FINANCE & MARKETS GLOBAL PRACTICE

Brazil Financial Intermediation Costs and Credit Allocation

Discussion paper

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DISCUSSION PAPER FOR WORKSHOP
BRAZIL: FINANCIAL INTERMEDIATION COSTS AND CREDIT ALLOCATION
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EXECUTIVE SUMMARY

1. **Earmarked credit was about half of total credit in Brazil at end-2015—after declining to one third of total credit in 2007, it is back to the levels in late 1990s.** During 2008-15, earmarked credit increased from 12 to close to 30 percent of GDP. Initially, the objective was to counteract the retrenchment in lending by private lenders. However, earmarked credit expansion continued during the subsequent commodity boom period.

2. **This paper provides a taxonomy of the complex earmarked credit system and a preliminary analysis of the potential implications.** The interventions include a complex web of price and quantity regulations, reserve requirements, tax exemptions and forced savings schemes that are used for earmarked lending to specific sectors.

3. **The objective of the taxonomy is to understand who funds the system, who benefits from it and how is it intermediated**. Below are the main findings.

Funding sources for earmarked credits:

- **Savers fund about 40 percent** (13 percent of GDP). The savings have been shifting away from deposits into tax-exempt instruments, repos, or investments outside the banking system. These funds are placed voluntarily.

- **Employees fund about 12 percent** (4 percent of GDP) through monthly salary deductions to the Severance Indemnity Fund (FGTS), at very low remuneration.

- **The fiscal sector funds about 48 percent** (15 percent of GDP), through direct lending to BNDES (9 percent of GDP) and through various special and constitutional funds (6 percent of GDP, excluding FGTS).

The costs of earmarked credits:

- **The estimated fiscal cost of explicit and implicit subsidies amounts to about 3.7 percent of general government revenue (1.5 percent of GDP) for 2015.** This is mainly due to the differential between regulated rates and market interest rates at which the government finances its lending.

- **Savers and employees each contribute about 0.3 percent of GDP to lowering interest rates on earmarked credit.** The savers and employees receive low remuneration on deposits and contributions to FGTS, respectively.

Beneficiaries of earmarked credits:

- **Among firms the main beneficiaries are in the services, rural, and energy sectors, and larger, older and less risky firms benefit more**. Conversely, the sectors intensive in positive social externalities were not the main beneficiaries.

The effect of earmarked credit on investment is insignificant for publicly traded firms.

- **Among household borrowers, those with access to rural credit and mortgage loans enjoy large subsidies**.

- **Average interest rates on earmarked loans (at about 10 percent) were less than one fourth of the interest rates charged on non-earmarked loans.** Smaller firms with access to earmarked credits benefit most from the rate differential.

Intermediation of earmarked credits:

- **Government-owned banks and the largest private banks dominate the earmarked credit market.** BNDES — directly and through on-lending via commercial banks — accounts for 72 percent of earmarked firm credits.

- **Banks make small profits on directed credits and seem to compensate with higher rates on non-earmarked credits and fee income.** An estimated 82 percent of nominal interest income is derived from the non-earmarked credits, despite accounting for only half of total credits.

- **The interventions have implications on the credit channel of monetary policy**. Our analysis suggests that the changes in the policy rate, SELIC, have to be larger to have the same impact. Also, monetary policy may distort credit cost and allocation as earmarked credit is unevenly distributed across sectors and firms.

4. **The size of the programs, the high costs, and the absence of clear evidence of their positive impact, calls for a comprehensive evaluation**. Earmarked credit programs are key levers of policy interventions. The policy options include the following:

- **Clarify the objectives and intended beneficiaries of the various earmarked credit schemes and develop a results framework accordingly**. The intended recipients behind the original creation of the schemes—infrastructure projects, low-income housing, small scale rural families, small firms—may no longer be adequately and efficiently served. In some cases technical support to improve productivity could be more beneficial than preferential credit.

- **Enhance transparency and develop monitoring and evaluation frameworks.** Greater transparency is the foundation for accountability and for senior policy makers' ability to identify reform needs. Initiatives are underway to this effect.

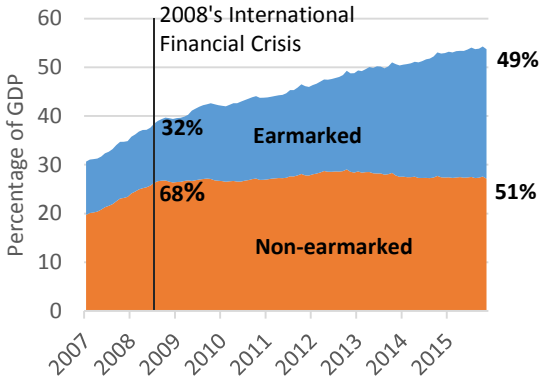
- **Increase public awareness and discuss the need for reforms**. Changes to earmarked credit schemes will occur as interest rates converge. The authorities

can drive the process by determining the appropriate speed and sequencing of reforms, which may differ across various schemes.

I. EARMARKED CREDIT MARKET IN BRAZIL

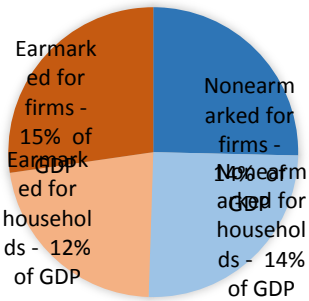
5. **Earmarked credit accounts for about half the credit market (27 percent of GDP) as of end-2015.** After declining to one third of total credit in 2007, it is back to the levels in late 1990s. Since 2008, earmarked lending has grown from 32 percent to 49 percent of total credit (Figure 1). This policy shift was initially attributed to the global financial crisis and an expectation among policy makers that Brazilian firms would be credit constrained. However, the earmarked credit expansion continued as Brazil recovered from the global crises buoyed by the commodity price boom.

Figure 1: Outstanding credit in Brazil



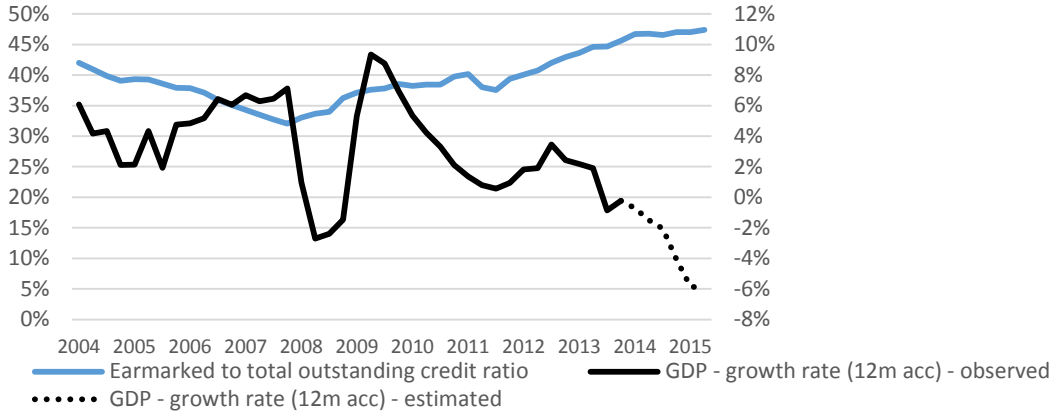
Note: Percentage numbers on the chart are share of total outstanding credit. Source: Central Bank of Brazil, 2016

Figure 2: Credit by borrower type and whether earmarked or not



Source: Central Bank of Brazil, SGS, December 2015.

Figure 3: Earmarked credits and GDP growth rate



Source: IBGE, Central Bank of Brazil , SCR database
Note: SCR data does not match Central Bank of Brazil time series on earmarked outstanding credit.

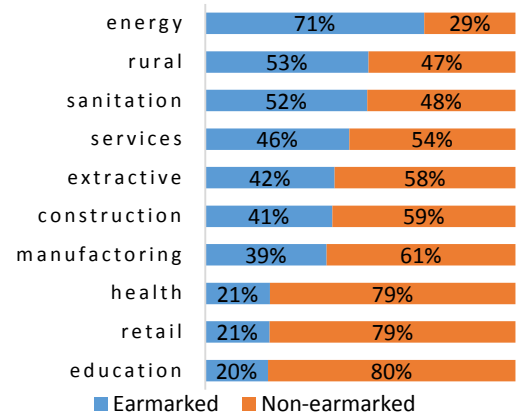
6. **Earmarked credit is mainly targeted to infrastructure and development projects, mortgages and rural activities.** Total credit is roughly equally divided between firms and households, and within those categories, credit is roughly equally divided between earmarked and non-earmarked credit (Figure 2). Within these four buckets, however, there is important segmentation:

- Earmarked credit to firms is targeted to firms' fixed investments, infrastructure and development projects, whereas non-earmarked credit is dominated by working capital (46 percent).

- There is large variation across sectors regarding the access to earmarked credits (Figure 4). The services and manufacturing sectors receive the largest shares of total earmarked credit (27 and 31 percent), followed by the energy sector.[1]

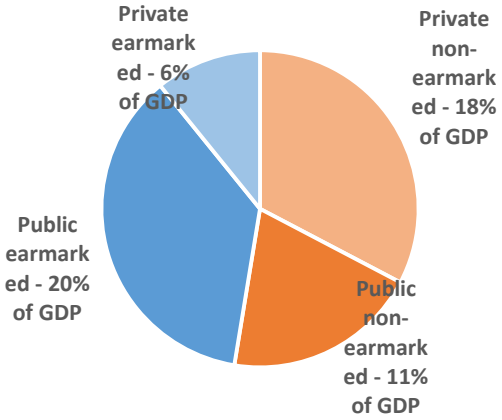
- Earmarked credit to households is targeted to real estate financing (70 percent) and rural activities (22 percent), whereas non-earmarked credit is mostly payroll deducted loans, goods financing and standard personal credit.

Figure 4: Earmarked vs. Non-earmarked by sector, Firms Credit, 2006-2015 average



Source: Central Bank of Brazil, credit registry (SCR), December 2015.

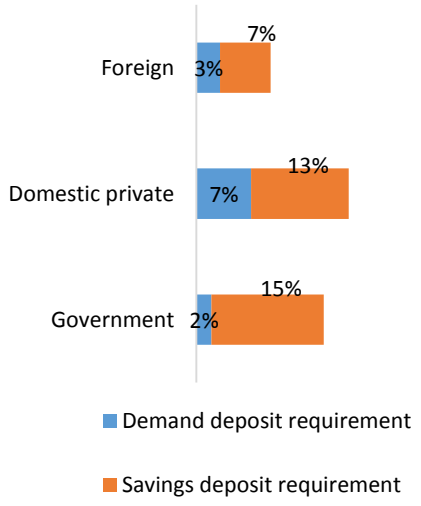
Figure 5: Earmarked vs. non-earmarked by bank ownership, all credit, March 2016



Source: SCR.

7. **Government-owned banks and the largest private banks dominate the earmarked credit market.** The national development bank, BNDES—directly and through on-lending via commercial banks—accounts for 72 percent of earmarked firm credits. The two largest government-owned commercial banks account for 61 and 74 percent market share in rural credit and residential housing lending, respectively. For the domestic and foreign private banks, deposit based earmarked lending (Figure 6) amount to 20 and 10 percent, respectively, of their total credit.

Figure 6: Deposit based earmarked lending/total credit



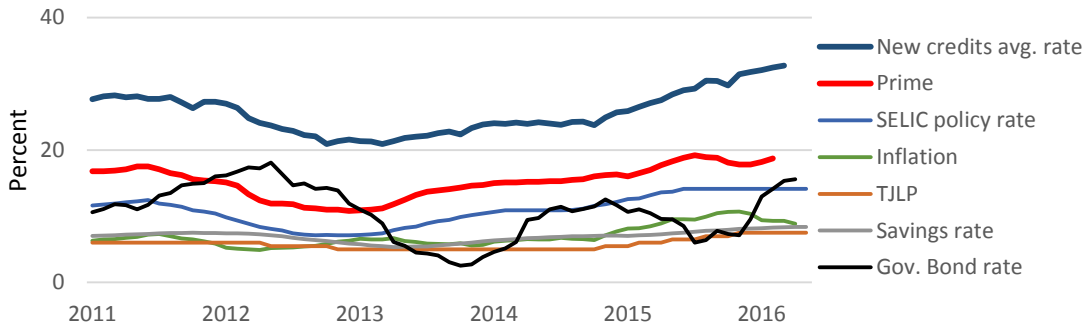
Source: Central Bank of Brazil, September 2015.

8. **Persistently high interest rates in**

[1] Annex 5, Figure 5.A provides the distribution of earmarked credit per economic sector.

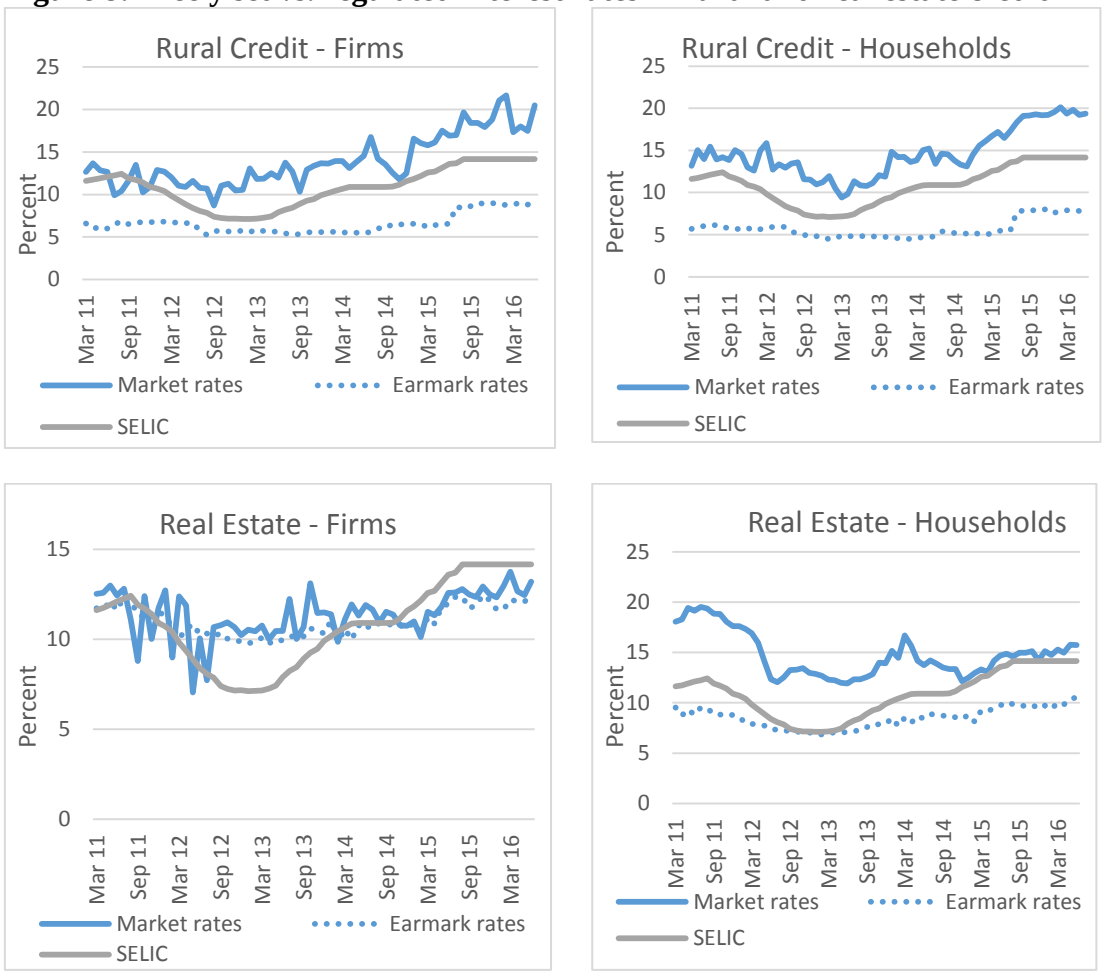
Brazil have motivated interventions. The interest rates charged for earmarked loans are mostly regulated and substantially lower than those charged in the non-regulated loans market (Figure 7). The Long Term Interest Rate (TJLP), the benchmark rate for BNDES loans, and rates for loans to specific sectors are set well below the monetary policy rate, the SELIC, and often below the inflation rate. The non-earmarked lending rates tend to follow the SELIC (Figure 8). Annex 1 provides a description of the key interest rates in Brazil.

Figure 7: Interest rates in Brazil



Source: Central Bank of Brazil, SGS, Bloomberg and Andima.

Figure 8: Freely set vs. regulated interest rates in rural and real estate credit

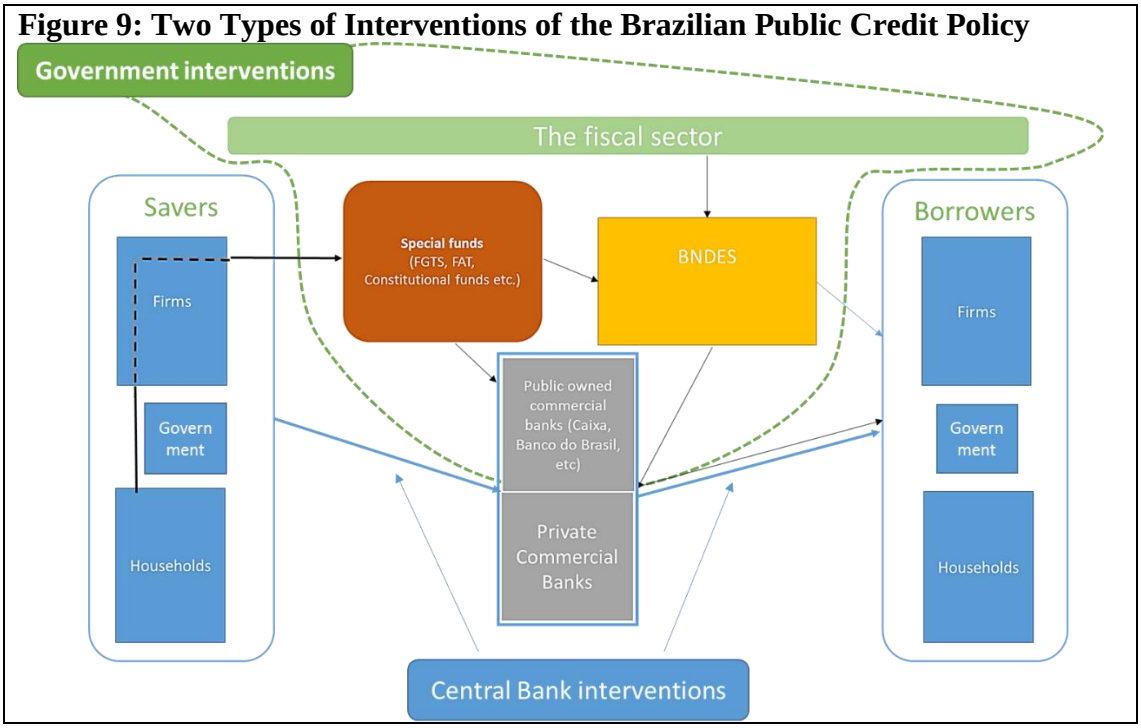


Source: Central Bank of Brazil.

II. A TAXONOMY OF THE CREDIT MARKET INTERVENTIONS

9. **This study classifies the Brazilian credit market interventions into two main categories: (1) Governmental interventions; and (2) Central Bank regulations** (Figure 9). Table 1 provides a summary description of the main interventions. Government interventions include the funding of earmarked credit through banks at below market rates, mandated saving schemes for earmarked credit programs at regulated interest rates, and direct fiscal subsidies to lower interest rates.[2] Central Bank regulations channel a share of standard reserve requirements on demand, time and savings deposits to housing, microcredit, and rural credit. [3]

Figure 9: Two Types of Interventions of the Brazilian Public Credit Policy



[2] Other interventions, such as preferential access to federal employees' payroll and judicial deposits by government-owned banks are not included in this analysis. These interventions are not linked to earmarked credits although they may have implications for financial intermediation more broadly.

[3] See Lundberg (2011) for a description of the different interventions by type of borrower (BNDES borrower, rural and housing) and a historical perspective.

Table 1: List of interventions in the Brazilian Credit Sector

Government interventions	
Special Funds (FAT, Constitutional Funds and FGTS)	As of end-2015, 27 percent of total BNDES resources comes from the Workers Support Fund (FAT), which in turn is remunerated with the regulated Long Run Interest Rate (TJLP) by BNDES.[4] Other funds of fiscal nature include the Marine Merchant Fund, directed for the naval industry and related infrastructure, and PIS-PASEP (precursor of FAT)—these amount to 7 percent of BNDES' total resources. The FGTS, a severance indemnity fund for employees, is a mandatory saving scheme that collects 8 percent of the employee's salary to individual accounts at Caixa Econômica Federal (Caixa), a commercial public bank.[5] Its resources are mostly directed to real estate credit at subsidized interest rates. The fund is under-remunerated earning 4.8 percent in 2015, well below inflation. Other funds include Regional Development Constitutional Funds, which are Northeast Fund (FNE), North Fund (FNO) and Midwest Fund (FCO).
Implicit subsidies through under-remunerated funding	The central government issues public debt at an average 13.6 percent interest rate[6] to finance credit programs through (mostly) BNDES, which in turn remunerates the central government with the TJLP, which was 7 percent at end-2015. The below-market remuneration implies a subsidy.
Direct subsidies	The Government provides subsidies reimbursing banks for lending under certain programs at below market interest rates. The largest such program was the Investment Support Program (PSI) operated by BNDES, which offered loans at an average rate as low as 3 percent in 2015. Other subsidized credit programs include Minha Casa Minha Vida housing program and PRONAF for farmers, both directed to low income families.
Tax exemptions	Savings instruments such as savings accounts and real estate and agriculture letters of credit are exempt from income tax.[7] Certain credit operations are exempt from the financial transactions tax (IOF), such as infrastructure and development financing that fulfill certain criteria, all credit transactions that use Regional Development Constitutional Funds (FNO, FCO and FNE), Minha Casa Minha Vida housing program's infrastructure projects, among others.
Central Bank regulations	
Deposits earmarked for lending to certain sectors	Central Bank regulations require that commercial banks lend for real estate and rural projects at below-market interest rates based their deposit collection.
Differential reserve requirements for earmarked credits	Loans to infrastructure projects offered at the public credit programs' contractual terms can be deducted from Central Bank's reserves requirements.[8]
Regulation of earmarked credit rates	The TJLP rate is regulated by the National Monetary Council (CMN) and the Central Bank sets the Taxa de Referência (TR), a reference rate that

[4] The FAT is funded with a 0.65% tax on gross revenues of the companies, 1% on the payroll of nonprofits and 1.65 % on imports of goods and services. Brazilian federal constitution, article number 239, assigns at least 40% of FAT resources to economic development programs, implemented through BNDES, with criteria that maintains its values.

[5] FGTS was created in 1966 and is currently managed by a trustee board, composed by workers, entrepreneurs and central government's representatives.

[6] Following MoF methodology, we adopt the average cost of new issuing of public debt on December 2015, accumulated for the last 12 months.

[7] Letters of credit for agriculture in Brazil do not seem to assign all its resources to agriculture. See Normativo nb 4487/2016 from the Central Bank of Brazil.

[8] See Circular nb. 3745/2015 as example.

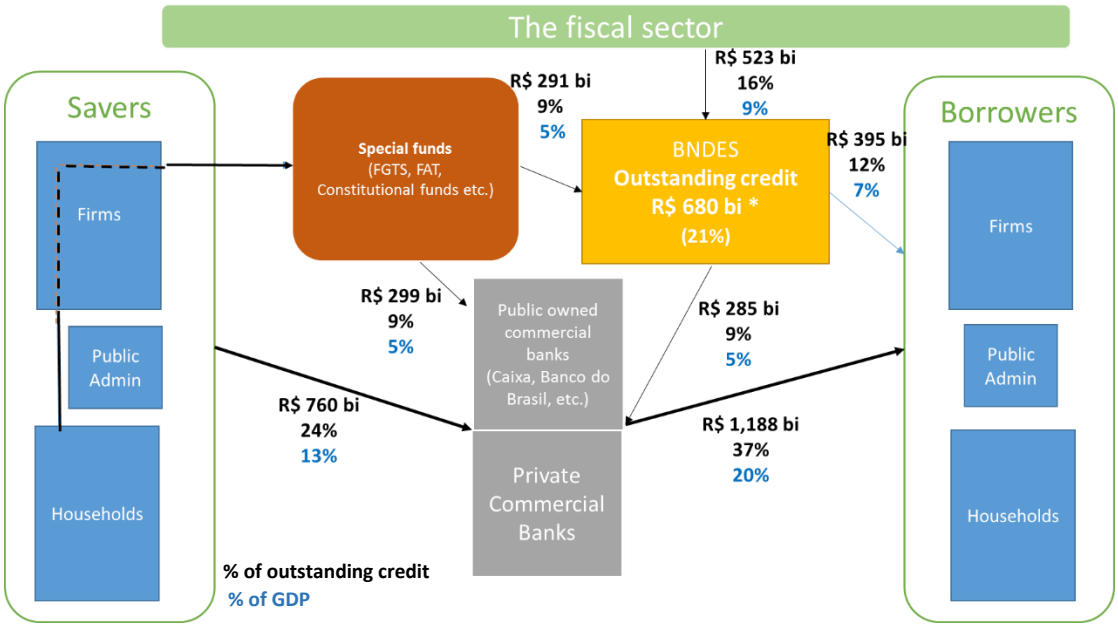
	remunerates saving accounts plus a fixed rate. CMN also sets the agriculture earmarked credit rate.[9]

Sources of Funding for Earmarked Credits

10. **Demand deposits, special funds, and direct lending from the fiscal sector are the main funding sources of earmarked credit.** Figure 10 provides a taxonomy of funding sources for earmarked credits, using a static balance sheet approach as of end-2015 (see Annex 4 for a comparison with 2007). Funding accumulated by the special funds are directed to BNDES (R$291bn) and to other development and public commercial banks (R$299bn). BNDES provided R$285bn of its resources to public and private commercial banks to on-lend to specific projects, based on agreed criteria. The Figure does not fully capture the flow of funds as some funding sources are used for other purposes than credit, and for example BNDES also raises funds in the capital market, from multilateral institutions, etc.

Figure 10: Funding Sources for Earmarked Credit - 2015

(R$ Billions, percent of total credit market and percent of GDP, respectively)



Source: Central Bank of Brazil, BNDES and FGTS balance sheet.
Note: Numbers scaled to total outstanding credit in 2015 of R$ 3.2 trillion, and GDP of R$ 5.9 trillion. Not all BNDES sources are directed to credit. BNDES also invests in stocks, debentures, securities, etc., which are not included. Resources from Special Funds to other banks than BNDES are approximations based on Central Bank of Brazil, BNDES, FGTS and Ministry of Agriculture data. Not all special funds for earmarked credit are covered in the study and as such total outstanding credit does not add up.

11. **To understand who funds the earmarked credits, we grouped the funding sources into three categories: savers, employees, and the fiscal sector.** The Special Funds are separated into: (i) Severance Indemnity Fund (FGTS), which is a mandatory

[9] See Resolution nb 4.511/2016 as an example of regulatory oversight over the earmarked rural credit.

savings scheme imposed on firms based on wage expenditures[10]; and, (ii) FAT and other constitutional funds which are based on tax collection and are thus considered under fiscal resources. It should be noted that there are interest rate subsidies given to certain earmarked programs, which do not have funding associated with them (PRONAF and Minha Casa Minha Vida).

12. **The funding of earmarked credit comes from the following sources[11]:**

- **Savers fund about 40 percent** (R$760bn; 13 percent of GDP) as of end-2015, compared to 49 percent (10 percent of GDP) at end-2007. Funding comes from demand and savings deposits as well as tax-exempt instruments such as from real estate and agricultural letters of credit (LCI and LCA).

- **Employees fund about 12 percent** (R$ 224bn; 4 percent of GDP) as of end-2015, through monthly salary deductions to the Severance Indemnity Fund (FGTS), at very low remuneration. FGTS provided funding for 18 percent of directed credit (7 percent of GDP) at end-2007.

- **The fiscal sector funds about 48 percent** (R$890bn; 15 percent of GDP), through direct lending to BNDES (R$523bn; 9 percent of GDP) and through various special and constitutional funds (6 percent of GDP, excluding FGTS). Fiscal sector funded 33 percent of directed funds (7 percent of GDP) at end-2007.

Direct Costs of Provision of Earmarked Credits

13. **The "costs" of the provision of earmarked credits are borne by the fiscal sector, and by under-remuneration of certain deposits and forced savings** (Figure 11). The costs considered here are a mix of direct and implicit subsidies and provide only a partial analysis. A comprehensive analysis of net costs should consider the benefits due to the provision of earmarked credits (on investment, growth, jobs etc.), which is partially addressed in the next section.

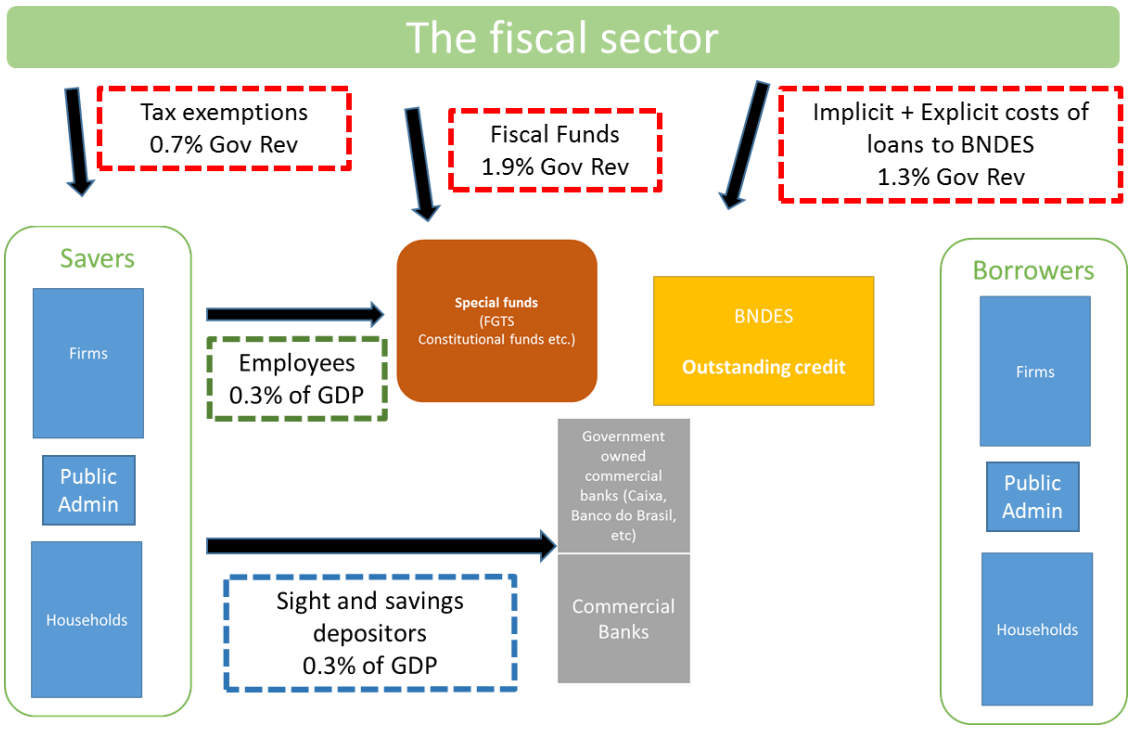
14. **The cost of potential equity injections are not considered although they can be large.** In particular when credit risks materialize in Government owned banks recapitalization can be costly. In the period 1995-1998 mostly those banks owned by Brazilian states were recapitalized. Moreover, in 1996 Banco do Brazil was recapitalized and Caixa was relieved of losses on unpaid mortgage debt. In 2001 under the PROEF program, Caixa, Banco do Brazil, Banco do Nordeste, and Banco da Amazonia all received capital contributions. In light of the recent credit expansion and substantial Government ownership of the banking sector the potential costs could be

[10] Firms pay into the FGTS based on their wage expenditures. It can be argued whether the cost is ultimately fully passed on to the employees or borne by the employers. For simplicity we consider it to be borne by employees.

[11] The sources are based on total directed funds. For some schemes it was not feasible to separate between earmarked credit and other directed funds.

substantial, but an assessment of possible capital needs are beyond the scope of this work.

Figure 11: Costs of Earmarked Credit



15. **The fiscal costs of earmarked credits are estimated at 3.7 percent of general government revenues or 1.5 percent of GDP (Table 2).** The fiscal costs include direct subsidies on specific programs as well as financing provided to BNDES. Regarding the latter, to finance additional BNDES programs, the government issued public debt at market rates (14 percent on average) and lend to BNDES at subsidized rates (TJLP; 7 percent on average). The increase in the interest rate differential combined with the growth in earmarked credit contributed to increasing costs as a share of general government revenues from 1 percent in 2009 to 2.6 percent[12] (see Table A3.3 in Annex 3 for details).

[12] The calculation does not take into account dividends from BNDES, which is considered remuneration on invested capital, nor tax revenues from BNDES.

Table 2: Fiscal financing (flow) of subsidies in earmarked credit - 2015

	Type of funding	Explicit costs (interest rate equalization policies)	Implicit costs	Fiscal Costs (R$ Bi)	% of GDP	% of General Gov. Revenues
BNDES funding						
Treasury lending to BNDES	Issuing of public debt	9.5	19.0	28.5	0.48%	1.3%
FAT Transfers	Specific taxation on firm's profit	-	14.0	14.0	0.24%	0.6%
Other funds						
Constitutional Fund	Specific taxation on industrialized products and services	-	12.6	12.6 [a]	0.21%	0.5%
Some rural credit programs (includes PRONAF)	Discretionary taxation	16.0	-	16.0 [a]	0.27%	0.7%
Savings instruments (foregone income from tax exemptions)						
Earnings from Savings	Income tax exemption	-	7.8	7.8	0.13%	0.3%
Earnings from agriculture and real estate letters	Income tax exemption	-	7.8	7.8	0.13%	0.3%
Totals		**25.5**	**70.7**	**86.5**	**1.47%**	**3.7%**

Sources: MoF (2016) and own estimates.
Note: Estimated fiscal costs of Treasury direct lending to BNDES, Constitutional Funds and some rural credit programs were computed by the MoF. The remaining estimates are our own. The figures estimated by MoF for 2015 might be overestimated as some payments from previous years were deferred to 2015.

16. **New funding for development and infrastructure projects through BNDES' credit programs was costly, reaching R$ 28.5 billion or 1.3 percent of fiscal revenues in 2015.** BNDES' Investment Support Program (PSI), which was in place during 2008-15, received most of this new funding and charged borrowers an average interest rate of 4.6 percent. The central government had to reimburse BNDES 2.5 percent in equalization rate, which implied R$ 9.5 billion in direct explicit subsidies in 2015 (0.43 percent of general government´s revenues).[13,14] The fiscal cost of Treasury's direct lending alone reached R$ 19 billion in 2015, 0.86 percent of the year's general government revenues. Direct and indirect credit subsidies from this operation amounted to 1.3 percent of 2015 general government revenues.

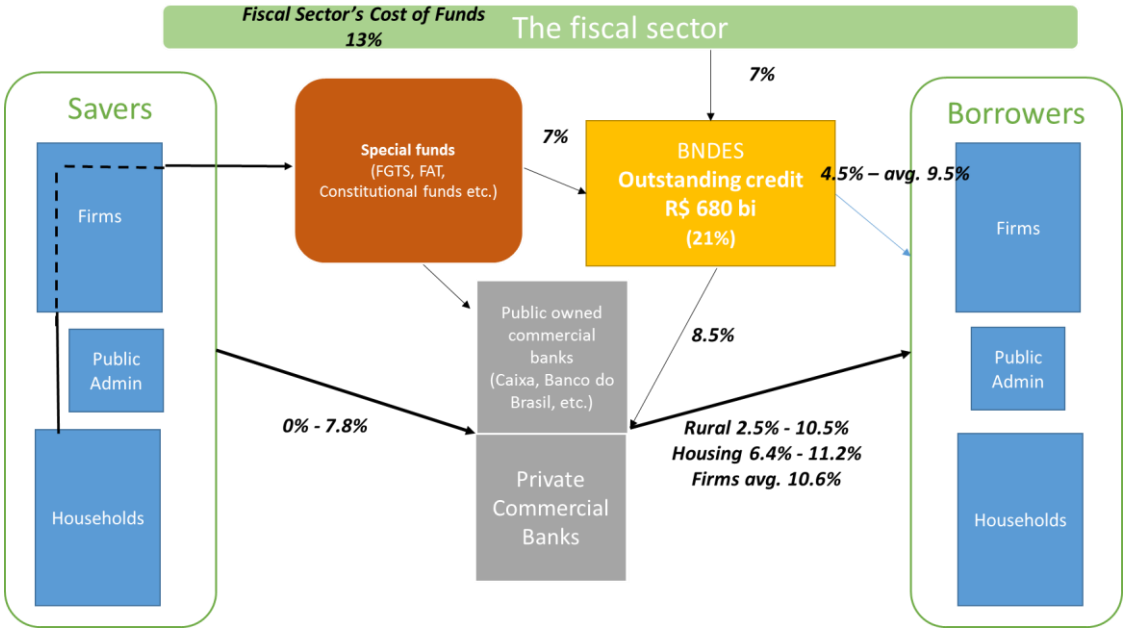
17. **The rural program, PRONAF, also carries a large fiscal subsidy.** The program had an explicit fiscal cost from interest rate equalization of R$ 8.3 billion, with

[13] MoF (2016).
[14] Besides decreasing interest rates through programs such as PSI, BNDES has also increased the average maturity of its overall loans from 6 years during the period 2002-2008 to 8 years during 2009-2015 for direct lending and from 7 to 8, for on-lendings.

interest rates as low as 0.5 percent to 5.5 percent - well below SELIC market rate and inflation (Figure A3.1 in Annex 3 presents the yearly fiscal cost flow as percentage of GDP).

18. **The implicit costs to employees and depositors result mainly due to the under-remuneration of forced savings and deposits** (Figure 12)**.** Most Special Funds are remunerated at 7 percent suffering a loss relative to investing in government bonds. The depositors who finance rural credits through demand deposits typically receive no remuneration while other deposits earn up to 7.8 percent. Borrowers benefit from subsidized interest rates that are frequently below the inflation rate. Lending rates vary by sector and can be as low as 2.5 percent for certain rural loans.

Figure 12: Interest Rates in the Earmarked Credit System



19. **Savers often receive limited remuneration and their savings options are constrained (Table 3).** Funding from savers reached R$ 760 billion in 2015[15], which corresponds to 24 percent of total outstanding credit in the economy. Savings accounts (poupança) pay less than inflation at 9 percent, but are tax-exempt. The reference rate for rural credit and savings accounts are set by the Central Bank.[16] The savings account rate has usually followed the inflation rate thus offering about zero real return. Recently the real return has been negative leading to a loss of savings mobilization, which in turn has constrained earmarked housing credit, which relies on such deposits. Time deposits are remunerated close to the SELIC rate, whereas demand deposits are not remunerated at all. Employees that contribute to the FGTS earn just 4.8 percent.

[15] Some of the funding raised is not for credit, but for other types of funding for directed purposes. It was not feasible to separate the funds, and the total funding therefore exceeds total earmarked credit.
[16] Reference rate based on monthly earnings of CDB/RDB issued with 30/35 days, with a reduction factor to extract inflation expectations, defined in turn by the Central Bank of Brazil. Savings earnings are based on TR + 6%, conditional on SELIC rate's level.

Table 3: Savers and employees financing of subsidies in earmarked credit [17]

Type of funding	2009		2015	
	% of GDP	Opportunity costs (R$ Bi)	% of GDP	Opportunity costs (R$ Bi)
Savers				
Demand Deposits	0.14%	4.7	0.11%	6.7
Savings	0.10%	3.2	0.20%	12.1
Savers total	0.24%	7.9	0.31%	18.8
Employees				
FGTS - Outstanding Credit	0.20%	6.8	0.32%	19.1
Total	**0.44%**	**14.7**	**0.64%**	**38.0**

20. **The cost of earmarked credits increases in line with the increase in market interest rates.** In particular, the gap between the Government's borrowing cost and the yield on its lending to the financial sector increases. Similarly, the burden of FGTS's mandatory savers and accounts without a direct link to market costs suffer a loss. An estimation of these costs' sensitivity to a 1 percentage point increase in market interest rates is presented in Table 4.

Table 4: Estimated impact of interest rates on financing earmarked credit

Estimated impact of a 1 percentage point increase in sovereign cost of funds	Estimated cost - R$ (billion)	Share of general gov. revenues	Share of GDP
Impact on fiscal costs			
Fiscal cost of Credit Policy Funding [a]	7.7	0.35%	0.13%
Fiscal cost of General Government (General Gov. Gross Debt)	39.9	1.81%	0.68%
Total	**49.9**	**2.36%**	**0.85%**
Impact on savers [b]			
Demand deposits	0.5	-	0.01%
Savings deposits	2.2	-	0.04%
FGTS mandatory savers	2.2		0.04%
Total	**2.7**		**0.09%**

Note a: Constitutional Funds and rural subsidies, estimated by the MoF, not included. Note b: estimated cost is over the share of savings and demand deposits directed to housing (65%) and rural credit (34 percent).

21. **The explicit regulation of earmarked interest rates is unusual by international standards.** In searching for international evidence on directed credit, India, China, and Argentina were identified as comparators (Box 1). Argentina introduced a program for lending to enterprises at a specified interest rate but other programs do not impose caps on lending rates.

[17] Following the methodology described in Annex 3 for estimating fiscal costs, the costs to savers are estimated multiplying the outstanding balance of (1) savings accounts and (2) demand deposits and the (3) FGTS' total outstanding credit operations to its respective earnings differential to the CDI interest rate.

Box 1. Provision of Directed Credits: International Comparisons

India: Industrial Financial Corporation and Directed Credit Requirements

The Indian banking system remains dominated by public banks, which collected over 77 percent of deposits and comprise over 90 percent of all branches[18]. The main provider of long-term loans is the Industrial Finance Corporation of India, which focuses on industrial and infrastructure sectors. Banks typically provide short-term working capital to firms.

Both public and private banks are required by the Reserve Bank of India to offer 'priority sector' loans, which are small value loans to farmers for agriculture and allied activities, micro and small enterprises[19], poor people for housing, students for education, other low income groups and weaker sections.[20]

Interest rates are freely set, but the dominance of public banks may lead to lower rates as these banks pursue social and economic development objectives.[21]

Banks that fail to achieve the lending target of at least 40 percent of their adjusted net bank credit to the 'priority sectors', are required to lend money to specific government agencies at very low rates of interest.[22]

China: Dominance of state banks and lending to state owned enterprises

State banks dominate China's banking sector with large part of lending going to state owned enterprises. According to Szamosszegi et al (2011), state owned enterprises benefit from: (1) access to credit at favorable interest rates; (2) debt forgiveness; and (3) in some cases, access to loans, despite lack of creditworthiness. More recently, the three policy banks have been playing an increasing role in credit expansion as the economy slows. The mandates of policy banks, traditionally focused on infrastructure and basic/pillar industries, have been broadened to support the government's economic and social policies. However, evidence of extensive earmarking credits through regulation or government interventions were not identified.

Argentina: "Line for Productive Credit" Program

Argentina requires its 30 largest banks to lend the equivalent of 14 percent of their deposits to enterprises at a fixed interest rate of 22 percent (negative in real terms). Up to 30 percent can be for working capital, but the rest has to be for investment purposes. The program parameters have been relaxed since it was introduced in 2012.

[18] Banerjee and Duflo (2014).

[19] More than 15 percent of credit must be directed to small and medium firms. However, banks have difficulties achieving this target loans and many companies still rely on alternative financing channels as main source of funds (Bhue et al, 2016).

[20] Weaker sections include small and marginal farmers, artisans, village cottage industries, scheduled castes and tribes and distressed poor.

[21] See Annual Report of the RBI (2015).

[22] See Bhue et al (2016).

III. POTENTIAL IMPLICATIONS OF EARMARKED CREDITS ON ALLOCATION OF CAPITAL

22. **Regulation of credit markets may be justified when market failures prevent viable or socially valuable projects from being pursued**. In these cases, interventions should benefit firms that are new, particularly innovative, or belonging to sectors that generate social externalities. Government intervention may be justified whenever projects whose social benefits exceed their costs would not be funded if private markets were functioning without intervention (Atkinson and Stiglitz 1980).

23. **This section provides a preliminary analysis of the impact of earmarked credit on the allocation of resources among sectors and firms.** The analysis is an update of Bonomo, Brito and Martins (2015) and includes both earmarked credits and other credits by public banks, collectively referred to as government driven credit (GDC). The detailed econometric results are provided in Annex 2. One directed credit program, FINAME, targeted firms in the value chain other than the borrower, and this methodology cannot assess such impact.

24. **Firms that benefited from earmarked and other public bank credits were larger, older and less risky.** An econometric analysis of lending to firms in the period 2004 to 2015 illustrates the characteristics of those firms that benefit vs. those that do not.[23] Separate results were obtained for the post global financial crisis period (2008-2015), and the results are summarized in Table 5 and detailed in Annex 2. Statistically significant results indicate that in the recent period firms that had higher probability of accessing earmarked loans were older, larger, had lower rate of non-performing loans (Annex 2, Table A2.1, Panel A). The share of BNDES outstanding credit to the public sector increased from an historical average of 17 percent to 25 percent by the end of 2009, reaching 37 percent on December, 2015, amounting to R$ 260 billion or 4.5 percent of GDP[24]. Mixed-capital companies such as Petrobras, Eletrobras and Furnas were the major beneficiaries.

[23] The analysis is based on the credit registry at the Central Bank of Brazil (SCR). It provides a repository of loan contracts between banks and firms, composing an unbalanced panel of more than 1 million firms between 2004 and 2015.

[24] BNDES data.

Table 5: Statistically significant relationships between government driven loans and firm characteristics

	Earmarked loans	**Non-earmarked loans from public banks**	**Government driven loans** (earmarked and other public bank loans)
Full period: 2004-2015			
Age of firm	+	+	+
Credit risk	-		-
Firm size	-	+	+
Interest rate	+		+
Post crisis: 2008-2015			
Age of firm	+	-	
Credit risk		-	-
Firm size	+	-	-
Interest rate	-		-

+ indicates a statistically significant and positive relationship
- indicates a statistically significant and negative relationship

25. **Firms that borrowed from public banks outside of the earmarked programs were also less risky, but were smaller than the earmarked borrowers.** Although after the crisis public banks also increased their market share through non-earmarked lending, the firms targeted by this expansion were smaller and less risky (Annex 2, Table A2.1, Panel B). They charged lower average interest rates than the private banks.

26. **Firms that received earmarked credits did not invest more.** Based on a subsample of public firms[25] from 2004 to 2012, it is analyzed how a higher proportion of government-driven loans affected the firms' investment rate, leverage ratio and financial costs. There was no significant relationship between the firms' investment rate and the proportion of BNDES loans and other earmarked loans.

27. **Firms that received earmarked loans lowered their financial expense and increased their leverage.** A higher proportion of BNDES loans were associated with a higher leverage, and firms with a larger participation of earmarked loans had lower financial expenses. These results are in line with those obtained by Lazzarini et al. (2014) which shows that BNDES mostly finances large and profitable firms, lowering their financial expenses, but with no effect on their investments and performances. Similarly, Lage de Sousa and Otaviano (2014) show that firms that were granted BNDES credits did not outperform those that were not granted such credits. A recent macro-economic analysis[26] suggests that because earmarked expansion is counteracted with a higher monetary policy rate in turn impacting other borrowers, the effect on productivity is negative.

28. **Earmarked loans may have been used for financial arbitrage.** Caballero, Panizza and Powell (2016) find that, in face of low global interest rates, firms in countries with capital controls were issuing external bonds to finance carry-trade

[25] Balance sheet data were available for these firms and could be linked with data on credit.
[26] Monica de Bolle (2015).

activities. Since firms that borrowed earmarked loans expanded indebtedness without a corresponding increase in investment, it is plausible that this leveraged expansion was partly motivated by the existing opportunity of financial arbitrage, since low-risk investment opportunities were widely available in the financial market at rates higher than those of earmarked loans.

29. **Interest rates on government driven credit are substantially lower than free credit[27] rates (Table 6).** Average interest rates on earmarked loans (about 10 percent) were less than one third of the interest rates charged by private banks on unregulated loans (always larger than 34 percent) for the whole period. Rates on non-earmarked loans from government-owned banks decreased from about 30 percent in 2011 to 20 percent in 2012 and 2013, mainly as a result of a strong push from government to reduce interest spreads. Average non-earmarked interest rates from private banks had much less variation, decreasing from 37 percent in 2011 to about 34 percent in 2012 and 2013. In 2015 non-earmarked interest rates from both private and government-owned banks were above those of 2011.

Table 6: Average interest rates per year, earmarked vs non-earmarked credit

	Government driven credit		Free credit
	Earmarked	Non-earmarked public banks	Non-earmarked private banks
2011	10.3	30.0	37.2
2012	10.2	20.9	33.7
2013	8.8	20.9	34.1
2014	8.7	27.1	35.2
2015	10.2	37.8	42.4

Source: Central Bank of Brazil, 2016.

30. **Interest rate differentials between earmarked and non-earmarked credits particularly benefit smaller firms (Table 7).** Within earmarked loans, the average interest rates on earmarked loans was only 1 percentage point higher for smaller firms than for the 50 largest. The difference was 13 percentage points for non-earmarked loans from public banks and 24 percentage points for non-earmarked loans from private banks. Thus, the interest rate benefit and implicit subsidy for a small firm accessing earmarked funding is greater than for larger firms.

Table 7: Average interest rates per borrower size

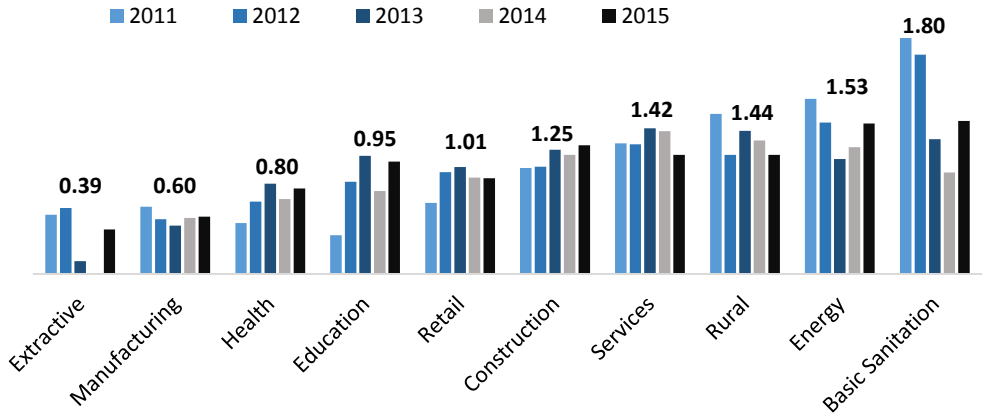
	Government driven credit		Free credit
	Earmarked	Non-earmarked public banks	Non-earmarked private banks
50 Largest	8.6	14.5	12.7
50/100 Largest	8.8	14.2	15.1
100/1,000 Largest	8.9	17.1	17.3
1,000/10,000 Largest	9.1	20.6	22.3
10,000/∞	9.7	27.5	37.0

[27] Free credit refers to credit that is not government driven, i.e. non-earmarked by privately owned banks.

31. **The allocation of subsidies is unequal across sectors even after adjusting for their share of credit (Figure 13)**. The distribution of the subsidies reflects in large part the amount of credit to each sector. However, the proportion of subsidies a sector received divided by its share of the total credit also demonstrates variation. When this measure is greater than one, the sector is receiving a share of the total subsidies that is larger than their share of credit. By this measure, subsidies are high for basic sanitation and energy and low for the extractive sector.

Figure 13: Allocation of subsidy relative to their share of credit

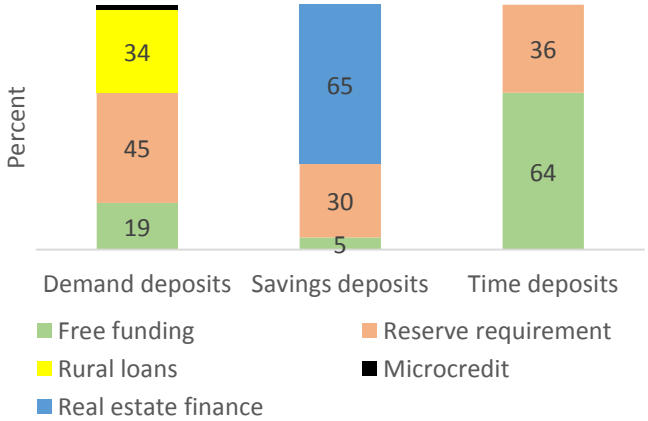
$$Allocation\_Index = \left(\frac{Subsidy\_Sector}{Subsidy\_Total}\right) \Big/ \left(\frac{Credit\_Sector}{Credit\_Total}\right)$$



Source: Central Bank of Brazil, SCR and calculations

IV. POTENTIAL IMPLICATIONS ON INTERMEDIARIES

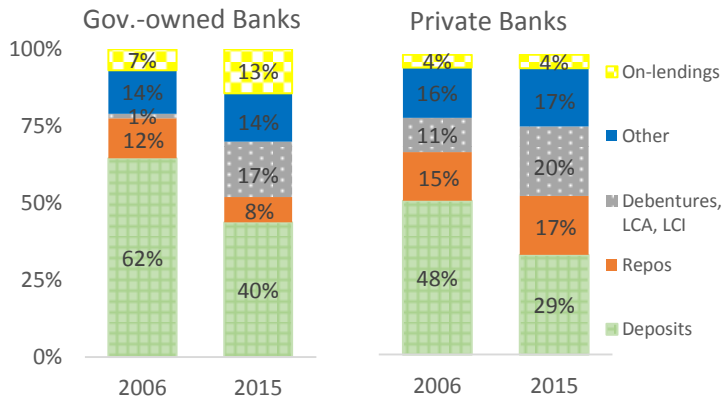
Figure 14 - Earmarked and reserve requirements



Source: Central Bank of Brazil, 2016.

32. **The regulations leave little free funding from demand and savings deposits (Figure 14).** Reserve requirements claim 45 percent of demand deposits, 30 percent of savings deposits and 36 percent of time deposits. In addition, 34 percent of demand deposits must be directed to rural loans and 2 percent, to microcredit. The use of savings deposits is the most limited, with a further 65 percent share going to real estate financing, only 5 percent is available as free funding. Time deposits and repos funding are more flexible, with 64 percent of resources freely available for any type of loan.

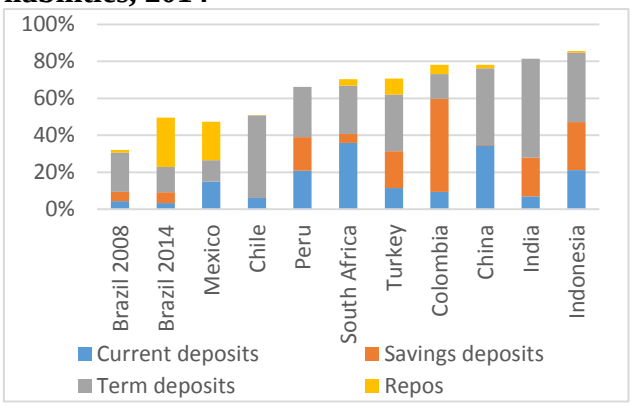
Figure 15: Funding Structure of Brazilian Banks, 2006 vs 2015



Banks' funding structure has been shifting away from deposits (Figure 15). Increasingly banks have funded their activities with real estate and rural letters of credit (LCA and LCI) and repos. Government-owned banks almost doubled the share of on-lending in total funding.

Source: Central Bank of Brazil, 2016.

Figure 16 - Deposits and repos as share of liabilities, 2014

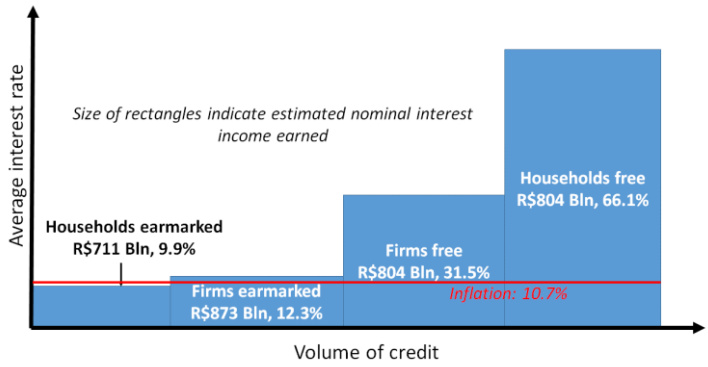


Source: Bankscope.

33. **By international comparison, Brazilian deposit funding is low and repo funding is high (Figure 16).** Demand and savings deposits combined appear depressed although Brazil offers tax exemptions for the latter. Conversely, Brazilian repo funding is greater than other peer countries with the exception of Mexico.

34. **Banks seem to compensate the impact on profitability by charging higher rates on non-earmarked credits and fee income.** An estimated 82 percent of nominal interest income is derived from the non-earmarked credits, which account for half of total credits (Figure 17). If interest rates were inflation adjusted, almost the entire real interest income would be due from the non-earmarked market.

Figure 17: Estimated interest income by segment



Note: The interest rates reflect averages for new loans as of January 2016, credit volumes reflect outstanding as of January 2016, and inflation reflects 2015.

Source: Central Bank of Brazil and staff calculations.

35. **The strong credit growth since 2008 promoted by earmarked credit may have contributed to build-up of risks in the system.** The increase in credit/GDP was mainly due to the increase in earmarked credit. The quality of these credits may be impacted due to the economic downturn and the increasing maturity mismatch. On the other hand, the subsidies reduce credit risk by lowering debt service requirements.

V. Potential Implications on Monetary Policy Transmission

36. **The interventions have implications on the credit channel of monetary policy**. Our analysis suggests that the changes in the policy rate, SELIC, have to be larger to have the same impact. Furthermore, as earmarked credit is unevenly distributed among sectors and firms, monetary policy has a distortive impact on credit cost and allocation.

37. **As the interest rates on earmarked credits are regulated, the impact of a change in the policy rate vary widely between credit segments.** Correlation between the monetary policy rate, the SELIC, and interest rates on new loans in the non-earmarked market is 96 percent compared to 76 percent for earmarked loans.

38. **This implies a lesser impact of monetary policy on firms with earmarked loans.** Our analysis shows that an increase in 1 percent in policy rate reduces the growth rate of corporate loans by an estimated 3 percentage points. This effect is reduced by one third for firms that receive earmarked credits. The mitigating impact of earmarked loans in the transmission of monetary policy is also evident in firms' employment growth: a 1 percentage point increase in policy rate reduced a firm's employment growth rate by almost 1.2 percentage points, but this effect is reduced to 0.73 percentage points for firms with only earmarked loans. Large firms were not impacted by changes in the policy rate. Annex Table A2.1 provides detailed results.

39. **As a consequence, changes in the policy rate (SELIC) have to be larger to have the same impact.** As the proportion of earmarked credit in the economy increases, this effect becomes larger. We estimate that if earmarked loans responded to changes in the SELIC in the same way as non-earmarked loans, an increase by 0.84 percent would have the same effect as the current effect of a 1 percent SELIC increase.

40. **Earmarked credit is unevenly distributed among sectors and firms, and monetary policy therefore has distortive impact on credit cost and allocation.** As discussed earlier, the interest rate for some sectors has greater correlation with the policy rate than others, and the effect on credit demand is therefore affected. Similarly, the subsidies associated with earmarked lending is affected. Thus, monetary policy generates effects beyond its objective.

VI. POLICY IMPLICATIONS

41. **The magnitude and the complexity of the credit market interventions call for a comprehensive evaluation to assess their effectiveness.** The costs to the savers, the fiscal sector, and borrowers with no access should be carefully balanced against the benefits for those that benefit from access to earmarked credit. Policy elements include transparency, accountability, objectives and results setting, earmark policy setting, and state bank activities.

42. **The objectives and intended beneficiaries of the various earmarked credit schemes should be clarified**. The intended recipients behind the original creation of the schemes—infrastructure projects, low-income housing, small scale rural families, small firms—may no longer be adequately and efficiently served. In some cases technical support to improve productivity could be more beneficial than preferential credit. These objectives appear to have motivated large fiscal expenditures, an acceptance of low returns to savers, and the tolerance of high interest costs for the remaining market. A clear view on how to balance these objectives and a cost-benefit analysis should drive the design of the credit market interventions.

43. **It is important to develop an impact analysis framework.** The credit interventions are executed by a multitude of actors including the finance ministry, the state banks, the Central Bank, and those who govern various funds. A result-based framework can help communicate policy objectives and create accountability for those who execute the programs.

44. **Earmark policy setting has many dimensions including pricing, eligibility, funding mechanisms, and tradability of lending obligations.** The pricing of earmarked lending defines the associated subsidy and by implication the cost of operating the subsidy. The eligibility criteria create segmentation in the credit market, which define the economic outcomes of the interventions. The funding mechanisms determines who pays the subsidy allowing for below-market interest rates. Mechanisms that allow financial institutions to trade the directed lending obligations may reduce the burden on intermediaries. For example, deposit based earmark lending obligations could be traded between intermediaries with a strong deposit base and those best able to reach the targeted borrowers.

45. **Transparency and accountability should be the key pillars of good policymaking.** The complexities of the interventions make it challenging for policy makers to understand if the objectives are being achieved in an efficient manner. BNDES has improved disclosures on its lending, and policy initiatives are put forward to support greater transparency (see Box 2). The Central Bank provides useful data to assess the evolution in state bank lending and earmarked credit by different segments. These are pillars that can be built on to enhance transparency and accountability.

46. **There is a need to increase public awareness and discuss the need for reforms**. Changes to earmarked credit schemes will occur as interest rates converge.

The authorities can drive the process by determining the appropriate speed and sequencing of reforms, which may differ across various schemes.

Box 2: Initiatives for greater transparency

The magnitude of credit market interventions and the risk of poor governance create the impetus for greater transparency. Transparency allows major stakeholders to have a clear picture of the costs and social impacts of the interventions. Transparency mechanism must assure that public credit programs are under formal and public evaluation and periodically monitored with regard to its effectiveness vis-vis its primary objectives, that is, whether it succeeded in reducing the market failures it intended to mitigate.

Besides efforts to increase transparency, the accurate fiscal cost of the Brazilian credit policy is not clear. The BNDES has made important steps towards improved disclosure of individual lending transactions, publishing its respective lending rates, grace and maturity periods. In 2011, a new law regulated the public access to public information, which fostered several new decisions to guarantee that society have comprehensive access to tractable and useful information.[28,29]

Initiatives are underway to strengthen transparency of credit market interventions. One project under evaluation at the Senate aims to turn obligatory for BNDES to process the cost of subsidized credit (based on TJLP) to the Tribunal de Contas da União (Central Audit Court or TCU), estimating the difference between the present value at market rates and the remaining parcels to be paid. Aggregate numbers per program should be available to the public, to improve society's oversight. A second project is to turn credit program monitoring an obligation, in particular with respect to its effectiveness. In addition, any new program must demonstrate, whenever feasible, its public policy motivation with specific analysis of expected results and counterfactuals.

[28] The Law nb 12.527/2011 established the mechanisms through which any person or entity, without the need for reason, can demand the delivery of public information any layer of government or public entities.

[29] As an example, the National Accounts Court (TCU) has determined the publication of all credit and financial subsidies distributed through the different credit programs in place by the MoF, which includes the BNDES's Investment Support Program (PSI) and rural credit programs.

VII. BIBLIOGRAPHY

Allen, Franklin, Rajesh Chakrabarti, Sankar De, Jun Qian, and Meijun Qian. (2006) "Financing firms in India." World Bank Policy Research Working Paper 3975.

Apostolou (2013) Brazil's bank spread in international context: from macro to micro drivers, World Bank WPS 6611.

Assunção, J. J., Benmelech, E., & Silva, F. S. (2014). Repossession and the Democratization of Credit. Review of Financial Studies, 27(9), 2661-2689.

Ayyagari, M., Demirgüç-Kunt, A., & Maksimovic, V. (2010). Formal versus informal finance: Evidence from China. Review of Financial Studies, 23(8), 3048-3097.

Banerjee, Abhijit V., and Esther Duflo. (2014) "Do firms want to borrow more? Testing credit constraints using a directed lending program." The Review of Economic Studies 81, no. 2, p. 572-607.

Bhattasali, D. (2002). Accelerating financial market restructuring in China. Washington, DC: The World Bank, mimeo.

Bhue, G., Prabhala, N., Tantri, P. (2016). Do Programs Mandating Small Business Lending Disincentivize Growth? Evidence From a Policy Experiment.

Bloomberg (2016), "Petrobras deve R$ 92 bi a bancos públicos", InfoMoney found on June, 17th, 2016 in http://www.infomoney.com.br/mercados/acoes-e-indices/noticia/5122130/petrobras-deve-bancos-publicos-nega-tratativa-para-fusao-com-caixa

Bonomo, M., Brito, R. and Martins, B., 2015. The after crisis government-driven credit expansion in Brazil: A firm level analysis. Journal of International Money and Finance 55 (2015) 111-134.

Caballero, J, Panizza, U. and Powell, A. (2016) The second wave of global liquidity: Why are firms acting like financial intermediaries?, IDB, mimeo.

Coelho, C. A., De Mello, J. M., & Funchal, B. (2012). The Brazilian payroll lending experiment. Review of economics and statistics, 94(4), 925-934.

Coelho, D. and Lage de Sousa, F. (2010) "Os Efeitos dos Financiamentos do BNDES sobre o Desempenho das Empresas Industriais Brasileiras" (A Survey on BNDES Effects on Manufacturing Firms' Performance) in: De Negri, Fernanda; Almeida, Mansueto. (Org.). 'Estrutura Produtiva Avançada e Integrada: Desafios do

Desenvolvimento Produtivo Brasileiro' 5th Edition, Vol. I, pages 267-292. IPEA, Brasília, Brazil.

Coleman, Nicholas, Feler, Leo (2015) Bank ownership, lending, and local economic performance during the 2008-2010 financial crisis, Journal of Monetary Economics, V 71, April 2015, 50–66.

Costa, A., & De Mello, J. (2006). Judicial Risk and Credit Market Performance: Micro Evidence from Brazil Payroll Loans (No. 102). Central Bank of Brazil, Research Department.

de Bolle (2015) Do Public Development Banks Hurt Growth? Evidence from Brazil, Petersen Institute for International Economics Policy Brief, September 2015.

FGTS (2015), Relatório de Demonstrações Financeiras.

Holanda-Barbosa Filho, F. (2014) Nota Sobre Evolução da Produtividade no Brasil, Nota Técnica, IBRE/FGV.

Lage de Sousa, F. and Ottaviano, G. (2014) "Relaxing Credit Constraints in Emerging Economies: The impact of public loans on the performance of Brazilian firms" Centre for Economic Performance Discussion Paper, No. 1309, LSE.

Lazzarini, Sergio G., Musacchio, Aldo, Bandeira-de-Mello, Rodrigo, Marcon, Rosilene, (2015). What do development banks do? Evidence from BNDES, 2002e2009. World Dev. 66, 237-253.

Lundberg, Eduardo (2011). Bancos Oficiais e Crédito Direcionado - O que diferencia o mercado de crédito brasileiro? Trabalhos para Discussão 258, Banco Central do Brasil.

Ministério da Fazenda (2013), Demonstrativo de Benefícios Financeiros e Creditícios – Descrição dos Fundos e Programas, Secretaria de Política Econômica.

Ministério da Fazenda (2015), Balanço do Setor Público Nacional, Secretaria do Tesouro Nacional.

Ministério da Fazenda (2016), Demonstrativo de Benefícios Financeiros e Creditícios – Ano 2015, Secretaria de Política Econômica.

Ministério da Fazenda (2016), Relatório de Subsídios do Tesouro Nacional ao BNDES – 1º Bimestre de 2016, Secretaria do Tesouro Nacional.

Ministério do Trabalho e Previdência Social (2015), Boletim de Informações Financeiras do Fundo de Amparo ao Trabalhador – 6º Bimestre de 2015.

Nakane et all (2002) The Determinants of Bank Interest Spread in Brazil, Central Bank of Brazil WPS 46.

Reserve Bank of India (2015), Annual Report.

Segura-Ubiergo (2012) The Puzzle of High Interest Rates in Brazil, IMF WPS 1262

Szamosszegi, Andrew, and Cole Kyle. An analysis of state-owned enterprises and state capitalism in China. Capital Trade, Incorporated for US-China Economic and Security Review Commission, 2011.

World Bank (2012), The Real Paradox: Untangling Credit Market Outcomes In Brazil, Report No. 67332.

VIII. ANNEXES

Annex 1: Interest rates in Brazil

Interest rates	Description
Long term interest rate (TJLP)	Benchmark rate for loans from BNDES to companies set quarterly by the National Monetary Council (CMN)
Reference rate (TR)	Reference rate based on monthly earnings of CDB/RDB issued with 30/35 days, with a reduction factor to extract inflation expectations, defined in turn by the Central Bank. Savings earnings are based on TR + 6 percent, conditional on level of the Selic rate.
Market rate (Selic rate)	Average weighted and adjusted rate of one-day financing operations, backed by federal public securities and processed within the system in the form of committed operations. It reflects market liquidity and its target rate is set by the Monetary Policy Committee (Copom) from Central Bank.
Prime rate	Interest rate that commercial banks charge their most credit-worthy customers.
Gov. Bond rate	Secondary market price index that measures the average return of the portfolio of fixed rate public bonds issued by the National Treasury, namely LTN and NTN-F. It is published by ANDIMA as IRF-M.

Annex 2 Regression estimates from loan level analysis

Please refer to Bonomo, Brito, and Martins (2015) for detailed description of methodology. The variables are as follows:

- Age: The age of the firm in years
- Credit risk: The proportion of non-performing loans in the sector
- Size: The number of employees in the firm
- Workforce share: the firms' share of the sector's workforce
- Private lending rate: average interest rate charged by private banks on non-earmarked loans in the sector
- I_ denotes an interaction with a dummy variable for post financial crisis (1 if year>2007)

Table A2.1: Regression estimates - Which firms were more likely to receive government-driven loans?

Dependent variable: Proportion of government-driven loan type:	Panel A: Earmarked Loans Earmarked + BNDES	Panel B: Non-earmarked loans Official Banks	Panel C: Total Loans All Government-driven Loans
AGE	0.0010***	0.0006***	0.0012***
	[0.0000]	[0.0001]	[0.0001]
I_AGE	0.0006***	-0.0004***	-0.0000
	[0.0000]	[0.0000]	[0.0000]
CREDIT RISK (NPL)	-0.0125***	0.0012	-0.0042***
	[0.0007]	[0.0008]	[0.0008]
I_CREDIT RISK (NPL)	0.0003	-0.0062***	-0.0072***
	[0.0008]	[0.0008]	[0.0009]
SIZE (empl)	-0.0017***	0.0022***	0.0043***
	[0.0003]	[0.0004]	[0.0004]
I_SIZE (empl)	0.0179***	-0.0114***	-0.0010***
	[0.0003]	[0.0003]	[0.0003]
WORKFORCE SHARE (empl)	-0.0539*	-0.0804***	-0.0144
	[0.0281]	[0.0312]	[0.0313]
I_WORKFORCESHARE (empl)	-0.1041***	-0.0992***	-0.1471***
	[0.0238]	[0.0249]	[0.0249]
PRIVATE LENDING RATE (Sector)	0.0010***	-0.0000	0.0007***
	[0.0000]	[0.0000]	[0.0000]
I_PRIVATE LENDING RATE (Sector)	-0.0013***	-0.0000	-0.0009***
	[0.0000]	[0.0000]	[0.0000]
Sector Fixed-effects	Yes	Yes	Yes
Observations	4.321.772	3.724.460	4.321.772
Number of firms	1.295.053	1.187.397	1.295.053

Table A2.2 Estimating the credit channel of monetary policy

Credit Channel of Monetary Policy by Firms' Size and Government-driven Loan Access

	Dep. variable.: Δ Ln(# of employees)									
Gov. Access Measure:	**Panel A: Earmarked Loans**					**Panel B: Government-driven Loans**				
Number of Employees	Total	[2;10)	[10;50)	[50;500)	[500;∞)	Total	[2;10)	[10;50)	[50;500)	[500;∞)
Constant	0.134	0.526**	0.173	-0.367	-6.969	0.132	0.523**	0.169	-0.367	-6.985
Gov. Access (-1)	0.001	0.001	0.004	0.014***	0.006	0.010***	0.007	0.017***	0.015***	-0.014
ΔSelic	-0.012***	-0.006***	-0.013***	-0.005***	0.004	-0.012***	-0.006***	-0.013***	-0.005***	0.003
Gov. Access (-1) x Δselic	0.005***	0.005***	0.002***	0.003***	0.001	0.002***	0.002***	0.001**	0.002***	0.001
Firms' Risk controls	No	No	No	No	No	No	No	No	No	No
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macro controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	721,880	305,866	301,107	107,329	7,625	721,880	305,866	301,107	107,329	7,625
Number of Firms	288,636	156,852	131,159	39,931	2,799	288,636	156,852	131,159	39,931	2,799

Source: Central Bank of Brazil, SCR, and calculations.

Annex 3: Methodology adopted to estimate the fiscal costs of public funds

The tables below present the concepts and the methodology adopted to estimate the fiscal costs of some of the public funds dedicated to Brazilian credit policy. Some estimates were provided by the Ministry of Finance (MoF) and the remaining are own estimates.

The MoF estimates the effect on revenues and expenses that arise from tax exemptions, remissions, subsidies and tax, financial and credit benefits. Fiscal costs are classified into implicit and explicit cost. Explicit costs are the actual disbursements of central government made through the equalization of interest rates to banks or other entities that offer under-remunerated earmarked loans. The fiscal implicit cost comprises expenses arising from official credit programs operated through funds or programs, where the interest rate is lower than the central government's cost of funding.

The estimated fiscal costs of Treasury's direct loans to BNDES, Constitutional Funds and some rural credit programs were computed by the MoF, which assumes that the government's opportunity cost is the average implicit cost to renew its public debt.

The implicit cost of FGTS and BNDES's funding from FAT were estimated using the same MoF methodology using the average CDI interest rate as the opportunity costs of public funds. This fiscal costs of FGTS and FAT are the outstanding credit volume multiplied by the difference between the CDI interest rate and the weighted average of the interest rate charged to FGTS borrowers or TLJP, in the case of FAT.

The foregone resources from tax exemption for the credit letters and savings investments are the product of the investment's earnings, the income tax and outstanding balances for each year.

The table below characterizes the credit policy instruments by type of cost.

Table A3.1: Credit policy instruments by type of cost

Credit policy instruments	Type of cost
BNDES funding	
Treasury lending to BNDES	Implicit and explicit costs
FAT	Implicit costs
Others	
Constitutional Fund	Implicit costs
FGTS	Implicit costs
Some rural credit programs (includes PRONAF)	Explicit costs
Savings instruments	
Earnings from Savings	Implicit costs
Earnings from agriculture and real estate letters	Implicit costs

Regarding the Treasury's direct loans to BNDES, two comments: (1) the implicit costs of Treasury's direct loans to BNDES is the difference between this opportunity cost and how much BNDES remunerates the Treasury for the loans, which is mostly the TJLP rate; (2) the explicit cost is how much the central government reimburses value paid for

the interest rate equalization policy, mostly directed to the Investment Support Program (PSI), initiated on 2008.

Table A3.2: Concepts used to estimate the fiscal costs

	Year		Variable id	Sources
	2009	2015		
Total fiscal revenues - Central Government - R$ (billion)	739.30	250.18	(1)	MoF
General Government revenues - R$ (billion) [a]	1,402.70	2,276.00 [a]	(2)	MoF
GDP at current prices in R$ - R$ (billion)	3,333.04	5,904.33	(3)	IBGE
Savings returns rate - %	7%	8%	(4)	Central Bank
Interest rate (TJLP)	6%	7%	(5)	Central Bank
Income tax - %	15%	15%	(6)	BNDES
Average CDI earnings - %	10%	13%	(7)	Central Bank
Savings balance (rural included) - R$ (billion)	319.08	656.59	(8)	Central Bank
LCI+LCA - R$ (billion)	25.45	389.35	(9)	Central Bank
Direct lending from Treasury to BNDES - R$ (billion)	144.21	523.74	(10)	BNDES
Total amounts from the explicit subsidies policy (PSI's equalization policy) - R$ (billion)	0.23	9.57	(11)	MoF/Treasury
Implicit subsidies policy (lending from Treasury to BNDES) - R$ (billion)	4.58	18.97	(12)	MoF/Treasury
BNDES funding from FAT - R$ (billion)	122.50	220.67	(13)	BNDES
FGTS total outstanding credit - R$ (billion)	108	224.19 [a]	(14)	FGTS
Weighted average rate on housing and credit programs - %	5.69%	5.08%	(15)	FGTS
Fiscal Cost of Regional Development Constitutional Funds (FNO, FCO, FNE) - R$ (billion)		13	(21)	MoF/SPE
Exclusive rural credit programs+ PRONAF (only credit equalization policies)		16	(22)	MoF/SPE

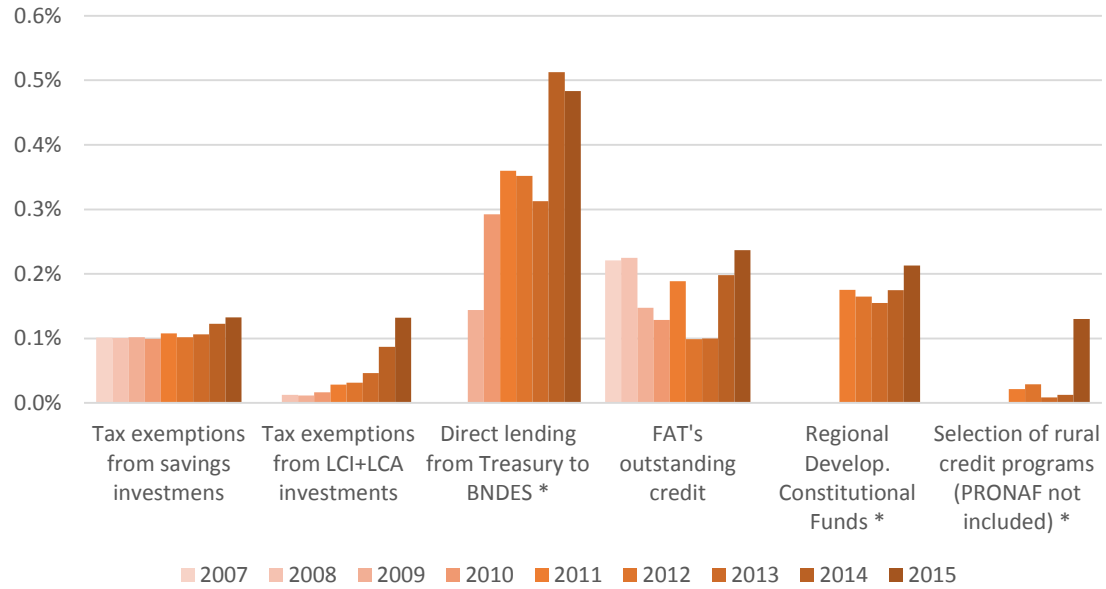
Note a: *FGTS outstanding credit and General Government Revenues for 2015 were estimated based on the 2015's growth rate of Central government's total fiscal revenue.*

Table A3.3: Methodology adopted to estimate the fiscal costs

	Year		Formulae [a]
	2009	**2015**	
Fiscal cost from tax exemption on savings investments - R$ (billion)	3.39	7.82	(4)*(6)*(8)
Fiscal cost from tax exemption on LCA+LCI investments - R$ (billion)	0.38	7.79	(7)*(6)*(9)
Fiscal cost from direct lending from Treasury to BNDES - R$ (billion)	4.81	28.54	(11)+(12)
Fiscal Cost from FAT - R$ (billion)	4.91	13.98	[(7)-(5)]*(13)
Total fiscal cost as share of general government revenues [b]	***0.96%***	***2.55%***	

Note: (a) formulae uses the variables id from Table A4.2 as reference; (b) rural and regional development constitutional funds not included.

Figure A3.1: Fiscal costs flow as percentage of GDP - 2007 to 2015



*Sources: MoF (2016) and own estimates. * MoF estimates. With exception of BNDES' estimates, constitutional funds and rural credit programs estimates are based on the Treasury's actual disbursements from expenses on interest rate equalization policies. The 2015 observed spike on rural credit programs' costs may be due to late payments from previous years.*

Annex 4: Figure 4.A - Funding (stock) of Earmarked Credit - 2007

(R$ Billions, percent of total credit market and percent of GDP, respectively)

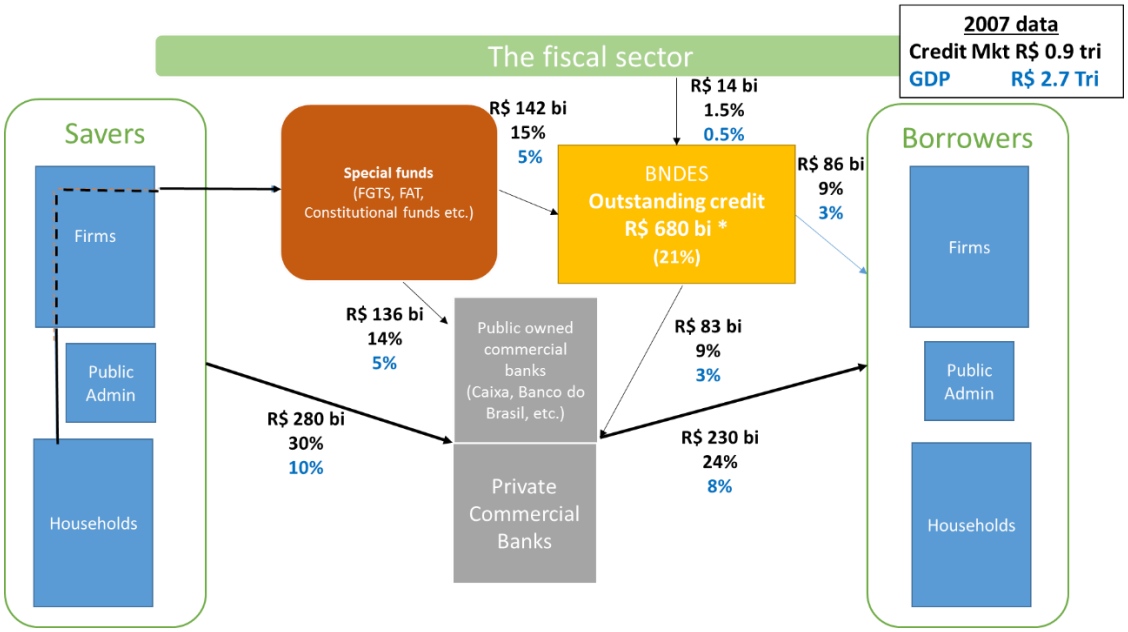


Figure 4.B - Funding (stock) of Earmarked Credit - detailed numbers

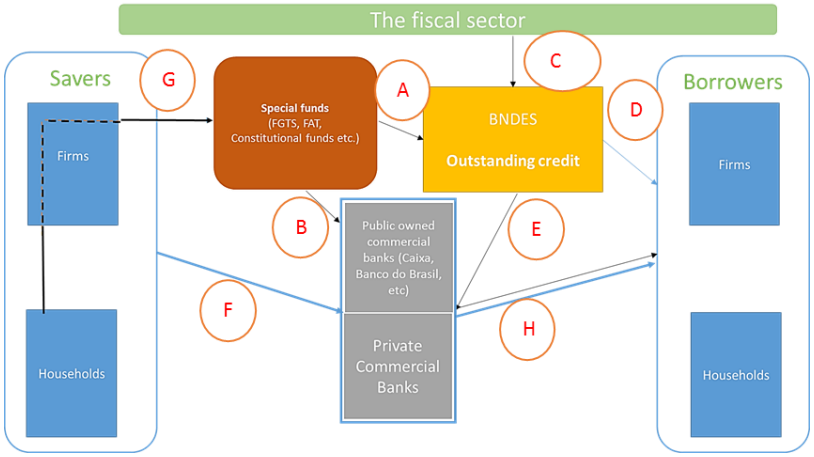
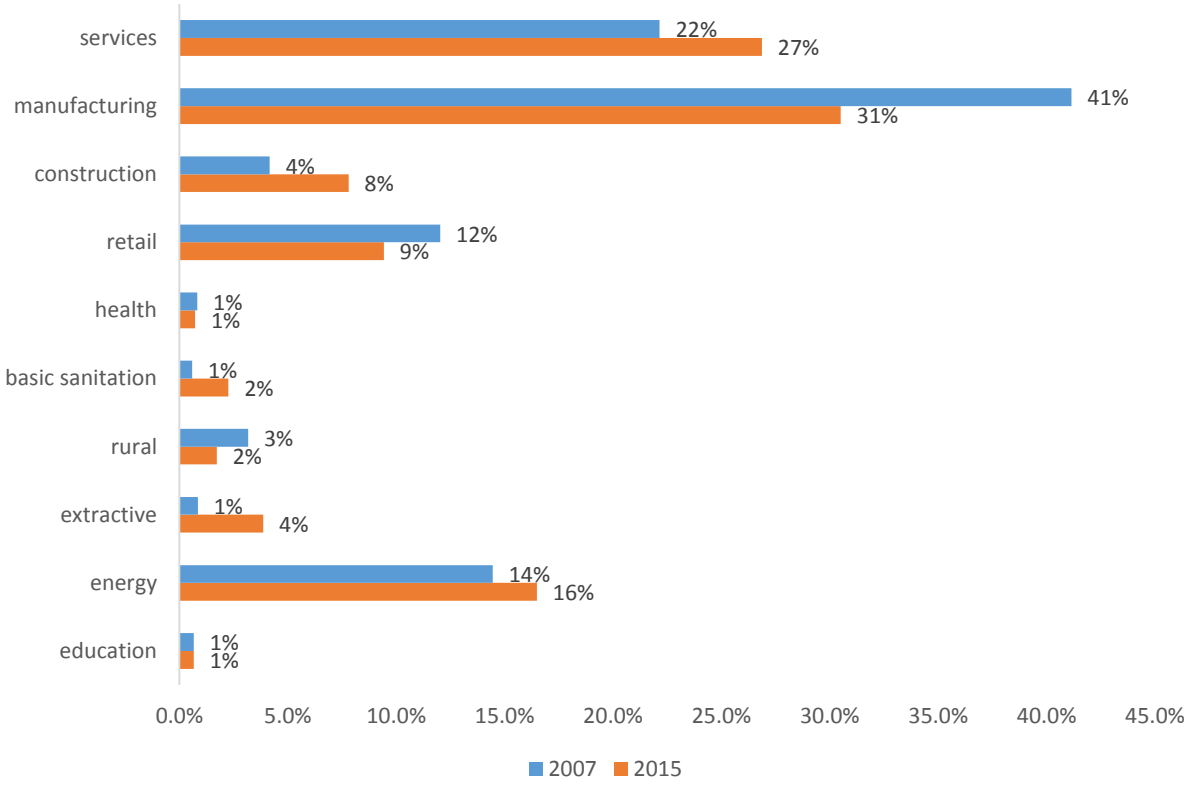


Table 4.A - Funding (stock) of Earmarked Credit – detailed numbers

Figure 9 and Figure 4A – Arrows	Funding (stock) of GDC (R$ bi)		Arrows	Percentage of total outstanding credit		Percentage of GDP	
	2007	2015		2007	2015	2007	2015
Special Funds -> BNDES	142	291	A	15.1%	9.1%	5.2%	4.9%
Special Funds -> Banks (BNDES excluded)	136	299	B	14.4%	9.3%	5.0%	5.1%
National Treasury -> BNDES	14	523	C	1.5%	16.3%	0.5%	8.9%
BNDES -> Borrowers	86	394	D	9.2%	12.3%	3.2%	6.7%
BNDES -> Banks (BNDES excluded)	83	285	E	8.7%	8.9%	3.0%	4.8%
Savers (non-FGTS) -> Banks (BNDES excluded)	280	760	F	29.7%	23.7%	10.3%	12.9%
Savers (FGTS only) -> Banks (BNDES excluded)	101	220	G	10.7%	6.9%	3.7%	3.7%
Banks (BNDES excluded) -> Borrowers	148	903		15.6%	28.2%	5.4%	15.3%
All Banks (not BNDES direct) -> Borrowers	230	1188	H	24.4%	37.2%	8.5%	20.1%
All Banks (BNDES included) -> Borrowers	316	1583		33.5%	49.5%	11.6%	26.8%

Annex 5: Figure 5.A - Distribution of earmarked credit per economic sector, 2007 - 2015



Annex 6: Risk allocation of earmarked credit – main credit segments

Credit Programs	Description	Risk Allocation	
		Fiscal Sector	Others
Credit for firms			
FINAME Credit Program	Financing of production and acquisition of machinery, equipment and computer goods and new automation, with national manufacturing. Operated by BNDES.	Central Government may warrant the loan transaction. In such case, BNDES may not charge a risk premium.	BNDES, as direct lender, holds the risk of R$ 14.2 bn. Commercial banks, as indirect lenders, holds the risk of R$ 149.2bn.
FINEM Credit Program	Financing of projects worth less than R$ 20 million.	For some projects on urban and social development, BNDES does not charge a risk premium.	BNDES, as direct lender, disbursed on 2015 R$ 61 bi, while commercial banks disbursed R$ 8.4 bi.
Housing credit			
Financial Housing System	Housing credit programs that aims to facilitate real estate acquisition through subsidized credit lines. Main sources: FGTS and savers.		Commercial banks as direct lenders hold the risk.
My House My Life Program.	Strongly subsidized housing credit programs to middle to low income families.	Central government can contribute to up to R$ 2bn to an insurance fund (Fundo Garantidor da Habitação Popular) created to protect monthly installments from credit due to financial institutions by families with monthly income of up to approximately 6 minimum wages (R$ 4,650).	Caixa Econômica Federal and Banco do Brasil are the financial institutions that disburse the credit lines. Credit lines disbursed on 2014 reached R$ 26.8 bn.
Rural credit			
PRONAF	Strongly subsidized rural credit program for low income family	Risk from credit transactions may be integrally taken by the Constitutional	Commercial bank may or may not hold the risk.

	farmers	Funds or the central government or it may be shared between parties.	Disbursements on 2014 summed R$ 22.2bn.
PRONAMP and large producers	PRONAMP aims to develop rural activities of medium-sized farmers, providing increased income and job creation with agricultural activities.		Commercial banks as direct lenders hold the risk. Disbursements on July to November of 2015 summed R$ 62bn.

Sources: Manual do Crédito Rural, Law 11.977/2009, BNDES, FGTS.