

Does Loan Portability Promote Bank Competition?*

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August 2, 2022

Very Preliminary and Incomplete

Abstract

Credit portability has been advocated as an important instrument to promote competition in the banking industry. In 2014, the Brazilian Central Bank (BCB) implemented a regulatory norm to facilitate consumers' credit portability. We explore the spatial local banking concentration in Brazil to investigate how this institutional change affected local credit markets. We show robust evidence that credit portability increased the volume of credit and reduced interest rates for types of loans most benefited by the law.

Keywords: bank competition, loan portability, household consumption

*We have benefited from helpful comments... Financial support from the Fundação de Amparo à Pesquisa do Estado de São Paulo (Fapesp) is gratefully acknowledged, grant 2021/00476-1. The views expressed in this article are those of the authors and do not necessarily represent those of the Central Bank of Brazil. Bonomo: Inspere (email: marcoacb@inspere.br), Cavalcanti: University of Cambridge, Sao Paulo School of Economics-FGV & CEPR (email: tvdc2@cam.ac.uk), Chertman: Central Bank of Brazil (email: fernando.chertman@bcb.gov.br), Fantinatti: Sao Paulo School of Economics-FGV (email: miranda.a.amanda@gmail.com)

1 Introduction

Consumer credit penetration has increased steadily over recent decades. There is currently more than \$41 trillion U.S. dollars in household debt in the world, equivalent to around 40% of GDP across countries¹. In Brazil, banking credit has increased from around 30% of GDP in 2007 to 48% in 2019, with household credit currently accounting for almost 60% of total credit.

Brazil experienced a significant economic expansion from 2005 to 2014. Loan to households were boosted by several legal reforms of the financial system and government programs targeted to increase the availability of credit to a significant fraction of the Brazilian population.²

The banking sector plays a central role in the functioning of the economy (e.g., Bernanke (1983)) and it is highly concentrated: averaging across countries, the share of assets held by the five largest banks in each country is 78%³, a number that has increased recently in several countries. In the United States, for instance, the share of assets held by the 5-largest banks increased from 30% in the mid-1990s to more than 45% in 2016. In Brazil, this share grew from 50% to more than 85% in the same period. The question of how to promote competition in the banking industry is particularly relevant to countries where spreads are higher and credit penetration is lower – both, probably, related to banks' market power.

One important intervention to foster competition in the banking industry implemented by the Brazilian Central Bank (BCB) was the enactment of Resolution nº 4,292, from December 20, 2013. This resolution came into force in May 2014 and implemented a regulatory norm to facilitate consumers' credit portability, establishing that a borrower can liquidate a credit transaction with a financial institution by creating a new one with a competitor. This BCB Resolution introduced important changes in the portability process, which had been initiated in 2006, but without being broadly effective. The new rules established

¹Calculations based on data from the Global Debt Database by the International Monetary Fund for 82 developed and developing countries with available data for 2016.

²Brazil introduced legal changes to facilitate repossession of collateral by financial institutions ("Lei de Alienação Fiduciária"), a new bankruptcy law, and a new law on payroll lending. Government programs targeting low-income households include "Bolsa Família" - a major conditional cash transfer program for education - and "Minha Casa Minha Vida" - which subsidizes house buying.

³World Bank Global Financial Development Database: <https://www.worldbank.org/en/publication/gfdr/data-financial-development-database>

more transparent and standardized procedures with the mandatory use of an electronic platform, developed by the BCB, to exchange information about the credit transaction between the two financial institutions. Besides, the new resolution imposed deadlines and penalties for the financial institutions that do not provide timely credit information. It established that consumers should not be charged for any costs related to credit portability.

The portability of credit creates leeway for price competition among banks, with the potential to increase rivalry. Loan portability allows for the exchange of information between banks because to transfer his/her credit, the client must present data from the previous contract to the new financial institution. Sharing information increases the share of private credit in the economy. The more information about the client the institution has, the more precise the definition of customer characteristics related to credit risk profiles.

As the new portability resolution facilitates the transfer of consumer credit across financial institutions, the opportunity cost of switching banks is expected to decrease, increasing competition in this market and reducing interest rates and spreads. It is expected that policies that promote rivalry in the banking industry will help expand the credit market and, consequently, of the economic activity. In this sense, there are few studies on the role of portability in the telecom industry, investigating several policy measures in different countries (Lee et al. (2006); Shi et al. (2006); Viard (2007)), all of them concluding that portability increased competition and reduced prices in telecom markets. To the best of our knowledge, the only paper that evaluated the credit portability for the Brazilian banking industry is Azevedo et al. (2019) and the authors find that credit spreads for types of credit susceptible to portability become significantly lower than credit spreads for other types of credit that were not benefited by the new law.

Related Literature Our research is directly related to Joaquin and van Doornik (2019). The authors find that (i) a reduction in bank competition increases lending spreads (the difference between lending and deposit rates) and decreases credit volume, all considered in relative terms. The decrease in volume occurs entirely through the extensive margin, i.e., fewer loans in equilibrium, and not smaller loans; (ii) the authors show that these effects on credit markets feed through to the real economy by providing evidence that M&A impact firms'

outputs of both tradable and non-tradable sectors, indicating that firm financing is relevant to real outcomes in some contexts.

In contrast, loan portability has been advocated as an important instrument to promote competition in the banking industry. Therefore, understanding the effects of banking competition amidst this institutional change on the volume of credit and interest rates is still an exciting and open question to be addressed. Thus, this paper tries to fill this void by analyzing the causal evidence of banking competition's effects on financial and real outcomes. To that end, we rely on the enactment of Resolution nº 4,292 as a source of exogenous variation in local competition and explore heterogeneous exposition to this episode across municipalities.

2 Data Description

In this paper, using a comprehensive consumer-level credit registry, we intend to examine the quantitative importance of loan portability law, bank concentration and the household credit channel. Brazil is the subject of our investigation since it offers us very detailed data. The credit register of the Brazilian Central Bank serves as our primary data source (SCR). It includes details about specific loans, including interest rates, loan amounts, maturities, credit risks, etc. Another source of banking information is the Monthly Bank Statistics by municipality (ESTBAN). It contains the balance sheet of each banking conglomerate as well as the number of branches per municipality. We additionally use the Brazilian matched employer-employee data collection (RAIS) and a government database that contains details on (often low-income) program participants for several studies (CadÚnico). For further information on the data, see Appendix A. From SCR, we extracted a representative sample of 12.8% of all borrowers (Garber et al. (2019)), more details in Appendix A. Tables 1 and 2 provide some summary statistics.

Table 1: Summary Statistics on payroll loans: interest rates (% p.a.), loan size (R\$) and maturity (days)

	N	mean	sd	p10	p50	p90
Payroll loans, total (1.000 R\$)	534390	5972.87	4707.33	262.07	1093.16	7732.78
Interest rate, % p.a.	534390	28.46	1.69	26.70	28.45	30.11
Weighted interest rate	534390	27.04	2.34	24.39	27.01	29.63
Maturity, days	534390	1901.33	185.34	1667.27	1904.09	2136.17
Weighted maturity	534390	2052.50	232.49	1747.51	2066.01	2344.05
Payroll loans (per capita)	534390	118.21	62.05	50.51	107.52	199.01
Selic interest rate, % p.a.	534390	9.76	2.97	6.50	9.50	14.25

Source: Central Bank's SCR data for a random sample of 15 million different individuals in 2011-2019, monthly.

Table 2 brings some descriptive statistics for municipalities with at least one bank for Dec/2014 and Dec/2018. Measures of concentration, such as HHI or the number of different bank branches confirm that banking markets in Brazil are very concentrated and somewhat heterogeneous in their degree of concentration due to the high standard deviation.

Table 2: Descriptive Statistics (ESTBAN)

	2014	2018
Loan to Household Volume (R\$ 1,000,000)		
Mean	122	148
Median	19	23
Stand. Dev.	2,249	2,853
# Branches (different banks)		
Mean	20	19
Median	7	6
Stand. Dev.	28	27
HHI		
Mean	0.40	0.42
Median	0.35	0.39
Stand. Dev.	0.23	0.23

3 Facts

3.1 Household Credit

Fact 1: Brazil has very high interest rates for consumer loans, even for “collateralized” credit types such as payroll and auto.

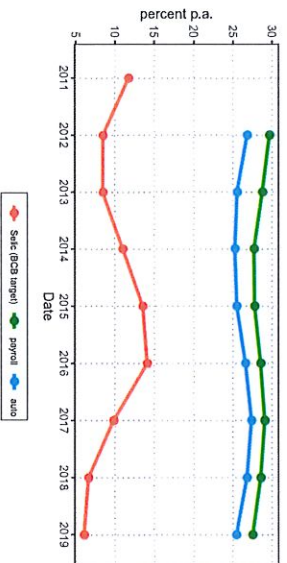


Figure 1: Effective Interest Rates (average)

SCR-BCB.

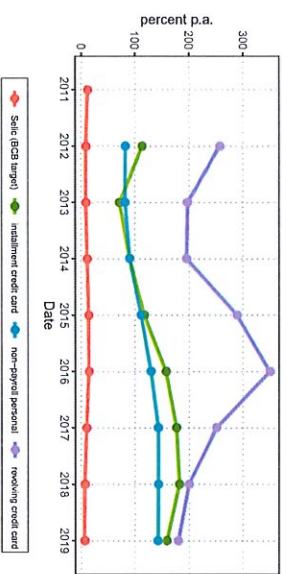


Figure 2: Effective Interest Rates (average)

SCR-BCB.

3.2 Payroll Loans

Payroll loans are a type of loan that allows banks to deduct payments directly from borrowers’ paycheck⁴.

Fact 2: Payroll loans are one of the loan types with the lowest interest rates and it is almost exclusive to public employees and retired individuals (Figure 4). From all payroll loans (2012-2020), public employees accounted for 59%, retired (INSS), 34%, and private sector employees, 7%.

⁴Law 10.820/2003

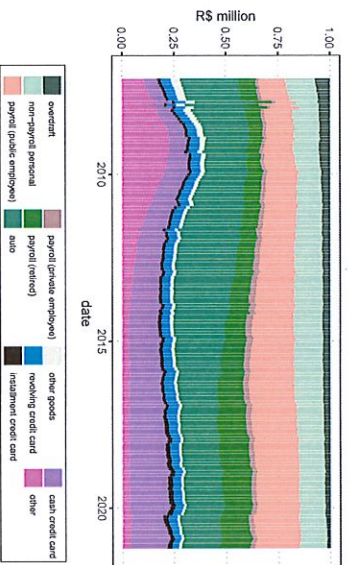


Figure 3: Non-earmarked Household Credit

Estadísticas monetárias e de crédito-BCB.

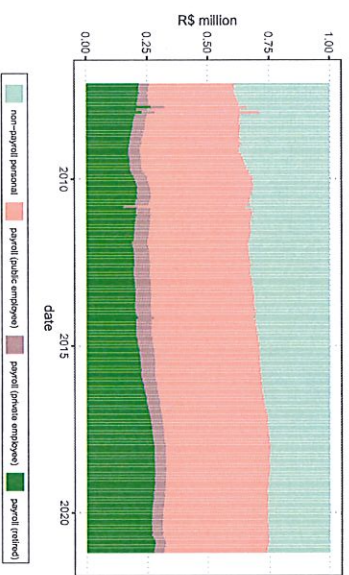


Figure 4: Non-earmarked Household Credit - Payroll vs. Non-Payroll Personal

Estadísticas monetárias e de crédito-BCB.

3.3 Loan Portability

Loan portability is the process of transferring a loan from one bank to a different bank in order to take advantage of lower interest rates. The BCB Resolution nº 4,292 introduced important changes in the portability process, which had been initiated in 2006, but without being broadly effective. The new rules established more transparent and standardized procedures with the mandatory use of an electronic platform, developed by the BCB, to exchange information about the credit transaction between the two financial institutions. Besides, the new resolution imposed deadlines and penalties for the financial institutions that do not provide timely credit information. This is an important intervention to foster competition in the banking industry.

Fact 3: The main loan ported is payroll, accounting for 95.6% of the value ported in 2019. The value ported represented 18.5% of new loans in 2019. Among these loans, historically, around 75% of the ported payroll loans came from retired individuals (Figure 5).

Table 3: Ported Loans

Description	R\$ million		Participation (%)		Participation (%) (in new loans)	
	2018	2019	2018	2019	2018	2019
Total Loans	27,726,4	39,892,0	100,0	100,0	1,5%	1,9%
Payroll Loans	27.111,8	38.148,4	97,8	95,6	16,5%	18,5%
Housing	591,2	1.697,1	2,1	4,3	3,5%	13,4%
Regulated	313,4	811,9	1,1	2,0	0,4%	0,9%
Non-regulated	271,8	868,3	1,0	2,2	3,1%	12,5%
Personal Loans	10,7	13,6	0,0	0,0	0,0%	0,0%
Auto Loans	12,7	32,9	0,0	0,1	0,0%	0,0%

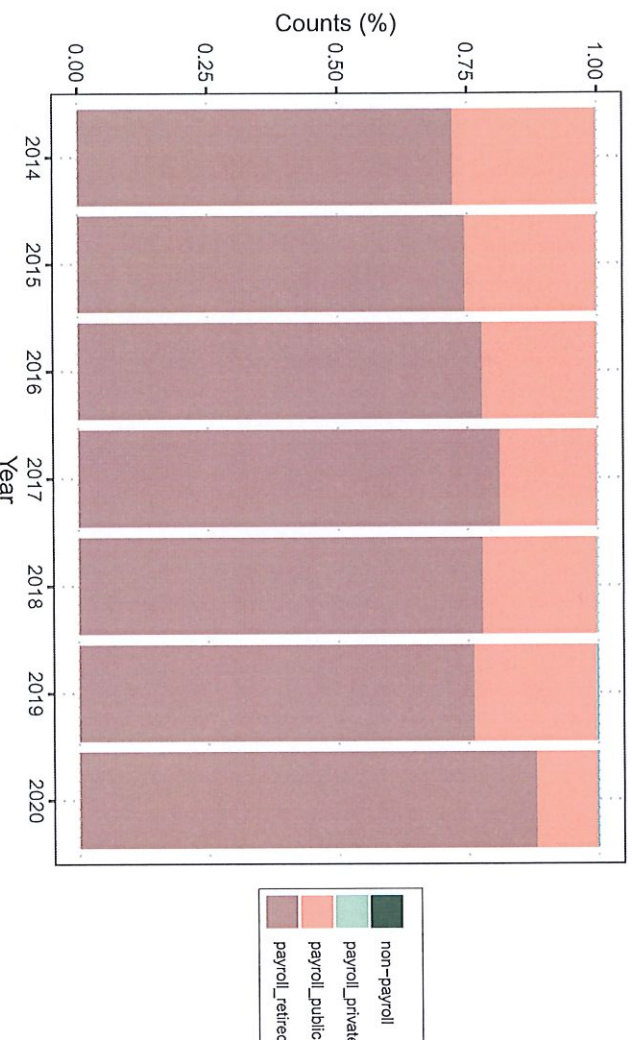


Figure 5: Ported Loans - Payroll vs. Non-Payroll Loans
SCR-BCB.

Fact 4: Any formal employee could have a ported payroll loan, however it is rarely the case for private sector employees (Figure 7). This facts presents another misallocation in the economy: public employees are better paid, in general, in Brazil (Cavalcanti and Santos (2020)) and, in case they need to access the credit market they probably will have a credit line with lower interest rates than the rest of the population (that are, actually, more subject to income shocks).

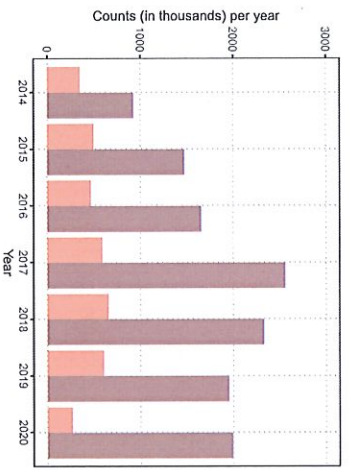


Figure 6: Ported Loans - Payroll Loans: Retired vs. Public SCR-BCB.

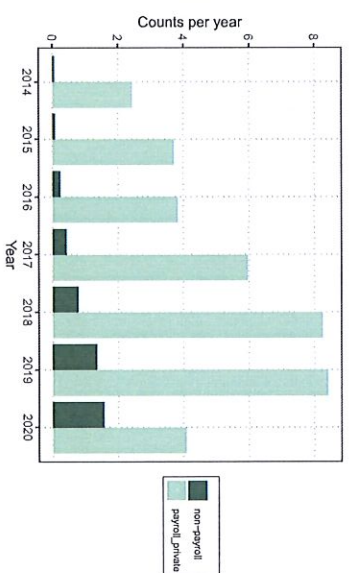


Figure 7: Ported Loans - Payroll Loans (Private Employee) vs. Non-Payroll Loans SCR-BCB.

Fact 5: In aggregate, loan portability did not change interest rates significantly (Figure 8). However, a more detailed look shows that this is basically due to ported payroll loans to retired individuals. Although difficult to point out the reason why, probably financial illiteracy plays an important role.

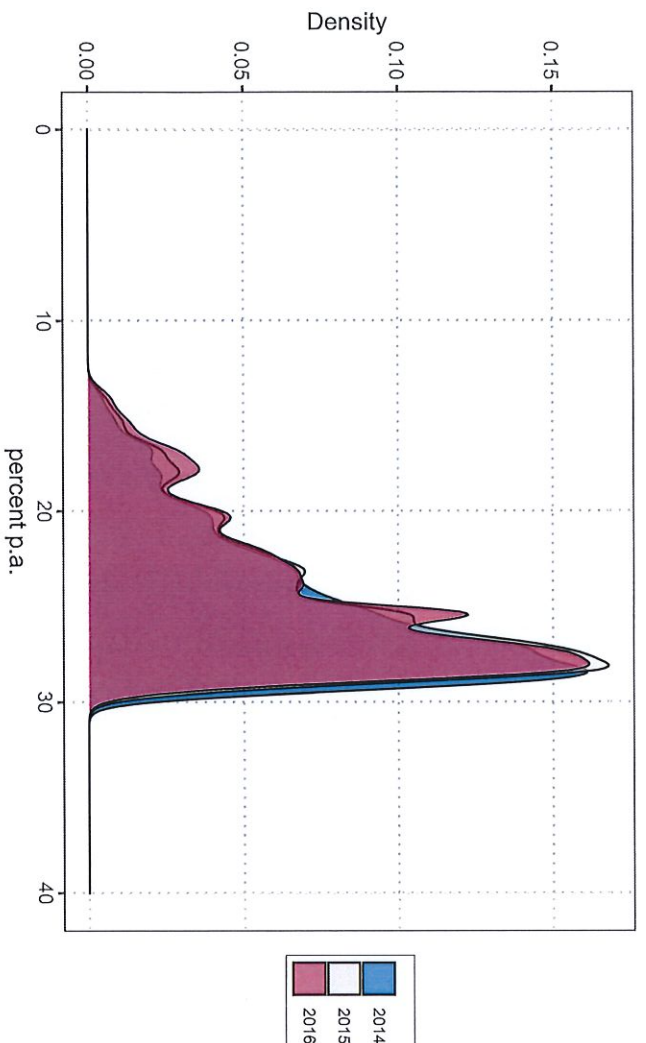


Figure 8: Effective Interest Rate of All Ported Loans SCR-BCB.

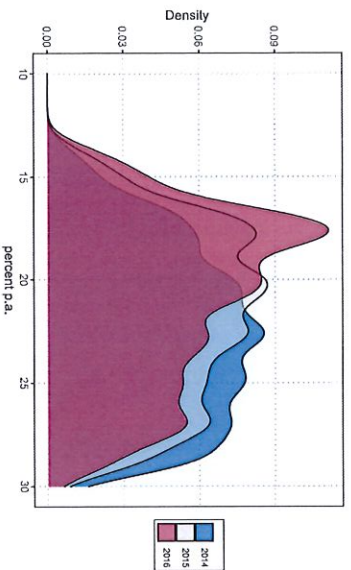


Figure 9: Effective Interest Rate for Ported Payroll Loans for Civil Servants SCR-BCB.

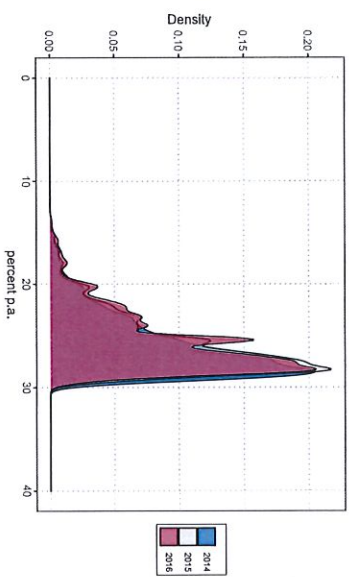


Figure 10: Effective Interest Rate for Ported Payroll Loans for Retirees SCR-BCB.

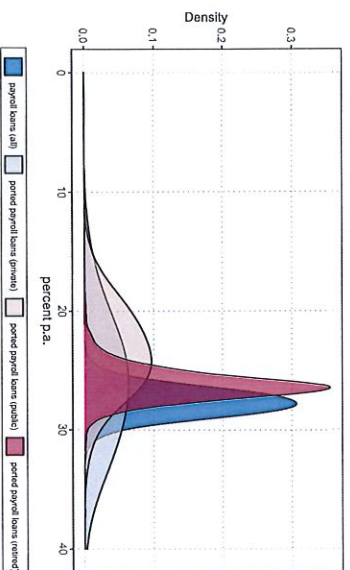


Figure 11: Payroll Loans - Effective Interest Rate in 2014 SCR-BCB.

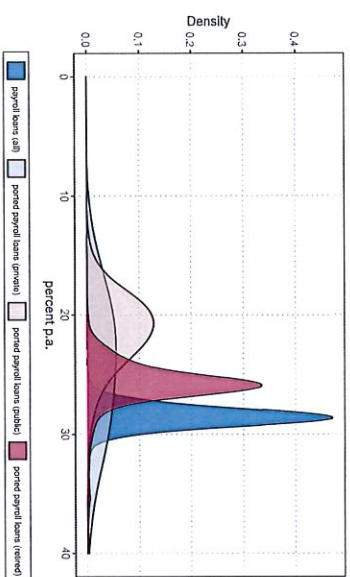


Figure 12: Payroll Loans - Effective Interest Rate in 2016 SCR-BCB.

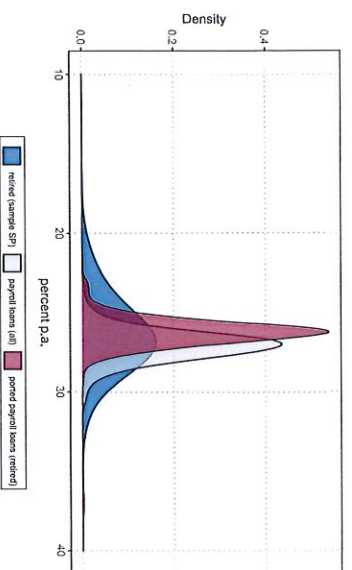


Figure 13: Payroll Loans - Effective Interest Rate in 2014 SCR-BCB.

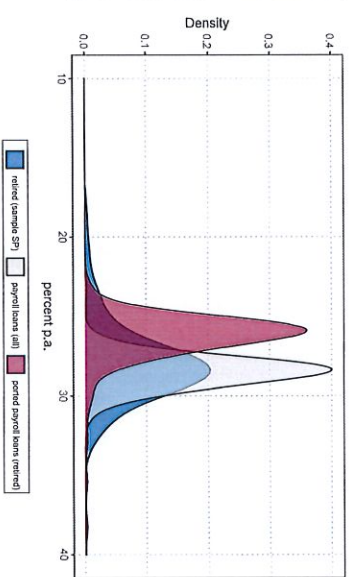


Figure 14: Payroll Loans - Effective Interest Rate in 2016 SCR-BCB.

3.4 Market concentration in the banking sector

Fact 6: Brazil's banking industry is highly concentrated.

Although highly developed and well regulated with high-level technology, Brazil's banking industry is highly concentrated. As already mentioned, Brazil's five most prominent institutions hold 85% of its financial assets, making Brazil one of the world's most concentrated markets. Therefore, banking market concentration in Brazil was already high, averaging 0.40, as measured by the HHI index⁵. Moreover, it increased even more in recent years (averaging 0.42 in 2018), as illustrated in Figure (15).

This concentration could lead to efficiencies gain and revert to lower interest rates and more substantial credit volumes from a theoretical perspective. On the other hand, banks could use this relationship lending/informational channel in their interest, and competition becomes detrimental to credit access. This theoretical ambiguity is reflected in empirical ambiguity. Consequently, identifying the effect of bank competition is challenging due to endogeneity, and for any source of identification, there is evidence that supports both views. This paper also aims at shading light to the relevant mechanism for Brazil.

⁵The Herfindahl-Hirschman Index (HHI) is a commonly accepted measure of market concentration. It is calculated by squaring each firm's market share competing in a market and then summing the resulting numbers. HHI above 0.25 is characteristic of highly concentrated markets.

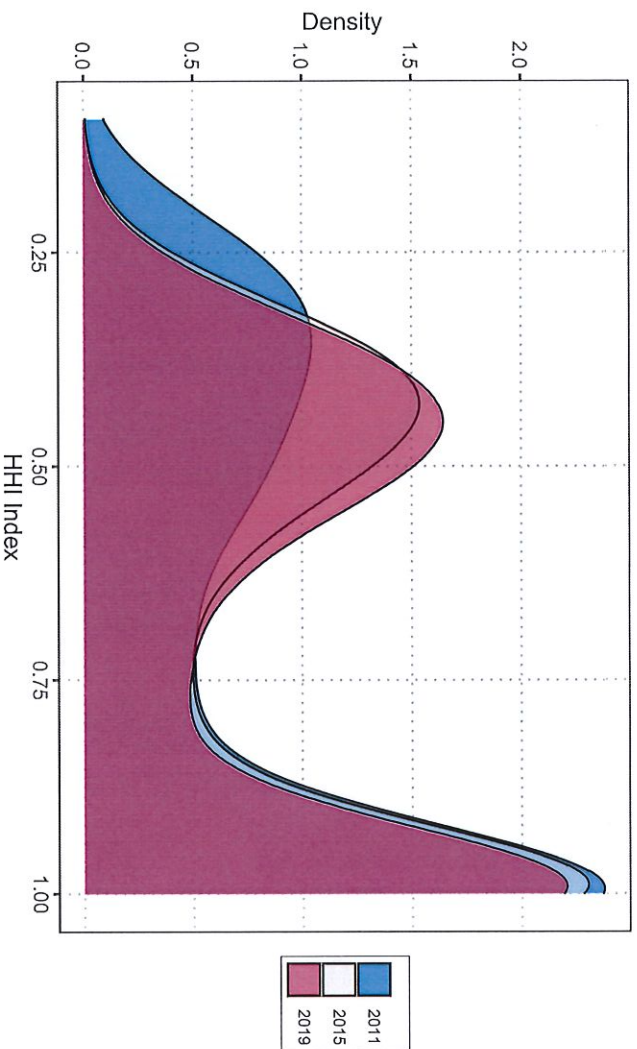


Figure 15: Hirschmann-Herfindahl Concentration Index of Credit Volume of the Brazilian Banking Sector by Municipalities in the period 2011-2019
Estban-BCB.

4 Methodology

4.1 Empirical Framework

This project aims to understand the effects of banking competition. In order to do so, we investigate how the quantity and price of credit changed in light of this institutional innovation. This effect is hard to identify because bank competition is not exogenous to these outcomes. For example, suppose a market receives a positive productivity shock. This shock will increase the total demand for lending and make the market more attractive to potential entrants, which changes incumbents' behavior and affects competition. We intend to overcome this identification challenge by using the enactment of Resolution nº 4,292 as a source of exogenous variation in local competition and explore heterogeneous exposition to this episode across municipalities.

Initially, we use a difference-in-difference (DiD) research design similar to the one used by Joaquin and van Doornik (2019) to estimate the effect of bank

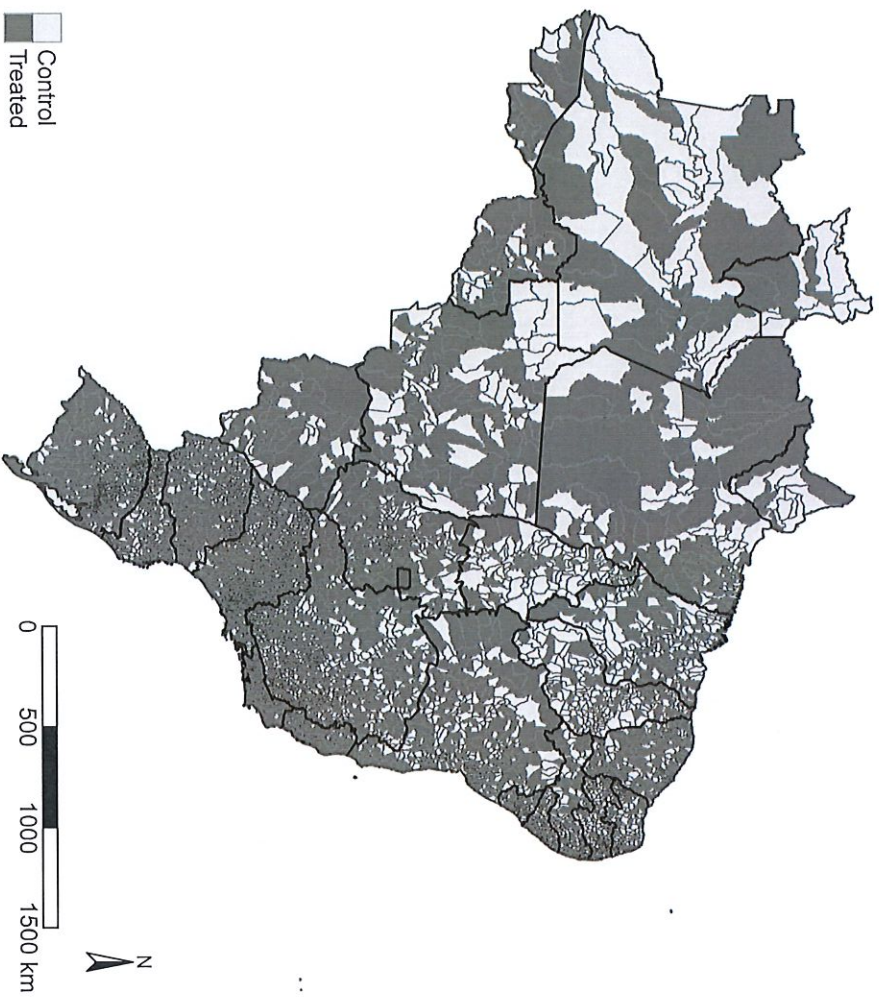


Figure 16: Treated and Control Municipalities in May, 2014
Estban-BCB.

competition on these outcomes. We compare outcomes for treated markets (markets exposed to the episode) with outcomes in the control group (not exposed) before and after the credit portability resolution. We say that a market is treated if it has at least two different bank branches at the enactment of this resolution. Figure 16 illustrates this heterogeneous exposure across municipalities for treated and control groups.

Our estimates' identifying assumption is that of parallel trends: absent this regulation, treatment, and control would have parallel outcomes (conditional on the market's characteristics) over time.

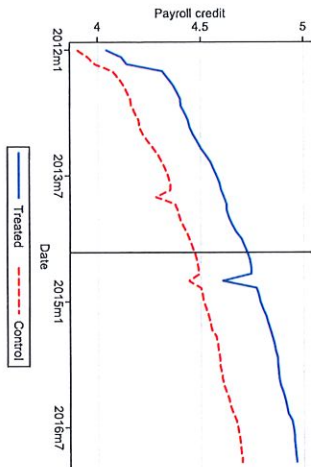


Figure 17: Payroll loans (per capita, in ln)
SCR-BCB.

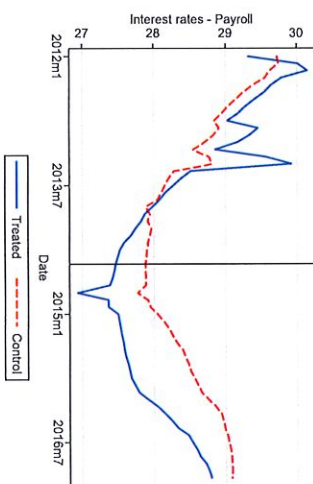


Figure 18: Interest rate (% p.a.)
SCR-BCB.

We focus on loan and household data aggregated at the municipality level⁶. Our baseline specification consists of the following DiD model:

$$y_{m,t} = \gamma_m + \gamma_t + \beta X_{m,t} + \delta TREAT_{m,t} \times POST_t + \varepsilon_{m,t} \quad (1)$$

where $y_{m,t}$ is consumer credit loan or interest rate for municipality m in month/year t ; γ_m and γ_t are municipality and time fixed-effects; $X_{m,t}$ is a vector of control variables that is allowed to have a varying effect over time β_t ; $T_{m,t}$ is a dummy that is equal to one if a municipality has more than two different bank branches in time t ; $TREAT_{m,t} \times POST_t$: interaction of the dummy with Loan Portability Resolution (May, 2014).

5 Results

5.1 The Effects of Loan Portability

5.1.1 Financial Outcomes

We report in Table 4 the estimates of Equation (1) on the volume of payroll loans per capita (in log). The rows of Table 4 represent the dependent variables. Each column in Table 4 represent a different regression (with different dependent variables). The coefficient δ in Equation (1) is the DiD causal effect

⁶There is a possibility of extending this analysis to the individual level using confidential data from SCR and RAIS.

we expect to estimate. The regressions confirm that the enactment of the loan portability resolution had a positive and significant effect in increasing the volume of payroll loans for the municipalities that had more than two different bank branches (i.e., for consumers that lived in a municipality that had the opportunity to switch credit to another bank in the same locality).

Table 4: Fixed effect estimate of the impact of the loan portability on payroll loans (per capita) by municipalities (sample: 201201 - 201612, all municipalities, in ln)

VARIABLES	FE (1)	FE (2)	FE (3)	FE (4)	FE (5)
Treated in May, 2014 x Post	0.0329*** (0.00795)	0.0275 (0.0200)	0.0334*** (0.00800)	0.0328*** (0.00794)	0.0312*** (0.00772)
Treated in May, 2014 x SELIC		0.00123 (0.00307)			
HHI Index			-0.0310** (0.0128)		-0.337*** (0.0605)
HHI Index sqrt					0.339*** (0.0623)
Constant	4.524*** (0.00179)	4.519*** (0.0106)	4.539*** (0.00540)	4.525*** (0.00179)	4.499*** (0.00812)
Observations	334,080	334,080	334,080	333,780	334,080
R-squared	0.952	0.952	0.952	0.952	0.952
Mun FE	YES	YES	YES	YES	YES
Date FE	YES	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Similarly, we report in Table 5 the estimates of Equation (1) on the interest rate of payroll loans. The rows of Table 5 represent the dependent variables. The regressions below show that the loan portability law helped decrease interest rates for this type of loan in the period analysed. Thus, these results confirm that the loan portability was an important fact to boost competitiveness in the credit market by increasing the volume of loans in the economy and decreasing its price.

Table 5: Fixed effect estimate of the impact of the loan portability on the effective annual interest rate by municipalities (sample: 201201 - 201612, all municipalities)

VARIABLES	FE (1)	FE (2)	FE (3)	FE (4)	FE (5)
Treated in May, 2014 x Post	-0.804*** (0.0774)	-0.249** (0.118)	-0.809*** (0.0773)	-0.803*** (0.0775)	-0.795*** (0.0765)
Treated in May, 2014 x SELIC		-0.126*** (0.0244)			
HHI Index			0.279*** (0.0718)		2.178*** (0.464)
HHI Index sqrt					-2.105*** (0.501)
Constant	28.64*** (0.0175)	29.13*** (0.0967)	28.51*** (0.0350)	28.64*** (0.0175)	28.75*** (0.0654)
Observations	333,992	333,992	333,992	333,692	333,992
R-squared	0.497	0.499	0.497	0.496	0.497
Mun FE	YES	YES	YES	YES	YES
Date FE	YES	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The map below (Figure 19) shows the effective interest rate for ported loans. This map confirms that between 2014 and 2017 interest rates decreased in most municipalities in Brazil.

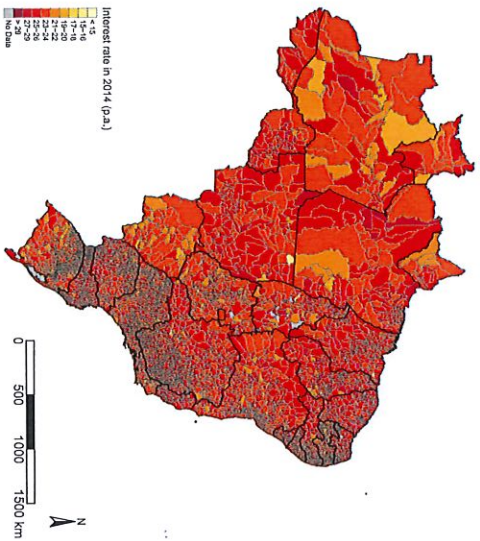


Figure 19: Interest Rate (2014)
SCR-BCB.

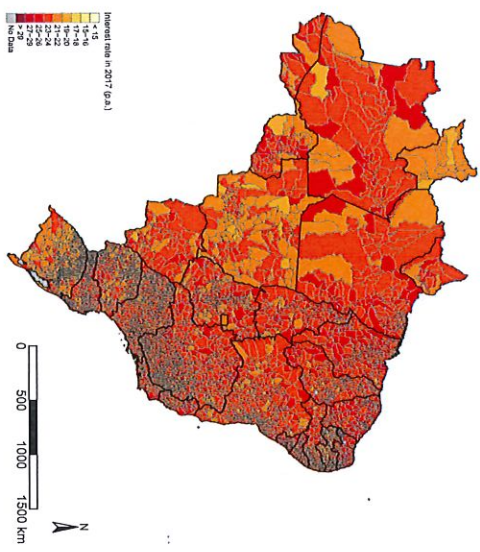


Figure 20: Interest Rate (2017)
SCR-BCB.

5.1.2 Extensions and Robustness

Table 6: Fixed effect estimate of the impact of the loan portability on housing loans (non-regulated) by municipalities (sample: 201201 - 201612, all municipalities, in ln)

VARIABLES	FE (1)	FE (2)	FE (3)	FE (4)	FE (5)
Treated in May, 2014 x Post	0.995*** (0.103)	0.552*** (0.116)	0.973*** (0.103)	0.984*** (0.102)	0.979*** (0.104)
Treated in May, 2014 x SELIC		0.119*** (0.0222)			
HHI Index			0.820*** (0.238)		2.011* (1.033)
HHI Index sqrt					-1.464 (1.227)
Constant	1.438*** (0.0499)	0.545*** (0.172)	1.046*** (0.124)	1.442*** (0.0494)	1.413*** (0.317)
Observations	93,893	93,893	93,893	93,814	93,893
R-squared	0.792	0.793	0.793	0.792	0.793
Mun FE	YES	YES	YES	YES	YES
Date FE	YES	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7: Fixed effect estimate of the impact of the loan portability on the effective annual interest rate for housing loans (non-regulated) by municipalities (sample: 201201 - 201612, all municipalities)

VARIABLES	FE (1)	FE (2)	FE (3)	FE (4)	FE (5)
Treated in May, 2014 x Post	-0.296** (0.137)	-0.212** (0.0853)	-0.279** (0.137)	-0.287** (0.137)	-0.280** (0.138)
Treated in May, 2014 x SELIC		-0.0227 (0.0295)			
HHI Index			-0.665* (0.333)		-1.017 (1.446)
HHI Index sqrt					0.433 (1.827)
Constant	10.36*** (0.0661)	10.53*** (0.276)	10.68*** (0.167)	10.36*** (0.0662)	10.57*** (0.516)
Observations	93,893	93,893	93,893	93,814	93,893
R-squared	0.740	0.740	0.740	0.740	0.740
Mun FE	YES	YES	YES	YES	YES
Date FE	YES	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Revolving credit card was not affected by the portability law:

Table 8: Fixed effect estimate of the impact of the loan portability on revolving credit card loans by municipalities (sample: 201201 - 201612, all municipalities, in ln)

VARIABLES	FE (1)	FE (2)	FE (3)	FE (4)	FE (5)
Treated in May, 2014 × Post	-0.283*** (0.0476)	-0.0706 (0.110)	-0.287*** (0.0478)	-0.289*** (0.0477)	-0.289*** (0.0476)
Treated in May, 2014 × SELIC		-0.0495** (0.0207)			
HHI Index			-0.0856** (0.0406)		-0.424** (0.169)
HHI Index sqrt					0.375* (0.189)
Constant	0.736*** (0.0108)	0.929*** (0.0789)	0.776*** (0.0182)	0.737*** (0.0108)	0.732*** (0.0314)
Observations	331,686	331,686	331,686	331,386	331,686
R-squared	0.728	0.728	0.728	0.728	0.728
Mun FE	YES	YES	YES	YES	YES
Date FE	YES	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 9: Fixed effect estimate of the impact of the loan portability on the effective annual interest rate for revolving credit card loans by municipalities (sample: 201201 - 201612, all municipalities)

VARIABLES	FE (1)	FE (2)	FE (3)	FE (4)	FE (5)
Treated in May, 2014 x Post	-9.142 (15.50)	-28.02 (30.02)	-9.375 (15.48)	-9.106 (15.49)	-8.097 (15.48)
Treated in May, 2014 x SELIC		4.301 (5.999)			
HHI Index			13.84*** (4.974)		187.3*** (27.40)
HHI Index sqrt					-192.3*** (31.01)
Constant	258.6*** (3.525)	241.9*** (23.72)	252.2*** (3.726)	258.6*** (3.526)	274.9*** (4.136)
Observations	331,686	331,686	331,686	331,386	331,686
R-squared	0.483	0.484	0.483	0.483	0.484
Mun FE	YES	YES	YES	YES	YES
Date FE	YES	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

5.2 Placebo

In order to confirm that the results estimated in Tables 4 and 5 are truly caused by the portability law, we estimated the placebo regressions below.

Table 10: Fixed effect estimate of the impact of the loan portability on payroll loans (per capita) by municipalities (**sample: 201201 - 201405**, all municipalities, in ln)

VARIABLES	FE (1)	FE (2)	FE (3)	FE (4)	FE (5)
Treated in May, 2013 x Post (May, 2013)	-0.0137*** (0.00449)	-0.0158*** (0.00536)	-0.0167*** (0.00486)	-0.0137*** (0.00449)	-0.0162*** (0.00483)
Treated in May, 2013 x SELIC		0.00141 (0.00134)			
HHI Index			-0.133*** (0.0302)		-0.0130 (0.0716)
HHI Index sqrt					-0.172 (0.102)
Constant	4.413*** (0.00132)	4.405*** (0.00694)	4.510*** (0.0224)	4.413*** (0.00132)	4.566*** (0.0423)
Observations	105,990	105,990	105,990	105,990	105,990
R-squared	0.969	0.969	0.969	0.969	0.969
Mun FE	YES	YES	YES	YES	YES
Date FE	YES	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 11: Fixed effect estimate of the impact of the loan portability on the effective annual interest rate by municipalities (**sample: 201201 - 201405**, all municipalities)

VARIABLES	FE (1)	FE (2)	FE (3)	FE (4)	FE (5)
Treated in May, 2013 × Post (May, 2013)	-0.0540 (0.0476)	0.0690 (0.0525)	-0.0495 (0.0473)	-0.0540 (0.0476)	-0.0476 (0.0475)
Treated in May, 2013 × SELIC		-0.0803*** (0.0217)			
HHI Index			0.203 (0.156)		0.683 (0.621)
HHI Index sqrt					-0.687 (0.779)
Constant	28.88*** (0.0140)	29.31*** (0.117)	28.73*** (0.113)	28.88*** (0.0140)	28.95*** (0.236)
Observations	105,961	105,961	105,961	105,961	105,961
R-squared	0.482	0.483	0.482	0.482	0.482
Mun FE	YES	YES	YES	YES	YES
Date FE	YES	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 12: Fixed effect estimate of the impact of the loan portability on housing loans (non-regulated) by municipalities (**sample: 201201 - 201405**, all municipalities, in ln)

VARIABLES	FE (1)	FE (2)	FE (3)	FE (4)	FE (5)
Treated in May, 2013 × Post (May, 2013)	0.447*** (0.0842)	0.431*** (0.0952)	0.444*** (0.0839)	0.447*** (0.0842)	0.431*** (0.0854)
Treated in May, 2013 × SELIC		0.00952 (0.0405)			
HHI Index			1.178*** (0.287)		-2.085 (2.412)
HHI Index sqrt					4.745 (3.767)
Constant	1.434*** (0.0381)	1.365*** (0.309)	0.839*** (0.163)	1.434*** (0.0381)	-0.793 (1.398)
Observations	33,016	33,016	33,016	33,016	33,016
R-squared	0.841	0.841	0.843	0.841	0.843
Mun FE	YES	YES	YES	YES	YES
Date FE	YES	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 13: Fixed effect estimate of the impact of the loan portability on the effective annual interest rate by municipalities (sample: 201201 - 201405, all municipalities)

VARIABLES	FE (1)	FE (2)	FE (3)	FE (4)	FE (5)
Treated in May, 2013 x Post (May, 2013)	-0.229*** (0.0780)	-0.182* (0.0930)	-0.227*** (0.0777)	-0.229*** (0.0780)	-0.212** (0.0798)
Treated in May, 2013 x SELIC		-0.0280 (0.0301)			
HHI Index			-0.795* (0.406)		2.788 (2.579)
HHI Index sqrt					-5.210 (3.867)
Constant	10.98*** (0.0353)	11.19*** (0.223)	11.38*** (0.210)	10.98*** (0.0353)	13.17*** (1.400)
Observations	33,016	33,016	33,016	33,016	33,016
R-squared	0.808	0.808	0.809	0.808	0.809
Mun FE	YES	YES	YES	YES	YES
Date FE	YES	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

6 Conclusion

The banking sector plays a central role in the functioning of the economy and is incredibly concentrated. Although highly developed and well regulated with high-level technology, Brazil's banking industry is highly concentrated, a factor enabling inefficiencies to emerge. Brazil's five most prominent institutions hold 85% of its financial assets, which makes Brazil one of the world's most concentrated markets. In 2014, Brazil's banking market concentration was already high, averaging 0.40, as measured by the HHI index, and it increased even more in the last couple of years (averaging 0.42 in 2018). The Central Bank of Brazil (BCB) has been implementing several measures to encourage competition, such as interest rate regulation and caps (on credit card, payroll lending, overdraft lending, etc.) and the aforementioned regulation on credit portability.

Thus, this papers analyzes the causal evidence of banking competition's ef-

fects on household consumption and economic activity in Brazil. To that end, we rely on the institutional setting that enacted the credit portability regulation (Resolution nº 4,292) as a source of exogenous variation in local competition and explore heterogeneous exposition across municipalities. Our results show that this law was effective to increase competition in this market by increasing the volume of loans and reducing its price at least for the loan types more susceptible by the law. However, we still see several inefficiencies / misallocation in the process. As shown, ported loan by public employees showed the highest decrease in interest rates, whereas interest rates charged in payroll loans for retirees changed very little. Therefore, there is room to improve this setting by advertising (some people do not know they can switch banks without costs and in a simple process, similar to a cell phone portability process). Also, it seems that some legal improvement in the payroll law (Law 10.820/2013) could boost payroll loans to private employees too and open up the possibility to port these loans in case faced with better credit conditions.

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Appendix

A Data Appendix

A.1 Description of Data Sets

- ESTBAN: contains the balance sheet of each banking conglomerate as well as the number of branches per municipality. To determine the amount of credit, we will use the following account entry: *verbeta 160 operacoes de credito*, which translates to “credit operations” in each bank’s asset. Additionally, from this dataset, we use the number of agencies in each municipality.
- Credit Information System (SCR): this dataset records detailed information on credit relationships between individuals and Brazilian banks. The data is transmitted monthly from financial institutions to the Central Bank of Brazil and covers all credit relationships of individuals that have a total exposure with a financial institution above a given reporting threshold⁷. This dataset is a confidential one at the individual level, and we already have a co-author at the BCB to access this information. The data contains detailed information on each transaction, including the type of debt, name of the lender, outstanding balance, interest rate, and maturity. For this project’s scope, we focus on credit (and debit, in another database) card consumption as a proxy for consumption. This dataset uniquely identifies the borrower in each credit relationship using fiscal code. This allows us to match credit relationships of each borrower with data on individual characteristics from the Annual Social Information System (RAIS) and Unique Registry for Social Programs (Cadastro Único), in case this project evolves to analyzing individuals instead of municipalities.
- Annual Social Information System (RAIS): This is a formal labor market dataset, and it is available publicly (without worker or firm identifiers).

⁷The reporting threshold has changed over time: 5,000 BRL in the period between January 2003 and December 2011, 1,000 BRL in the period between January 2011 and May 2016, 200 BRL in the period starting in June 2016.

We will drop firms that are not operating or have zero registered employees and workers that have wages equal to zero. For this project's scope, and since the credit registry has limited information on income, we use RAIS to extract information on individual annual labor income, labor condition, and education.

- Unique Registry for Social Programs (Cadastro Único): This is Federal Government's instrument that identifies and characterizes low-income families, allowing the government to understand this population's socioeconomic reality better. It contains information such as the residence characteristics, identification of each person, education, work situation, and income, among others. Since 2003, the Cadastro Único has become the main instrument of the Brazilian State for the selection and inclusion of low-income families in federal programs, being mandatorily used to grant the benefits of the Bolsa Família Program, of the Social Electricity Tariff, of the Programa Minha Casa Minha Vida, from Bolsa Verde, among others.
- IBGE: Municipality level output and population are available at IBGE's Sidra system.

A.2 Sample

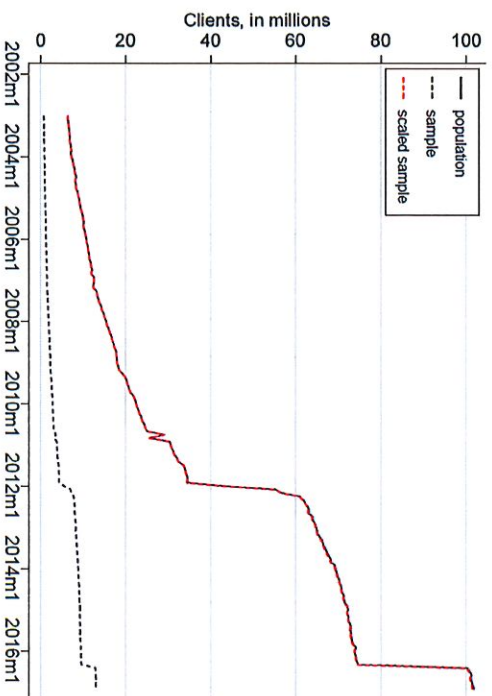


Figure A1: Number of Individuals in Credit Information System (SCR)

Note: Data from SCR-BCB. The sample series shows total number of individuals clients by month in the 12.8% random sample of individuals extracted from SCR. The scaled sample series is obtained by multiplying total clients by month in the extracted sample by 117/15.

Garber et al. (2019)

A.3 Descriptive Statistics for Housing Loans (non-regulated)

	N	mean	sd	p10	p50	p90
Housing loans, total (1.000 R\$)	179891	3746.56	48052.61	6.55	143.35	2604.32
Interest rate, % p.a.	179891	12.39	6.39	6.39	10.45	22.70
Weighted interest rate	179891	11.73	5.94	8.11	10.08	18.27
Maturity, days	179891	6439.21	2995.57	2638.00	6398.00	10958.00
Weighted maturity	179891	7301.33	3238.07	2800.00	7640.26	10984.00
Housing loans (per capita)	179891	16.93	37.76	0.43	6.74	40.30
Selic interest rate, % p.a.	179891	9.52	3.14	6.50	9.00	14.25
Observations ^s	179891					

A.4 Descriptive Statistics for Revolving Credit Card

	N	mean	sd	p10	p50	p90
Revolving credit card, total (1.000 R\$)	530069	300.91	3005.37	3.46	31.24	325.36
Interest rate, % p.a.	530069	239.57	93.68	130.49	229.15	370.17
Weighted interest rate	530069	173.00	97.07	71.80	154.02	301.41
Revolving credit card (per capita)	530069	4.11	3.51	0.56	3.30	8.74
Selic interest rate, % p.a.	530069	9.52	3.14	6.50	9.00	14.25
Observations ⁹	530069					

A.5 Loan Portability - Interest Rates (selected groups)

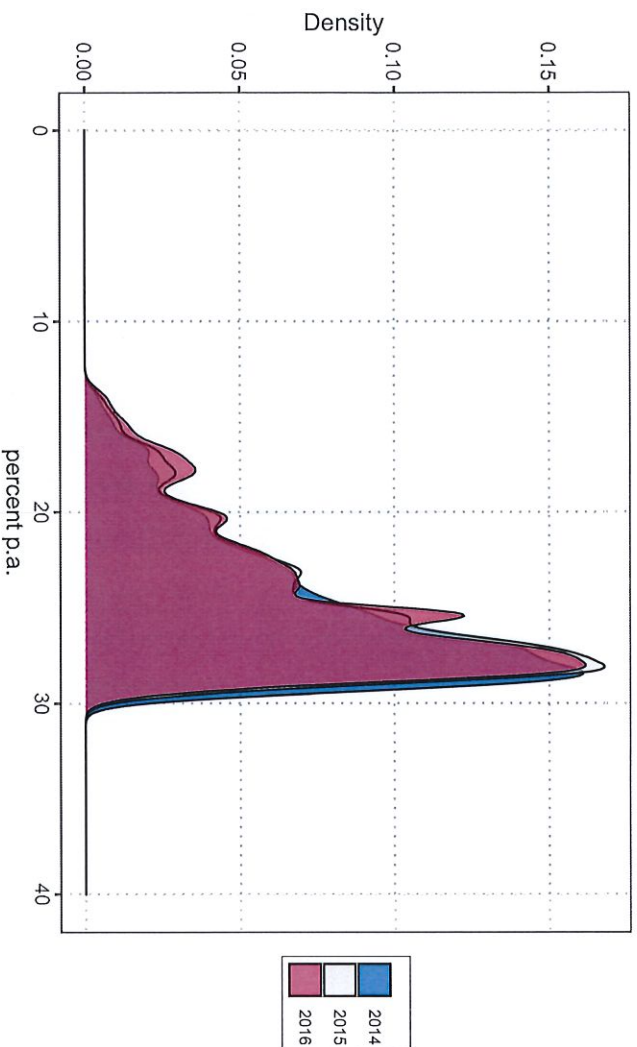


Figure A2: Ported Payroll Loans - Effective Interest Rate
SCR-BCB.

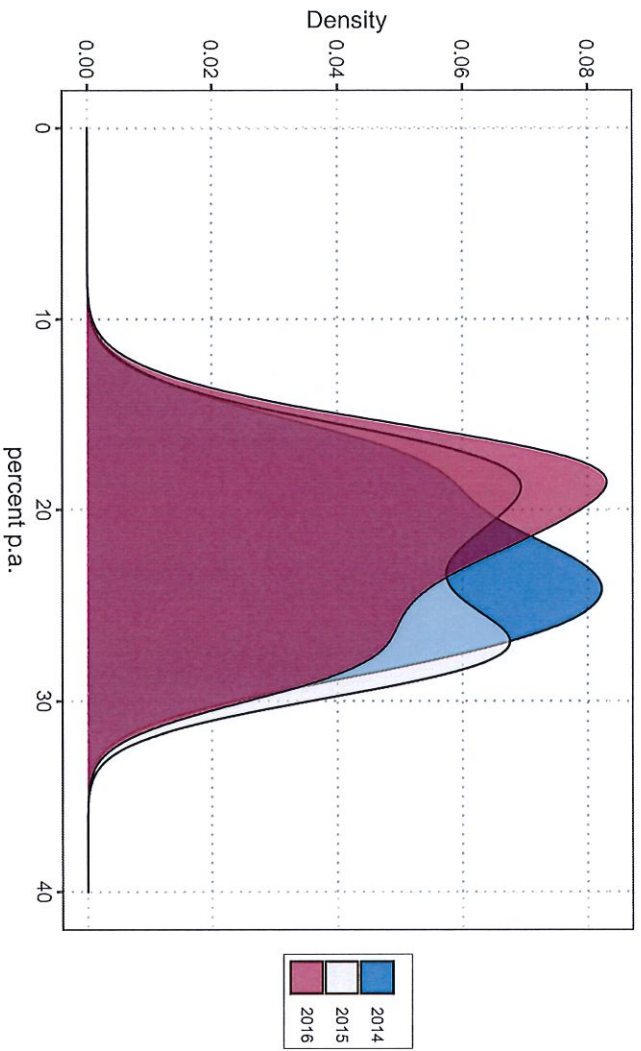


Figure A3: Ported Payroll Loans for Private Employees - Effective Interest Rate
SCR-BCB.

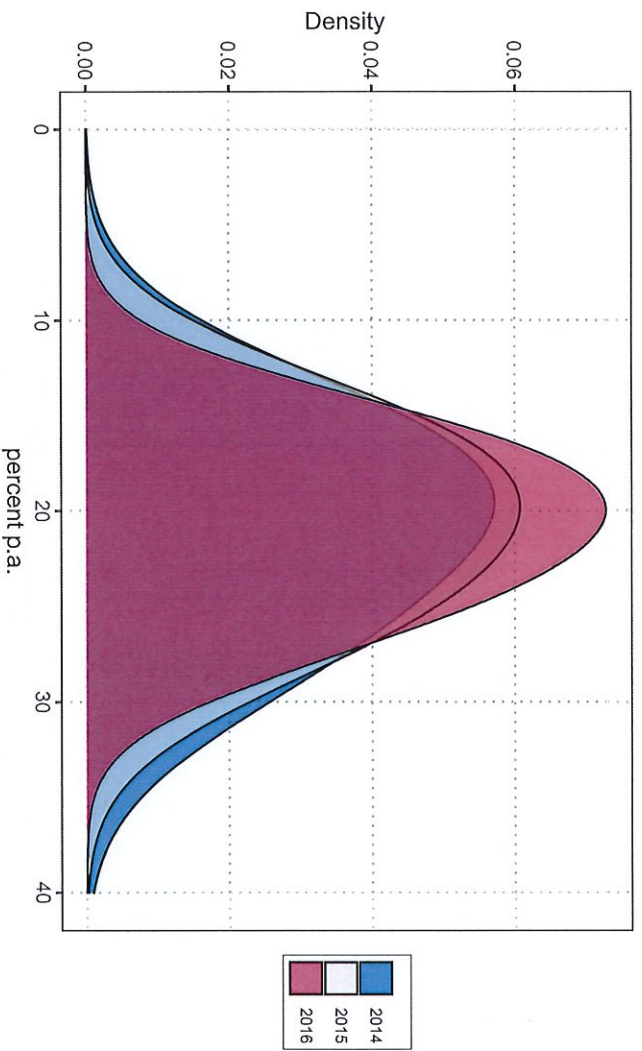


Figure A4: Ported Non-Payroll Loans - Effective Interest Rate
SCR-BCB.

Ported Payroll Loans (retired)

