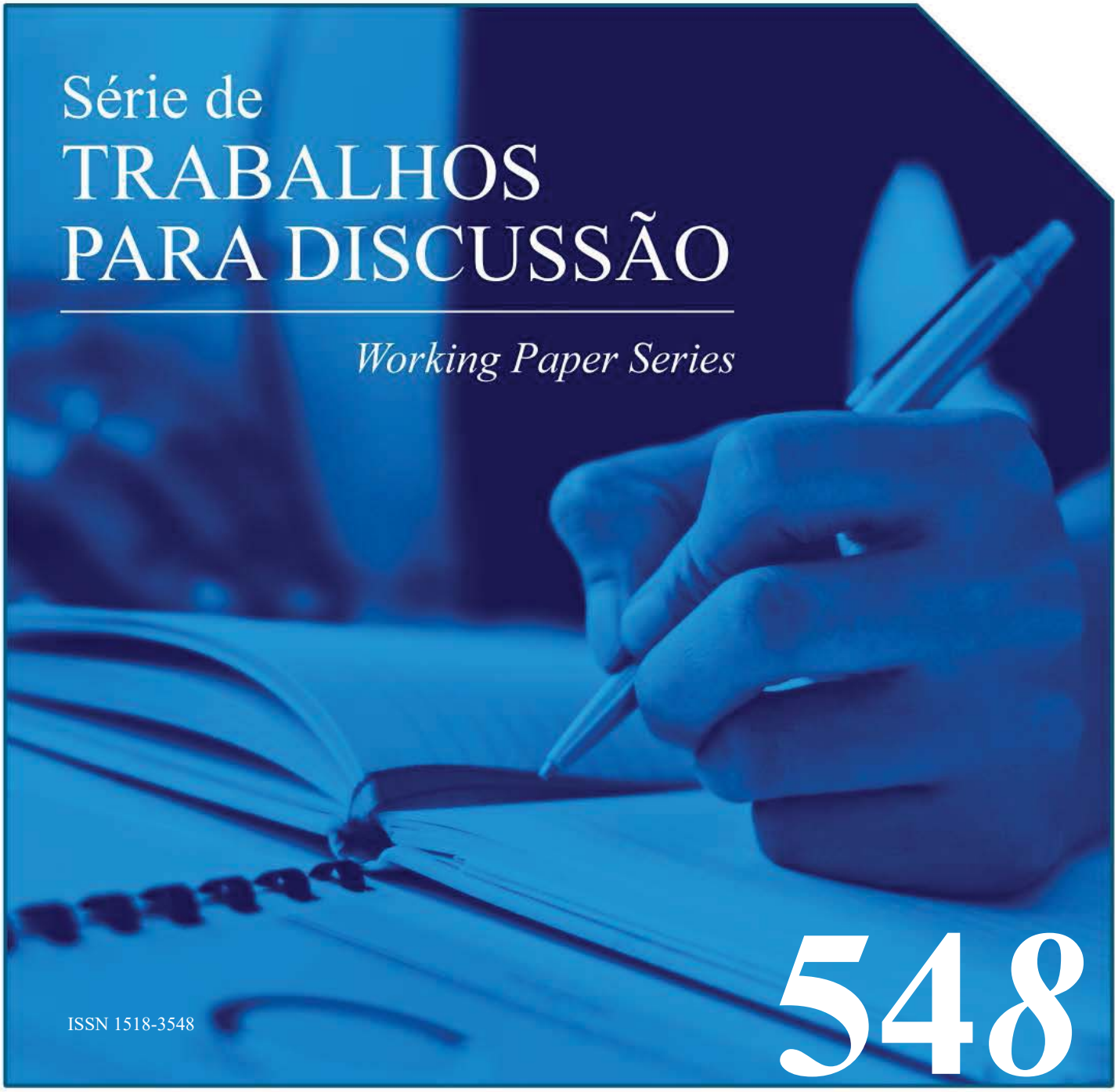

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Non-Technical Summary

In Brazil, private banks operate in two credit markets for firms: a competitive free market and an earmarked market characterized by government-funded loans at below-market interest rates.

The Brazilian subsidized credit framework was designed to stimulate investment and capital expenditures in strategic sectors. A large portion of the program funds are transferred from the Brazilian National Development Bank (BNDES) to private banks that then select loan recipients. These below-market interest rates government-sponsored loans, known as earmarked loans, complement "free market" credit. In this paper, we address the issues that arise when earmarked loans are channeled via private banks using loan-level data maintained by the Central Bank of Brazil from 2005 to 2016. We also examine cross-selling strategies that banks might be using when giving an earmarked loan to a firm.

When distributing earmarked loans, private banks tend to select larger firms and especially borrowers with an existing credit relationship. The incentives for banks seem to be straightforward. Banks servicing an earmarked loan bear part of its credit risk. Banks reduce these risks by selecting borrowers that are *ex-ante* less risky (larger customers and already established clients). We find that larger banks are more active in the program. In turn, firms with outstanding credit relationships with the largest banks have greater access to earmarked funds. It seems that the bank connection matters for whether a firm can access earmarked loans or not.

Furthermore, private banks appear to compensate for the limited expected revenue from earmarked loans by increasing their interest rates in other free-market loans for the same recipient firms that take earmarked loans. Our findings suggest that banks are willing to disburse earmarked loans at below-market interest rates to riskier borrowers, as long as they can adjust the interest rates of other credit products in the competitive credit market to these same firms (suggesting a type of cross-selling strategy).

Sumário não técnico

No Brasil, os bancos privados operam em dois mercados de crédito para firmas: um mercado com recursos livres e um mercado com recursos direcionados, caracterizado por empréstimos financiados pelo governo a taxas de juros abaixo das de mercado.

A estrutura de crédito subsidiado brasileiro foi projetada para estimular investimentos e despesas de capital em setores estratégicos. Grande parte desses recursos é transferida pelo Banco Nacional de Desenvolvimento Econômico e Social (BNDES) para bancos privados, que selecionam os beneficiários dos empréstimos. Esses empréstimos patrocinados pelo governo com taxas de juros abaixo do mercado, conhecidos como empréstimos direcionados, complementam o crédito com recursos livres. Neste artigo, abordam-se questões que surgem quando empréstimos direcionados são canalizados por meio de bancos privados usando dados de nível de empréstimo mantidos pelo Banco Central do Brasil (BCB) de 2005 a 2016. Também se examinam estratégias de vendas cruzadas que os bancos podem estar usando ao conceder um empréstimo destinado a uma empresa.

De acordo com os resultados do trabalho, ao distribuir empréstimos direcionados, os bancos privados tendem a selecionar empresas maiores e, especialmente, tomadores de empréstimo com uma relação de crédito já existente. Os bancos que concedem um empréstimo direcionado com recursos do BNDES assumem parte de seu risco de crédito. Os bancos reduzem esses riscos selecionando devedores que apresentam menor risco *ex-ante* (clientes maiores e clientes já estabelecidos). Os resultados sugerem que os bancos maiores são os mais ativos nesse tipo de operação. Por sua vez, as empresas com relações de crédito anteriores com os maiores bancos têm maior acesso aos recursos direcionados. Uma conexão anterior com o banco é importante para saber se uma empresa terá acesso a empréstimos direcionados ou não.

Além disso, os bancos privados parecem compensar a receita limitada esperada de empréstimos direcionados, aumentando suas taxas de juros em outros empréstimos com recursos livres para as mesmas empresas beneficiárias que tomam empréstimos direcionados. Os resultados sugerem que os bancos estão dispostos a desembolsar empréstimos direcionados a taxas de juros abaixo das de mercado para tomadores de empréstimo mais arriscados, desde que possam ajustar as taxas de juros de outros produtos de crédito no mercado de crédito livre para essas mesmas empresas, sugerindo uma estratégia de venda cruzada.

Credit Allocation When Private Banks Distribute Government Loans[⊗]

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The views expressed in this paper are those of the authors and do not necessarily reflect those of the Banco Central do Brasil.

Abstract

We study bank lending when private banks distribute subsidized loans. In Brazil, private banks operate in two credit markets: a competitive free market and an earmarked market characterized by government-funded loans at below-market interest rates. We find that banks are more likely to extend earmarked loans to larger firms and firms with existing relationships. We further document a novel cross-selling strategy whereby banks increase the price of free-market loans for riskier borrowers that obtain earmarked credit.

JEL Classification: G21, H81, E43
Keywords: bank lending, government credit programs, credit risk, cross-selling strategies

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[ℑ] The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent.

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 inherent to the public sector (Claessens et al. 2008).[1] Alternatives to direct government lending include interventions that use public funds but rely on private banks to allocate credit.[2] Although such settings reduce distortions from politically motivated credit, they introduce principal-agent considerations from the objectives of private lenders; namely, that a bank (the agent) would not fund projects with high social returns if its own private benefit were small. For instance, if interest rates of government loans are fixed and set below market rates, banks will ration credit away from riskier borrowers (Stiglitz and Weiss 1981). However, it is well-established that banks derive multiple benefits from their lending relationships, such as enhanced sales in other products (Petersen and Rajan 1994; Kanatas and Qi 2003; Bharath et al. 2007). In turn, when the contracted interest rate of a government loan does not compensate the lender for its risk taking, the bank might spread lending costs by adjusting the price of other products to the same borrower to generate additional revenue. Despite the ubiquity of government-driven credit around the world, little is known about its effect on the strategies of private lenders.

In this paper, we study credit allocation strategies when private banks distribute loans financed with public funds. Concretely, we analyze the characteristics of firms that access government loans and examine whether banks adjust their pricing in other lending products. We document a novel cross-selling strategy whereby banks "bundle" government-sponsored loans with privately funded short-term credit, a strategy that is more pronounced for riskier firms. Moreover, we show that banks issue government loans to risky firms but increase the interest rate in subsequent working capital loans of these same borrowers.

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[1] For example, the political view of public banking assumes politicians have career concerns that conflict with social objectives (Sapienza 2004; Dinc 2005; Khwaja and Mian 2005; Dinc and Gupta 2011; Carvalho 2014).

[2] One example comes from the recent COVID-19 crisis, where governments moved swiftly to provide liquidity to small businesses. In the United States, through the CARES Act Paycheck Protection Program, the government established a 350 billion USD fund of partially forgivable loans. Private banks intermediate the financial assistance application process, screening, disbursement, and loan servicing. Developing countries have also introduced or strengthened similar credit programs that leverage the private financial sector to provide funds to many small and medium-sized enterprises (IMF 2020).

Our analysis is based on *Earmarked Credit* in Brazil, a government-sponsored framework designed to stimulate investment and capital expenditures in strategic sectors (detailed in Section 2). Importantly, a large portion of the funds for earmarked credit are transferred from the Brazilian National Development Bank (BNDES) to private banks that then select loan recipients. Earmarked loans complement the usual free market for commercial credit (credit that is not earmarked), with regulated interest rates set below the average market rate.[3] Starting in 2008, in order to mitigate the negative effects from the global financial crisis and to alleviate credit constraints among micro, small, and medium-sized firms, the Brazilian government substantially expanded the program.

We use administrative loan-level data from the Central Bank of Brazil (BCB) credit registry, which includes the universe of (free-market) working capital loans issued to firms by 136 private banks between 2005 and 2016. Financing of working capital accounts for 44% of the total outstanding volume of private credit to businesses in the free market. We further augment our data by including information (e.g., originating bank, date, and credit type) on all earmarked loans received during the period for each firm in the sample. In all, this unique data set allows us to analyze how banks allocate earmarked loans across firms and how the government program may impact credit terms on their new free-market loans.

We first investigate the characteristics of firms selected to receive earmarked loans. We refer to these borrowers as "recipient" firms, which account for 6% of the firms in our sample. Interestingly, firms that access earmarked credit tend to receive multiple and frequent earmarked loans from the same bank. The median time between consecutive earmarked loans is nine months; in 92% of cases, a firm obtains subsequent earmarked credit from the same lender. We show that banks systematically allocate earmarked loans to firms with an existing relationship; 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-loan recipients. Importantly, after conditioning on firm size and duration of firm-bank relationship, we do not find differences

[3]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.

between measures of ex ante risk among recipients and nonrecipient firms.[4] In other words, a large risky firm has the same likelihood of obtaining earmarked credit relative to a low-risk firm of similar size. The key difference between these two groups is that high-risk firms are more likely to receive earmarked loans bundled with free-market working capital loans from the inside bank.

Our central finding is that high-risk firms experience an increase of 60 basis points (bps) in the interest rate of working capital loans disbursed together or after the earmarked loan with the inside bank. The increase is calculated relative to other working capital loans issued by the inside bank and for loans obtained by the firm prior to the allocation of earmarked credit. Furthermore, a firm that obtains working capital loans from multiple banks during the same year pays an additional 35 bps with the inside bank relative to outside banks after an earmarked loan is issued.

Identifying the impact of new earmarked credit relations on the cost of free-market loans has multiple challenges. For example, firms that apply for and receive earmarked loans are likely to differ from nonrecipient firms. Among recipients, the willingness to obtain loans in bundles might be a signal of project riskiness. To address these concerns, we proceed as follows. 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 in 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 relationship. In some specifications, we also include firm-year fixed effects. By doing so, we examine the variation on the interest rates of all working capital loans of the same firm in the same year that originated from different banks. Our identification comes from comparing the interest rates of loans from banks with whom the firm has an earmarked credit relationship to 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 this loan. Consistently, our impact estimates remain similar throughout our different specifications.

[4] We measure firms' ex ante risk in two ways: (1) the average credit rating of past loans and (2) the average ex ante loan rates (Morais et al. 2019).

The documented increase in the interest rate of working capital loans is exclusive to the inside bank and is not driven by local economic conditions or by changes within the firm. Moreover, the increase in the cost of credit does not precede changes in the volume of working capital loans acquired by the firm from the inside bank.[5] We also rule out information frictions between the inside and outside banks. For example, in Brazil, information sharing through the credit registry helps banks distinguish loan applicants with earmarked loans; hence, it is expected that outside banks will internalize this information and price new free-market loans accordingly.

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 bundling of an earmarked loan at a fixed (and low) interest rate with a non-earmarked loan at a higher rate guarantees that the bank is compensated for its risk taking. This is especially true concerning firms for 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 no 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 specific credit products are less likely to allocate earmarked credit since they 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.

An alternative explanation to our results is that high-risk firms in general demand more bank financing. While this mechanism would explain why riskier firms are more likely to bundle loans and pay higher interest rates on their loans, it does not explain why—among all banks—only the inside bank increases the interest rates of working capital loans after issuing the earmarked loan. To further validate the interpretation of our findings, we obtained data on the universe of vehicle-financing loans issued by private banks in Brazil. While working capital loans are almost exclusively accessed in the free market, firms obtain vehicle financing through

[5] In fact, the evidence seems to suggest that some firms even increase their working capital borrowing with the inside bank.

both free-market and earmarked loans.[6] As a result, banks are less able to adjust interest rates in this lending product since firms can substitute costly free-market vehicle loans with low-cost earmarked ones.

Using this credit modality as a placebo test, we find that riskier firms are more likely to bundle earmarked credit with working capital loans but not with free-market vehicle loans. Furthermore, we confirm that the interest rate of free-market vehicle loans by the inside bank does not change after a borrower receives an earmarked loan. These tests provide evidence that cross-selling strategies occur with products where banks have greater flexibility to adjust prices.

Our paper first 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). These earlier studies explored the aggregate effects of government credit, but more recent work relies on firm- and loan-level data from government-owned banks to evaluate real effects (Carvalho 2014; Ru 2017). An important yet overlooked question regards the role private banks play as intermediaries of government loans. In Brazil, private commercial banks disburse up to 40% of government-sponsored loans. While we do not focus on real effects, we use detailed loan-level data to provide comprehensive analysis on the allocation and pricing strategies of private banks with government loans in their portfolio. Our evidence that banks engage in cross-selling strategies suggests that the design of the government program should consider the incentives of private lenders. For example, banks might also prioritize larger firms due to the potential added sales in nonlending products (e.g., investment banking services, deposit-related products, etc.). Whether an excessive focus on large firms is a desirable outcome depends on the policy objectives, but such behavior might arise naturally as banks react by spreading the cost of lending over multiple products.

Our work also relates to extensive research in finance that studies the nature of lending relationships. Bharath et al. (2007) examine the impact of a lending relationship on the ability

[6] As we explain in Section 2, government-sponsored loans target fixed investments including vehicle financing. In contrast, due to government directives, the presence of earmarked lending in working capital is almost negligible.

to win future loan business.[7] Ioannidou and Ongena (2010) find a dynamic pattern of bank loan conditions consistent with the idea that banks first offer loans at low interest rates to attract new clients and later increase their prices. Although our paper also examines intertemporal pricing strategies of banks, we contribute to this literature by studying how these strategies connect across products. Our results suggest that for a specific borrower, banks seem to price credit products jointly rather than as several stand-alone products. In the Brazilian setting, such flexibility allows banks to reach riskier clients that would otherwise be excluded from receiving earmarked credit with capped interest rates.

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 examines the cross-selling strategies adopted by banks. Section 6 concludes.

1. Institutional Background

High government-driven lending characterizes Brazil's credit market. The interventions include a complex web of price and quantity regulations, reserve requirements, tax exemptions, and forced savings schemes to target lending to specific projects. Lending directed by these 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, this surge was a policy response to the global financial crisis in order to alleviate credit constraints and promote access to credit among individuals and micro, small, and medium-sized 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.[8] In line with government directives, among earmarked loans issued between 2005 and 2016, 88% of the contracts financed firms' fixed-asset purchases such as new machinery. In contrast,

[7] Drucker and Puri (2005), Yasuda (2005), and Ljungqvit et al. (2006) report that prior lending relationships are associated with a higher probability of winning future investment banking business, especially for debt underwriting.

[8] Earmarked credit to households mostly targets real estate financing.

working capital loans dominated non-earmarked credit in the same period, representing 44% of the non-earmarked outstanding credit market.

Earmarked credit for large firms is usually granted directly by BNDES. For medium-sized and smaller firms, earmarked credit is mostly indirectly allocated through other financial institutions. By 2016, nearly 40% of the outstanding indirect earmarked loans to firms were originated by private banks. These institutions screen, select loan recipients, and bear the credit risk. Although funding comes from government sources at rates below the interbank market, private banks can add an interest rate spread to cope with credit losses. The interest rates of these loans are strongly regulated and substantially lower than those of free-market loans. Moreover, interest rates of earmarked loans are always set below the monetary policy rate, the SELIC rate, and in some cases below inflation rates (see Appendix Figure A1).

The government funds earmarked credit via multiple sources, including 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.[9] Figure 2 presents the average share of earmarked credit received by firms according to the funding source. Starting in the second half of 2008, the share of earmarked loans funded via BNDES increased significantly. In that year, the government launched the Investment Support Program (PSI). Operated by BNDES, the government provided subsidies to reimburse banks for earmarked loans. 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.

2. Data

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

The first data set comprises all working capital and vehicle financing loans above a 5,000 *reais* threshold (approximately 2,200 USD using the average exchange rate during the

[9] BNDES also has direct credit lines with borrowers. These, however, are targeted for the largest corporations in the country.

sample) that were 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.[10] The data set also reports information about the borrower, including its industry, location, number of workers, and the number of years with a relationship with the bank. The advantage of studying these two products is twofold. First, they 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 (including vehicles), working capital only accounts for a minor share of earmarked loans (only 0.3%). In other words, firms might substitute free-market loans for earmarked loans to purchase vehicles, but working capital financing is almost exclusively accessed through the free market.

Our second data set 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% of the firms that obtain their first earmarked credit and receive consecutive earmarked loans will use the same bank. Second, firms that receive earmarked loans obtain these loans on a frequent basis. The median time between consecutive earmarked loans in the data is nine months. Based on these patterns, we create an indicator variable, *EarmakRel*, that records when an earmarked credit relationship starts between a firm-bank pair. To guarantee that our data capture the time at which a firm-bank pair enters an earmarked credit relationship, we drop from the sample 2.5 million loans that belong to firm-bank pairs that started their credit relationship before the beginning of our sample period. Doing so allows us to focus on firm-bank relationships that start and evolve throughout our sample period, some of which also begin with an earmarked loan. 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 to increase over time, more rapidly among medium-sized and large firms (Figure 3).

[10] 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 all ratings below E, which account for less than 1% of the observations and are loans associated with evergreening processes.

Our final data set contains 4.7 million working capital and vehicle financing loans of 1.2 million firms issued by 136 private commercial banks. Of these firms, approximately 74 thousand receive at least one earmarked loan.

Panels A and B of Table 1 present summary statistics for the loan-level data.[11] The average annual interest rate spread is 33.9 percentage points (p.p.) for working capital loans and 9.5 p.p. for vehicle financing. We calculate interest rate spreads as the difference between the loan interest rate and the Treasury yield for the same maturity. The median size of working capital loans is 25,125 reais (~11,068 USD) with average maturity of 16.5 months. For vehicle financing, the median loan amount is higher (30,895 reais or 13,610 USD) with a maturity of 34.1 months. The lower spreads on vehicle financing loans relate partly to the presence of collateral: 89% of vehicle financing loans have collateral and 77% of working capital loans have collateral. Similarly, the average provision rate of vehicle financing loans is approximately half the provision rate of working capital credits (0.67% vs 1.22%). In our loan sample, 5% (4%) of the working capital (vehicle financing) loans were disbursed after a firm-bank pair started an earmarked relationship.

3. Allocation of Earmarked Loans

We first study how banks select recipients of earmarked loans. The exercise relates the probability that a firm starts an earmarked relationship with a bank to characteristics of each borrower.

Aggregate trends in the data suggest that larger firms receive a disproportional share of earmarked credit. As Figure 4 shows, medium-sized 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 credit program started in the end of 2008. Starting in 2009, the gap in the share of earmarked credit between medium-sized and micro enterprises rapidly widened, even during post-crisis years. By the end of 2016, earmarked loans represented on average 13% of all credit of medium-sized firms but less than 5% of credit among micro firms. The government program aimed at providing financing to credit-constrained firms.

[11] Table A1 in the Appendix lists definitions of all the variables.

Nonetheless, recipients of earmarked loans appear to be larger firms, which often have less constraints relative to smaller businesses.

A second key pattern in the data shows that while the earmarked credit program was available to all private commercial banks, the largest banks 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 in the country. The documented difference between borrowers across banks increased right after the earmarked credit program expansion. By the end of 2016, earmarked loans for clients of the top three banks accounted for more than a quarter of their total lending.

The more active engagement of larger banks in the earmarked credit program may suggest a mechanical effect in the allocation of earmarked credit, whereby larger firms disproportionately receive earmarked credit because they are more likely to be clients of top three banks. Alternatively, among all firms that apply to the program, banks may select larger applicants to receive earmarked loans. To disentangle more rigorously the different drivers of earmarked credit allocation, we collapse the loan-level data at the firm-bank-year level (summary statistics in Table 1, panel C) and run OLS regressions to control for firm, bank, and time-specific factors not captured in the data patterns shown above. The standard errors are robust and clustered at the bank x year dimension. Our benchmark specification is as follows:

$$EarmarkRel_{fby} = \alpha + X_{fy} + Y_{by} + Z_{fby} + \gamma_y + \gamma_b + u_{fby} \quad (1)$$

In Equation (1), the dependent variable $EarmarkRel_{fby}$ corresponds to the likelihood that firm *f* starts an earmarked credit relationship with bank *b* at year *y*. The variable is set to one the year when *f* received its first earmarked loan from *b* and for all years thereafter. It is equal to zero otherwise. X_{fy} consists of time-varying characteristics of firms and includes firm size (measured by the log of the number of workers) and age (measured in logs). Y_{by} corresponds to $Top3Bank_{by,}$ a time-varying indicator variable that equals one if bank *b* is one of the three largest private banks[12] in Brazil in terms of total credit volume at year *y*, and zero otherwise. Z_{fby} is a vector with two firm-bank pair characteristics that vary over time. The first one is $BF\ Relation_{fby}$, which measures the number of years of the relationship between bank *b* and firm *f*. The second one, $BF\ Provisions_{fby}$, corresponds to the average fraction of credit to firm *f*

[12] During our sample, we had always two public banks among the top 5 overall (i.e., public plus private) banks, so that we may also interpret this variable as a private bank being in the top 5 overall banks.

provisioned by bank *b* prior to 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. We further include an interaction term of the size of the firm with the length of its relationship duration with different banks. This interaction term examines whether the effect of firm size on the likelihood of beginning an earmarked relationship with a bank is different depending on the firm-bank relationship. We also interact $Top3Bank_{by}$ with the size of the firm, the length of duration of the firm-bank relationship, and the credit risk. These interactions evaluate whether large banks follow different strategies when allocating earmarked loans. Our benchmark specification includes year (γ_y) and bank (γ_b) fixed effects. The inclusion of bank fixed effects allows us to analyze the allocation of earmarked credit by the same bank to different firms over time. Year fixed effects control for aggregate changes in the earmarked program, such as changes in BNDES funds.

Table 2 displays the results of Equation (1). We find that larger firms are more likely to obtain earmarked credit. The inclusion of bank fixed effects in column 1 rules out a compositional mechanism by which larger banks give more earmarked loans to their borrowers that happen to be larger firms. A 1% increase in the number of workers of a firm is associated with an increase of 2.6% in the likelihood of receiving an earmarked loan. Older borrowers are also more likely to receive earmarked credit, with a 1% increase in the firm's age related to a 0.4% increase in the likelihood of starting an earmarked relationship. Banks are also more likely to distribute earmarked loans to firms with an existing credit relationship. In particular, for every additional year that a firm has been a client of a bank, its probability of starting an earmarked relationship increases by 2.5%.

In columns 2 and 3, 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 relationship with its bank increases by 2.6% for every percentage increase in the size of the firm, and by 2.7% for every additional month of relationship with the bank. Thus, larger firms are more likely to access earmarked loans because banks select larger applicants. When including the interaction term of the size of the firm with the length of the bank-firm relationship (column 3), we find that the effect of firm size on the likelihood of receiving an earmarked loan from a bank increases with the relationship of the firm-bank pair. That is, the likelihood of receiving an earmarked loan from

a bank is not only higher for larger firms, but for larger firms with longer relationships with the bank.

In column 4, we include firm-year fixed effects to analyze earmarked loans to the same firm from different banks in the same year. Patterns characterizing banks and earmarked recipients continue to emerge: (1) the likelihood of receiving an earmarked loan is higher for larger firms with longer bank relationships; and (2) the largest banks, those in the top three, are substantially more likely than other banks to select larger firms and firms with more established relationships to receive an earmarked loan.

A key finding is that after conditioning on firm size, age, and the duration of the relationship with a bank, we do not see evidence that the likelihood of earmarked credit relates to the credit risk that the bank attributes to the firm. Alternative measures of firms' ex ante risk confirm this finding. Notwithstanding the interest rate ceiling for earmarked loans, some risky firms (for which the bank normally requires higher provisions) appear to have access to the government lending program.

4. Cross-selling strategies

To identify the extent to which banks adjust their supply of free-market credit, we proceed as follows. We first examine whether banks bundle earmarked credit loans with free-market loans. We then investigate whether banks engage in other cross-selling strategies (beyond bundling) that allow them to compensate their low revenues from earmarked lending over time. To do this, we study the interest rates of new loans issued in the free market for a firm after it has established an earmarked relationship with a bank.

4.1. Loan bundles

We define credit bundles as combinations of free-market working capital loans and earmarked credit from a bank to a specific firm originated within a 60-day window.[13] Table 1, panel D reports that 50,239 firms that received working capital started an earmarked relationship during our sample period. Among these, 26% received their first earmarked loan together with a working capital loan from the inside bank.

[13] We use alternative time windows to define a loan bundle (i.e., 15 and 30 days) and find that the results do not change with these definitions.

Importantly, there seems to be a systematic difference between credit bundles of high- and low-risk firms. Among high-risk firms (i.e., firms above the median provision rate) that begin an earmarked relationship with a bank, 29.3% bundle their earmarked loan with a working capital loan. This share is lower among low-risk firms (below the median average provision rate), with 22.7% of them bundling loans. In other words, high-risk firms are 29% more likely to bundle their earmarked loans than are low-risk firms.

We now investigate more rigorously if firms with higher ex ante risk are more likely to engage in this form of cross-selling when they receive their first earmarked loan. To do so, we restrict the sample of working capital loans to the years in which firm-bank pairs started an earmarked relationship. We then compare the likelihood that a firm-bank pair bundles the new earmarked loan with a working capital credit using the following specification:

$$Bundle_{fby} = \alpha + X_f + Z_{fb} + \gamma_b + u_{fb} \quad (2)$$

In Equation (2), the dependent variable $Bundle_{fby}$ is an indicator variable that equals one if firm *f* bundled its first earmarked credit with a working capital loan from bank *b* and zero otherwise. X_f consists of firm characteristics at the time of the first earmarked loan, including firm size and age, both measured in logs. Z_{fb} corresponds to characteristics of the firm-bank pair at the time of the earmarked loan. These characteristics include the number of years of the relationship between bank *b* and firm *f* and the share of credit to firm *f* provisioned by bank *b*. We further include an indicator of whether bank *b* was one of the largest five banks in Brazil at the time the first earmarked loan to firm *f* was granted. We saturate the specification with bank-level fixed effects γ_b. u_{fb} corresponds to the error term clustered at the bank level.

Panel A of Table 3 summarizes the results of Equation (2). Results in columns 1 and 2 show that larger firms with longer bank relationships are more likely to bundle their first earmarked loan with a loan for working capital. The likelihood of bundling increases with the average ex ante provisioning rate a bank assigns to a firm. That is, banks are more likely to bundle earmarked credit together with working capital loans to riskier firms. The coefficient of the indicator variable *Top 3 Bank* suggests this strategy is more common among larger banks. However, most of the outcomes predicting bundling are not robust to the inclusion of interaction terms that relate firm characteristics with whether the earmarked relationship was established with a top-three bank. The one robust result across all specifications is that—controlling for firm size and bank-firm relationship—ex ante riskier borrowers of large banks (i.e., firms with higher loan-loss provisions) are more likely to bundle an earmarked loan with

a loan for working capital. More precisely, an increase of 1% in the provision rate of a firm borrowing from a top-three bank increases the likelihood of obtaining an earmarked loan simultaneously with a working capital loan from the inside bank by 1.8%. We interpret this finding as evidence of product cross-selling, as banks might try to offset below-market revenues from earmarked loans to riskier borrowers.

In our supply-side interpretation, loan bundles offset low revenue from earmarked loans. As such, we should expect this bundling strategy to be more pronounced in products where banks have more flexibility to alter prices. Alternatively, a demand-side explanation is that riskier firms are simply more likely to bundle earmarked credit with other products. To test these competing hypotheses, we run Equation (2) using the sample of vehicle financing loans. Vehicle loans can serve as a placebo test as the free-market interest rates of this product are artificially pulled down by the earmarked rates, limiting the ability of banks to increase prices. The results of this placebo test are presented in Table 3, panel B. Overall, the results align with the supply-side hypothesis. Larger firms and firms with longer bank relationships bundle earmarked loans with vehicle financing loans more often. However, we do not find evidence that these bundling strategies are more pronounced among ex ante riskier borrowers.

4.2. Interest rates in the free market

We now investigate if banks adopt other types of cross-selling strategies over time when making earmarked loans to firms. To do this, we examine how interest rate spreads on new free-market loans of a firm-bank pair evolve after the pair begins an earmarked credit relationship. Although banks cannot adjust the pricing of earmarked loans, they can adjust the terms of privately funded credit. If the interest rate of an earmarked loan does not reflect a given firm's risk, banks may not lend to this firm in the first place. Alternatively, banks could offset the extra risk of providing an earmarked loan to a riskier firm by adjusting the price of other loans to the same 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 on working capital loans of top three 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. As top-three banks began to disburse earmarked loans more aggressively as a result of the program expansion, the spreads on their working capital loans also started to increase. Within a few months after the expansion of the earmarked credit program, working capital loans from top

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

We use loan-level data to study if inside banks adjust the pricing of other non-earmarked products after starting an earmarked credit relationship with a client. Loans for working capital are useful in studying non-earmarked credit products as they have negligible direct interference from government credit programs. Thus, we restrict our data to these. Equation (3) displays our benchmark specification.

$$y_{lfbt} = \alpha_0 + \alpha_1 EverEarmark_{fb} + \alpha_2 EarmarkRel_{fbt} + BF\ Rel_{fbt} + BF\ Rel_{fbt} * EverEarmark_{fb} + BF\ Rel_{fbt} * EarmarkRel_{fbt} + X_{lfbt} + u_{lfbt} \quad (3)$$

Equation (3) consists of an OLS regression that relates the interest rate spread *y* on each working capital loan *l* from a firm *f* with bank *b* at time *t* to the following variables. $EverEarmark_{fb}$ 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 rate 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, α_2 identifies the effect on the credit terms once firm *f* has started an earmarked relationship with bank *b* ($EarmarkRel_{fbt} = 1$). The next variable, $BF\ Rel_{fbt}$, 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 to the pricing strategy of banks. At the start of a relationship, banks compete more aggressively for clients by offering low interest rates; once a relationship has formed, they increase rates of locked-in firms (Ioannidou and Ongena 2010). However, this strategy is likely heterogeneous across borrowers, and potentially more pronounced for cases in which the inside bank enjoys a stronger informational advantage relative to outside lenders—for instance, with 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, $BF\ Rel_{fbt} * EverEarmark_{fb}$, 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, $BF\ Rel_{fbt} * EarmarkRel_{fbt}$, identifies how the length of the bank-firm relationship affects interest rates for recipient firms already in an active earmarked lending relationship 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_{lfbt}, 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. 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.

Table 4 summarizes the loan-level results of running Equation (3) on the interest rate spreads on 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 during the same year. Firms that were selected to receive earmarked credit ($EverEarmark_{fb}$=1), 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).[14] The coefficient of $EarmarkRel_{fbt}$ measures how much extra spread a recipient firm pays after the first earmarked loan compared to recipient firms that have not yet received an earmarked loan and nonrecipients. As substantially more firms never receive an earmarked credit, this coefficient ultimately measures 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

[14]This finding is also present in Ornelas et al. (2020), using a similar data set.

firms begin to receive earmarked loans, their working capital spreads are on average indistinguishable from those of firms that were never selected for earmarked loans.

Columns 2 and 3 further add firm-bank fixed effects to the specification. That is, we examine how interest rate spreads on working capital loans by the same bank with the same firm change after the firm-bank pair starts an earmarked credit relationship. In column 3, our preferred specification, we further restrict the sample to recipient firms. Doing this allows us to address concerns that recipient firms are different from nonrecipients in ways that might be difficult to fully control in the regressions.

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

In column 4 we continue to analyze the subsample of recipient firms and additionally saturate the specification with firm-year fixed effects. While these fixed effects restrict the analysis to firms that have multiple loans across banks in a given year, they help to isolate variation exclusively obtained from changes in interest rate spreads that the same firm obtains from different banks in the same year. Estimates from this specification confirm that the interest rate spreads paid by a firm with an active earmarked credit relationship with a bank are considerably higher than the spreads on working capital loans that the firm obtains from other banks in the same year.

Finally, in column 5 we analyze the entire sample of firms to study how interest rate spreads on working capital loans evolve as the relationship between a firm and its bank advances. We first examine if the length of the relationship of a firm-bank pair affects spreads differently for recipient firms (i.e., $EverEarmark_{fb} = 1$). We then analyze if the length of the relationship of a firm-bank pair changes once the firm-bank pair engages in an earmarked credit relationship. The coefficients of $BF\ Rel_{fbt}$ and $BF\ Rel_{fbt}*EverEarmark_{fb}$ suggest that over the length of the

firm-bank relationship, banks price working capital loans differently depending on whether or not firms receive earmarked credit. Nonrecipient firms experience an increase of 0.497 percentage points in their working capital loan spreads for every additional month of their firm-bank relationship. In contrast, recipient firms that have not yet started their earmarked credit relationship pay on average the same spreads on working capital loans independent of the duration of their bank relationship (i.e., the coefficient of $BF\ Rel_{fbt}*EverEarmark_{fb}$ cancels out the coefficient of $BF\ Rel_{fbt}$). These results show 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 $BF\ Rel_{fbt}*EarmarkRel_{fbt}$ shows that once the bank provides earmarked credit to a firm, the interest rate of working capital loans starts to increase as the relationship extends, 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 4 demonstrate that recipients of earmarked credit start to pay higher interest rate spreads on their working capital loans after they begin an earmarked credit relationship with a bank. Importantly, it is exclusively the inside bank—again, the bank that provides the earmarked loan—that increases the pricing of working capital loans to recipient firms.

We run two robustness checks to corroborate our findings. If banks adjust their prices in working capital loans to compensate for the risk of 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 relationships are concentrated among riskier clients. To evaluate this hypothesis, we estimate Equation (3) on two subsamples of firms classified by risk level. We calculate the average provision rates of all loans obtained by each firm prior to the first earmarked relationship. Based on the average provision rate, we classify firms as below and above the median. The below-median group on average comprises firms that are ex ante safer, as banks set lower provisions to their loans. The above-median group consists of firms whose loans are perceived as riskier by banks. Table 5 presents our results. The three columns of panel A display the estimates of Equation (3) 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 4. Consistently across the specifications, we find that the coefficient on $EarmarkRel_{fbt}$ 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 relationship with their banks. The increase in spreads ranges from 0.35 to 0.595 p.p. depending on the specification. In contrast, there is no clear pattern to spreads on working capital loans for safer firms that start an earmarked relationship 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. Appendix Table A2 presents results on the subsample of firms with average size below and above the median. While the pattern by firm size appears noisier, these estimates seem to confirm the evidence that smaller firms—those that are typically riskier—experience larger increases in the interest rate spread on working capital loans from the inside bank.

As a second robustness test, we run Equation (3) on the interest rate spreads on vehicle financing loans. A large share of earmarked loans is available for this credit modality, which suggests that banks may have less flexibility to extract higher rents in this product. Thus, we consider vehicle financing loans as a type of placebo test, where we do not expect the inside bank to alter the loan's interest rate spread to recipient firms. Appendix Table A3 presents results that confirm that banks do not increase spreads on these loans after they begin an earmarked credit relationship with a firm. In general, interest rate spreads on vehicle financing loans do not respond to whether a firm receives an earmarked loan, to the duration of a firm-bank relationship, or to the start of an earmarked credit relationship.

Finally, we use Equation (3) to analyze changes in the volume of working capital loans. The effect of starting an earmarked relationship on the volume of working capital loans is not obvious. On one hand, an increase in the price of working capital loans should prompt a contraction in the demand for these loans. On the other hand, the data reveal that once an earmarked credit relationship with a given bank starts, more than 90% of firms continue to receive an earmarked loan from that bank every year. Thus, firms may continue to borrow working capital funds from the same bank even at higher prices in order to maintain an earmarked credit relationship. Figure 8 depicts suggestive evidence for this: the time series of the average size of working capital and vehicle financing loans in our sample shows an increase in the size of working capital loans right after the earmarked credit expansion.

Table 6 presents the results of Equation (3) on the volume of working capital loans. There is a statistically significant increase in the volume of working capital loans obtained by a recipient firm after it is granted an earmarked loan (columns 1–5). Table 7 further examines

changes in loan volume of working capital in the subsample of riskier and safer firms, as defined by average loan provisions. The table follows the same format as Table 5. Again, we do not find evidence that riskier firms reduce their working capital loan amounts after they start an earmarked credit relationship with a given bank, even though these firms experience most of the increase in the cost of working capital loans (panel A). If we instead classify firms according to size, we again confirm the same findings, as Appendix Table A4 shows.[15]

To summarize, our evidence suggests that banks are more likely to bundle earmarked credit with working capital loans to riskier borrowers. In addition, banks increase the interest rate of new working capital loans to these same borrowers, potentially to offset the below-market revenue associated with the origination of earmarked products to risky clients. Conversely, we find that low-risk borrowers access earmarked loans with little to no associated cross-selling; namely, safer firms do not experience an increase in the interest rate of free-market loans issued concurrently with or after earmarked credit.

5. Conclusions

A common strategy used by governments to improve access to credit among small businesses and to alleviate negative effects from large financial shocks is to channel resources via private banks. The strategy is popular because it mitigates potential inefficiencies from direct lending by state-owned banks, such as political considerations often associated with credit misallocation. Also, in countries where private lenders dominate the credit market, the state might not have the infrastructure and capacity to reach most borrowers. In this paper, however, we establish that such reliance on private banks raises frictions concerning private benefits versus social objectives.

Using a rich loan-level data set from Brazil, we study how private banks allocate government-sponsored loans to businesses. We identify two related facts. First, although the program is mostly meant to promote investment in fixed assets among micro, small, and medium-sized enterprises, larger firms disproportionately benefit from these subsidies. Furthermore, access to the program is largely determined by the bank-firm relationship prior

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

to the program's expansion. That is, firms with existing credit relationships with the largest banks are more likely to receive earmarked funds.

Second, we document the prevalence of a cross-selling strategy whereby banks price-discriminate against riskier borrowers seeking free-market loans. It appears banks are willing to disburse earmarked loans at below-market interest rates to riskier borrowers as long as they can adjust rates for other credit products in the competitive market. This strategy guarantees banks are compensated for taking risk. 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 the cross-selling strategies documented here are likely to underestimate the total benefits to private banks. For instance, we only observe increases in the interest rate spread on working capital loans, but such pricing strategies may exist in other nonlending products. Future work in this area should evaluate those benefits, which might be sizable.

References

Ayyagari, M., Demirguc-Kunt, A. and Maksimovic, V., 2011. Small vs. young firms across the world: contribution to employment, job creation, and growth. The World Bank.

Bartik, A., Cullen, Z., Bertrand, M., Glaeser, E.L., Luca, M. and Stanton, C., 2020. How Are Small Businesses Adjusting to COVID-19? Early Evidence from a Survey. *(April 6, 2020). Harvard Business School NOM Unit Working Paper*, (20-102), pp.20-102.

Berger, A.N. and Udell, G.F., 1995. Relationship lending and lines of credit in small firm finance. *Journal of Business*, pp.351-381.

Bharath, S., Dahiya, S., Sauders, A., and Srinivasan, A. (2007). "So what do I get? The bank's view of lending relationships." *Journal of Financial Economics* 85 368-419.

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

Carvalho, C. & Martins, B. (2019). Cross-subsidy in credit markets: micro level evidence from directed lending in Brazil. *Mimeo*.

Carvalho, Daniel (2014). The real effects of government-owned bank: evidence from an emerging market. *Journal of Finance*, 69 (1) 577-609.

Claessens, S., Feijen, E., Laeven, L., (2008). Political connections and preferential access to finance: the role of campaign contributions. *Journal of Financial Economics*, 88(3), 554-580.

Degryse, H., & Ongena, S. (2005). Distance, lending relationships, and competition. *The Journal of Finance*, *60*(1), 231-266.

Degryse, H. and Ongena, S., 2008. Competition and regulation in the banking sector: A review of the empirical evidence on the sources of bank rents. *Handbook of financial intermediation and banking*, 2008, pp.483-554.

Demirgüç-Kunt, A. and Maksimovic, V., 1998. Law, finance, and firm growth. *the Journal of Finance*, *53*(6), pp.2107-2137.

Dinç, I.S., 2005. Politicians and banks: Political influences on government-owned banks in emerging markets. *Journal of financial economics*, *77*(2), pp.453-479.

Dinc, I.S. and Gupta, N., 2011. The decision to privatize: Finance and politics. *The Journal of Finance*, *66*(1), pp.241-269.

Drucker, S. and Puri, M., 2005. On the benefits of concurrent lending and underwriting. *Journal of Finance* 60, 2763-2799.

Haltiwanger, John, Ron S. Jarmin, and Javier Miranda, 2013. "Who creates jobs? Small versus large versus young." Review of Economics and Statistics 95.2: 347-361.

IMF, 2020. https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19

Ioannidou, V., & Ongena, S. (2010). "Time for a change": loan conditions and bank behavior when firms switch banks. *The Journal of Finance*, *65*(5), 1847-1877.

Kanatas, G., Qi, J., (2003). "Integration of lending and underwriting: implications of scope economy." *The Journal of Finance*, 58, 1167-1191.

King, R.G. and Levine, R., 1993. Finance and growth: Schumpeter might be right. *The quarterly journal of economics*, *108*(3), pp.717-737.

Khwaja, A.I. and Mian, A., 2005. Do lenders favor politically connected firms? Rent provision in an emerging financial market. *The Quarterly Journal of Economics*, *120*(4), pp.1371-1411.

Khwaja, A.I. and Mian, A., 2008. Tracing the impact of bank liquidity shocks: Evidence from an emerging market. *American Economic Review*, 98(4), pp.1413-42.

Ljungqvist, A., Marston, F., Wilhelm, W.J., 2006. Competing for securities underwriting mandates: banking relationship and analyst recommendations. *Journal of Finance* 61, 301-340.

Morais, B., Peydró, J.L., Roldán-Peña, J. and Ruiz-Ortega, C., 2019. The international bank lending channel of monetary policy rates and QE: Credit supply, reach-for-yield, and real effects. The Journal of Finance, 74(1), pp.55-90.

Ongena, S. and Smith, D.C., 2001. The duration of bank relationships. Journal of financial economics, 61(3), pp.449-475.

Ornelas, J.R.H., Silva, M. S. and van Doornik, B. F. N., 2020, Informational Switching Costs, Bank Competition and the Cost of Finance. Central Bank of Brazil Working Paper Series N. 512.

Pazarbasioglu, Ceyla; Byskov, Steen; Bonomo, Marco Antonio Cesar; Carneiro, Igor Andre; Martins, Bruno; Azevedo Hernandez Perez, Adriana. (2017). Brazil - Financial intermediation costs and credit allocation. Discussion paper for workshop. Washington, D.C. World Bank Group.

Petersen, M.A. and Rajan, R.G., 1994. The benefits of lending relationships: Evidence from small business data. *The journal of finance*, 49(1), pp.3-37.

Petersen, M.A. and Rajan, R.G., 1995. The effect of credit market competition on lending relationships. The Quarterly Journal of Economics, 110(2), pp.407-443.

Rajan, R.G., 1992. Insiders and outsiders: The choice between informed and arm's-length debt. *The Journal of finance*, 47(4), pp.1367-1400.

Rajan, R. and Zingales, L., 1998. Financial Dependence and Growth, American Economic Review. 88 (1998): 559-586

Ru, H., 2018. Government Credit, a Double-Edged Sword: Evidence from the China Development Bank. *The Journal of Finance*, 73(1), pp.275-316.

Sapienza, P., 2004. The effects of government ownership on bank lending. *Journal of financial economics*, *72*(2), pp.357-384.

Sharpe, S.A., 1990. Asymmetric information, bank lending, and implicit contracts: A stylized model of customer relationships. *The journal of finance*, 45(4), pp.1069-1087.

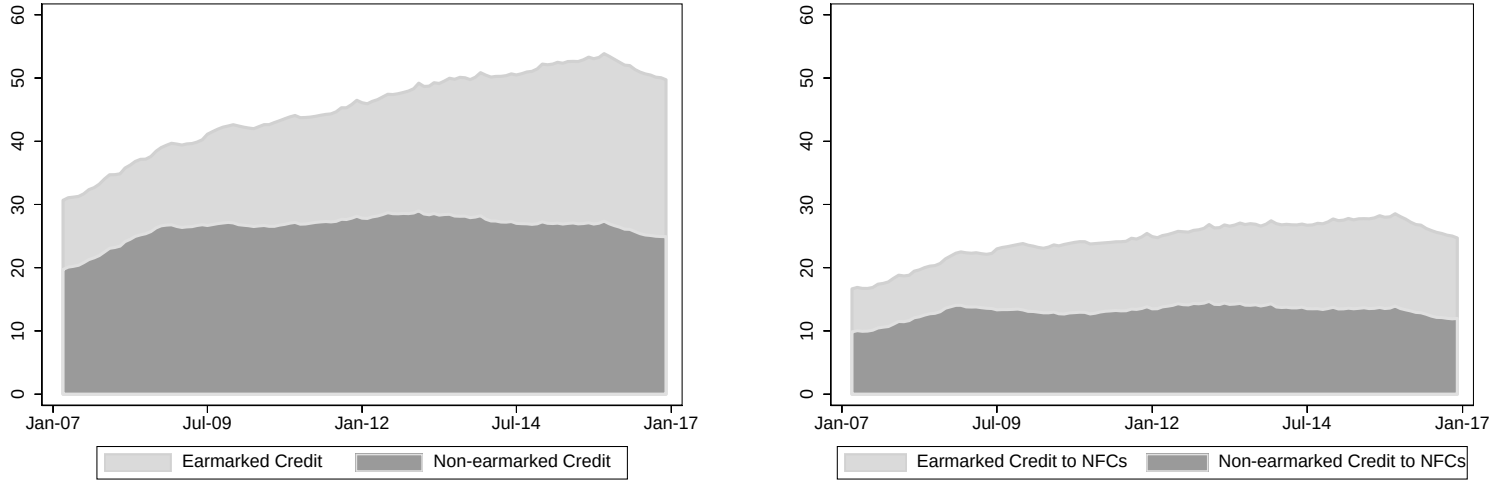
Stiglitz, J.E. and Weiss, A., 1981. Credit rationing in markets with imperfect information. *The American Economic Review*, 71(3), pp.393-410.

Von Thadden, E.L., 2004. Asymmetric information, bank lending and implicit contracts: the winner's curse. *Finance Research Letters*, 1(1), pp.11-23.

Yasuda, A., 2005. Do bank relationships affect the firm's underwriter choice in the corporate-bond underwriting market? *Journal of Finance* 60, 1259-1292.

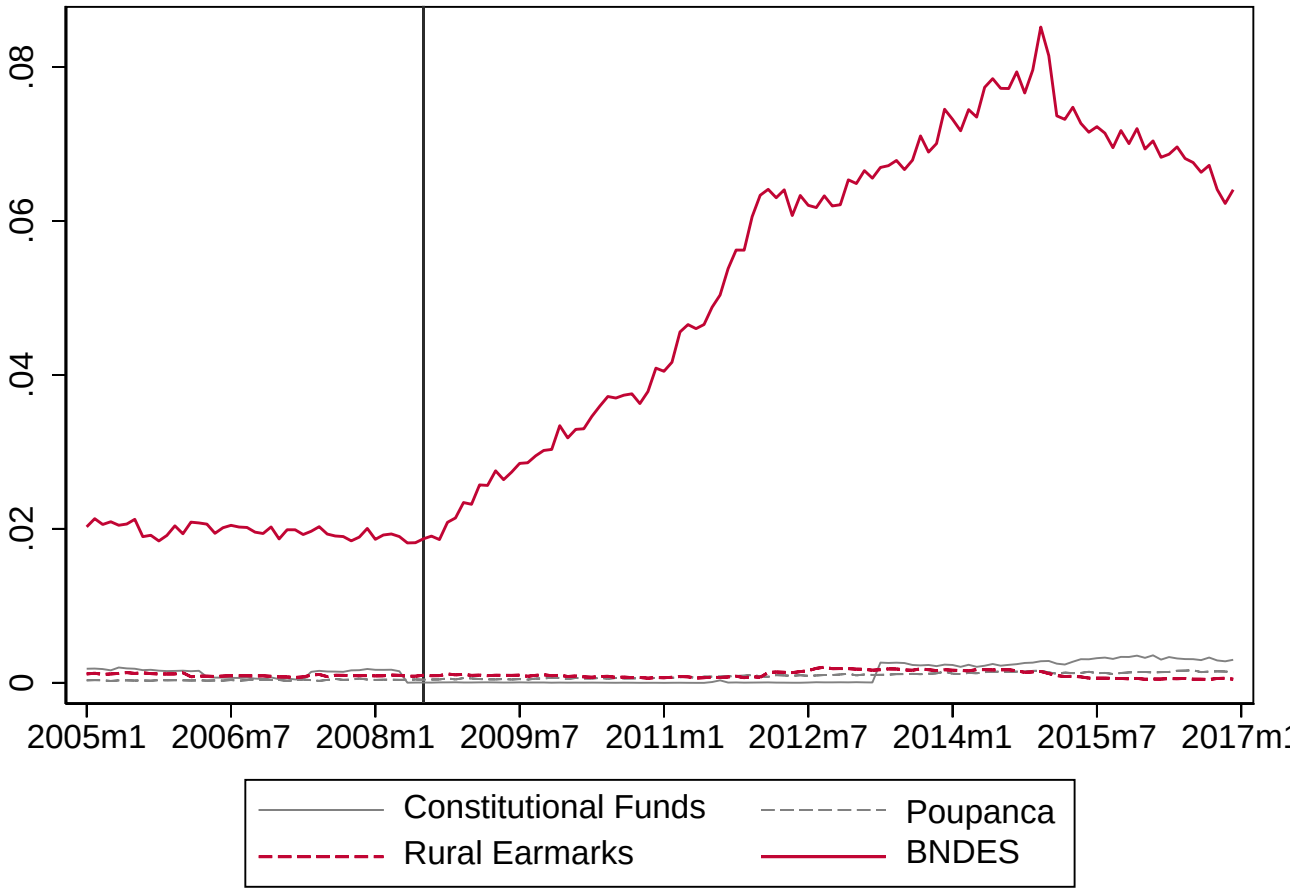
Figure 1. Earmarked and Non-Earmarked Credit as a Share of GDP

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



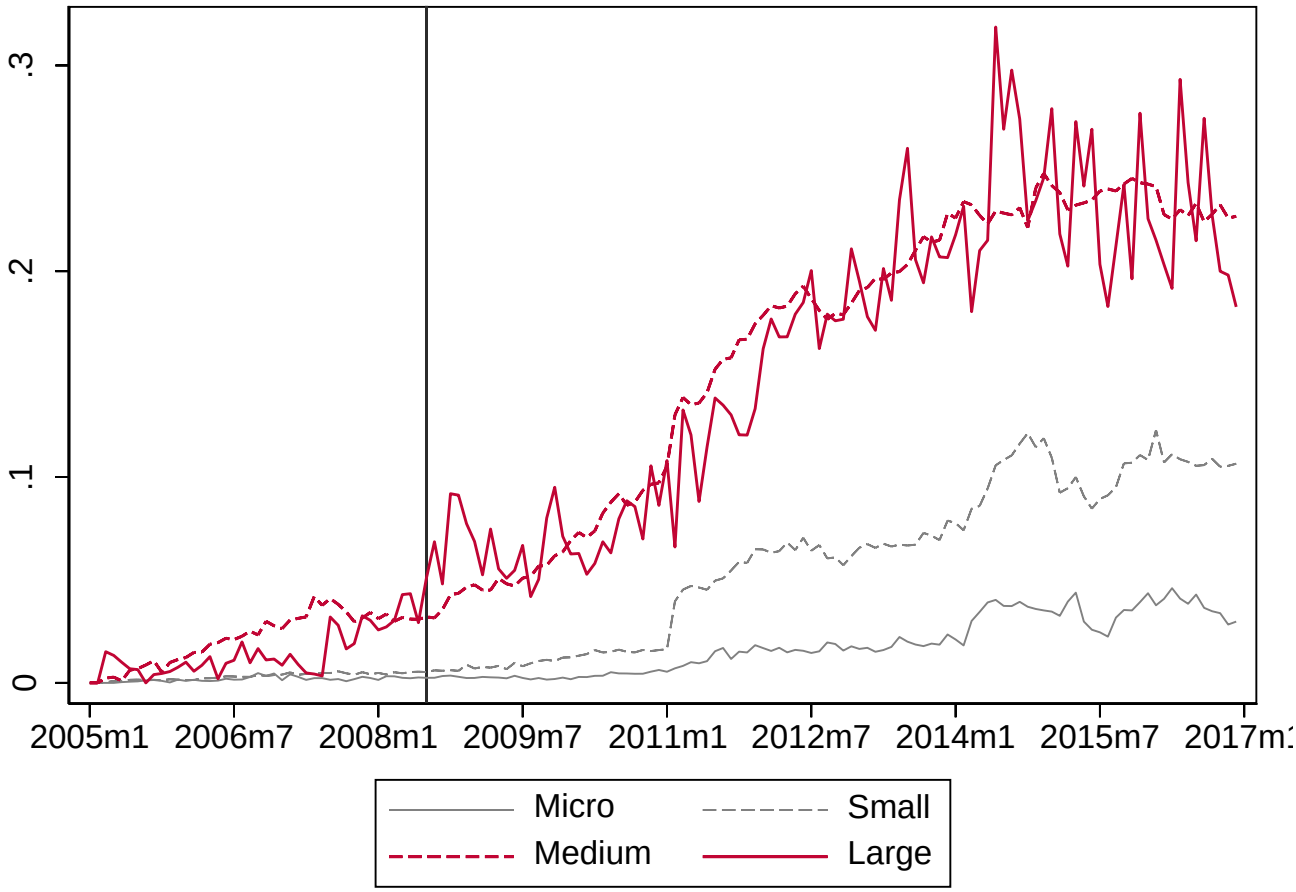
Notes: Data obtained from the Banco Central do Brasil for the period available (January 2007 to December 2016).

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



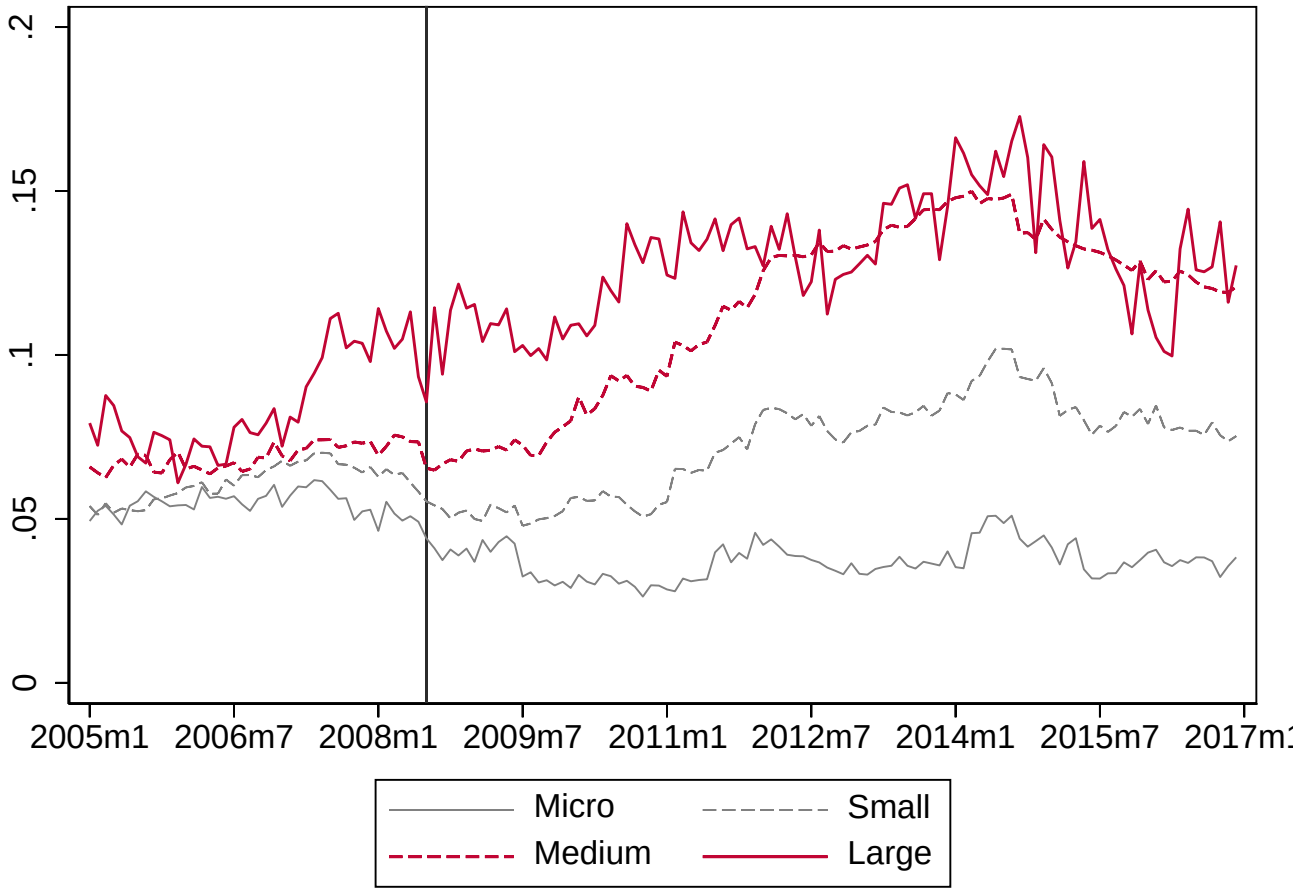
Notes: The share of earmarked credit of firms corresponds to the fraction of earmarked credit relative to total credit obtained by firms. The vertical line marks the date when the BNDES earmarked credit program began its expansion.

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



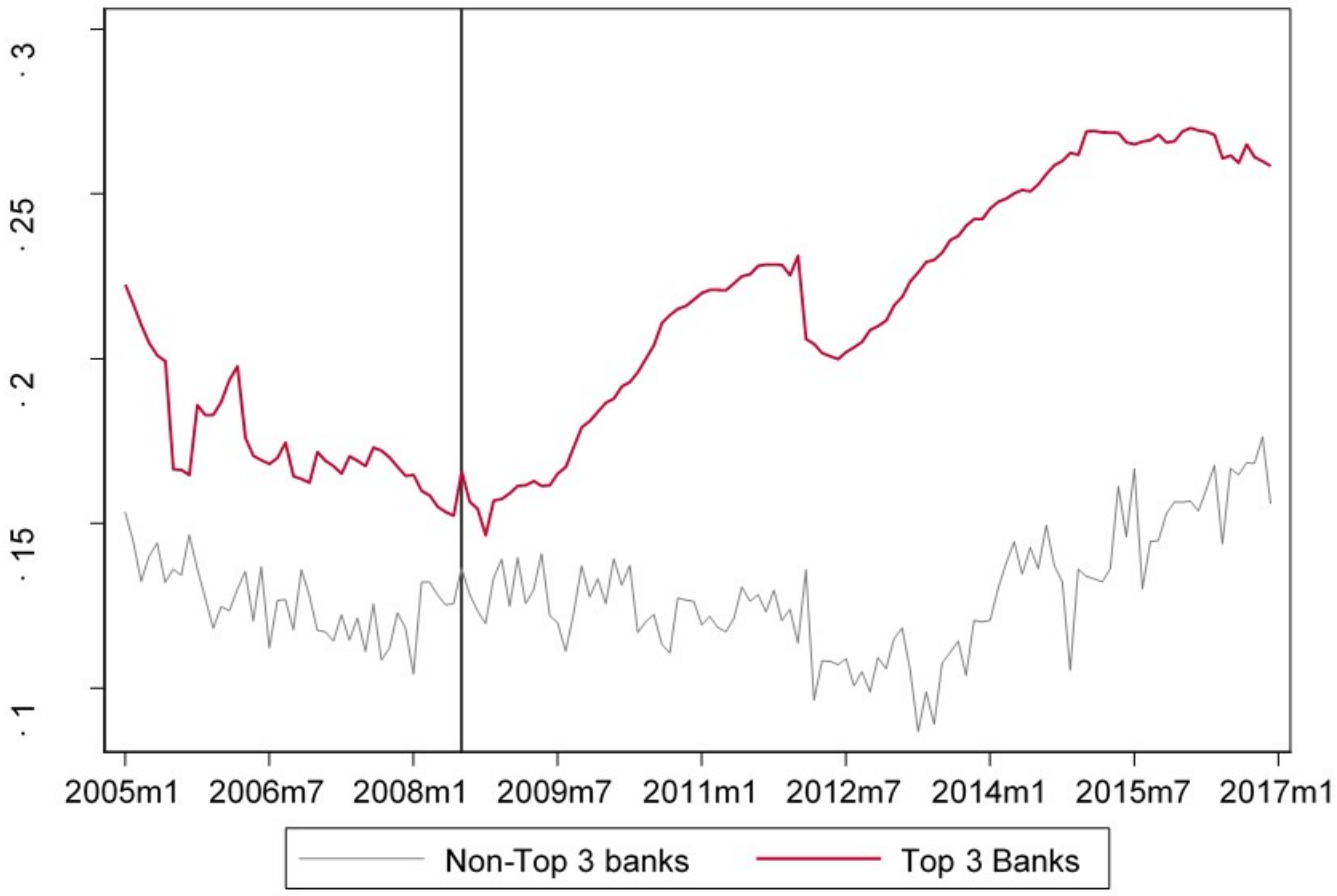
Notes: The vertical line marks the date when the BNDES earmarked credit program began its expansion. We follow the classification of firms by size used by IBGE. Under this classification, firms in the industry and construction sectors are considered micro if they employ fewer than 20 workers; small if they employ from 20 to 99 workers; medium-sized 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-sized if they employ from 50 to 99 workers; and large if they employ 100 workers or more.

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



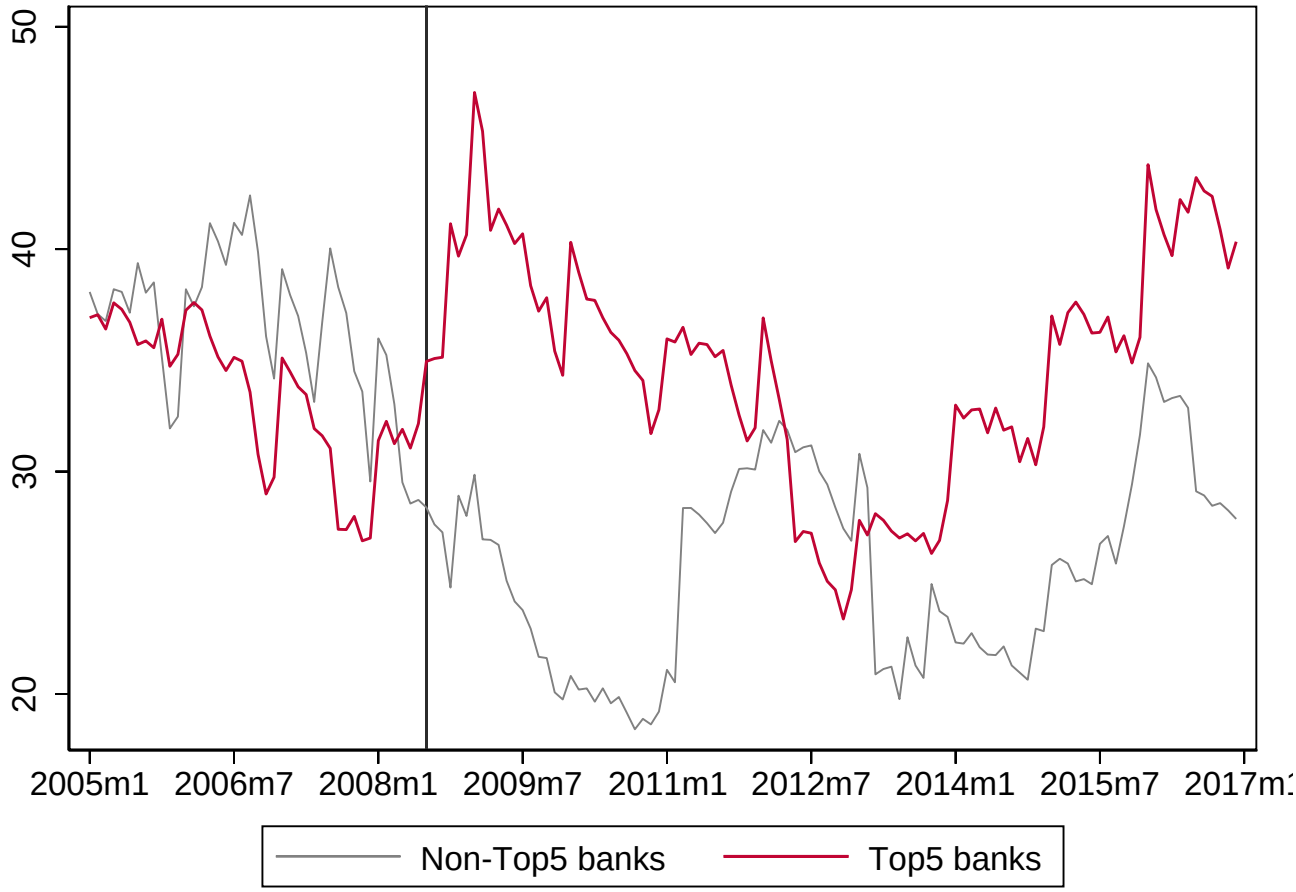
Notes: We follow the classification of firms by size used by IBGE. Under this classification, firms in the industry and construction sectors are considered micro if they employ fewer than 20 workers; small if they employ from 20 to 99 workers; medium-sized if they employ 100 to 499 workers; and large 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-sized if they employ from 50 to 99 workers; and large if they employ 100 workers or more. The vertical line marks the date when the BNDES earmarked credit program began its expansion.

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



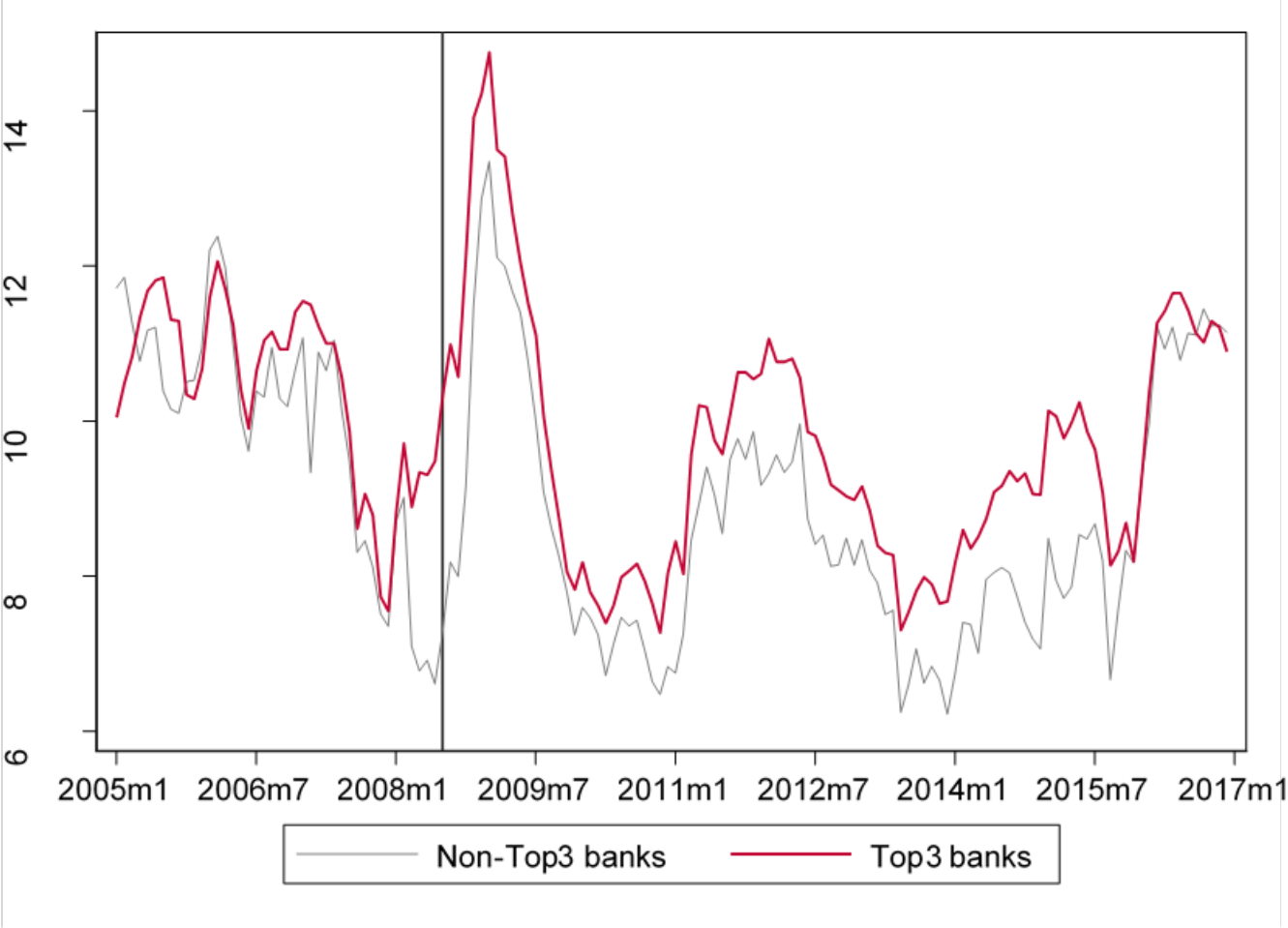
Notes: The vertical line marks the date when the BNDES earmarked credit program began its expansion.

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



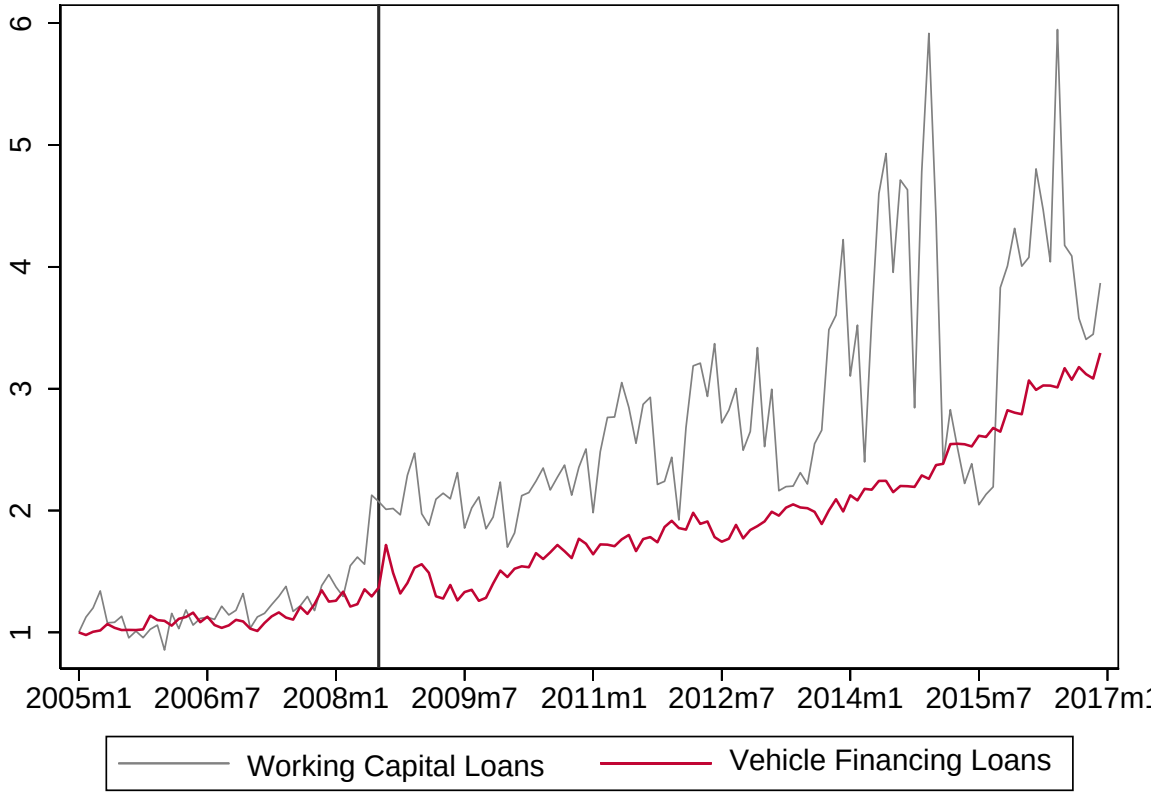
Notes: The vertical line marks the date when BNDES earmarked credit program began its expansion.

Figure 7. Average interest rate spread on vehicle financing loans, by size of bank



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

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



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

Table 1. Summary Statistics

	Mean	Median	Std Dev	# Obs
Panel A. Loan-level data – working capital loans				
EverEarmark$_{fb}$	0.09	0.00	0.29	4,120,577
EarmarkRel$_{fbt}$	0.05	0.00	0.23	4,120,577
BF Relation$_{fbt}$	1.91	1.04	2.21	4,120,577
Interest rate spread$_{lfbt}$	33.9	29.4	21.2	4,120,577
Loan volume (logs) $_{lfbt}$	10.3	10.1	1.35	4,120,577
Loan provision rate$_{lfbt}$	1.22	0.50	1.54	4,120,577
Loan maturity$_{lfbt}$	16.5	14.0	10.7	4,120,577
Loan collateral$_{lfbt}$	0.77	1.00	0.42	4,120,577
Firm size$_{ft}$	1.67	1.39	1.52	4,120,577
Panel B. Loan-level data – vehicle financing loans				
EverEarmark$_{fb}$	0.08	0.00	0.28	589,026
EarmarkRel$_{fbt}$	0.04	0.00	0.20	589,026
BF Rel$_{fbt}$	1.20	0.16	1.89	589,026
Interest rate spread$_{lfbt}$	9.50	8.87	4.61	589,026
Loan volume (logs)$_{lfbt}$	10.4	10.3	0.72	589,026
Loan provision rate$_{lfbt}$	0.67	0.50	0.84	589,026
Loan maturity$_{lfbt}$	34.1	37.0	13.5	589,026
Loan collateral$_{lfbt}$	0.89	1.00	0.31	589,026
Firm size$_{ft}$	1.71	1.61	1.46	589,026
Panel C. Bank-firm-year-level data				
EarmarkRel$_{fby}$	0.04	0.00	0.20	1,990,572
Firm size$_{fy}$ (logs)	1.71	1.61	1.46	1,990,572
BF Relation$_{fby}$	1.62	0.71	2.12	1,990,572
BF Provisions$_{fby}$	1.07	0.50	1.40	1,990,572
Top3Bank$_{b}$	0.83	1.00	0.37	1,990,572
Panel D. Bank-firm-level data (at the start of an earmarked relationship)				
Bundle$_{fb}$	0.26	0.00	0.44	50,239
Firm size$_{f}$ (logs)	2.28	2.08	1.62	50,239
BF Relation$_{fb}$	1.84	1.24	1.87	50,239
BF Provisions$_{fb}$	1.50	1.00	1.22	50,239
Top3Bank$_{b}$	0.95	1.00	0.23	50,239

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 Appendix Table A1.

Table 2. Determinants of earmarked credit relationship

	(1)	(2)	(3)	(4)
Firm size$_{fy}$	0.026***	0.026***	0.017***	
	(0.004)	(0.004)	(0.003)	
Firm age$_{fy}$	0.004**	0.002	0.004**	
	(0.001)	(0.001)	(0.002)	
BF Relation$_{fby}$	0.025***	0.027***	0.017***	0.004
	(0.008)	(0.009)	(0.005)	(0.004)
BF Provisions$_{fby}$	0.005	0.005	0.005	0.002
	(0.006)	(0.006)	(0.006)	(0.001)
Top3Bank$_{by}$	0.005*			
	(0.002)			
BF Relation$_{fby}$ * Firm size$_{fy}$			0.005**	0.003***
			(0.002)	(0.001)
Top3Bank$_{by}$ * Firm size$_{fy}$				0.029***
				(0.004)
Top3Bank$_{by}$ * BF Relation$_{fby}$				0.016***
				(0.003)
Top3Bank$_{by}$ * BF Provisions$_{fby}$				-0.002
				(0.002)
Top3Bank$_{by}$ * Firm size$_{fy}$ * BF Relation$_{fby}$				-0.001
				(0.002)
Observations	1,990,572	1,990,504	1,990,504	360,207
R-squared	0.115	0.121	0.125	0.607
Sample	All Firms	All Firms	All Firms	All Firms
Bank FE	Yes	-	-	-
Year FE	Yes	-	-	-
Bank-Year FE	No	Yes	Yes	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. Standard errors are clustered at the bank-year level and are shown in parentheses. Coefficients marked with ***, **, and * are significantly higher than zero at least at 1%, 5%, and 10%, respectively.

Table 3. Determinants of probability of bundling earmarked credit with other free-market loans

	Panel A. Bundling with working capital loans			Panel B. Bundling with vehicle financing loans		
	(1)	(2)	(3)	(1)	(2)	(3)
Firm size$_f$	0.007***	0.005***	-0.007	0.013***	0.012***	0.023**
	(0.002)	(0.001)	(0.007)	(0.003)	(0.004)	(0.010)
Firm age$_f$	-0.005	-0.004	-0.004	-0.005	-0.005	-0.005
	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)
BF Relation$_{fb}$	0.009***	0.007***	0.001	0.017***	0.015***	0.050***
	(0.003)	(0.002)	(0.015)	(0.002)	(0.003)	(0.008)
BF Provisions$_{fb}$	0.021***	0.021***	0.004	-0.010	-0.010	0.005
	(0.007)	(0.007)	(0.005)	(0.006)	(0.006)	(0.015)
Top3Bank$_{fb}$	0.057*	0.056*	-0.005	-0.003	-0.003	0.073**
	(0.029)	(0.030)	(0.062)	(0.008)	(0.008)	(0.032)
BF Relation$_{fb}$ * Firm size$_f$		0.001*	0.001		0.001	-0.005**
		(0.001)	(0.002)		(0.001)	(0.002)
Top3Bank$_{fb}$ * Firm size$_f$			0.012			-0.014
			(0.008)			(0.010)
Top3Bank$_{fb}$ * BF Relation$_{fb}$			0.006			-0.037***
			(0.015)			(0.007)
Top3Bank$_{fb}$ * BF Provisions$_{fb}$			0.018**			-0.018
			(0.009)			(0.015)
Top3Bank$_{fb}$ * Firm size$_f$ * BF Relation$_{fb}$			0.000			0.006**
			(0.002)			(0.002)
Observations	50,239	50,239	50,239	23,341	23,341	23,341
R-squared	0.055	0.055	0.055	0.050	0.050	0.052
Sample	All Firms	All Firms	All Firms	All Firms	All Firms	All Firms
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The table shows estimates of OLS regressions for the sample of firms with working capital loans (panel A) or vehicle financing credit (panel B) that have an earmarked relationship with a bank. Each observation corresponds to a firm-bank pair. The dependent variable corresponds to a dummy variable that equals one if bank b issued a working capital loan to firm f 60 days before or after the issuance of f's first earmarked loan with bank b, and zero otherwise. Firm size is measured by the log of number of workers. Standard errors are clustered at the bank level and are shown in parentheses. Coefficients marked with ***, **, and * are significantly higher than zero at least at 1%, 5%, and 10%, respectively.

Table 4. Effect of earmarked relationships on interest rate spreads on working capital loans

	(1)	(2)	(3)	(4)	(5)
$EverEarmark_{fb}$	-1.225***				
	(0.405)				
$EarmarkRel_{fbt}$	0.226	0.070	0.383***	0.326***	0.425**
	(0.226)	(0.241)	(0.099)	(0.109)	(0.207)
BF Rel_{fbt}	0.240**	0.457**	0.126	-0.343*	0.497***
	(0.105)	(0.184)	(0.128)	(0.190)	(0.185)
BF Rel_{fbt}*$EverEarmark_{fb}$					-0.493***
					(0.032)
BF Rel_{fbt}*$EarmarkRel_{fbt}$					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 rate spread on a working capital loan of firm f with bank b at time t. $EverEarmark_{fb}$ is an indicator variable that is equal to one for firms receiving an earmarked loan from bank b and zero otherwise. $EarmarkRel_{fbt}$ 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 $Relation_{fbt}$ captures the length of the relationship of firm f with bank b and is measured in log of the 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 and are shown in parentheses. Coefficients marked with ***, **, and * are significantly higher than zero at least at 1%, 5%, and 10%, respectively. All variable definitions are listed in Appendix Table A1.

Table 5. Effect of earmarked relationships on interest rate spreads on 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)
$EarmarkRel_{fbt}$	0.595***	0.350***	0.443***	-0.150**	0.204	0.466
	(0.063)	(0.075)	(0.058)	(0.063)	(0.237)	(0.407)
$BF\ Rel_{fbt}$	0.121	-0.470*	0.396**	0.233	0.061	0.649***
	(0.095)	(0.241)	(0.198)	(0.147)	(0.167)	(0.161)
$BF\ Rel_{fbt}$*$EverEarmark_{fb}$			-0.510***			-0.529***
			(0.026)			(0.080)
$BF\ Rel_{fbt}$*$EarmarkRel_{fbt}$			0.145***			0.200**
			(0.049)			(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 rate spread on a working capital loan of firm f with bank b at time t. Columns 1–3 present the OLS estimates for the sample of firms with average provisions over time above the median provision rates in the data. Columns 4–6 present the OLS estimates for firms with average provisions over time below the median provision rate. $EarmarkRel_{fbt}$ 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. $BF\ Relation_{fbt}$ captures the length of the relationship of firm f with bank b and is measured in log of the number of years. Estimates of columns 1, 2, 4 and 5 are based on the sample of firms that at any point in time receive an earmarked loan. Estimates of columns 3 and 6 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 and are shown in parentheses. Coefficients marked with ***, **, and * are significantly higher than zero at least at 1%, 5%, and 10%, respectively. All variable definitions are listed in Appendix Table A1.

Table 6. Effect of earmarked relationships on volume of working capital loans

	(1)	(2)	(3)	(4)	(5)
$EverEarmark_{fb}$	0.009				
	(0.015)				
$EarmarkRel_{fbt}$	0.039***	0.036***	0.028**	-0.015	0.073***
	(0.012)	(0.010)	(0.012)	(0.021)	(0.025)
BF Rel_{fbt}	-0.007	-0.011***	-0.001	-0.019	-0.012***
	(0.004)	(0.003)	(0.002)	(0.018)	(0.003)
BF Rel_{fbt}*$EverEarmark_{fb}$					0.022***
					(0.003)
BF Rel_{fbt}*$EarmarkRel_{fbt}$					-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. $EverEarmark_{fb}$ is an indicator variable that is equal to one for firms receiving an earmarked loan from bank b and zero otherwise. $EarmarkRel_{fbt}$ 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 $Relation_{fbt}$ captures the length of the relationship of firm f with bank b and is measured in log of the 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 and are shown in parentheses. Coefficients marked with ***, **, and * are significantly higher than zero at least at 1%, 5%, and 10%, respectively. All variable definitions are listed in Appendix Table A1.

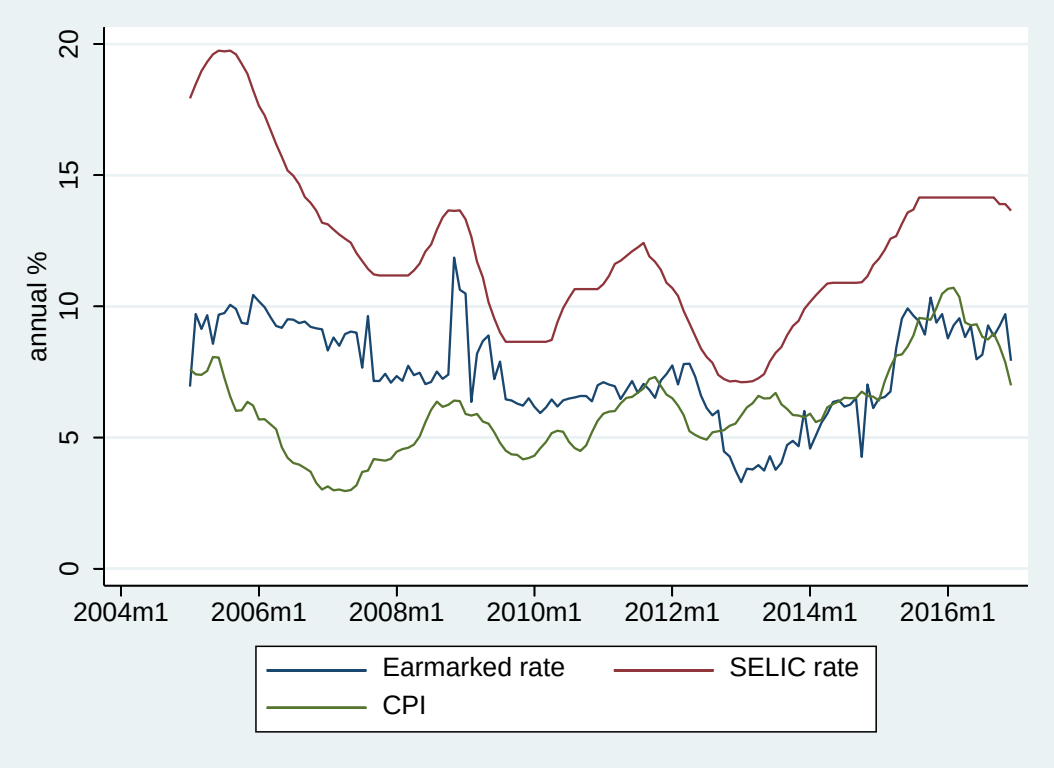
Table 7. Effect of earmarked relationships on volume of working capital loans by average rating of firms

	Panel A. Firms with avg provisions above the median			Panel B. Firms with avg provisions below the median		
	(1)	(2)	(3)	(4)	(5)	(6)
$EarmarkRel_{fbt}$	0.035***	-0.015	0.073***	0.010	-0.018	0.070**
	(0.008)	(0.020)	(0.022)	(0.017)	(0.030)	(0.032)
BF Rel_{fbt}	-0.000	-0.016	-0.013***	-0.001	-0.024***	-0.012***
	(0.003)	(0.028)	(0.003)	(0.001)	(0.007)	(0.004)
BF Rel_{fbt}*$EverEarmark_{fb}$			0.018***			0.030***
			(0.004)			(0.003)
BF Rel_{fbt}*$EarmarkRel_{fbt}$			-0.021***			-0.021**
			(0.003)			(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 1–3 present OLS estimates for the sample of firms with average provisions over time above the median provision rates in the data. Columns 4–6 present the OLS estimates for firms with average provisions over time below the median provision rate. $EarmarkRel_{fbt}$ 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 $Relation_{fbt}$ captures the length of the relationship of firm f with bank b and is measured in log of the number of years. Estimates of columns 1, 2, 4 and 5 are based on the sample of firms that at any point in time receive an earmarked loan. Estimates of columns 3 and 6 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 and are shown in parentheses. Coefficients marked with ***, **, and * are significantly higher than zero at least at 1%, 5%, and 10%, respectively. All variable definitions are listed in Appendix Table A1.

Appendix

Figure A1. Monetary policy rate, inflation rate, and interest rates of earmarked loans



Notes: The figure plots the average interest rate over time of earmarked loans (Earmarked rate), the domestic policy rate (SELIC rate), and inflation rate (CPI).

Table A1. Definition of Variables

Panel A. Bank-firm-year-level data	
Firm size$_{fy}$	Log of the number of workers of firm *f* at year *y*.
BF Rel$_{fby}$	Length of relationship (in years) of firm *f* and bank *b* at year *y*.
BF Prov$_{fby}$	Average loan provision rate of firm *f* with bank *b* at year *y*.
Top3Bank$_{b}$	Indicator variable equal to one for top three largest banks (in terms of total assets).
Panel B. Loan-level data	
EverEarmark$_{fb}$	Indicator variable equal to one if firm *f* and bank *b* establish an earmarked credit relationship at any point in the sample period.
EarmarkRel$_{fbt}$	Indicator variable equal to one in the periods after firm *f* and bank *b* establish an earmarked credit relationship.
BF Rel$_{fbt}$	Length of relationship (in years) of firm *f* with bank *b* at time *t*.
Interest rate spread$_{lfbt}$	Interest rate spread corresponding to loan *l* of firm *f* with bank *b* at time *t*. Calculated as the difference between loan interest rate and Treasury yield for the same maturity.
Loan volume$_{lfbt}$	Log amount of loan *l* of firm *f* with bank *b* at time *t* (in logs).
Loan provision rate$_{lfbt}$	Provision rate of loan *l* of firm *f* with bank *b* at time *t*.
Loan maturity$_{lfbt}$	Maturity (in months) of loan *l* of firm *f* with bank *b* at time *t*.
Loan collateral$_{lfbt}$	Indicator variable equal to one if loan *l* of firm *f* with bank *b* at time *t* was collateralized.
Firm size$_{ft}$	Log of the number of workers of firm *f* at time *t*.

Table A2. Effect of earmarked relationships on interest rate spreads on 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)
$EarmarkRel_{fbt}$	0.580***	0.418**	-0.317	0.321**	0.287**	0.408*
	(0.103)	(0.152)	(0.537)	(0.130)	(0.128)	(0.219)
BF Rel_{fbt}	0.276***	-0.085	0.656***	0.125	-0.285	0.343*
	(0.076)	(0.525)	(0.181)	(0.142)	(0.230)	(0.173)
BF Rel_{fbt}*$EverEarmark_{fb}$			-0.516***			-0.509***
			(0.120)			(0.069)
BF Rel_{fbt}*$EarmarkRel_{fbt}$			0.299**			0.136***
			(0.146)			(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 rate spread on a working capital loan of firm f with bank b at time t. Columns 1–3 present OLS estimates for the sample of firms with average size over time below the median size in the data. Columns 4–6 present OLS estimates for firms with average size over time above the median size. $EarmarkRel_{fbt}$ 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 $Relation_{fbt}$ captures the length of the relationship of firm f with bank b and is measured in log of the number of years. Estimates of columns 1, 2, 4 and 5 are based on the sample of firms that at any point in time receive an earmarked loan. Estimates of column 3 and 6 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 and are shown in parentheses. Coefficients marked with ***, **, and * are significantly higher than zero at least at 1%, 5%, and 10%, respectively. All variable definitions are listed in Appendix Table A1.

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

	(1)	(2)	(3)	(4)	(5)
$EverEarmark_{fb}$	-0.084				
	(0.090)				
$EarmarkRel_{fbt}$	-0.078	-0.059	-0.059	-0.024	-0.178
	(0.087)	(0.079)	(0.055)	(0.093)	(0.122)
BF Rel_{fbt}	0.066***	0.044	0.005	-0.087**	0.043
	(0.013)	(0.038)	(0.027)	(0.031)	(0.038)
BF Rel_{fbt}*$EverEarmark_{fb}$					-0.029
					(0.019)
BF Rel_{fbt}*$EarmarkRel_{fbt}$					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 rate spread on a vehicle financing loan of firm f with bank b at time t. $EverEarmark_{fb}$ is an indicator variable that is equal to one for firms receiving an earmarked loan from bank b, and zero otherwise. $EarmarkRel_{fbt}$ 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 $Relation_{fbt}$ captures the length of the relationship of firm f with bank b and is measured in log of the 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 and are shown in parentheses. Coefficients marked with ***, **, and * are significantly higher than zero at least at 1%, 5%, and 10%, respectively. All variable definitions are listed in Appendix Table A1.

Table A4. Effect of earmarked relationships 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)
$EarmarkRel_{fbt}$	0.041***	-0.003	0.082***	0.018	-0.025	0.059**
	(0.003)	(0.008)	(0.019)	(0.016)	(0.028)	(0.026)
BF Rel_{fbt}	-0.007	-0.027	-0.008**	0.001	-0.019	-0.017***
	(0.007)	(0.037)	(0.004)	(0.002)	(0.015)	(0.004)
BF Rel_{fbt}*$EverEarmark_{fb}$			0.018***			0.023***
			(0.001)			(0.006)
BF Rel_{fbt}*$EarmarkRel_{fbt}$			-0.023***			-0.019***
			(0.003)			(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 1–3 present OLS estimates for the sample of firms with average size over time below the median size in the data. Columns 4–6 present OLS estimates for firms with average size over time above the median size. $EarmarkRel_{fbt}$ 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 $Relation_{fbt}$ captures the length of the relationship of firm f with bank b and is measured in log of the number of years. Estimates of columns 1, 2, 4 and 5 are based on the sample of firms that at any point in time receive an earmarked loan. Estimates of columns 3 and 6 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 and are shown in parentheses. Coefficients marked with ***, **, and * are significantly higher than zero at least at 1%, 5%, and 10%, respectively. All variable definitions are listed in Appendix Table A1.

Table A5. Effect of earmarked relationships on volume of vehicle financing loans

	(1)	(2)	(3)	(4)	(5)
$EverEarmark_{fb}$	0.036***				
	(0.012)				
$EarmarkRel_{fbt}$	-0.038***	-0.029**	-0.021**	-0.053**	-0.014
	(0.009)	(0.013)	(0.010)	(0.023)	(0.012)
BF Rel_{fbt}	0.007***	0.000	0.002	-0.006	0.001
	(0.002)	(0.004)	(0.006)	(0.008)	(0.004)
BF Rel_{fbt}*$EverEarmark_{fb}$					-0.003
					(0.005)
BF Rel_{fbt}*$EarmarkRel_{fbt}$					-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 financing loan of firm f with bank b at time t. $EverEarmark_{fb}$ is an indicator variable that is equal to one for firms receiving an earmarked loan from bank b, and zero otherwise. $EarmarkRel_{fbt}$ 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 $Relation_{fbt}$ captures the length of the relationship of firm f with bank b and is measured in log of the 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 and are shown in parentheses. Coefficients marked with ***, **, and * are significantly higher than zero at least at 1%, 5%, and 10%, respectively. All variable definitions are listed in Appendix Table A1.