Lending Rate Caps and Credit Reallocation*

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August 4, 2023

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Abstract

We estimate the effects of lending rate caps by studying a regulation that prohibited interest rates above 83 percent in Peru. We find that this policy generated substantial reallocation of lending with aggregate implications for credit and financial stability. Banks reduce small-size loans that tend to be granted at high interest rates and expand larger loans so the average incumbent firm is not affected. We define a city-level measure of treatment equal to the percent decline in interest payments necessary to bring interest rates down to the lending rate cap. Using a difference-in-differences approach, we estimate that one standard deviation higher treatment leads to a 4 percentage points decline in interest rates with null effects on credit. This is because banks can reallocate loans away from risky borrowers towards safe clients and new borrowers in highly concentrated local credit markets and low-risk industries. Such credit reallocation cause a reduction in the share of non-performing loans, suggesting a minor role for risk-taking incentives associated with the deterioration of banks charter value when interest rates are regulated.

*We are extremely grateful to Adrien Matray and Eduardo Morales for continued guidance and support, and Atif Mian, Richard Rogerson, Nobuhiro Kiyotaki, and seminar participants at Princeton, the Central Bank of Peru, the Vietnam Symposium in Banking and Finance, LACEA-LAMES, and the Paris Financial Management Conference for helpful discussions and comments. Bryan Camiloaga and Edgard Oporto provided excellent research assistance. The views expressed herein are those of the authors and do not necessarily reflect those of the Central Bank of Peru.

1 Introduction

Many small firms in emerging markets borrow at high interest rates that cannot be explained by default risk. As a result, the regulation of interest rates is often floated in the political debate. Indeed, most developing countries have introduced or strengthened price regulations in bank credit markets over the last decade (Ferrari et al. (2018)). However, such regulations can actually reduce credit access and increase financial vulnerability. In this paper, we estimate the effects of lending rate caps on credit and financial stability in Peru, providing detailed evidence on how banks adjust to this policy.

The effects of lending rate caps on credit are a priori unclear. They can increase credit supply by restraining bank market power, or reduce it by excluding risky borrowers from bank credit markets. Developing economies are characterized by highly concentrated banking sectors and strong informational frictions such that both, bank market power and firm risk, play an important role in credit markets. Thus, whether lending rate caps can reduce credit or not is an empirical question. The response of financial stability is also theoretically ambiguous. Lending rate caps can reduce bank risk-taking incentives by limiting the ability of banks to properly price risk through interest rates. However, the decline in banks charter value associated with the regulation of interest rates can actually increase risk-taking incentives.

To understand how lending rate caps affect credit and financial stability, we study a large reform implemented by the Central Bank of Peru that prohibited annualized interest rates above 83.4 percent. This policy was introduced in July 2021 and directly affected 27 percent of loans to small firms (6 percent of the total value). Moreover, if we bring interest rates on every loan granted in the pre-reform period down to the lending rate cap, the annualized interest payments faced by small firms would have declined by 10 percent.

We combine two datasets provided by the Central Bank of Peru covering the universe of loans to small firms. The first dataset includes information on new loans in a monthly basis over 2021. We observe the value, interest rate, and maturity of every loan granted by all banks established in Peru to each Peruvian firm. The second dataset includes information of the outstanding debt, also at the bank-firm level, for the period 2019-2021. We observe the balance of loans and the number of days of repayment delay. Both datasets contain information of the city where loans are granted, the industry where firms operate, and a unique bank and client identifier used for bank regulation purposes that allows us to merge both datasets.

The first part of the paper studies the loan-level effects of the policy. We leverage the joint distribution of loan size and interest rates to construct a loan-level measure of treatment. We split loans in 40 bins based on loan-size. The bottom 20 bins were highly affected by the policy because most loans were granted at interest rates above the cap in the pre-reform period. Thus, we define loans in the bottom 20 bins as treated and those in the top 20 bins as the control group and collapse our data at the size-bin $\times$ industry $\times$ city level. Using a difference-in-differences approach, we find a decline of 7 percent in interest rates and a 9 percent contraction in the value of treated loans. We then explore whether firms can substitute small-size credit with large-size loans. We aggregate our data at the firm level and compute the interest rate at which firms borrow in the pre-reform period. We split firms in eight groups, four below and four above the cap, and define treatment as an indicator variable equal to one for firms borrowing above the cap. We document that firms experience a reduction in interest rates and small-size credit, however they are not affected in terms of total loans. Our findings indicate that lending rate caps can effectively reduce interest rates without reducing credit for incumbent borrowers, who can substitute small-size loans granted at high interest rates with larger loans. Thus, focusing solely on the response of small-size loans can be misleading.

The second part of the paper explores the city level effects of lending rate caps which allows us to study additional margins through which banks adjust to the regulation of interest rates such as entry and exit of borrowers and credit reallocation across cities and industries. We use a difference-in-differences strategy that leverages variation in the exposure of different cities to the reform. We define treatment as the percent decline in interest payments necessary to bring interest rates of every loan granted in a given city during the pre-reform period down to the lending rate cap. We quantify the effects of the policy by comparing multiple outcomes in more treated cities relative to less treated cities before and after the reform. Our identification exploits variation in the distribution of interest rates across cities and requires that, absent the reform, more and less treated locations should have followed similar trends, i.e. treatment should have null effects in the absence of the reform.

We provide evidence supporting our identifying assumption in four ways. First, we provide clean event-study graphs showing that treatment has null effects before the reform. Second, even though our identification does not require cities to be similar in *levels*, we include high dimensionality fixed effects in our benchmark specification to control for various unobserved time-varying shocks at the region and city-size level. Third, we estimate city $\times$ industry level regressions where we control for industry-specific shocks that might correlate with our treatment measure. Fourth, we perform placebo tests estimating the response of small firm lending considering only non-treated banks in our analysis, i.e., banks that never charged interest rates above the cap, and we also estimate the response of large firm lending, a segment of the market that was not affected by the policy.

We estimate that lending rate caps were effective in reducing interest rates without affecting the balance of loans to small firms. One standard deviation (SD) higher treatment is associated with a 4 percentage points decline in the weighted average interest rate of new loans after the reform. Despite this reduction in interest rates, the response of total loans is statistically insignificant, consistent with the *within-firm* reallocation of credit discussed above. The null response of credit hides substantial heterogeneity that shapes the response of financial stability. We split loans into two groups: non-performing loans (NPL), those with 30 or more days of repayment delay, and normal loans, those with less than 30 days of delay in repayment. We find that one SD higher treatment is associated with a 5 percent decline in NPL that is totally offset by a 2% increase in normal loans, resulting in a contraction of 0.8 percentage points in the share of NPL.[1] We then analyze the cross-section of cities and industries to study the role of local bank competition and industry-specific risk in shaping our results. We split cities into two groups based on the Herfindahl Hirschman Index (HHI) of the banking sector and, similarly, we split industries based on their pre-reform share of NPL. We find that the expansion of normal loans only occurs in highly concentrated local credit markets and low-risk industries, while the contraction of NPL is common to the four groups.

The heterogeneous response of credit across cities and industries is consistent with lending rate caps improving financial conditions by lowering banks ability to exert market power. An alternative explanation is that banks are searching for “safe” clients, for whom the lending rate cap is not binding. These firms are more likely to operate in low-risk industries and in cities with low bank competition, where we expect credit rationing to be a bigger deal, even for safe clients. We use our detailed administrative dataset to test this hypotheses. We define (ex-ante) risky firms as those experiencing more than 30 days of repayment delay at least once in 2020. Otherwise, firms with active loans in 2020 are classified as (ex-ante) safe firms. Finally, firms receiving a loan for the first time in 2021 are classified as new firms. We calculate the

[1] We interpret this decline in the share of NPL as a meaningful effect on financial stability at the local credit market level as the average cross-city share of NPL was 7 percent before the reform

contribution of each group of borrowers to credit growth and estimate their response. If our first hypothesis were true, we would observe a positive contribution of all firms independently on their risk. Instead, if the second hypothesis were true, we would observe a positive contribution only for safe firms and new clients. We find that ex-ante safe borrowers and new clients contribute positively to credit growth in highly concentrated cities (+ 1.7 percent) and low-risk industries (+ 1.6 percent), while ex-ante risky borrowers contribute negatively to credit growth in the four groups. Our results indicate that the ability of banks to find safe clients across cities and industries determines the response of credit.

Overall, our paper shows that lending rate caps can reduce interest rates without affecting total loans because banks can reallocate credit within firms, substituting small-size credit with larger loans, and across firms, moving credit away from risky firms towards safer clients and new borrowers in highly concentrated markets and low-risk industries. Such reallocation of credit strengthens financial stability, suggesting a minor role for risk-taking incentives associated with the deterioration of banks charter value when interest rates are regulated.

Literature Review. Our paper contributes to two main strands of literature. First, we contribute to the literature studying the effects of lending rate caps (Bodenhorn (2007), Temin and Voth (2008), Benmelech and Moskowitz (2010), Zinman (2010), Rigbi (2013), Melzer and Schroeder (2017), Fekrazad (2020), Joaquim and Sandri (2020), Cuesta and Sepúlveda (2021)). Our contribution to this literature is threefold. First, we study the response of small firms in an emerging market. This is an interesting setting because small firms face particularly high interest rates in developing economies, a feature that can not be explained by default rates (Banerjee (2003)), suggesting the presence of capital misallocation which can partially explain under-development. Second, we provide empirical evidence of a novel channel through which bank credit markets adjust once interest rates are regulated, named the reallocation of credit within firms and across cities and industries. We find that banks reduce small-size loans but increase the supply of medium-size loans so the average incumbent firm is not affected. Moreover, credit moves away from risky borrowers towards safer clients in highly concentrated markets and low-risk industries. Third, we study how lending rate caps affect financial stability which is a crucial outcome in the banking regulation debate.

Our paper also relates to the broader literature that studies the effects of price regulations in credit markets (Jambulapati and Stavins (2014), Agarwal et al. (2014), Debbaut et al. (2016), Keys and Wang (2019), Nelson (2022)). We contribute to this literature by studying the effects of lending rate caps, which is a commonly used policy in developing economies. We also relate to the literature that studies regulations in markets with imperfect competition and asymmetric information (Mahoney and Weyl (2017), Einav et al. (2012), Crawford et al. (2018)). Our main contribution is to provide empirical evidence on the role of firm risk, bank market power, and credit reallocation.

Second, we contribute to the literature that studies how financial frictions affect economic development. On the empirical side, we contribute to the literature studying how financial policy can promote economic development by alleviating credit constraints (Burgess and Pande (2005), Banerjee and Duflo (2014), Bruhn and Love (2014), Ponticelli and Alencar (2016), Garber et al. (2021), Bau and Matray (2020), Fonseca and Van Doornik (2022), Fonseca and Matray (2022)). We contribute to this literature in three ways. First, we study the effects of lending rate caps, a policy that is widely used in emerging markets with a priori ambiguous effects given the high levels of concentration and informational frictions in bank credit markets of developing economies. Second, we use administrative data to explore how risk and market power shape the ability of banks to adjust to the regulation of interest rates. Third, we explore the effects on financial stability, which is a key concern when policy makers introduce bank regulations to promote economic growth (Corbae and Levine (2022), Carlson et al. (2022)).

On the theoretical side, most of the literature models financial frictions in the form of collateral constraints (Banerjee and Moll (2010), Buera and Shin (2013), Midrigan and Xu (2014), Moll (2014), Itskhoki and Moll (2019)). Such constraints are motivated by informational frictions in bank credit markets and lead to policy recommendations aimed at helping firms to accumulate capital to ease collateral constraints (Itskhoki and Moll (2019)). However, this literature is silent about price regulations despite of growing evidence that low bank competition might reduce credit access and economic development in emerging markets (Joaquim et al. (2020), Burga and Céspedes (2021)). A salient exception in the theoretical literature is a recent paper by Joaquim and Sandri (2020) studying the role of firm risk and bank market power in shaping economic growth in a calibrated model. Our paper contributes to this literature by documenting that lending rate caps can lead to substantial reductions in interest payments without affecting the total volume of loans, highlighting the role of credit reallocation across cities and industries.

The rest of the paper is organized as follows. Section 2 provides a description of the data and section 3 presents our empirical approach. Section 4 reports the loan-level effects of the policy and section 5 studies the response of city-level outcomes. Section 6 concludes.

2 Data and Institutional Background

We combine two main administrative datasets covering the universe of loans to small firms. The first one includes information of interest rates on new loans, and the second one contains information of the outstanding bank debt.

2.1 Interest rates

We use loan-level data from the *Reporte de Tasas de Interés* provided by the Central Bank of Peru. This is a monthly panel data including the value, annualized interest rate, and maturity of every loan to small firms granted between March and December 2021 by every bank established in Peru. We also observe the city where loans are originated, the industry where firms operate, and a unique client identifier used for regulation purposes. We use this *flow* dataset to conduct our loan- and firm-level analysis and to construct our measure of city-level treatment.

2.2 Balance of loans

We use bank-firm level data from the *Reporte Crediticio Consolidado* provided by the Central Bank of Peru to estimate the effect of lending rate caps on total loans and financial stability. Our dataset includes the outstanding debt that firms have with each bank established in Peru in a monthly basis over 2019-2021. We observe loans to small and large firms, and we can distinguish loans with 30 or more days of repayment delay. We use this *stock* dataset to conduct our city-level analysis and to study how banks adjust to the regulation of interest rates by reallocating credit across cities and industries.

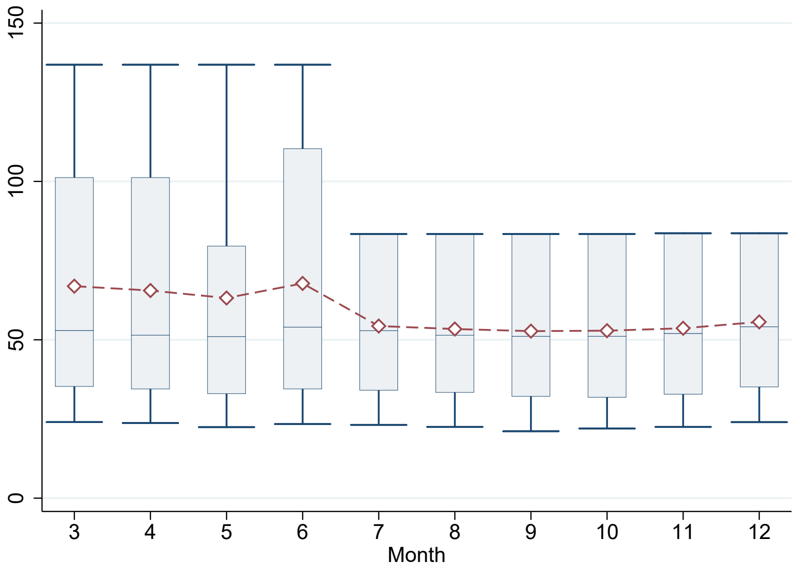
2.3 Institutional background

Lending rate caps were introduced in Peru in two stages. First, it prohibited interest rates above 83.4% for all consumer loans since May 2021. In the second stage, since July 2021, it also prohibited interest rates above the same cap for small firms. Figure 1 provides information of interest rates for the universe of loans to small firms originated between March and December 2021.

We observe a large dispersion in interest rates before the reform, with 27% of loans showing interest rates above the lending rate cap. These loans represented 6% of the total value of credit granted to small firms in the pre-reform period. The average interest rate declined from

65 to 53%, while the median interest rate was not affected. Moreover, if we bring interest rates of every loan originated in the pre-reform period down to the lending rate cap, the total annualized interest payments would have declined by 10%. We plot the distribution of loan-size and maturity in Figure A1 in the Appendix. The average loan-size exhibits a minor increase from USD 2.8 to 3 thousand. The average maturity is one year and we do not observe any important change after the policy implementation.

Figure 1: Distribution of Interest Rates



Note: This figure shows the distribution of annualized interest rates in 2021.

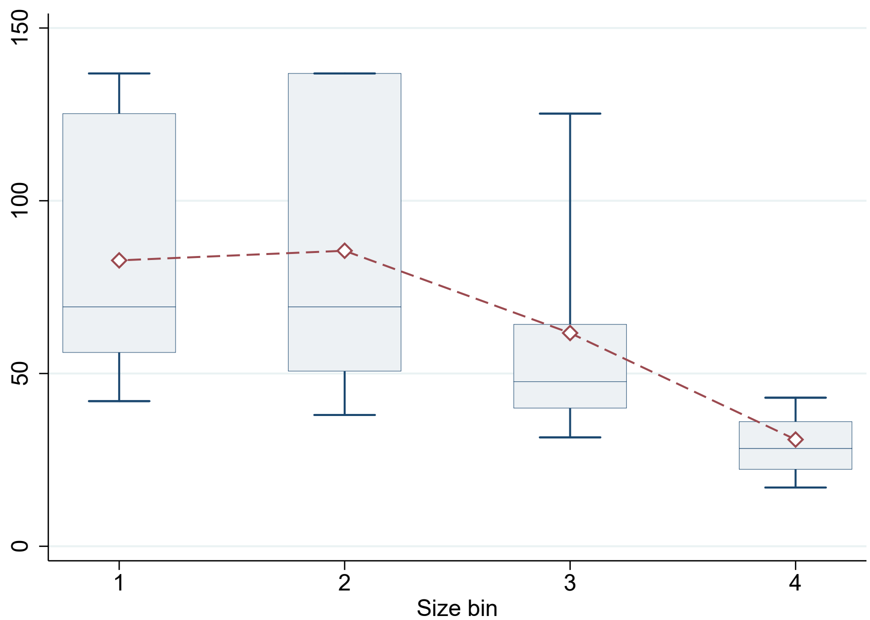
3 Empirical approach

We conduct our empirical analysis at different levels of aggregation. We start by estimating the loan-level effects of the policy leveraging heterogeneity in the distribution of interest rates across loans of different size. Then, we estimate the firm-level effect of the program exploiting different interest rates paid by incumbent borrowers. Finally, we estimate the city-level effects of the program by comparing cities with different exposure to the policy. By aggregating our data up to different levels we can measure the role of credit reallocation in shaping the response of credit and financial stability.

3.1 Loan-level analysis

The reform prohibited interest rates above 83.4% for loans granted to small firms since July 2021. We leverage the joint distribution of interest rates and loan size to build a treatment measure at the loan level. Figure 2 plots the distribution of interest rates for different quartiles of the loan-size distribution in the pre-reform period. We can see that small-size loans, the bottom two quartiles, are strongly affected by the regulation since most loans were granted at high interest rates. On the other hand, large-size loans at the top two quartiles are less affected.

Figure 2: Distribution of Interest Rates by Loan-Size Quartile



Note: This figure plots the distribution of annualized interest rates by loan-size quartile in the pre-reform period.

We split loans in 40 bins based on the loan-size distribution in the pre-reform period[2]. We define the control group as those loans in the top 20 bins (top quartiles), and the treated group as those in the bottom 20 bins. Then we aggregate our data up to the size-bin×industry×city level and estimate the effects of the policy by comparing different outcomes in treated bins relative to control ones, before and after the policy, including high-dimensionality fixed effects to account for multiple time-varying shocks at the industry and city levels. We estimate the

[2]We use the whole set of loans granted in the pre-reform period, rank them by size, and split them in 40 bins. Each bin accounts for (approximately) the same number of observations.

following equation:[3]

$$Y_{kjct} = \sum_{\substack{\tau=2021m3 \\ \tau\neq 2021m6}}^{2021m12} \gamma_\tau \times \text{Treatment}_k \times \mathbb{1}[t=\tau] + \delta_{kjc} + \delta_{jct} + u_{kjct} \tag{1}$$

Where Y_{kjct} is an outcome variable computed at size-bin k, industry j, city c, and time t, Treatment_k equals one for the bottom 20 bins, and δ_{kjc} and δ_{jct} denote time invariant size-bin×industry×city fixed effects and time-varying industry×city fixed effects, respectively. Standard errors are clustered at the size-bin level. Our parameter of interest γ_τ measures the monthly treatment effect.

3.2 Firm-level analysis

We aggregate our data at the firm level to explore whether firms can substitute small-size credit with large-size loans. We calculate the weighted average interest rate at which firms borrow in the pre-reform period and split firms into eight groups, four groups including firms borrowing below the cap and four groups including those borrowing above. Notice that we can only include incumbent firms in our analysis, i.e., those borrowing in our pre-reform period which includes only three months. Then we aggregate our data at the interest rate bin×industry×city level and estimate the following specification:

$$Y_{gjct} = \sum_{\substack{\tau=2021m3 \\ \tau\neq 2021m6}}^{2021m12} \theta_\tau \times \text{Treatment}_g \times \mathbb{1}[t=\tau] + \delta_{gjc} + \delta_{jct} + u_{gjct} \tag{2}$$

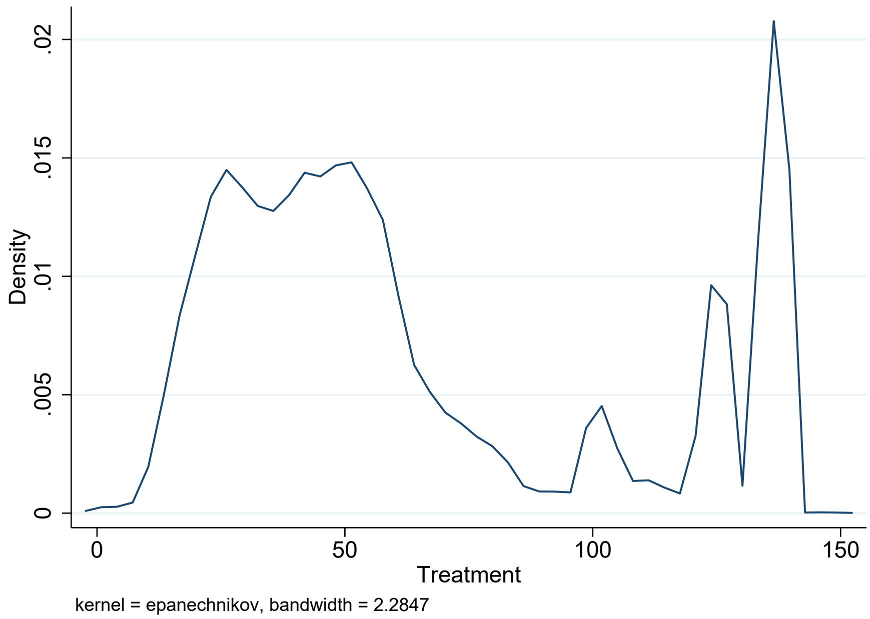
Where Y_{gjct} is an outcome variable for firms in interest rate bin g, industry j, city c, and time t, Treatment_g equals one for groups of firms borrowing at interest rates above 83.4 percent in the pref-reform period. δ_{gjc} and δ_{jct} denote time-invariant interest rate bin×industry×city fixed effects and time-varying industry×city fixed effects, respectively. Standard errors are clustered at the interest rate group level.

Figure 3 plots the distribution of interest rates across firms borrowing in the pre-reform period. This is a multimodal distribution with most firms borrowing below the lending rate cap and around 28 percent of firms borrowing at higher rates.[4]

[3] We define industries at the 2-digit ISIC classification.

[4] The mode for firms borrowing below the cap is 55 percent, while the mode for those borrowing above the cap is 136 percent.

Figure 3: Distribution of Interest Rates Across Incumbent Borrowers



Note: This figure plots the distribution of the weighted average interest rate paid by firms in the pre-reform period.

Figure A3 in the Appendix plots the distribution of interest rates for firms borrowing at different maturities. Since incumbent firms borrowing at longer maturities borrow at lower rates, a potential concern is that, by including all firms in the analysis, we might find an *artifact* positive effect on strongly treated firms just because they continue borrowing after the reform while less treated firms will not borrow again in the short-run. Thus, in our benchmark specification we only include firms borrowing at maturities below one year (the median maturity of loans in the pre-reform period).

3.3 Local credit market analysis

In the last part of our empirical analysis we study the city-level effects of lending rate caps, a second layer of aggregation that allows us to explore additional margins of adjustment to the regulation such as the reallocation of credit across cities and industries, as well as the effects on extensive margins.

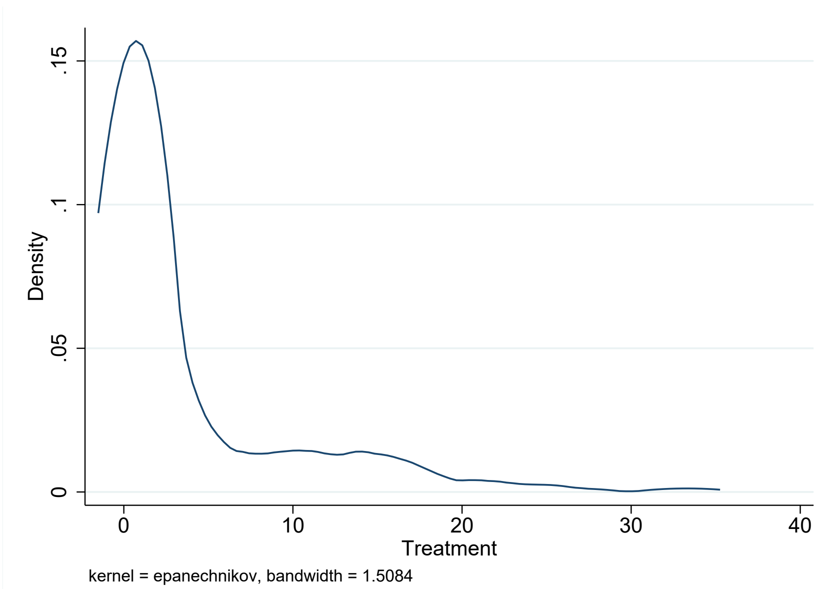
We define a local credit market at the city level and estimate the effects of lending rate caps by comparing the evolution of multiple outcomes in cities that were differently treated by the policy, before and after its implementation, using a difference-in-differences approach. We define treatment in city c and month t as follows[5]:

$$\text{Treatment}_{ct} = \frac{\sum_{i \in c} \ell_{it} \times \max\{r_{it} - \overline{r}, 0\}}{\sum_{i \in c} \ell_{it} \times r_{it}} \times 100 \tag{3}$$

Where ℓ_{it} denotes the value of loans granted to firm i in month t, r_{it} is the interest rate charged on those loans, and $\overline{r}$ is the lending rate cap. This measure captures how binding the policy was in a given city. It indicates the percent decline in interest payments necessary to bring interest rates on all loans granted in city c and month t down to the lending rate cap. We take the average from March to June 2021 to define our city-level treatment:

$$\text{Treatment}_{c} = \frac{1}{4} \sum_{k=2021m3}^{2021m6} \text{Treatment}_{ct} \tag{4}$$

Figure 4: Density Distribution of Treatment across Cities



Note: This figure shows the distribution of treatment as defined in equations (3) and (4).

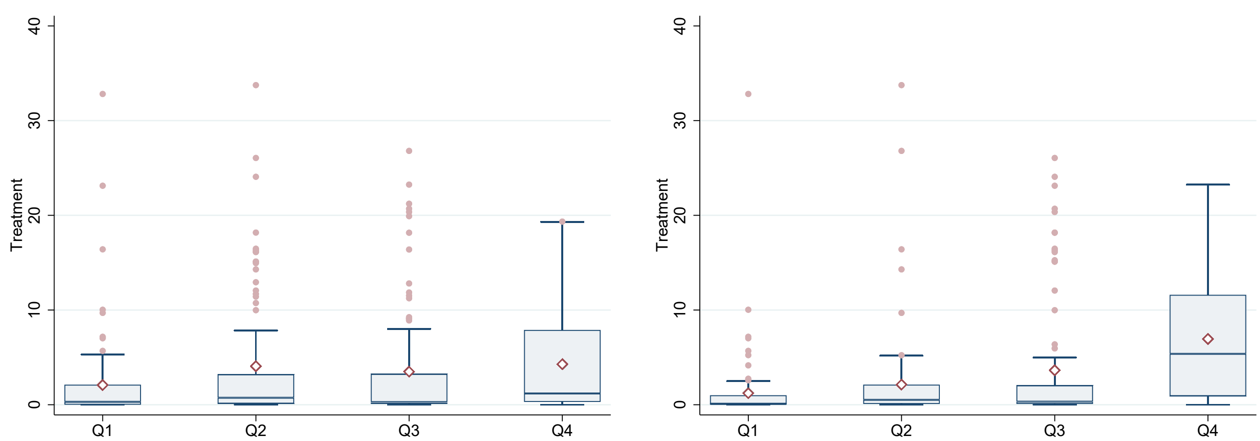
Figure 4 shows the distribution of treatment across cities. The average treatment is .7% and the standard deviation is 3%. The distribution is highly skewed to the right, with half of cities

[5]This measure follows the minimum wage literature. See for example Card and Krueger (1994), Draca, Machin, and Van Reenen (2011), and Dustmann et al. (2021)

exhibiting treatment below .7% and a quarter of them above 3%.

Our identifying assumption is that absent the policy, highly treated cities would have evolved in parallel trends with less treated locations. A potential concern is that small locations might grow at different rates than large cities. Then, our estimates would be biased if city size is correlated with our treatment measure. Figure 5 shows the distribution of treatment for each quartile of the city size distribution defined by credit percapita and total credit. This figure shows that large cities are on average more treated, but we have enough variation of treatment within quartiles to estimate the effects of lending rate caps by comparing cities of similar size. Our benchmark specification includes time-varying fixed effects for each quartile of the city size distribution.

Figure 5: Distribution of Treatment across Cities by Size



(a) Credit per capita (b) Total Credit

Note: This figure shows the distribution of treatment as defined in equations (3) and (4) across different quartiles of the city size distribution defined by credit percapita and number of banks in 2019. The circles denote the average value of treatment.

We also use a discrete measure of treatment to account for potential non-linear effects of lending rate caps. We split cities in three groups according to our benchmark treatment. Then, we define cities in the top tercile as strongly treated and cities in the bottom tercile as non-treated. We report summary statistics in Table 1. We have 354 cities in our data. The average city is highly concentrated (average HHI equals .4), has USD 46 thousand of loans percapita and 9 banks. We have 118 strongly treated locations where the continuum measure of treatment is 9% on average, and 118 non-treated cities where this measure is .04% on average. Strongly treated locations are bigger and less concentrated than non-treated locations on average.

Table 1: Characteristics of Cities

	All Cities		Strongly Treated		Non-Treated	
	Mean	Median	Mean	Median	Mean	Median
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	4	1	9	9	0	0
HHI	.4	.3	.3	.2	.5	.4
Loans percapita	46	10	26	11	12	9
Num. banks	9	5	14	13	5	3
Distinct cities	354		118		118	

Notes. HHI, loans percapita, and number of banks in 2019. Loans per capita in USD thousand.

We quantify the effects of lending rate caps on financial outcomes by estimating the following difference-in-differences equation:

$$Y_{crt} = \sum_{\substack{k=2021m1 \\ k\neq 2021m6}}^{2021m12} \beta_k \times \text{Treatment}_c \times \mathbb{1}[t=k] + \delta_{q(c),t} + \delta_c + \delta_{rt} + u_{ct} \tag{5}$$

Where Y_{crt} denotes an outcome variable in city c, region r, and time t. $\delta_{q(c)t}$ represents time-varying fixed effects for each quartile of the city size distribution defined by credit percapita and total credit in 2019. We include city fixed effects δ_c to control for any time-invariant unobserved heterogeneity at the city-level, and time-varying region fixed effects δ_{rt} to control for any shock affecting cities in the same region. Standard errors are clustered at the city level.

The coefficient of interest is β_k, which captures the monthly effect of being one standard deviation more treated. By including the set of fixed effects described above, we identify this parameter comparing cities within region and city-size bins. We provide evidence supporting our identifying assumption in four ways. First, we provide clean event-study graphs showing that treatment has null effects before the regulation. Second, we include high dimensionality fixed effects in our benchmark specification to control for various unobserved time-varying shocks at the region and city-size level. Third, we estimate city $\times$ industry level regressions where we control for industry-specific shocks that might correlate with our treatment measure. Fourth, we perform placebo tests estimating the response of small firm lending considering only non-treated banks in our analysis, i.e., banks that never charged interest rates above the cap, and we also estimate the response of large firm lending, a segment of the market that was not affected by the policy.

4 Loan Level Effects

We start by estimating the response of interest rates and new loans after the regulation. We split loans in 40 size-bins, each of them accounts for approximately the same number of loans in the pre-reform period. Then, we aggregate our data up to the size-bin×industry×city level and estimate equation (1), where treatment is equal to one for small-size loans at the bottom 20 bins and zero otherwise.[6] Table 2 reports the average treatment effect of the reform on interest rates and value of loans. The weighted average interest rate at which small-size loans are granted declined by 6.7 percentage points relative to large-size loans after the reform, while the value of loans experienced a contraction of 9 percent.

Table 2: Average Effect of Lending Rate Caps on Small-Size Loans

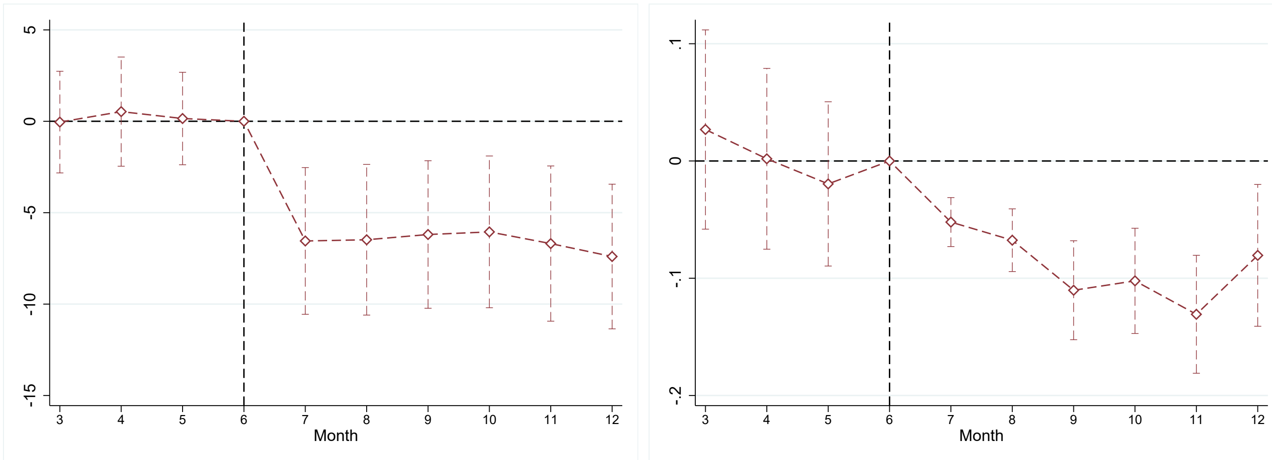
	Interest rate (1)	Value of loans (2)
$\text{Treatment}_k \times \text{Post}_t$	-6.719***	-0.093***
	(1.466)	(0.032)
Fixed Effects		
Size bin-Industry-City	✓	✓
Industry-City-Month	✓	✓
Observations	557,662	557,662

Notes. Interest rate is a weighted average at the size-bin level. Treatment_k is an indicator variable equal to one for small-size loans ($k < 20$) and Post_t equals one after June 2021. We include a vector of time-invariant fixed effects at the size bin-industry-city level and a vector of time-varying fixed effects at the industry-city level. Standard errors are clustered at the size-bin level. *, **, and *** denote 10, 5, and 1% statistical significance respectively.

We plot event-study graphs in Figure 6. Panel (a) shows a sharp and persistent decline in interest rates of small-size loans relative to large-size credit after the reform. Consistent with our parallel trends assumption, treatment has null effects on interest rates before the reform. We also find a significant reduction of total loans reported in Panel (b).

[6] Small-size loans are below USD 800 and represent 9 percent of the value of total loans to small firms in the pre-reform period.

Figure 6: Event Study Graphs for the Loan-Level Effects of Lending Rate Caps



(a) Interest rates (b) Total Loans

Notes. This figure reports the event study graph for the average effect of lending rate caps on interest rates and total loans at the loan-level. The policy was implemented in June 2021. Each dot is the coefficient on the interaction between being treated and month fixed effects. The confidence interval is at the 95% level.

Within-firm credit reallocation. The reduction in small-size loan origination is consistent with the trade-off between borrowers protection and access to credit. However, our results compare the evolution of small-size loans relative to large-size credit, they do not tell anything about the ability of banks and borrowers to substitute credit in equilibrium. To explore this margin, we aggregate our data up to the firm-level and split firms according to the interest rates they face in the pre-reform period. Thus, we can only include firms obtaining new loans in the four months prior to the regulation of lending rates. We split firms borrowing below the cap into four interest rate bins of equal size (control groups). Similarly, we split treated firms into four groups of equal size. Then, we collapse our data at the interest rate bin×industry×city level. Figure A4 in the Appendix plots the share of small-size loans in each interest rate bin. We can notice that the share of small-size credit increases across bins, consistent with our loan-level analysis. This share is close to zero for group 1 (firms borrowing at the lowest interest rates) and is almost 70 percent for firms in group 8 (borrowing at the highest rates). Moreover, the share of small-size loans declines after the regulation of lending rates.

Table 3 reports our results from estimating equation (2). Columns 1 and 2 show the response of interest rates and value of loans, respectively. While interest rates decline by 42 percentage points, the value of new loans is not statistically affected. Column 3 reports the response of the share of small loans. We observe a decline of around 13 percentage points in this share, consistent with small-size loans being granted at high rates and thus, more affected by the reform. Figure 7 plots event-study graphs. Panel (a) shows a significant decline in interest rates for the average treated group of firms after the reform. Consistent with our parallel trends assumption, treatment has null effects before the reform. Panel (b) reports an insignificant effect on the value of loans and Panel (c) shows a persistent decline in the share of small-size credit.

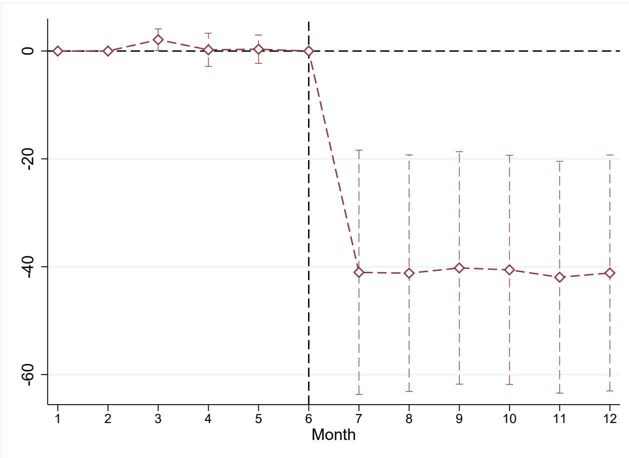
We could be concerned about the level of aggregation being too narrow. Since our specification do not consider exiting observations, our results could be over estimating the actual response of loans. We conduct two robustness checks by aggregating our data up to the interest rate bin$\times$city level and interest rate bin$\times$industry level. Table A1 in the Appendix shows that our results are robust to these different levels of aggregation. Table **??** in the Appendix reports the response of interest rates and credit considering all firms independently of the maturity at which they borrow in the pre-reform period. As we discussed above, including these firms leads to an over estimation of the actual response of credit because they usually get low rates (are part of the control group) and do not borrow again in the short-run. Overall, our results indicate that lending rate caps reduce small-size loans that tend to be granted at high interest rates. However, banks expand large-size loans so the average incumbent borrower is not affected in equilibrium.

Table 3: Average Effect of Lending Rate Caps on Firm Credit

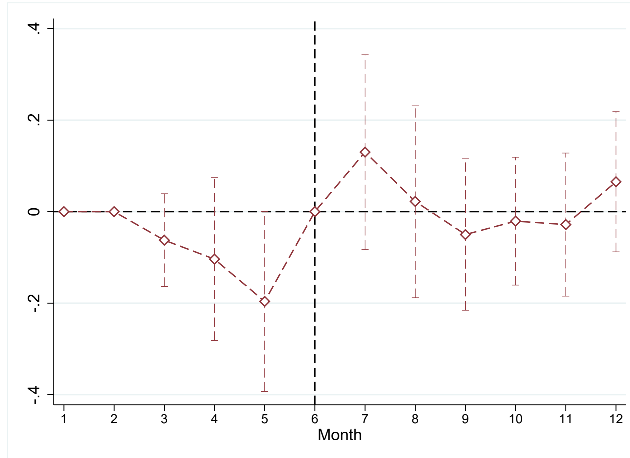
	Interest rate (1)	Value of loans (2)	Share small-size (2)
$\text{Treatment}_g \times \text{Post}_t$	-41.697***	0.108	-0.126**
	(11.112)	(0.069)	(0.050)
Fixed Effects			
Interest rate bin-Industry-City	✓	✓	✓
Industry-City-Month	✓	✓	✓
Observations	94,556	94,556	94,556

Notes. Interest rate is a weighted average at the interest rate bin level. Treatment_g is an indicator variable equal to one for interest rate bins g including firms borrowing at lending rates above the cap and Post_t equals one after June 2021. We only consider firms obtaining new loans in the pre-reform period. We include a vector of time-invariant fixed effects at the interest rate bin-industry-city level and a vector of time-varying fixed effects at the industry-city level. Standard errors are clustered at the interest rate bin level. *, **, and *** denote 10, 5, and 1% statistical significance respectively.

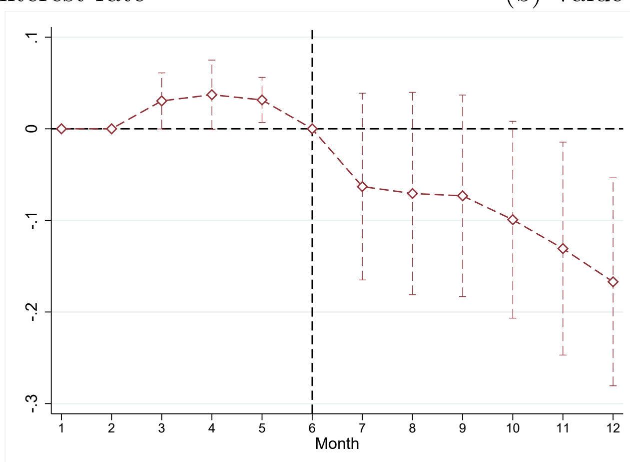
Figure 7: Event Study Graphs for the Firm-Level Effects of Lending Rate Caps



(a) Interest rate



(b) Value of loans



(c) Share small-size loans

Notes. This figure reports the event study graph for the effect of lending rate caps on interest rates and new loans for firms borrowing in the pre-reform period. The policy was implemented in June 2021. Each dot is the coefficient on the interaction between being treated and month fixed effects. The confidence interval is at the 95% level.

5 Local Credit Market Effects

In this section we estimate the impact of the regulation on city level outcomes. We start by quantifying the response of credit and financial stability. Then, test the role of risk and market power in shaping our average effects. Finally, we study how banks ability to reallocate credit across firms, industries, and cities determines the aggregate response of credit and financial stability to lending rate caps.

5.1 Credit and Financial Stability

We estimate equation (5) using interest rates and outstanding credit as dependent variables. Table 4 reports our results. Columns 1 to 3 show the response of the weighted average interest rate on loans to small firms and columns 4 to 6 report the response of the balance of loans to small firms. In our benchmark specification reported in column 3, interest rates decline by 3.8 percentage points on average in cities with one standard deviation higher treatment after the implementation of lending rate caps. Our results are robust to excluding fixed effects as we report in columns 1 and 2. Despite the large decline in interest rates, column 6 reports null effects on the balance of loans.

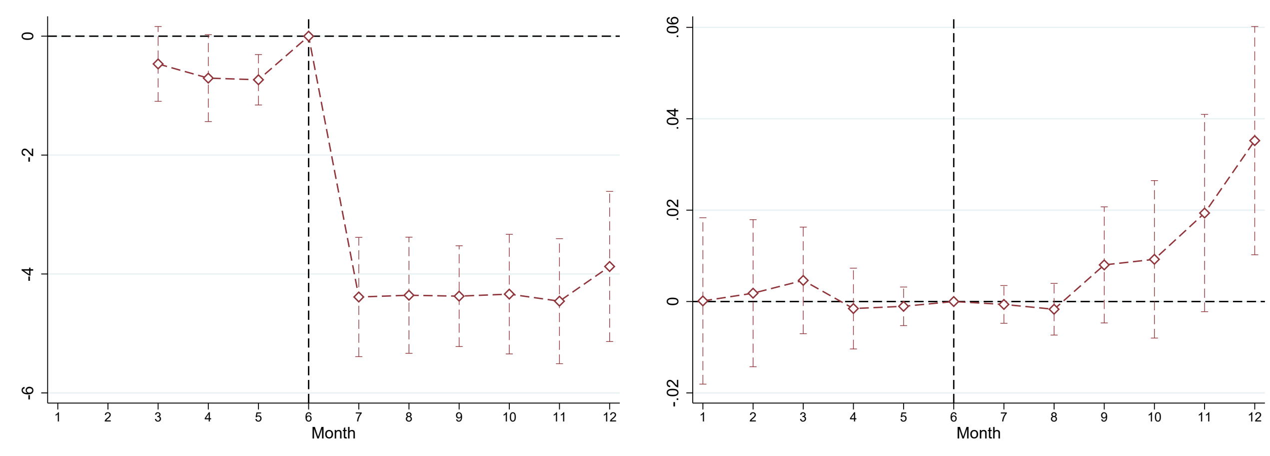
Table 4: Average Effect of Lending Rate Caps on Interest Rates and Loans

	Interest Rates			Total Loans		
	(1)	(2)	(3)	(4)	(5)	(6)
$\text{Treatment}_c \times \text{Post}_t$	-3.306***	-3.850***	-3.822***	0.014	0.009	0.011
	(0.478)	(0.572)	(0.545)	(0.008)	(0.009)	(0.008)
Fixed Effects						
City	✓	✓	✓	✓	✓	✓
Month	✓	✗	✗	✓	✗	✗
City size-Month	✗	✓	✓	✗	✓	✓
City-industry	✗	✗	✓	✗	✗	✓
Industry-Month	✗	✗	✓	✗	✗	✓
Region-Month	✗	✗	✓	✗	✗	✓
Observations	3,527	3,527	87,289	4,248	4,248	179,868

Notes. Interest rates is a weighted average with weights equal to the share of firms' new loans relative to total new loans in the city. Total loans is the city-level balance of loans in logs. Treatment_c is the standardized percent decline in interest payments necessary to bring all loans originated between March and June 2021 to the lending rate cap. Post_t is an indicator variable equal to one after June 2021. We include a vector of fixed effects for each quartile of the distribution of total loans percapita and total credit across cities in 2019 interacted with month fixed effects. Columns (3) and (6) use city c × industry j level data, where observations (j, c) are weighted by the share of industry j in city c pre-reform balance of loans. Standard errors are clustered at the city level. *, **, and *** denote 10, 5, and 1% statistical significance respectively.

Figure 8 plots the event study graphs for the response of interest rates and outstanding debt. We show the estimated monthly treatment effect before and after the policy implementation, including the same fixed effects used in our benchmark specification. We normalize the month before the policy was implemented to zero. Both figures report null treatment effects before the policy, which is consistent with our identifying assumption. Interest rates on new loans experience a significant and persistent decline after June 2021. We observe a steady increase in the balance of small firm loans after the reform. Figure A5 in the Appendix plots event-study graphs for the other specifications reported in Table 4 showing similar patterns.

Figure 8: Event Study Graphs for the Average Effect of Lending Rate Caps



(a) Interest rates (b) Total Loans

Notes. This figure reports the event study graph for the average effect of lending rate caps on interest rates and total loans. The policy was implemented in June 2021. Each dot is the coefficient on the interaction between being treated and month fixed effects. The confidence interval is at the 95% level.

We conduct several robustness checks. One potential concern is that the definition of local credit market might be too narrow. We aggregate our data at the province level and estimate equation (5). Our results, reported in Table A3, are qualitatively similar. Interest rates exhibit a significant decline while total loans are not affected by the policy. Figure A6 display event study graphs showing no evidence of pre-trends. Another concern is that our results could be driven by small cities with minor aggregate implications. We weight our regressions using city-level population as reported in the 2017 Peruvian Census. Table A4 and Figure A7 show our results. We observe a reduction in interest rates with null effects on total loans and no evidence of pre-trends. Our results are also robust to excluding Lima from our analysis as we observe in Table A5 and Figure A8. Finally, we compare cities in the top and bottom treatment terciles. Our results are shown in Table A6 in the Appendix. Strongly treated cities experience a decline of 12 percentage points in interest rates after the reform, while total loans exhibit a small and insignificant increase of 2%. Figure A9 show a clear lack of pre-trends in both regressions and exhibit a significant increase of 5% in total loans by the end of the sample period.

Finally, we conduct two placebo tests. First, we use the outstanding debt of large firms as our dependent variable. We report our results in Column 1 of Table 5. The balance of loans to large firms is not affected by our treatment. Figure A10 in the Appendix shows the monthly treatment effects where we can notice that, different from small firms, credit to large firms does not show any increase after the regulation. Notice that loans to large firms are granted in a fewer number of cities. Columns 2 and 3 of Table 5 show the response of interest rates and total loans in the segment of small firms considering cities where banks also provide credit to large firms. Our results are qualitatively similar as those reported in Table 4.[7] Second, we exclude treated banks, those charging loans above the cap, which account for around 60 percent of total credit to small firms in the pre-reform period. Columns 1 and 2 of Table A7 in the Appendix report our results. Interest rates and outstanding small firm debt are not statistically affected.

Table 5: Average Effect of Lending Rate Caps on Loans to Large Firms

	Placebo	Small firms	
	Total Loans	Total Loans	Interest rates
	(1)	(2)	(3)
$\text{Treatment}_c \times \text{Post}_t$	0.038	0.010*	-3.875***
	(0.045)	(0.006)	(0.778)
Fixed Effects			
City	✓	✓	✓
City size-Month	✓	✓	✓
Region-Month	✓	✓	✓
Observations	925	996	830

Notes. Interest rates is a weighted average with weights equal to the share of firms' new loans relative to total new loans in the city. Total loans is the city-level balance of loans in logs. Treatment_c is the standardized percent decline in interest payments necessary to bring all loans originated between March and June 2021 to the lending rate cap. Post_t is an indicator variable equal to one after June 2021. Standard errors are clustered at the city level. *, **, and *** denote 10, 5, and 1% statistical significance respectively.

Our results indicate that lending rate caps can generate substantial reductions in interest rates without affecting total loans. We now study the response of financial stability. Despite the

[7] We only report city-level results because our data of large firm lending does not include industry.

null effects on total credit, bank regulations can increase risk-taking incentives by lowering bank charter value. We test this hypothesis by splitting total loans into two groups based on the number of days of repayment delay and estimating the response of each of them. Non-performing loans (NPL) are those with 30 or more days of repayment delay, while normal loans are those with less than 30 days of delay. We define the vulnerability of local credit markets as the share of NPL. We estimate a city-industry version of equation (5) using NPL, normal loans, and the share of NPL as outcome variables.

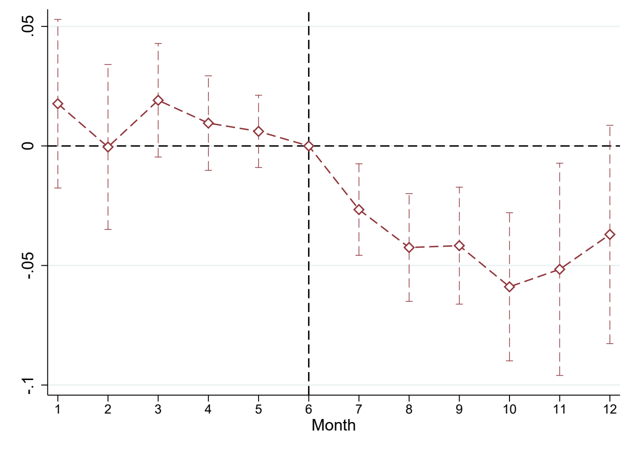
Table 6 shows that the null effects on credit hides important heterogeneity. One SD higher treatment is associated with a 5.2% decline in NPL, while normal loans increase by 2.2%. As a result, the share of NPL declines by 0.8 percentage points, an important reduction since the pre-policy average share is 7 percent. Figure 9 shows the evolution of these variables before and after the policy implementation. None of these variables exhibit pre-trends. Our results indicate that lending rate caps strengthen financial stability in our setting, suggesting a minor role for increasing bank risk-raking incentives associated with the deterioration of banks charter value when interest rates are regulated Next subsection explores the channels driving our results.

Table 6: Average Effect of Lending Rate Caps on Financial Stability

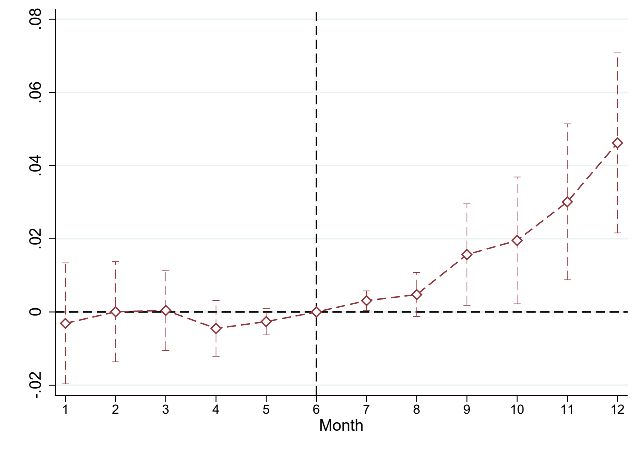
	NPL (1)	Normal Loans (2)	Share of NPL (3)
$\text{Treatment}_c \times \text{Post}_t$	-0.052** (0.021)	0.022*** (0.008)	-0.008*** (0.003)
Fixed Effects			
City-industry	✓	✓	✓
Industry-Month	✓	✓	✓
City size-Month	✓	✓	✓
Observations	140,784	177,792	166,974

Notes. Normal loans refers to the outstanding debt with less than 30 days of repayment delay, while NPL is the balance of loans with 30 or more days of delay, and the share of NPL is the ratio of NPL to total loans (normal loans + NPL). Treatment_c is the standardized percent decline in interest payments necessary to bring all loans originated between March and June 2021 to the lending rate cap. Post_t is an indicator variable equal to one after June 2021. We include a vector of fixed effects for each quartile of the distribution of total loans percapita and number of banks across cities in 2019, interacted with month fixed effects. We use city $c \times$ industry j level data, where observations (j, c) are weighted by the share of industry j in city c pre-reform balance of loans. Standard errors are clustered at the city level. *, **, and *** denote 10, 5, and 1% statistical significance respectively.

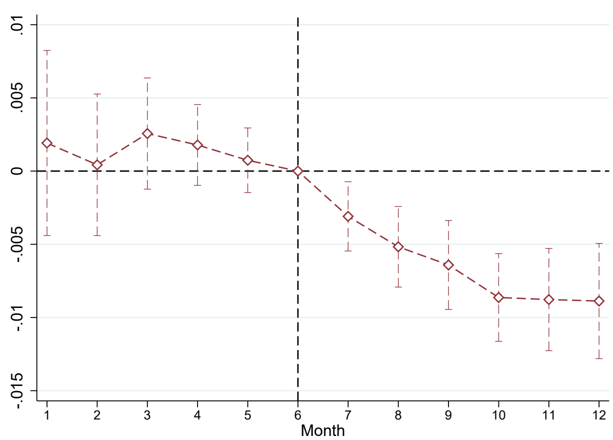
Figure 9: Event Study Graphs for the Average Effect of Lending Rate Caps on Financial Stability



(a) Non-performing loans



(b) Normal loans



(c) Share NPL

Notes. This figure reports event study graphs for the average effect of lending rate caps on normal loans, NPL, and the share of NPL. The policy was implemented in June 2021. Each dot is the coefficient on the interaction between being treated and month fixed effects. The confidence interval is at the 95% level.

5.2 Market power and risk

The regulation of lending rates was effective in reducing interest payments without affecting the outstanding balance of credit at the local level. Moreover, this regulation reduced the vulnerability of local credit markets, increasing the outstanding debt with less than 30 days of repayment delay and reducing NPL. The effects are consistent with a reduction of banks' ability to exert market power, which improves financial conditions and thus, might reduce firms delinquency rates. On the other hand, lending rate caps might exclude risky borrowers that can obtain credit only at high interest rates. Then, our results might depend on risk profiles. We test these hypothesis by estimating the response of credit in the cross-section of cities and industries.

City-level HHI. We study the role of bank market power in shaping the average response of credit. We define local credit markets at the city level and compute the corresponding HHI. Then, we split cities into two groups, each of them accounting for half of small firms outstanding debt. We estimate equation (5) for each group of cities and report our results in Table 7. Columns 1 and 4 show that the contraction of NPL is common to all cities, although stronger in concentrated markets, while columns 2 and 4 show that the expansion of normal loans is fully driven by highly concentrated markets. Our results are consistent with lending rate caps reducing banks ability to exert market power. When credit markets are more competitive, lending rate caps only reduce risky loans.

Table 7: Average Effect of Lending Rate Caps on Financial Stability - Concentrated Cities

	Highly concentrated markets			Less concentrated markets		
	NPL	Normal Loans	Share NPL	NPL	Normal Loans	Share NPL
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment$_c$ × Post$_t$	-0.059**	0.026***	-0.009***	-0.020*	0.000	-0.003*
	(0.025)	(0.009)	(0.003)	(0.011)	(0.005)	(0.002)
Fixed Effects						
City-industry	✓	✓	✓	✓	✓	✓
Industry-Month	✓	✓	✓	✓	✓	✓
City size-Month	✓	✓	✓	✓	✓	✓
Observations	103,620	136,968	127,197	37,164	40,824	39,777

Notes. Normal loans refers to the outstanding debt with less than 30 days of repayment delay, while NPL is the balance of loans with 30 or more days of delay, and the share of NPL is the ratio of NPL to total loans (normal loans + NPL). Treatment$_c$ is the standardized percent decline in interest payments necessary to bring all loans originated between March and June 2021 to the lending rate cap. Post$_t$ is an indicator variable equal to one after June 2021. We include a vector of fixed effects for each quartile of the distribution of total loans percapita and number of banks across cities in 2019, interacted with month fixed effects. We use city c × industry j level data, where observations (j, c) are weighted by the share of industry j in city c pre-reform balance of loans. Standard errors are clustered at the city level. *, **, and *** denote 10, 5, and 1% statistical significance respectively.

Industry-specific risk. Finally, we explore the role of risk in shaping the response of credit. Lending rate caps might exclude risky firms that can borrow only at high interest rates and thus, the response of credit could vary across different risk profiles. We compute an industry-specific measure of risk equal to the pre-reform share of NPL and split industries into two groups, each of the accounting for half of the balance of small firm loans. We estimate a city-industry version of equation (5) for each group of industries and report our results in Table 8. We find a contraction of NPL in all industries, as we can observe in columns 1 and 3. Columns 2 and 4 show that the expansion of normal loans only occurs in safe industries, those with low share of NPL in the pre-reform period.

Table 8: Average Effect of Lending Rate Caps on Financial Stability - Safe Industries

	Low share of NPL			High share of NPL		
	NPL	Normal Loans	Share NPL	NPL	Normal Loans	Share NPL
	(1)	(2)	(3)	(4)	(5)	(6)
$\text{Treatment}_c \times \text{Post}_t$	-0.057***	0.029***	-0.010***	-0.041*	-0.005	-0.004
	(0.022)	(0.008)	(0.003)	(0.024)	(0.016)	(0.003)
Fixed Effects						
City-industry	✓	✓	✓	✓	✓	✓
Industry-Month	✓	✓	✓	✓	✓	✓
City size-Month	✓	✓	✓	✓	✓	✓
Observations	100,332	130,488	121,703	40,452	47,304	45,271

Notes. Normal loans refers to the outstanding debt with less than 30 days of repayment delay, while NPL is the balance of loans with 30 or more days of delay, and the share of NPL is the ratio of NPL to total loans (normal loans + NPL). Treatment_c is the standardized percent decline in interest payments necessary to bring all loans originated between March and June 2021 to the lending rate cap. Post_t is an indicator variable equal to one after June 2021. We include a vector of fixed effects for each quartile of the distribution of total loans percapita and number of banks across cities in 2019, interacted with month fixed effects. We use city $c \times$ industry j level data, where observations (j, c) are weighted by the share of industry j in city c pre-reform balance of loans. Standard errors are clustered at the city level. *, **, and *** denote 10, 5, and 1% statistical significance respectively.

Overall, our results are consistent with lending rate caps excluding risky borrowers, as we observe a contraction in NPL. Moreover, the expansion of normal loans in safe industries is consistent with a reallocation of credit towards safe clients. However, our findings are also consistent with improving financial conditions by lowering bank ability to exert market power. This might allow firms to obtain cheaper credit, leading to a reduction in NPL. Next subsection tests these channels by looking at credit reallocation across firms within cities and industries.

5.3 Credit reallocation

We exploit our detailed administrative data to test two hypotheses that can explain our findings. First, lending rate caps might reallocate credit away from risky borrowers towards safe clients leading to a reduction in NPL and an expansion of normal loans, mainly in low-risk industries where such firms are located. Second, lending rate caps might reduce bank market power improving financial conditions for all firms in the economy, lowering NPL and increasing normal loans. In the former case, we would observe an heterogeneous pattern among safe and risky borrowers within cities and industries, while in the latter case we would find a similar response.

We leverage a variable in our data that indicates whenter loans have less than 30 days of repayment delay or not. We classify firms as risky if they have experienced more than 30 days of repayment delay at least once in 2020, the year prior to the regulation of lending rates. Otherwise, firms with bank debt in 2020 are classified as safe clients. Finally, we consider firms without bank debt in 2020 as new firms. Figure 10 plots the distribution of interest rates of loans granted to safe and risky, as defined above, from March to December 2021. The median interest rate at which risky firms borrow in the pre-reform period is 100%, while the median rate for safe firms is 50%. In the post-reform period the median interest rate for risky borrowers is equal to the lending rate cap, while it remains at 50% for safe borrowers. Figure A2 in the appendix plots the distribution of interest rates on loans to new clients. In the pre-reform period, 52% of loans granted to risky borrowers were above the cap. This share is 25% for safe borrowers and 20% for new clients.

We decompose loan growth rate into the contribution of safe, risky, and new borrowers as follows:

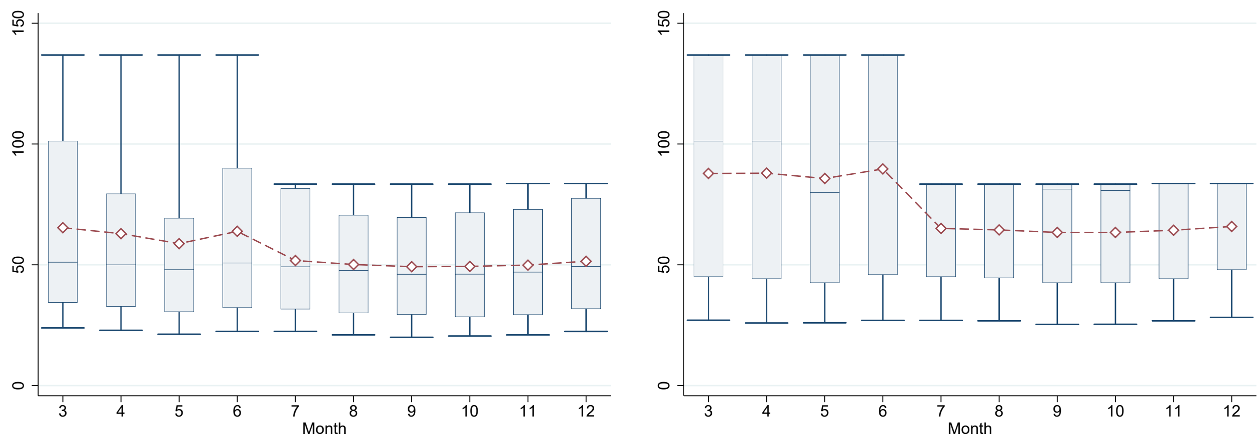
$$\frac{\mathrm{L_{post}} - \mathrm{L_{pre}}}{\mathrm{L_{pre}}} = \frac{\mathrm{L_{post}^{Safe}} - \mathrm{L_{pre}^{Safe}}}{\mathrm{L_{pre}}} + \frac{\mathrm{L_{post}^{Risky}} - \mathrm{L_{pre}^{Risky}}}{\mathrm{L_{pre}}} + \frac{\mathrm{L_{post}^{New}} - \mathrm{L_{pre}^{New}}}{\mathrm{L_{pre}}} \tag{6}$$

Where "pre" and "post" denote average values in the first and second half of 2021, respectively. The three terms in the right hand side represent the contribution of loans to safe, risky, and new borrowers, respectively. We estimate the following regression using each term of equation (6) as a dependent variable.

$$Y_{cjr} = \gamma \mathrm{Treatment}_c + \delta_{q(c)} + \delta_r + \delta_j + u_{cjr} \tag{7}$$

Where $\delta_{q(c)}$, δ_r, and δ_j denote city-size quartile, region, and industry fixed effects, respectively. City size is measured by credit percapita and total credit in 2019. This specification is consistent with our difference-in-differences equation (5) and allows us to decompose the response of total loans into the response of each component of equation (6). In the main text, we consider only highly concentrated cities and safe industries as they fully account for the heterogeneous response of credit.

Figure 10: Distribution of Interest Rates among Existing Borrowers



(a) Safe borrowers

(b) Risky borrowers

Note: This figure shows the distribution of annualized interest rates in 2021.

If bank market power were the main driver of the credit response we would expect all borrowers to be benefited from the regulation in highly concentrated markets. Table 9 reports our results. Column 1 shows a positive, albeit insignificant increase of credit after the reform. Column 3 and 5 show that only safe borrowers and new clients have a positive contribution on credit growth (.1 and .07 percent, respectively). Risky firms contribute negatively as we observe in column 4. We interpret our results as evidence that lowering bank market power is not the main mechanism through which lending rate caps affect credit. Our findings suggest that banks only search for safe and new borrowers in highly concentrated cities, which is consistent with strong credit rationing in these locations, making it easier to find clients in these places.

We provide further evidence on how banks reallocate credit across firms by estimating equation (6) in safe industries. Table 10 reports our results. Columns 3 and 5 show that credit growth is fully accounted for by the contribution of safe and new borrowers. Once again, we find that the contribution of risky firms to credit growth is negative. We present the estimation results for low concentrated cities and risky industries in Table A8 and A9 in the Appendix. Point estimates indicate a negative contribution of risky firms, although we do not find any statistically positive contribution of safe nor new clients, suggesting that it is difficult for banks to reallocate credit in these markets and industries.

Table 9: Loans Growth Rate Decomposition - Concentrated Cities

	Total Loans	Existing Borrowers			New Borrowers
		All	Safe	Risky	
	(1)	(2)	(3)	(4)	(5)
Treatment$_c$	0.014	0.007	0.010**	-0.002	0.007*
	(0.009)	(0.007)	(0.005)	(0.004)	(0.004)
Fixed effects					
City size	✓	✓	✓	✓	✓
Industry	✓	✓	✓	✓	✓
Observations	11,573	11,573	11,573	11,573	11,573

Notes. This table reports the effect of lending rate caps on each component of equation (6). Data are collapsed as an average "pre" (January-June 2021) and "post" (July-December 2021). Standard errors are clustered at the city level. *, **, and *** denote 10, 5, and 1% statistical significance respectively.

Table 10: Loans Growth Rate Decomposition - Safe Industries

	Total Loans	Existing Borrowers			New Borrowers
		All	Safe	Risky	
	(1)	(2)	(3)	(4)	(5)
Treatment$_c$	0.015**	0.011*	0.012***	-0.001	0.004***
	(0.007)	(0.007)	(0.004)	(0.003)	(0.001)
Fixed effects					
City size	✓	✓	✓	✓	✓
Industry	✓	✓	✓	✓	✓
Observations	11,013	11,013	11,013	11,013	11,013

Notes. This table reports the effect of lending rate caps on each component of equation (6) in cities that are below and above the median of the HHI distribution. Data are collapsed as an average "pre" (January-June 2021) and "post" (July-December 2021). Standard errors are clustered at the city level. *, **, and *** denote 10, 5, and 1% statistical significance respectively.

Our results indicate that credit reallocation away from risky borrowers is key to explain the effects of lending rate caps. Market power and industry risk determine banks ability to find alternative clients. Indeed, banks reallocate credit towards safe clients and new borrowers in highly concentrated cities and low-risk industries.

6 Conclusions

Many small firms in developing countries borrow at high interest rates which makes price regulations in bank credit markets to be often floated in the political debate. Indeed, most emerging markets have introduced or strengthen existing regulations on interest rates in the past decade. Despite the unclear effects on credit and potential unintended consequences on financial stability, there is little empirical evidence on how lending rate caps affect small firms in developing economies. In this paper we estimate the effects of lending rate caps on credit and financial stability by studying a policy introduced by the Central Bank of Peru in 2021 that prohibited interest rates above 83.4 percent.

We provide empirical evidence that lending rate caps can reduce interest rates with substantial reallocation of lending that has aggregate implications for credit and financial stability. We find that banks reduce small-size loans that tend to be granted at high interest rates. However, this is totally offset by an expansion of large-size credit so the average incumbent firm is not affected. Moreover, banks reallocate credit away from risky firms towards safe borrowers and new clients in highly concentrated cities and low-risk industries. Such reallocation of credit strengthen financial stability, suggesting a minor role for risk-taking incentives associated with the deterioration of banks charter value when interest rates are regulated.

References

Agarwal, S., Chomsisengphet, S., Mahoney, N., and Stroebel, J. (2014). Regulating Consumer Financial Products: Evidence from Credit Cards. *The Quarterly Journal of Economics*, 130(1):111–164.

Banerjee, A. (2003). Contracting Constraints, Credit Markets, and Economic Development. *Advances in Economics and Econometrics: Theory and Applications, Eighth World Congress*, Vol. III, ed. Mathias Dewatripont, Lars Peter Hansen, and Stephen J. Turnovsky, 1–46. New York: Cambridge University Press.

Banerjee, A. V. and Duflo, E. (2014). Do Firms Want to Borrow More? Testing Credit Constraints Using a Directed Lending Program. *The Review of Economic Studies*, 81(2):572–607.

Banerjee, A. V. and Moll, B. (2010). Why Does Misallocation Persist? *American Economic Journal: Macroeconomics*, 2(1):189–206.

Bau, N. and Matray, A. (2020). Misallocation and Capital Market Integration: Evidence From India. Working Paper 27955, National Bureau of Economic Research.

Benmelech, E. and Moskowitz, T. J. (2010). The Political Economy of Financial Regulation: Evidence from U.S. State Usury Laws in the 19th Century. *The Journal of Finance*, 65(3):1029–1073.

Bodenhorn, H. (2007). Usury ceilings and bank lending behavior: Evidence from nineteenth century New York. *Explorations in Economic History*, 44(2):179–202.

Bruhn, M. and Love, I. (2014). The Real Impact of Improved Access to Finance: Evidence from Mexico. *The Journal of Finance*, 69(3):1347–1376.

Buera, F. J. and Shin, Y. (2013). Financial Frictions and the Persistence of History: A Quantitative Exploration. *Journal of Political Economy*, 121(2):221–272.

Burga, C. and Céspedes, N. (2021). Bank Competition, Capital Misallocation, and Industry Concentration: Evidence from Peru. *Working Paper*.

Burgess, R. and Pande, R. (2005). Do Rural Banks Matter? Evidence from the Indian Social Banking Experiment. *American Economic Review*, 95(3):780–795.

Carlson, M., Correia, S., and Luck, S. (2022). The Effects of Banking Competition on Growth and Financial Stability: Evidence from the National Banking Era. *Journal of Political Economy*, 130(2):462–520.

Corbae, D. and Levine, R. (2022). Competition, Stability, and Efficiency in the Banking Industry. *Working Paper*.

Crawford, G. S., Pavanini, N., and Schivardi, F. (2018). Asymmetric Information and Imperfect Competition in Lending Markets. *American Economic Review*, 108(7):1659–1701.

Cuesta, J. and Sepúlveda, A. (2021). Price Regulation in Credit Markets: A Trade-off between Consumer Protection and Credit Access. *Working Paper*.

Debbaut, P., Ghent, A., and Kudlyak, M. (2016). The CARD Act and Young Borrowers: The Effects and the Affected. *Journal of Money, Credit and Banking*, 48(7):1495–1513.

Einav, L., Jenkins, M., and Levin, J. (2012). Contract Pricing in Consumer Credit Markets. *Econometrica*, 80(4):1387–1432.

Fekrazad, A. (2020). Impacts of interest rate caps on the payday loan market: Evidence from Rhode Island. *Journal of Banking & Finance*, 113:105750.

Ferrari, A., Masetti, O., and Ren, J. (2018). Interest Rate Caps: The Theory and The Practice. *World Bank Policy Research*, Working Paper No. 8398.

Fonseca, J. and Matray, A. (2022). The Real Effects of Banking the Poor: Evidence from Brazil. Working Paper 30057, National Bureau of Economic Research.

Fonseca, J. and Van Doornik, B. (2022). Financial development and labor market outcomes: Evidence from Brazil. *Journal of Financial Economics*, 143(1):550–568.

Garber, G., Mian, A. R., Ponticelli, J., and Sufi, A. (2021). Household Credit as Stimulus? Evidence from Brazil. Working Paper 29386, National Bureau of Economic Research.

Itskhoki, O. and Moll, B. (2019). Optimal Development Policies With Financial Frictions. *Econometrica*, 87(1):139–173.

Jambulapati, V. and Stavins, J. (2014). Credit CARD Act of 2009: What did banks do? *Journal of Banking & Finance*, 46:21–30.

Joaquim, G. and Sandri, D. (2020). Lending Rate Caps in Emerging Markets: Good for Growth? *Working Paper*.

Joaquim, G., van Doornik, B., and Haas, J. (2020). Bank Competition, Cost of Credit and Economic Activity: Evidence from Brazil. *Working Paper*.

Keys, B. J. and Wang, J. (2019). Minimum payments and debt paydown in consumer credit cards. *Journal of Financial Economics*, 131(3):528–548.

Mahoney, N. and Weyl, E. G. (2017). Imperfect Competition in Selection Markets. *The Review of Economics and Statistics*, 99(4):637–651.

Melzer, B. and Schroeder, A. (2017). Loan Contracting in the Presence of Usury Limits: Evidence from Automobile Lending. *Consumer Financial Protection Bureau Office of Research*, Working Paper No. 2017-02.

Midrigan, V. and Xu, D. Y. (2014). Finance and Misallocation: Evidence from Plant-Level Data. *American Economic Review*, 104(2):422–58.

Moll, B. (2014). Productivity Losses from Financial Frictions: Can Self-Financing Undo Capital Misallocation? *American Economic Review*, 104(10):3186–3221.

Nelson, S. (2022). Private Information and Price Regulation in the US Credit Card Market. *Working Paper*.

Ponticelli, J. and Alencar, L. S. (2016). Court Enforcement, Bank Loans, and Firm Investment: Evidence from a Bankruptcy Reform in Brazil. *The Quarterly Journal of Economics*, 131(3):1365–1413.

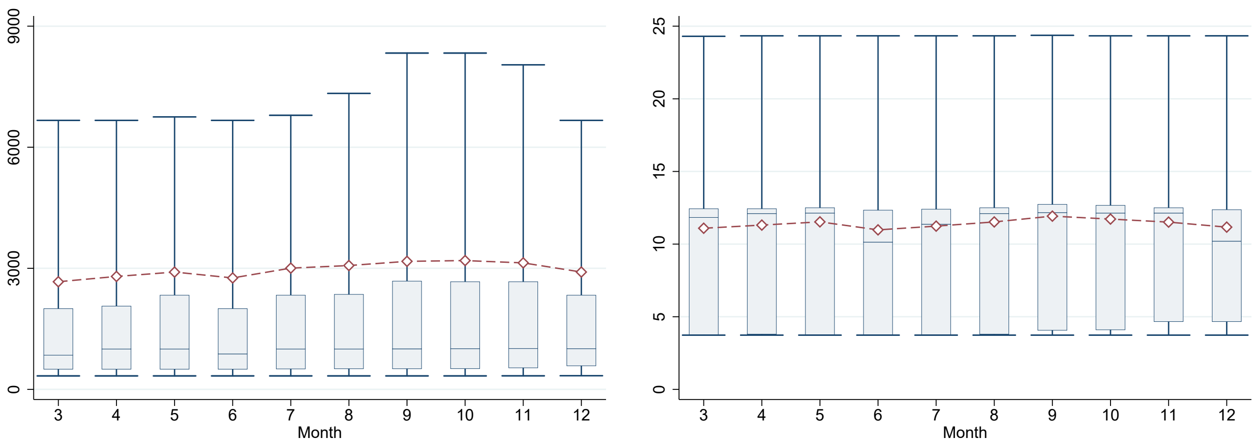
Rigbi, O. (2013). The Effects of Usury Laws: Evidence from the Online Loan Market. *The Review of Economics and Statistics*, 95(4):1238–1248.

Temin, P. and Voth, H.-J. (2008). Private borrowing during the financial revolution: Hoare's Bank and its customers, 1702–241. *The Economic History Review*, 61(3):541–564.

Zinman, J. (2010). Restricting consumer credit access: Household survey evidence on effects around the Oregon rate cap. *Journal of Banking & Finance*, 34(3):546–556.

Appendix

Figure A1: Distribution of Loan-size and Maturity

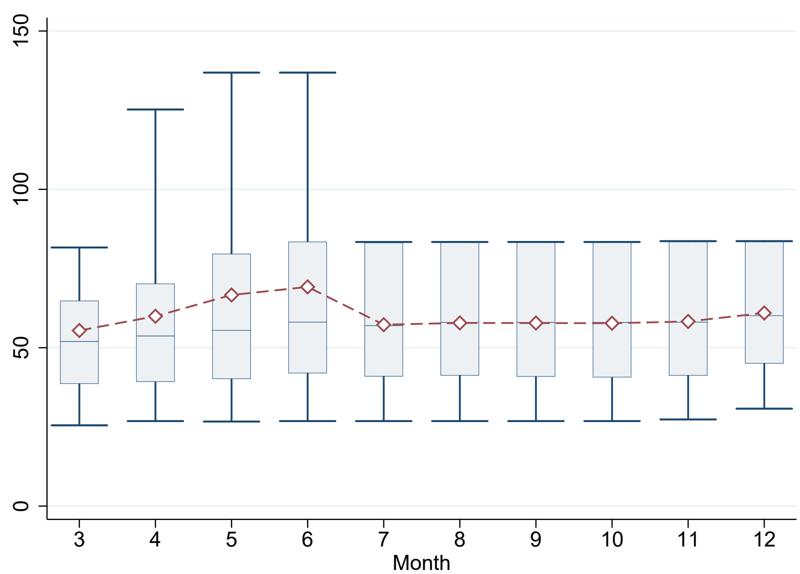


(a) Loan-size

(b) Maturity

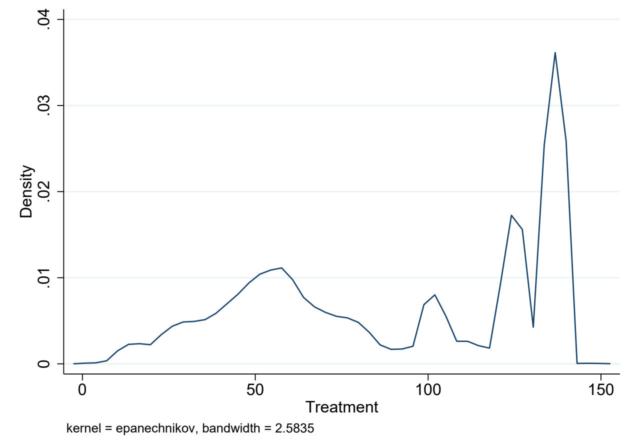
Note: This figure shows the distribution of loan-size and maturity in months in 2021.

Figure A2: Distribution of Interest Rates on Loans to New Borrowers

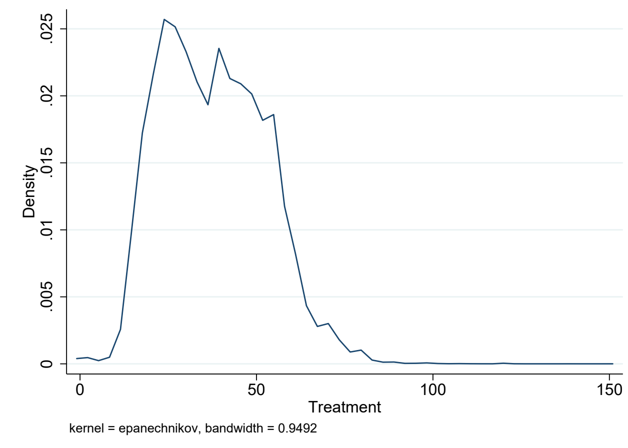


Note: This figure shows the distribution of annualized interest rates in 2021.

Figure A3: Distribution of Interest Rates Across Incumbent Borrowers



(a) Maturity $\leq$ 1 year



(b) Maturity $>$ 1 year

Note: This figure plots the distribution of the weighted average interest rate paid by firms in the pre-reform period.

Figure A4: Share of Small-Size Loans across Interest Rate Bins

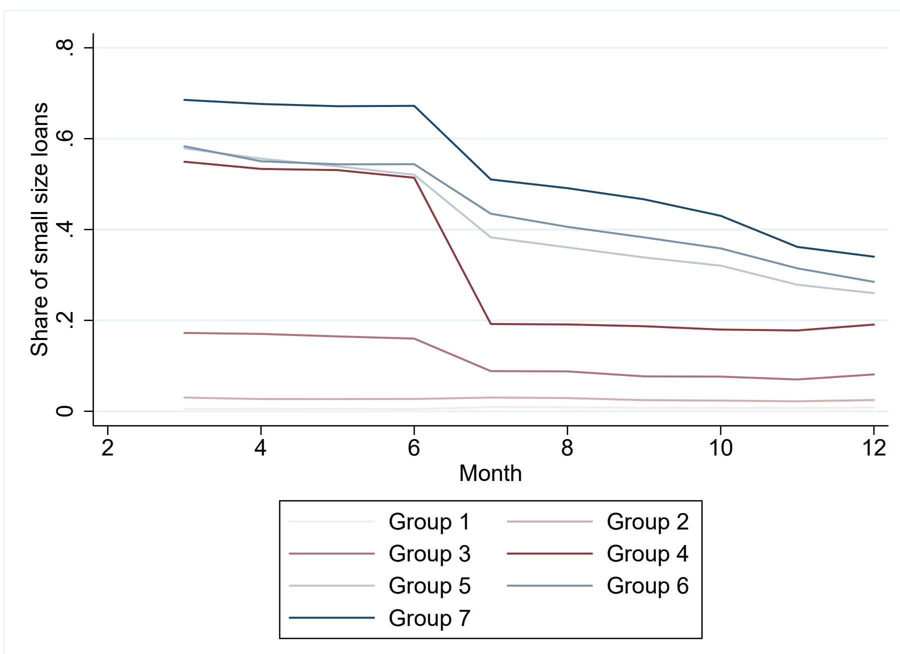


Table A1: Average Effect of Lending Rate Caps on Firm Credit - Aggregate level

	Interest rate bin × city			Interest rate bin × industry		
	Interest rate	Value of loans	Share small	Interest rate	Value of loans	Share small
	(1)	(2)	(3)	(4)	(5)	(6)
$\text{Treatment}_g \times \text{Post}_t$	-45.799***	0.315*	-0.220***	-43.539***	0.187	-0.199**
	(11.274)	(0.153)	(0.047)	(10.037)	(0.178)	(0.056)
Fixed Effects						
Interest rate bin-City	✓	✓	✓	✗	✗	✗
City-Month	✓	✓	✓	✗	✗	✗
Interest rate bin-Industry	✗	✗	✗	✓	✓	✓
Industry-Month	✗	✗	✗	✓	✓	✓
Observations	16,422	16,422	16,422	3,525	3,525	3,525

Notes. Interest rate is a weighted average at the interest rate bin level. Treatment_g is an indicator variable equal to one for interest rate bins g including firms borrowing at lending rates above the cap and Post_t equals one after June 2021. We only consider firms obtaining new loans in the pre-reform period. We include a vector of time-invariant fixed effects at the interest rate bin-industry-city level and a vector of time-varying fixed effects at the industry-city level. Standard errors are clustered at the interest rate bin level. *, **, and *** denote 10, 5, and 1% statistical significance respectively.

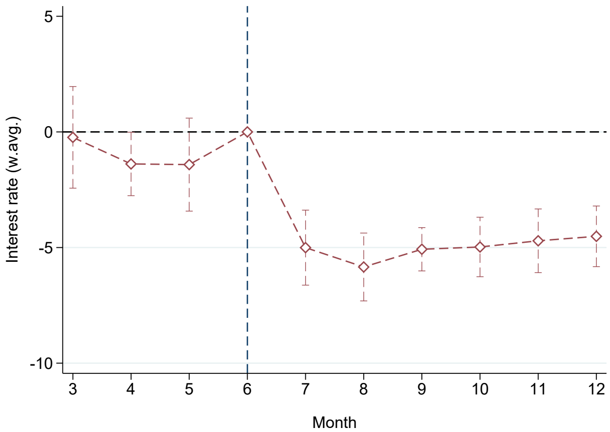
Table A2: Average Effect of Lending Rate Caps on Firm Credit - All maturity

	Interest rate	Value of loans	Share small-size
	(1)	(2)	(2)
$\text{Treatment}_g \times \text{Post}_t$	-45.351***	1.013***	-0.260***
	(10.791)	(0.245)	(0.030)
Fixed Effects			
Interest rate bin-Industry-City	✓	✓	✓
Industry-City-Month	✓	✓	✓
Observations	160,925	160,925	160,925

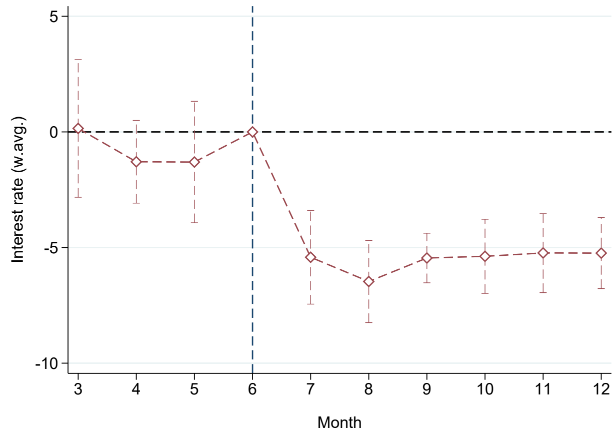
Notes. Interest rate is a weighted average at the interest rate bin level. Treatment_g is an indicator variable equal to one for interest rate bins g including firms borrowing at lending rates above the cap and Post_t equals one after June 2021. We only consider firms obtaining new loans in the pre-reform period. We include a vector of time-invariant fixed effects at the interest rate bin-industry-city level and a vector of time-varying fixed effects at the industry-city level. Standard errors are clustered at the interest rate bin level. *, **, and *** denote 10, 5, and 1% statistical significance respectively.

Different set of fixed effects

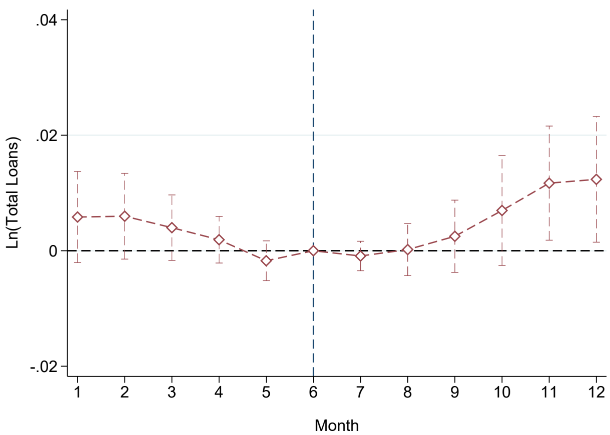
Figure A5: Event Study Graphs for the Average Effect of Lending Rate Caps on Interest Rates and Loans with Different Fixed Effects



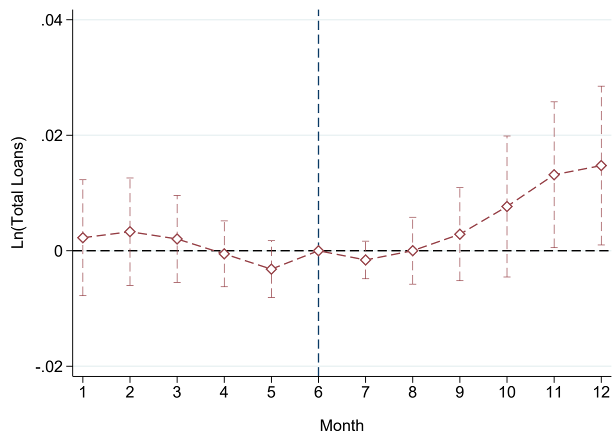
(a) Interest rates (City and Year FE)



(b) Interest rates (City and City size-Year FE)



(a) Total Loans (City and Year FE)



(b) Total Loans (City and City size-Year FE)

Notes. This figure reports the event study graph for the average effect of lending rate caps on interest rates and total loans. The policy was implemented in June 2021. Each dot is the coefficient on the interaction between being treated and month fixed effects. The confidence interval is at the 95% level.

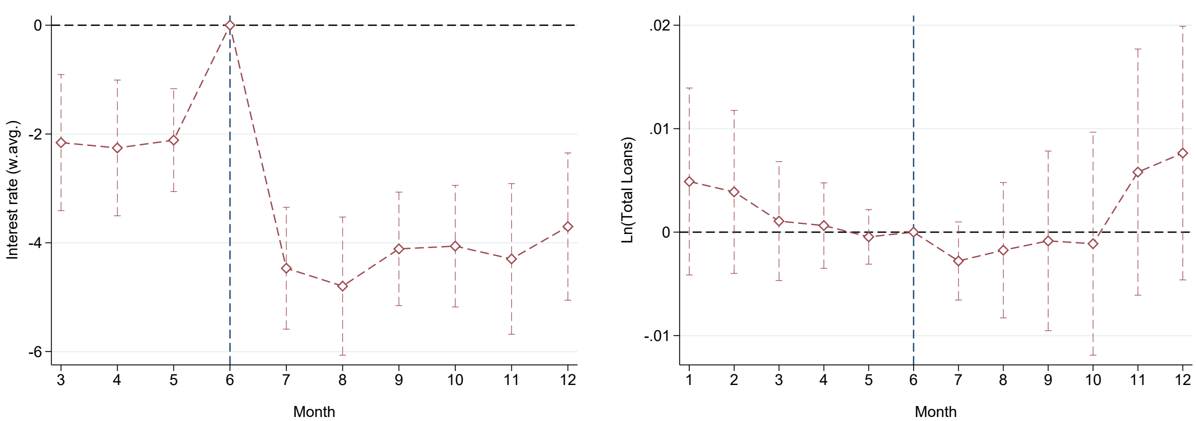
Province-level results

Table A3: Average Effect of Lending Rate Caps on Interest Rates and Loans

	Interest Rates	Total Loans
	(1)	(2)
Treated$_c$ × Post$_t$	-2.608***	-0.001
	(0.292)	(0.005)
Fixed Effects		
Province	✓	✓
Month	✓	✓
Province size-Month	✓	✓
Region-Month	✓	✓
Observations	1,530	1,836

Notes. Interest rates is a weighted average with weights equal to the share of firms' new loans relative to total new loans in the province. Total loans is the province-level balance of loans in logs. Treatment$_p$ is the standardized percent decline in interest payments necessary to bring all loans issued between March and June 2021 to the lending rate cap. Post$_t$ is an indicator variable equal to one after June 2021. We include a vector of fixed effects for each quartile of the distribution of total loans percapita and number of banks across provinces in 2019 interacted with month fixed effects. Standard errors are clustered at the province level. *, **, and *** denote 10, 5, and 1% statistical significance respectively.

Figure A6: Event Study Graphs for the Average Effect of Lending Rate Caps on Interest Rates and Loans



(a) Interest rates (b) Total Loans

Notes. This figure reports the event study graph for the average effect of lending rate caps on interest rates and total loans at the province level. The policy was implemented in June 2021. Each dot is the coefficient on the interaction between being treated and month fixed effects. The confidence interval is at the 95% level.

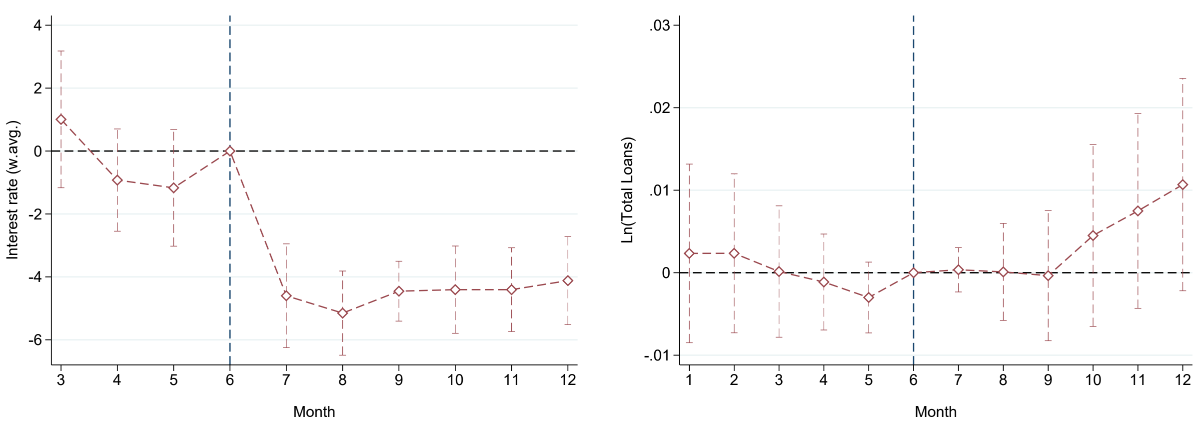
Weighted regressions

Table A4: Average Effect of Lending Rate Caps on Interest Rates and Loans

	Interest Rates	Total Loans
	(1)	(2)
Strongly Treated$_c$ × Post$_t$	-4.251***	0.004
	(0.404)	(0.006)
Fixed Effects		
City	✓	✓
Month	✓	✓
City size-Month	✓	✓
Region-Month	✓	✓
Observations	3,508	4,212

Notes. Interest rates is a weighted average with weights equal to the share of firms' new loans relative to total new loans in the city. Total loans is the city-level balance of loans in logs. Treatment$_c$ is the standardized percent decline in interest payments necessary to bring all loans issued between March and June 2021 to the lending rate cap. Post$_t$ is an indicator variable equal to one after June 2021. We include a vector of fixed effects for each quartile of the distribution of total loans percapita and number of banks across cities in 2019 interacted with month fixed effects. Standard errors are clustered at the city level. *, **, and *** denote 10, 5, and 1% statistical significance respectively.

Figure A7: Event Study Graphs for the Average Effect of Lending Rate Caps on Interest Rates and Loans



(a) Interest rates (b) Total Loans

Notes. This figure reports the event study graph for the average effect of lending rate caps on interest rates and total loans at the city level. The policy was implemented in June 2021. Each dot is the coefficient on the interaction between being treated and month fixed effects. The confidence interval is at the 95% level.

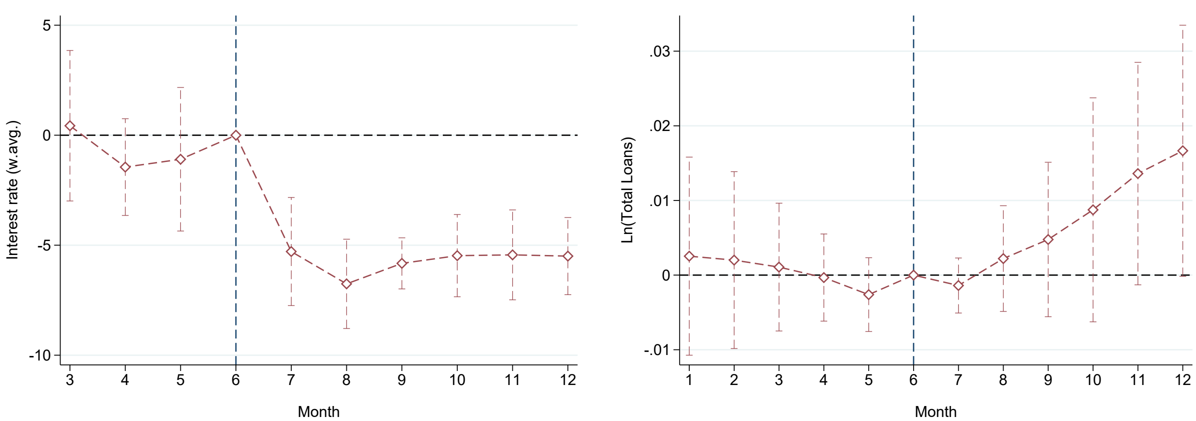
Excluding Lima

Table A5: Average Effect of Lending Rate Caps on Interest Rates and Loans

	Interest Rates	Total Loans
	(1)	(2)
Strongly Treated$_c$ × Post$_t$	-5.185***	0.007
	(0.546)	(0.008)
Fixed Effects		
City	✓	✓
Month	✓	✓
City size-Month	✓	✓
Region-Month	✓	✓
Observations	2,998	3,600

Notes. Interest rates is a weighted average with weights equal to the share of firms' new loans relative to total new loans in the city. Total loans is the city-level balance of loans in logs. Treatment$_c$ is the standardized percent decline in interest payments necessary to bring all loans issued between March and June 2021 to the lending rate cap. Post$_t$ is an indicator variable equal to one after June 2021. We include a vector of fixed effects for each quartile of the distribution of total loans percapita and number of banks across cities in 2019 interacted with month fixed effects. Standard errors are clustered at the city level. *, **, and *** denote 10, 5, and 1% statistical significance respectively.

Figure A8: Event Study Graphs for the Average Effect of Lending Rate Caps on Interest Rates and Loans



(a) Interest rates (b) Total Loans

Notes. This figure reports the event study graph for the average effect of lending rate caps on interest rates and total loans at the city level. The policy was implemented in June 2021. Each dot is the coefficient on the interaction between being treated and month fixed effects. The confidence interval is at the 95% level.

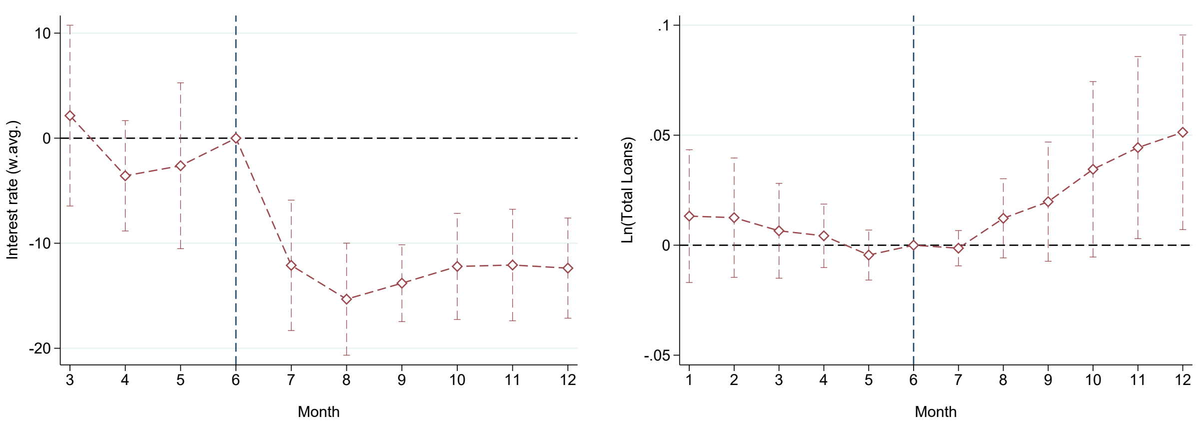
Discrete treatment

Table A6: Average Effect of LRC on Interest Rates and Loans

	Interest Rates (1)	Total Loans (2)
Strongly Treated$_c$ × Post$_t$	-11.967***	0.021
	(1.728)	(0.018)
Fixed Effects		
City	✓	✓
Month	✓	✓
City size-Month	✓	✓
Region-Month	✓	✓
Observations	2,878	3,456

Notes. Interest rates is a weighted average with weights equal to the share of firms' new loans relative to total new loans in the city. Total loans is the city-level balance of loans in logs. Strongly Treated$_c$ equals one for the top tercile (and zero for the bottom tercile) of treatment defined as the percent decline in interest payments necessary to bring all loans issued between March and June 2021 to the lending rate cap. Post$_t$ is an indicator variable equal to one after June 2021. We include a vector of fixed effects for each quartile of the distribution of total loans percapita and number of banks across cities in 2019 interacted with month fixed effects. Standard errors are clustered at the city level. *, **, and *** denote 10, 5, and 1% statistical significance respectively.

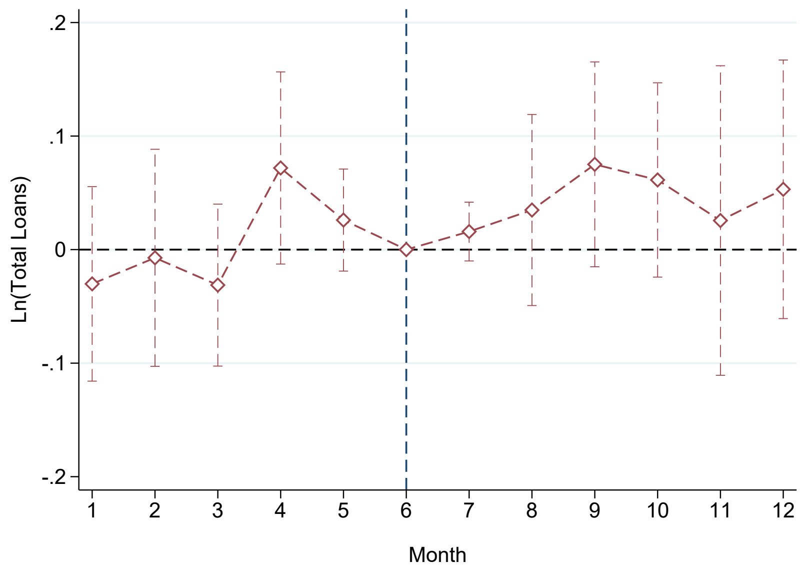
Figure A9: Event Study Graphs for the Average Effect of Lending Rate Caps on Interest Rates and Loans



(a) Interest rates (b) Total Loans

Notes. This figure reports the event study graph for the average effect of lending rate caps on interest rates and total loans at the city level. The policy was implemented in June 2021. Each dot is the coefficient on the interaction between being treated and month fixed effects. The confidence interval is at the 95% level.

Figure A10: Event Study Graphs for the Average Effect of Lending Rate Caps on Large Firms



Notes. This figure reports the event study graph for the average effect of lending rate caps on total loans to large firms. The policy was implemented in June 2021. Each dot is the coefficient on the interaction between being treated and month fixed effects. The confidence interval is at the 95% level.

Table A7: Average Effect of Lending Rate Caps - Non-Treated Banks

	Interest rate	Credit	NPL	Normal Loans	Share of NPL
	(1)	(2)	(3)	(4)	(5)
$\text{Treatment}_c \times \text{Post}_t$	0.448	0.018	0.039	0.005	0.007
	(0.346)	(0.012)	(0.026)	(0.016)	(0.005)
Fixed Effects					
City-industry	✓	✓	✓	✓	✓
Industry-Month	✓	✓	✓	✓	✓
City size-Month	✓	✓	✓	✓	✓
Observations	44,557	105,408	84,144	103,248	95,975

Table A8: Loans Growth Rate Decomposition - Concentrated Cities

	Total Loans	Existing Borrowers			New Borrowers
		All	Safe	Risky	
	(1)	(2)	(3)	(4)	(5)
Treatment$_c$	-0.004	-0.004	-0.003	-0.002	0.001
	(0.004)	(0.003)	(0.002)	(0.002)	(0.001)
Fixed effects					
City size	✓	✓	✓	✓	✓
Industry	✓	✓	✓	✓	✓
Observations	3,416	3,416	3,416	3,416	3,416

Notes. This table reports the effect of lending rate caps on each component of equation (6). Data are collapsed as an average "pre" (January-June 2021) and "post" (July-December 2021). Standard errors are clustered at the city level. *, **, and *** denote 10, 5, and 1% statistical significance respectively.

Table A9: Loans Growth Rate Decomposition - Safe Industries

	Total Loans	Existing Borrowers			New Borrowers
		All	Safe	Risky	
	(1)	(2)	(3)	(4)	(5)
Treatment$_c$	-0.003	-0.015*	-0.009	-0.006**	0.012
	(0.016)	(0.008)	(0.007)	(0.003)	(0.012)
Fixed effects					
City size	✓	✓	✓	✓	✓
Industry	✓	✓	✓	✓	✓
Observations	3,976	3,976	3,976	3,976	3,976

Notes. This table reports the effect of lending rate caps on each component of equation (6) in cities that are below and above the median of the HHI distribution. Data are collapsed as an average "pre" (January-June 2021) and "post" (July-December 2021). Standard errors are clustered at the city level. *, **, and *** denote 10, 5, and 1% statistical significance respectively.