BNDES equity)	Logarithmic value of BNDES equity (% participation times book value of equity, 1000 US\$)	0.835 [2.988]	0.000	16.205
%BNDES loans	BNDES loans divided by total loans	0.244 [0.271]	0.000	1.000
%BNDES equity	BNDES equity divided by total equity	0.011 [0.049]	0.000	0.450
<i>Political variables</i>				
Donations	Number of candidates receiving donations by the firm in the last election	5.814 [17.972]	0	171
Donations for winners	Number of candidates who received donations and won the last election	3.320 [10.130]	0	89
Donations for losers	Number of candidates who received donations and lost the last election	2.488 [8.119]	0	82
Donations for winners – losers	Donations for winners minus donations for losers	0.832 [3.748]	-8	38
<i>Controls</i>				
Belongs to a group	Dummy variable coded 1 if the firm belongs to a business group	0.473 [0.499]	0	1
Ln(assets)	Logarithmic value of total assets (1,000 US\$)	12.636 [1.686]	1.386	19.015
Leverage	Total debt divided by total assets	0.186 [0.174]	0.000	0.957
Foreign	Dummy variable coded 1 if the firm is foreign-controlled	0.200 [0.400]	0	1

Table 5  
Summary of hypothesized effects

	Industrial policy view	Political view
Effect of BNDES on firm-level performance (ROA, EBITDA/assets, Tobin's q, Finex/debt)	Positive (including, but not only, through a reduction in financial expenses).	If any, only through a reduction in financial expenses due to subsidies.
Effect of BNDES on investments (Capex/assets, Investment/assets)	Positive.	Null.
Determinants of selection: factors affecting BNDES allocations (loans, equity)	No particular effect; BNDES may revamp firms with good performance ("national champions") or select good firms to guarantee repayment. Alternatively, BNDES may not take into consideration past performance if the bank wants to stimulate firms with latent advantages.	Effect of firm-level performance on selection: negative (bailing out failing firms). Effect of political connections: positive.

Table 6  
Mean comparison tests

Variable	Firm was observed with BNDES loans?		Firm was observed with BNDES equity?	
	No	Yes	No	Yes
ROA	0.039 [0.008] <i>N</i> = 290	0.056* [0.003] <i>N</i> = 887	0.049 [0.003] <i>N</i> = 1405	0.041 [0.009] <i>N</i> = 158
EBITDA/assets	0.075 [0.009] <i>N</i> = 279	0.123*** [0.004] <i>N</i> = 861	0.112 [0.003] <i>N</i> = 1349	0.091* [0.010] <i>N</i> = 157
Tobin's q	1.199 [0.071] <i>N</i> = 239	1.147 [0.032] <i>N</i> = 760	1.169 [0.028] <i>N</i> = 1166	1.159 [0.063] <i>N</i> = 154
Finex/assets	0.328 [0.020] <i>N</i> = 129	0.265*** [0.007] <i>N</i> = 689	0.289 [0.006] <i>N</i> = 933	0.255† [0.017] <i>N</i> = 112
Capex/assets	0.069 [0.008] <i>N</i> = 273	0.078 [0.003] <i>N</i> = 852	0.073 [0.003] <i>N</i> = 1333	0.076 [0.008] <i>N</i> = 153
Fixed assets/assets	0.157 [0.013] <i>N</i> = 290	0.266*** [0.008] <i>N</i> = 887	0.243 [0.006] <i>N</i> = 1407	0.206* [0.019] <i>N</i> = 158
Ln(assets)	12.287 [0.107] <i>N</i> = 290	13.119*** [0.053] <i>N</i> = 887	12.621 [0.044] <i>N</i> = 1407	14.093*** [0.167] <i>N</i> = 158

†  $p < 0.10$  \*  $p < 0.05$  \*\*  $p < 0.01$  \*\*\*  $p < 0.001$  (two-tailed mean comparison tests). Standard errors in brackets.

Table 7  
Effect of BNDES loans and equity on firm-level performance variables: fixed effect regressions

	ROA		EBITDA/assets		Tobin's q		
Ln(BNDES loans) <sub>t</sub>	0.000 [0.002]	-0.002 [0.002]	0.001 [0.002]	-0.003 [0.003]	-0.010 [0.011]	-0.009 [0.008]	
Ln(BNDES loans) <sub>t-1</sub>		0.001 [0.003]		0.002 [0.003]		-0.01 [0.015]	
Ln(BNDES loans) <sub>t-2</sub>		-0.001 [0.003]		-0.004 [0.004]		-0.03 [0.021]	
Ln(BNDES equity) <sub>t</sub>	0.001 [0.002]	-0.002 [0.002]	0.000 [0.003]	-0.004 [0.003]	-0.006 [0.008]	0.000 [0.006]	
Ln(BNDES equity) <sub>t-1</sub>		-0.001 [0.004]		0.001 [0.004]		-0.024 [0.016]	
Ln(BNDES equity) <sub>t-2</sub>		0.004 [0.005]		0.003 [0.005]		0.030 [0.019]	
%BNDES loans <sub>t</sub>		0.020 [0.022]	0.018 [0.026]	0.031 [0.021]	0.025 [0.031]	0.033 [0.177]	0.085 [0.173]
%BNDES loans <sub>t-1</sub>			0.038 [0.029]		0.028 [0.036]		-0.078 [0.127]
%BNDES loans <sub>t-2</sub>			-0.011 [0.027]		-0.012 [0.029]		-0.074 [0.173]
%BNDES equity <sub>t</sub>		0.030 [0.181]	-0.092 [0.151]	0.006 [0.200]	-0.156 [0.186]	-0.652 [0.476]	0.692 [1.084]
%BNDES equity <sub>t-1</sub>			-0.07 [0.272]		0.069 [0.258]		-1.529 [0.982]
%BNDES equity <sub>t-2</sub>			0.315 [0.367]		0.191 [0.383]		2.561 [1.955]

Belongs to a group	0.018 [0.057]	-0.145*** [0.033]	0.016 [0.058]	-0.137*** [0.035]	-0.012 [0.051]	-0.161*** [0.031]	-0.011 [0.052]	-0.148*** [0.039]	-0.118 [0.178]	0.010 [0.159]	-0.114 [0.171]	0.119 [0.137]
Ln(Assets)	0.072** [0.022]	0.103* [0.042]	0.079** [0.029]	0.113* [0.044]	0.062* [0.026]	0.081* [0.040]	0.082* [0.032]	0.090* [0.040]	-0.076 [0.202]	-0.009 [0.262]	-0.046 [0.207]	0.145 [0.258]
Leverage	-0.223*** [0.047]	-0.236*** [0.055]	-0.212*** [0.050]	-0.228*** [0.055]	-0.154** [0.050]	-0.148** [0.051]	-0.137* [0.053]	-0.147** [0.050]	0.579* [0.272]	1.191** [0.402]	0.531† [0.272]	1.126** [0.424]
Fixed	-0.043 [0.056]	-0.051 [0.080]	-0.043 [0.060]	0.002 [0.088]	0.033 [0.064]	0.028 [0.086]	0.024 [0.064]	0.083 [0.085]	0.013 [0.283]	0.240 [0.363]	0.039 [0.288]	0.289 [0.463]
Foreign	0.052 [0.046]	0.033 [0.026]	0.050 [0.046]	0.035 [0.032]	0.049 [0.047]	0.042 [0.038]	0.048 [0.048]	0.047 [0.049]	0.045 [0.138]	-0.340† [0.179]	0.106 [0.125]	-0.147 [0.140]
Fixed effects												
Firm	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry-year	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<i>N</i> (total)	1,177	600	1,102	553	1,140	590	1,068	545	999	501	946	468
<i>N</i> (firms)	266	172	252	161	260	168	246	159	246	160	236	150
<i>R</i> <sup>2</sup> (within)	0.451	0.563	0.468	0.588	0.417	0.512	0.438	0.519	0.582	0.63	0.573	0.622
<i>p</i> ( <i>F</i> test)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

†  $p < 0.10$  \*  $p < 0.05$  \*\*  $p < 0.01$  \*\*\*  $p < 0.001$ . Robust standard errors in brackets, clustered on each firm.

Table 8  
Effect of BNDES loans and equity on firm-level financial expenses, capital expenditures and investments: fixed effect regressions

	Finex/debt		Capex/assets			Fixed assets/assets		
Ln(BNDES loans) <sub>t</sub>	-0.006*	-0.013*	0.002	0.004*	-0.004	-0.002		
	[0.003]	[0.005]	[0.001]	[0.002]	[0.003]	[0.005]		
Ln(BNDES loans) <sub>t-1</sub>		0.005		-0.001		0.000		
		[0.006]		[0.002]		[0.002]		
Ln(BNDES loans) <sub>t-2</sub>		-0.001		-0.004		-0.004		
		[0.006]		[0.002]		[0.003]		
Ln(BNDES equity) <sub>t</sub>	-0.001	0.001	-0.002	-0.003	0.000	0.001		
	[0.004]	[0.006]	[0.002]	[0.003]	[0.003]	[0.002]		
Ln(BNDES equity) <sub>t-1</sub>		-0.014		0.001		0.003		
		[0.009]		[0.002]		[0.002]		
Ln(BNDES equity) <sub>t-2</sub>		0.003		-0.001		-0.001		
		[0.007]		[0.002]		[0.004]		
%BNDES loans <sub>t</sub>		0.005	0.101	-0.032†	0.000	0.013	-0.041†	
		[0.050]	[0.065]	[0.017]	[0.021]	[0.028]	[0.024]	
%BNDES loans <sub>t-1</sub>			-0.124**		-0.007		-0.018	
			[0.047]		[0.024]		[0.031]	
%BNDES loans <sub>t-2</sub>			0.093		-0.063		-0.020	
			[0.069]		[0.061]		[0.045]	
%BNDES equity <sub>t</sub>		-0.099	0.277	-0.045	-0.135	-0.011	0.182	
		[0.306]	[0.352]	[0.147]	[0.284]	[0.169]	[0.207]	
%BNDES equity <sub>t-1</sub>			-2.100***		-0.003		0.109	
			[0.496]		[0.120]		[0.133]	
%BNDES equity <sub>t-2</sub>			-0.171		-0.135		-0.048	
			[1.704]		[0.204]		[0.184]	

Belongs to a group	-0.080 [0.054]	0.031 [0.059]	-0.078 [0.059]	0.063 [0.069]	0.045* [0.020]	-0.007 [0.027]	0.053* [0.022]	-0.010 [0.028]	-0.035 [0.033]	0.007 [0.029]	-0.031 [0.032]	0.015 [0.025]
Ln(Assets)	0.067† [0.039]	0.113* [0.054]	0.061 [0.041]	0.114* [0.050]	0.006 [0.023]	0.027 [0.031]	0.000 [0.025]	0.028 [0.036]	0.057† [0.031]	0.109* [0.054]	0.079* [0.037]	0.101† [0.053]
Leverage	-0.483*** [0.091]	-0.596*** [0.155]	-0.500*** [0.089]	-0.613*** [0.143]	0.001 [0.043]	-0.015 [0.056]	0.005 [0.040]	-0.016 [0.058]	-0.079 [0.071]	-0.154 [0.108]	-0.115† [0.068]	-0.188† [0.096]
Fixed	-0.074 [0.091]	-0.334† [0.171]	-0.044 [0.086]	-0.186 [0.148]	0.040 [0.050]	-0.059 [0.123]	0.037 [0.049]	-0.069 [0.148]				
Foreign	0.002 [0.044]	-0.041 [0.034]	0.009 [0.052]	-0.035 [0.052]	-0.002 [0.011]	-0.021 [0.019]	-0.003 [0.016]	-0.022 [0.024]	-0.021 [0.026]	-0.038* [0.019]	-0.018 [0.024]	-0.020 [0.016]
Fixed effects												
Firm	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry-year	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<i>N</i> (total)	818	422	807	416	1,125	582	1,057	539	1,177	600	1,102	553
<i>N</i> (firms)	211	130	207	129	257	168	244	158	266	172	252	161
<i>R</i> <sup>2</sup> (within)	0.53	0.613	0.515	0.58	0.314	0.397	0.314	0.413	0.264	0.303	0.294	0.346
<i>p</i> ( <i>F</i> test)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

†  $p < 0.10$  \*  $p < 0.05$  \*\*  $p < 0.01$  \*\*\*  $p < 0.001$ . Robust standard errors in brackets, clustered on each firm.

Table 9  
Determinants of BNDES' loans: fixed effect regressions

	Ln(BNDES loans)		%BNDES loans	
ROA <sub>t</sub>	0.924		0.195†	
	[1.459]		[0.114]	
ROA <sub>t-1</sub>	2.868†		0.141	
	[1.663]		[0.118]	
ROA <sub>t-2</sub>	0.676		0.178†	
	[1.535]		[0.107]	
EBITDA/assets <sub>t</sub>	1.430		0.204†	
	[1.360]		[0.118]	
EBITDA/assets <sub>t-1</sub>	2.157		0.106	
	[1.625]		[0.124]	
EBITDA/assets <sub>t-2</sub>	1.744		0.215†	
	[1.757]		[0.116]	
Tobin's q <sub>t</sub>	0.134		0.036	
	[0.270]		[0.027]	
Tobin's q <sub>t-1</sub>	0.244		0.046	
	[0.210]		[0.030]	
Tobin's q <sub>t-2</sub>	0.321		-0.021	
	[0.331]		[0.027]	
Donations	0.000		0.000	
	[0.008]		[0.001]	
Donations for winners	0.170**		0.015**	
	[0.062]		[0.005]	
Donations for losers	-0.147**		-0.013**	
	[0.049]		[0.004]	

Donations for winners - losers						0.146**						0.013**
						[0.051]						[0.004]
Belongs to a group	-0.582	-0.827	-1.819	-0.188	-0.198	-0.199	0.047	0.041	0.04	0.045	0.042	0.042
	[1.611]	[1.547]	[2.564]	[1.369]	[1.359]	[1.360]	[0.080]	[0.078]	[0.117]	[0.094]	[0.093]	[0.093]
Ln(assets)	0.194	0.386	0.225	0.278	0.347	0.334	-0.038	-0.048	0.015	0.004	0.009	0.007
	[0.767]	[0.758]	[0.899]	[0.600]	[0.591]	[0.589]	[0.063]	[0.065]	[0.089]	[0.046]	[0.045]	[0.045]
Leverage	5.793***	4.863**	5.209**	4.512***	4.339***	4.381***	-0.139	-0.214	-0.274	-0.234†	-0.251*	-0.247†
	[1.681]	[1.554]	[1.776]	[1.220]	[1.195]	[1.191]	[0.132]	[0.136]	[0.193]	[0.128]	[0.126]	[0.126]
Fixed	-1.375	-2.501	-0.666	-3.778	-4.121	-4.060	0.036	-0.03	0.041	0.025	-0.008	-0.002
	[3.431]	[3.703]	[3.856]	[2.962]	[2.912]	[2.915]	[0.182]	[0.196]	[0.261]	[0.147]	[0.139]	[0.141]
Foreign	-1.861	-1.827	-4.651	-1.445	-1.491	-1.484	0.013	0.013	-0.169†	0.007	0.003	0.004
	[1.996]	[1.973]	[3.077]	[1.922]	[1.918]	[1.918]	[0.112]	[0.109]	[0.094]	[0.119]	[0.120]	[0.120]
Fixed effects												
Firm	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry-year	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<i>N</i> (total)	1,212	1,136	910	1,243	1,243	1,243	1,212	1,136	910	1,243	1,243	1,243
<i>N</i> (firms)	267	253	226	286	286	286	267	253	226	286	286	286
<i>R</i> <sup>2</sup> (within)	0.338	0.341	0.383	0.286	0.289	0.286	0.168	0.178	0.231	0.16	0.163	0.137
<i>p</i> ( <i>F</i> test)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

†  $p < 0.10$  \*  $p < 0.05$  \*\*  $p < 0.01$  \*\*\*  $p < 0.001$ . Robust standard errors in brackets, clustered on each firm.

Table 10  
Determinants of BNDES' equity: fixed effect regressions

	Ln(BNDES equity)		%BNDES equity	
ROA <sub>t</sub>	-0.497		0.005	
	[0.788]		[0.011]	
ROA <sub>t-1</sub>	-0.615		0.004	
	[1.005]		[0.015]	
ROA <sub>t-2</sub>	0.089		-0.010	
	[1.286]		[0.013]	
EBITDA/assets <sub>t</sub>	0.281		0.009	
	[0.902]		[0.011]	
EBITDA/assets <sub>t-1</sub>	-1.024		-0.002	
	[1.321]		[0.018]	
EBITDA/assets <sub>t-2</sub>	0.197		-0.020	
	[1.470]		[0.017]	
Tobin's q <sub>t</sub>	-0.200		-0.001	
	[0.155]		[0.002]	
Tobin's q <sub>t-1</sub>	-0.252		-0.003	
	[0.172]		[0.002]	
Tobin's q <sub>t-2</sub>	-0.289		-0.007†	
	[0.182]		[0.004]	
Donations	-0.021		-0.001	
	[0.036]		[0.000]	
Donations for winners	0.042		0.000	
	[0.075]		[0.001]	
Donations for losers	-0.079		-0.001	
	[0.070]		[0.001]	

Donations for winners - losers						0.069							0.001
						[0.069]							[0.001]
Belongs to a group	-0.200	-0.259	-1.505	-0.198	-0.234	-0.243	-0.007	-0.007	-0.032	-0.006	-0.006	-0.006	
	[0.366]	[0.363]	[1.205]	[0.333]	[0.322]	[0.315]	[0.007]	[0.007]	[0.022]	[0.006]	[0.005]	[0.005]	
Ln(assets)	0.263	0.290	0.094	0.586	0.571	0.536	0.005	0.006	0.008	0.013†	0.013†	0.012	
	[0.328]	[0.424]	[0.473]	[0.472]	[0.460]	[0.451]	[0.006]	[0.007]	[0.009]	[0.007]	[0.007]	[0.007]	
Leverage	0.244	0.38	0.692	-1.048	-1.032	-1.065	0.005	0.004	0.007	-0.022	-0.022	-0.023	
	[0.857]	[1.032]	[1.421]	[1.492]	[1.499]	[1.502]	[0.016]	[0.019]	[0.028]	[0.023]	[0.023]	[0.023]	
Fixed	0.433	0.494	0.354	0.083	-0.068	-0.167	0.028	0.033	0.039	0.008	0.006	0.003	
	[1.191]	[1.310]	[1.447]	[1.363]	[1.305]	[1.310]	[0.022]	[0.024]	[0.025]	[0.021]	[0.021]	[0.021]	
Foreign	1.228	1.232	2.443	1.126	1.160	1.151	0.028	0.029	0.053	0.023	0.024	0.023	
	[1.133]	[1.132]	[2.013]	[1.117]	[1.103]	[1.073]	[0.024]	[0.023]	[0.035]	[0.022]	[0.022]	[0.021]	
Fixed effects													
Firm	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry-year	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<i>N</i> (total)	1,213	1,213	1,213	1,243	1,243	1,243	1,213	1,213	1,213	1,243	1,243	1,243	
<i>N</i> (firms)	267	267	267	286	286	286	267	267	267	286	286	286	
<i>R</i> <sup>2</sup> (within)	0.338	0.338	0.337	0.286	0.289	0.286	0.168	0.169	0.167	0.160	0.163	0.137	
<i>p</i> ( <i>F</i> test)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	

†  $p < 0.10$  \*  $p < 0.05$  \*\*  $p < 0.01$  \*\*\*  $p < 0.001$ . Robust standard errors in brackets, clustered on each firm.

Table 11

Effect of BNDES loans on performance and investment: fixed effect regressions with weights computed using propensity score matching

	ROA	EBITA/assets	Tobin's q	Finex/assets	Capex/assets	Fixed/assets
Firm is observed with with BNDES loan (0 or 1)	0.021 [0.048]	0.036 [0.044]	0.015 [0.165]	-0.148** [0.052]	0.001 [0.022]	-0.018 [0.032]
Belongs to a group	-0.158 [0.096]	-0.155* [0.075]	-0.434 [0.378]	-0.026 [0.082]	-0.025 [0.019]	-0.020 [0.096]
Ln(Assets)	0.062 [0.080]	0.096 [0.082]	-0.494* [0.184]	-0.170 [0.133]	0.067† [0.033]	0.150** [0.050]
Leverage	-0.256 [0.162]	-0.112 [0.150]	0.397 [0.743]	-0.101 [0.259]	-0.084 [0.117]	-0.249† [0.129]
Fixed	-0.154 [0.161]	-0.057 [0.180]	0.510 [0.581]	0.807† [0.439]	-0.101 [0.212]	
Foreign	0.148 [0.091]	0.129† [0.068]	0.222 [0.353]	-0.048 [0.047]	-0.029 [0.027]	-0.037 [0.087]
Fixed effects						
Firm	Y	Y	Y	Y	Y	Y
Year	Y	Y	Y	Y	Y	Y
Industry-year	Y	Y	Y	Y	Y	Y
<i>N</i> (total)	260	253	238	146	251	260
<i>p</i> ( <i>F</i> test)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

†  $p < 0.10$  \*  $p < 0.05$  \*\*  $p < 0.01$  \*\*\*  $p < 0.001$ . Robust standard errors in brackets, clustered on each firm. Regression weights come from propensity matching score (kernel) estimation on the observed variables for the initial year of the sample (2002). Fixed-effect regressions are restricted to regions of common support.

Table 12

Effect of BNDES loans and equity on firm-level financial constraints: fixed effect regressions

	Investment (Capex / stock of fixed assets in $t-1$ )			
Cash flow	0.028*	0.059**	0.027*	0.046***
	[0.012]	[0.019]	[0.011]	[0.013]
%BNDES loans <sub><i>t</i></sub>	-22.642	-17.365		
	[14.154]	[12.775]		
%BNDES equity <sub><i>t</i></sub>	-523.029	-474.118		
	[425.345]	[351.557]		
Ln(BNDES loans) <sub><i>t</i></sub>			-0.688	-0.262
			[0.996]	[0.979]
Ln(BNDES equity) <sub><i>t</i></sub>			-5.130	-4.451
			[5.003]	[4.093]
Cash flow×%BNDES loans <sub><i>t</i></sub>		-0.057		
		[0.123]		
Cash flow×%BNDES equity <sub><i>t</i></sub>		-0.382		
		[0.243]		
Cash flow×Ln(BNDES loans) <sub><i>t</i></sub>				0.000
				[0.003]
Cash flow×Ln(BNDES equity) <sub><i>t</i></sub>				-0.008
				[0.006]
Tobin's q	10.631	5.419	10.727	6.493
	[13.280]	[11.355]	[12.283]	[10.651]
Belongs to a group	-2.582	1.234	-2.400	2.621
	[14.752]	[14.231]	[12.295]	[11.044]
Ln(Assets)	33.869†	24.079	28.791*	25.407†
	[17.818]	[19.612]	[12.107]	[14.124]
Leverage	7.884	9.967	14.813	9.832
	[43.612]	[52.722]	[32.494]	[38.489]
Foreign	24.292	27.746	20.457	24.693
	[19.389]	[23.735]	[19.841]	[25.444]
Fixed effects				
Firm	Y	Y	Y	Y
Year	Y	Y	Y	Y
Industry-year	Y	Y	Y	Y
<i>N</i> (total)	741	741	783	783
<i>N</i> (firms)	192	192	201	201
<i>p</i> ( <i>F</i> test)	< 0.001	< 0.001	< 0.001	< 0.001

†  $p < 0.10$  \*  $p < 0.05$  \*\*  $p < 0.01$  \*\*\*  $p < 0.001$ . Robust standard errors in brackets, clustered on each firm.