The Nuanced Role of Government Credit on Monetary Policy Transmission

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Abstract

We investigate the role of government credit on monetary policy transmission using detailed credit registry data from Brazil. We find that government direct lending effectively facilitates the transmission of monetary policy through credit to small and medium enterprises. However, indirect lending introduces complexities, notably cross-subsidization between earmarked and non-earmarked credit, impacting loan interest rates and their responsiveness to monetary policy shifts. We uncover distinct effects across loan segments and asymmetries during monetary policy easing and tightening. These insights inform policymakers about the impacts and trade-offs associated with government credit.

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1 Introduction

This paper examines the impact of government credit on the transmission of monetary policy, exploring the channels through which this influence operates. This inquiry is especially pertinent in the wake of recent crises, such as the COVID-19 pandemic and the Global Financial Crisis (GFC), during which policymakers worldwide deployed various credit programs to assist struggling households and businesses. These measures were often implemented alongside monetary policy easing to bolster the economy. Despite extensive research on the transmission of monetary policy through the banking system (e.g., Bernanke and Blinder, 1992; Bernanke and Gertler, 1995; Kashyap and Stein, 2000), significant gaps remain in our understanding, particularly concerning how public credit programs modify the transmission mechanism of monetary policy.

Recent studies, such as Jiménez et al., 2012, highlight the importance of disentangling credit supply from demand to identify the bank balance-sheet channel. They demonstrate how bank-specific characteristics, such as capital ratios, influence credit availability under varying monetary conditions. Similarly, Jiménez et al., 2014 provide compelling evidence on how monetary policy impacts bank risk-taking behaviors, emphasizing the nuanced effects on credit risk-taking and composition. These findings underline the relevance of examining how public credit interacts with these bank-driven dynamics. Furthermore, Dwarkasing et al., 2016 and Morais et al., 2019 underscore the heterogeneity in the responses of foreign and domestic banks to monetary policy changes, a perspective that remains underexplored in the context of government credit.

There are two primary perspectives on the role of government credit, each with different implications for the effectiveness of monetary policy transmission. The "developmental view" posits that government banks and credit support can catalyze financial and economic development in countries with weak institutions, where private banks may be less effective in implementing long-term credit policies (King and Levine, 1993; King and Levine, 1998; Rajan and Zingales, 1998). In contrast, the "political view" suggests that government intervention in credit markets can lead to inefficiencies, misaligned incentives, and corruption (Sapienza, 2004; Khwaja and Mian, 2005; Claessens et al., 2008; Cole, 2009; Dinc and Gupta, 2011; Dinc, 2005; Carvalho, 2014). These perspectives align with findings from Jiménez et al., 2012, which document how weaker banks exhibit greater credit tightening under monetary contraction, highlighting potential inefficiencies in credit allocation.

Consequently, the transmission of monetary policy could be either strengthened, if government involvement addresses structural weaknesses and enhances the credit market's responsiveness to changes in monetary conditions, or weakened, if it distorts credit allocation. Jiménez et al., 2014 further explore how such distortions could arise through differential responses of banks to monetary policy, with implications for risk-taking and financial stability. Thus, understanding the impact of large-scale government-directed lending on monetary policy transmission is a crucial empirical question.

The variety of government credit interventions adds another layer of complexity to this investiga-

tion. Governments typically allocate credit through two main approaches: direct lending by government banks (i.e., government direct credit) and government-subsidized lending (i.e., earmarked credit). In the first approach, government banks provide credit directly to households and businesses, often targeting specific sectors or groups. In the second approach, governments subsidize or mandate private banks to lend to designated sectors or groups.[1]

These considerations motivate our three research questions. First, does government direct credit facilitate the transmission of monetary policy through a direct pass-through of loan interest rates? Second, how effective is the monetary policy transmission through earmarked lending mediated by private banks? Third, do private banks adjust the interest rates of non-earmarked credit, thereby affecting the transmission of monetary policy through non-earmarked credit? In this paper, "non-earmarked credit" refers to loans issued by banks independently, without special funding or directives from government credit programs.

Our analysis is based on detailed credit registry information from Brazil, which provides an ideal setting to examine the role of government credit on monetary policy transmission. Brazil has extensively used both government direct credit and earmarked credit, forming two pillars of its credit strategy. Following the GFC, large-scale government interventions in the credit market were employed alongside monetary policy measures to bolster the economy. This is particularly evidenced in the period 2011–2016, which saw a significant surge in government credit.

Our findings reveal a complex and variable role of government credit in monetary policy transmission, highlighting the distinct dynamics at play for different firm sizes and monetary conditions. We find that government banks facilitate monetary policy transmission by passing changes in policy rates to government-issued loan interest rates. However, the effectiveness of monetary policy transmission through earmarked lending by private banks is more nuanced. Additionally, we document a novel cross-subsidization channel, where exposure to earmarked credit with subsidized rates affects the pricing and monetary policy transmission of non-earmarked credit, reflecting the banks' compensation strategies.

First, we find that government banks effectively facilitate the transmission of monetary policy by directly passing on changes in policy rates to the interest rates on government direct credit to small and medium enterprises (SMEs). Private banks, in comparison, have downward rigidity in interest rates and do not achieve this as effectively.[2] During economic booms and periods of monetary tightening, both government and private banks increase interest rates. The transmission is more pronounced for government banks—particularly for SMEs, though less significantly for large firms—thereby supporting monetary policy efforts.

Second, the effectiveness of monetary policy transmission through earmarked lending by private banks is more nuanced. For large firms, private banks exhibit strong policy rate pass-through during

[1] Although beyond the scope of this paper, it is worth noting that guaranteed credit represents another method of government influence, where private banks lend but governments guarantee a portion of the loan against default.

[2] The downward rigidity in lending rate can result from bank competition with adverse selection (Ausubel, 1991). Mello and Castro (2012) find evidence of downward rigidity in the interest rate of consumer credit in Brazil.

periods of monetary tightening, especially for firms with high earmarked credit exposure. During monetary loosening, while the transmission remains positive, it is weaker, indicating some limits to how effectively private banks adjust their lending practices in response to loosening policies. We do not find earmarked exposure to have significant effects on SMEs, likely due to the importance of risk premiums rather than funding costs in the pricing of SME loan interest rates.

Third, in the context of non-earmarked credit, private banks do adjust interest rates in response to policy changes. For large firms, while this adjustment is less significant than for earmarked credit, there is evidence that earmarked exposure affects non-earmarked loan rates during the tightening period—higher earmarked exposure is associated with stronger pass-through. For SMEs, the transmission is weak for both earmarked and non-earmarked credit, regardless of earmarked exposure. However, a longer earmarked relationship is associated with a slightly stronger pass-through of earmarked credit.

Our findings highlight a cross-subsidization effect on the average interest rate for earmarked credit. For SMEs, the length of earmarked relationships is more influential than earmarked exposure in driving this effect, whereas for large firms, the opposite holds true. Moreover, for large firms, cross-subsidization enhances pass-through to both earmarked and non-earmarked credit during monetary policy tightening periods.

We interpret our findings as evidence of the complex and variable role of government credit. On the one hand, government direct lending can effectively reinforce monetary policy, playing a strong and positive role in monetary policy transmission. This supports the developmental view of government credit and suggests that direct lending can facilitate monetary policy transmission, especially in segments of the credit market, such as SMEs, where financial frictions constrain transmission. On the other hand, while government indirect lending through earmarked credit can also reinforce monetary policy, it may cause spillovers to non-earmarked credit due to private banks' pricing strategies. Importantly, the finding that exposure to earmarked credit affects the pricing and transmission of non-earmarked credit indicates cross-subsidization between government-subsidized credit and private market credit. This result is indicative of the influential role of government credit on credit relationships in the private credit market. From a bank's perspective, intermediating earmarked credit allows them to extract higher rates from non-earmarked credit, especially during periods of monetary policy tightening. From a firm's perspective, they are willing to pay higher rates on non-earmarked credit to access cheaper earmarked credit. From the government's perspective, the availability of earmarked credit provides an implicit subsidy to banks that intermediate this credit.

Our results reveal distinct market frictions in different market segments and suggest targeted approaches to address them. For large firms, the cross-subsidization between earmarked and non-earmarked credit highlights the market power private banks gain by intermediating earmarked credit.[3] For SMEs, firm-specific risk premiums, rather than funding costs, are more critical in loan pricing, especially dur-

[3]In 2018, the government introduced a new market-based benchmark rate for earmarked loans with the goal to reduce subsidies to earmarked loans. See Section 2.2 for more detail.

ing monetary policy loosening periods. The finding that access to earmarked credit has no effect on SME credit cost suggests various frictions. One possibility is the lack of economies of scale, as the relatively small credit demand from individual SMEs makes it unprofitable for private banks to screen and offer loans, even with cross-subsidization. Another potential factor is the information opacity of SMEs. However, this is less likely since applying for earmarked credit requires firms to provide detailed information. Understanding the precise nature of SME loan pricing frictions remains a valuable area for future research.

Our empirical strategy addresses key challenges in identifying the role of government credit in monetary policy transmission. First, we need to disentangle the role of government credit from credit supply and demand. When monetary policy is tightened, private credit supply may decrease due to increased funding costs for banks, while demand may also fall because credit becomes more expensive. Additionally, firms more affected by changes in monetary conditions might borrow more from banks that are more responsive to monetary policy actions, creating an omitted variable bias. Second, we must separate the effect of monetary policy from that of economic conditions, as monetary policy tightening often responds to a widening positive output gap. This responsiveness makes it difficult to distinguish the effects of monetary policy from those of the economic backdrop and outlook.

We address these challenges by exploiting variations across different types of credit over time by bank, firm, and bank-firm pair. Utilizing the granularity of the credit registry dataset, we control for time-varying observed and unobserved firm heterogeneity with firm-time fixed effects, thus suppressing the credit demand channel. We control for bank-firm relationships with bank-firm fixed effects to mitigate concerns about non-random matching between banks and firms. In some specifications, we also control for time-varying observed and unobserved bank heterogeneity with bank-time fixed effects, thus suppressing the credit supply channel. In the most comprehensive specification with all controls, the outcome is identified from variations across different types of credit within a given firm-bank relationship in a given month.

Our key contribution to the literature is to offer a new perspective on how government credit interacts with the broader credit market. We highlight important considerations for policymakers regarding the trade-offs of government credit programs. On the one hand, they can facilitate monetary policy transmission through direct credit to SMEs. On the other hand, the presence of preferential access or pricing to government credit may also create distortion to credit allocation and impede monetary policy transmission in some segments of the credit market. Moreover, our results support the view that the heterogeneity of frictions in different market segments is central to understanding monetary policy transmission.

The paper adds to the literature along three dimensions. First, we provide evidence that government credit is a crucial factor in the transmission of monetary policy. Surprisingly, while the role of foreign banks in monetary policy transmission has been extensively studied (see Morais et al., 2019 and the references therein, as well as Dwarkasing et al., 2016, for a general review of the literature on the

bank lending channel of monetary policy), there is limited work on the role of government presence in credit markets for the transmission mechanism. Our results suggest that government credit is an important supply-side factor for monetary policy transmission, not only through direct credit provision but also through its influence on the credit relationships and pricing strategies of private banks that intermediate government credit. These channels complement other factors identified by the literature on the bank-lending channel of monetary policy transmission.

Second, we contribute to the policy-oriented literature on government intervention in credit markets. Direct lending and government-sponsored lending are important policy tools in many countries, yet the literature has not systemically assessed their role in monetary policy transmission. For example, U.S.-based literature has analyzed the similarities between government-sponsored housing credit programs and fiscal policy (Lucas, 2016) and examined government-sponsored entities' securitization and lending activities in response to higher policy rates (Pescatori and Sole, 2016). Additionally, the introduction of unconventional monetary policy has spurred research on the implications of asset purchases for credit allocation (Maggio et al., 2020). In Brazil, the literature has examined the effect of government credit on relationship lending (**?**), employment (Carvalho, 2014), and credit allocation (Bonomo et al., 2015; Carvalho, 2014). Our study offers new evidence on the interaction between credit policy and monetary policy. We show that the role of government credit critically depends on how it addresses market frictions and influences banking relationships in the private market.

Third, we contribute to the literature on banking relationships. We find that borrowing from banks that intermediate government credit has direct implications for the pricing of both government and private market credit. Intermediating earmarked credit with subsidized rates allows banks to extract higher prices from non-earmarked credit, particularly during periods of monetary policy tightening. This finding complements existing literature on how banking relationships affect credit outcomes (Petersen and Rajan, 1994; Degryse and Van Cayseele, 2000).

The rest of the paper is organized as follows. Section II provides background on the Brazilian credit markets, focusing on the role played by the government. Section III describes the data used in the analysis and lays out the empirical strategy. Section IV presents the results. Section V concludes.

2 Institutional Background

2.1 Monetary Policy

The Central Bank of Brazil introduced an inflation-targeting framework in 1999. The inflation target, comprising a midpoint and a tolerance interval, is set annually by the National Monetary Council based on the Broad National Consumer Price Index (IPCA). The primary instrument of monetary policy is the Special System for Settlement and Custody (SELIC) rate, an average of interest rates on overnight interbank credit backed by federal government securities. The Monetary Policy Committee (Copom)

of the Central Bank sets the SELIC rate target every 45 days following a two-day meeting, with open market operations conducted to maintain the daily effective rate close to the target.

The inflation-targeting framework in Brazil has achieved notable success. It has contributed to reducing inflation and likely aided macroeconomic stability during periods of economic turmoil, such as in 2001–2 (Giavazzi et al., 2005). Real interest rates have also declined, although they remain relatively high compared to global standards. However, economic growth has been slower, albeit with reduced volatility (Arestis et al., 2008).

2.2 Credit Policy

Government ownership of banks (Porta et al., 2002) and government-sponsored credit programs (Beck et al., 2010) are prevalent worldwide, with Brazil serving as a notable example of significant government involvement in the credit market. In Brazil, government credit is disbursed through two primary channels: direct credit from government banks and indirect credit via government lending programs, known as earmarked credit. Firms seeking direct credit apply to government banks, which evaluate projects and negotiate loan terms directly. These loans are typically tied to specific investment projects of significant size. The largest government bank in Brazil is the Brazilian National Development Bank (BNDES), established in the 1950s to foster long-term investment in strategic industries. During our sample period (2011–16), loans issued by BNDES were remunerated by the Long-Term Interest Rate (TJLP), determined on a quarterly basis by the National Monetary Council (CMN) based on inflation targets. Although the TJLP serves as a benchmark, government banks like BNDES have discretion in setting loan terms, subject to negotiation and varying based on project specifics.[4]

Earmarked credit consists of subsidized loans provided through government programs designed to stimulate investment, export, agriculture, and other objectives. The largest such program is the Investment Support Program (PSI), established in 2009 and operated by BNDES. This program has gained significant popularity among SMEs, with more than half of the total disbursements being allocated to them. Earmarked credit can be directly granted by government banks or intermediated through private banks. In the latter case, firms apply to the intermediary bank, with some applications approved automatically if they meet predetermined eligibility criteria. For other applications, the intermediary bank screens the borrowers and negotiates loan terms, bearing the credit risk. While funding comes from government sources at subsidized rates, private banks can add an interest rate spread to account for credit risk, with total interest rates capped by program-specific limits.[5] Consequently, interest rate variations reflect both the subsidized benchmark rate and the firm- or project-specific risk. Despite this, subsidized funding and interest rate limits typically result in lower interest rates for earmarked credit compared to non-earmarked credit. For instance, in June 2016, the average interest rates for earmarked

[4] In 2018, BNDES retired TJLP and introduced a new market-based rate called the Taxa de Longo Prazo (TLP), which is based on a consumer price index and a spread derived from five-year government bond yields.

[5] Each program or line of credit has specific interest rate limits.

and non-earmarked credit for corporations were 11.7 percent and 30.6 percent, respectively. The interest rate spread, measured as the difference between the lending rate and the funding rate, was 18.3 percent for non-earmarked credit and 4.7 percent for earmarked credit.[6]

In the period after the GFC, large-scale government interventions in the credit market were used in conjunction with monetary policy to support the economy. The Brazilian economy, thanks to the buffers built during the commodity boom years in the run-up to the GFC, weathered the crisis relatively well. Increased public spending and lower interest rates provided the stimulus needed to swing the economy from a 0.9 percent contraction in 2009 to a 7.5 percent expansion in 2010, riding the strong recovery in commodity prices. However, the recovery stalled by mid-2011, driven by falling commodity prices and the tightening in global financial conditions. Growth disappointed at 2.7 percent in 2011. The weaker economic prospects drove a wave of large government interventions in the credit market, concurrent with monetary policy easing. Direct lending by government banks and earmarked credit were two pillars of this intervention. According to aggregate statistics reported by the Central Bank, government bank credit accounted for approximately 42 percent of total credit in early 2011. By the end of 2015, this share had risen to around 56 percent. Earmarked credit as a share of total credit to non-financial corporations was 47 percent in early 2011 and 51 percent in end-2015. Private banks played a significant role in the earmarked credit market, originating nearly 40 percent of the outstanding earmarked credit to firms by 2016.

3 Data and Empirical Strategy

3.1 Data

We use an administrative dataset from the Central Bank of Brazil, which contains detailed loan-level information and captures the credit relationships between banks and firms. This dataset is sourced from a comprehensive credit registry that includes loans above certain thresholds granted by various financial institutions operating in Brazil, including government banks, private domestic banks, and foreign banks.[7] The credit registry serves as both a screening and monitoring tool for financial intermediaries and a supervisory device for the Central Bank.

This dataset provides valuable insights into the dynamics of bank-firm credit relationships in Brazil, allowing us to examine loan characteristics, borrower profiles, interest rates, and loan performance metrics. Each observation in the dataset corresponds to a loan and contains information on the contracted interest rate, the loan amount, its maturity, risk rating, and the borrower's background (industry, location, and size as proxied by the number of workers).

[6]Source: Central Bank of Brazil, https://www.bcb.gov.br/conteudo/home-en/FAQs/FAQ%2001-Interest%20Rates%20and%20Bank%20Spreads.pdf

[7]The thresholds were 5,000 BRL (about 1,500 USD) before December 2011, 1,000 BRL (about 500 USD) between January 2012 and May 2016, and 200 BRL (60 USD) from June 2016 onwards.

Our sample period ranges from September 2011 to September 2016, covering the introduction of the new credit registry in 2011, which mandates reporting of information such as funding sources and firm sizes. This period predates significant alterations in credit programs, including BNDES's operational policy changes in 2017 and the TLP reform in 2018. It is marked by a notable expansion of government credit programs as economic growth stalled in mid-2011 following a recovery from the GFC by the second half of 2010. This led to a substantial increase in both government direct credit and earmarked credit. During our sample period, credit by government banks grew faster than private banks and foreign banks. Earmarked credit grew at a similar rate as non-earmarked credit before 2013 and at a higher rate after 2013 (Figures 1 and 2).

During this period, monetary policy was also actively employed in response to the economic cycle. The reduction in the SELIC rate after the crisis was followed by a tightening phase starting in the second half of 2010 as the economy recovered. This trend reversed in late 2011, but monetary policy tightening resumed in early 2013, even though government support for credit remained relatively strong. This significant shift in monetary policy allows us to analyze two distinct sub-periods: a period of monetary policy loosening from September 2011 to March 2013, and a period of monetary policy tightening from April 2013 to September 2016.

Our analysis is based on a 50 percent random sample of firms from the full credit registry data. The sample comprises approximately 55 million observations. Of these, 23 percent are loans from government banks, and 77 percent are loans from private banks. Earmarked credit constituted 25 percent of total credit in early 2011 and increased to 32 percent by the end of 2015.

Table 1 provides detailed summary statistics of the full sample. 94 percent of the credit is extended to SMEs, while 6 percent is to large firms. Among the credit extended to SMEs, 25 percent is government direct credit, and 75 percent is private bank credit. For large firms, only 4 percent is government direct credit, with the remaining 96 percent being private bank credit. SME credit has a higher average interest rate than that for large firms (e.g., 47 percent versus 20 percent during the loosening period), although the medians are about the same (28 percent versus 30 percent). Credit to SMEs is also smaller and has lower ratings and shorter maturities on average than credit to large firms.

Tables 2 and 3 present the summary statistics for the sample of private bank credit to SMEs and large firms respectively. Non-earmarked credit represents about 97 percent of the credit to SMEs and 94 percent of the credit to large firms. SME credit has a higher average interest rate than that for large firms (e.g., 27 percent versus 13 percent during the loosening period). Similar to the full sample, credit to SMEs is also smaller and has lower ratings and shorter maturities on average than credit to large firms. SMEs also have, on average, shorter earmarked relationships than large firms.

3.2 The Role of Government Direct Credit

The empirical analysis has two parts. The first examines the role of government direct credit and the second examines the role of earmarked credit. Our main objective in the first part is to investigate

whether government direct credit facilitates the transmission of monetary policy through a direct pass-through of loan interest rates.

Our baseline specification is given by equation (1). This is a loan-level regression that relates the interest rate of a new loan in a given month to the one-month lagged policy rate. Specifically,

$$\begin{aligned} y_{libct} = \alpha + \beta i_{BR,t-1} I_{b,BR} + \gamma i_{BR,t-1} I_{b,BR} G_b \\ + \Sigma_{c \neq BR} \theta_c i_{c,t-1} I_{bc} + \Sigma_c X_{c,t-1} I_{bc} + Z_{lt} + \epsilon_{libct} \end{aligned} \tag{1}$$

where l, i, b, and t index loan, firm, bank, and month respectively. c is the country origin of the bank. Our focus here is the transmission of domestic monetary policy in Brazil. Nevertheless, we include the foreign policy rate of a bank's country of origin to control for the international credit channel of monetary policy, as identified in the literature (Lee and Bowdler, 2019; Morais et al., 2019).[8] The independent variable $i_{c,t-1}$ measures the one-month lagged monetary policy in country c. We use the SELIC rate (in percent) for Brazil. $I_{b,c}$ is an indicator variable for the bank's country of origin. G_b is a dummy variable for Brazilian government banks. $X_{c,t-1}$ includes one-month lagged annual growth rates of all countries' GDPs and CPIs, all interacted with the indicator variable of the bank's country origin. These variables control for the business cycle and allow us to isolate the effect of monetary policy from other changes in economic activity. Z_{lt} is a vector of loan-level controls including loan amount, collateral, loan ratings, and loan maturity. The loan amount is measured in natural logarithms. Collateral is a dummy variable that takes the value of one if there is a collateral. Loan ratings are dummy variables for the nine categories of loan ratings. The base category is the lowest rating. Loan maturity is the time to maturity measured in months.

The specification includes several fixed effects. A key identification challenge is that different banks may have borrowers with different characteristics. To address this concern of non-random matching between banks and borrowers, we first saturate our specification with fixed effects at the bank$\times$firm level. This controls for all time-invariant firm heterogeneity and bank heterogeneity, as well as the sticky bank-firm relationship. It allows us to exploit the variation within the same bank-firm pair over time.

In our preferred specification, we also include firm$\times$month fixed effects. This enables us to control for all time-varying firm heterogeneity that may influence the loan interest rate, stemming from firm balance-sheet channels. The identification, therefore, comes from variations in the interest rate of loans offered by government banks and private banks to a given firm in a given month. This specification comes at the cost of a reduced sample because it restricts the sample to firms with more than one lending bank in a given month (i.e., multiple-bank relationships). While it is comforting that they represent

[8]Foreign banks have a moderate presence in Brazil. Credit from foreign banks ranged between 13 to 17 percent of total credit and exhibited a downward trend in our sample period. We control for the monetary policy of three main sources of foreign banks: the Euro Area, U.K. and the U.S., each measured by the shadow rate. Banks from the Euro Area, U.K, and the U.K. represent respectively 43 percent, 27 percent, and 6 percent of the foreign banks in our sample.

over 70 percent of our loan sample, one concern is that these firms with multiple lending banks may not be representative of all firms. For example, they may be larger and older than firms with single-bank relationship. To address this, in another specification, instead of using firm×month fixed effects, we use region×industry×month fixed effects to control for shocks to loan demand. The assumption is that demand shocks are common within the narrowly defined region-industry group, rather than firm-specific. To determine whether differences across specifications are due to unobserved (region-industry or firm-specific) shocks or due to the firm sample, we run the specification with region×industry×month fixed effects twice: first using the full sample, then using only firms with multiple-bank relationships in a given month. In all specifications, we cluster the standard errors at the bank and time level.

3.3 The Role of Earmarked Credit

In the second part of the empirical analysis, we examine the effectiveness of monetary policy transmission through private bank credit. Our focus is twofold: first, we assess the effectiveness of monetary policy transmission through earmarked lending mediated by private banks, and second, we investigate whether private banks adjust the interest rates of non-earmarked credit, thereby influencing the transmission of monetary policy through non-earmarked credit. Our baseline specification is as follows:

$$\begin{aligned} y_{libct} = \alpha &+ \beta i_{BR,t-1} I_{b,BR} + \gamma_1 S_{ibt} NE_{libt} i_{BR,t-1} I_{b,BR} + \gamma_2 S_{ibt} NE_{libt} \\ &+ \gamma_3 S_{ibt} i_{BR,t-1} I_{b,BR} + \gamma_4 NE_{libt} i_{BR,t-1} I_{b,BR} + \gamma_5 S_{ibt} + \gamma_6 NE_{libt} \\ &+ \Sigma_{c \neq BR} \theta_c i_{c,t-1} I_{bc} + \Sigma_c X_{c,t-1} I_{bc} + Z_{lt} + \epsilon_{libct} \end{aligned} \tag{2}$$

where l, i, b, and t index loan, firm, bank, and month respectively. c is the country origin of the bank. NE_{libct} is a dummy variable that takes a value of one for non-earmarked credit. S_{ibt} measures exposure to earmarked credit, defined as the amount of earmarked credit as a share of total credit for a bank-firm pair in a given month. As is in equation (1), $I_{b,c}$ is an indicator variable for the bank's country of origin; $X_{c,t-1}$ includes macroeconomic control and Z_{lt} includes loan-level controls. We include the same set of fixed effects as equation (1). In an additional specification, we include bank×month fixed effects. This enables us to control for all time-varying bank heterogeneity that may influence the loan interest rates, stemming from bank balance-sheet channels. Together with the other controls, this specification enables us to identify variations from multiple loans between a given bank-firm pair in a given month while simultaneously controlling for bank- and firm-specific loan supply and demand factors. Our main coefficients of interest are γ_3 and γ_1. The former, γ_3, measures how the pass-through of monetary policy to earmarked credit depends on the the firm's earmarked exposure. The latter, γ_1, measures how this dependence differ between earmarked and non-earmarked credit. Our sample includes both earmarked and non-earmarked credit from private banks.

We complement equation (2) with the following specification:

$$\begin{aligned} y_{libct} = \alpha + \beta i_{BR,t-1} I_{b,BR} + \gamma_1 Length_{ibt} NE_{libt} i_{BR,t-1} I_{b,BR} + \gamma_2 Length_{ibt} NE_{libt} \\ + \gamma_3 Length_{ibt} i_{BR,t-1} I_{b,BR} + \gamma_4 NE_{libt} i_{BR,t-1} I_{b,BR} + \gamma_5 Length_{ibt} \\ + \gamma_6 NE_{libt} + \Sigma_{c \neq BR} \theta_c i_{c,t-1} I_{bc} + \Sigma_c X_{c,t-1} I_{bc} + \epsilon_{libct} \end{aligned} \tag{3}$$

This is different from equation (2) in how exposure to earmarked credit is measured. Here we measure the exposure from a temporal perspective. $Length_{ibt}$ is the length of earmarked relationship measured as the number of months since a bank-firm pair established an earmarked lending relationship. This complements exposure measure in equation (2) from a loan composition perspective.

4 Results

4.1 Government Direct Credit Outcomes

Tables 4 to 7 report the results on the role of government direct credit, as per equation (1). We divide the sample based on firm size (SMEs and large firms) and the two periods of monetary policy (loosening and tightening). This approach enables us to differentiate between the various loan segments for SMEs and large firms and to examine any potential asymmetry between monetary policy loosening and tightening.

Table 4 reports results on the sample of SME credit during the loosening period. Column 1 includes bank×firm fixed effects and region×industry×month fixed effects. The sample encompasses all credit from firms with either single- or multiple-bank relationships. The coefficient of interest—the interaction of monetary policy and the government bank dummy—is significantly positive, indicating a significantly higher pass-through for government direct credit compared to private bank credit. Column 2 repeats the same specification but is limited to firms with multiple-bank relationships. The coefficients remain similar to those in column 1, suggesting the similarity between credit to firms with single-bank relationship and those with multiple-bank relationships. This similarity provides reassurance regarding the representativeness of the findings in column 3. Column 3 uses the same loan sample but adopts a tighter specification with firm×month fixed effects instead of region×industry×month fixed effects. Despite this change, the coefficient for the interaction of monetary policy and the government bank dummy remains very similar to that in Column 2. This consistency reinforces the robustness of the results across different specifications.

An interesting observation is the difference in the coefficient for monetary policy between columns 2 and 3. In Column 2, the coefficient is relatively large (2.2) and significant at the 10 percent level, whereas in column 3, it is small (0.3) and not significant. This comparison suggests that controlling for time-varying firm heterogeneity is crucial in estimating the pass-through of private bank credit. The substantial pass-through observed in column 2 likely reflects demand factors, such as lower demand

during periods of economic slack when monetary policy loosens. However, column 3 indicates that once this is controlled for, the average pass-through of private bank credit is quite small.

Overall, the results suggest a substantial difference in the pass-through to government direct credit and private bank credit to SMEs during the period of monetary policy loosening. The preferred specification indicates that a one percentage point increase in the policy rate raises the average interest rate for government direct credit by 1.4 percentage points more than the average interest rate for private bank credit.

Table 5 presents the findings for the sample of SME credit during the tightening period, revealing a significantly higher pass-through to government direct credit compared to private bank credit. Interestingly, this discrepancy is more pronounced than in the loosening period. According to our preferred specification, a one percentage point increase in the policy rate elevates the average interest rate for government direct credit by 2.4 percentage points more than that for private bank credit. Moreover, the pass-through to private bank credit is also positively significant in our preferred specification, indicating that a one percentage point increase in the policy rate raises the average interest rate for private bank credit by 0.8 percentage points. This comparison underscores the asymmetric effects of monetary policy transmission between loosening and tightening periods, where the pass-through is higher during the tightening period for both government direct credit and private bank credit. One plausible explanation is that banks are more inclined to reflect rising costs during tightening periods than to offset decreasing costs during loosening periods.

Tables 6 and 7 report results on the sample of large firm credit during the loosening and tightening periods respectively. In Table 6, columns 1 and 2 show similar results, with the coefficients for monetary policy as well as the interaction of monetary policy and government bank dummy not significantly different from zero. However, in column 3, our preferred specification shows that the pass-through to private bank credit is positively significant at 0.7. The comparison between columns 2 and 3 in Table 6 underscores the importance of controlling for time-varying firm heterogeneity in understanding the pass-through to private bank credit, echoing the observations from Tables 4 and 5. Similarly, in the tightening period analyzed in Table 7, our preferred specification reveals a positively significant pass-through to private bank credit, albeit with a smaller coefficient of 0.3.

In summary, our findings reveal differing sensitivities to monetary policy changes between SME and large firm credit. Notably, there is a strong pass-through effect observed in government direct credit to SMEs. This suggests that, for SMEs, firm-specific credit risk outweighs funding costs as the primary determinant of credit cost. This underscores the developmental role of government credit, particularly in supporting SMEs, which aligns with the government's strategic objective. By providing low-cost and targeted credit to SMEs, the government helps alleviate barriers to SME financing in the private market. Additionally, government direct lending serves to bolster monetary policy. Overall, our results underscore the significance of firm size in the transmission of monetary policy, a theme we will revisit in our subsequent discussions.

4.2 Earmarked Credit Outcomes

Tables 8 to 11 present our findings regarding the role of earmarked credit, as per equation (2). We again divide the sample based on firm size and the two periods of monetary policy. In each table, the first three columns follow the same structure as Tables 4 to 7, while Column 4 represents the most stringent specification, incorporating bank×time fixed effects.

Consistency is observed across various specifications and sample segments. Specifically, Table 8 delves into SME credit during the loosening period. Here, we do not detect a significant impact of monetary policy on loan interest rates overall. This aligns with the results of Table 4, which indicate that the average effect on all private bank credit does not significantly differ from zero. Table 8 further elaborates on this average effect, indicating its consistency across earmarked and non-earmarked credit, irrespective of the magnitude of earmarked exposure. Similar results are observed during the tightening period, as shown in Table 9. This suggests that earmarked exposure has no impact on SME loan pricing, though it does not preclude the possibility that other measures of earmarked credit access matter. We will return to this point when we discuss the results in Table 13.

Table 10 shows the results on the sample of large firm credit during the loosening period. We find that a higher earmarked exposure correlates with a higher average interest rate for non-earmarked credit, indicating substantial economic significance. For instance, in our preferred specification (column 4), an decrease of one standard deviation in earmarked credit as a share of total credit (0.2) corresponds to a 1 percentage point decrease in the average interest rate for non-earmarked credit. This underscores the influential role of earmarked relationships on credit dynamics in the private market, where a bank's pricing of non-earmarked credit is influenced by the firm's access to earmarked credit. Essentially, a bank intermediating earmarked credit charges its debtor firm a higher interest rate on its non-earmarked credit, indicative of cross-subsidization between the government-subsidized and private market credit. However, there is no evidence suggesting that the share of earmarked credit influences the pass-through of monetary policy.

Moving to Table 11, which focuses on the sample of large firm credit during the tightening period, a similar pattern emerges. A higher share of earmarked credit is associated with a higher average interest rate for non-earmarked credit, albeit to a lesser extent than observed during the loosening period. For instance, in column 4, an increase of one standard deviation in earmarked credit as a share of total credit (0.2) corresponds to a 0.1 percentage point increase in the average interest rate for non-earmarked credit. Additionally, two new findings surface. Firstly, a higher earmarked exposure correlates with a stronger pass-through to earmarked credit, indicating an enhanced responsiveness of earmarked credit to monetary policy changes. Secondly, higher earmarked exposure is also associated with a higher pass-through to non-earmarked credit, albeit to a small extent. This indicates that high exposure to earmarked credit leads to a slight increase in the pass-through to non-earmarked credit, revealing cross-subsidization between earmarked and non-earmarked credit. Here, cross-subsidization not only results in higher average interest rates for non-earmarked credit but also more pronounced rate hikes during

monetary policy tightening.

Tables 12 to 15 replicate the analysis in Tables 8 to 11 but replace the share of earmarked credit with the length of the earmarked relationship.

In Table 12, focusing on SME credit during the loosening period, a longer earmarked relationship is associated with a higher average interest rate for non-earmarked credit. For instance, in column 4, a one standard deviation decrease in earmarked relationship length (93 months) corresponds to a 1 percentage point decrease in the average interest rate for non-earmarked credit. However, monetary policy does not exhibit a significant effect on loan interest rates overall, consistent with the findings in Tables 4 and 8.

Table 13, which examines SME credit during the tightening period, reveals a positive pass-through to non-earmarked credit, with substantial magnitude. In our preferred specification (column 4), a one percentage point increase in the policy rate leads to a one percentage point increase in the interest rate of non-earmarked credit. The result in column 3 without bank$\times$month fixed effects is very similar. Another useful observation from column 3 is that the pass-through to earmarked credit is small (0.1) and not significantly different from zero, in contrast to the large pass-through to non-earmarked credit. This observation implies that the strong pass-through for private bank credit observed in column 3 of Table 5 is driven by non-earmarked credit rather than earmarked credit. Moreover, consistent across the columns, we find that the length of the earmarked relationship significantly influences the pass-through to earmarked credit. For example, column 4 shows that a one standard deviation increase in relationship length (93 months) increases the pass-through to earmarked credit by 0.6 percentage points. However, there is no evidence suggesting that the length of the earmarked relationship significantly affects the pass-through to non-earmarked credit.

In Table 14, examining large firm credit during the loosening period, there is no evidence indicating that the length of the earmarked relationship affects the average interest rate or the pass-through of non-earmarked credit.

Lastly, Table 15, focusing on large firm credit during the tightening period, mirrors the findings of SME credit during the same period. There is a positive pass-through to non-earmarked credit and a positive relationship between the length of the earmarked relationship and the pass-through to earmarked credit. However, the effect of the earmarked relationship length on non-earmarked credit is negligible.

In summary, our findings highlight a cross-subsidization effect on the average interest rate for earmarked credit. For SMEs, the length of earmarked relationships is more influential than earmarked exposure in driving this effect, whereas for large firms, the opposite holds true. Moreover, for large firms, the cross-subsidization enhances the pass-through to both earmarked and non-earmarked credit during the monetary policy tightening period.

5 Conclusion

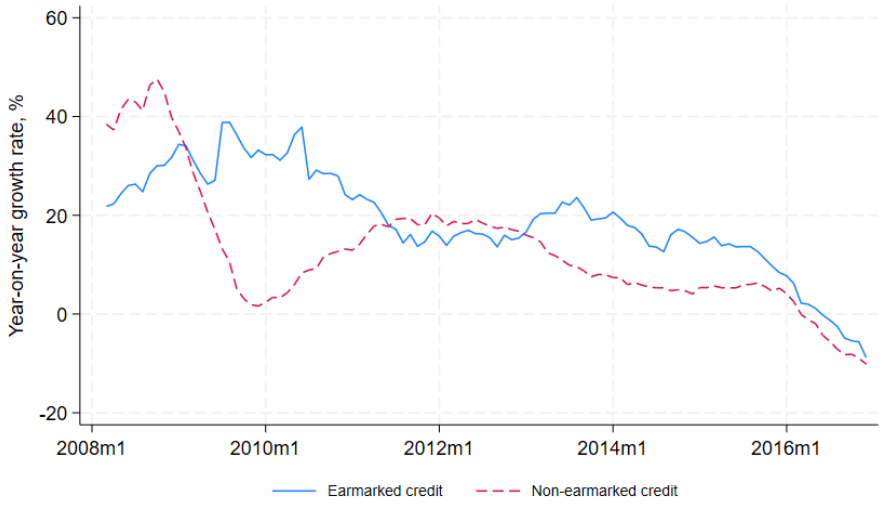
The paper delves into the intricate relationship between government credit and monetary policy transmission, particularly crucial amid recent crises like the COVID-19 pandemic and the Global Financial Crisis. It investigates how government credit, via direct lending and indirect earmarked credit, influences monetary policy dynamics, examining differing views on its effectiveness. Using detailed credit registry data from Brazil during a period of significant government intervention, we dissect the impact on various loan segments and firm sizes. Our findings reveal nuanced effects: government direct lending effectively facilitates monetary policy transmission, especially benefiting SMEs, while indirect lending through private banks introduces complexities, including cross-subsidization between earmarked and non-earmarked credit.

These insights inform policymakers about the impacts and trade-offs associated with government credit. On the one hand, they can facilitate monetary policy transmission through direct credit to SMEs. On the other hand, the presence of preferential access or pricing to government credit may also create distortion to credit allocation and impede monetary policy transmission in some segments of the credit market. Moreover, our results highlight heterogeneities across credit market segments. Understanding the impediments to monetary policy transmission in each segment is central to designing policies to improve monetary policy transmission.

Figure 1: Credit growth by bank ownership

Notes: This figure plots the year-on-year growth rate for government banks, domestic private banks, and foreign banks. Source: Central Bank of Brazil and authors' calculations.

Figure 2: Credit growth by bank ownership



Notes: This figure plots the year-on-year growth rate for earmarked and nonearmarked credit to non-financial corporations. Source: Central Bank of Brazil and authors' calculations.

Table 1: Summary statistics: all credit

	No. observation	Mean	Std. Dev	Min	P50	Max
Panel A: SMEs						
Loosening period						
Interest rate	21,000,000	46.7	36.7	0.2	28.0	100.0
ln(amount)	21,000,000	9.9	1.1	8.5	9.7	14.0
Rating	21,000,000	8.8	1.2	2.0	9.0	10.0
Maturity	21,000,000	0.5	0.9	0.0	0.2	14.6
Collateral	21,000,000	0.3	0.5	0.0	0.0	1.0
Government loan	21,000,000	0.2	0.4	0.0	0.0	1.0
Tightening period						
Interest rate	31,200,000	46.2	34.9	0.3	12.0	100.0
ln(amount)	31,200,000	9.9	1.1	8.5	10.0	14.0
Rating	31,200,000	8.7	1.2	2.0	10.0	10.0
Maturity	31,200,000	0.6	1.0	0.0	0.2	34.9
Collateral	31,200,000	0.3	0.4	0.0	0.0	1.0
Government loan	31,200,000	0.3	0.4	0.0	0.0	1.0
Panel B: Large firms						
Loosening period						
Interest rate	1,030,420	20.3	25.2	0.2	30.0	100.0
ln(amount)	1,030,420	10.3	1.4	8.5	9.6	14.0
Rating	1,030,420	9.4	1.0	2.0	9.0	10.0
Maturity	1,030,420	0.4	0.9	0.0	0.2	13.8
Collateral	1,030,420	0.2	0.4	0.0	0.0	1.0
Government loan	1,030,420	0.1	0.2	0.0	0.0	1.0
Tightening period						
Interest rate	2,089,822	16.7	13.9	0.3	14.0	100.0
ln(amount)	2,089,822	10.3	1.3	8.5	10.1	14.0
Rating	2,089,822	9.4	1.0	2.0	10.0	10.0
Maturity	2,089,822	0.3	0.6	0.0	0.2	19.6
Collateral	2,089,822	0.2	0.4	0.0	0.0	1.0
Government loan	2,089,822	0.0	0.2	0.0	0.0	1.0

Notes: This table reports summary statistics of all credit from government and private banks. Interest rate is the contracted interest rate of a new loan in a given month. Loan amount is measured in natural logarithm. Rating is a set of dummy variables for loan rating. There are nine ratings but we consider only the top four ratings, which account for most of the observations. The base-case is the worst rating. Maturity is the time to maturity measured in months. Collateral is a dummy variable that takes the value of one if there is a collateral. Collateral is a dummy variable that takes the value of one for credit from government banks. The loosening period is from September 2011 to March 2013 and the tightening period is from April 2013 to September 2016.

Table 2: Summary statistics: SME credit from private banks

	No. observations	Mean	Std. Dev	Min	P50	Max
Panel A: All firms						
Loosening period						
Interest rate	10,200,000	26.5	17.4	0.2	22.0	100.0
ln(amount)	10,200,000	10.0	1.2	8.5	9.7	14.0
Rating	10,200,000	8.7	1.1	2.0	9.0	10.0
Maturity	10,200,000	0.6	1.0	0.0	0.2	14.6
Collateral	10,200,000	0.3	0.5	0.0	0.0	1.0
Share of earmarked loans	10,200,000	0.1	0.2	0.0	0.0	1.0
Non-earmarked loans	10,200,000	1.0	0.1	0.0	1.0	1.0
Length of relationship	9,289,453	74.4	92.8	0.0	36.4	603.1
Tightening period						
Interest rate	14,800,000	27.5	17.4	0.3	23.0	99.9
ln(amount)	14,800,000	9.9	1.2	8.5	9.6	14.0
Rating	14,800,000	8.6	1.2	2.0	9.0	10.0
Maturity	14,800,000	0.6	1.0	0.0	0.2	29.5
Collateral	14,800,000	0.3	0.5	0.0	0.0	1.0
Share of earmarked loans	14,800,000	0.1	0.2	0.0	0.0	1.0
Non-earmarked loans	14,800,000	1.0	0.2	0.0	1.0	1.0
Length of relationship	13,900,000	82.9	96.1	0.0	46.5	634.0
Panel B: Firms with multiple-bank relationships						
Loosening period						
Interest rate	7,851,746	24.8	16.4	0.3	21.0	100.0
ln(amount)	7,851,746	10.0	1.3	8.5	9.7	14.0
Rating	7,851,746	8.7	1.1	2.0	9.0	10.0
Maturity	7,851,746	0.5	0.9	0.0	0.2	14.6
Collateral	7,851,746	0.3	0.5	0.0	0.0	1.0
Share of earmarked loans	7,851,746	0.1	0.2	0.0	0.0	1.0
Non-earmarked loans	7,851,746	1.0	0.2	0.0	1.0	1.0
Length of relationship	7,131,936	81.5	96.8	0.0	43.6	603.1
Tightening period						
Interest rate	11,200,000	25.7	16.0	0.3	22.0	99.9
ln(amount)	11,200,000	9.9	1.2	8.5	9.6	14.0
Rating	11,200,000	8.6	1.1	2.0	9.0	10.0
Maturity	11,200,000	0.5	0.9	0.0	0.2	29.5
Collateral	11,200,000	0.3	0.5	0.0	0.0	1.0
Share of earmarked loans	11,200,000	0.1	0.2	0.0	0.0	1.0
Non-earmarked loans	11,200,000	1.0	0.2	0.0	1.0	1.0
Length of relationship	10,500,000	91.1	100.0	0.0	55.0	634.0

Notes: This table reports summary statistics of SME credit from private banks. Interest rate is the contracted interest rate of a new loan in a given month. Loan amount is measured in natural logarithm. Rating is a set of dummy variables for loan rating. There are nine ratings but we consider only the top four ratings, which account for most of the observations. The base-case is the worst rating. Maturity is the time to maturity measured in months. Collateral is a dummy variable that takes the value of one if there is a collateral. Share of earmarked is earmarked credit as a share of total credit for a bank-firm pair in a given month. Non-earmarked loans is a dummy variable that takes a value of one for non-earmarked credit. Length of relationship is the length of earmarked relationship measured as the number of months since a bank-firm pair established an earmarked lending relationship. The loosening period is from September 2011 to March 2013 and the tightening period is from April 2013 to September 2016.

Table 3: Summary statistics: large firm credit from private banks

	No. observations	Mean	Std. Dev	Min	P50	Max
Panel A: All firms						
Loosening period						
Interest rate	883,982	13.1	8.3	0.3	12.0	99.2
ln(amount)	883,982	10.3	1.4	8.5	10.1	14.0
Rating	883,982	9.4	0.9	2.0	10.0	10.0
Maturity	883,982	0.3	0.6	0.0	0.1	13.8
Collateral	883,982	0.2	0.4	0.0	0.0	1.0
Share of earmarked loans	883,982	0.1	0.2	0.0	0.0	1.0
Non-earmarked loans	883,982	1.0	0.1	0.0	1.0	1.0
Length of relationship	805,721	116.5	91.2	0.0	113.7	558.4
Tightening period						
Interest rate	2,007,815	15.7	10.8	0.3	14.0	99.9
ln(amount)	2,007,815	10.3	1.3	8.5	10.1	14.0
Rating	2,007,815	9.5	0.9	2.0	10.0	10.0
Maturity	2,007,815	0.3	0.6	0.0	0.2	19.6
Collateral	2,007,815	0.2	0.4	0.0	0.0	1.0
Share of earmarked loans	2,007,815	0.1	0.3	0.0	0.0	1.0
Non-earmarked loans	2,007,815	0.9	0.3	0.0	1.0	1.0
Length of relationship	1,885,106	135.9	112.8	0.0	112.6	568.6
Panel B: Firms with multiple-bank relationships						
Loosening period						
Interest rate	832,673	13.0	8.0	0.3	12.0	99.2
ln(amount)	832,673	10.3	1.3	8.5	10.0	14.0
Rating	832,673	9.5	0.9	2.0	10.0	10.0
Maturity	832,673	0.3	0.6	0.0	0.1	13.8
Collateral	832,673	0.2	0.4	0.0	0.0	1.0
Share of earmarked loans	832,673	0.1	0.2	0.0	0.0	1.0
Non-earmarked loans	832,673	1.0	0.1	0.0	1.0	1.0
Length of relationship	759,551	118.6	90.4	0.0	116.9	558.4
Tightening period						
Interest rate	1,888,743	15.7	10.7	0.3	14.0	99.9
ln(amount)	1,888,743	10.3	1.3	8.5	10.1	14.0
Rating	1,888,743	9.5	0.9	2.0	10.0	10.0
Maturity	1,888,743	0.3	0.6	0.0	0.2	19.6
Collateral	1,888,743	0.2	0.4	0.0	0.0	1.0
Share of earmarked loans	1,888,743	0.1	0.3	0.0	0.0	1.0
Non-earmarked loans	1,888,743	0.9	0.3	0.0	1.0	1.0
Length of relationship	1,772,185	138.7	113.4	0.0	114.6	568.6

Notes: This table reports summary statistics of large firm credit from private banks. Interest rate is the contracted interest rate of a new loan in a given month. Loan amount is measured in natural logarithm. Rating is a set of dummy variables for loan rating. There are nine ratings but we consider only the top four ratings, which account for most of the observations. The base-case is the worst rating. Maturity is the time to maturity measured in months. Collateral is a dummy variable that takes the value of one if there is a collateral. Share of earmarked is earmarked credit as a share of total credit for a bank-firm pair in a given month. Non-earmarked loans is a dummy variable that takes a value of one for non-earmarked credit. Length of relationship is the length of earmarked relationship measured as the number of months since a bank-firm pair established an earmarked lending relationship. The loosening period is from September 2011 to March 2013 and the tightening period is from April 2013 to September 2016.

Table 4: Government direct credit outcomes: SME credit, loosening period

	(1)	(2)	(3)
Monetary policy	2.443*	2.224*	0.348
	(1.241)	(1.272)	(0.703)
Monetary policy * government bank	1.210***	1.380***	1.371***
	(0.351)	(0.335)	(0.295)
Observations	19,519,976	13,758,039	13,241,197
R-squared	0.792	0.769	0.787
Firm-Bank FE	Yes	Yes	Yes
Region-Industry-Time FE	Yes	Yes	No
Firm-Time FE	No	No	Yes
Bank-Time FE	No	No	No
Firms borrowing from more than 1 bank	No	Yes	Yes

Notes: This table reports estimates of equation (1). The dependent variable is the interest rate of a new loan in a given month. Monetary policy is the one-month lagged policy rate, measured by SELIC (in percent). Government bank is a dummy variable for Brazilian government banks. The set of controls includes macroeconomic controls and loan-level controls. Macroeconomic controls include one-month lagged annual growth rates of all countries' GDPs and CPIs, all interacted with the indicator variable of the bank's country origin. These variables control for the business cycle and allow us to isolate the effect of monetary policy from other changes in economic activity. Loan-level controls include loan amount, collateral, loan ratings, and loan maturity. Loan amount is measured in natural logarithm. Collateral is a dummy variable that takes the value of one if there is a collateral. Loan ratings are dummy variables of the loan. There are nine ratings but we consider only the top four ratings, which account for most of the observations. The base-case is the worst rating. Loan maturity is the time to maturity measured in months. Standard errors (in parentheses) are clustered by at the bank and month level. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent, respectively.

Table 5: The role of government direct credit: SME credit, tightening period

	(1)	(2)	(3)
Monetary policy	0.273	0.360	0.750**
	(0.300)	(0.317)	(0.283)
Monetary policy * government bank	2.557***	2.367***	2.401***
	(0.820)	(0.715)	(0.635)
Observations	41,693,450	28,671,643	27,610,355
R-squared	0.752	0.732	0.762
Firm-Bank FE	Yes	Yes	Yes
Region-Industry-Time FE	Yes	Yes	No
Firm-Time FE	No	No	Yes
Bank-Time FE	No	No	No
Firms borrowing from more than 1 bank	No	Yes	Yes

Notes: This table reports estimates of equation (1). The dependent variable is the interest rate of a new loan in a given month. Monetary policy is the one-month lagged policy rate, measured by SELIC (in percent). Government bank is a dummy variable for Brazilian government banks. The set of controls includes macroeconomic controls and loan-level controls. Macroeconomic controls include one-month lagged annual growth rates of all countries' GDPs and CPIs, all interacted with the indicator variable of the bank's country origin. These variables control for the business cycle and allow us to isolate the effect of monetary policy from other changes in economic activity. Loan-level controls include loan amount, collateral, loan ratings, and loan maturity. Loan amount is measured in natural logarithm. Collateral is a dummy variable that takes the value of one if there is a collateral. Loan ratings are dummy variables of the loan. There are nine ratings but we consider only the top four ratings, which account for most of the observations. The base-case is the worst rating. Loan maturity is the time to maturity measured in months. Standard errors (in parentheses) are clustered by at the bank and month level. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent, respectively.

Table 6: The role of government direct credit: large firm credit, loosening period

	(1)	(2)	(3)
Monetary policy	-0.099	-0.050	0.713***
	(0.219)	(0.208)	(0.083)
Monetary policy * government bank	-0.176	-0.199	-0.367*
	(0.287)	(0.290)	(0.187)
Observations	1,014,705	946,523	960,060
R-squared	0.962	0.956	0.951
Firm-Bank FE	Yes	Yes	Yes
Region-Industry-Time FE	Yes	Yes	No
Firm-Time FE	No	No	Yes
Bank-Time FE	No	No	No
Firms borrowing from more than 1 bank	No	Yes	Yes

Notes: This table reports estimates of equation (1). The dependent variable is the interest rate of a new loan in a given month. Monetary policy is the one-month lagged policy rate, measured by SELIC (in percent). Government bank is a dummy variable for Brazilian government banks. The set of controls includes macroeconomic controls and loan-level controls. Macroeconomic controls include one-month lagged annual growth rates of all countries' GDPs and CPIs, all interacted with the indicator variable of the bank's country origin. These variables control for the business cycle and allow us to isolate the effect of monetary policy from other changes in economic activity. Loan-level controls include loan amount, collateral, loan ratings, and loan maturity. Loan amount is measured in natural logarithm. Collateral is a dummy variable that takes the value of one if there is a collateral. Loan ratings are dummy variables of the loan. There are nine ratings but we consider only the top four ratings, which account for most of the observations. The base-case is the worst rating. Loan maturity is the time to maturity measured in months. Standard errors (in parentheses) are clustered by at the bank and month level. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent, respectively.

Table 7: The role of government direct credit: large firm credit, tightening period

	(1)	(2)	(3)
Monetary policy	-0.203	-0.124	0.292***
	(0.227)	(0.226)	(0.106)
Monetary policy * government bank	0.457	0.448	0.575
	(0.354)	(0.343)	(0.343)
Observations	3,018,239	2,847,729	2,876,672
R-squared	0.723	0.706	0.696
Firm-Bank FE	Yes	Yes	Yes
Region-Industry-Time FE	Yes	Yes	No
Firm-Time FE	No	No	Yes
Bank-Time FE	No	No	No
Firms borrowing from more than 1 bank	No	Yes	Yes

Notes: This table reports estimates of equation (1). The dependent variable is the interest rate of a new loan in a given month. Monetary policy is the one-month lagged policy rate, measured by SELIC (in percent). Government bank is a dummy variable for Brazilian government banks. The set of controls includes macroeconomic controls and loan-level controls. Macroeconomic controls include one-month lagged annual growth rates of all countries' GDPs and CPIs, all interacted with the indicator variable of the bank's country origin. These variables control for the business cycle and allow us to isolate the effect of monetary policy from other changes in economic activity. Loan-level controls include loan amount, collateral, loan ratings, and loan maturity. Loan amount is measured in natural logarithm. Collateral is a dummy variable that takes the value of one if there is a collateral. Loan ratings are dummy variables of the loan. There are nine ratings but we consider only the top four ratings, which account for most of the observations. The base-case is the worst rating. Loan maturity is the time to maturity measured in months. Standard errors (in parentheses) are clustered by at the bank and month level. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent, respectively.

Table 8: The role of earmarked credit exposure: SME credit, loosening period

	(1)	(2)	(3)	(4)
Monetary policy	2.172	1.932	-0.129	
	(1.377)	(1.427)	(0.704)	
Monetary policy * Earmarked exposure * Non-earmarked loans	-0.111	0.029	-0.267	-0.248
	(0.457)	(0.452)	(0.556)	(0.539)
Earmarked exposure * Non-earmarked loans	-5.026	-2.097	1.941	1.755
	(6.467)	(6.888)	(8.884)	(8.345)
Monetary policy * Earmarked exposure	0.443	0.328	0.600	0.577
	(0.515)	(0.496)	(0.615)	(0.610)
Monetary policy * Non-earmarked loans	0.212	0.270	0.439	0.486
	(0.376)	(0.403)	(0.413)	(0.413)
Earmarked exposure	8.717	7.448	4.929	5.378
	(5.550)	(6.036)	(7.642)	(7.338)
Non-earmarked loans	-3.233	-2.185	-4.778	-5.249
	(8.806)	(8.984)	(11.088)	(10.484)
Observations	15,195,866	10,488,305	10,007,734	10,007,095
R-squared	0.781	0.763	0.781	0.783
Firm-Bank FE	Yes	Yes	Yes	Yes
Region-Industry-Time FE	Yes	Yes	No	No
Firm-Time FE	No	No	Yes	Yes
Bank-Time FE	No	No	No	Yes
Firms borrowing from more than 1 bank	No	Yes	Yes	Yes

Notes: This table reports estimates of equation (2). The dependent variable is the interest rate of a new loan in a given month. Monetary policy is the one-month lagged policy rate, measured by SELIC (in percent). Non-earmarked loans is a dummy variable that takes a value of one for non-earmarked credit. Earmarked exposure is earmarked credit as a share of total credit for a bank-firm pair in a given month. The set of controls includes macroeconomic controls and loan-level controls. Macroeconomic controls include one-month lagged annual growth rates of all countries' GDPs and CPIs, all interacted with the indicator variable of the bank's country origin. These variables control for the business cycle and allow us to isolate the effect of monetary policy from other changes in economic activity. Loan-level controls include loan amount, collateral, loan ratings, and loan maturity. Loan amount is measured in natural logarithm. Collateral is a dummy variable that takes the value of one if there is a collateral. Loan ratings are dummy variables of the loan. There are nine ratings but we consider only the top four ratings, which account for most of the observations. The base-case is the worst rating. Loan maturity is the time to maturity measured in months. Standard errors (in parentheses) are clustered by at the bank and month level. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent, respectively.

Table 9: The role of earmarked credit exposure: SME credit, tightening period

	(1)	(2)	(3)	(4)
Monetary policy	0.100	0.229	0.490	
	(0.707)	(0.575)	(0.686)	
Monetary policy * Earmarked exposure * Non-earmarked loans	-0.781	-0.366	0.020	-0.158
	(0.778)	(0.724)	(0.887)	(0.901)
Earmarked exposure * Non-earmarked loans	4.158	4.815	6.476	8.416
	(11.544)	(10.730)	(11.726)	(11.224)
Monetary policy * Earmarked exposure	0.872	0.564	0.551	0.663
	(0.770)	(0.704)	(0.782)	(0.806)
Monetary policy * Non-earmarked loans	0.452	0.397	0.453	0.617
	(0.779)	(0.657)	(0.786)	(0.785)
Earmarked exposure	5.540	4.837	0.480	0.223
	(8.786)	(8.024)	(8.835)	(9.295)
Non-earmarked loans	-0.105	0.601	-2.504	-4.396
	(9.262)	(8.697)	(10.577)	(10.461)
Observations	31,107,576	21,085,361	20,135,008	20,133,041
R-squared	0.770	0.753	0.780	0.782
Firm-Bank FE	Yes	Yes	Yes	Yes
Region-Industry-Time FE	Yes	Yes	No	No
Firm-Time FE	No	No	Yes	Yes
Bank-Time FE	No	No	No	Yes
Firms borrowing from more than 1 bank	No	Yes	Yes	Yes

Notes: This table reports estimates of equation (2). The dependent variable is the interest rate of a new loan in a given month. Monetary policy is the one-month lagged policy rate, measured by SELIC (in percent). Non-earmarked loans is a dummy variable that takes a value of one for non-earmarked credit. Earmarked exposure is earmarked credit as a share of total credit for a bank-firm pair in a given month. The set of controls includes macroeconomic controls and loan-level controls. Macroeconomic controls include one-month lagged annual growth rates of all countries' GDPs and CPIs, all interacted with the indicator variable of the bank's country origin. These variables control for the business cycle and allow us to isolate the effect of monetary policy from other changes in economic activity. Loan-level controls include loan amount, collateral, loan ratings, and loan maturity. Loan amount is measured in natural logarithm. Collateral is a dummy variable that takes the value of one if there is a collateral. Loan ratings are dummy variables of the loan. There are nine ratings but we consider only the top four ratings, which account for most of the observations. The base-case is the worst rating. Loan maturity is the time to maturity measured in months. Standard errors (in parentheses) are clustered by at the bank and month level. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent, respectively.

Table 10: The role of earmarked credit exposure: large firm credit, loosening period

	(1)	(2)	(3)	(4)
Monetary policy	-3.187	-3.330	-2.483	
	(2.238)	(2.271)	(2.181)	
Monetary policy * Earmarked exposure * Non-earmarked loans	-2.388	-2.553	-2.616	-2.749
	(2.260)	(2.286)	(2.129)	(2.140)
Earmarked exposure * Non-earmarked loans	33.698*	35.900*	34.361*	34.218*
	(19.314)	(19.133)	(17.726)	(17.863)
Monetary policy * Earmarked exposure	2.017	2.158	2.306	2.430
	(2.132)	(2.161)	(2.017)	(2.017)
Monetary policy * Non-earmarked loans	3.106	3.292	3.230	3.264
	(2.262)	(2.277)	(2.181)	(2.195)
Earmarked exposure	-27.541	-29.322	-29.164*	-29.355*
	(17.425)	(17.330)	(16.136)	(16.092)
Non-earmarked loans	-28.106	-29.333	-28.155	-28.302
	(20.000)	(20.213)	(19.305)	(19.447)
Observations	955,384	889,361	902,597	902,141
R-squared	0.963	0.958	0.953	0.955
Firm-Bank FE	Yes	Yes	Yes	Yes
Region-Industry-Time FE	Yes	Yes	No	No
Firm-Time FE	No	No	Yes	Yes
Bank-Time FE	No	No	No	Yes
Firms borrowing from more than 1 bank	No	Yes	Yes	Yes

Notes: This table reports estimates of equation (2). The dependent variable is the interest rate of a new loan in a given month. Monetary policy is the one-month lagged policy rate, measured by SELIC (in percent). Non-earmarked loans is a dummy variable that takes a value of one for non-earmarked credit. Earmarked exposure is earmarked credit as a share of total credit for a bank-firm pair in a given month. The set of controls includes macroeconomic controls and loan-level controls. Macroeconomic controls include one-month lagged annual growth rates of all countries' GDPs and CPIs, all interacted with the indicator variable of the bank's country origin. These variables control for the business cycle and allow us to isolate the effect of monetary policy from other changes in economic activity. Loan-level controls include loan amount, collateral, loan ratings, and loan maturity. Loan amount is measured in natural logarithm. Collateral is a dummy variable that takes the value of one if there is a collateral. Loan ratings are dummy variables of the loan. There are nine ratings but we consider only the top four ratings, which account for most of the observations. The base-case is the worst rating. Loan maturity is the time to maturity measured in months. Standard errors (in parentheses) are clustered by at the bank and month level. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent, respectively.

Table 11: The role of earmarked credit exposure: large firm credit, tightening period

	(1)	(2)	(3)	(4)
Monetary policy	-0.716	-0.700	-0.227	
	(0.459)	(0.433)	(0.361)	
Monetary policy * Earmarked exposure * Non-earmarked loans	-0.834***	-0.956***	-0.685**	-0.786***
	(0.176)	(0.179)	(0.261)	(0.224)
Earmarked exposure * Non-earmarked loans	10.587***	11.492***	8.175***	8.408***
	(1.811)	(1.676)	(2.357)	(2.204)
Monetary policy * Earmarked exposure	0.786***	0.892***	1.047***	1.083***
	(0.290)	(0.266)	(0.260)	(0.229)
Monetary policy * Non-earmarked loans	0.503	0.568	0.498	0.534
	(0.396)	(0.369)	(0.355)	(0.337)
Earmarked exposure	-6.493**	-7.311***	-5.717*	-7.930***
	(2.695)	(2.523)	(2.968)	(2.653)
Non-earmarked loans	0.774	0.685	2.159	1.918
	(2.303)	(2.016)	(1.823)	(1.700)
Observations	2,944,255	2,775,334	2,804,191	2,802,663
R-squared	0.725	0.707	0.698	0.709
Firm-Bank FE	Yes	Yes	Yes	Yes
Region-Industry-Time FE	Yes	Yes	No	No
Firm-Time FE	No	No	Yes	Yes
Bank-Time FE	No	No	No	Yes
Firms borrowing from more than 1 bank	No	Yes	Yes	Yes

Notes: This table reports estimates of equation (2). The dependent variable is the interest rate of a new loan in a given month. Monetary policy is the one-month lagged policy rate, measured by SELIC (in percent). Non-earmarked loans is a dummy variable that takes a value of one for non-earmarked credit. Earmarked exposure is earmarked credit as a share of total credit for a bank-firm pair in a given month. The set of controls includes macroeconomic controls and loan-level controls. Macroeconomic controls include one-month lagged annual growth rates of all countries' GDPs and CPIs, all interacted with the indicator variable of the bank's country origin. These variables control for the business cycle and allow us to isolate the effect of monetary policy from other changes in economic activity. Loan-level controls include loan amount, collateral, loan ratings, and loan maturity. Loan amount is measured in natural logarithm. Collateral is a dummy variable that takes the value of one if there is a collateral. Loan ratings are dummy variables of the loan. There are nine ratings but we consider only the top four ratings, which account for most of the observations. The base-case is the worst rating. Loan maturity is the time to maturity measured in months. Standard errors (in parentheses) are clustered by at the bank and month level. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent, respectively.

Table 12: The role of earmarked credit relationship length: SME credit, loosening period

	(1)	(2)	(3)	(4)
Monetary policy	2.597	2.139	0.042	
	(1.683)	(1.653)	(0.810)	
Monetary policy * Relationship length * Non-earmarked loans	0.001	-0.001	-0.002	-0.002
	(0.003)	(0.002)	(0.002)	(0.002)
Relationship length * Non-earmarked loans	-0.043***	-0.039**	-0.038**	-0.037**
	(0.014)	(0.016)	(0.016)	(0.014)
Monetary policy * Relationship length	-0.000	0.001	0.002	0.002
	(0.003)	(0.002)	(0.002)	(0.002)
Monetary policy * Non-earmarked loans	-0.107	0.207	0.301	0.365
	(0.597)	(0.516)	(0.571)	(0.530)
Relationship length	0.070**	0.053**	0.045**	0.048*
	(0.030)	(0.023)	(0.018)	(0.023)
Non-earmarked loans	-2.830	-0.546	-0.860	-1.332
	(7.754)	(6.896)	(8.007)	(8.221)
Observations	13,700,121	9,471,539	9,004,161	9,003,529
R-squared	0.783	0.765	0.782	0.784
Firm-Bank FE	Yes	Yes	Yes	Yes
Region-Industry-Time FE	Yes	Yes	No	No
Firm-Time FE	No	No	Yes	Yes
Bank-Time FE	No	No	No	Yes
Firms borrowing from more than 1 bank	No	Yes	Yes	Yes

Notes: This table reports estimates of equation (3). The dependent variable is the interest rate of a new loan in a given month. Monetary policy is the one-month lagged policy rate, measured by SELIC (in percent). Non-earmarked loans is a dummy variable that takes a value of one for non-earmarked credit. Relationship length is the length of earmarked relationship measured as the number of months since a bank-firm pair established an earmarked lending relationship. The set of controls includes macroeconomic controls and loan-level controls. Macroeconomic controls include one-month lagged annual growth rates of all countries' GDPs and CPIs, all interacted with the indicator variable of the bank's country origin. These variables control for the business cycle and allow us to isolate the effect of monetary policy from other changes in economic activity. Loan-level controls include loan amount, collateral, loan ratings, and loan maturity. Loan amount is measured in natural logarithm. Collateral is a dummy variable that takes the value of one if there is a collateral. Loan ratings are dummy variables of the loan. There are nine ratings but we consider only the top four ratings, which account for most of the observations. The base-case is the worst rating. Loan maturity is the time to maturity measured in months. Standard errors (in parentheses) are clustered by at the bank and month level. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent, respectively.

Table 13: The role of earmarked credit relationship length: SME credit, tightening period

	(1)	(2)	(3)	(4)
Monetary policy	0.385	0.093	0.125	
	(0.487)	(0.500)	(0.513)	
Monetary policy * Relationship length * Non-earmarked loans	-0.005**	-0.006***	-0.006**	-0.006**
	(0.002)	(0.002)	(0.003)	(0.002)
Relationship length * Non-earmarked loans	0.034	0.028	0.025	0.025
	(0.022)	(0.019)	(0.020)	(0.024)
Monetary policy * Relationship length	0.005*	0.006**	0.005*	0.006**
	(0.003)	(0.002)	(0.003)	(0.003)
Monetary policy * Non-earmarked loans	0.325	0.697*	0.934**	1.034**
	(0.460)	(0.388)	(0.438)	(0.472)
Relationship length	-0.048*	-0.043**	-0.022	-0.018
	(0.025)	(0.019)	(0.020)	(0.026)
Non-earmarked loans	-1.826	-0.182	-0.985	-1.872
	(4.240)	(3.811)	(5.021)	(5.268)
Observations	28,960,631	19,660,398	18,728,262	18,726,360
R-squared	0.770	0.752	0.780	0.782
Firm-Bank FE	Yes	Yes	Yes	Yes
Region-Industry-Time FE	Yes	Yes	No	No
Firm-Time FE	No	No	Yes	Yes
Bank-Time FE	No	No	No	Yes
Firms borrowing from more than 1 bank	No	Yes	Yes	Yes

Notes: This table reports estimates of equation (3). The dependent variable is the interest rate of a new loan in a given month. Monetary policy is the one-month lagged policy rate, measured by SELIC (in percent). Non-earmarked loans is a dummy variable that takes a value of one for non-earmarked credit. Relationship length is the length of earmarked relationship measured as the number of months since a bank-firm pair established an earmarked lending relationship. The set of controls includes macroeconomic controls and loan-level controls. Macroeconomic controls include one-month lagged annual growth rates of all countries' GDPs and CPIs, all interacted with the indicator variable of the bank's country origin. These variables control for the business cycle and allow us to isolate the effect of monetary policy from other changes in economic activity. Loan-level controls include loan amount, collateral, loan ratings, and loan maturity. Loan amount is measured in natural logarithm. Collateral is a dummy variable that takes the value of one if there is a collateral. Loan ratings are dummy variables of the loan. There are nine ratings but we consider only the top four ratings, which account for most of the observations. The base-case is the worst rating. Loan maturity is the time to maturity measured in months. Standard errors (in parentheses) are clustered by at the bank and month level. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent, respectively.

Table 14: The role of earmarked credit relationship length: large firm credit, loosening period

	(1)	(2)	(3)	(4)
Monetary policy	-1.938	-1.971	-1.082	
	(1.200)	(1.244)	(1.224)	
Monetary policy * Relationship length * Non-earmarked loans	-0.004	-0.004	-0.003	-0.004
	(0.003)	(0.003)	(0.003)	(0.004)
Relationship length * Non-earmarked loans	0.008	0.011	0.009	0.011
	(0.018)	(0.019)	(0.020)	(0.020)
Monetary policy * Relationship length	0.004	0.004	0.004	0.004
	(0.003)	(0.003)	(0.003)	(0.004)
Monetary policy * Non-earmarked loans	1.935	2.013	1.842	1.866
	(1.258)	(1.287)	(1.231)	(1.288)
Relationship length	-0.014	-0.016	-0.013	-0.014
	(0.017)	(0.018)	(0.019)	(0.019)
Non-earmarked loans	-9.478	-10.244	-8.637	-9.220
	(10.304)	(10.817)	(10.048)	(10.437)
Observations	873,899	813,047	824,639	824,233
R-squared	0.965	0.960	0.955	0.957
Firm-Bank FE	Yes	Yes	Yes	Yes
Region-Industry-Time FE	Yes	Yes	No	No
Firm-Time FE	No	No	Yes	Yes
Bank-Time FE	No	No	No	Yes
Firms borrowing from more than 1 bank	No	Yes	Yes	Yes

Notes: This table reports estimates of equation (3). The dependent variable is the interest rate of a new loan in a given month. Monetary policy is the one-month lagged policy rate, measured by SELIC (in percent). Non-earmarked loans is a dummy variable that takes a value of one for non-earmarked credit. Relationship length is the length of earmarked relationship measured as the number of months since a bank-firm pair established an earmarked lending relationship. The set of controls includes macroeconomic controls and loan-level controls. Macroeconomic controls include one-month lagged annual growth rates of all countries' GDPs and CPIs, all interacted with the indicator variable of the bank's country origin. These variables control for the business cycle and allow us to isolate the effect of monetary policy from other changes in economic activity. Loan-level controls include loan amount, collateral, loan ratings, and loan maturity. Loan amount is measured in natural logarithm. Collateral is a dummy variable that takes the value of one if there is a collateral. Loan ratings are dummy variables of the loan. There are nine ratings but we consider only the top four ratings, which account for most of the observations. The base-case is the worst rating. Loan maturity is the time to maturity measured in months. Standard errors (in parentheses) are clustered by at the bank and month level. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent, respectively.

Table 15: The role of earmarked credit relationship length: large firm credit, tightening period

	(1)	(2)	(3)	(4)
Monetary policy	-1.098***	-1.011***	-0.659***	
	(0.349)	(0.344)	(0.240)	
Monetary policy * Relationship length * Non-earmarked loans	-0.004***	-0.004***	-0.004***	-0.005***
	(0.001)	(0.001)	(0.001)	(0.001)
Relationship length * Non-earmarked loans	0.006	0.007	0.009	0.011
	(0.014)	(0.014)	(0.015)	(0.016)
Monetary policy * Relationship length	0.005***	0.005***	0.005***	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)
Monetary policy * Non-earmarked loans	0.855***	0.862***	0.879***	0.940***
	(0.211)	(0.204)	(0.208)	(0.208)
Relationship length	-0.012	-0.012	-0.012	-0.015
	(0.014)	(0.015)	(0.015)	(0.017)
Non-earmarked loans	5.986***	6.485***	6.268***	5.482**
	(2.064)	(2.011)	(1.986)	(2.143)
Observations	2,751,795	2,594,433	2,620,653	2,619,223
R-squared	0.729	0.712	0.703	0.714
Firm-Bank FE	Yes	Yes	Yes	Yes
Region-Industry-Time FE	Yes	Yes	No	No
Firm-Time FE	No	No	Yes	Yes
Bank-Time FE	No	No	No	Yes
Firms borrowing from more than 1 bank	No	Yes	Yes	Yes

Notes: This table reports estimates of equation (3). The dependent variable is the interest rate of a new loan in a given month. Monetary policy is the one-month lagged policy rate, measured by SELIC (in percent). Non-earmarked loans is a dummy variable that takes a value of one for non-earmarked credit. Relationship length is the length of earmarked relationship measured as the number of months since a bank-firm pair established an earmarked lending relationship. The set of controls includes macroeconomic controls and loan-level controls. Macroeconomic controls include one-month lagged annual growth rates of all countries' GDPs and CPIs, all interacted with the indicator variable of the bank's country origin. These variables control for the business cycle and allow us to isolate the effect of monetary policy from other changes in economic activity. Loan-level controls include loan amount, collateral, loan ratings, and loan maturity. Loan amount is measured in natural logarithm. Collateral is a dummy variable that takes the value of one if there is a collateral. Loan ratings are dummy variables of the loan. There are nine ratings but we consider only the top four ratings, which account for most of the observations. The base-case is the worst rating. Loan maturity is the time to maturity measured in months. Standard errors (in parentheses) are clustered by at the bank and month level. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent, respectively.

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