

# Winners and Losers When Private Banks Distribute Government Loans

Evidence from Earmarked Credit in Brazil

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**WORLD BANK GROUP**

Development Economics

Development Research Group

July 2019

## Abstract

This paper studies credit allocation when government loan programs are distributed by private banks. The study focuses on Brazil, where private lenders can operate in two credit markets: competitive loans with own funding and earmarked loans that rely on government funds to finance firms at below-the-market interest rates. Using rich loan-level data between 2005–2016, the paper finds that banks are disproportionately more likely to extend earmarked loans

to larger firms and firms with an existing credit relationship. The paper further documents a cross-selling strategy whereby banks increase the price of free-market loans of riskier borrowers that also obtain earmarked credit. Inadvertently, the government selects winners and losers, since mostly larger businesses, those that bank with the largest private lenders, and those willing to bundle free-market and earmarked loans disproportionately access the program.

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# Winners and Losers When Private Banks Distribute Government Loans: Evidence from Earmarked Credit in Brazil

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**THIS VERSION: April 20, 2020**

JEL Classification: G21, H81, E43

Keywords: Second-tier lending, government-credit programs, credit risk, cross-selling strategies

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This project was supported by the Finance, Competitiveness and Innovation Global Practice and the Brazil Country Management Unit of the World Bank. This paper should not be reported as representing the views of the Banco Central do Brasil. The views expressed in the papers are those of the authors and do not necessarily reflect those of the Banco Central do Brasil.

## 1. Introduction

A commonly held view about the effectiveness of government credit argues that when led by state-owned banks, these programs may fail to fulfill their social role due to incentive problems that are inherent to the public sector (Claessens et al., 2008). For example, the political view of public banking assumes that politicians have career concerns that conflict with social objectives (Sapienza, 2004; Dinc, 2005; Khwaja and Mian, 2005; Dinc and Gupta, 2011; Carvalho, 2014). Alternatives to government lending include interventions that use public funds but rely on private banks to allocate credit.<sup>5</sup> Although such settings reduce distortions from politically motivated credit, they generate principal-agent considerations from the objectives of private lenders – a bank (the agent) would not fund projects with high social returns if its own private benefit is small.

Furthermore, a key and under-explored aspect of these credit programs is that private banks can simultaneously allocate government-sponsored loans alongside their usual lending portfolio. While the contracted interest rate of a loan compensates the lender for its risk taking (Stiglitz and Weiss, 1981), interest rates of government loans are typically fixed and set to below-market rates. In turn, banks will ration government credit away from riskier borrowers if they bear part of the risk on these loans. When the lending portfolio includes both government and free-market loans, banks might offset some of the lower expected revenue from government loans by changing their pricing strategy in other credit products.

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<sup>5</sup> One example comes from the recent COVID-19 crisis, where governments moved swiftly to provide liquidity to small businesses. In the case of the U.S., through the CARES Act Paycheck Protection Program, the government established a \$350 billion fund of partially forgivable loans. The application process for the financial assistance, screening, disbursement and loan servicing are intermediated by private banks. Developing countries have also introduced or strengthened similar credit programs which leverage on the private financial sector to provide funds to many small and medium size enterprises (IMF, 2020).

In this paper, we study credit allocation strategies when government loans are channeled by private banks. More concretely, we focus on one of the world's largest second tier lending programs: the case of Earmarked Credit in Brazil. This government-sponsored program was designed to stimulate investment and capital expenditures in strategic sectors (details of the program in Section 2). Importantly, a large portion of the funds for earmarked credit are transferred from the Brazilian National Development Bank to private banks that then select loan recipients. These earmarked loans complement the usual free-market for commercial credit (or non-earmarked credit),<sup>6</sup> with regulated interest rates set below the average market rate. Starting in 2008, to mitigate the negative effects from the Global Financial Crisis and to alleviate credit constraints among micro, small, and medium size firms, the Brazilian government substantially expanded the program.

We use administrative loan-level data from the Brazilian Central Bank credit registry, which includes 5.8 million loans to 1.85 million firms issued by 136 private banks between 2005 and 2016. We consider two type of loans – working capital and vehicle financing – which account for 50 percent of the total outstanding volume of private credit to businesses in the free-market. These two credit modalities represent opposite extremes of the distribution of earmarked loans. While the purchase of vehicles can be financed via loans from both the free-market and the earmarked-credit market, working capital loans are almost exclusively accessed in the free-market. We further include information on the origination of all earmarked loans for each firm-bank pair in our sample. This unique dataset allows us to analyze how banks allocate earmarked loans across firms and how the credit terms on their new free-market loans may be impacted by the program.

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<sup>6</sup>Throughout the paper, we use non-earmarked and free-market credit interchangeably to refer to loans that are not part of the government program. That is, loans issued by banks without special funding or directive from the government.

We first investigate the extensive margin of the earmarked credit allocation. That is, the characteristics of firms that were selected to receive earmarked loans. We refer to these borrowers as ‘recipient’ firms, which account for six percent of the firms in our sample. Interestingly, firms that access earmarked credit tend to receive multiple and frequent earmarked loans with the same bank. The median time between consecutive earmarked loans is nine months and in 92 percent of the cases a firm obtains an earmarked credit from the same lender. We show that banks systematically allocate earmarked loans to firms with an existing credit relation, that is, to borrowers with a credit line, checking account or other financial products with the issuing bank (we refer to this institution as the *inside bank*). Banks also overwhelmingly select larger firms as earmarked recipients. The documented credit allocation is consistent with a risk mitigating strategy. To the extent that a bank servicing an earmarked loan at a capped interest rate bears the credit risk, its incentive is to select borrowers that are ex-ante less risky, such as larger firms and firms for which it has acquired private information during the course of an existing lending relationship.

In a second exercise, we study how interest rate spreads of free-market loans of a firm-bank pair evolve after the pair begins an earmarked credit relation. To do this, we focus on the sample of working capital loans as the presence of earmarked lending in this credit modality is negligible. One challenge to identify the impact of new earmarked credit relations on the cost of free-market loans is that firms that receive earmarked loans are likely to differ from non-recipient firms. We tackle this concern in two ways. First, we saturate our specifications with a series of fixed effects at the *bank\*year* and *firm\*bank* level that allow us to isolate variation in the data in different ways. For instance, the inclusion of *firm\*bank* fixed effects allows us to exploit variation on the interest rates on all working capital loans of the *same* firm-bank pair over time and examine how these

rates change after the pair starts an earmarked credit relation. In some specifications, we also include *firm\*year* fixed effects. By doing so, we examine variation on the interest rates of all working capital loans of the *same* firm in the *same* year originated by different banks. Our identification comes from comparing the interest rates of loans from banks with whom the firm has an earmarked credit relation with the interest rates of loans from all other banks. To more cleanly reduce the selection problem, we further restrict the sample to recipient firms –those that at some point receive an earmarked loan – and examine how the credit terms of these firms change after they obtain the earmarked loan. Consistently, our impact estimates remain similar throughout our different specifications.

Our main and novel finding is that once an earmarked loan is allocated, the recipient firm experiences an increase of 38 basis points in the interest rate of new working capital loans contracted with the inside bank. In other words, around the same time that a firm receives an earmarked loan, the inside bank charges the firm higher interest rates in non-earmarked working capital loans. The documented increase is exclusive to the inside bank and is not driven by local economic conditions or by changes within the firm. Also, we do not observe a similar increase in the sample of vehicle loans, where earmarked lending operates more actively, and banks have less flexibility to adjust interest rates.

We also find that the increase in interest rate of working capital loans is only observed among high-risk firms – those with below median credit rating, for which the bank requires higher provisions. These firms pay an additional 60 bps on the interest rate of new working capital loans

with the inside bank. Importantly, there is no evidence that borrowers contracting working capital loans at higher interest rates reduce their loan amounts with the inside bank.<sup>7</sup>

We interpret our findings as evidence that banks increase the interest rate in free-market credit products – such as working capital loans in the Brazilian context – to make up for the below-market revenue associated with the origination of earmarked products to riskier clients. It appears that riskier borrowers receive earmarked loans only if they pay a premium for other loans. Consistent with a profit maximizing strategy, the bundle of an earmarked loan at a fix (and low) interest rate with a non-earmarked loan at a higher rate guarantees that the bank is compensated for its risk taking; especially for firms in which the lender needs larger provisions. In contrast, we find that low-risk borrowers can access earmarked loans at the program interest rate with little to none associated cross-selling. The price discrimination strategy guarantees that earmarked lending is profitable. A corollary from this simple benchmark is that banks specializing in niche markets, or in specific credit products, are less likely to allocate earmarked credit since these are less able to use cross-selling strategies. Consistent with this idea, we find that the largest banks in Brazil were more likely to participate in the government credit program.

Our paper contributes to the literature that studies government driven lending. A large body of empirical work examines whether government credit crowds in or out the private sector, and whether public lending promotes financial development and growth (King and Levine, 1993; Demirgüç-Kunt and Maksimovic, 1998; Rajan and Zingales, 1998). While these earlier studies explored the aggregate effects of government credit, more recent work relies on firm- and loan-level data from government-owned banks to evaluate real effects (Carvalho, 2014; Ru, 2017). An

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<sup>7</sup> In fact, the evidence seems to suggest that some firms even increase their working capital borrowing with the inside bank.



important yet overlooked question is the role of private banks as intermediaries of government loans. For example, in Brazil, up to 40 percent of government-sponsored loans are disbursed by private commercial banks. While we do not focus on real effects, we use detail loan level data to provide a comprehensive analysis on the allocation and pricing strategies of private banks when government loans are part of their portfolio. Our evidence that banks engage in cross-selling strategies suggests that the design of the government program needs to consider the incentives of private lenders.

The rest of the paper proceeds as follows. Section 2 describes the institutional background and Section 3 the data. Section 4 discusses the allocation of earmarked loans across firms. Section 5 presents the empirical approach to examine the impact of starting an earmarked credit relation on credit terms of free-market loans and summarize our results. Finally, Section 6 concludes.

## **2. Institutional Background**

The credit market in Brazil is characterized by a large presence of government-driven lending. The interventions include a complex web of price and quantity regulations, reserve requirements, tax exemptions, and forced savings schemes that are used to target lending to specific projects. Lending directed by government initiatives is known as earmarked credit. After 2008, earmarked lending grew substantially, exceeding 50% of total credit by 2015 (Figure 1). According to the government, the surge in earmarked lending was a policy response to the global financial crisis to alleviate credit constraints and promote access to credit among individuals and micro, small, and medium size businesses. However, the expansion of earmarked credit continued for several years after the onset of the global crisis, reaching all sectors of economic activity. For

firms, earmarked loans target fixed investments, infrastructure, development projects and rural activities.<sup>8</sup> In line with government directives, among earmarked loans issued between 2005 and 2016, 88 percent finance firms' fixed asset purchases, such as new machinery. On the contrary, non-earmarked credit in the same period was dominated by working capital loans; representing 44% of the non-earmarked outstanding credit market.

Earmarked credit for large firms is usually granted directly by the National Development Bank (BNDES). For medium and smaller firms, earmarked credit is indirectly allocated through other financial institutions. By 2016, nearly 40% of the outstanding indirect earmarked loans to firms were originated by private lenders, including commercial banks. These institutions screen, select loan recipients, and bear the credit risk. However, funding comes from government sources at rates below interbank market, but private banks can add a spread to cope with credit losses. Interest rates charged from firms for these loans are strongly regulated and are substantially lower than those charged for free-market loans. Moreover, interest rates for earmarked loans are often set below the monetary policy rate, the SELIC rate, and in some cases below inflation rates.

The government funds earmarked credit via multiple sources. For example, through demand deposit, mandatory savings schemes, employment funds, and constitutional funds that are remunerated at low interest rates. Also, BNDES combines direct resources from the fiscal sector with external funding raised in capital markets to fund earmarked loans issued by public and private banks.<sup>9</sup> In Figure 2, we present the average share of earmarked credit received by firms according to the funding source. Starting in the second half of 2008, there was a significant increase in the share of earmarked loans funded via BNDES. In that year, the government launched the

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<sup>8</sup> Earmarked credit to households mostly targets real estate financing.

<sup>9</sup> BNDES also has direct credit lines with borrowers. These, however, are exclusive for the largest corporations in the country.

Investment Support Program (PSI). Operated by BNDES, the government provided subsidies reimbursing banks for lending earmarked loans at below market interest rates. For firms in our sample, the share of earmarked credit funded by non-BNDES sources remained constant and close to zero throughout our period of analysis.

### 3. Data

Our analysis relies on two large data sources of corporate loan contracts in the Credit Registry maintained by the Central Bank of Brazil covering the period between January 2005 and December 2016.

The first dataset comprises all working capital and vehicle financing loans above a 5,000 *reais* threshold (approximately 2,200 USD) originated by all private banks during the period. For each loan, we observe the contracted interest rate, the loan amount, its maturity, collateral and risk rating.<sup>10</sup> The dataset also reports information about the borrower, including its industry, location, number of workers, and the number of years with a relation with the bank. The advantage of studying these two products is twofold. First, these represent a large share of the non-earmarked credit market – 44% of non-earmarked total outstanding credit are working capital loans and 6% are vehicle loans. Second, these two products represent opposite extremes of the distribution of earmarked loans. That is, while most earmarked loans finance fixed asset purchases, which includes vehicles, working capital only accounts for a minor share of earmarked loans (only 0.3%).

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<sup>10</sup> Each rating is associated with a minimum loan accounting provision, which is an estimate of the probability of default. The possible ratings are AA, A, B, C, D, E, F, G, H. However, we exclude from our sample ratings below rating E, which account for less than one percent of the observations and are loans associated with evergreening processes.

In other words, firms might substitute free-market vehicle loans for earmarked loans to purchase vehicles but working capital financing is almost exclusively accessed through the free market.

Our second dataset includes information on the origination of earmarked loans for every firm-bank pair in our sample. Each record includes the date and credit type of all earmarked loans originated in the country. Two patterns emerge from the earmarked credit data. First, the relationship of earmarked credit between a lender and its borrowers is highly persistent. More precisely, 92 percent of the firms that obtain their first earmarked credit and receive consecutive earmarked loans receive them from the *same* bank that issued the first earmarked loan. Second, firms that are recipients of earmarked loans obtain these loans on a frequent basis. The median time between consecutive earmarked loans in the data is 9 months. Based on these patterns, we create an indicator variable, *EarmakRel*, that records when an earmarked credit relation starts between a firm-bank pair. To guarantee that our data captures the time at which a firm-bank pair enters an earmarked credit relation, we drop from the sample 2.5 million loans that belong to firm-bank pairs that started their credit relations before the beginning of our sample period. Doing so allows us to focus on firm-bank relations that started and evolve throughout our sample period, some of which also begin an earmarked credit relation. While almost no firm in our data had received its first earmarked loan by January 2005, the share of firms receiving earmarked loans for the first time begins increasing over time, more rapidly among medium and large firms (Figure 3).

Our final dataset contains 5.8 million working capital and vehicle finance loans from 1.85 million firms issued by 136 private commercial banks. Of all firms in our sample, approximately 111 thousand receive at least one earmarked loan (74 thousand receive at least two), highlighting the ubiquity of earmarked lending in Brazil. To analyze the allocation of earmarked loans across firms, we collapse the loan-level data at the firm-bank-year level. We then use the data on working

capital loans to examine how the cost of free-market credit products evolves as firm-bank pairs start an earmarked credit relation. We run the exact same exercise with the data on vehicle finance loans, which are credit modalities that face more intense government intervention and where banks have less flexibility to adjust interest rates.

Table 1 presents the summary statistics of our data split by the type of sample we use in the analysis.<sup>11</sup> Panel A of Table 1 provides the summary statistics of our firm-bank-year data. Panels B and C present the main statistics of the loan-level data, restricting the sample to only working capital (Panel B) and vehicle finance (Panel C) loans.

As Panel A shows, 4 percent of the firm-bank pairs observed yearly have an earmarked relationship. Firms in our sample have on average 5.5 workers with the median firm employing 5 workers. The average relationship of a firm-bank pair is 1.62 years, with a median relation of 0.7 years. While the median loan provision in the sample is 0.50 percent of the value lent, the average loan provisions that banks set aside is equivalent to 1.07% the amount lent to firms, reflecting large heterogeneity in the borrowing risk of firms. Top five banks concentrate 83 percent of the firm-bank pairs that are observed each year with either working capital or vehicle finance loans.

As the next two panels show, less than 10 percent of working capital and vehicle loans are from firms that at some point become recipients of earmarked loans, and about 5 percent of loans are from firms that have an active earmarked credit relation with a bank. The average annual interest spread is 33.87% for working capital loans (Panel B) and 9.5% for vehicle financing loans (Panel C). We calculate interest spreads as the difference between the loan interest rate and the treasury yield for the same maturity. The average size of working capital loans is 30,638 reais

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<sup>11</sup> Table A1 in the Appendix lists the definitions of all the variables.

(~48,683 USD) with average maturity of 16.5 months. For vehicle financing, the average loan amount is similar (32k reais or 51.7k USD) with a higher maturity of 34.1 months. The lower spreads of vehicle financing are partly related to the presence of collateral: 89 percent of vehicle finance credits have collateral while collateral is reported only in 77 percent of working capital loans. Similarly, the average provision rate of vehicle financing loans is approximately half the provision rate of working capital credits (0.67% vs 1.22%).

#### **4. Allocation of Earmarked Loans**

In this section, we study how banks select recipients of earmarked loans (the extensive margin of earmarked credit allocation). We conduct a descriptive exercise where we relate the probability that a firm starts an earmarked relation with a bank to observable characteristics of each borrower. The broad idea is to examine if recipients of earmarked loans tend to be more credit constrained firms, following the main intent of the program, and if some banks are more likely to disburse the subsidized loans.

Aggregate trends in the data already suggest that larger firms receive a disproportional share of earmarked credit. As Figure 4 shows, medium and large enterprises obtained a greater proportion of their loans from private banks via earmarked loans, relative to their micro and small counterparts. The difference across firm size becomes more pronounced after the expansion of the government-sponsored credit program by the end of 2008. Starting in 2009, the gap in the share of earmarked credit between medium and micro enterprises rapidly widened— even during post-crisis years. By the end of 2016, earmarked loans represented on average thirteen percent of all credit of medium-size firms but less than 5 percent of the credit among micro firms. While the objective of the government program was to provide financing to credit constrained firms,

recipients of earmarked loans appear to be larger firms, which often have less constraints to access finance relative to smaller enterprises.

A second key pattern that emerges from the data is that while the earmarked credit program was available for all private commercial banks, it was the largest banks that used it more actively. As Figure 5 illustrates, the average borrower from the five largest banks in Brazil received a higher share of earmarked credit than the average borrower from other banks operating in the country. The documented difference between borrowers across banks increases right after the earmarked credit program expansion. By the end of 2016, earmarked loans for clients of the top five banks accounted for more than a quarter of their total lending.

The fact that larger banks engaged more actively in the earmarked credit program may suggest a mechanical effect in the allocation of earmarked credit, whereby larger firms are disproportionately receiving earmarked credit because they are more likely to be clients of top five banks. Alternatively, among all firms that apply to the program, banks may select larger applicants to be recipients of earmarked loans. To disentangle more rigorously the different drivers of earmarked credit allocation, we run OLS regressions on our firm-bank-year level data, which allows us to control for firm, bank and time specific factors not captured in the data patterns shown above. Our benchmark specification is outlined in Equation 1.

$$\begin{aligned}
 EarmarkRel_{fby} = & \alpha_0 + \alpha_1 Firm\ size_{fy} + \alpha_2 BF\ Rel_{fby} + \alpha_3 BF\ Prov_{fby} + \alpha_4 Top5_{by} * \\
 & Firm\ size_{fy} + \alpha_5 Top5_{by} * BF\ Rel_{fby} + \alpha_6 Top5_{by} * BF\ Prov_{fby} + \gamma_y + \gamma_b + u_{fby} \quad (1)
 \end{aligned}$$

In Equation 1, the dependent variable  $EarmarkRel_{fby}$  corresponds to the likelihood that firm  $f$  starts an earmarked credit relation with bank  $b$  at year  $y$ . The variable is set to one the years after  $f$  receives its first earmarked loan from  $b$  and zero otherwise.  $Firm\ size_{fy}$  consists of the number

of workers of firm  $f$  at year  $y$  and is measured in logs.  $BF Rel_{fby}$  measures the number of years of the relationship between bank  $b$  and firm  $f$ .  $BF Prov_{fby}$  refers to the average fraction of credit to firm  $f$  provisioned by bank  $b$  in year  $y$ . This variable proxies for the credit risk that a bank assigns to a firm, as higher provisions imply banks expect higher uncollected loan payments from the firm. We further interact these firm characteristics with the indicator variable  $Top5_b$ , which equals one if bank  $b$  is one of the five largest private banks in Brazil in terms of total credit volume. These interactions capture if earmarked loans are more likely to be disbursed by the largest banks in the country. Our benchmark specification includes fixed effects at the year and bank level. The inclusion of bank fixed effects allows us to analyze the granting of earmarked credit made by the *same* bank to different firms over time. Fixed effects at the year level allow us to control for aggregate changes in the allocation of earmarked loans, such as changes in BNDES funds over time and examine how in the *same* year, different banks select recipients of earmarked loans. We consecutively saturate additional specifications with bank\*year, firm, and firm\*year fixed effects to isolate different sources of variation in the data that we explain next.

#### 4.1. Results

The results of Equation 1 are displayed in Table 2. In the first column of the table, we find that banks are more likely to extend earmarked loans to firms of larger size. For every additional worker of a firm, the likelihood of receiving an earmarked loan increases in 2.6 percent. Banks are also more likely to distribute earmarked loans to firms with whom they have longer credit relationships. For every additional year that a firm has been client of a bank, its probability of starting an earmarked relation increases in 2.5 percent. Controlling for size and length of relationship, the average loan provision rate of firms is not related to the probability of starting an earmarked relation.



In column 2, we introduce bank\*year fixed effects to analyze the origination of earmarked credit by the *same* bank in the *same* year to different firms. The results remain very similar. The probability that a firm starts an earmarked relation with its bank increases in 2.6 percent for every additional worker, and in 2.7 percent for every additional month of relationship with the bank. Thus, larger firms are more likely to access earmarked loans because banks select larger applicants.

In column 3, we investigate the granting of earmarked credit to the *same* firm across different banks over time. To do this, we start from the same specification as the first column and add to it fixed effects at the firm level. As most of the variation on firm size in our data comes from variation across firms rather than within a firm over time, the inclusion of firm-level fixed effects absorbs the effect of firm size (and other unobservable characteristics) on the likelihood of starting an earmarked relation. While the economic magnitude of the bank-firm relationship coefficient is greatly reduced, its effect continues to be statistically significant. This implies that the *same* firm is more likely to start an earmarked credit relation with banks with whom the firm has longer relations. This specification additionally explores for heterogeneity across banks in their selection of earmark recipient firms. The coefficients of the interactions  $Top_5Bank_b * Firm\ size_{fy}$  and  $Top_5Bank_b * BF\ Rel_{fy}$  indicate that large firms and firms with longer bank relations are more likely to receive an earmarked loan with a top five bank than with other commercial banks, confirming that the top five banks were more active in their participation of the program. In this specification, we again find no significant effect of the average loan provisions of a firm on its likelihood of receiving earmarked loans, as shown by the coefficients of  $BF\ Prov_{fy}$  and  $Top_5Bank_b * BF\ Prov_{fy}$ .

In column, 4 we saturate the specification with firm\*year fixed effects to analyze the granting of earmarked credit to the *same* firm across different banks in the *same* year. Two patterns characterizing firms that receive earmarked loans continue to emerge. Importantly, neither of these

patterns appears consistent with the original objective of the program, which is to reach credit constrained firms. The first one is that a firm is more likely to receive an earmarked loan the longer it has maintained a relationship with a bank. For every additional year of relation with a bank, the likelihood of starting an earmarked relation increases in 1.6 percentage points. The second pattern that remains robust across specifications is that larger firms are substantially more likely to receive earmarked loans, particularly from the largest banks.

## **5. Interest rates and volume of loans in the free market**

We now turn to the intensive margin of earmarked credit. That is, we examine how interest rate spreads in the free-market of a firm-bank pair evolve after the pair begins an earmarked credit relation. While banks providing earmarked loans cannot adjust the terms on these loans, they can adjust the terms of other credits that firms obtain in the free market, such as loans for working capital. If the interest rate of an earmarked loan does not reflect the risk of a firm, banks may not lend to this firm in the first place. Alternatively, banks could compensate the extra risk of providing an earmarked loan to a riskier firm by adjusting the price of other loans they lend to the firm.

Descriptive evidence from the time series of loan spreads across banks is consistent with this argument. Figure 6 traces the average interest rate spreads of working capital loans of top five banks and the rest of banks over time. The average interest rate spreads followed a somewhat similar trajectory across banks before the earmarked credit expansion of 2008. Right when top five banks begin disbursing earmarked loans more aggressively as a result of the program expansion, the spreads of their working capital loans also start to increase. Within a few months after the expansion of the earmarked credit program, working capital loans from top five banks became

more expensive. Thereafter, the average cost of working capital loans of top five banks stopped tracing that of the rest of commercial banks. This pattern, however, is not observed in the spreads of credit products with more government intervention such as vehicle financing loans. As Figure 7 shows, the average interest rate spreads of vehicle finance loans of top five banks traces closely that of the rest of the banks over the entire sample period.

We use the loan-level data to study if inside banks adjust the pricing of other non-earmarked products after starting an earmarked credit relation with a client. Working capital loans provide a good setting to study non-earmarked credit products as they have negligible interference from government credit programs. Thus, we restrict our data to loans for working capital. The benchmark specification we use is displayed in Equation 2.

$$y_{lfbt} = \alpha_0 + \alpha_1 \text{EverEarmark}_{fb} + \alpha_2 \text{EarmarkRel}_{fbt} + \text{BF Rel}_{fbt} + \text{BF Rel}_{fbt} * \text{EverEarmark}_{fb} + \text{BF Rel}_{fbt} * \text{EarmarkRel}_{fbt} + X_{lfbt} + u_{lfbt} \quad (2)$$

Equation 2 consists of an OLS regression that relates the interest rate spread  $y$  of each working capital loan  $l$  from a firm  $f$  with bank  $b$  at time  $t$  to the following variables.  $\text{EverEarmark}_{fb}$  is a time-unvarying dummy variable at the firm-bank level that equals one if firm  $f$  received an earmarked loan from bank  $b$  at any point in time in our sample. This variable allows us to identify the difference in interest spreads that exists between firms that were selected by a bank to receive earmarked credit (recipient firms) versus those never selected. The second covariate is an indicator variable that equals one if the firm has an ongoing earmarked relationship with the bank and zero otherwise. Thus,  $\alpha_2$  identifies the effect on the credit terms once firm  $f$  has started an earmarked relation with bank  $b$  ( $\text{EarmarkRel}_{fbt} = 1$ ). The next variable,  $\text{BF Rel}_{fbt}$ , corresponds to the length of the bank-firm relationship between  $f$  and  $b$ , measured in years. Recent empirical work

finds that the length of the relationship between a bank and a firm is important for the pricing strategy of banks. At the beginning of a relationship, banks compete more aggressively for clients by offering low interest rates, and, once a relationship has been established, they increase rates of locked-in firms (Ioannidou and Ongena, 2010). This pricing strategy, however, is likely heterogeneous across borrowers, and potentially more pronounced for firms in which the inside bank enjoys a stronger informational advantage relative to outside lenders. For instance, firms whose information is either unavailable or only marginally observed by competing banks.

We include two interaction terms in our benchmark specification. The first interaction,  $BF Rel_{f_{bt}} * EverEarmark_{fb}$ , evaluates how the length of the bank-firm relationship affects interest rates for firms that were selected to receive an earmarked credit. The second interaction,  $BF Rel_{f_{bt}} * EarmarkRel_{f_{bt}}$ , identifies how the length of the bank-firm relationship affects interest rates for recipient firms already in an active earmarked lending relation with their banks. The first interaction term identifies if the pricing strategy of “Ever earmarked” firms is different to the one used for “Never earmarked firms” as their relationship with the bank increases. The second interaction term identifies if the pricing strategy in working capital loans among the “Ever earmarked firms” is affected after the earmarked credit is granted (and an active earmarked credit relationship begins). In  $X_{l_{f_{bt}}}$ , we also control for other terms of the working capital loan, including loan volume, maturity, loan rating and a dummy variable indicating if the loan was collateralized.

One challenge in our identification is that firms that receive earmarked loans are likely to differ from non-recipient firms. If this selection is not properly controlled for, then the estimates on the impact of earmarked loans on credit terms will be biased. We include firm-level fixed effects in all our specifications to help reduce this concern. If most differences across firms are time unvarying, the inclusion of fixed effects at the firm level will control for a large part of the selection

across borrowers. Alternatively, to reduce the selection problem, we restrict the sample to recipient firms –those that at some point receive an earmarked loan – and examine how the credit terms of these firms change after they obtain the earmarked credit.

In some specifications, we further include firm\*bank fixed effects. These fixed effects allow us to exploit the variation within the same firm and bank over time and control for sticky firm-bank relationships and unobserved time-invariant firm and bank heterogeneity. Importantly, firm\*bank fixed effects also help us isolate the impact of earmarked credit on the credit terms of loans received by the same bank that provided the earmarked loan before and after the earmarked relation started. In these specifications, the coefficient  $\alpha_2$  identifies how the interest rate spreads of working capital loans from bank  $b$  to firm  $f$  adjust once  $f$  and  $b$  begin an earmarked relation.

We also include in all specifications bank\*year fixed effects. These fixed effects control for time-varying supply-side changes such as changes in the supply of earmarked funds obtained by BNDES over the years. In some specifications, we also include firm\*year fixed effects. By doing so, we restrict the analysis to firms with multiple working capital loans in a year. However, there are two advantages of including these fixed effects. First, these fixed effects help us control for unobserved time-varying firm fundamentals, such as the firm risk, its investment opportunities, and other balance sheet characteristics. Second, they allow us to exclusively examine the interest rate of working capital loans of the *same* firm in the *same* year across different banks, and compare how interest rates of loans from banks with whom the firm has an active earmarked relation compare to interest rates of loans from other banks.

## 5.1. Results

Table 3 summarizes the loan-level results of running Equation 2 on the interest spreads of working capital loans. The first column includes fixed effects at the firm level, which allow us to analyze changes in interest rate spreads on working capital loans for the same firm over time. We additionally introduce fixed effects at the bank\*year level to compare interest rate spreads on working capital loans to different firms by the *same* bank at the *same* year. The indicator variable  $EverEarmark_{fb}$  distinguishes between firms that were selected to receive earmarked credit in the data versus those that never received earmarked credit. As its coefficient shows, firms that were selected to receive earmarked credit, unconditional on the date when the earmarked loan is disbursed, pay on average lower interest rates on working capital loans than firms that were not selected for earmarked credit (1.23 percentage points lower). The coefficient of  $BF Rel_{fbt}$  suggests that banks charge on average higher interest rates to firms as the firm-bank relationship matures, consistent with the view of hold-up costs (Ioannidou and Ongena, 2010).<sup>12</sup> The coefficient of  $EarmarkRel_{fbt}$  measures how much extra spread a recipient firm pays after the first earmarked loan compared to *both* recipient firms that have not yet received an earmarked loan and firms that are never selected to receive an earmarked loan. As there are substantially more firms that never receive an earmarked credit, this coefficient ends up measuring the difference in working capital loan spreads between recipient firms after receiving an earmarked loan and firms that never receive earmarked credit. Thus, this coefficient indicates that once recipient firms begin receiving earmarked loans, their working capital spreads are on average indistinguishable from the spreads of firms that were never selected for earmarked loans.

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<sup>12</sup> This finding is also present in Ornelas et al. (2020) using a similar dataset.

Columns 2 and 3 further add firm\*bank fixed effects to the specification, while still controlling for bank\*year fixed effects. That is, in these two columns we now examine how interest rate spreads of working capital loans by the *same* bank with the *same* firm change after the firm-bank pair starts an earmarked credit relation. In column 3, our preferred specification, we further restrict the sample to firms that at any point in time were recipients of earmarked loans. Doing this allows us to address concerns that recipient firms are different from non-recipient ones in ways that might be difficult to fully control in the regressions.

Similar to column 1, the coefficient of starting an earmarked credit relation in column 2 compares the difference in spreads of working capital loans of firms that received an earmarked credit with loan spreads of firms that were not selected to receive an earmarked loan. In column 3 however, the selection bias of this coefficient is reduced by restricting the sample to only recipient firms. That is, we now compare the difference in working capital loan spreads between firms that start an earmarked credit relation with a bank with borrowers that have not yet received an earmarked loan, but that will benefit from earmarked loans in the future. According to the coefficient of  $EarmarkRel_{bt}$  in column 3, once recipient firms access earmarked loans, they experience an increase in the average interest spread of working capital loans of 0.383 percentage points. This effect is statistically significant and large in economic magnitude.

In column 4 we continue analyzing the subsample of recipient firms and additionally saturate the specification with firm\*year fixed effects. While these fixed effects restrict the analysis to only firms that have multiple loans across banks in a given year, they help isolate from the data variation exclusively obtained from changes in interest rate spreads that the *same* firm obtains from different banks in the *same* year. The estimates from this specification confirm that the interest rate spreads paid by a firm that has an active earmarked credit relation with a bank are considerably higher than

the interest rate spreads of working capital loans obtained by the firm from other banks in the same year.

Finally, in column 5 we analyze back the entire sample of firms to study how interest rate spreads of working capital loans evolve as the duration of the relation between a firm and its bank grows. We first examine if the length of the relation of a firm-bank pair affects spreads differently for recipient firms (i.e.,  $EverEarmark_{fb} = 1$ ). We then analyze if the duration of the relation of a firm-bank pair of recipient firms changes once the firm-bank pair engages in an earmarked credit relation. The coefficients of  $BF Rel_{fbi}$  and  $BF Rel_{fbi} * EverEarmark_{fb}$  suggest that over the length of the firm-bank relation, banks have different pricing strategies on working capital loans depending on whether firms are from the group of recipient firms or not. Non-recipient firms experience an increase of 0.497 percentage points in their working capital loan spreads for every additional month of their firm-bank relation. In contrast, recipient firms that have not started their earmarked credit relation yet pay on average the same spreads on working capital loans regardless of how long the relation with their bank is. This comes from the coefficient of  $BF Rel_{fbi} * EverEarmark_{fb}$  canceling out the coefficient of  $BF Rel_{fbi}$ ). These results highlight the fact that recipients of earmarked credit might represent profitable clients for banks, and financial institutions would try to retain these clients via low pricing strategies. Interestingly, the coefficient of the interaction  $BF Rel_{fbi} * EarmarkRel_{fbi}$  shows that once the bank provides an earmarked loan to a firm, the interest rate of working capital loans starts increasing as the relationship duration lengthens— similar to the behavior observed for non-earmarked firms. This is consistent with private banks using earmarked credit to lock-in firms.

The overall results of Table 3 show that recipients of earmarked credit start paying higher interest rate spreads on their working capital loans after they begin an earmarked credit relation



with a bank. Importantly, it is the inside bank – the bank that provides the earmarked loan – the one that increases the cost of working capital loans to its recipient firms. This behavior is consistent with banks adjusting interest rates in free-market credit products when allocating an earmarked credit priced at below-market rates.

We run two robustness checks to corroborate our findings. If banks adjust their prices in working capital loans to compensate for the risk they take when extending earmarked credit to riskier firms, it must follow that changes in the price of working capital loans as a result of new earmarked credit relations are concentrated among riskier clients. To evaluate this hypothesis, we estimate equation 2 on two subsamples of firms classified by their risk level. We calculate the average provision rates of all loans obtained by each firm over the period. Based on the average provision rate in the sample, we classify firms as below and above the median. The below-the-median group is on average constituted by safer firms, as banks set lower provisions to their loans. The above-the-median group consists of firms whose loans are perceived as riskier by banks. Table 4 presents our results. The three columns of Panel A display the estimates of equation 2 on the sample of riskier firms. Columns 4 to 6 (Panel B) present the results for the group of safer firms. The three columns in each panel replicate columns 3, 4 and 5 of Table 3. Consistently across the specifications, we find that the coefficient on  $EarmarkRel_{jt}$  in Panel A is statistically significant and large in economic magnitude. That is, riskier firms experience an average increase in their interest rate spreads on working capital loans after starting an earmarked credit relation with their banks. The increase in spreads ranges from 0.35 to 0.595 depending on the specification. In contrast, there is no clear pattern on spreads on working capital loans for safer firms that start an earmarked relation with the inside banks (Panel B). As larger firms tend to be more informationally transparent borrowers, an alternative way to group firms is based on size. Table A2 of the

Appendix presents the results on the subsample of firms with average size below and above the median. While the pattern by firm size appears noisier, the estimates seem to confirm the evidence that smaller firms, those that are typically riskier, experience larger increases in the working capital spread with the inside bank.

As a second robustness test, we run equation 2 on the interest rate spreads of vehicle financing loans. A large share of earmarked loans is provided for this credit modality, which suggests that banks may have less flexibility to extract higher rents in this credit product. Thus, we consider vehicle finance loans as a type of placebo test, where we do not expect the inside bank to alter the loan's spread to its recipient firms. Table A3 in the Appendix presents the results, which confirm that banks do not increase spreads on these loans after they begin an earmarked credit relation with a firm. In general, interest rate spreads of vehicle finance loans do not respond to whether a firm is recipient of an earmarked loan, to the duration of the relationship between a firm-bank pair, or to the start of an earmarked credit relation.

Finally, we use equation 2 to analyze changes in the volume of working capital loans. The effect of starting an earmarked relation on the volume of working capital loans is not obvious. On one hand, an increase in the price of working capital loans should be met by a contraction in the demand for these loans. On the other hand, we see from the data that once an earmarked credit relation with a bank starts, more than 90 percent of firms continue receiving an earmarked loan from that same bank every year. Thus, firms may continue borrowing working capital loans with the bank even at higher prices to maintain their earmarked credit relation. In Figure 8 we plot suggestive evidence for this. As the figure shows, the time series of the average size of working capital and vehicle finance loans in our sample shows an increase in the size of working capital loans right after the earmarked credit expansion.

Table 5 presents the results of equation 2 on volume of working capital loans. The results show that there is a statistically significant increase in the volume of working capital loans obtained by a recipient firm after the firm is granted an earmarked loan (Columns 1 through 5). In Table 6, we further examine changes in loan volume of working capital in the subsample of riskier and safer firms, as defined by their average loan provisions. The table follows the same format as that of Table 4. Again, we do not find evidence that riskier firms reduce their working capital loan amounts after they start an earmarked credit relation with their bank, even though these are the firms concentrating most of the increase in the cost of their working capital loans (Panel A). If we instead classify firms according to their size, we again confirm the same findings, as Table A4 in the appendix shows.

As a robustness check, we present the results on loan volume for the free-market credit modality of vehicle financing loans. The results are displayed in Table A5 of the Appendix. Interestingly, we find that after a recipient firm begins an earmarked credit relation with a bank, the size of vehicle finance loans that the firm demands in the free-market from the bank declines. This is consistent with the fact that vehicle finance is a heavily subsidized credit modality via earmarked programs.

## **6. Conclusions**

A common strategy used by governments to improve access to credit among small businesses and mitigate the negative effects from large financial shocks is to channel resources via private banks. Such setting is popular because it mitigates potential inefficiencies from direct lending by state-owned banks. For example, it reduces political considerations often associated with credit misallocation. Also, in countries where the credit market is dominated by private lenders the state

might not have the infrastructure and capacity to reach most borrowers. In this paper, we document that the reliance on private banks, however, raises frictions related to private benefits versus social objectives.

Using a rich loan-level dataset from Brazil, we study how private banks allocate government-sponsored loans to businesses in the country. We document two related facts. First, although the program is mostly meant to promote investment in fixed assets among micro, small, and medium enterprises, it is larger firms that disproportionately benefit from the loan subsidies. Furthermore, access to the program tends to be largely determined by the bank-firm relationship prior to the expansion of the program. That is, firms with existing credit relationship with the largest banks in the country are more likely to receive earmarked funds.

Second, we document the prevalence of a cross-selling strategy whereby banks price-discriminate against riskier borrowers in free-market loans. It appears that banks are willing to disburse earmarked loans at below-the-market interest rates to riskier borrowers, as long as they can adjust the interest rates in other credit products in the competitive credit market. The strategy guarantees that banks are compensated for their risk-taking. Inadvertently, the government selects winners and losers, since mostly larger businesses, those that bank with the largest private lenders, and those willing to bundle free-market and earmarked loans disproportionately access the program.

The potential gains from cross-selling strategies documented here are likely to underestimate the total benefits for private banks. For instance, we only observe increases in the interest spread of working capital loans, but such pricing strategies may exist in other products. Future work in this area should include those benefits, which might be sizeable.

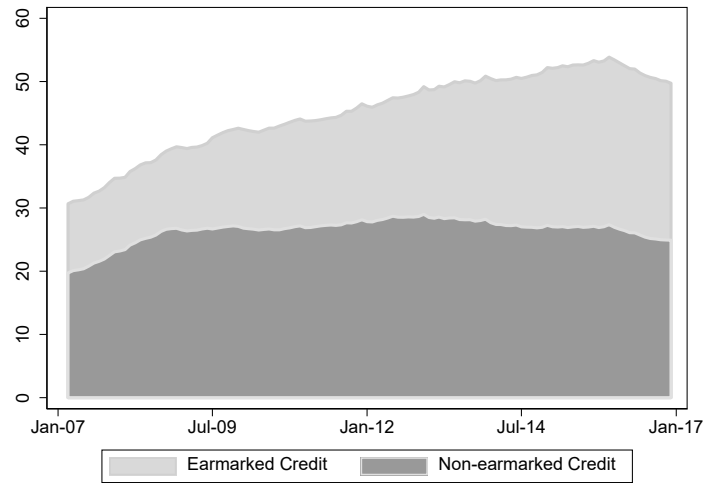
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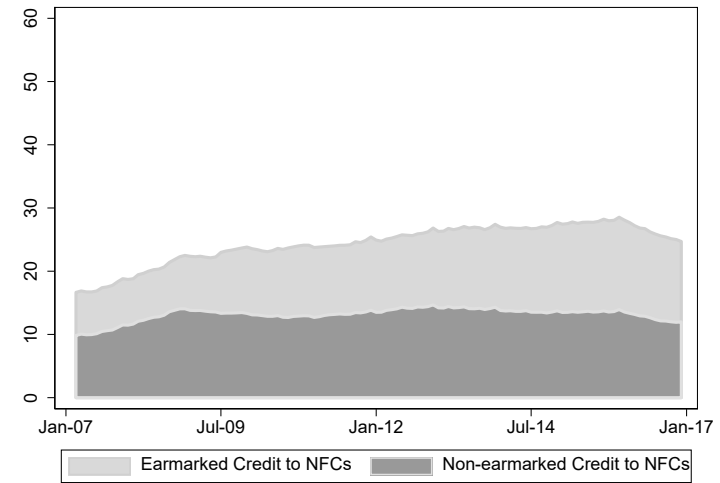
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**Figure 1. Earmarked and Non-Earmarked Credit as a share of GDP**

**Panel A. Total Earmarked and Non-Earmarked Credit**

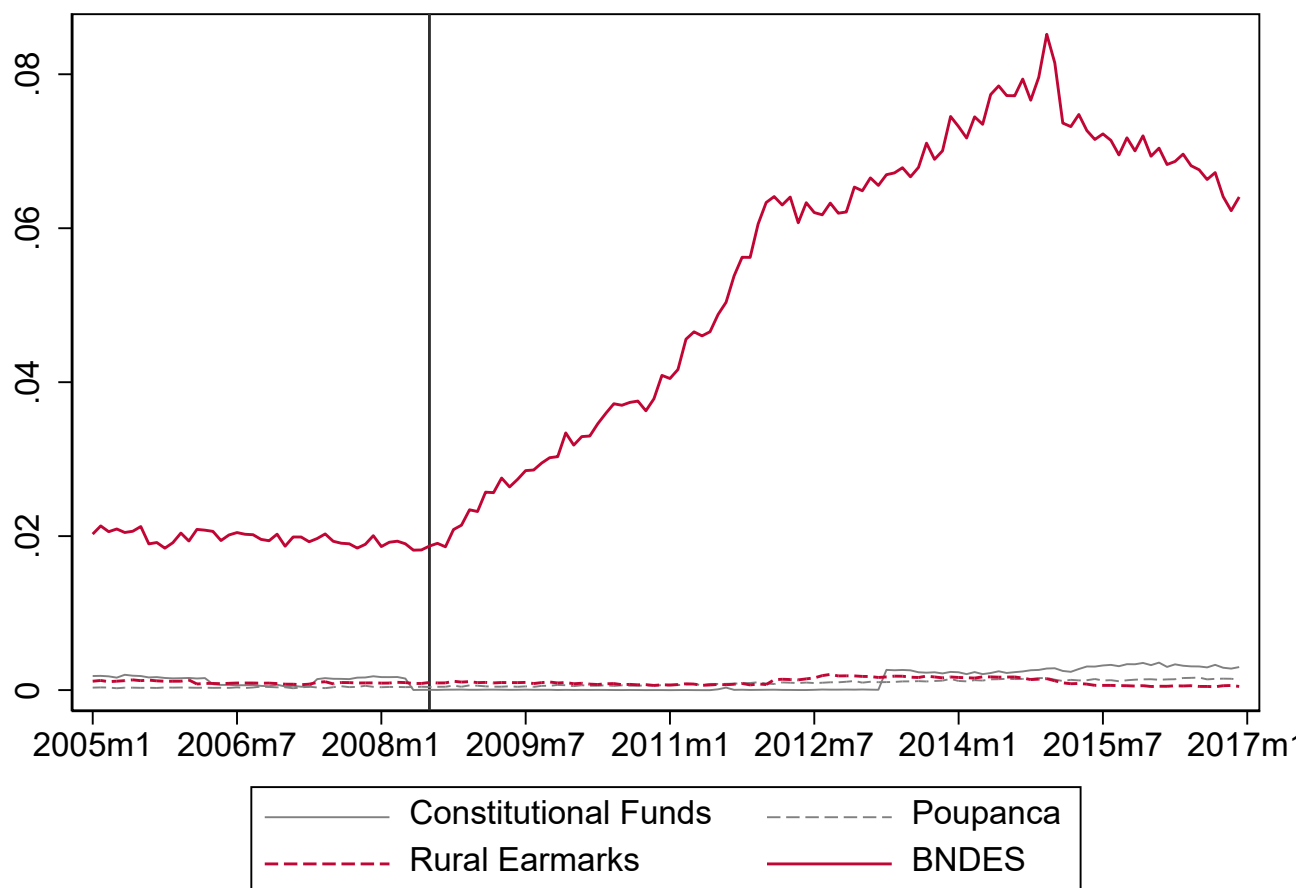


**Panel B. Earmarked and Non-Earmarked Credit to Firms**



Notes: Data obtained from the Brazilian Central Bank for the period available (January 2007 to December 2016).

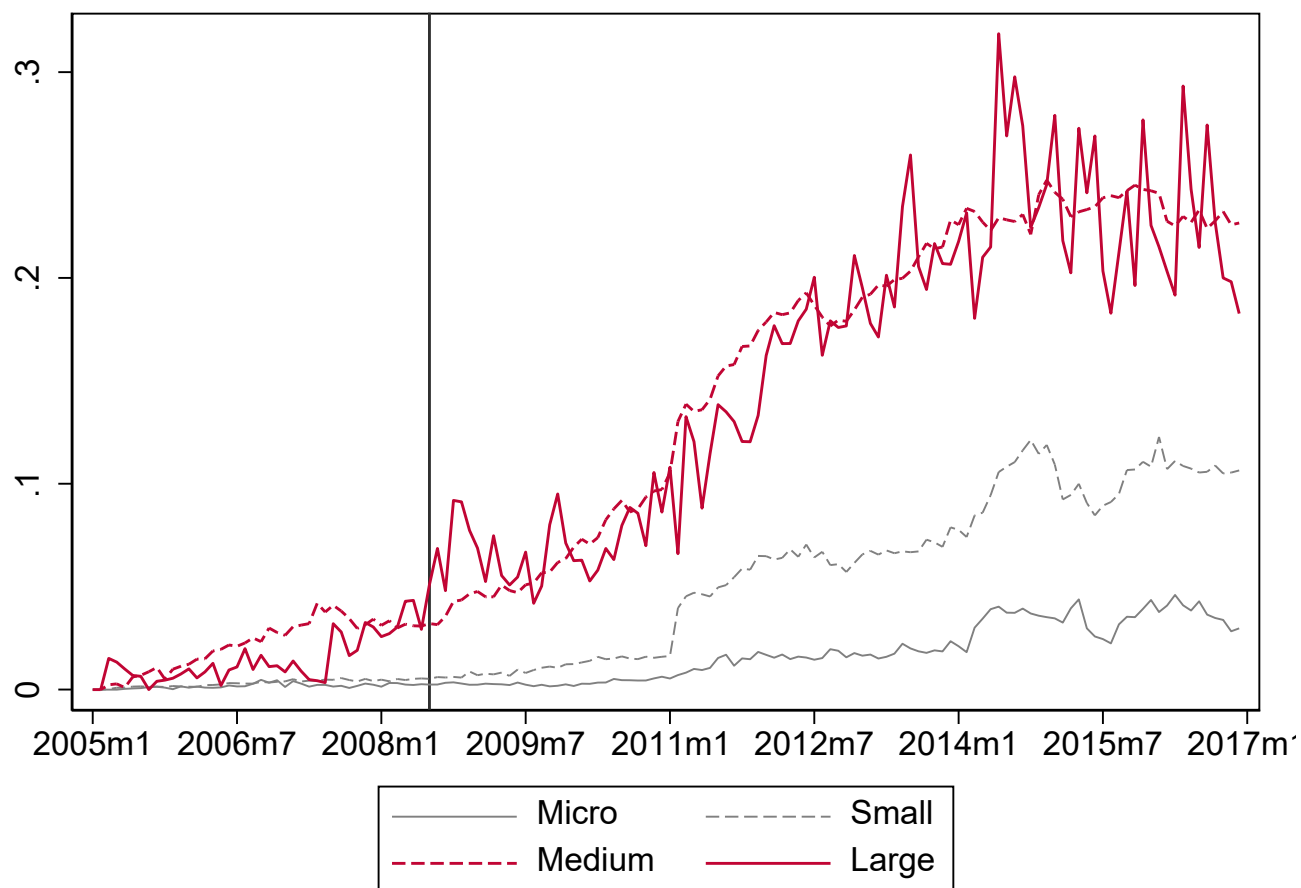
**Figure 2. Average share of earmarked credit of firms, by type of program**



Notes: The share of earmarked credit of firms corresponds to the fraction of earmarked credit relative to total credit obtained by firms. The vertical line marks the date when BNDES earmarked credit program began its expansion.

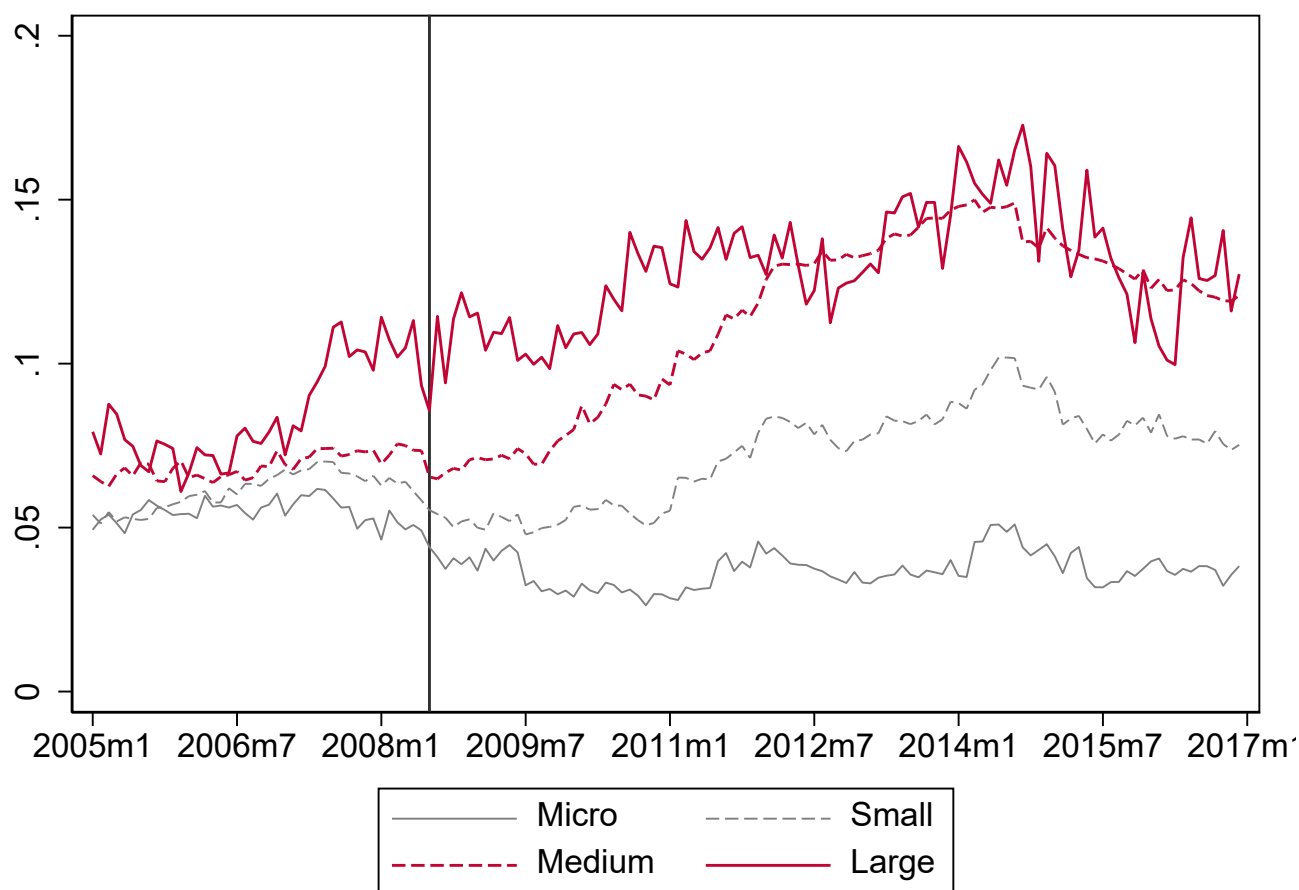


**Figure 3. Share of firms that receive an earmarked loan for the first time, by firm size**



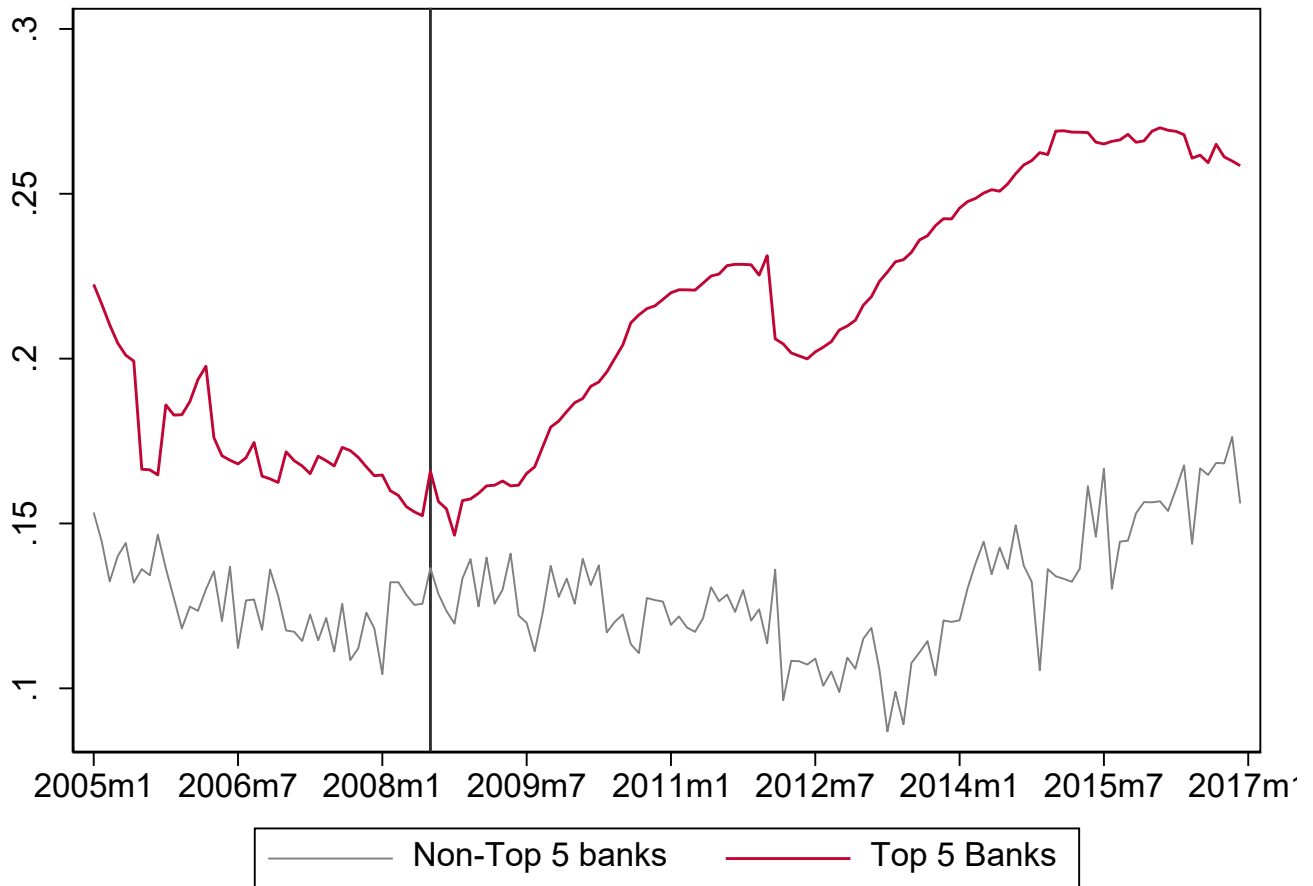
Notes: The vertical line marks the date when BNDES earmarked credit program began its expansion.

**Figure 4. Average share of earmarked credit of firms, by firm size**



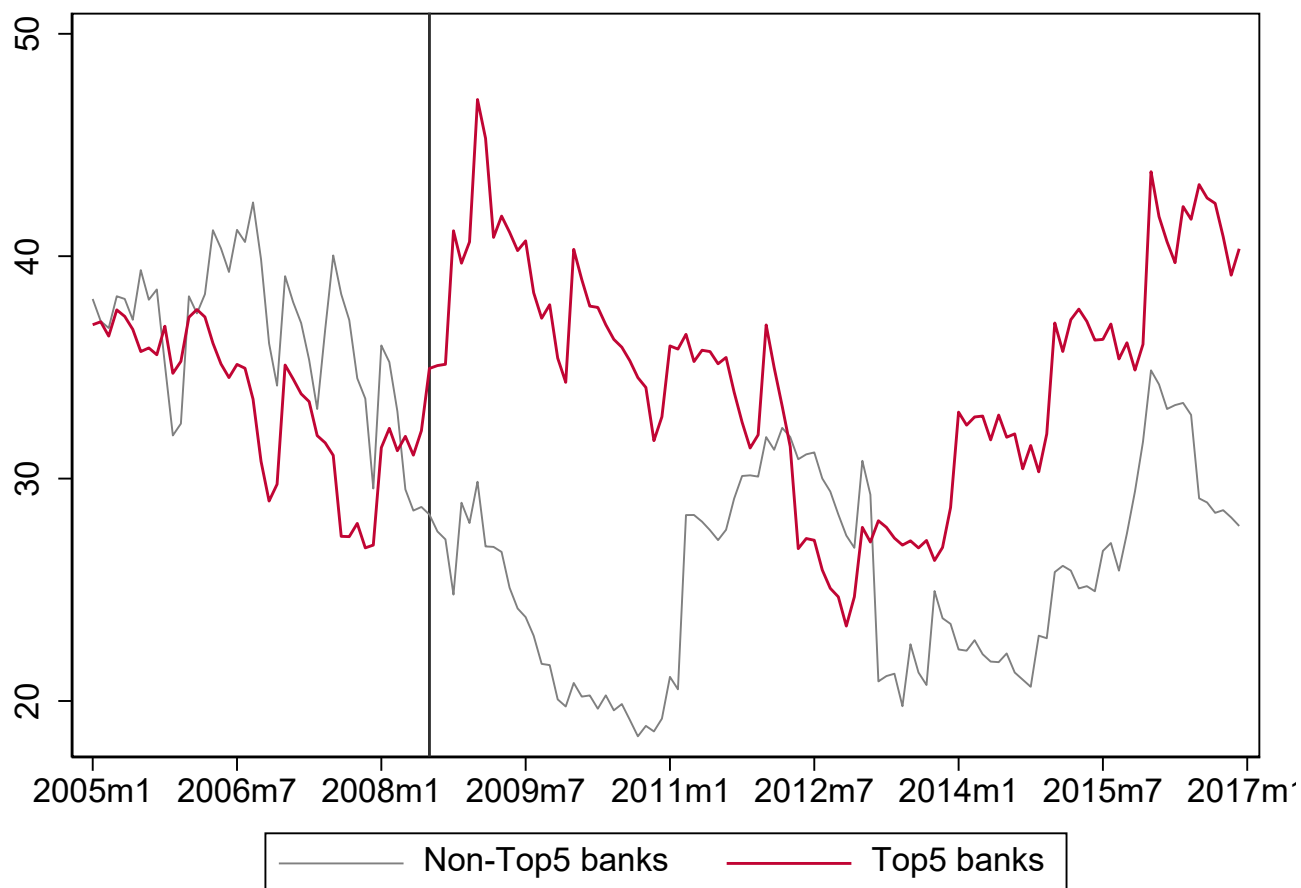
Notes: We follow the classification of firms by size provided by the Central Bank of Brazil. Under this classification, firms in the industry and construction sectors are considered micro if they employ fewer than 20 workers; small if they employ from 20 to 99 workers; medium if they employ 100 to 499 workers; and large if they employ 500 or more workers. Firms in the trade and services sectors are considered micro if they employ fewer than 10 workers; small if they employ from 10 to 49 workers; medium if they employ from 50 to 99 workers; and large if they employ 100 workers or more. The vertical line marks the date when BNDES earmarked credit program began its expansion.

**Figure 5. Average share of earmarked credit to firms, by type of bank**



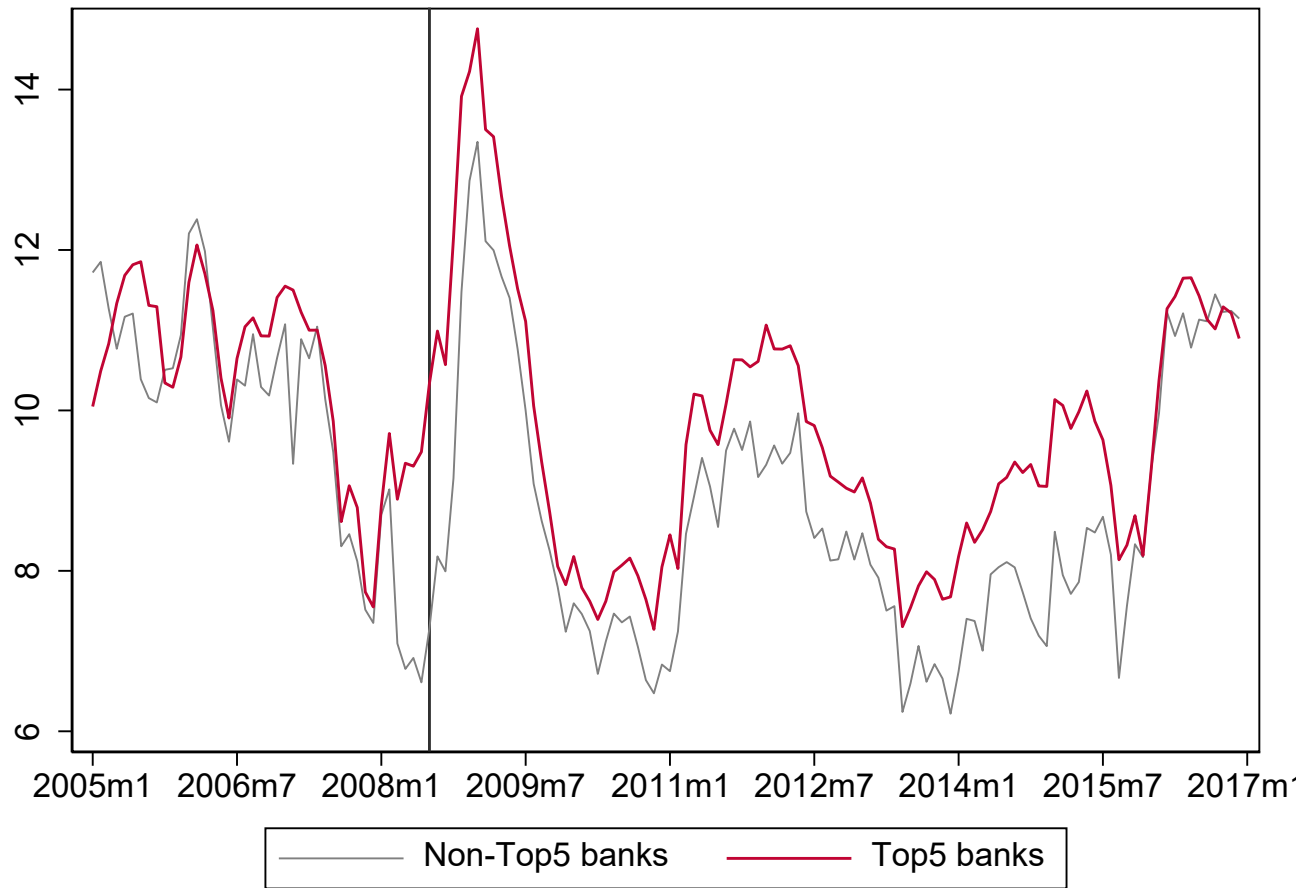
Notes: The vertical line marks the date when BNDES earmarked credit program began its expansion.

**Figure 6. Average interest rate spread of working capital loans, by type of bank**



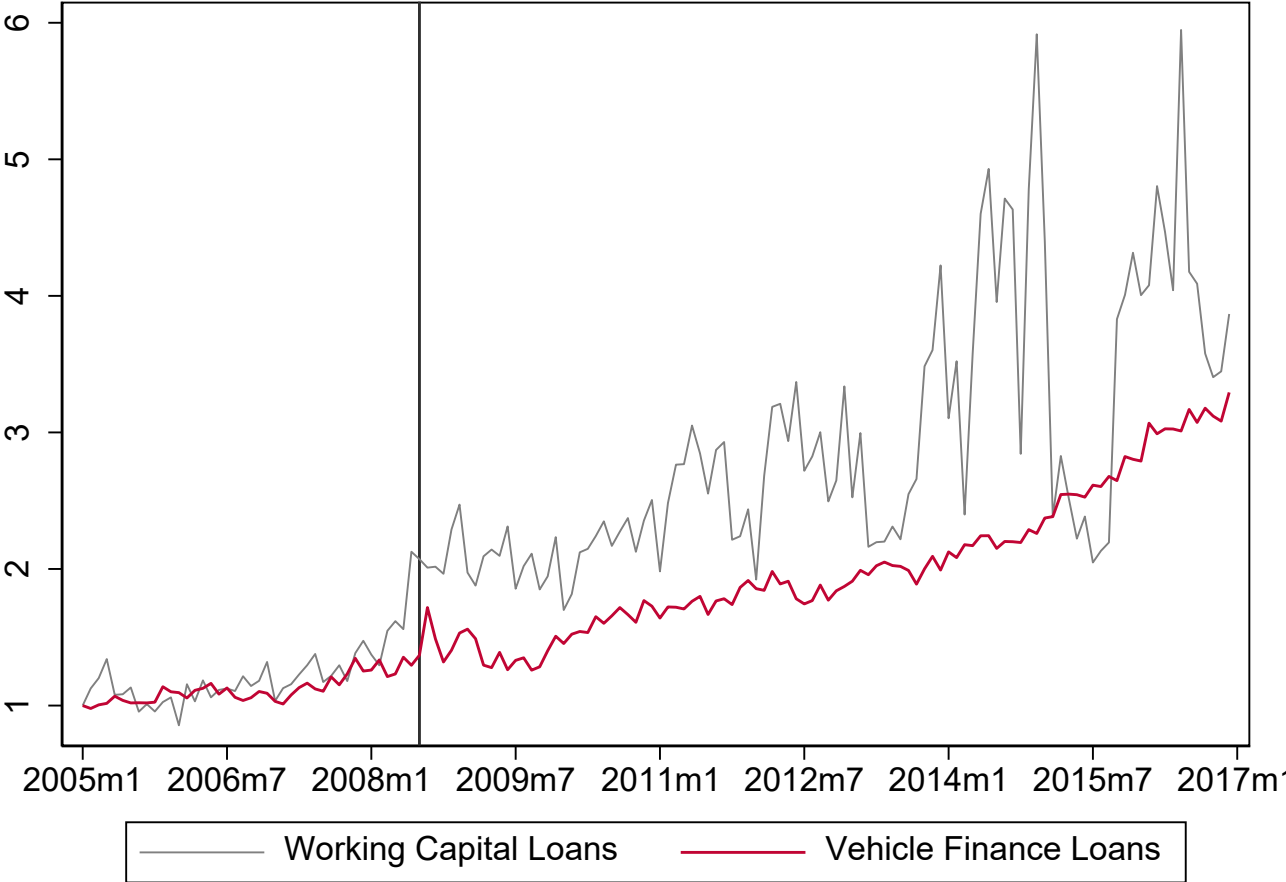
Notes: The vertical line marks the date when BNDES earmarked credit program began its expansion.

**Figure 7. Average interest rate spread of vehicle finance loans, by type of bank**



Notes: The vertical line marks the date when BNDES earmarked credit program began its expansion.

**Figure 8. Volume of working capital and vehicle finance loans (normalized to 2005m1)**



Notes: The vertical line marks the date when BNDES earmarked credit program began its expansion.

**Table 1. Summary Statistics**

	Mean	Median	Std Dev	# Obs
<b>Panel A. Bank-firm-year level data</b>				
EarmarkRel <sub>fb</sub> y	0.04	0.00	0.20	4,076,760
Firm size <sub>f</sub> y (logs)	1.71	1.61	1.46	4,076,760
BF Rel <sub>fb</sub> y	1.62	0.71	2.12	4,076,760
BF Prov <sub>fb</sub> y	1.07	0.50	1.40	4,076,760
Top5Bank <sub>b</sub>	0.83	1.00	0.37	4,076,760
<b>Panel B. Loan level data- working capital loans</b>				
EverEarmark <sub>fb</sub>	0.09	0.00	0.29	4,794,493
EarmarkRel <sub>fb</sub> t	0.05	0.00	0.23	4,794,493
BF Rel <sub>fb</sub> t	1.91	1.04	2.21	4,794,493
Interest rate spread <sub>lfb</sub> t	33.87	29.42	21.21	4,794,493
Loan volume (logs) <sub>lfb</sub> t	10.33	10.13	1.35	4,794,493
Loan provision rate <sub>lfb</sub> t	1.22	0.50	1.54	4,794,493
Loan maturity <sub>lfb</sub> t	16.53	14.00	10.73	4,794,493
Loan collateral <sub>lfb</sub> t	0.77	1.00	0.42	4,794,493
Firm size <sub>f</sub> t	1.67	1.39	1.52	4,794,493
<b>Panel C. Loan level data- vehicle financing loans</b>				
EverEarmark <sub>fb</sub>	0.08	0.00	0.28	1,041,984
EarmarkRel <sub>fb</sub> t	0.04	0.00	0.20	1,041,984
BF Rel <sub>fb</sub> t	1.20	0.16	1.89	1,041,984
Interest rate spread <sub>lfb</sub> t	9.50	8.87	4.61	1,041,984
Loan volume (logs) <sub>lfb</sub> t	10.39	10.34	0.72	1,041,984
Loan provision rate <sub>lfb</sub> t	0.67	0.50	0.84	1,041,984
Loan maturity <sub>lfb</sub> t	34.10	37.00	13.48	1,041,984
Loan collateral <sub>lfb</sub> t	0.89	1.00	0.31	1,041,984
Firm size <sub>f</sub> t	1.71	1.61	1.46	1,041,984

Notes: The table displays the summary statistics of our sample for the period between January 2005 and December 2016. All variable definitions are listed in Table A1 of the Appendix.

**Table 2. Determinants of earmarked credit relation**

	(1)	(2)	(3)	(4)
Firm size <sub>fy</sub>	0.026*** (0.004)	0.026*** (0.004)	-0.004 (0.004)	
BF Rel <sub>fby</sub>	0.025*** (0.008)	0.027*** (0.009)	0.008* (0.005)	0.016*** (0.005)
BF Prov <sub>fby</sub>	0.005 (0.006)	0.005 (0.006)	-0.001 (0.001)	0.001 (0.001)
Top5Bank <sub>b</sub> * Firm size <sub>fy</sub>			0.019*** (0.005)	0.025*** (0.004)
Top5Bank <sub>b</sub> * BF Rel <sub>fby</sub>			0.019** (0.008)	0.011 (0.007)
Top5Bank <sub>b</sub> * BF Prov <sub>fby</sub>			0.001 (0.002)	-0.001 (0.003)
Observations	1,990,572	1,990,504	1,571,556	360,207
R-squared	0.115	0.121	0.661	0.607
Sample	All Firms	All Firms	All Firms	Firms with >1 bank in a year
Bank FE	Yes	-	Yes	Yes
Year FE	Yes	-	Yes	Yes
Bank*Year FE	No	Yes	No	No
Firm FE	No	No	Yes	-
Firm*Year FE	No	No	No	Yes

Notes: The table shows estimates of OLS regressions where each observation corresponds to a firm-bank-year triplet. The dependent variable corresponds to a dummy variable that equals one for all years after firm f had its first earmarked loan with bank b, and zero otherwise. Firm size is measured by the log of number of workers. The length of a bank-firm relation (BR Rel) is measured in years. Other controls include age of the firm. Standard errors are clustered at the bank\*time level. All variable definitions are listed in Table A1 of the Appendix.



**Table 3. Effect of earmarked relations on interest rate spreads of working capital loans**

	(1)	(2)	(3)	(4)	(5)
EverEarmark <sub>fb</sub>	-1.225*** (0.405)				
EarmarkRel <sub>fbt</sub>	0.226 (0.226)	0.070 (0.241)	0.383*** (0.099)	0.326*** (0.109)	0.425** (0.207)
BF Rel <sub>fbt</sub>	0.240** (0.105)	0.457** (0.184)	0.126 (0.128)	-0.343* (0.190)	0.497*** (0.185)
BF Rel <sub>fbt</sub> *EverEarmark <sub>fb</sub>					-0.493*** (0.032)
BF Rel <sub>fbt</sub> *EarmarkRel <sub>fbt</sub>					0.174*** (0.035)
Observations	4,120,577	3,905,486	398,291	265,647	3,905,486
R-squared	0.693	0.724	0.721	0.837	0.724
Sample	All Firms	All Firms	Recipient Firms	Recipient Firms	All Firms
Firm FE	Yes				
Firm*Bank FE	No	Yes	Yes	Yes	Yes
Bank*Year FE	Yes	Yes	Yes	Yes	Yes
Firm*Year FE	No	No	No	Yes	No

Notes: The table shows estimates of OLS regressions where the dependent variable corresponds to the interest spread of a working capital loan of firm *f* with bank *b* at time *t*. EverEarmark<sub>fb</sub> is an indicator variable that is equal to one for firms receiving an earmarked loan from bank *b* and zero otherwise. EarmarkRel<sub>fbt</sub> is an indicator variable that equals one for all consecutive periods after firm *f* receives its first earmarked loan from bank *b* at time *t*, and zero otherwise. BF Relation<sub>fbt</sub> captures the length of the relationship duration of firm *f* with bank *b* and is measured in log number of years. Estimates of columns 1, 2 and 5 are based on the full sample of firms. Estimates of columns 3 and 4 constrain the sample to firms that at any point in time receive an earmarked loan. Regressions further control for the loan rating, loan volume, loan maturity and a dummy variable indicating if the loan was collateralized. Standard errors are clustered at the bank\*time level. All variable definitions are listed in Table A1 of the Appendix.

**Table 4. Effect of earmarked relations on interest rate spreads of working capital loans by average rating of firms**

	Panel A. Firms with avg provisions above the median			Panel B. Firms with avg provisions below the median		
	(1)	(2)	(3)	(4)	(5)	(6)
EarmarkRel <sub>f<sub>bt</sub></sub>	0.595*** (0.063)	0.350*** (0.075)	0.443*** (0.058)	-0.150** (0.063)	0.204 (0.237)	0.466 (0.407)
BF Rel <sub>f<sub>bt</sub></sub>	0.121 (0.095)	-0.470* (0.241)	0.396** (0.198)	0.233 (0.147)	0.061 (0.167)	0.649*** (0.161)
BF Rel <sub>f<sub>bt</sub></sub> *EverEarmark <sub>f<sub>b</sub></sub>			-0.510*** (0.026)			-0.529*** (0.080)
BF Rel <sub>f<sub>bt</sub></sub> *EarmarkRel <sub>f<sub>bt</sub></sub>			0.145*** (0.049)			0.200** (0.079)
Observations	281,245	191,161	2,246,907	116,998	74,465	1,658,493
R-squared	0.712	0.829	0.714	0.710	0.842	0.747
Sample	Recipient Firms	Recipient Firms	All Firms	Recipient Firms	Recipient Firms	All Firms
Firm*Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank*Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm*Year FE	No	Yes	No	No	Yes	No

Notes: The table shows estimates of OLS regressions where the dependent variable corresponds to the interest spread of a working capital loan of firm  $f$  with bank  $b$  at time  $t$ . Columns 1 through 3 present the OLS estimates for the sample of firms with average provisions over time above the median provision rates in the data. Columns 4 through 6 present the OLS estimates for firms with average provisions over time below the median provision rate. EarmarkRel<sub>f<sub>bt</sub></sub> is an indicator variable that equals one for all consecutive periods after firm  $f$  receives its first earmarked loan from bank  $b$  at time  $t$ , and zero otherwise. BF Relation<sub>f<sub>bt</sub></sub> captures the length of the relationship duration of firm  $f$  with bank  $b$  and is measured in log number of years. Estimates of columns 1 and 2 are based on the sample of firms that at any point in time receive an earmarked loan. Estimates of column 3 use the full sample of firms. Regressions further control for the loan rating, loan volume, loan maturity and a dummy variable indicating if the loan was collateralized. Standard errors are clustered at the bank\*time level. All variable definitions are listed in Table A1 of the Appendix.

**Table 5. Effect of earmarked relations on volume of working capital loans**

	(1)	(2)	(3)	(4)	(5)
EverEarmark <sub>fb</sub>	0.009 (0.015)				
EarmarkRel <sub>fbt</sub>	0.039*** (0.012)	0.036*** (0.010)	0.028** (0.012)	-0.015 (0.021)	0.073*** (0.025)
BF Rel <sub>fbt</sub>	-0.007 (0.004)	-0.011*** (0.003)	-0.001 (0.002)	-0.019 (0.018)	-0.012*** (0.003)
BF Rel <sub>fbt</sub> *EverEarmark <sub>fb</sub>					0.022*** (0.003)
BF Rel <sub>fbt</sub> *EarmarkRel <sub>fbt</sub>					-0.022*** (0.004)
Observations	4,120,577	3,905,486	398,291	265,647	3,905,486
R-squared	0.856	0.876	0.878	0.921	0.876
Sample	All Firms	All Firms	Recipient Firms	Recipient Firms	All Firms
Firm FE	Yes				
Firm*Bank FE	No	Yes	Yes	Yes	Yes
Bank*Year FE	Yes	Yes	Yes	Yes	Yes
Firm*Year FE	No	No	No	Yes	No

Notes: The table shows estimates of OLS regressions where the dependent variable corresponds to the log volume of a working capital loan of firm *f* with bank *b* at time *t*. EverEarmark<sub>fb</sub> is an indicator variable that is equal to one for firms receiving an earmarked loan from bank *b* and zero otherwise. EarmarkRel<sub>fbt</sub> is an indicator variable that equals one for all consecutive periods after firm *f* receives its first earmarked loan from bank *b* at time *t*, and zero otherwise. BF Relation<sub>fbt</sub> captures the length of the relationship duration of firm *f* with bank *b* and is measured in log number of years. Estimates of columns 1, 2 and 5 are based on the full sample of firms. Estimates of columns 3 and 4 constrain the sample to firms that at any point in time receive an earmarked loan. Regressions further control for the loan rating, interest spread, loan maturity and a dummy variable indicating if the loan was collateralized. Standard errors are clustered at the bank\*time level. All variable definitions are listed in Table A1 of the Appendix.

**Table 6. Effect of earmarked relations on volume of working capital loans by average rating of firms**

	Panel A. Firms with avg provisions above the median			Panel B. Firms with avg provisions below the median		
	(1)	(2)	(3)	(4)	(5)	(6)
EarmarkRel <sub>f<sub>bt</sub></sub>	0.035*** (0.008)	-0.015 (0.020)	0.073*** (0.022)	0.010 (0.017)	-0.018 (0.030)	0.070** (0.032)
BF Rel <sub>f<sub>bt</sub></sub>	-0.000 (0.003)	-0.016 (0.028)	-0.013*** (0.003)	-0.001 (0.001)	-0.024*** (0.007)	-0.012*** (0.004)
BF Rel <sub>f<sub>bt</sub></sub> *EverEarmark <sub>f<sub>b</sub></sub>			0.018*** (0.004)			0.030*** (0.003)
BF Rel <sub>f<sub>bt</sub></sub> *EarmarkRel <sub>f<sub>bt</sub></sub>			-0.021*** (0.003)			-0.021** (0.009)
Observations	281,245	191,161	2,246,907	116,998	74,465	1,658,493
R-squared	0.862	0.909	0.855	0.886	0.925	0.899
Sample	Recipient Firms	Recipient Firms	All Firms	Recipient Firms	Recipient Firms	All Firms
Firm FE						
Firm*Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank*Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm*Year FE	No	Yes	No	No	Yes	No

Notes: The table shows estimates of OLS regressions where the dependent variable corresponds to the log volume of a working capital loan of firm *f* with bank *b* at time *t*. Columns 1 through 3 present the OLS estimates for the sample of firms with average provisions over time above the median provision rates in the data. Columns 4 through 6 present the OLS estimates for firms with average provisions over time below the median provision rate. EarmarkRel<sub>f<sub>bt</sub></sub> is an indicator variable that equals one for all consecutive periods after firm *f* receives its first earmarked loan from bank *b* at time *t*, and zero otherwise. BF Relation<sub>f<sub>bt</sub></sub> captures the length of the relationship duration of firm *f* with bank *b* and is measured in log number of years. Estimates of columns 1 and 2 are based on the sample of firms that at any point in time receive an earmarked loan. Estimates of column 3 use the full sample of firms. Regressions further control for the loan rating, interest spread, loan maturity and a dummy variable indicating if the loan was collateralized. Standard errors are clustered at the bank\*time level. All variable definitions are listed in Table A1 of the Appendix.

**Table A1. Definition of Variables**

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**Panel A. Bank-firm-year level data**

Firm size <sub><i>f</i>y</sub>	Log number of workers of firm <i>f</i> at year <i>y</i> .
BF Rel <sub><i>f</i>by</sub>	Length of relationship duration (in years) of firm <i>f</i> and bank <i>b</i> at year <i>y</i> .
BF Prov <sub><i>f</i>by</sub>	Average loan provision rate of firm <i>f</i> with bank <i>b</i> at year <i>y</i> .
Top5Bank <sub><i>b</i></sub>	Indicator variable equal to one for top five largest banks (in terms of total credit volume).

**Panel B. Loan level data**

EverEarmark <sub><i>f</i>b</sub>	Indicator variable equal to one if firm <i>f</i> and bank <i>b</i> establish an earmarked credit relation at any point in the sample period.
EarmarkRel <sub><i>f</i>bt</sub>	Indicator variable equal to one the periods after firm <i>f</i> and bank <i>b</i> establish an earmarked credit relation.
BF Rel <sub><i>f</i>bt</sub>	Length of relationship duration (in years) of firm <i>f</i> with bank <i>b</i> at time <i>t</i> .
Interest rate spread <sub><i>f</i>bt</sub>	Interest rate spread corresponding to loan <i>l</i> of firm <i>f</i> with bank <i>b</i> at time <i>t</i> . Calculated as the difference between loan interest rate and treasury yield for the same maturity.
Loan volume <sub><i>f</i>bt</sub>	Log amount of loan <i>l</i> of firm <i>f</i> with bank <i>b</i> at time <i>t</i> (in logs).
Loan provision rate <sub><i>f</i>bt</sub>	Provision rate of loan <i>l</i> of firm <i>f</i> with bank <i>b</i> at time <i>t</i> .
Loan maturity <sub><i>f</i>bt</sub>	Maturity (in months) of loan <i>l</i> of firm <i>f</i> with bank <i>b</i> at time <i>t</i> .
Loan collateral <sub><i>f</i>bt</sub>	Indicator variable equal to one if loan <i>l</i> of firm <i>f</i> with bank <i>b</i> at time <i>t</i> was collateralized.
Firm size <sub><i>f</i>t</sub>	Log number of workers of firm <i>f</i> at time <i>t</i> .

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**Table A2. Effect of earmarked relations on interest rate spreads of working capital loans by average size of firms**

	Panel A. Firms with avg size below median			Panel B. Firms with avg size above median		
	(1)	(2)	(3)	(4)	(5)	(6)
EarmarkRel <sub>f<sub>bt</sub></sub>	0.580*** (0.103)	0.418** (0.152)	-0.317 (0.537)	0.321** (0.130)	0.287** (0.128)	0.408* (0.219)
BF Rel <sub>f<sub>bt</sub></sub>	0.276*** (0.076)	-0.085 (0.525)	0.656*** (0.181)	0.125 (0.142)	-0.285 (0.230)	0.343* (0.173)
BF Rel <sub>f<sub>bt</sub></sub> *EverEarmark <sub>f<sub>b</sub></sub>			-0.516*** (0.120)			-0.509*** (0.069)
BF Rel <sub>f<sub>bt</sub></sub> *EarmarkRel <sub>f<sub>bt</sub></sub>			0.299** (0.146)			0.136*** (0.035)
Observations	151,151	91,362	2,304,817	247,125	174,284	1,600,592
R-squared	0.699	0.817	0.694	0.716	0.839	0.741
Sample	Recipient Firms	Recipient Firms	All Firms	Recipient Firms	Recipient Firms	All Firms
Firm FE						
Firm*Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank*Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm*Year FE	No	Yes	No	No	Yes	No

Notes: The table shows estimates of OLS regressions where the dependent variable corresponds to the interest spread of a working capital loan of firm *f* with bank *b* at time *t*. Columns 1 through 3 present the OLS estimates for the sample of firms with average size over time below the median size in the data. Columns 4 through 6 present the OLS estimates for firms with average size over time above the median size. EarmarkRel<sub>f<sub>bt</sub></sub> is an indicator variable that equals one for all consecutive periods after firm *f* receives its first earmarked loan from bank *b* at time *t*, and zero otherwise. BF Relation<sub>f<sub>bt</sub></sub> captures the length of the relationship duration of firm *f* with bank *b* and is measured in log number of years. Estimates of columns 1 and 2 are based on the sample of firms that at any point in time receive an earmarked loan. Estimates of column 3 use the full sample of firms. Regressions further control for the loan rating, loan volume, loan maturity and a dummy variable indicating if the loan was collateralized. Standard errors are clustered at the bank\*time level. All variable definitions are listed in Table A1 of the Appendix.

**Table A3. Effect of earmarked relations on interest rate spreads of vehicle financing loans**

	(1)	(2)	(3)	(4)	(5)
EverEarmark <sub>fb</sub>	-0.084 (0.090)				
EarmarkRel <sub>fbt</sub>	-0.078 (0.087)	-0.059 (0.079)	-0.059 (0.055)	-0.024 (0.093)	-0.178 (0.122)
BF Rel <sub>fbt</sub>	0.066*** (0.013)	0.044 (0.038)	0.005 (0.027)	-0.087** (0.031)	0.043 (0.038)
BF Rel <sub>fbt</sub> *EverEarmark <sub>fb</sub>					-0.029 (0.019)
BF Rel <sub>fbt</sub> *EarmarkRel <sub>fbt</sub>					0.047*** (0.010)
Observations	589,026	389,435	53,764	24,824	389,435
R-squared	0.651	0.732	0.682	0.817	0.732
Sample	All Firms	All Firms	Recipient Firms	Recipient Firms	All Firms
Firm FE	Yes				
Firm*Bank FE	No	Yes	Yes	Yes	Yes
Bank*Year FE	Yes	Yes	Yes	Yes	Yes
Firm*Year FE	No	No	No	Yes	No

Notes: The table shows estimates of OLS regressions where the dependent variable corresponds to the interest spread of a vehicle finance loan of firm  $f$  with bank  $b$  at time  $t$ . EverEarmark<sub>fb</sub> is an indicator variable that is equal to one for firms receiving an earmarked loan from bank  $b$  and zero otherwise. EarmarkRel<sub>fbt</sub> is an indicator variable that equals one for all consecutive periods after firm  $f$  receives its first earmarked loan from bank  $b$  at time  $t$ , and zero otherwise. BF Relation<sub>fbt</sub> captures the length of the relationship duration of firm  $f$  with bank  $b$  and is measured in log number of years. Estimates of columns 1, 2 and 5 are based on the full sample of firms. Estimates of columns 3 and 4 constrain the sample to firms that at any point in time receive an earmarked loan. Regressions further control for the loan rating, loan volume, loan maturity and a dummy variable indicating if the loan was collateralized. Standard errors are clustered at the bank\*time level. All variable definitions are listed in Table A1 of the Appendix.

**Table A4. Effect of earmarked relations on volume of working capital loans by average size of firms**

	Panel A. Firms with avg size below median			Panel B. Firms with avg size above median		
	(1)	(2)	(3)	(4)	(5)	(6)
EarmarkRel <sub>f<sub>bt</sub></sub>	0.041*** (0.003)	-0.003 (0.008)	0.082*** (0.019)	0.018 (0.016)	-0.025 (0.028)	0.059** (0.026)
BF Rel <sub>f<sub>bt</sub></sub>	-0.007 (0.007)	-0.027 (0.037)	-0.008** (0.004)	0.001 (0.002)	-0.019 (0.015)	-0.017*** (0.004)
BF Rel <sub>f<sub>bt</sub></sub> *EverEarmark <sub>f<sub>b</sub></sub>			0.018*** (0.001)			0.023*** (0.006)
BF Rel <sub>f<sub>bt</sub></sub> *EarmarkRel <sub>f<sub>bt</sub></sub>			-0.023*** (0.003)			-0.019*** (0.005)
Observations	151,151	91,362	2,304,817	247,125	174,284	1,600,592
R-squared	0.804	0.865	0.812	0.864	0.914	0.879
Sample	Recipient Firms	Recipient Firms	All Firms	Recipient Firms	Recipient Firms	All Firms
Firm FE						
Firm*Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank*Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm*Year FE	No	Yes	No	No	Yes	No

Notes: The table shows estimates of OLS regressions where the dependent variable corresponds to the log volume of a working capital loan of firm *f* with bank *b* at time *t*. Columns 1 through 3 present the OLS estimates for the sample of firms with average size over time below the median size in the data. Columns 4 through 6 present the OLS estimates for firms with average size over time above the median size. EarmarkRel<sub>f<sub>bt</sub></sub> is an indicator variable that equals one for all consecutive periods after firm *f* receives its first earmarked loan from bank *b* at time *t*, and zero otherwise. BF Relation<sub>f<sub>bt</sub></sub> captures the length of the relationship duration of firm *f* with bank *b* and is measured in log number of years. Estimates of columns 1 and 2 are based on the sample of firms that at any point in time receive an earmarked loan. Estimates of column 3 use the full sample of firms. Regressions further control for the loan rating, interest spread, loan maturity and a dummy variable indicating if the loan was collateralized. Standard errors are clustered at the bank\*time level. All variable definitions are listed in Table A1 of the Appendix.



**Table A5. Effect of earmarked relations on volume of vehicle financing loans**

	(1)	(2)	(3)	(4)	(5)
EverEarmark <sub>fb</sub>	0.036*** (0.012)				
EarmarkRel <sub>fbt</sub>	-0.038*** (0.009)	-0.029** (0.013)	-0.021** (0.010)	-0.053** (0.023)	-0.014 (0.012)
BF Rel <sub>fbt</sub>	0.007*** (0.002)	0.000 (0.004)	0.002 (0.006)	-0.006 (0.008)	0.001 (0.004)
BF Rel <sub>fbt</sub> *EverEarmark <sub>fb</sub>					-0.003 (0.005)
BF Rel <sub>fbt</sub> *EarmarkRel <sub>fbt</sub>					-0.002 (0.003)
Observations	589,026	389,435	53,764	24,824	389,435
R-squared	0.668	0.722	0.679	0.759	0.722
Sample	All Firms	All Firms	Recipient Firms	Recipient Firms	All Firms
Firm FE	Yes				
Firm*Bank FE	No	Yes	Yes	Yes	Yes
Bank*Year FE	Yes	Yes	Yes	Yes	Yes
Firm*Year FE	No	No	No	Yes	No

Notes: The table shows estimates of OLS regressions where the dependent variable corresponds to the log volume of a vehicle finance loan of firm *f* with bank *b* at time *t*. EverEarmark<sub>fb</sub> is an indicator variable that is equal to one for firms receiving an earmarked loan from bank *b* and zero otherwise. EarmarkRel<sub>fbt</sub> is an indicator variable that equals one for all consecutive periods after firm *f* receives its first earmarked loan from bank *b* at time *t*, and zero otherwise. BF Relation<sub>fbt</sub> captures the length of the relationship duration of firm *f* with bank *b* and is measured in log number of years. Estimates of columns 1, 2 and 5 are based on the full sample of firms. Estimates of columns 3 and 4 constrain the sample to firms that at any point in time receive an earmarked loan. Regressions further control for the loan rating, interest spread, loan maturity and a dummy variable indicating if the loan was collateralized. Standard errors are clustered at the bank\*time level. All variable definitions are listed in Table A1 of the Appendix.