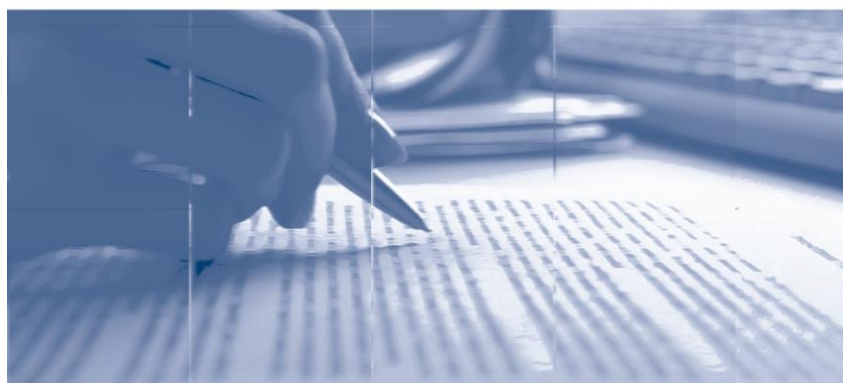


Macroeconomic and Financial Consequences of the After Crisis Government-Driven Credit Expansion in Brazil

Marco Bonomo, Ricardo Brito and Bruno Martins

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Macroeconomic and Financial Consequences of the After Crisis Government-Driven Credit Expansion in Brazil*

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Abstract

The Working Papers should not be reported as representing the views of the Banco Central do Brasil. The views expressed in the papers are those of the author(s) and do not necessarily reflect those of the Banco Central do Brasil.

Government-driven credit had an important role in countervailing private credit crunch in Brazil during the recent financial crisis. However, government credit concessions continued to expand after the economy recovered. This paper investigates some important features of this expansion using a huge repository of loan contracts between banks and firms, composing an unbalanced panel of almost 1 million firms between 2004 and 2012. We show that earmarked funds have been particularly important for sectors intensive in positive social externalities. However, those sectors were not the main beneficiaries of the strong expansion in earmarked credit observed since the crisis. Our results also show that larger, older and less risky firms have benefited most from the government sponsored credit expansion. Additionally, although a higher access to earmarked credit tends to lead to higher leverage, the effect on investment appears to be insignificant for publicly traded firms. Since interest rates on earmarked loans are lower than the market interest rates, firms with higher access to this type of loan tend to lower cost of debt.

Keywords: crisis management, state-ownership of banks, investment

JEL Classification: G20, H1, L3 and O1

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1. Introduction

Government-driven credit expansion had an important role in countervailing the non-earmarked private credit crunch in Brazil triggered by the international financial crisis in 2007/2008. The Brazilian economy recovered fast, with a strong rebound in 2009. However, earmarked and government-owned banks credit concessions have not receded after the crisis, but continued to expand reaching much higher levels than the ones prevailing before the crisis (47.66% of the total credit in December 2012, as compared to 34.27% in September 2008). A point of interest of this overall government-driven credit expansion is related to its impact on the allocation of resources among sectors and firms, as well as on private banks credit allocation.

Government ownership of banks and regulation of private credit markets are pervasive around the world (see La Porta et al. 2002). One may take the social view that government intervention is justified whenever projects whose social benefits exceed their costs would not be funded if private markets were functioning without intervention (Atkinson and Stiglitz 1980)¹. This definition encompasses two different cases. The first one is when credit market failures, caused by asymmetric information, prevent the funding of otherwise privately viable projects. The second is when social externalities make an unprofitable project socially desirable. The latter case could justify subsidizing the project, which may take many alternative forms. The concession of subsidized loans to boost the project's Net Present Value (NPV) is one of the most common ways to incentivize the implementation of projects with social externalities. Cyclical intervention in the credit market could also be justified, according to the macroeconomic view, by externalities in increasing credit during a crisis period.

Government intervention through state-ownership of banks and earmarked credit lines may fail to fulfill the role proposed by the social view due to incentive problems that are inherent to the public sector. State intervention may not maximize the social welfare because of agency costs within government bureaucracy (Banerjee 1997, and Hart, Shleifer and Vishny 1997), which may result in misallocation. Another branch of the

¹ The optimal form of intervention could be the ownership of banks or regulation of the private market depending on the contractible nature of objectives (see Levy-Yeyati et al. 2007 for a detailed discussion).

literature explores the political view, as in Sapienza (2004) and in Carvalho (2014), that provide evidence in favor of this view.

In this study we investigate whether the after crisis government-driven banks' credit expansion in Brazil fulfilled the role proposed by the social view. In order to investigate those issues we use a huge repository of loan contracts between banks and firms, composing an unbalanced panel of almost 1 million firms between 2004 and 2012 from the Brazilian Public Credit Register² (SCR - Credit Information System, owned and managed by Central Bank of Brazil). We also combine the above data with accounting information available at Economática for publicly traded firms in order to relate public credit policies with firms' investment and indebtedness decisions.

One clear limitation that we face in our investigation is that we do not observe when a firm is rationed or when a project generates social externalities. Thus, we have to rely on the statistical relation between our observable variables in order to try to answer the question we pose.

For a given macroeconomic environment, market failures are more likely to affect firms with higher information asymmetry, among them those that are smaller, newer and more innovative. They are more likely to be credit constrained or to pay high interest rates. Small, new and innovative firms are arguably more likely to generate externalities, either by increasing competition or by generating technological spillovers. Thus, even if they have access to credit at high interest rates, government intervention in order to provide them with cheaper credit may be justified. Thus, earmarked and government-owned banks' credit could release the credit constraint facing small, new and innovative firms, or reduce their financial cost. In both cases, it should contribute to increase the investment of the economy.

On the other hand, government-driven credit lines may be allocated to large firms finance projects with social externalities that otherwise would not be implemented – infrastructure, for example. Then, those credit lines with lower interest rate would turn those projects viable and would lead to investment increase. Another possibility is that those subsidized loans are allocated to fund projects with no social externalities. Then, if

²A confidential loan level database, protected by Brazilian banking privacy law, provides detailed information on all loans granted after January 2004, such as loan amount, loan maturity, interest rates and default rates. However it contains little borrower level information. The collection and manipulation of data from the SCR were conducted exclusively by the staff of the Central Bank of Brazil.

a project is profitable with private financing, the investment would be undertaken anyway and the subsidized loan will only contribute to boost the firm's profit and to inhibit the development of private credit markets. If a project is not profitable at market rates, the subsidized loan could still contribute to its implementation, but this would be socially undesirable.

Government intervention in the credit market in Brazil is done through government-owned banks and earmarked loans. Firms may receive earmarked loans through programs designed to stimulate investment, exports or agriculture, among others. Earmarked loans for investment and exports are either granted directly by the Brazilian National Development Bank (BNDES) or transferred from BNDES to private banks that select their recipients. Agricultural credit is financed mainly by Banco do Brasil (a government-owned commercial bank).³ The earmarked loans are either directly granted by government-owned banks or channeled through private banks. Interest rates charged on those loans are regulated and are substantially lower than those charged in the non-regulated loans market. Government-owned banks also participate in the non-regulated loans market, but tend to charge lower interest rates than their private competitors.⁴

In order to evaluate the presence of government-driven loans on socially profitable investments, we start by looking at the evolution of this source of funds between two groups of firms: firms whose activities are potentially intensive in positive social externalities and those operating in sectors apparently uncorrelated with social issues. We show that earmarked funds, especially those directly granted by BNDES, have been particularly important for sectors intensive in positive social externalities. However, those sectors were not the main beneficiaries of the strong expansion in earmarked credit observed since the crisis.

Then, we relate the access of firms to earmarked and government-owned banks loans⁵ to their characteristics as size, age and perceived risk, using individual firm-loan level data. Loans in our sample are either government driven or private. The government

³ Another large government-owned commercial bank, Caixa Econômica Federal, is the main operator of the mortgage system, where borrowers are individuals.

⁴ Lundberg (2011) provides a detailed account of the earmarked credit programs in Brazil, for the period of 2002 to 2010.

⁵ We investigate the access of firms to any type of government oriented credit market, earmarked plus non-earmarked government-owned bank loans, and exclusively to non-earmarked government-owned bank loans.

driven loans are the earmarked and government-owned banks loans, which in our sample are partitioned in the following categories: BNDES direct, other earmarked (includes credit lines in private banks through BNDES transfers) and non-earmarked government loans. We create access dummies for each of those categories and for the total of government driven loans, and estimate a logit model with random and sector-fixed effects. Larger and older firms were found to have higher probability of accessing earmarked and government-owned banks loans. After the crisis, less risky firms, as measured by the proportion of non-performing loans and interest rate charged by private banks on firms' sector, became more likely to access those loans. We were also able to illustrate the increasing pattern of government credit access after the crisis through estimated time-dummies. Thus, in the recent period, larger, older and less risky firms benefited most from government sponsored loans. Most likely, those were the firms with better access to alternative sources of private funding, which, in our view, is in contradiction with the social view of government intervention in this market.

We then examine how the access to government-sponsored loans affects the firm behavior. Due to data restriction, we have to limit this investigation to publicly traded firms. If the government intervention channels resources for projects that would not be otherwise financed, one should expect that a higher government-sponsored credit access would lead to more investment, more indebtedness, and lower financial expenses. In order to test these hypotheses, we run two-step *difference GMM* regressions of these three alternative dependent variables on the proportion of earmarked and government-owned banks loans to total debt ratio, together with the usual controls. Although a higher access to earmarked credit tends to lead to higher leverage, the effect on investment appears to be insignificant in the data. It did not come as a surprise that firms with higher access to earmarked loans tend to have lower financial expenditure. Since interest rates on earmarked loans are lower than the market interest rates, firms with higher access to this type of loan tend to lower cost of debt, leading to higher profitability.

The big picture emerging from our results is that the expansion of earmarked and government-owned bank loans after the crisis was mostly directed to established firms – which had already access to other private credit market – and had meaningless impact on investment, at least for publicly traded firms. Those established public firms in part substituted more expensive credit with subsidized loans, and even expanded

indebtedness. It is well possible that this leveraged expansion was partly motivated by the existing opportunity of financial arbitrage, enabled by the availability of low risk financial investments at rates higher than those of earmarked loans.

Our paper adds to the literature in several dimensions. First, due to the unique database we use, our sample includes all loans to public and private firms. Thus, we have in our sample firms of all sizes, with different characteristics. Second, we are able to discriminate if the loan is a direct loan from BNDES, other type of earmarked loan, a non-earmarked loan from a government-owned bank or a non-earmarked loan from a private bank. This allows us to study what type of firm is most likely to receive each kind of loan. Finally, in the second part of the study, where we are forced to restrict our sample to public firms, we are able to examine the effect of all categories of government-driven loans on firms' performance, using loan data from the Brazilian Credit Register, while most studies before focus only on BNDES's loans.

The rest of the paper is organized as follows. The next section describes the macroeconomic and financial environment in Brazil in the years before and after the crisis. The third section describes the data used in this paper and presents some descriptive statistics. Section 4 presents the econometric methodology used in our micro data based investigation. The results obtained are presented in section 5. Section 6 concludes.

2. The macroeconomic and financial environment

The Brazilian economy expanded at a fast pace during the years that preceded the 2008 financial crisis, recovered quickly after that and saw its growth diminish subsequently. The same factors underlying the fast recovery from the crisis may be at the origin of the recent growth moderation.

i) The pre-crisis period

During the five years that followed the pre-election turmoil of 2002-2003, Brazil grew at an average rate of approximately 5%. The macroeconomic policy was based on a tripod regime characterized by floating exchange rate, a 4.5% inflation target, and a 4.5% of GDP primary surplus target. The fiscal rule was an important improvement with respect to the previous' fiscal regime, contributing to disseminate the view that the country had finally conquered macroeconomic stability. The country became investment

grade in the first semester of 2008, growing at 5.2% in 2008, when the financial crisis in the advanced economies was deepening.

As in the US, those years preceding the crisis were characterized by rapid credit expansion and interest spread reduction for individuals. Differently from the US, the Brazilian economy starting point was characterized by a low degree of intermediation and higher interest rate spreads. Institutional reforms⁶ aimed at decreasing banks' lending risk were effective in substantially lowering interest rate spreads for households and fostering credit expansion. Another relevant difference is that the financial sector was more tightly regulated⁷. All this amounts to a different situation when the Brazilian economy was hit by the crisis: credit was not excessive, banks were solid, individuals and firms were not over levered.

ii) The financial crisis and Brazilian policy response

The crisis hit Brazil through an abrupt halt of external flows triggered by the bankruptcy of Lehman. For a few months in the second semester of 2008, working capital loans were severely reduced, with effects that would propagate throughout the economy into the following year.

Interest rate cuts were not among the most important policy measures adopted in response to the crisis. Liquidity shortage affected small and medium-sized banks, prompting the Central Bank to act by reducing reserve requirements of large banks as a counterpart of the acquisition of credit portfolios of smaller institutions⁸. On the other hand, the credit dryness prompted an active effort from government banks to increase their credit supply to compensate for the private banks credit crunch (see Figure 1 in the appendix). This policy was effective and quickly normalized Brazilian credit market operations. As a side effect, it sharply increased the participation of earmarked and government-owned bank loans in the credit market (see Figure 2 in the appendix).

[Figure 1 and Figure 2]

⁶From those, payroll lending was probably the most important driver of the substantial decrease in borrowing rates for households. See De Mello and Garcia (2012) for an account of the Brazilian financial intermediation evolution from the 80's until the financial crisis.

⁷In Brazil, the Central Bank is the only supervisor of financial intermediaries.

⁸Another important measure aimed at restoring small and medium-sized banks funding was the establishment of an additional deposit guarantee mechanism. See Mesquita and Toros (2010) for a detailed account of Brazilian Central Bank measures during the crisis.

As part of government oriented credit was subsidized – notably BNDES loans – the credit expansion had some fiscal impact. Additionally, the government also directly used fiscal policy to stimulate the economy, by granting temporary rebates on manufacturing sales taxes on selected sectors. This policy had immediate impact on those sectors, eliciting pressures for its extension beyond their announced expiration dates.

iii) After the crisis: long lasting effects of the countercyclical policies

Brazil had only a mild recession in 2009 (-0.2 % GDP growth), recovering relatively fast. At the end of 2010 the economy was growing at 7.5% rate, and with a 5.3% unemployment rate. Credit expansion, in particular the government-driven portion, seems to have played an important role in this recovery.

The total amount of private credit had a moderate increase, from 25% of the GDP in 2009 to 28% in 2012, but the public credit continued to expand, and led the total amount of credit to jump from 40% to 52%. The earmarked and government-owned banks' credit expansion was not a policy tool for the crisis period that receded just after its effects ceased. On the contrary, its participation in the total credit, which had increased almost 10 percentage points during the crisis (from July 2008 to January 2010), continued to swell, reaching 47.66% of the total credit in December 2012.

This government oriented credit expansion, in a country where its participation was already high, should create some distortions: i) the allocation of resources among sectors and firms could be distorted; ii) as part of the credit is subsidized it could have fiscal consequences; iii) it could prevent the development of capital markets and impact adversely the private banking sector; iv) as non-market interest rates are paid on earmarked credit, which is a large fraction of the total credit (around 37% in December 2012), the transmission of monetary policy could be adversely affected.

The topics we investigate in this paper are more directly related to the first set of issues: which firms have received government sponsored credit, and how the availability of this type of credit has impacted their beneficiaries' capital budgeting.

3. Data and Summary Statistics

We make use of multiple sources of data. A huge repository of loan contracts comes from the Brazilian Public Credit Register⁹ (SCR - Credit Information System), a confidential loan level database protected by Brazilian banking privacy law, owned and managed by Central Bank of Brazil. It provides detailed information on all loans granted after January 2004, such as loan amount, loan maturity, interest rate and default rates. However, it contains little borrower-level information¹⁰, so that we cannot appropriately control for the multifaceted aspects of borrowers' creditworthiness, neither relate a loan to the possible borrowers' actions it could induce. The number of employees of Brazilian firms from 2006 to 2012 was collected from RAIS (Annual Social Information Report) and merged into the dataset.

We combine the above data with information available at Economatica, a database with financial-accounting information of Brazilian publicly traded firms. From Economatica we get market price quotes and accounting information from income statement and balance sheets. We merge Economatica with SCR data in order to relate the loan information to the borrower accounting information, when the borrower is a publicly traded firm.

Our sample comprises annual data of all firms whose total bank debt was greater than R\$30,000 (around U\$15,000 in December 2012) on average from December 2006 to December 2012. Public administration, non-governmental organizations, multilateral agencies and financial firms were excluded. In order to avoid the inclusion of individuals registered as firms, we also excluded firms with only one employee. In addition, economic sectors¹¹ with less than 6 firms, on average, were also excluded (totaling less than 5% of all sectors), composing an unbalanced panel of 3,146,217 observations and 992,047 firms. The distribution of firms along the sample period is presented in Table 1. As mentioned in the second section, it reflects the recent increase of financial intermediation and the strong expansion of the credit market in Brazil.

[Table 1]

⁹ It register all loans above R\$5,000 (around U\$2,000). The reporting threshold was lowered in January 2012 and is currently R\$1000 (around U\$ 400).

¹⁰ Borrower-level information is restricted to location, sector, number of employees and credit rating.

¹¹In the empirical exercise we consider the second larger disaggregated measure of economic sector defined by IBGE, "CLASSE CNAE", totaling 672 sectors.

The SCR database brings information on firms' total bank debt, disaggregated by the type of loan, earmarked and non-earmarked, and also by the lenders' ownership. Thus, we build four measures of firms' government oriented credit access: (1) the proportion of bank debt directly granted by BNDES (hereafter *BNDES-Direct*), (2) the proportion of bank debt originated from earmarked rules, except BNDES-Direct (hereafter *Other Earmarked*), (3) the proportion of non-earmarked loans, which is known in Brazil as the free market, granted by government-owned banks (hereafter NGBL) and (4) the proportion of bank debt originated from earmarked rules and/or granted by government-owned banks (hereafter EGBL). As all variables frequently assume the values zero and one, we also create four additional binary variables which are 1 if the original access variable is greater than zero, and are 0 otherwise.

Table 2 displays summary statistics for key variables used in the empirical analysis. In panel A we display statistics for the whole sample, while in panel B the sample is restricted to publicly traded firms. The first eight variables are used as dependent variables in the first part of our empirical investigation. The other variables represent features of the firms which could potentially be relevant for determining its access to earmarked or government-owned banks loans. We have as independent variables the age of the firm in years, *AGE*, the proportion of non-performing loan, *CREDIT RISK*, the average interest rate charged by private banks on non-earmarked loans in each sector, *PRIVATE LENDING RATE*, the number of employees, *SIZE*, and firms' sector workforce share, *SECTOR WORKFORCE SHARE*.

The proportion of non-performing loans is a measure of risk, but it does not distinguish well among firms that have no non-performing loan. So, the interest rate charged by the private lender is a more discriminating measure. Since some firms have only government-driven loans, we use the average interest rate charged by private banks in the firm sector as their risk measure, besides NPL. We use sector workforce share in addition to the log of number of employees as a measure of size because the latter variable misses the fact that some sectors are more human capital intensive than others.

[Table 2]

Each observation corresponds to a firm-year in our data base. There are more than 4 million observations in our sample. Of those, only 0.72% had loans directly granted by BNDES. Earmarked loans given through other banks occurred much more often: in more than 32% of the observations. Moreover, 57.03% of the firm-year observations had some earmarked or government-owned banks loans, while 42.53% had some non-earmarked government-owned banks loans. This implies that 42.97% of the observations correspond exclusively to non-earmarked private banks loans. In terms of loan amounts, on average, loans granted directly by BNDES and other earmarked account for respectively 0.4% and 21.68% of the total, while earmarked or government-owned banks and non-earmarked government-owned banks loans sum up to respectively 45.78% and 31.79% of the total. As a consequence, 54.22% of the total loans amount corresponds to non-earmarked private loans. Table 2 also shows that, on average, firms are reasonably young, 11.5 years old, and have respectively 6.51% and 7.52% of total and non-earmarked loans in arrears. Furthermore, firms have 40.27 employees and a very small participation in the workforce of its sector (0.14%). In addition, they pay, on average, 42.33% of interest on its private bank debt annually¹².

Panel B of Table 2 displays the summary statistics restricting the universe of firms to publicly traded firms and its subsidiaries. The number of observations fell to 6,100. From those, 29.80% correspond to observations that include some BNDES loans while 54.00% includes other earmarked loans. In 77% of firm-year observations of public firms, earmarked or government-owned banks loans were granted, with non-earmarked government owned banks loans accounting for about 44%. Thus, only 23% of public firms' observations contain only non-earmarked private loans. The proportions direct BNDES, other earmarked, EGBL and NGBL are also substantially different from panel A, amounting to 17.89%, 28.15%, 56% and 19%, respectively. Thus, our descriptive statistics indicate that publicly traded firms access more often government and earmarked loans than non-public firms, and have a larger proportion of their credit in those government sponsored categories, except for the smaller proportion of non-earmarked loans from government-owned banks. Publicly traded

¹²To avoid the inclusion of outliers, all non-earmarked (earmarked) lending rates less than 10% (5%) and greater than 200% are replaced by missing values.

firms in the sample are older and less risky than in the unrestricted sample: about 19 years-old and 2% and 4% in arrears for total and non-earmarked loans. They are also larger (2,231 employees on average), have a larger participation in the workforce of their sector (6.2%), and pay lower interest rates in non-earmarked private banks loans (36% on average).

As the issues we analyze are related to the change in the government intervention policy towards the banking sector from the crisis on, it is useful to split the sample by showing the summary statistics before (2006 and 2007) and after the crisis (2008 to 2012), as reported in Table 3. In general, it indicates an increase on government loan access after the financial crisis of 2008. For the sample of all firms, in panel A, the most noteworthy differences are a decrease in the proportion of loans directly granted by BNDES from 0.79% to 0.28%, an increase in the proportion of non-earmarked government-owned public loans from 26% to 33%, and a decrease in both age and size of borrowing firms. For the subsample of public firms, there is a large increase (from 48% to 60%) in the proportion of earmarked and government-owned banks loans, implying a decrease in the proportion of non-earmarked private loans from 52% to 40%. A decrease in the average age of borrowing firms from about 22 to 18 years of existence is also noticeable.

[Table 3]

Additionally, we examine whether the presence of public loans affect performance and investments of firms. However, only publicly traded listed firms report reliable information on balance sheet and income statement in Brazil, reducing and biasing our sample toward large firms. However, despite the small number of firms, their participation in the credit market as a whole is large, averaging (from 2004 to 2012) 40%, 16%, 25% and 13% for BNDES-direct, other earmarked, non-earmarked granted by government banks and non-earmarked granted by private banks, respectively.

In Table 4, we present some summary statistics of our analyzed variables. Our dependent variables are going to be capital expenditure to total assets, total debt to total assets and the interest expenditures to total debt ratio, respectively proxies for investments, leverage and cost of debt of firms. Besides our main interest on the effects of government-sponsored loans access of firms, our models also control for covariates that are usual in the corporate finance empirical literature. Our chosen variables are *cash*

flow, measured by earnings before interest, taxes, depreciation and amortization (EBITDA) to total assets ratio, *Tobin's q*, measured by the market value to book value ratio, and earnings-to-debt, measured by EBITDA to total debt ratio. In Panel C of Table 4, we show that on average, public Brazilian firms in our sample reduced investments by 34% after the crisis, at the same time their leverage was slightly increased by 3% and their financial expenditures fell by 16%.

[Table 4]

4. Empirical Methodology

Our study has as central theme the recent government-driven credit expansion in Brazil. This has several aspects, and we chose to investigate two of them. First, we propose to study the determinants of government-sponsored loan access of firms. Then, we tackle the question of whether those loans affected the recipient firms' investments, indebtedness and financial expenses.

Besides market failures due to the presence of costly and asymmetric information, state intervention in the credit market may also be justified on the grounds of financing socially valuable, but financially unprofitable, projects. The idea is that private lenders may have limited incentive to finance projects that produce externalities. Empirically identifying those potential social spillovers on each loan contract is very difficult. However, for generating potential positive externalities, some sectors are viewed as candidates to be funded by government sponsored loans, such as education, health, housing, agriculture and infrastructure sectors.

Hence, in order to evaluate the presence of government-driven loans on socially profitable investments, we start by looking at a simple table comparing the proportion of this source of funding between two groups of firms: firms whose activities are potentially intensive in positive social externalities, we call them *Social*, and those operating in sectors apparently uncorrelated with social issues, we call them *Others*¹³.

¹³*Social group* contains the following sectors: agriculture, livestock and related activities; fisheries and aquaculture; pharmaceutical; electricity, gas and other utilities; collection, processing and distribution of water; sewer and related activities; collection, treatment and disposal of leavings; infrastructure; transportation; delivery activities; research and scientific development; labor agency services; education; human health and social assistance, while *Others* represents the following sectors: forest production; extraction industries (coal, petroleum, natural gas and minerals); manufacture industries (food, beverages,

Table 5 below shows the evolution of government-driven banks loans ratio for both groups of sectors. Panel A brings the evolution of earmarked (BNDES direct and BNDES indirect plus other earmarked loans) to total loans ratio. It clearly indicates that the participation of earmarked loans in “social intensive” sectors is much larger than in other sectors (61.69% and 33.64%, respectively). And the difference comes essentially from the BNDES direct operations (38.19% vs 13.95%). However, the strong expansion of earmarked loans since the financial crisis of 2007-2008 has been largely absorbed by “non-social intensive” sectors (-1.39% vs 9.76%). This was driven by BNDES direct loans, which reduced their participation in “social intensive” sectors by 25%. Panel B shows the evolution for each group of sectors of the ratio between non-earmarked loans from public banks to total non-earmarked loans. It shows that official loans have not been especially granted to “social intensive” sectors (21.93% vs 26.28%), and that this situation was not altered after the crisis. Looking at all government-driven loans at Panel C, it can be noted that, despite the higher participation of government-sponsored loans on “social intensive” sectors (70.16% vs 50.95%), the after crisis growth rate was larger for “non-social intensive” sectors (3.98% vs 17.38%). Therefore, besides the greater importance of earmarked loans in financing social intensive sectors since 2004, Table 6 allows us to conclude that its strong expansion since the financial crisis may not be justified on the grounds of a suboptimal allocation of resources by private banks on socially profitable projects thereafter.

Given that a sectoral analysis of social externality does not seem to justify the increased state intervention in credit market after the crisis (for both earmarked and non-earmarked loans), we turn to an investigation focused on the borrowing firms’ characteristics.

[Table 5]

tobacco, textile, clothing and accessories, leather, footwear, wood, pulp, paper, coke, oil derivatives and biofuels, chemicals, rubber and plastic materials, non-metals, miscellaneous, etc...); metallurgy; building construction; real estate activities; production of automotive vehicles, trailers and carts; trade and repair of automobiles and motorcycles; wholesale trade; retail trade; restaurants; lodging; sound and music edition; furniture; machinery and equipment; computer, optical and electronic products; media; telecommunication; domestic services; sports, recreation and leisure activities; gambling and betting; artistic activities; office, administrative and other business services; activities of surveillance, security and investigation; veterinary activities; advertising; legal, accounting and audit activities; tourism; architectural and engineering; other technical professional activities, among others.

i) The determinants of government loan access of firms

Which firms receive public loans? Public loans should be directed towards firms that cannot borrow from the private sector or to projects that generate social externalities. Empirical evidence suggests that this is not necessarily true. The BNDES lends more to large firms that can fund their projects with other sources of capital (see De Mello and Garcia, 2012; and Lazzarini et al., 2014). We investigate the relation between firms characteristics – among them risk profile, age and size – and access to public loans.

Our regression analysis starts investigating the determinants of government loan access of firms in Brazil. We analyze an unbalanced panel of firms whose total loans is greater than BR\$30,000 from 2006 to 2012, totaling almost 1 million firms. Our baseline logit model aims to estimate which factors contribute most for the government-sponsored loan access of firms. The government-sponsored loans access of firms is measured by four dummy variables that take the value of one if the proportion of government-sponsored loans is greater than zero, and zero otherwise: (1) BNDES Direct, (2) Other Earmarked, (3) NGBL and (4) EGBL. Hence, we estimate the following equation using the Logit model, which is represented by:

$$Prob(Public Access_i) = Prob(y_i = 1) = \Lambda(\beta'x_i) = \frac{e^{\beta'x_i}}{1 + e^{\beta'x_i}}$$

where y_i measures the government loan access of firms and x_i captures its determinants. Our model follows the specification:

$$\beta x_{i,t} = \alpha + \eta \overline{Interest}_{z,t} + \rho NPL_{i,t} + \mu Age_{i,t} + \theta Size_{i,t} + \vartheta Workforce_Share_{i,t} + \sum_{k=1}^8 \delta^k M_t^k + \sum_{s=1}^{88} \psi^s S_t^s \quad (1)$$

where β is a vector of parameters and $x_{i,t}$ is a vector of variables that explain the access of firm i to government loans at time t .

Firm's risk profile is captured by two variables: non-performing loans (NPL) and the average lending rate charged by private banks on the firm's sector ($\overline{Interest}_z$)¹⁴. A firm in a sector that pays higher interest rate is more likely to have projects rationed.

¹⁴ Based on a broader definition of economic sector, this variable captures the cost of bank credit for 672 sectors.

Age and size are other factors that could affect the probability of firms getting government loans. Since younger and newer firms are more likely to face financial constraint, one would expect them to have greater access to government loans, corresponding to $\mu < 0$, $\theta < 0$ and $\vartheta < 0$, if government intervention complements the private credit market. We include 88 dummies to control for unobservable sector fixed effect¹⁵. We also include time dummies, M^k , to control for macroeconomic risk factors. Changes in the determinants of government loan access after the crisis are identified by adding interactions of all independent variables with a post-crisis dummy.

ii) Government-sponsored Loans, Investments, Indebtedness and Financial Expenditures of Firms

Does public funding release credit constraints? A firm could be constrained because of market failures or because its projects could not be profitably financed by market interest rates. In the latter case only if there are social externalities, public funding at lower rates could be optimal. However, in any case, if access to government-sponsored loans release credit constraints it should lead to investment increase.

We investigate whether access to government-sponsored loans is associated with higher capital expenditures, after controlling for relevant covariates. But even if recipients of public loans do not have their credit constraints released, and therefore do not increase their investments, they may become more leveraged and profitable by lowering the cost of capital (see Inoue et al., 2013; and Lazzarini et al., 2014).

To evaluate the impact of public subsidized loans on (i) investments, (ii) leverage and (iii) financial expenditures of firms, we estimate dynamic panel models for these three variables as functions of public funds access.

Explicitly, for the investments, we propose:

¹⁵ We do not include the broader definition of sector (with 672 sectors) for computational reason.

$$\begin{aligned}
Investment_{i,t} = & \alpha + \tau Gov.Access_{i,t-1} + \beta CashFlow_{i,t-1} \\
& + \vartheta(Gov.Access_{i,t-1} * CashFlow_{i,t-1}) \\
& + \varphi(Gov.Access_{i,t-1} * AfterCrisis_t) \\
& + \theta(CashFlow_{i,t-1} * AfterCrisis_t) \\
& + \delta(Gov.Access_{i,t-1} * CashFlow_{i,t-1} * AfterCrisis_t) \\
& + \pi Tobin_{i,t-1} + \sigma Investment_{i,t-1} + \sum_{k=1}^8 \delta^k M_t^k + \vartheta_i + \varepsilon_{i,t}
\end{aligned} \tag{2}$$

where firms' investment is measured by the capital expenditure to total assets ratio of firm i at time t . $Gov.Access_{i,t}$ measures the participation of “government-sponsored” funding in the firm debt structure and is alternatively represented by (i) BNDES direct; (ii) other earmarked loans; (iii) non-earmarked state-owned banks' loans and (iv) the total government-sponsored funding. $AfterCrisis_t$ is a dummy variable that is one from 2008 to 2012, and its interaction with $Gov.Access_{i,t}$ tries to capture differential effects of the government-sponsored funding during recovery period. The coefficient β measures the investment cash flow sensitivity of firms. It represents the degree of firms' financial constraint. So we also interact the cash flow with the government-sponsored loan access of firms in order to verify if government loans restrain the financial constraints faced by firms; $Tobin_{i,t-1}$ is a proxy for future investment opportunities of firms, usually used in the corporate finance literature (see Fazzari, Hubbard and Petersen, 1988; Hoshi, Kashyap and Scharfstein 1991). And the lagged dependent variable captures persistency in the firm's investment policy. Finally, the term $\sum_{k=1}^8 \delta^k M_t^k$ allows for time effects that capture common macro shocks to all firms, the ϑ_i term allows for cross-firm fixed effects, and $\varepsilon_{i,t}$ is the disturbance.

If the government provides funds to credit constrained firms with profitable projects, firms investments should be positively correlated with government-sponsored loans, i.e., the coefficient τ should be positive. Moreover, if government-sponsored loans have a distinctive effect to stimulate investments during the crisis, the interaction coefficient φ should be positive.¹⁶ Additionally, if government provides funds to credit constrained firms, its investment decision should be less dependent of its cash flow, i.e.,

¹⁶ The different effects of government stimulus during recessions and expansions have been debated in Macroeconomics (see Owyang, Ramey and Zubairy, 2013).

the coefficient ϑ should be negative. And finally, the time dummies play an important role in our context, by capturing the common effect of the 2008 crisis.

We also investigate whether public loan access leads to higher indebtedness of firms. Indebtedness is captured by the firms' leverage, measured by the total debt to total assets ratio. The following model is estimated:

$$\begin{aligned} Leverage_{i,t} = & \alpha + \tau Gov.Access_{i,t-1} + \varphi(Gov.Access_{i,t-1} * AfterCrisis_t) \\ & + \omega CashFlow_{i,t-1} + \pi Tobin_{i,t-1} + \sigma Leverage_{i,t-1} + \sum_{k=1}^8 \delta^k M_t^k + \vartheta_i + \varepsilon_{i,t} \end{aligned} \quad (3)$$

As before, $Gov.Access_{i,t}$ and its interaction with $AfterCrisis_t$ measure the participation of government-sponsored loans in the firm debt structure. The other covariates are usual controls for leverage in the corporate finance literature (see Fama and French, 2002; Shyam-Sunder and Myers 1999). The lagged dependent variable captures persistency in the firm's leverage policy, and the term $\sum_{k=1}^8 \delta^k M_t^k$ allows for time effects that capture common macro shocks to all firms, ϑ_i allows for cross-firm fixed effects, and $\varepsilon_{i,t}$ is the disturbance.

Yet, if government-sponsored funds do not significantly affect the investment of firms but strictly decrease its financial expenses, then it is not being efficiently allocated. So, we also evaluate the impact of government-sponsored loans on firms' cost of debt using the following specification:

$$\begin{aligned} Fin.Exp_{i,t} = & \alpha + \tau Gov.Access_{i,t-1} + \varphi(Gov.Access_{i,t-1} * AfterCrisis_t) \\ & + \pi ED_{i,t-1} + \eta Leverage_{i,t-1} + \sigma Fin.Exp_{i,t-1} + \sum_{k=1}^8 \delta^k M_t^k + \vartheta_i + \varepsilon_{i,t} \end{aligned} \quad (4)$$

where financial expenditure is defined by the interest expenditures to total debt ratio. The ratio of earnings (EBITDA) to total debt, $ED_{i,t-1}$, and the capital structure of firms, $Leverage_{i,t-1}$, capture the credit risk of firms.

The models are estimated by Arellano and Bond (1991) *difference GMM* estimator. In all specifications, our identification assumption is that all covariates are predetermined but not strictly exogenous, meaning that current shocks to the dependent variable can affect the future value of the explanatory variables.¹⁷

¹⁷ As usual, common time effects are assumed strictly exogenous.

5. Results

i) The determinants of government loan access of firms

Table 6 presents the estimates of equation (1) using a random-effect logistic regression. The dependent indicator variable BNDES-Direct in Panel A indicates that the firm received direct loans from BNDES, while Earmarked + BNDES-Indirect denotes that the firm received an earmarked loan from other banks, including earmarked loans from BNDES channeled through privately owned banks. In panel B we have only one regression which has the access to non-earmarked loans from government-owned banks as the dependent variable. Finally in Panel C the dependent variable indicates whether the firm received any government-driven loan, either earmarked or non-earmarked but granted by a government-owned bank. The regressions control for unobservable sector-fixed effects and "I_" indicates an interaction with a dummy variable after the financial crisis (1 if year greater than or equal to 2008). Table 7 reports the same results for the subsample of public firms, and Table 8 presents results for linear regressions with the same variables. The purpose of this last table is to get a sense of the magnitude of the marginal effects.¹⁸

We start by examining the results concerning the access to direct BNDES loans. The results displayed in the first column of Table 6 indicates that firms that are older, larger, with higher workforce share, pay lower interest rate in the private market and have lower rate of non-performing loans have larger probability of receiving BNDES loans. All effects are statistically significant at 1%, except the coefficient of non-performing loans. It also becomes apparent that, with exception of the coefficient of age, all those effects became stronger from the crisis on, since the correspondent interaction regressors have the same sign as the one without interaction, and are statistically significant at 1% level. The coefficient of age became significantly smaller after the crisis, but still kept the same sign indicating that for the whole sample older firms have higher probability of receiving BNDES loans. All those estimated effects have opposite signs from the predicted by the social view.

¹⁸When we have interactions of variables as regressors, the marginal effects cannot be calculated in the usual way.

Table 8 shows that those effects are not economically important, with exception of workforce share. The reason is that an average firm in our sample is very small and has very low probability of getting a direct loan from BNDES. The results for workforce share indicate that a monopolistic firm has about 11% higher chance of receiving a BNDES loan than firms with negligible market share before the crisis, and that this effect increases to 18% after the crisis.

The effects obtained for the subsample of publicly traded firms, shown in the first column of Table 7, were similar although statistically weaker, which was expected since the sample is substantially smaller. The most noticeable difference is that the effect of the interest rate charged by private banks is canceled after the crisis. Thus, results for public firms are in line with those for the whole sample.

The access to earmarked loans other than those given directly by BNDES is the dependent variable in the second column regression of Table 6. As with the access to BNDES direct loans, firms that are older, larger, have lower proportion of arrears, have higher probability of having an earmarked loan other than from BNDES. However, a lower workforce share increases the chances of receiving such a loan, as well as a higher interest rate paid in private loans before the crisis. After the crisis the latter effect reverts. The year dummy coefficients, which are also depicted in Figure 3, have a clear increasing pattern, indicating that there is a positive trend in access to earmarked credit. The effects are similar in the subsample of publicly traded firms, as shown in the second column of Table 7, with exceptions of the coefficients of workforce share and interest rates charged by private lenders, which are not statistically different from zero.

In column 2 of Table 8, the variables tend to be also economically significant. For example, a firm 10 years older has 0.9% (1.3%) higher chance of receiving an (non-BNDES) earmarked loan before (after) the crisis, while a firm with 10% higher rate of non-performing loans has a 2% (1.3%) lower probability. A firm that is ten times larger than the average has 1.7% higher chance of receiving those types of loans after the crisis, while a firm with 10% higher workforce share has 1.8% (2.7%) lower probability before (after) the crisis.¹⁹ It is worth noticing that a firm in a sector that pays 1% higher interest rates in loans from private banks has 1% higher chance of receiving earmarked loans of

¹⁹ Size is measured by the logarithm of the number of employees. Thus, this effect is obtained by multiplying the coefficient by log10.

this type before the crisis, with the effect becoming much attenuated from the crisis period on. The year dummy coefficients plotted in Figure 4 show that the unconditional probability of getting a non-BNDES earmarked loan in 2012 is about 29% higher than in the beginning of the sample in 2006. The pattern in the figure shows this probability is approximately constant in 2006 and 2007, with an upward jump to a new plateau of about 25% in 2008, staying there until 2012.

The third column of Table 6 shows the results for the non-earmarked loans. In this market government-owned banks compete against privately owned banks. Our dependent variable is constructed from the subsample of firms that borrowed from the free market, and has value one if the firm borrowed from a government-owned bank in the free market and zero if the firm only had free market loans granted by privately owned banks. The results show that in the years before the crisis older and larger firms have higher probability of getting a loan from a government bank in the free market, but also indicates that risky firms (with higher NPL) in risky sectors (with higher private interest rates) were also more likely to get those loans. The coefficient of workforce share is positive but not statistically significant. After the crisis all effects were either attenuated (age, size, and sectors' interest rates) or reversed (NPL and workforce share). The time dummies show also an increasing pattern (see also Figure 3), as in the case of earmarked loans, indicating a higher unconditional probability of having government-owned banks loans in recent years. The effects are similar in the subsample of public firms from the crisis on, except for the workforce share, which in this group contributes positively to the probability of having non-earmarked government-owned banks loans.

The linear regression estimates in the third column of Table 8 indicate that the effects of size and workforce share are economically important in the more recent years. After the crisis, a firm 10 times smaller than the average has about 2.5% higher probability of receiving a free market loan from a government-owned bank, while a firm with 10% lower market share has 1.5% higher probability.

Thus, according to the evidence above, larger and older firms have always had higher probability of accessing earmarked loans, but the same does not necessarily apply to government-owned banks loans in the free market. Thus, in terms of characterizing the beneficiaries of government-driven credit, the nature of the loan (if it is from earmarked

program or not) seems to be more relevant than the granter's property ownership (if government-owned or not).

There were important changes in the period after the recent financial crisis. There was a widespread increase in the participation of earmarked and government-owned banks loans. Also, in this new regime, less risky firms, as measured by the proportion of non-performing loans, became more likely to receive earmarked loans directly granted by BNDES or by other banks. Thus, in the more recent period, larger, older and less risky firms benefited most from lower interest rate earmarked loans. Those were also, most likely, the firms with better access to alternative sources of funding.

[Table 6, Table 7, Table 8, Figure 3 and Figure 4]

A natural concern about our estimation results could be about our risk controls. Since NPL does not discriminate among firms that have no non-performing loans and PRIVATE LENDING RATE is a sector variable, one may think that SIZE and AGE in our sample may be correlated with the firm's risk.

In order to address this concern we created a subsample of firms that borrow from the private market and belong to the 10 largest sectors (from a total of 1307). We split this subsample according to two criteria: i) three credit risk groups, depending on the interest rate paid on private loans; ii) ten sector groups. We believe that firms in the same sector and credit risk group should carry similar risk. As a robustness analysis, we then reestimate equation (1) for each one of the 30 groups.

Table 9 reports the results when all government-driven loans access of firms is used as dependent variable²⁰. The results show that the coefficients μ and θ remain positive and significant for most of sectors in all risk categories, supporting the qualitative findings of Table 6 that older and larger firms have greater probability of receiving government-driven loans. Thus, our results do not seem to be driven by risk as a correlated omitted variable.

[Table 9]

²⁰ The qualitative results remain when the total earmarked loans access (BNDES direct and other earmarked) and the non-earmarked official loans access of firms are used as dependent variable.

ii) Subsidized Loans, Investment and Indebtedness of Firms

Now we turn to the impact of public and earmarked loans access on firm performance, as measured by some accounting ratios that are only available to publicly traded firms.

In Tables 10-12 below, we present two-step *difference GMM* estimates (Arellano and Bond, 1991) for determinants of firm investment, leverage and financial expenses according to the specification of equations (2), (3) and (4), respectively. We use a sample of public Brazilian firms that have been solvent during the 2004-2012 period, i.e., net equity is always positive. The variables' definitions are described in sections 3 and 4. The data frequency is annual. $L.Z_{i,t} = Z_{i,t-1}$ means 1-year lag in relation to the dependent variable. In each table we present estimates for different versions of the variable $Gov.Access_{i,t}$: proportion of BNDES direct loans in total loans (in columns (1)-(2)), proportion of earmarked loans not granted directly by BNDES (in columns (3)-(4)), proportion of free-market loans from government-owned banks (in columns (5)-(6)), and proportion of all government driven loans (in columns (7)-(8)). For each variable, in the even columns, we estimate interactions with the after crisis dummy as specified in equations (2)-(4).

[Table 10]

Table 10 presents estimates of the Investments equation (2). In the first column without *AfterCrisis* interaction terms, both Tobin's q and cash flow coefficients have the expected sign and are statistically significant. The proportion of BNDES loans variable coefficient is not statistically significant, indicating that the access to those loans does not stimulate investment. Additionally, the interaction between this variable and cash flow is not statistically significant either, although it has the negative expected sign. Thus, we cannot conclude that BNDES loans alleviate the firms' financial constraint. In the second column we allow for different effects of the government loan variable from the crisis on and find no statistically significant difference between the effects in the two periods. When the government loan variable is other earmarked loans, in columns (3)-(4), the sign of the government loans variable becomes negative, and statistically significant at 10% in the specification with the *AfterCrisis* dummy. For free market loans from government banks, in columns (5)-(6), the direct effect on investment is not statistically significant. In sum, we find no evidence that any type of those government-driven loans stimulate

firms' investment or release their financial constraint. Thus, our regressions indicate that a small reduction in government sponsored loans would not have altered the affected firms' investment rate²¹.

[Table 11]

Table 11 reports the result of our estimation of equation (3) for leverage. Now all coefficients measuring the direct effect of government loans on leverage are positive, and in the case of BNDES direct loans are statistically significant at 5%. According to our results, a firm that has only BNDES loans has 6% higher leverage than a firm with no BNDES loans. The effects for other type of government-driven loans are smaller and not statistically significant, but when we pool all government-driven loans together, the results become more important in terms of magnitude and statistical significance. A firm with only government-driven loans has a debt ratio of about 8% higher than a firm with only private loans. Those effects do not change from the crisis on.

[Table 12]

Since earmarked loans are subsidized and interest rates charged in government-owned banks loans in the free market tend to be lower than their private counterpart, we would expect firms that received them to save in financial expenses. Table 12 displays our estimates of the financial expenses ratio equation (4). As expected, the sign for the government loans is negative, but they are not always statistically significant. The strongest result, both in terms of magnitude and statistical significance, is that a firm with access to other earmarked loans (different from BNDES direct) would reduce its financial expenditures by 4.8%²² in the more recent period. A surprising result, which is significant at 10% level, is that access to direct BNDES loans after the crisis increase financial expenses ratio.²³

²¹ The results could be different for large changes due to possible non-linearities not captured by the regression.

²² The sum of the coefficients is statistically significant at 5% (p-value of 0.0139).

²³ This could be due to increase in other type of financial expenses, which are not related to the accounted debt.

We summarize the above results as follows. We found no compelling evidence that government-driven loans stimulate investment or release financial constraints of publicly traded firms. Public firms with a higher proportion of BNDES direct loans seem to be more levered, while firms that receive other earmarked loans tend to have lower financial expense to debt ratio.

6. Conclusions

As pointed out by the social view of state-ownership, government intervention in the credit markets would be justified due to market failures caused by asymmetric information or to externalities that make financially unprofitable projects socially desirable. Cyclical intervention in the credit market could also be justified, according to the macroeconomic view, by existing externalities in increasing credit during a crisis period. Earmarked and government-owned banks credit growth has been substantial in Brazil since the 2007/2008 financial crisis. While the initial phase of the expansion was beneficial, contributing to alleviate the effect of financial crisis on the Brazilian credit market, its continuing expansion after crisis is a point of interest as regards its impact on the allocation of resources among sectors and firms, as well as on the private banking sector.

In this study we investigate whether the earmarked and government-owned banks' credit expansion in Brazil fulfilled the role proposed by the social view of state-ownership of banks. Our investigation is based on the characteristic of firms receiving government-sponsored loans, and on how their performances differ from similar firms that do not have access to this type of loan. First, we investigate the determinants of government-sponsored loan access of firms. Then, we tackle the question of whether government loans relieve the credit constraint faced by firms, increasing investments, indebtedness and reducing financial expenses.

We show that earmarked funds, especially those directly granted by BNDES, have been particularly important for sectors intensive in positive social externalities. However, those sectors were not the main beneficiaries of the strong expansion in earmarked credit observed after 2008. Our results also show that larger, older and less risky firms have benefitted most from government sponsored loans. Most likely, those were the firms with better access to alternative sources of private funding, which is in contradiction with the

social view of government intervention in this market. Additionally, although a higher access to earmarked credit tends to lead to higher leverage, the effect on investment appears to be insignificant for publicly traded firms. Moreover, since interest rates on earmarked loans are lower than the market interest rates, firms with higher access to this type of loan tend to lower cost of debt, leading to higher profitability.

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Appendix : Variable description

For reference, the following is a list of the variables used and a brief description of how each is constructed.

- *BNDES-Direct*: proportion of bank debt directly granted by BNDES (source: authors calculation from SCR);
- *Other Earmarked*: the proportion of bank debt originated from earmarked rules, except from BNDES (source: authors calculation from SCR);
- *NGBL*: the proportion of non-earmarked loans granted by government-owned banks (source: authors calculation from SCR);
- *EGBL*: the proportion of bank debt originated from earmarked rules and/or granted by government-owned banks (source: authors calculation from SCR);
- *Age*: the firms' age (in years) (source: RAIS);
- *Credit Risk (Non Performing Loans)*: The ratio of loans in arrears to total loans of firms (source: COSIF and SCR);
- *Size (empl)*: Number of employees of firms (in log) (source: RAIS);
- *Workforce Share (empl)*: The ratio of total number of employees to total number of employees of firms' economic sector (672 sectors) (source: authors calculation from RAIS);
- *Private Lending Rate (sector)*: Average of lending rate charged by private banks on economic sectors (672 sectors) (source: authors calculation from COSIF and SCR);
- *Investments*: firms's CAPEX (capital expenditure) to total assets (source: Economatica);
- *CashFlow*: firms' EBITDA (earnings before interest, taxes, depreciation and amortization) to total assets (source: Economatica);
- *Tobin's q*: firms' market value to book value (source: Economatica);

- Leverage: firms's total debt to total assets (source: Economatica);
- Financial Expenditure: firm's interest expenses to total debt (source: Economatica);
- ED: firm's EBITDA to total debt (source: Economatica);
- Crisis: A dummy variable that takes the value of one if year greater than 2007, and zero otherwise (source: authors calculation).

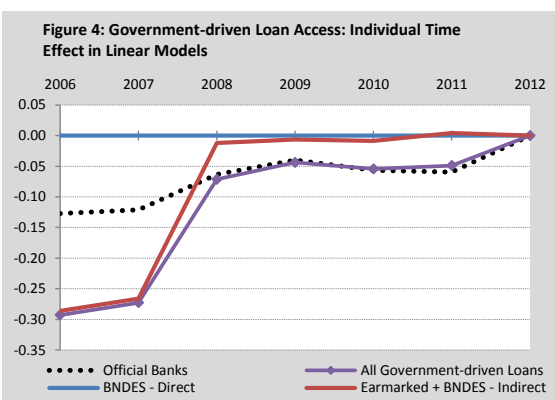
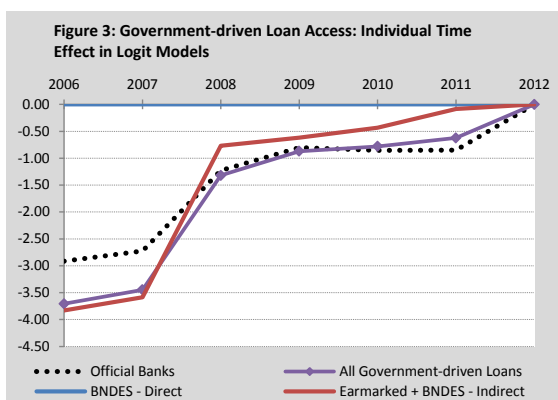
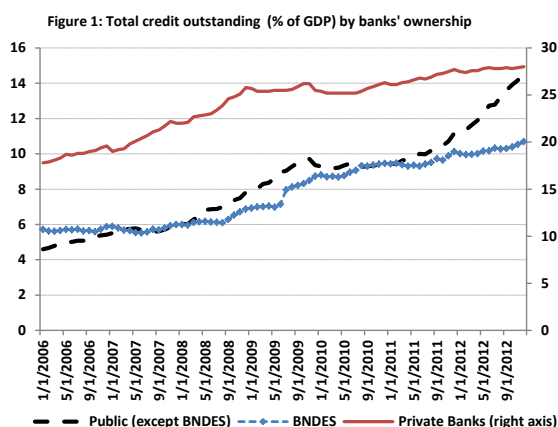


Table 1: Number of firms by year

| Year | Freq. | Percent | Cum. |
|-------|-----------|---------|-------|
| 2006 | 230,847 | 7.34 | 7.34 |
| 2007 | 297,185 | 9.45 | 16.78 |
| 2008 | 371,569 | 11.81 | 28.59 |
| 2009 | 444,585 | 14.13 | 42.72 |
| 2010 | 533,904 | 16.97 | 59.69 |
| 2011 | 592,830 | 18.84 | 78.54 |
| 2012 | 675,297 | 21.46 | 100 |
| Total | 3,146,217 | 100 | |

Table 2:
Summary Statistics

This table provides descriptive statistics for the variables used in the empirical analysis. There are 672 economic sectors in the sample. Variables definitions are provided in the Appendix. Panel A reports summary statistics for the whole sample. Panel B reports summary statistics for public traded firms and its subsidiaries. BNDES (direct) refers to earmarked loans directly granted by BNDES, Other Earmarked refers to all earmarked loans except those directly granted by BNDES, EGBL refers to earmarked plus government-owned bank loans to total loans ratio and NGBL refers to non-earmarked government-owned bank loans to total non-earmarked bank loans ratio.

| Panel A: | | | | | |
|--|-----------|--------|-----------|----------|---------|
| Variable: | Obs | Mean | Std. Dev. | Min | Max |
| BNDES (direct) - Dummy | 4,565,310 | 0.0072 | 0.0849 | 0 | 1 |
| Other Earmarked - Dummy | 4,565,310 | 0.3267 | 0.4690 | 0 | 1 |
| EGBL Dummy | 4,565,310 | 0.5703 | 0.4950 | 0 | 1 |
| NGBL Dummy | 3,912,269 | 0.4253 | 0.4944 | 0 | 1 |
| BNDES (direct) | 4,565,310 | 0.0040 | 0.0565 | 0 | 1 |
| Other Earmarked | 4,565,310 | 0.2168 | 0.3682 | 0 | 1 |
| EGBL | 4,565,310 | 0.4578 | 0.4519 | 0 | 1 |
| NGBL | 3,912,269 | 0.3179 | 0.4232 | 0 | 1 |
| AGE (years) | 4,502,081 | 11.52 | 9.38 | 0 | 109.07 |
| CREDIT RISK (NPL) | 4,565,310 | 0.0651 | 0.1932 | 0 | 1 |
| CREDIT RISK (NPL for non-earmarked) | 3,912,269 | 0.0752 | 0.2071 | 0 | 1 |
| SIZE (# of employees) | 3,146,217 | 40.27 | 433.58 | 1 | 116,465 |
| SECTOR WORKFORCE SHARE (by employees) | 3,146,217 | 0.0014 | 0.0125 | 1.20E-06 | 1 |
| PRIVATE LENDING RATE (by sector - 672) | 4,565,296 | 42.33 | 6.04 | 10.03 | 97.80 |
| Panel B: | | | | | |
| Variable: | Obs | Mean | Std. Dev. | Min | Max |
| BNDES (direct) - Dummy | 6,100 | 0.2980 | 0.4574 | 0 | 1 |
| Other Earmarked - Dummy | 6,100 | 0.5400 | 0.4984 | 0 | 1 |
| EGBL - Dummy | 6,100 | 0.7678 | 0.4222 | 0 | 1 |
| NGBL - Dummy | 4,561 | 0.4356 | 0.4958 | 0 | 1 |
| BNDES (direct) | 6,100 | 0.1789 | 0.3396 | 0 | 1 |
| Other Earmarked | 4,561 | 0.2815 | 0.3930 | 0 | 1 |
| EGBL | 6,100 | 0.5630 | 0.4257 | 0 | 1 |
| NGBL | 4,561 | 0.1884 | 0.3175 | 0 | 1 |
| AGE (years) | 5,423 | 19.21 | 15.64 | 0 | 77.79 |
| CREDIT RISK (NPL) | 6,100 | 0.0206 | 0.1140 | 0 | 1 |
| CREDIT RISK (NPL for non-earmarked) | 4,561 | 0.0396 | 0.1615 | 0 | 1 |
| SIZE (# of employees) | 4,371 | 2,231 | 6,357 | 1 | 84,071 |
| SECTOR WORKFORCE SHARE (by employees) | 4,371 | 0.0619 | 0.1301 | 3.08E-06 | 1 |
| PRIVATE LENDING RATE (by sector - 672) | 6,098 | 35.64 | 8.22 | 12.11 | 90.11 |

Table 3:

Summary Statistics - Before and After the Crisis

This table provides summary statistics for the variables used in the empirical analysis. There are 672 economic sectors in the sample. Variables definitions are provided in the Appendix. Panel A reports summary statistics for the whole sample. Panel B reports summary statistics for public traded firms and its subsidiaries. BNDES (direct) refers to earmarked loans directly granted by BNDES, Other Earmarked refers to all earmarked loans except those directly granted by BNDES, EGBL refers to earmarked plus government-owned bank loans to total loans ratio and NGBL refers to non-earmarked government-owned bank loans to total non-earmarked bank loans ratio.

| Panel A: | | | | | | |
|--|-----------|--------|-----------|-----------|--------|-----------|
| Variable: | Before | | | After | | |
| | Obs | Mean | Std. Dev. | Obs | Mean | Std. Dev. |
| BNDES (direct) - Dummy | 1,040,787 | 0.0139 | 0.1174 | 3,524,523 | 0.0052 | 0.0725 |
| Other Earmarked - Dummy | 1,040,787 | 0.3415 | 0.4742 | 3,524,523 | 0.3223 | 0.4673 |
| EGBL Dummy | 1,040,787 | 0.5529 | 0.4971 | 3,524,523 | 0.5754 | 0.4942 |
| NGBL Dummy | 861,472 | 0.3759 | 0.4843 | 3,050,797 | 0.4391 | 0.4962 |
| BNDES (direct) | 1,040,787 | 0.0079 | 0.0802 | 3,524,523 | 0.0028 | 0.0472 |
| Other Earmarked | 1,040,787 | 0.2376 | 0.3852 | 3,524,523 | 0.2106 | 0.3628 |
| EGBL | 1,040,787 | 0.4339 | 0.4485 | 3,524,523 | 0.4648 | 0.4526 |
| NGBL | 861,472 | 0.2625 | 0.3956 | 3,050,797 | 0.3335 | 0.4293 |
| AGE (years) | 1,021,115 | 11.92 | 9.55 | 3,480,966 | 11.40 | 9.33 |
| CREDIT RISK (NPL) | 1,040,787 | 0.0640 | 0.1919 | 3,524,523 | 0.0653 | 0.1935 |
| CREDIT RISK (NPL for non-earmarked) | 861,472 | 0.0753 | 0.2077 | 3,050,797 | 0.0751 | 0.2068 |
| SIZE (# of employees) | 528,032 | 51.71 | 485.64 | 2,618,185 | 37.96 | 422.26 |
| SECTOR WORKFORCE SHARE (by employees) | 528,032 | 0.0023 | 0.0172 | 2,618,185 | 0.0011 | 0.0112 |
| PRIVATE LENDING RATE (by sector - 672) | 1,040,773 | 41.24 | 5.98 | 3,524,523 | 42.64 | 6.02 |
| Panel B: | | | | | | |
| Variable: | Before | | | After | | |
| | Obs | Mean | Std. Dev. | Obs | Mean | Std. Dev. |
| BNDES (direct) - Dummy | 2,044 | 0.3375 | 0.4729 | 4,056 | 0.2781 | 0.4481 |
| Other Earmarked - Dummy | 2,044 | 0.4995 | 0.5001 | 4,056 | 0.5604 | 0.4963 |
| EGBL Dummy | 2,044 | 0.7480 | 0.4342 | 4,056 | 0.7778 | 0.4157 |
| NGBL Dummy | 1,713 | 0.4658 | 0.4989 | 2,848 | 0.4174 | 0.4932 |
| BNDES (direct) | 2,044 | 0.1826 | 0.3323 | 4,056 | 0.177 | 0.3433 |
| Other Earmarked | 2,044 | 0.2034 | 0.3276 | 4,056 | 0.3208 | 0.4167 |
| EGBL | 2,044 | 0.4853 | 0.4106 | 4,056 | 0.6022 | 0.4278 |
| NGBL | 1,713 | 0.1618 | 0.2797 | 2,848 | 0.2045 | 0.3372 |
| AGE (years) | 1,767 | 21.81 | 14.94 | 3,656 | 17.95 | 15.82 |
| CREDIT RISK (NPL) | 2,044 | 0.0254 | 0.1216 | 4,056 | 0.0182 | 0.1099 |
| CREDIT RISK (NPL for non-earmarked) | 1,713 | 0.0394 | 0.1551 | 2,848 | 0.0398 | 0.1653 |
| SIZE (# of employees) | 1,034 | 2,042 | 5,408 | 3,337 | 2,290 | 6,623 |
| SECTOR WORKFORCE SHARE (by employees) | 1,034 | 0.0703 | 0.1386 | 3,337 | 0.0592 | 0.1272 |
| PRIVATE LENDING RATE (by sector - 672) | 2,042 | 35.75 | 8.42 | 4,056 | 35.59 | 8.13 |

Table 4: Summary statistics of the publicly traded firms variables

| <i>Panel A - Means and Dispersion</i> | | | | | | |
|---------------------------------------|----------------------------------|------|-------|-----------|--------|-------|
| Variable | Definition | Obs. | Mean | Std. Dev. | Min | Max |
| Investments | CAPEX/Total Assets | 1664 | 0.077 | 0.087 | -0.622 | 0.827 |
| Leverage | Total Debt/Total Assets | 1664 | 0.564 | 0.179 | 0.068 | 0.998 |
| Fin.Expenditure | Financial Expenditure/Total Debt | 1629 | 0.098 | 0.070 | 0.000 | 0.836 |
| Cash flow | EBITDA/Total Assets | 1652 | 0.119 | 0.097 | -0.678 | 0.668 |
| Tobin's q | Market Value/Book Value | 1495 | 1.467 | 0.914 | 0.387 | 8.888 |
| Earnings-to-debt | EBITDA/Total Debt | 1617 | 0.240 | 0.271 | -5.263 | 2.230 |

| <i>Panel B - Correlation Matrix</i> | | | | | | |
|-------------------------------------|---------|----------|----------|-----------|-----------|------------------|
| | Invest. | Leverage | Fin.Exp. | Cash flow | Tobin's q | Earnings-to-debt |
| Investments | 1 | | | | | |
| Leverage | -0.03 | 1 | | | | |
| Fin.Expenditure | 0.01 | 0.03 | 1 | | | |
| Cash flow | 0.10 | -0.03 | 0.08 | 1 | | |
| Tobin's q | 0.15 | -0.07 | -0.07 | 0.04 | 1 | |
| Earnings-to-debt | 0.01 | -0.17 | -0.04 | 0.05 | 0.39 | 1 |

| <i>Panel C - Pre- and post-crisis means</i> | | | |
|---|------------|-------------|---------------|
| | Pre-crisis | Post-crisis | Diference (%) |
| Investments | 0.088 | 0.058 | -0.34 |
| Leverage | 0.559 | 0.575 | 0.03 |
| Fin.Expenditure | 0.102 | 0.085 | -0.16 |

Table 5

Are Government-driven Banks Loans Going to Socially Profitable Firms?

This table provides the evolution of government-driven banks loans ratio for two groups of firms. Firms operating in sectors with significant social spillovers are classified as *Social*, while all others are grouped as *Others*. *Social* contains the following sectors: agriculture, livestock and related activities; fisheries and aquaculture; pharmaceutical products; electricity, gas and other utilities; collection, processing and distribution of water; sewer and related activities; collection, treatment and disposal of leavings; infrastructure; transportation; delivery activities; research and scientific development; labor agency services; education; human health and social assistance. The following sectors are grouped as *Others*: forest production; extraction industries (coal, petroleum, natural gas and minerals); manufacture industries (food, beverages, tobacco, textile, clothing and accessories, leather, footwear, wood, pulp, paper, coke, oil derivatives and biofuels, chemicals, rubber and plastic materials, non-metals, miscellaneous, etc...); metallurgy; building construction; real estate activities; production of automotive vehicles, trailers and carts; trade and repair of automobiles and motorcycles; wholesale trade; retail trade; restaurants; lodging; sound and music edition; furniture; machinery and equipment; computer, optical and electronic products; media; telecommunication; domestic services; sports, recreation and leisure activities; gambling and betting; artistic activities; office, administrative and other business services; activities of surveillance, security and investigation; veterinary activities; advertising; legal, accounting and audit activities; tourism; architectural and engineering; other technical professional activities, among others.

| Credit Market: | Panel A: Earmarked Loans | | | | | | Panel B: Non-earmarked Loans | | Panel C: Total Loans | |
|--|-----------------------------|---------------|----------------------------|---------------|---------------|---------------|---------------------------------|---------------|-----------------------------|---------------|
| | BNDES-Direct | | Earmarked + BNDES Indirect | | All Earmarked | | Official Banks | | All Government-driven Loans | |
| | Social | Others | Social | Others | Social | Others | Social | Others | Social | Others |
| 2004 | 51.42% | 12.88% | 16.88% | 19.12% | 68.30% | 32.00% | 12.85% | 19.82% | 72.38% | 45.47% |
| 2005 | 46.34% | 12.68% | 17.17% | 19.13% | 63.51% | 31.81% | 13.08% | 19.01% | 68.28% | 44.77% |
| 2006 | 40.71% | 12.43% | 19.68% | 19.87% | 60.39% | 32.30% | 19.01% | 21.50% | 67.92% | 46.86% |
| 2007 | 33.68% | 11.96% | 22.78% | 18.89% | 56.46% | 30.84% | 21.30% | 21.00% | 65.74% | 45.36% |
| 2008 | 33.89% | 12.01% | 23.16% | 16.69% | 57.05% | 28.71% | 22.50% | 26.77% | 66.71% | 47.79% |
| 2009 | 34.18% | 16.90% | 24.01% | 18.39% | 58.19% | 35.30% | 25.97% | 31.01% | 69.05% | 55.36% |
| 2010 | 35.27% | 15.01% | 25.80% | 21.76% | 61.07% | 36.77% | 28.92% | 31.48% | 72.33% | 56.68% |
| 2011 | 37.08% | 14.46% | 29.23% | 21.47% | 66.32% | 35.92% | 26.04% | 31.79% | 75.09% | 56.30% |
| 2012 | 31.10% | 17.24% | 32.84% | 21.91% | 63.94% | 39.15% | 27.70% | 34.14% | 73.93% | 59.92% |
| Mean | 38.19% | 13.95% | 23.51% | 19.69% | 61.69% | 33.64% | 21.93% | 26.28% | 70.16% | 50.95% |
| Pre-crisis Mean (from 2004 to 2007) | 43.04% | 12.49% | 19.13% | 19.25% | 62.17% | 31.74% | 16.56% | 20.33% | 68.58% | 45.62% |
| Post-crisis Mean (from 2008 to 2012) | 34.30% | 15.12% | 27.01% | 20.05% | 61.31% | 35.17% | 26.23% | 31.04% | 71.42% | 55.21% |
| Δ (%) (from Pre to Post Crisis) | -25.46% | 17.45% | 29.18% | 3.96% | -1.39% | 9.76% | 36.84% | 34.50% | 3.98% | 17.38% |

Source: CIS

Table 6:

Logistic Analysis of Government-Driven Loan Access of Firms

We apply a random-effects logistic regression in all models of this table. Panel A reports results from regressing earmarked loan access on firms and sector characteristics, Panel B reports results from regressing non-earmarked official loan access on firms and sector characteristics, and Panel C reports results from regressing all government-driven loan access on firms and sector characteristics. All models control for unobservable sector (88) fixed effects. I_{\cdot} indicates a interaction with a dummy variable after the financial crisis (1 if year greater than 2007). All regressions include an intercept. Variables definitions are provided in the Appendix. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

| Binary dependent variable: | Panel A: Earmarked Loans | | Panel B: Non-earmarked loans | Panel C: Total Loans |
|-------------------------------------|--------------------------|---------------------------------|------------------------------------|---------------------------------|
| Government-driven Loan Type: | BNDES - Direct | Earmarked + BNDES - Indirect | Official Banks | All Government- driven Loans |
| AGE | 0.0460*** [0.003] | 0.0268*** [0.001] | 0.0380*** [0.001] | 0.0463*** [0.001] |
| I_{AGE} | -0.0117*** [0.003] | -0.0063*** [0.001] | -0.0123*** [0.001] | -0.0101*** [0.001] |
| CREDIT RISK (NPL) | -0.1271 [0.275] | -1.9403*** [0.050] | 1.5234*** [0.046] | 0.2880*** [0.047] |
| $I_{CREDIT RISK (NPL)}$ | -2.1574*** [0.347] | -0.6175*** [0.054] | -2.2130*** [0.050] | -1.7051*** [0.051] |
| SIZE (empl) | 0.8457*** [0.027] | 0.3802*** [0.005] | 0.4753*** [0.006] | 0.5094*** [0.006] |
| $I_{SIZE (empl)}$ | 0.0619*** [0.019] | 0.1648*** [0.004] | -0.2261*** [0.005] | -0.0762*** [0.005] |
| WORKFORCE SHARE (empl) | 13.1067*** [0.979] | -1.1958*** [0.436] | 0.7171 [0.493] | 1.2058** [0.491] |
| $I_{WORKFORCESHARE (empl)}$ | 2.5079*** [0.694] | -1.6152*** [0.373] | -2.0949*** [0.397] | -1.6918*** [0.428] |
| PRIVATE LENDING RATE (Sector) | -0.0201*** [0.007] | 0.0843*** [0.001] | 0.0036** [0.002] | 0.0454*** [0.001] |
| $I_{PRIVATE LENDING RATE (Sector)}$ | -0.0313*** [0.007] | -0.0885*** [0.001] | -0.0006*** [0.001] | -0.0365*** [0.001] |
| 2006 | -0.237 | -3.833*** | -2.915*** | -3.707*** |
| 2007 | -1.101*** | -3.587*** | -2.726*** | -3.446*** |
| 2008 | -0.043 | -0.767*** | -1.230*** | -1.319*** |
| 2009 | -0.258*** | -0.616*** | -0.804*** | -0.870*** |
| 2010 | -0.141*** | -0.433*** | -0.854*** | -0.781*** |
| 2011 | 0.069 | -0.086*** | -0.851*** | -0.624*** |
| 2012 | 0.000 | 0.000 | 0.000 | 0.000 |
| Sector Fixed-effects | Yes | Yes | Yes | Yes |
| Observations | 3,096,564 | 3,096,564 | 2,632,175 | 3,096,564 |
| Number of firms | 980,165 | 980,165 | 893,030 | 980,165 |

Table 7:

Logistic Analysis of Government-Driven Loan Access of Public Firms

We apply a random-effects logistic regression in all models of this table. Panel A reports results from regressing earmarked loan access on firms and sector characteristics, Panel B reports results from regressing non-earmarked official loan access on firms and sector characteristics, and Panel C reports results from regressing all government-driven loan access on firms and sector characteristics. All models control for unobservable sector (88) fixed effects. *I_* indicates a interaction with a dummy variable after the financial crisis (1 if year greater than 2007). All regressions include an intercept. Variables definitions are provided in the Appendix. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

| Binary dependent variable: | Panel A: Earmarked Loans | | Panel B: Non-earmarked loans | Panel C: Total Loans |
|---------------------------------|-----------------------------|---------------------------------|------------------------------------|---------------------------------|
| Government-driven Loan Type: | BNDES - Direct | Earmarked + BNDES - Indirect | Official Banks | All Government- driven Loans |
| AGE | 0.0232 [0.025] | 0.0363*** [0.014] | 0.0099 [0.012] | 0.0347** [0.014] |
| I_AGE | -0.0275** [0.013] | -0.0143 [0.010] | 0.0197** [0.010] | -0.0160 [0.012] |
| CREDIT RISK (NPL) | -2.3623 [2.018] | -2.7475* [1.426] | -1.9255 [1.448] | -3.2688** [1.282] |
| I_CREDIT RISK (NPL) | -1.4287 [2.331] | -0.5837 [1.553] | -0.6707 [1.596] | -0.6335 [1.402] |
| SIZE (empl) | 0.6204*** [0.193] | 0.7925*** [0.112] | 0.4469*** [0.101] | 0.7223*** [0.117] |
| I_SIZE (empl) | 0.0091 [0.125] | -0.0969 [0.088] | -0.1782* [0.091] | -0.2051** [0.101] |
| WORKFORCE SHARE (empl) | 2.2633 [2.628] | -1.4700 [1.605] | 3.9142** [1.578] | 5.7010* [3.216] |
| I_WORKFORCE SHARE (empl) | 4.3417** [1.693] | 0.0778 [1.144] | 0.2742 [1.256] | 0.4052 [2.893] |
| PRIVATE LENDING RATE (Sector) | -0.0886** [0.036] | 0.0224 [0.025] | -0.0153 [0.023] | -0.0034 [0.028] |
| I_PRIVATE LENDING RATE (Sector) | 0.0881*** [0.028] | -0.0115 [0.020] | -0.0125 [0.018] | -0.0190 [0.023] |
| 2006 | 2.402** | -2.027** | -0.281 | -2.229** |
| 2007 | 1.640 | -1.385* | -0.670 | -2.269*** |
| 2008 | -1.432*** | -0.317 | 0.747*** | -0.209 |
| 2009 | -0.976*** | -0.504** | 0.266 | -0.122 |
| 2010 | -0.381 | -0.110 | 0.209 | 0.288 |
| 2011 | -0.211 | -0.011 | 0.245 | 0.241 |
| 2012 | 0.000 | 0.000 | 0.000 | 0.000 |
| Sector Fixed-effects | Yes | Yes | Yes | Yes |
| Observations | 3,653 | 3,653 | 2,917 | 3,653 |
| Number of firms | 766 | 766 | 655 | 766 |

Table 8:

Linear Regression for Government-Driven Loan Access of Firms

We apply a random-effects linear regression in all models of this table. Panel A reports results from regressing earmarked loan access on firms and sector characteristics, Panel B reports results from regressing non-earmarked official loan access on firms and sector characteristics, and Panel C reports results from regressing all government-driven loan access on firms and sector characteristics. All models control for unobservable sector (88) fixed effects. I_ indicates a interaction with a dummy variable after the financial crisis (1 if year greater than 2007). All regressions include an intercept. Variables definitions are provided in the Appendix. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

| Dependent variable: Proportion of government-driven loans | Panel A: Earmarked Loans | | Panel B: Non-earmarked loans | Panel C: Total Loans |
|---|-----------------------------|---------------------------------|---------------------------------|-----------------------------|
| Government-driven Loan Type: | BNDES - Direct | Earmarked + BNDES - Indirect | Official Banks | All Government-driven Loans |
| AGE | 0.0001*** [0.000] | 0.0009*** [0.000] | 0.0012*** [0.000] | 0.0018*** [0.000] |
| I_AGE | -0.00004*** [0.000] | 0.0004*** [0.000] | -0.00001 [0.000] | 0.0002*** [0.000] |
| CREDIT RISK (NPL) | -0.0016*** [0.000] | -0.1959*** [0.003] | 0.0068* [0.004] | -0.0836*** [0.004] |
| I_CREDIT RISK (NPL) | 0.0010** [0.000] | 0.0714*** [0.003] | -0.0801*** [0.004] | -0.0403*** [0.004] |
| SIZE (empl) | 0.0009*** [0.000] | -0.0017*** [0.000] | -0.0010** [0.000] | 0.0035*** [0.000] |
| I_SIZE (empl) | -0.0001 [0.000] | 0.0092*** [0.000] | -0.0100*** [0.000] | -0.0057*** [0.000] |
| WORKFORCE SHARE (empl) | 0.1144*** [0.021] | -0.1834*** [0.036] | -0.0927** [0.037] | -0.0896** [0.042] |
| I_WORKFORCE SHARE (empl) | 0.0717*** [0.020] | -0.0927*** [0.036] | -0.0585* [0.033] | -0.0572 [0.036] |
| PRIVATE LENDING RATE (Sector) | -0.00005** [0.000] | 0.0102*** [0.000] | 0.0011*** [0.000] | 0.0072*** [0.000] |
| I_PRIVATE LENDING RATE (Sector) | -0.00004* [0.000] | -0.0086*** [0.000] | 0.00003 [0.000] | -0.0049*** [0.000] |
| 2006 | 0.0009 | -0.2861*** | -0.1272*** | -0.2928*** |
| 2007 | -0.001 | -0.2662*** | -0.1210*** | -0.2728*** |
| 2008 | 0.0008*** | -0.0118*** | -0.0635*** | -0.0713*** |
| 2009 | 0.0005*** | -0.0064*** | -0.0399*** | -0.0438*** |
| 2010 | 0.0006*** | -0.0085*** | -0.0567*** | -0.0543*** |
| 2011 | 0.0007*** | 0.0042*** | -0.0596*** | -0.0489*** |
| 2012 | 0.000 | 0.000 | 0.000 | 0.000 |
| Sector Fixed-effects | Yes | Yes | Yes | Yes |
| Observations | 3,096,564 | 3,096,564 | 2,632,175 | 3,096,564 |
| Number of firms | 980,165 | 980,165 | 893,030 | 980,165 |

Table 9:
Robustness: Logistic Analysis of All Government-Driven Loan Access of Firms

We apply a random-effects logistic regression in all models. Each column represents an economic sector (the tighter criteria). From more than 1,300 sectors, we report the results of the 10 largest ones (in number of firms). We also split the sample in three equal parts, according to the interest rate charged by private banks on each firm-year outstanding loans. Panel A brings the results for the first tertile (low risk firms), Panel B shows the results for the second tertile (medium risk firms) and Panel C for the third tertile (high risk firms). We apply the model of equation (1), except the credit risk measures (*NPL* and sector *PRIVATE LENDING RATE*) and the relative size of firms (*SECTOR WORKFORCE SHARE*). Only variables AGE and SIZE are reported. All regressions include an intercept and time dummies. Variables definitions are provided in the Appendix. Standard errors are heteroskedasticity robust and clustered at the firm level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

| Panel A: Low Risk Firms | | | | | | | | | | |
|-----------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|-----------------------|-----------------------|-----------------------------|
| Sectors | Clothes | Road Freight | Foods | Auto Parts | Restaurants | Building Materials | Retail - Others | Automotive Fuel | Building Construction | Building Materials - Others |
| AGE | 0.1412*** [0.017] | 0.0393*** [0.004] | 0.0867*** [0.009] | 0.0425*** [0.006] | 0.0320*** [0.010] | 0.0617*** [0.007] | 0.0558*** [0.007] | -0.0048 [0.004] | 0.0234*** [0.005] | 0.0324*** [0.006] |
| SIZE (empl) | 0.2105*** [0.069] | 0.6194*** [0.028] | -0.0108 [0.059] | 0.4942*** [0.052] | 0.2541*** [0.068] | 0.6552*** [0.055] | 0.2920*** [0.050] | -0.2962*** [0.044] | 0.4755*** [0.032] | 0.6051*** [0.057] |
| Observations | 43,020 | 47,849 | 24,739 | 28,621 | 25,526 | 19,673 | 20,631 | 26,746 | 18,577 | 19,297 |
| Number of firms | 25,309 | 22,528 | 15,082 | 16,180 | 15,135 | 11,159 | 10,991 | 12,911 | 9,675 | 10,127 |
| Panel B: Medium Risk Firms | | | | | | | | | | |
| Sectors | Clothes | Road Freight | Foods | Auto Parts | Restaurants | Building Materials | Retail - Others | Automotive Fuel | Building Construction | Building Materials - Others |
| AGE | 0.1365*** [0.010] | 0.0503*** [0.005] | 0.0849*** [0.013] | 0.1071*** [0.018] | 0.0564*** [0.015] | 0.0967*** [0.007] | 0.0742*** [0.022] | -0.0063 [0.004] | 0.0454*** [0.007] | 0.0462*** [0.007] |
| SIZE (empl) | 0.4146*** [0.111] | 0.5721*** [0.031] | 0.0988 [0.086] | 1.0235*** [0.145] | 0.5886*** [0.109] | 0.7836*** [0.059] | 0.5469*** [0.172] | 0.0230 [0.047] | 0.5806*** [0.040] | 0.9194*** [0.070] |
| Observations | 42,619 | 46,167 | 25,077 | 28,257 | 25,429 | 19,565 | 20,494 | 26,657 | 18,404 | 19,301 |
| Number of firms | 26,549 | 24,473 | 15,817 | 16,997 | 16,198 | 11,847 | 11,867 | 13,741 | 10,670 | 10,878 |
| Panel C: High Risk Firms | | | | | | | | | | |
| Sectors | Clothes | Road Freight | Foods | Auto Parts | Restaurants | Building Materials | Retail - Others | Automotive Fuel | Building Construction | Building Materials - Others |
| AGE | 0.1338*** [0.016] | 0.0599*** [0.005] | 0.1430*** [0.015] | 0.0802*** [0.013] | 0.0676 [0.182] | 0.1068*** [0.008] | 0.0870*** [0.017] | -0.0042 [0.006] | 0.0873*** [0.023] | 0.0545*** [0.009] |
| SIZE (empl) | 0.7102*** [0.089] | 0.3925*** [0.036] | 0.3225** [0.153] | 1.1501*** [0.119] | 1.5543 [1.355] | 0.8771*** [0.069] | 0.8783*** [0.134] | 0.2045*** [0.064] | 0.7112*** [0.089] | 1.1482*** [0.080] |
| Observations | 38,956 | 45,161 | 23,834 | 26,800 | 24,355 | 18,626 | 18,938 | 25,742 | 17,314 | 18,628 |
| Number of firms | 25,162 | 23,758 | 15,300 | 16,311 | 15,795 | 11,578 | 11,050 | 13,254 | 10,643 | 10,529 |

Table 10 - Difference GMM estimates of the dynamic Investments equation (2)

| | Panel A - Earmarked | | | | Panel B - Non-earmarked | | Panel C - Total loans | |
|---|---------------------|---------------------|--------------------------|---------------------|-------------------------|---------------------|-----------------------------|---------------------|
| Government loans defined by: | BNDES - Direct | | Earmarked+BNDES-Indirect | | Official Banks | | All Government-driven Loans | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| L.(Gov. Loans / Total Debt) | 0.014 (0.032) | 0.013 (0.032) | -0.035 (0.029) | -0.047* (0.024) | -0.116 (0.398) | 0.021 (0.113) | -0.016 (0.035) | -0.008 (0.036) |
| L.Cash Flow | 0.144* (0.086) | 0.131 (0.096) | 0.112 (0.072) | 0.111 (0.076) | 0.053 (0.249) | 0.169 (0.202) | 0.111 (0.106) | 0.147 (0.142) |
| L.(Gov. Loans/Total Debt)* L.Cash Flow | -0.088 (0.139) | -0.106 (0.174) | 0.116 (0.120) | 0.144 (0.137) | 0.428 (1.360) | -0.129 (0.770) | 0.027 (0.150) | -0.020 (0.195) |
| AfterCrisis*L.(Gov. Loans/Total Debt) | | -0.024 (0.040) | | 0.024 (0.031) | | 0.026 (0.356) | | -0.006 (0.039) |
| AfterCrisis*L.Cash Flow | | 0.004 (0.094) | | -0.006 (0.089) | | -0.015 (0.313) | | -0.064 (0.131) |
| AfterCrisis *L.(Gov. Loans/Total Debt)* L.Cash Flow | | 0.013 (0.191) | | -0.042 (0.174) | | 0.145 (1.551) | | 0.111 (0.192) |
| L.Tobin's q | 0.015** (0.007) | 0.015** (0.007) | 0.015** (0.007) | 0.015** (0.007) | 0.017 (0.011) | 0.017 (0.015) | 0.015** (0.007) | 0.016** (0.007) |
| L.Investments | 0.411*** (0.112) | 0.403*** (0.113) | 0.409*** (0.114) | 0.408*** (0.113) | 0.444*** (0.124) | 0.438*** (0.114) | 0.406*** (0.112) | 0.408*** (0.111) |
| 2006 | 0.004 | 0.004 | 0.004 | 0.004 | 0.006 | 0.004 | 0.004 | 0.004 |
| 2007 | 0.004 | 0.004 | 0.005 | 0.006 | 0.006 | 0.003 | 0.005 | 0.005 |
| 2008 | 0.011 | 0.015 | 0.013 | 0.010 | 0.014 | 0.002 | 0.012 | 0.015 |
| 2009 | -0.025*** | -0.021 | -0.024*** | -0.026* | -0.020 | -0.035 | -0.024*** | -0.021 |
| 2010 | -0.014** | -0.010 | -0.013* | -0.015 | -0.006 | -0.025 | -0.013* | -0.010 |
| 2011 | -0.007 | -0.003 | -0.006 | -0.008 | 0.005 | -0.019 | -0.006 | -0.003 |
| 2012 | -0.003 | 0.001 | -0.001 | -0.004 | 0.009 | -0.017 | -0.001 | 0.002 |
| AR(1) test | 0.004 | 0.004 | 0.005 | 0.005 | 0.01 | 0.005 | 0.004 | 0.004 |
| AR(2) test | 0.351 | 0.359 | 0.329 | 0.337 | 0.453 | 0.418 | 0.349 | 0.352 |
| Observations | 909 | 909 | 909 | 909 | 863 | 863 | 909 | 909 |
| Firms | 199 | 199 | 199 | 199 | 194 | 194 | 199 | 199 |
| PublicFunds joint-signif. p-value | | 0.79 | | 0.22 | | 0.29 | | 0.84 |

Notes : Samples and variables' definitions are described in sections 3 and 4. The data frequency is annual. LZ=Zt-1 means 1-year lag in relation to the dependent variable. Two-step difference GMM estimates (Arellano and Bond, 1991) with robust standard errors clustered by firms in parentheses. All covariates are predetermined, except year dummies. *, ** and *** indicate the significance level of 10%, 5%, and 1%, respectively. AR(1) and AR(2) respectively report the p-values of tests for 1st- and 2nd-order serial correlation. These test the first-differenced residuals. PublicFunds joint-signif. reports the p-value of the F-test.

Table 11 - Difference GMM estimates of the dynamic Leverage equation (3)

| Government loans defined by: | Panel A - Earmarked | | | | Panel B - Non-earmarked | | Panel C - Total loans | |
|---------------------------------------|---------------------|---------------------|--------------------------|---------------------|-------------------------|---------------------|-----------------------------|---------------------|
| | BNDES - Direct | | Earmarked+BNDES-Indirect | | Official Banks | | All Government-driven Loans | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| L.(Gov. Loans / Total Debt) | 0.060** (0.029) | 0.059** (0.030) | 0.029 (0.027) | 0.021 (0.026) | 0.404 (0.333) | 0.367 (0.283) | 0.076*** (0.026) | 0.077*** (0.027) |
| AfterCrisis*L.(Gov. Loans/Total Debt) | | -0.002 (0.034) | | 0.020 (0.020) | | -0.023 (0.084) | | 0.024 (0.025) |
| L.Cash Flow | 0.117 (0.082) | 0.116 (0.082) | 0.087 (0.081) | 0.087 (0.081) | 0.116 (0.153) | 0.107 (0.140) | 0.115 (0.088) | 0.127 (0.091) |
| L.Tobin's q | -0.009 (0.009) | -0.009 (0.009) | -0.011 (0.009) | -0.011 (0.009) | -0.016 (0.015) | -0.016 (0.014) | -0.007 (0.009) | -0.006 (0.010) |
| L.Leverage | 0.603*** (0.086) | 0.603*** (0.088) | 0.587*** (0.084) | 0.576*** (0.086) | 0.575*** (0.165) | 0.569*** (0.151) | 0.616*** (0.090) | 0.613*** (0.092) |
| 2006 | 0.000 | 0.000 | 0.000 | 0.000 | -0.009 | -0.008 | 0.000 | 0.001 |
| 2007 | 0.014 | 0.014 | 0.011 | 0.012 | -0.008 | -0.006 | 0.009 | 0.009 |
| 2008 | 0.058*** | 0.058*** | 0.051*** | 0.047*** | 0.035 | 0.042 | 0.051*** | 0.037* |
| 2009 | -0.010 | -0.010 | -0.018* | -0.021** | -0.053 | -0.043 | -0.017* | -0.031* |
| 2010 | 0.010 | 0.011 | 0.004 | 0.000 | -0.039 | -0.029 | 0.001 | -0.014 |
| 2011 | 0.036*** | 0.036** | 0.030*** | 0.026** | -0.024 | -0.011 | 0.023** | 0.007 |
| 2012 | 0.028** | 0.028* | 0.023** | 0.019 | -0.044 | -0.030 | 0.017 | 0.001 |
| AR(1) test | 0.000 | 0.000 | 0.000 | 0.000 | 0.018 | 0.010 | 0.000 | 0.000 |
| AR(2) test | 0.067 | 0.066 | 0.07 | 0.071 | 0.125 | 0.09 | 0.152 | 0.199 |
| Observations | 909 | 909 | 909 | 909 | 863 | 863 | 909 | 909 |
| Firms | 199 | 199 | 199 | 199 | 194 | 194 | 199 | 199 |
| PublicFunds joint-signif. p-value | | 0.10 | | 0.40 | | 0.40 | | 0.01 |

Notes : Samples and variables' definitions are described in sections 3 and 4. The data frequency is annual. LZ=Zt-1 means 1-year lag in relation to the dependent variable. Two-step difference GMM estimates (Arellano and Bond, 1991) with robust standard errors clustered by firms in parentheses. All covariates are predetermined, except year dummies. *, ** and *** indicate the significance level of 10%, 5%, and 1%, respectively. AR(1) and AR(2) respectively report the p-values of tests for 1st- and 2nd-order serial correlation. These test the first-differenced residuals. PublicFunds joint-signif. reports the p-value of the F-test.

Table 12 - Difference GMM estimates of the dynamic Financial Expenditure equation (4)

| Government loans defined by: | Panel A - Earmarked | | | | Panel B - Non-earmarked | | Panel C - Total loans | |
|---------------------------------------|---------------------|---------------------|--------------------------|---------------------|-------------------------|---------------------|-----------------------------|---------------------|
| | BNDES - Direct | | Earmarked+BNDES-Indirect | | Official Banks | | All Government-driven Loans | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| L.(Gov. Loans / Total Debt) | -0.010 (0.015) | -0.004 (0.017) | -0.023 (0.014) | -0.011 (0.015) | -0.085 (0.088) | -0.051 (0.072) | -0.024* (0.015) | -0.024 (0.015) |
| AfterCrisis*L.(Gov. Loans/Total Debt) | | 0.035* (0.021) | | -0.037** (0.017) | | 0.034 (0.037) | | -0.001 (0.016) |
| L.(EBITDA/Total Debt) | -0.009 (0.023) | -0.001 (0.022) | -0.004 (0.023) | -0.000 (0.023) | -0.010 (0.025) | -0.011 (0.023) | -0.008 (0.023) | -0.008 (0.023) |
| L.Leverage | 0.023 (0.055) | 0.037 (0.056) | 0.029 (0.056) | 0.052 (0.057) | 0.014 (0.061) | 0.010 (0.059) | 0.021 (0.056) | 0.021 (0.056) |
| L.Fin. Expenditure | 0.299*** (0.066) | 0.290*** (0.064) | 0.287*** (0.066) | 0.280*** (0.066) | 0.312*** (0.077) | 0.292*** (0.071) | 0.293*** (0.066) | 0.293*** (0.066) |
| 2006 | -0.010* | -0.009* | -0.009* | -0.009* | -0.008 | -0.009 | -0.009* | -0.009* |
| 2007 | -0.022*** | -0.022*** | -0.021*** | -0.021*** | -0.020*** | -0.021*** | -0.022*** | -0.022*** |
| 2008 | 0.018** | 0.012 | 0.021*** | 0.030*** | 0.025*** | 0.015 | 0.019*** | 0.020 |
| 2009 | -0.023*** | -0.029*** | -0.020** | -0.012 | -0.014 | -0.025* | -0.021** | -0.020 |
| 2010 | -0.032*** | -0.039*** | -0.030*** | -0.022*** | -0.023** | -0.037** | -0.030*** | -0.030** |
| 2011 | -0.012** | -0.019*** | -0.009* | -0.001 | 0.002 | -0.014 | -0.009 | -0.008 |
| 2012 | -0.022*** | -0.030*** | -0.020*** | -0.012* | -0.009 | -0.026 | -0.019*** | -0.019 |
| AR(1) test | 0.007 | 0.008 | 0.007 | 0.007 | 0.008 | 0.008 | 0.007 | 0.007 |
| AR(2) test | 0.235 | 0.200 | 0.254 | 0.314 | 0.350 | 0.260 | 0.257 | 0.250 |
| Observations | 983 | 983 | 983 | 983 | 933 | 933 | 983 | 983 |
| Firms | 212 | 212 | 212 | 212 | 207 | 207 | 212 | 212 |
| N. of instruments | 11 | 12 | 11 | 12 | 11 | 12 | 11 | 12 |
| PublicFunds joint-signif. p-value | | 0.16 | | 0.04 | | 0.50 | | 0.25 |

Notes : Samples and variables' definitions are described in sections 3 and 4. The data frequency is annual. LZ=Zt-1 means 1-year lag in relation to the dependent variable. Two-step difference GMM estimates (Arellano and Bond, 1991) with robust standard errors clustered by firms in parentheses. All covariates are predetermined, except year dummies. *, ** and *** indicate the significance level of 10%, 5%, and 1%, respectively. AR(1) and AR(2) respectively report the p-values of tests for 1st- and 2nd-order serial correlation. These test the first-differenced residuals. PublicFunds joint-signif. reports the p-value of the F-test.